Effectiveness and Acceptability of Parent-Implemented Behavior Interventions for Children with Autism in Three African American Families

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Abstract: No studies of parent-implemented behavior interventions for children with autism spectrum disorders (ASD) have purposefully examined their effectiveness and acceptability with African American families. The present study used a multiple baseline across participants design to evaluate the effectiveness of parent-implemented differential reinforcement plus visual support to increase appropriate alternatives to problem behavior in three children with ASD from African American families. Parents also rated the social validity of the intervention and were qualitatively interviewed regarding their perceptions of its effectiveness and acceptability. Results indicated the intervention was effective for 2 of 3 dyads, though levels of treatment integrity ranged greatly across participants and over time. In general, all dyads rated the intervention as acceptable and effective. Implications of this study for effectiveness and acceptability of behavior interventions in groups less represented in autism research are discussed.

Children diagnosed with autism spectrum disorder (ASD) are at high risk of developing challenging behaviors such as aggression and self-injury in comparison to both typical children and children with other developmental disabilities (Baker et al., 2003; Chadwick, Kusel, & Cuddy, 2008). These behaviors are often severe and persistent (Emerson et al., 2001; Green, O’Reilly, Ichon, and Sigafoos, 2005) and associated with poor outcomes, such as exclusion from mainstream environments (Allen, Lowe, Moore, & Brophy, 2007; Yianni-Coudurier et al., 2008) and decreased adaptive skills (Richman & Lindauer, 2005) for children, and increased stress (Lecavalier, Leone, & Wiltz, 2006) and marital difficulty (Brobst, Clopton, & Hendrick, 2009) for parents.

Fortunately, decades of research in areas related to applied behavior analysis have led to an evidence base of effective interventions to improve adaptive behavior and decrease problematic behavior in children with ASD (Odom, Collet-Klingenberg, Rogers, & Hatton, 2010; Rogers & Vismara, 2008). In particular, parent involvement, training, and implementation of interventions has been identified as both a means to improve the effectiveness, generalizability, maintenance, and cost of interventions for children with ASD (Matson, Mahan, & Matson, 2009) and as an evidence-based practice itself (Odom et al., 2010). Specifically, teaching parents to implement interventions can increase intervention dosage by allowing parents to integrate intervention strategies into ongoing daily activities for months or years past the point of training, and during activities and in settings less accessible to another interventionist (Brookman-Frazee, Vismara, Drahota, Stahmer, & Openden, 2009).

Parent participants involved in studies of parent-implemented interventions are in the...
unique role of being both the recipients of intervention, as researchers must train parents to implement the intervention, as well as the deliverers of the intervention to their child. Because of this dual role, parents themselves are extremely important factors in the success of parent-implemented interventions (Brookman-Frazee et al., 2009). Further, specific parent characteristics have been associated with increased or decreased effectiveness of parent training. For example, Lundahl, Risser, and Lovejoy (2006) conducted a meta-analysis of parent training interventions for parents of children with behavior problems and found these interventions were least effective for economically disadvantaged parents. Unfortunately, the demographic characteristics of parent participants in studies of parent-implemented behavior interventions for children with ASD are not fully known, as few studies appear to report race or SES of parent or child participants (Conroy, Dunlap, Clarke, & Alter, 2005; McLaughlin, Denney, Snyder, & Welsh, 2012). Nevertheless, there is general agreement among many researchers that the evidence bases for both autism intervention and parent training have been developed primarily using participants from middle class Caucasian families (Coard, Wallace, Stevenson, & Brotman, 2004; Dyches, Wilder, Sudweeks, Obiakor, & Algozzine, 2004; Forehand & Kotchick, 1996; Horovitz, Matson, Rieske, Kozlowski, & Sipes, 2011), with very few studies purposefully testing the effectiveness of parent-implemented behavior interventions for children with ASD in families who are not Caucasian (Cheremshynski, Lucyshyn, & Olson, 2012) or who are of lower SES.

While it is not yet clear what impact culture, race, SES, or other demographic factors may have on the effectiveness and acceptability of parent-implemented behavior interventions for children with ASD, there are reasons to believe such factors are important. Race and culture bring a shared identity, history, and set of values that may shape which skills and competencies parents deem most important for children to learn to ensure their survival and success (Forehand & Kotchick, 1996). Race and culture have been shown to affect which behavior management practices a parent may choose to employ (LeGuyer, Christensen, Kearney, & Kitzman, 2011) and find acceptable (Njardvic & Kelley, 2008). Additionally, lower SES is often associated with a variety of hardships, such as poverty, unemployment, homelessness, single parenthood, community violence, and mental health issues (Bradley & Corwyn, 2002), many of which have been found to have negative influences on parenting practices (Klebanov, Brooks-Gunn, & Duncan, 1994) and possibly decrease the treatment integrity and maintenance of interventions (Schertz & Odom, 2007). Furthermore, it is likely that race and SES interact to impact the experience of parenting a child with ASD. For example, Carr and Lord (2012) found perceived negative impact of having a child with ASD was reduced in African American mothers with lower educational levels when compared to African American mothers with higher educational levels and Caucasian mothers of all educational levels. Finally, there is mixed evidence on whether behavior interventions yield different effects for Caucasian and non-Caucasian groups. Kolko, Cheng, Campo, and Kelleher (2011) compared two treatments for typical children with behavior problems and found that an on-site, nurse-administered intervention was more effective for Caucasian families, whereas enhanced usual care was more effective for non-Caucasian families. Alternatively, McCabe and Yeh (2009) found that Mexican American families of children with conduct problems benefitted similarly regardless of whether they received Parent-Child Interaction Therapy (PCIT) or a culturally adapted version of PCIT. Taken together, there is evidence that race and SES may influence parenting styles and approaches to behavior management; however it is not clear whether or how such differences may influence the effectiveness of parent-implemented interventions in children with ASD.

African American families in particular appear to have been infrequent participants in autism research (Hilton et al., 2010), and more specifically in studies of parent-implemented behavior interventions for children with ASD (e.g., Baker-Ericzen et al., 2007). Certainly little to no research in parent training has been purposefully directed towards African American families of children with ASD. For example, a search of the PsychINFO database for “parent training” and “autism”
revealed 315 results whereas a search for “parent training” “autism” and “African American” or “black” produced one result (Farber & Maharaj, 2005), and this study did not report including parents of children with ASD. There are a variety of reasons why African Americans may be less likely than other groups to participate in autism intervention research, such as the historic exploitation of African Americans in medical research (Skloot, 2010), the delay African Americans may experience in getting an autism diagnosis for their child (Mandell, Ittenbach, Levy, & Pinto-Martin, 2007), perceived power imbalances between researchers and research participants (Hilton et al., 2010), and traditional recruitment strategies being ineffective in connecting with potential African American participants (Spruill, 2010). The lack of African American participants in parent-implemented behavior interventions for children with ASD is concerning given that African American children and Caucasian children may be equally likely to develop ASD (Dyches et al., 2004) and preliminary evidence indicating that African American children with ASD may be more likely to develop challenging behavior (Horovitz et al., 2011). Because research-based, parent-implemented interventions are likely to reflect the values, preferences, and results of families who have been involved in developing this research base to date, parent-implemented behavior management strategies for children with ASD may be less useful, acceptable, or effective for African American families and may need to be adapted to better suit their values and needs.

The purpose of this study was to examine the effectiveness and acceptability of parent-implemented behavior interventions for children with ASD in African American families in order to study the effectiveness and acceptability of behavior interventions with families less represented in autism research. Research questions were (a) would a multiple baseline across participants design show behavior interventions to be effective across purposefully sampled African American families with children with ASD, (b) would parents maintain results and procedures over time, and (c) would parents perceive the intervention they received as acceptable and effective?

**Method**

**Participants**

Four families responded to recruitment efforts. Because one child did not meet the inclusion criterion of displaying difficult behavior at home, three parent-child dyads participated in the present study. Evan was a 7-year-old boy diagnosed with Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS). He communicated in complete sentences, followed 1- and 2-step directions, and attended a public 1st grade general education classroom for the full day. A masters-level behavior consultant regularly provided him and his mother with home-based behavior support through a state-funded program. His mother contacted the investigator due to Evan’s severe tantrums, mild aggression, and mild self-injurious behavior at home. Aggressive behaviors were often directed towards one of his four siblings. Evan’s mother, Viola, was 33 years old, married, possessed a master’s degree, and was a stay-at-home-mother at the time of the study. Evan’s father frequently traveled for work. Viola reported their household income to be above $80,000.

Prince was a 16-year-old boy diagnosed with autistic disorder. He communicated in brief sentences and phrases, followed 1- and 2-step directions, occasionally showed mild self-injury, and attended an all-day self-contained special education class at a public junior high school. His mother contacted the investigator due to concern about his prompt dependence and off-task behavior at home after school. Prince’s mother, Latisha, was a 37-year-old full-time student working towards a bachelor’s degree. She had another son who was 14 years old who also resided with her and Prince. She was divorced from Prince’s father and remarried; however her husband was incarcerated out of state. She had also been recently incarcerated and resided in a supportive housing program for homeless women. Latisha did not return a form requesting demographic information so her income level is unknown, but she did verbally report having little money past what was needed to cover necessities. She did not possess a vehicle and relied on public transportation.

Clarice was a 17-year-old female, diagnosed
with autistic disorder, who communicated in
one to three word phrases, followed 1-step
directions, and attended a self-contained spe-
cial education school for children with signif-
icant disabilities. She had a long history of
severe aggressive, self-injurious, and destruc-
tive behaviors; however none had been ob-
served for the previous 6 months at the start of
the study, reportedly due to adding Risperdal
to her medications. One year prior to the
beginning of the study, Clarice had been
placed in a group residence for women with
developmental disabilities. Although Clarice
no longer resided with her mother, she went
to visit her mother, accompanied by a group
residence staff member, every Friday for din-
ner and leisure time. Her mother, Talia, was
concerned about Clarice’s rapid eating during
these dinners and residence staff indicated
she was considered a choke risk due to the
rate at which she ate as well as the size of the
bites of food she put into her mouth. Talia,
Clarice’s mother, was in her late 40s, unem-
ployed, and did not reside with Clarice’s fa-
ther, who lived in a nearby town. Talia did not
return a form requesting demographic infor-
mation. She resided in public housing and
often described having little money past what
was needed to cover necessities. Talia did not
have a car and relied on public transportation,
which was sparse in her area.

Setting and Materials

The study was completed in each participant
dyad’s home and took place during a natural-
ly-occurring routine associated with difficult
child behavior. Sessions were conducted ap-
proximately once per week. For Evan, the tar-
get routine was playing video games with his
parents and siblings, which took place in the
living room each day and lasted 1 hour. For
Prince, the target routine was his daily after
school routine, during which his mother ex-
pected him to change his clothes, put his
school clothes away, do his homework, and get
a snack. Prince’s after school routine took
place in his bedroom and the kitchen and
lasted approximately 20 min each day. For
Clarice, the target routine was eating dinner
at her mother’s house on Friday evenings.
Dinner took place in the kitchen and lasted
approximately 1 hour; however the first
course of dinner (salad or another vegetable
dish) was the focus of baseline and interven-
tion sessions and lasted approximately 10 min.
The investigator brought a video camera
and tripod to each session to record the dyad
in their target routine for later coding. Addi-
tional materials were developed for each dy-
ad’s intervention phase; these materials are
described in the section on intervention pro-
cedures.

Additionally, parents completed one rating
scale during the study. The Social Validity and
Maintenance Rating Scale (see Table 1) was a
researcher-designed questionnaire used to as-
sess parent perceptions of the effectiveness
and acceptability of the intervention they
received.

Dependent Variables

Dependent variables were individualized to
each dyad and focused on adaptive alterna-
tives to problem behaviors to target for in-
crease in each child. Evan’s dependent vari-
able was “safe behavior” as indicated by
keeping his hands, mouth, and feet to himself,
absence of mild self-injury, such as dropping
to the floor and banging body parts on the
floor, and absence of crying and screaming.
Prince’s dependent variable was independent
completion of the steps of his after school
routine. A step was considered completed in-
dependently if Prince successfully completed
the required behavior without verbal, ges-
tural, or physical prompting from his mother.
Clarice’s dependent variable was interre-
sponse time (IRT) between bites of food. A
bite was defined as Clarice putting food into
her mouth. She typically used a fork or spoon
but occasionally used her fingers to take bites.
Any means by which she placed food in her
mouth was considered a bite. Additionally, the
time between taking a bite of food and a sip of
a drink was also included in her IRT measure
as Clarice’s mother wanted her to chew and
swallow food before taking a drink. A sip of
drink was defined as Clarice putting drink
into her mouth.

Data Collection and Interobserver Agreement

Data were collected by digitally videotaping
each session for later coding. Evan’s depen-
dent variable of safe behavior was measured using 10-s whole interval recording, such that the 1-hour observation period was broken into 360 10-s intervals. If Evan displayed safe behavior throughout the entirety of a 10-s interval, that interval was counted as safe. Intervals with safe behavior were divided by total number of intervals for each session, which produced a percentage of intervals with safe behavior per session.

Prince’s dependent variable of independent completion of steps of his after-school routine was measured per session by coding each of his 11 after-school routine steps as prompted or independent and as complete or incomplete. The number of steps completed independently was divided by total number of steps in the routine to produce the percentage of steps completed independently during each session. If a step was not included in the after school routine that day (e.g., no homework was given), that step was removed from the calculation for that session.

Clarice’s dependent variable of IRT between bites was measured by continuous event recording of each bite per session using ProCoder for Digital Video (Tapp, 2003). Number of seconds between each bite was then calculated and averaged to produce the average IRT between bites per session.

A second observer independently coded data for 38% of Evan’s sessions, 32% of Prince’s sessions, and 33% of Clarice’s sessions for a total of 34% of all sessions. Each interobserver agreement (IOA) session was randomly selected from every three chronologically occurring data collection sessions in each condition. IOA was calculated for each dependent variable using exact agreement, such that first and second observers’ coding streams were aligned to assess point-by-point agreements and disagreements. For Clarice, IOA was calculated using exact agreement for the onset and offset of each IRT using a 2 s coding window. Number of agreements was then divided by total number of agreements plus disagreements to produce a percentage of IOA for each observation. IOA was 93% across participants and behaviors.

**Experimental Design**

The effectiveness of parent-implemented behavior interventions was evaluated using a multiple baseline across participants design. Baseline data were collected on dependent variables in the naturally-occurring difficult routine reported by parents. Intervention data were collected in the same routine while parents were taught to use the intervention, and maintenance data were collected in the same routine after parents had demonstrated adequate implementation of the intervention and investigator coaching had been withdrawn. Visits for data collection occurred weekly during all conditions although some visits were cancelled by parents due to self or child illness or other family issues. Cancelled visits remain on the X-axis of the graph to accurately capture the passage of time across participants during the study. Additionally Evan’s family was visited every other week after 7 weeks with no problem behavior.

**Procedure**

**Baseline.** Baseline sessions were conducted weekly in the difficult routine reported by parents. For Evan, this routine was playing video games with his family, during which he frequently engaged in tantrums and mild self-injury when he lost a game to a family member. The one change made to this routine for the purpose of the study was that all video games included direct competition (e.g., competitive racing games) as opposed to games without direct competition (e.g., role playing games). This change was made to control for competitive versus non-competitive games being a source of variability in the dependent variable. Video games typically began at 4:30 p.m. each day and lasted 1 hour. During baseline, Evan’s mother was not provided with any instruction on how to respond to his tantrums or his appropriate behavior and was free to interact with him as she normally would. For Prince, the baseline routine was his daily after school routine at home, during which his mother wanted him to change clothes, put clothes away, do homework, and eat a snack. Prince typically arrived home from school at 3 p.m. each day. The routine began immediately and lasted approximately 20 min. During
baseline, Prince’s mother was not given any instructions on how to interact with Prince during his after school routine and was free to respond to him as she normally would. For Clarice, the baseline routine was eating dinner with her mother at her mother’s house, which occurred every Friday, and during which she engaged in rapid eating. The focus of baseline and intervention data collection was the first course of Clarice’s dinner which was a salad or other vegetable course and lasted approximately 10 min. During baseline, Clarice’s mother was not instructed on how to interact with Clarice and was free to respond to Clarice as she normally would.

**Intervention.** While intervention procedures were individualized to each dyad, all interventions used a combination of differential reinforcement plus visual support.

**Evan.** Evan’s intervention procedure was developed by his masters-level behavior specialist. The strategy consisted of visual supports, differential reinforcement, and response cost. The primary visual support was an 8” by 11” laminated red paper with the words “Playing Video Games” on the top that visually depicted the following contingency: If Evan kept safe hands, feet, mouth, and body for the duration of each video game, he was allowed to move on to playing the next video game. A game was defined as playing a round of a specific game (e.g., Mario Kart) until the competition involved in the game was complete, and it was clear who had won and how all the family members playing had placed. This procedure continued until Evan reached 10 video games, at which point he earned a peanut butter cup and could start the 10 game-sequence over again. If, however, he did not maintain safe behavior during any one of the 10 games, video games ended immediately, and Evan would only be allowed to play board games. This consequence was indicated on the visual as well. At this point, a secondary visual would be presented showing that if Evan played three board games with safe behavior, he could return to playing video games.

**Prince.** Prince’s intervention consisted of visual support, 5 s of wait time for each step of his after school routine, differential reinforcement in the form of praise for independently completing steps, and most-to-least prompting (without verbal prompting) for error correction. Prince’s visual support was an 8” by 11” white piece of paper with a checklist of the steps of his after-school routine. For the purposes of his checklist, the 11 steps of his routine on which data were collected were consolidated into eight simply-phrased steps (e.g., “hang up coat”). Each day when Prince arrived home from school, a copy of this checklist was on the dining room table accompanied by a pen or pencil. Prince read the checklist, completed each step, and crossed steps off of the checklist after they were completed. Because baseline observations suggested that Latisha’s verbal statements (positive and negative) may have functioned as reinforcers for Prince’s behavior, independent completion of each step was followed by verbal praise from Latisha. To avoid reinforcing Prince’s errors in completing the routine, Latisha was to refrain from verbally prompting during error correction and instead used a system of most-to-least prompting in which she physically-to-gesturally guided Prince back to his checklist to complete any step he skipped or did not fully complete on his own. When Prince finished and crossed off all steps of the after-school routine, the words “Finished!” with a smiley face remained at the bottom of the page and Prince was allowed to move on to free time. At session 19 (the third maintenance session) Latisha had written a more consolidated checklist (4 steps) on a dry erase board and hung it on Prince’s bedroom door. This dry erase board was used as Prince’s visual support for the remainder of the study.

**Clarice.** Clarice’s intervention consisted of visual support plus spaced-responding differential reinforcement of low rates of behavior (DRL) during the first course of her weekly dinner with her mother. Her visual support was a pink GymBoss™ interval timer which depicted a countdown of the number of seconds until Clarice could take a bite of food. When the countdown was completed, the timer beeped twice and began the interval countdown again. Because Clarice’s average baseline IRT was 5 s with a range of 0.5 to 23 s, the timer was initially set for 8 s intervals as this interval was estimated to be feasible, and the interval could be made longer once this interval was mastered. Because Clarice was observed during baseline to frequently comply
with her mother’s verbal requests to slow her eating, and because her mother and group home staff were concerned that physically blocking Clarice from taking a bite might trigger her aggressive, destructive, or self-injurious behavior, her mother verbally prompted her to wait for the “beep” to take a bite and to put her fork down between “beeps.” Waiting during the 8 s interval was reinforced by allowing Clarice to take a bite of food. At session 28 the prompting level was increased to mild physical blocking accomplished by Talia holding and rubbing Clarice’s eating hand between “beeps” and letting her hand go once the timer sounded.

**Maintenance.** Once parents demonstrated adequate treatment integrity (TI; defined in parent training section) they were told they could manage behavior however they chose, and the maintenance phase began. Procedures for maintenance sessions were the same as those used during intervention sessions except no training, instructions, or feedback were provided to the parent. Ongoing maintenance data were collected on dependent variables for Evan and Viola and Prince and Latisha for a period of 15 and 13 weeks, respectively. One maintenance session was collected for Clarice and Talia.

**Parent training.** Latisha and Talia were individually trained to implement procedures using a combination of instructions, modeling, role play, and feedback. Viola’s intervention was developed by Evan’s behavior specialist, who taught Viola how to implement the intervention by showing her the visual supports and verbally instructing her on their use. During training for Latisha and Talia, the investigator introduced the visual supports and instructed parents on reinforcement and error correction procedures. The investigator then modeled the use of the procedures with the parent role-playing as the child. Investigator and parent then switched roles and the parent role-played using the procedures, as the investigator role-played as the child. The investigator gave behavior-specific praise for correct implementation by parents and gave corrective feedback when the parent made an error. After this training session, the child entered, and the parent implemented the intervention with their child in the target routine. During this time, the investigator continued to give prompts and behavior-specific praise to the parents for correct implementation and corrective feedback for parent errors. Training sessions took place for the first three intervention sessions, after which pre-session instructions, modeling, role play, and feedback ended. Investigator coaching using prompting, praise, and corrective feedback during intervention sessions continued until parents implemented procedures at 80% TI or greater for at least two of three consecutive sessions. At this point (week 11 for Viola and week 16 for Latisha) all prompting and feedback were withdrawn, and the parent entered the maintenance phase, during which they were told they could manage behavior however they chose. Talia did not reach adequate implementation; however one maintenance session was conducted to examine her implementation in absence of investigator support.

**Treatment integrity.** Treatment Integrity for parent implementation of intervention procedures was calculated for all baseline and intervention sessions for all participants. Baseline TI was scored to assess the degree to which parents were implementing intervention procedures during baseline compared to intervention. After each intervention was implemented and TI scoring procedures were established, baseline videos were reviewed and baseline parent behavior was scored with the same tool used to assess parent TI during intervention.

Correct implementation of procedures for Viola was broken into three categories: pre-game use of the visual support (50% of TI), implementation of contingencies in response to each game (25% of TI), and use of visual in response to each game (25% of TI). For pre-game use of the visual support, Viola was to (a) have the visual support out and available in the video game area, and (b) review the rules outlined in the visual support with Evan prior to the start of video games. These two items were scored as yes (1) or no (0) and were aggregated for a pre-game visual support score per session of 0% (neither items were implemented), 50% (one item was implemented), or 100% (both items were implemented). This aggregate score counted for 50% of the session’s total TI. For implementation of contingencies, if Evan had safe behavior throughout a game Viola was to state
that Evan had done so and could move on to the next game; if Evan had problem behavior, Viola was to direct Evan away from video games to play board games instead. For use of visual in response to each game, Viola was to move the corresponding pieces on the visual to indicate that Evan had safe behavior and could move on to the next game, or that he had problem behavior and had to leave video games for board games. These criteria were each scored as full implementation (1.0), partial implementation (0.5), or no implementation (0). Therefore, for each individual game, perfect TI would earn a score of 1 for implementation of contingencies and 1 for use of visual, totaling 2 points per game. TI was then calculated by adding the total score for implementation of contingencies and use of visual across all games played during the session and dividing by the total number of points that could be earned for perfect implementation. The resulting percentage was then averaged with the percentage score for pregame use of visual described above to produce the total TI percentage for each session.

For Latisha, correct implementation of procedures was defined as (a) having the visual support out and available for Prince, (b) waiting 5 s for Prince to independently check his schedule and begin the next step of the routine, (c) if Prince independently completed the step, praising Prince, or (d) if Prince did not independently complete the step, nonverbally directing Prince to his checklist. For each session, the criterion of having the visual available was counted once as yes (1) or no (0), while the remaining two criteria (waiting to see if Prince would execute the target behavior independently and either praising or correcting his response) were calculated for each of eight steps outlined on Prince’s checklist. These criteria were also scored as yes (1) or no (0) for each step. These procedures resulted in a total of 17 criteria per session (1 criterion for presence of visual and two criteria per each of 8 steps). The number of criteria met was divided by total number of criteria (17) to produce a percentage of TI per session.

For Talia, TI was defined as (a) having the visual timer out and running, and (b) preventing Clarice from taking a bite until the 8 s interval lapsed. The criterion of having the visual timer out and running was counted once per session as yes (1) or no (0) and made up 25% of each session’s TI. The remaining 75% of TI came from the criterion of only allowing bites after 8 s had lapsed and was counted as the percentage of bites meeting this criterion out of the total number of bites. The resulting percentage for using the visual timer was then averaged with three times the resulting percentage for preventing bites until 8 s had lapsed to produce the total percentage TI for the session.

Results

Figure 1 presents the effects of visual support plus reinforcement on child adaptive behavior and parent TI during baseline, intervention, and maintenance phases. Visual analysis of the data suggests the intervention was effective for 2 of 3 participant dyads.

Evan and Viola

Safe behavior occurred for 84%, 100%, and then 70% of intervals during Evan’s three baseline sessions (M = 84.7%). Upon implementation of the intervention, Evan’s safe behavior immediately increased to 100% of intervals for the remainder of the intervention phase. After investigator coaching was withdrawn and the maintenance phase began, Evan’s safe behavior remained at 100% for the duration of the 15-week maintenance period. During baseline, Viola’s TI was low and variable, averaging 11.3% (range 0 – 30%), with TI during her final baseline session at 0%. After intervention, Viola’s TI immediately increased to 71% and continued in a variable, accelerating trend, with TI during her final intervention session at 89% (M = 73.4%, range 58 – 89%). After the withdrawal of all investigator support, Viola’s TI steadily decreased over the first four maintenance sessions from 75% to 31%. TI then increased briefly to 59% and 63% before decreasing to 6% and 2% during final maintenance sessions (M = 41.5%, range 2 – 75%).

Prince and Latisha

During baseline, the percentage of steps of Prince’s after-school routine completed inde-
independently were low in level and somewhat variable with a slight increase in trend between sessions 3 and 8 ($M = 39\%$, range 27 – 55$\%$). Upon implementation of the intervention, Prince’s independent completion of steps increased immediately to 82$. Independently completion of steps then decreased slightly to 80$\%$ before increasing to 93$\%$ in session 12 and 100$\%$ in sessions 14 and 15 to complete the intervention phase ($M = 90.4\%$, range 80 – 100$\%$). After all investigator coaching was withdrawn and the maintenance phase began, Prince’s independent completion of steps became more variable but remained above baseline levels, with an initial decrease to 73$\%$ in session 16 before steadily
increasing over the remainder of the maintenance phase ($M = 84.5$, range $64 – 100$). Prince’s independent completion of steps during his final 3 maintenance sessions was elevated and stable in level with a range from $86\%$ to $91\%$ ($M = 88.7\%$). During baseline, Latisha’s TI had a variable, slightly increasing trend and averaged $55.3\%$ (range $24 – 53\%$). After intervention, TI immediately increased to $88\%$, then decreased to $73\%$ before increasing to $93\%$, $100\%$, and $94\%$ in the final three intervention sessions ($M = 89.6\%$, range $73 – 100\%$). Once investigator support was withdrawn, TI immediately decreased to $65\%$, increased briefly to $71\%$, and then decreased gradually while remaining at a similar level for the remainder of the maintenance phase, ending at $47\%$ ($M = 54.3\%$, range $45 – 71\%$).

Clarice and Talia

Clarice’s average IRT was somewhat variable with a slightly increasing trend during baseline and ranged from $3.3\ s$ to $5.8\ s$, with her final baseline session at $5.8\ s$ ($M = 4.85$). After implementation of intervention, average IRT remained at a level, trend, and variability similar to baseline with a range of $4.1\ s$ to $6\ s$ ($M = 4.7$). Due to low TI with the initial intervention and the lack of an effect on the dependent variable, an increase from verbal to physical prompting was introduced during session 28. During the three sessions with physical prompting, there was an increasing trend in average IRT, with an average of $5.7\ s$, $5.9\ s$, and $8.1\ s$, respectively ($M = 6.6\ s$). Because IRT criterion (8 s) was reached during session 30 and part of the goal of the study was to assess parent maintenance without coaching, investigator coaching was withdrawn at this point and the maintenance phase began. Maintenance data were collected during one final session and indicated that average IRT had decreased to a level similar to previous baseline and intervention levels at $5.4\ s$. During baseline, Talia’s TI was low in level with little variability and a relatively flat trend, averaging $9.6\%$ (range $4.5 – 13.5\%$). After intervention, TI increased from $8.5\%$ on the last baseline session to $44.5\%$ during the first intervention session. TI then remained relatively stable at this level with a slightly decreasing trend until session 28 when physical prompting was begun, after which TI increased slightly to $43.8\%$, $42.3\%$, and $48.3\%$ during the last three intervention sessions ($M = 38.8\%$, range $31 – 48.25\%$). When investigator support was withdrawn for one maintenance session, TI decreased to $35.5\%$.

Social Validity and Maintenance Rating Scale and Qualitative Comments

Table 1 displays each parent’s rating of each item on the Social Validity and Maintenance Rating Scale, along with means for each participant, each item, and each domain. Parents indicated an average total rating of 4.1 out of 5 on the Social Validity and Maintenance Rating Scale. Per participant, average ratings were 4.1 for Viola, 4.4 for Latisha, and 3.7 for Talia. Across participants, average ratings per question ranged from 3.3 to 4.7. Highest rated items were “The behavior management strategy was a good fit for my child,” and “Based on training from the study, I use some principles of the behavior management strategy to help manage my child’s behavior.” Lowest rated items were “Using the behavior management strategy did not take up too much of my time” and “I use the behavior management strategy as trained.”

While completing the Social Validity and Maintenance Questionnaire, participants were asked follow up questions about their ratings. Viola stated that she enjoyed implementing the behavior management strategy with Evan and would continue using it because it was effective and provided needed structure to leisure time. She described the strategy as clear, easy to use, and a good fit for her child because he is a visual learner. Viola did feel that implementing the intervention was time-consuming and interfered with her regular routines; however she reported that the demands on her time and energy were acceptable given the improvement in her child’s behavior. She felt that the strategy improved the atmosphere at home in that Evan showed fewer “meltdowns” when it was in place. While she reported that she did not use the strategy exactly as trained, Viola strongly agreed that she used some principles of the strategy to help manage her child’s behavior. Specifically, she described using visual supports across Evan’s day to break down steps of
an activity and provide a reward at completion.

Latisha said she enjoyed implementing the strategy and would continue to use it because Prince enjoyed it and it made him more independent. She also strongly agreed that the strategy was a good fit for Prince and easy to use with him. While she felt that some aspects of the intervention were a burden, she thought that overall it saved time and improved Prince’s behavior and her home routines. She especially liked the simplicity of the strategy, and stated that a lot of interventions overcomplicate simple problems and that is why she consolidated the steps of Prince’s after school routine onto a dry erase board during the maintenance period. She said she felt she had to change the intervention to better fit with her life. She acknowledged that she did not use the behavior management strategy exactly as trained but that she used some principles of the strategy to manage Prince’s behavior. Specifically, she described explicitly stating or writing the routine she expected from Prince at different times and places throughout the day. One aspect of the intervention that she discontinued was praise; Latisha did not feel that she should praise Prince except for superb performance, such as cleaning his room exceptionally well, due to concerns that he would start to expect praise for routine behavior.

Talia stated that she enjoyed implementing the strategy and thought she would continue using it but suggested she would be less likely to use it when Clarice was having a “bad day.” She found the intervention difficult to implement and, while she thought it was a good fit for her daughter, she was concerned that it might aggravate Clarice. Talia felt that imple-
menting the intervention interfered with other activities but that this was acceptable given the importance of getting Clarice to eat more slowly. Regarding this goal, Talia repeatedly described feeling conflicted between sympathizing with Clarice being hungry and wanting Clarice to eat more slowly. However, she strongly agreed that using the behavior management strategy did not take up too much of her time, and indicated an interest in extending the strategy to more of Clarice’s meal. When asked whether the behavior management strategy improved her child’s behavior, Talia was not sure. She stated that she thought there were some days when Clarice showed improvement and that perhaps it was starting to work. She emphasized the importance of using strategies consistently with Clarice and admitted that she had not used the strategy when the investigator was not present, suggesting that if she had it might have been more effective. She also expressed concern that Clarice’s group home was not working on getting her to eat more slowly and felt that their lack of intervention may have decreased the effectiveness of the intervention at her home. Talia was not sure that the behavior management strategy improved the atmosphere in her home and felt that waiting to take a bite continued to be hard for Clarice. When asked whether she used some principles of the strategy to help with Clarice’s behavior, Talia said that she did by verbally prompting Clarice to eat more slowly.

Discussion

No previous studies have purposefully examined the effectiveness and acceptability of parent-implemented behavior interventions for children with ASD in African American families. The purpose of this study was to gain preliminary evidence regarding the effectiveness of research-based parent-mediated behavior interventions (differential reinforcement and visual supports) with African American families with children with ASD. In the process of this investigation, (a) a multiple baseline across participants design was used to examine the effectiveness of interventions in changing child behavior, (b) parent TI data were collected throughout the duration of the study to examine parent implementation of procedures over time, and (c) parents completed a rating scale and were qualitatively interviewed regarding their perceptions of the effectiveness and acceptability of the intervention.

Specifically, this study attempted to answer three research questions. The first question asked whether a multiple baseline across participants design would show behavior interventions to be effective across purposefully sampled African American families with children with ASD. The results suggest the intervention was effective for two of three dyads. For Evan and Viola, introduction of parent-implemented differential reinforcement with visual support was associated with an immediate increase to 100% in Evan’s dependent variable of safe behavior, which remained at 100% for the remainder of the study including 4 months of maintenance sessions. For Prince and Latisha, introduction of parent-implemented differential reinforcement with visual support was associated with an increase in independent completion of steps of Prince’s after school routine, with the last two intervention sessions resulting in 100% completion. While results for Prince and Latisha became more variable during the maintenance phase, independent completion of steps remained well above baseline levels. For Clarice and Talia, introduction of the intervention was not associated with an increase in Clarice’s average IRT between bites of food. During sessions 28, 29, and 30, Talia was coached to add physical prompting to her verbal prompts, and IRT increased over these sessions with IRT in the 30th session meeting criterion of 8 s; however one follow up maintenance session showed IRT back at baseline levels. An examination of Talia’s TI indicates that while she used the visual support (usually after investigator prompting) she struggled to prevent Clarice from taking bites until the completion of each 8 s interval. Because of the lack of TI in this aspect of the intervention, taking a bite at the end of the interval was not differentially reinforced and therefore the timer and its “beeps” did not take stimulus control over Clarice’s eating.

The second research question asked whether parents would maintain procedures and results over time. Results show that Viola and Latisha implemented their interventions
with a relatively high level of TI during intervention phases when compared to baseline and that TI decreased over time during maintenance phases but averaged above baseline levels. Interestingly, decreased parent TI during maintenance was not associated with decreases in child performance, suggesting that the decreased levels of TI used by Viola and Latisha during maintenance were sufficient for maintaining their children’s levels of target behavior. It is possible that Viola’s and Latisha’s implementation was shaped such that only the components most necessary for maintaining their child’s behavior change remained. It is also possible that parents’ higher levels of TI during the intervention phase resulted in their children acquiring the skills needed to maintain target behavior with reduced support over time. Additionally it is possible that implementing the intervention changed parent behavior in a way that was not captured in TI measures. Talia’s results show that while her TI did increase after intervention, she did not implement the intervention with adequate integrity and her increased TI during intervention was not associated with increases in Clarice’s dependent variable. There are a number of possible explanations for Talia’s low TI. Spaced-responding DRL is relatively more technical and difficult to implement than the components of Viola’s and Latisha’s intervention, and is noted to produce slow changes in behavior even when TI is adequate (Cooper, Heron, & Heward, 2007). Additionally, Talia’s reported feelings of conflict regarding getting her daughter to eat slowly when she was hungry may have interfered with her implementation. Finally, Talia was the only parent whose child did not reside with her, resulting in Viola and Latisha having multiple opportunities throughout the week to use the intervention strategy and Talia having only one.

The third research question asked whether parents would perceive the intervention they received as acceptable and effective. Parents’ results on the Social Validity Rating Scale as well as their qualitative statements indicate that overall all three parents found their interventions effective and acceptable. In particular, all parents felt that the intervention strategy was a good fit for their child and that they would continue to use the strategy in the future. Talia’s ratings and qualitative statements, however, indicated less agreement with certain items in the rating scale, presumably reflecting the difficulty she had with implementation and the reduced effectiveness of her intervention. Additionally, while Viola and Latisha indicated overall support for the effectiveness and acceptability of the intervention, both mothers decreased TI over time and adapted aspects of the intervention to better suit their needs. As Latisha described in her qualitative comments, both appear to have supported the intervention in general but felt the need to alter it to suit their particular needs.

Various limitations of this study need to be addressed. First, interventions tested in this study were packages of combined strategies and do not allow for an analysis of which components contributed most to intervention effectiveness. Second, TI ranged across dyads and both Viola and Latisha altered their implementation of the independent variable during the maintenance phase, which introduces a variety of uncontrolled variables into the intervention. Third, because the intervention was ineffective for the third dyad, it is not possible to conclude that there was a functional relationship between the intervention and the dependent variables. Finally, the social validity and maintenance questionnaire used in this study did not have evidence of validity and reliability, and therefore its results should be taken with caution.

Overall, results from this study provide some support for the conclusion that differential reinforcement and visual support as parent-implemented behavior interventions for children with ASD may be effective and acceptable for some African American families with ranging levels of SES. While the intervention was ineffective for one of the three dyads, the mother did report the intervention as generally acceptable and effective. Additionally, in the two dyads for whom the intervention was effective, parents maintained some aspects of the intervention and child results for the duration of the study, which included 15 and 13 weeks of maintenance. That these two parents maintained the intervention on their own may be considered additional evidence that they found it acceptable.
and effective (Kennedy, 2002; Schwartz & Baer, 1991; Wolf, 1978).

Research into understanding how families of children with ASD representing minority groups respond to evidence-based interventions would be greatly enhanced by additional single-subject studies purposefully examining the effectiveness of such interventions with racially and socioeconomically diverse families. Research in this area would also be aided by researchers reporting race and SES of participants (Conroy et al., 2005; McLaughlin et al., 2012), which would allow a greater understanding of the populations with whom behavior interventions for children with ASD have been found effective. In terms of practice, this study offers preliminary evidence that differential reinforcement and visual supports may be successful home-based interventions for some African American parents to use with their children with ASD, and that practitioners working with African American families with ASD at home should consider their use for improving problem behavior.

References


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Received: 21 May 2015
Initial Acceptance: 8 July 2015
Final Acceptance: 1 September 2015