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Improving FASD Children's Self-Regulation: Piloting Phase 1 of the GoFAR Intervention

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Abstract

The initial parent training component of GoFAR, an intervention designed to improve the self-regulation and adaptive living skills of children with Fetal Alcohol Spectrum Disorders, was piloted in a small, randomized clinical trial of 28 participants assigned to either a time-lapsed control group or one of two parent training groups who differed on whether the child's computerized instruction was congruent or incongruent with the parent instruction. Parental compliance and achievement of therapy goals were indicators of improvement in the child's self-regulation skills. Children who received computerized instruction consistent with the parent training demonstrated greater self-regulation improvements than those receiving incongruent computerized instruction.

Keywords

Fetal alcohol spectrum disorder; intervention; parent training; self-regulation

Fetal Alcohol Spectrum Disorders (FASDs) are disabling conditions associated with prenatal alcohol exposure (PAE) that have significant impact on affected individuals' cognition, academic functioning, adaptive living skills and social outcomes (Riley, Infante, & Warren, 2011). Of the array of negative outcomes, in clinically referred samples, adaptive skill deficits demonstrate a unique developmental trajectory in that these skills deteriorate relative to unexposed peers over the course of the lifespan (Crocker, Vaurio, Riley, & Mattson, 2009; Whaley, O'Connor, & Gunderson, 2001). Adaptive life skills involve behaviors that allow one to function independently and require a greater reliance on planning and organizational skills as environmental demands increase and the required adaptive behaviors become more complex over time. Global deficits in learning capacity (Riley et al., 2011) and impoverished early environments (Olson, Oti, Gelo, & Beck, 2009a) often interfere with learning age appropriate adaptive living skills but these factors do not adequately explain the relative

decline in adaptive skills seen over the lifetime of a child with an FASD. Rather problems in this area may result from deficits in self-regulation associated with PAE as well as alterations in brain-based executive functioning skills (EF), which involve higher order planning and organization of behavioral responses and have been found frequently in individuals with an FASD (Connor, Sampson, Bookstein, Barr, & Streissguth, 2000; Green et al., 2009; Kodituwakku, Kalberg, & May, 2001; Vaurio, Riley, & Mattson, 2008).

Many studies have demonstrated that prenatal alcohol exposure impacts brain regions that support self-regulation and efficient EF (Fryer et al., 2007; Gautam, Nunez, Narr, Kan, & Sowell, 2014; Nunez et al., 2011; Roussotte et al., 2012). Although, deficits in these skills are common and performance on EF tasks has been able to differentiate children with a history of prenatal alcohol exposure from controls and children diagnosed with other disorders (i.e. ADHD) (Nguyen et al., 2014), recent intervention research suggests that self-regulation and EF skills in children with FASDs can be improved through direct instruction (Wells, Chasnoff, Schmidt, Telford, & Schwartz, 2012).

EF skills are referred to as “metacognitive” since they, in a sense, oversee the organization and application of other cognitive skills. Using a metacognitive learning strategy, children with FASDs were found to improve their behavior and math learning skills (Kable, Coles, & Taddeo, 2007) and the results were maintained 6-months after completion of the intervention (Coles, Kable, & Taddeo, 2009). The strategy is referred to as FAR, which is an acronym standing for (1) Focus and plan, (2) Act, and (3) Reflect. On the “meta” level, this strategy teaches the child to regulate affect and provides repeated trials to strengthen cognitive inhibition. Using this technique, children learn to control their attention and approach problems thoughtfully by developing a plan rather than responding in a hurried and impulsive manner. Children then perform the plan and reflect back on what worked or did not work while problem-solving. This is a process that most typical children learn either by themselves or through interaction with their parents, but it is usually lacking in children with an FASD.

The GoFAR program was developed to improve the self-regulation skills in children with FASDs in the context of teaching them adaptive life skills. In GoFAR, the same FAR metacognitive learning technique used in our previous math intervention (Coles et al., 2009; Kable et al., 2007) was applied to improving self-regulation and adaptive living skills of children with an FASD. Typically, adaptive skills are taught to children by their parents but caregivers of children with an FASD face repeated frustrations in teaching their children these life skills and often report high levels of parenting stress (Olson et al., 2009a; Paley, O'Connor M, Frankel, & Marquardt, 2006) associated with the frequent temper tantrums expressed by their children when learning new skills. The neurodevelopmental problems seen in these children provide challenges for parents that are difficult to overcome without specific training in implementing positive behavioral supports that facilitate learning independent living skills. Unfortunately, although there are some parent training programs for families with FASD that focus on other aspects of the neurobehavioral sequelae associated with an FASD (e.g., reducing negative behaviors; developing social skills) (Bertrand, 2009; Kable, Coles, Strickland, & Taddeo, 2012; Kable et al., 2007; Paley et al.,

2006), there are none that provide guidance or support to families of children with FASD in building adaptive life skills.

The GoFAR program was developed with three components: 1) a computer game for the child that teaches the FAR metacognitive control strategy; 2) therapy sessions for the parent to teach them to facilitate their child's behavioral regulation skills; and 3) behavioral analog therapy sessions where the parent and child implement the metacognitive learning strategy in the context of learning adaptive living skills. Components 1 and 2 are presented simultaneously over the first 5 weekly sessions (Phase 1) followed by Phase 2 that implements Component 3 implemented over an additional 5 weekly sessions. Phase 1, the initial training component of the GoFAR program, was designed to help reduce the child's disruptive behaviors that often interfere with learning, including temper tantrums, low frustration tolerance, aggression, impulsivity, destructive behavior, and poor sustained mental effort, making the child more available to learn adaptive skills presented in Phase 2 of the intervention.

Previously, we implemented caregiver training programs delivered via workshops (Coles et al., 2009; Kable et al., 2007) and on-line training programs (Kable et al., 2012). The training programs were well received and improved caregiver knowledge and the child's behavioral functioning as rated by parents (Coles et al., 2009; Kable et al., 2012; Kable et al., 2007) and teachers (Coles et al., 2009; Kable et al., 2007). Collectively, these studies have led us to believe that a critical component of positive adaptation for children with FASD is informing caregivers of the nature of their children's neurodevelopmental deficits, helping them understand the impact of these deficits on their child's everyday lives, and arming them with effective positive behavioral support strategies. Similar success has been found in other caregiver training programs for children with FASDs (Bertrand, 2009; Olson, Oti, Gelo, & Beck, 2009b), which is not surprising as children with other developmental disabilities have been found to benefit from parent training programs (Matson, Mahan, & LoVullo, 2009; C. Wade, Llewellyn, & Matthews, 2008; S. L. Wade, Walz, Carey, & Williams, 2009).

To obtain initial estimates of the efficacy of the intervention to assist with planning a larger scale clinical trial a small pilot was carried. As part of this process, the role of each component of the GoFAR intervention in producing positive behavioral change was also explored. In this study, we examined the impact of the Phase 1 therapy sessions with the aims of assessing parents' receptivity to training, the impact of parental engagement in the learning process on the child's self-regulation skills, and the importance of the congruency between the parent training and the child computer instructional training. To achieve the latter, the outcomes of two intervention groups were contrasted to a time-lapsed control group. The intervention groups both received the same parent training experiences but differed in computer game play experiences of the child with one group receiving computer software that taught the child the FAR metacognitive learning strategy (GoFAR®) and the other a child computer game that taught children about identifying emotions (Faceland®). Parents' perception of their children's disruptive behaviors both before treatment and after Phase 1 (parent training and the child's computer sessions) was used as the outcome. This was done before Phase 2 implementation of the behavioral analog therapy sessions (BATS) where adaptive skills were taught specifically.

Parental engagement with the parent training experience, as indicated by their compliance with homework and attainment of therapy goals, was predicted to improve treatment outcome. In addition, children who received congruent information from the computerized instruction were hypothesized to demonstrate better outcomes than those who received incongruent information from the computer training sessions. Better outcomes with congruent instruction were hypothesized based on the assumption that the computerized FAR instruction would facilitate communication between the parent and child about learning the appropriate self-regulation skills.

Method

Participants and Recruitment

Children (n=30), ages 5 to 10, with an FASD were recruited and randomly assigned to one of three groups: 1) GoFAR; 2) Faceland; or 3) Control. Parents in both the GoFAR and the Faceland groups received the same 5 parent training therapy sessions while the intervention provided to the child differed. For the child, those enrolled in the incongruent or Faceland group received instruction via a computer program (Faceland ®) that focused on recognition of facial expressions associated with emotions. Those enrolled in the congruent or GoFAR group received instruction via a computer program (GoFAR®) that was developed specifically for the intervention and designed to teach the child to use the FAR learning strategy within the context of a game involving a space alien's travels. Participants assigned to the Control group served as time-elapsed controls as participants were scheduled for a post-test evaluation as close in time as was possible, preferably in the same week, as a child from one of the treatment groups whose pretest was carried out within a two week interval of their pretest to control for the interval between assessments.

All participants were required to have a clinical diagnosis of FAS or partial FAS using the Institute of Medicine criteria (Stratton, Howe, & Battaglia, 1996) or significant levels of alcohol-related physical features. Participants were recruited from an archival clinical database and active case logs from a multidisciplinary FASD diagnostic clinic in the Atlanta metropolitan area. Children who qualified for the study were identified by clinicians from medical records under a Health Insurance Portability and Accountability Act (HIPAA) partial waiver. Letters and pamphlets regarding the program were sent to the homes of the children or presented at the conclusion of a clinic visit by study personnel. To enroll into the study, participants' families were required to attend a group workshop on the impact of prenatal alcohol exposure on neurodevelopmental functioning. Parents or guardians then completed the consent procedure and signed an informed consent document approved by the Human Subjects Committee of Emory University School of Medicine.

A pediatric geneticist with specialized training in assessing alcohol-related dysmorphic features completed a standardized pediatric dysmorphia checklist (Coles, Fernhoff, Lynch, Falek, & Dellis, 1997) as part of the diagnostic process used in the FASD Clinic. The checklist has repeatedly been found to have higher total scores in individuals prenatally exposed to alcohol in comparison to non-exposed controls in longitudinal prospective research studies (Coles et al., 1991; Coles, Platzman, et al., 1997). The checklist weights dysmorphic features based on their saliency for the diagnosis (e.g., hypoplastic philtrum is a

“3”) and are summed, with scores greater than 10 indicating significant levels of alcohol-related dysmorphia.

Intervention Procedures and Assessments

Parent training therapy sessions—Parent training therapy sessions were conducted by clinical psychology graduate students and post-doctoral fellows under the supervision of the first author. Each child’s family was seen separately with one or two parents in attendance for 5, 1-hour long sessions, which was the minimum time needed to cover the session content based on our previous work (Coles et al., 2009; Kable et al., 2012; Kable et al., 2007). As many parents travel several hours to our facility due the limited availability of resources for these families, it was important to limit the number of sessions. The session content was adapted from our previous parent training programs that were delivered in either a workshop format (Kable et al., 2007) or via on-line training (Kable et al., 2012) to include the FAR metacognitive learning strategy and its use in teaching basic life skills. Sessions consisted of the parent and therapist reviewing the parent training manual together and then discussing how the information applied to the target child and their family. Sessions were videotaped and reviewed to insure appropriate content was discussed in the sessions and strategies or modifications regarding presentation of the information to the family were discussed in supervision. Table 1 contains the Table of Contents from the parent training manual, outlining the content for each of the 5 sessions.

Although often more than one parent attended the training sessions, one of the pair was selected to provide the responses on the questionnaires used in the study and was required to attend all of the sessions. Parents were asked to achieve 27 therapeutic learning goals (see Table 2) and given a total of 9 homework assignments (see Table 3) over the course of the 5 sessions. Therapists logged whether or not homework was completed, recorded the duration of each session, counted therapy goals that were presented for each session, and rated the parents understanding of the concepts presented. The latter were determined using a subjective Likert format rating scale based on the therapist’s perception of the parent’s understanding of the concepts presented in the session.

Parental engagement in the therapy learning process was indexed by three outcomes. Completion of homework for each session was used as an index of parental compliance with the training process. Counts of therapy goals presented in the sessions were also used as an index of engagement in the training process as deviations from the goals typically reflected intrusions in the sessions presented by the family and ratings of goal achievement reflected the extent to which the parent was an active, engaged learning in the therapy process.

Child computer instruction sessions—Children assigned to one of the two intervention groups attended 5, 1-hour long individualized computer instructional sessions while their parents were being trained. Computer instructional sessions were administered by clinical psychology graduate students or trained undergraduate students who were supervised by the primary author. The staff member reviewed both the current session content with the child at the end of each session and the previous week’s content at the beginning of the session in all but the first session. The content of the GoFAR® game was

consistent throughout each session and limited to using the FAR metacognitive learning strategy but the Faceland® varied from session to session depending on which emotions the child chose to explore in their gameplay.

GoFAR® game—The GoFAR® game included an initial training session during which the child learned the GoFAR metacognitive strategy in the context of helping a space alien feed his cat. In this introduction, Miles, the space alien, illustrates each letter of the FAR acronym and discusses what behavior is associated with each component (Focus and plan, Act, and Reflect). This teaching phase is followed by a three item multiple choice question for each of the FAR components. The alien verbally praises the child for making the correct choices or encourages them to select again for incorrect choices. Children are then guided through making a plan to feed the cat, the space alien carries out the plan and children interactively reflect back on the steps needed to complete the plan. After this initial training, the children are allowed access to the game environment where the child helps the alien find his lost spaceship and pet. For each trial, the children are presented with a game field that includes the space alien, various obstacles, a key, and a door. Children are asked to create a plan by ordering the obstacles to be overcome to get the key to the door. Once the plan has been put in place, children can move Miles throughout the game space to carry it out. Once the door is opened, the software provides verbal praise (i.e., You did it!) and then asks children to reflect back on the plan before the next level can be started. After the child successfully negotiates the game field, the software provides verbal praise and displays fireworks. The child then sees the space alien flying in his spaceship to the next screen. The game can be varied by changing the game level (number of obstacles to complete the plan) and the game environment (i.e. space, underwater). The child was allowed to explore the game content with minimal interference from the staff but help was sometimes needed if the software stopped functioning properly or the child could not find the mouse on the screen to properly interact with the software. The goal of each trial was to provide an opportunity for the child to learn to implement the FAR metacognitive learning strategy and was not to advance to higher levels of game play. Higher levels of game play and varying environments were incorporated into the game play to maintain the child's interest in the learning experience.

Faceland® game—The Faceland® game was developed to provide instruction regarding emotions and their associated facial expressions to children with autism spectrum disorder (Strickland, McAllister, Coles, & Osborne, 2007). The game provides a fun, engaging learning environment where the child travels to various stops in an amusement park and learns about a unique emotion at each stop. The games are interactive and provide children with “clues” that they can use to detect emotions and then quizzes them in a game-like atmosphere to assess their mastery of the knowledge. Children are able to move throughout the amusement park and explore the various emotions. The software also provides verbal praise for successfully completing a learning module. The Faceland® game was selected as a contrast to the GoFAR game as it is engaging software that is able to maintain the interest of children while teaching important learning concepts but does not provide any direct instruction in self-regulation skills. Thus, it provides a similar experience to GoFAR without the specific content that was the focus of the intervention.

Outcomes—Although several measures, including parent questionnaires and child neuropsychological outcomes, were used to evaluate the overall GoFAR program, only one measure, The Disruptive Behavior Record Form, was administered initially before participants were randomized to treatment groups and again after completing Phase 1 of the intervention that included the parent training therapy sessions and child computer instruction. The Disruptive Behavior Record Form was developed specifically for this study to provide a direct assessment of the child's disruptive behaviors that interfere with learning to evaluate the effectiveness of the initial parent training experience and the relative importance of the type of computer instruction provided to the child. The questionnaire asked parents to report the number of temper tantrums or meltdowns, as defined by the parent, for each day of the week of the assessment. The average number of meltdowns/temper tantrums was computed for a given week and used in subsequent analyses. The parents were then asked to rate the child's tolerance of frustration, aggressive behavior, impulsivity, destructive behavior, and ability to sustain mental effort at the conclusion of the assessment week. Ratings were based on the following scale: 0=never; 1 = sometimes (1–3 times/wk); 2 = fairly often (4–6 times/wk); 3 = often (daily); and 4 = always (several times daily).

Operational definitions were provided to the families for the disruptive behaviors that they were asked to rate. A low tolerance of frustration was defined as giving up easily when trying something new and getting angry when things don't work out right away. Acting aggressively towards others was defined as hitting or kicking others and shouting at others or calling them names. Responding impulsively when attempting something was defined as not listening to instructions before trying something and doing things without thinking about them first. Behaving destructively was defined as breaking objects that belongs to others and breaking his or her own toys. Difficulties with maintaining sustained mental effort or attention was defined as having a hard time focusing on something for any length of time and complaining about how long he or she has to do something.

Statistical Analysis Plan

Descriptive information was computed on the characteristics of the children and their families, on characteristics of the parent therapy sessions by group status, and parent ratings of satisfaction. Group differences were evaluated using t-tests for continuous measures and chi-squares for categorical information. Group differences in each of the disruptive behavior outcomes were computed for outcomes at pretreatment and after completion of the parent training therapy sessions and child computer instruction. Change scores were computed for each behavioral outcome and then correlated with indices of parental engagement in the therapeutic context. Finally, a multivariate analysis of variance was conducted by entering change scores for each of the disruptive behavior outcomes and comparing group differences on the latent trait of change in disruptive or negative behaviors.

Results

Attrition

Thirty participants were recruited for the study with 10 being assigned to each of the three groups. Two participants dropped out of the study shortly after enrollment with one being in the GoFAR group and one in the CONTROL condition. One participant from the Faceland group was enrolled and treatment was initiated (2 parent training/child computer training sessions) but the parent requested to withdraw for a period of time as a result of a family crisis. Treatment was re-initiated eight months later and pretesting and the initial two sessions were repeated. All remaining parents and their children completed the 5 training sessions.

Group Characteristics

Table 4 provides sample characteristics by group status. Comparisons of demographic and family characteristics, birth weight, and intellectual skills of the participants, yielded no significant group differences but the small number of participants in this pilot study limited the power to detect significant group differences. There was trend for differences in child protection team involvement (GoFAR>Faceland, Control, $p = .08$) and number of lifetime placements (GoFAR >Faceland, Control, $p = .09$).

Parent Training Therapy Sessions: Descriptive Information

The average time for parent training therapy session was 55.6 minutes. Therapists reported covering an average of 26.3 of 27 therapy goals with a range from 24 to 27 and indicated that parents completed, on average, 5.7 of 9 homework assignments with a range from 3 to 9. Table 5 contains the mean levels by group status. There were no significant group differences in the characteristics of the sessions between treatment groups.

Parent Satisfaction

The means and standard deviations of parent ratings of their satisfaction with the parent training therapy component of the program by group status are displayed in Table 6. There were no significant group differences on the satisfaction ratings.

Behavioral Outcomes: Child Disruptive Behaviors

The number of days between pretest and the second assessment did not differ by group [GoFAR: 66.7 (19.1); Faceland: 68.6 (34.0); Control: 52.2 (21.8)] and was not related to changes in disruptive behaviors. Table 7 contains the mean and standard deviations for each of the disruptive behaviors assessed by the three groups. Improvements in the child's ability to regulate attention was related to the therapist's ratings of achievement of therapy goals across the sessions, $r = -.70$, $p < .001$, and trended towards a relationship with parental completion of homework during the sessions, $r = -.44$, $p = .059$. A trend was also found between therapist ratings of the parent's achievement of therapy goals and reductions in children's destructive behavior, $r = .39$, $p = .10$.

When comparing all the participants using a multivariate analysis of variance (MANOVA), the multivariate group effect, $F(12,42) = 1.58$, $p = .134$, $\eta^2 = .311$, on change in disruptive

behaviors was not significant but a trend for a specific univariate effect on change in sustained mental effort, $F(2,25) = 2.77$, $p = 0.08$, $\eta^2 = .181$, was found. Planned contrasts between groups indicated that those in the GoFAR group had a significant reduction in frustration level relative to individuals in both other groups, $p = .05$, and a trend was found for those in the GoFAR group making more improvement in sustained mental effort, $p = .09$. Contrasts between those in the Faceland and Control groups were not significant. When using only the groups receiving parent training, the MANOVA on disruptive behavioral outcomes resulted in a significant univariate treatment group effect on change in sustained mental effort, $F(1, 17) = 5.85$, $p = .027$, $\eta^2 = .26$, with those in the GoFAR group demonstrating greater reductions in problems in this area than those in the Faceland group but not a significant multivariate group effect.

Discussion

Targeted interventions for children with an FASD have been found to be most effective with this group (Bertrand, 2009) but are in short supply, despite parental concerns and requests for such interventions (Ryan, Bonnett, & Gass, 2006). The GoFAR program, which was recently developed and piloted to establish its impact on child functioning, employ straining experiences for both the parent and child to improve the child's ability to self-regulate and effectively learn basic life skills. The program is composed of two phases with the first phase devoted to separately training the parents and the child and the second phase to bringing them together to practice their newly learned skills in the context of learning adaptive life skills. This analysis focused on the outcomes associated with the initial phase of this intervention program to evaluate the impact of the parent training and the child computer instruction in changing disruptive behaviors that interfere with learning and to obtain estimates of effect sizes associated with the intervention to help with designing future clinical trials.

Parents who received parent instruction reported a high degree of satisfaction with their training experiences. The analysis of the parent training component of the intervention indicated that the therapists' ratings of achievement of therapy goals was positively related to the parents' ratings of improvement in children's self-regulation skills after completing the parent training and the child computer instructional training components of the intervention, suggesting that parent engagement in the therapeutic process is important in achieving positive gains for the child. The child's computerized instructional experience also seemed to contribute to positive change in self-regulation skills, in that those children who received computerized instruction in FAR improved in their ability to sustain mental effort or attention more than those who received computerized instruction in recognizing emotional expressions.

Therapy process measures of the parent training sessions, including session time, goal achievement, and homework completion did not significantly differ between those who received the Faceland® or GoFAR® computer games but the means indicated those in the GoFAR group spent a few more minutes in sessions on average and completed an additional homework assignment relative to those in the Faceland group. These differences may reflect a differential level of engagement by the parents of the GoFAR group relative to the

Faceland group. Parents of the GoFAR group also reported slightly higher satisfaction with the intervention to help improve their child's attentional regulation skills but the differences were not statistically significant. Additional research with a larger sample size is needed to clarify if there are in fact differences in parental engagement and satisfaction associated with having the child receive computerized instruction that parallels parent training of the FAR methodology.

Parent engagement in the therapeutic process was a significant predictor of changes in children's sustained mental effort in that therapist ratings of parental achievement of therapy goals were positively related to reductions in problems with sustaining mental effort. There were some non-significant findings or trends in this small pilot sample that should be followed up in a larger group. For instance, the Faceland group completing an average of 56.7 % of assignments and those in the GoFAR group completing an average of 71.1%. The completion of assignments did not significantly predict changes in self-regulation behaviors but trends were found between number of assignments completed and improvements in sustained mental effort and destructive behavior. In future work with a larger sample, it may be important to establish thresholds for compliance on homework completion that predict treatment outcome. Information such as this would aid clinicians in knowing when to modify the curriculum or therapy goals to insure a minimally sufficient level of treatment engagement needed to support positive treatment outcome.

The limited sample size may have prevented true group differences from being detected as a result of power limitations. This study was intended to be an initial piloting of the intervention to determine potential effect size and the appropriate sample size needed for further exploration of the treatment effects. Only large effects sizes could be detected with the existing sample size and additional power is needed to adequately explore the relationships between the differential group effects and the indices of therapeutic compliance and changes in self-regulation skills.

The results of this study are also limited by factors related to the characteristics of the sample and the methods used to assess outcome. Caregiver competence may have impacted our estimates of therapy engagement and further exploration of the relationship between caregiver competency and treatment outcome may be needed to identify additional training supports needed for some participants to support caregiver learning. Relative to the children, despite randomization participants in the GoFAR group had the highest levels of disruptive behaviors in all areas but sustained mental effort and demonstrated the greatest amounts of change over the course of the intervention. Although the group differences were not statistically significant in their baseline levels, regression to the mean may have contributed to their differential gains in tolerance to frustration. Future research with a larger sample size would be helpful in reducing potential subject characteristic biases that may have impacted results.

In addition, the respondents in this study were predominantly female caregivers who were adoptive parents or legal guardians. The outcomes may differ if more males were used as responders or if participants were biological parents. Only one participant in the study was a biological parent, which is not sufficient to assess the receptivity of the program by this

population. Although these caregiver and child characteristics are common in intervention studies with children who have an FASD (Coles et al., 2009; Coles, Strickland, Padgett, & Bellmoff, 2007; Kable et al., 2012; Kable et al., 2007; Kerns, Macsween, Vander Wekken, & Gruppuso, 2010; Olson et al., 2009a; Paley et al., 2006; Wells et al., 2012), the results of this study may not generalize to other parent training programs developed for different populations of children and their families. Finally, parents were the sole reporters of the level of disruptive behaviors in the children and it is possible that their investment into the program may have influenced their observations or ratings of their child's behavior. The caregivers who enrolled in this study, as are many who volunteer for treatment research, were highly motivated and often willing to drive over an hour to receive services and this may have impacted their estimates of the effectiveness of the intervention. Future research should include blinded independent assessments of the child's behavioral functioning to reduce this bias.

The parent training component of the GoFAR program was found to positively impact the parental ratings of the child's sustained mental effort and this was particularly true for those whose children received parallel instruction in the FAR metacognitive problem-solving and learning strategy. The extent of parental engagement in these sessions as rated or recorded by the therapist predicted the child's gains in self-regulation skills, particularly improvements in the child's sustained mental effort or attentional regulation skills. Although this study had significant power limitations that may have obscured significant relationships, the findings suggests that this initial component of the GoFAR program laid the appropriate ground work for subsequent instruction in adaptive life skills by improving self-regulation skills that are needed to facilitate the learning process.

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Table 1

Outline of the Table of Contents from the Parent Training Manual

Session Number and Description
SESSION 1: BACKGROUND: FASD, FAR, AND REGULATION
What is FASD and what are the effects on cognition and development?
What is self-regulation?
What is FAR?
What is Focus and plan?
What is Act?
What is Reflect?
The parental role in learning self-regulation
Arousal and its impact on learning and behavior
Monitor your child's level of arousal
Identifying "triggers" of over-excitement
Identify techniques to calm or reduce arousal
Teaching a language of arousal and emotions
SESSION 2: MODIFYING YOUR CHILD'S LEVEL OF AROUSAL?
What are social learning principles?
The fundamental assumptions of social learning
Antecedents, behaviors, and consequences
Reinforcement and the praise rule
The ignore rule
Punishment
Additional learning principles
Avoiding accidental reinforcement
Summary
SESSION 3: HOW DO I MODIFY MY CHILD'S WORLD TO PREVENT PROBLEMATIC SITUATIONS?
Establishing a good working relationship with my child
Avoiding triggers
Preparing your child for problematic situations
Practicing difficult situations
Tools to compensate for neurodevelopmental problems
SESSION 4: USING FAR TO IMPROVE YOUR CHILD'S ADAPTIVE LIVING SKILLS
Compliance vs non-compliance
Helping your child with understanding what is wanted
Strategies for dealing with "Won'tDo's" (true noncompliance) and meltdowns
Time-out or taking time out
Overcoming problems for time out or taking time out
Using FAR to improve adaptive skills
SESSION 5: APPLYING FAR IN THE HOME ENVIRONMENT
What are the targeted problem behaviors?
How should these problem behaviors be prioritized?

Session Number and Description

Identify steps needed for success for these behaviors

Identify supports needed for your child to be successful

Identify potential barriers and problems

How is FAR teaching implemented with your child?

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Table 2**List of Therapy Goals by Session**

Session Goals	
Session 1 Goals	
1	Parent understands the overall program and discussion of FAR
2	Parent understands arousal and behavioral regulation
3	Parent understands how to monitor the child's arousal
4	Parent understands how to identify triggers
5	Parent understands techniques to calm their child
6	Parent understands how to teach their child language about emotions and arousal
7	Parent was given the Behavioral Analog Therapy Session Survey
Session 2 Goals	
1	Parent understands the fundamental assumptions of social learning
2	Parent understands reinforcers
3	Parent understands ignoring
4	Parent understands punishment
5	Parent understands additional learning principles
6	Parent understands accidental reinforcement
Session 3 Goals	
1	Parent understands how to establish a good working relationship with the child
2	Parent understands how to avoid triggers
3	Parent understands steps to prepare a child for problematic situations and can practice them
4	Parent understands ways to compensate for the neurodevelopmental problems that their child has
Session Four Goals	
1	Parent understands how to differentiate compliance from noncompliance
2	Parent understands techniques for giving directions that increase compliance
3	Parent understands the difference between time out and taking time out
4	Parent understands how to overcome problems with time out and taking time out
5	Parent understands how FAR can be used to improve compliance
Session 5 Goals	
1	Parent can identify targeted problem behaviors that the child has
2	Parent can prioritize the problem behaviors
3	Parent can identify steps needed to successfully change these behaviors
4	Parent can identify supports needed and potential barriers to teaching their child a new behavior
5	Parent understands when to ask for additional help and how this can be achieved

Table 3

List of Parent Training Homework Sheets

Label	Description
Behavioral Analog Therapy Session (BATS) Adaptive Skills Survey	List of adaptive skills from which parents select target behaviors for the BATS
Trigger Sheet	List of environmental events/stimuli that precede or elicit temper tantrums
Calming Sheet	List of experiences or stimuli that often result in the child calming or relaxing
Reinforcer Chart	List of potential reinforcers that may be selected to increase a desired behavior
Ignoring Chart	List of unwanted behaviors that the parent may ignore
Punisher Chart	List of potential punishers that may be selected to decrease an unwanted behavior
Log of Positive Play Time	A weekly log of positive play time with the child
Problem Identification Sheet	A list of unwanted behaviors that the parent is interested in targeting with assessments of priority, supports needed, and anticipated barriers
Task Analysis Sheet	The sub-steps needed to successfully complete a specific behavior listed on the problem identification sheet are identified

Table 4**Sample Characteristics by Group Status**

	Control (N=9)	Faceland (N=10)	GoFAR (N=9)
Caregiver's Age in Years	52.6 (11.2)	46.8 (10.0)	48.0 (5.1)
Caregiver Gender-% Female	90%	90%	90%
Caregiver Education Years	13.9 (1.8)	13.8 (5.1)	14.6 (1.8)
Combined Household Income (6=35,000–49,999)	5.5 (1.8)	6.0 (2.4)	7.4 (1.7)
Number of Adults in Household	1.7 (.71)	1.8 (.63)	2.2 (.44)
Number of Children in Household	2.2 (1.9)	1.5 (1.8)	1.8 (1.5)
Parent Reported Weekly Time with Child (Hours)	21.9 (8.2)	19.5 (5.1)	24.7 (9.8)
Child's Age (years)	6.8 (1.5)	6.8 (1.3)	7.4 (1.4)
% in Adopted Home or Legal Guardianship	100%	90%	100%
Child's Gender-% Male	77.8%	40.0%	77.8%
Child's Race % Caucasian/African American/Mixed Race	44.4%/44.4%/0.0%	50.0%/40.0%/10.0%	44.4%/11.1%/44.4%
Number of Child Placements	1.8 (1.2)	2.0 (1.1)	3.6 (2.7)
Child Protection Involvement	66.7%	40%	88.9%
Child's Birth Head Circumference (cm) ^a	32.1 (2.3)	30.4 (3.4)	33.3 (4.0)
Child's Birth Weight (grams) ^b	2444.5 (790.5)	2268.3 (638.8)	3065.6 (1192.1)
Child's Pedscore ^c	16.0 (7.4)	17.7 (3.5)	19.4 (3.2)
Child's DAS ^d : General Conceptual Ability	89.8 (9.7)	81.6 (19.5)	90.9 (10.7)

^aData available on 7 Controls, 10 Faceland, and 8GoFAR participants

^bData available on 8 Controls, 10 Faceland, and 8GoFAR participants

^cThe Pedscore is the sum of the 30 weighted items on a standard pediatric dysmorphia checklist (Coles, Fernhoff, et al., 1997) used to identify alcohol-related dysmorphic features. This Checklist is a modification of the usual "genetics" checklist where characteristics associated with the disorder are listed and weighted based on their saliency for the diagnosis (e.g., hypoplastic philtrum is a "3"). Scores greater than 10 are assumed to indicate alcohol-related dysmorphology.

^dDAS refers to the Differential Ability Scale 2nd edition (Elliot, 2007). Performance is measured using standard score that has a mean of 100 and a standard deviation of 15 points.

Table 5

Therapy Process Outcomes with the Parent Training Component of the GoFAR Program

Variable	Faceland (n=10)	GoFAR(n = 9)
Average Session Time (minutes)	54.4 (4.1)	56.9 (4.3)
Total Treatment Goals Achieved (27 possible)	26.4 (.97)	26.2 (1.30)
Average Rating of Goal Achievement ^a	3.3 (.53)	3.6 (.35)
Completed Homework Assignments (9 possible)	5.1 (2.0)	6.4 (2.1)

Note. Responses are based on a 5 point Likert scale with 1 = strongly disagree and 5 = strongly agree

Table 6

Satisfaction with Parent Training Component of the GoFAR Program

Item	Faceland(n=10)	GoFAR(n =9)
The parent training sessions were informative.	4.8 (.44)	4.8 (.44)
The parent training sessions were helpful.	4.6 (.70)	4.7 (.50)
The parent training sessions improved my understanding of FAS/pFAS as related to behavior	4.8 (.42)	4.7 (.50)
The parent training sessions improved my understanding of self-regulation and arousal	4.6 (.52)	4.8 (.44)
The parent training sessions improved my understanding of FAR and how it can help my child	4.8 (.42)	4.7 (.50)
The parent training sessions improved my ability to help my child regulate his/her behavior	4.0 (.94)	4.6 (.81)

Note. Responses are based on a 5 point Likert scale with 1 = strongly disagree and 5 = strongly agree

Table 7

Means and Standard Deviations of Disruptive Behaviors by Each Treatment Group

Disruptive Behavior Variables	GoFAR		Faceland		Control	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Average Temper Tantrums per Day	2.7 (3.5)	1.1 (1.3)	1.6 (1.3)	1.5 (1.5)	1.9 (1.4)	1.4 (1.1)
Frustration Level	3.2 (1.2)	2.3 (.87)	2.4 (1.2)	2.3 (1.7)	2.7 (.87)	2.8 (.83)
Aggression	1.8 (1.4)	1.7 (1.1)	1.1 (1.4)	1.4 (1.3)	1.7 (1.4)	1.1 (.78)
Impulsivity	3.2 (.97)	2.9 (.60)	2.8 (1.2)	2.4 (.97)	2.4 (1.1)	2.8 (.67)
Destructiveness	1.3 (1.2)	1.3 (.87)	0.90 (.88)	1.4 (1.3)	2.0 (1.1)	1.9 (1.3)
Poor Sustained Mental Effort	3.2 (.97)	2.4 (.88)	3.5 (.71)	3.7 (.68)	3.1 (1.2)	2.7 (1.1)

Note. Post-treatment refers to the assessment conducted after completing the initial phase of the GoFAR intervention, which includes parent training therapy sessions and the child computer instruction.