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PRELIMINARY EVIDENCE ON THE USE OF TELEHEALTH IN AN OUTPATIENT BEHAVIOR CLINIC

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Previous studies have shown that telehealth can be an effective way to deliver behavior-analytic services. In this study, we provided a demonstration of the use of telehealth to assess and initiate treatment of problem behavior in an outpatient clinic. We coached parents of children with autism via telehealth to conduct functional analyses during 1 appointment that lasted 1 hr and subsequently coached them as they implemented functional communication training during 3 subsequent appointments (15 min each). Social functions were identified for most children, and problem behavior was reduced by an average of 65.1%.

Key words: functional analysis, functional communication training, telehealth

Wacker et al. (2013a, 2013b) coached parents via telehealth to implement functional analyses (FA) and functional communication training (FCT) with children in pediatric clinics located across the state of Iowa. Behavior analysts provided coaching from the telehealth center located at the University of Iowa Children's Hospital (UICH). FA results identified social functions for most children's problem behavior, and FCT reduced problem behavior by an average of 94.4% by the end of treatment. Lindgren et al. (2016) achieved similar results conducting the same procedures via telehealth in the children's homes.

In the current study, we extended these telehealth procedures to determine if they could be incorporated into an existing, time-limited outpatient clinic that routinely provides FA and FCT. The families who participated had to wait approximately 6 months for an evaluation at the clinic, which is a common wait time for such services. We aimed to determine whether we could effectively conduct a brief FA and matched FCT treatment via telehealth within the same 2-hr timeframe we used for evaluations at the clinic, but during four telehealth visits for each child (1-hr visit for the FA and three 15-min visits for FCT).

METHOD

Participants

Five children (Table 1) who had been diagnosed with autism spectrum disorders and had been referred for the treatment of problem behavior participated. The children's parents conducted all sessions in the therapy room at a regional autism center, with coaching from the behavior consultants and support from a parent assistant. Parents had no prior experience with the FA and FCT procedures.

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Table 1
Child Demographic Information

Child	Age (years: months) and gender	Problem behavior	Mand modality
Bobby	4:1, male	Aggression, destruction, crying	Microswitch
Dillon	2:5, male	Self-injury, aggression, destruction	Microswitch
Isaiah	5:4, male	Aggression, destruction	iPad
Kim	5:9, female	Aggression, destruction	Microswitch
Izzy	7:1, female	Aggression	Vocal communication

The parent assistant, who directed the regional center, had some prior experience implementing FAs and FCT. She set up the therapy room, established the Skype[1] connection, and assisted the parents as needed.

Three doctoral students, with 5 to 8 years of experience coaching parents on FAs and FCT, served as the behavior consultants. They coached the parents via Skype and received supervision from a faculty behavior analyst.

Setting and Materials

The behavior consultants used the same telehealth center at the UICH as described in Wacker et al. (2013a). The parents conducted all FA and FCT sessions in a therapy room at the regional center, 171 miles from UICH. The parents used a laptop computer and webcam at the regional center for the telehealth visits.

Work tasks involved receptive language tasks such as matching items and putting items in a cup. We used Boardmaker play and work picture cards and augmentative communication devices (i.e., microswitch, Touch Chat, iPad) to facilitate the functional communication response during FCT.

Response Definitions, Observation System, and Interobserver Agreement

The problem behaviors we targeted included aggression, destruction, self-injurious behavior (SIB), and crying. We defined *aggression* as any behavior that could result in tissue damage to another person; *destruction* as any behavior that could result in damage to inanimate objects; *SIB* as any behavior that could cause tissue damage to the child due to his or her own behavior; and *crying* as any vocalization louder than conversational level.

We coded mands and task completion as either independent (without physical guidance) or prompted (with physical guidance). In addition, we did not score task completion as independent if the child emitted problem behavior at any time during an instructional trial.

Data collectors scored the frequency of the dependent variables. We subsequently converted the frequency data for problem behavior and mands to responses per minute and converted the frequency of task completion to the percentage of opportunities with independent task completion.

A second data collector simultaneously but independently scored the child's behavior on 49% of FA sessions and 75% of FCT sessions conducted across children. To calculate interobserver agreement, we compared frequency data for each dependent variable across data collectors on a session-by-session basis by

[1]This was a clinical demonstration project authorized by the e-Health department in the College of Medicine at the University of Iowa. They had intended to use MyChart, an application in the electronic medical record, as the videoconferencing software for the telehealth visits. However, technical problems precluded the use of MyChart, and thus, they authorized us to use Skype. The risks associated with using Skype were discussed with the parents before the start of their participation in the project, and the parents signed a consent form to participate in the project.

dividing the smaller frequency recorded by the larger frequency and converting the result to a percentage. During the FA, interobserver agreement averaged 91%, 87%, and 100% across children for problem behavior, task completion, and mands, respectively. During FCT, interobserver agreement averaged 80%, 95%, and 90% across children for problem behavior, task completion, and mands, respectively. We sometimes obtained low interobserver-agreement values due to variability in the quality of the video feed.

Design and Procedure

Parent meeting. Before the FAs, the parents participated in a 1-hr group meeting with the behavior consultants via telehealth during which the consultants explained the purpose of the study and the descriptive assessment we asked the parents to complete before the FA.

Functional analysis. We conducted an FA using a multielement design (Wacker et al., 2013a). We typically tested for negative (escape) and positive (attention or tangible) reinforcement and included a control condition (free play). We determined which specific conditions to include based on information gathered from the descriptive assessment. The parent conducted all FA sessions, which lasted 5 min, during a 1-hr telehealth visit. At the start of the FA visit, the behavior consultant briefly reviewed the purpose of the FA and instructed the parent on how to set up the room. The consultant described the procedures before starting each session and coached the parents on how to implement the procedures throughout each session.

During the free-play condition, the child and parent played together with the toys, and the parent issued no demands.

During the escape condition, the parent presented a task for the child to complete every 30 s using a three-step prompting procedure (i.e., an initial vocal instruction followed by modeled and then hand-over-hand prompts as needed). The parent removed the task for 30 s if the child engaged in problem behavior.

During the tangible condition, the parent allowed the child to play with a preferred toy for a brief period of time before restricting his or her access to that toy. If the child engaged in problem behavior, the parent provided access to the toy for 30 s.

During the attention condition, the parent restricted his or her attention and the child was allowed to play with toys. If the child engaged in problem behavior, the parent provided a brief reprimand and engaged in the play activity with the child for 30 s.

Functional communication training. After the FA, the parent implemented FCT (with coaching) during three 15-min telehealth visits, scheduled weekly over 3 consecutive weeks. We introduced FCT using a nonconcurrent multiple baseline design across children, but deviated from typical design methods in that we did not wait until we observed stable baseline rates of problem behavior before initiating FCT (due to time constraints). During the first FCT visit, a consultant reviewed the results of the FA and introduced the FCT procedures. During each FCT visit, the consultant described the procedures before the start of each session and provided coaching during each session, as described by Suess et al. (2014).

We targeted escape functions during FCT for Bobby, Dillon, Isaiah, and Kim. Izzy displayed no problem behavior during the FA, and therefore we did not include her in the treatment analysis. We implemented two 5-min FCT sessions, as described by Wacker et al. (2013b), during each visit. An FCT trial involved the child completing a two-step chain that consisted of task completion and manding. The parent directed the child to the work table and presented the child with one to three tasks. After the child completed the tasks, the parent praised him or her and presented the communication modality while saying, “Tell me if you

want to play." An FCT trial ended with a 2-min break to toys and attention after the child emitted an appropriate mand. We coached the parent not to respond to problem behavior (i.e., extinction) at any time during instructional trials. In addition, we coached the parent to implement a response-cost-plus-contingent-work procedure if the child engaged in problem behavior during the reinforcement interval by terminating reinforcement and prompting the child to return to work.

We gave the parents weekly homework assignments during FCT and encouraged them to practice FCT with their child at home without coaching. We provided the parent with homework sheets that included a task analysis of the treatment steps and asked them to implement a minimum of 12 FCT trials each week. For each practice trial, the parent rated the child's problem behavior and indicated the child's level of independence with completing the task and manding on a data sheet we provided. The parent briefly reviewed the practice sessions with the consultant at the start of the subsequent telehealth visit by describing the tasks used and any challenges that occurred during their practice.

RESULTS AND DISCUSSION

Figures 1 and 2 show the FA and FCT results, respectively. FA results for Bobby, Dillon, Isaiah, and Kim suggested that negative reinforcement maintained their problem behavior. Dillon's results also demonstrated a tangible function. Izzy displayed no problem behavior during the FA, which we considered to be a false negative based on the incongruence between the FA and descriptive assessment results.

Bobby did not engage in problem behavior when FCT was initially implemented; however, a slight increase in problem behavior occurred during the last two FCT sessions. Dillon's problem behavior was initially on an increasing trend at the start of FCT, but the rates trended downward across FCT sessions. Isaiah engaged in low rates of problem behavior throughout FCT. Kim's problem behavior was variable, but on a slight decreasing trend across FCT sessions. Across participants, FCT reduced problem behavior by an average of 65.1%, and independent task completion and manding increased by averages of 34.3% and 87.5%, respectively, by the end of FCT (see Table 2). Reductions in problem behavior may have been due, in part, to the reduction in the number of demands presented per session. However, these procedures are consistent with our evaluations at the clinic, where we typically implement demand fading later in treatment.

Recently, mathematicians have developed statistical procedures specifically designed to analyze the results of single-case designs. These statistical analyses produce effect sizes that are equivalent to those of group-comparison studies. Reporting such statistics may increase the likelihood that the results of single-case studies will be included in meta-analyses. Therefore, we compared levels of problem behavior during baseline and treatment and found significantly lower levels of problem behavior during treatment (Hedge's $G = 1.31$; $Z = 3.15$; $p < .001$). These results replicated those of Wacker et al. (2013a, 2013b) by providing preliminary evidence that parents can be coached to implement FA and FCT via telehealth to reduce their children's problem behavior. This study extended previous findings by showing how telehealth can be incorporated into a typical outpatient clinic and by allowing us to initiate treatment more quickly; to provide multiple brief visits more efficiently; and often to circumvent months of waitlist time. When this brief consultation was sufficient, it bypassed the need for further services from the clinic. However, if problems persisted, we would have kept the scheduled visit in the clinic to address any continuing issues.

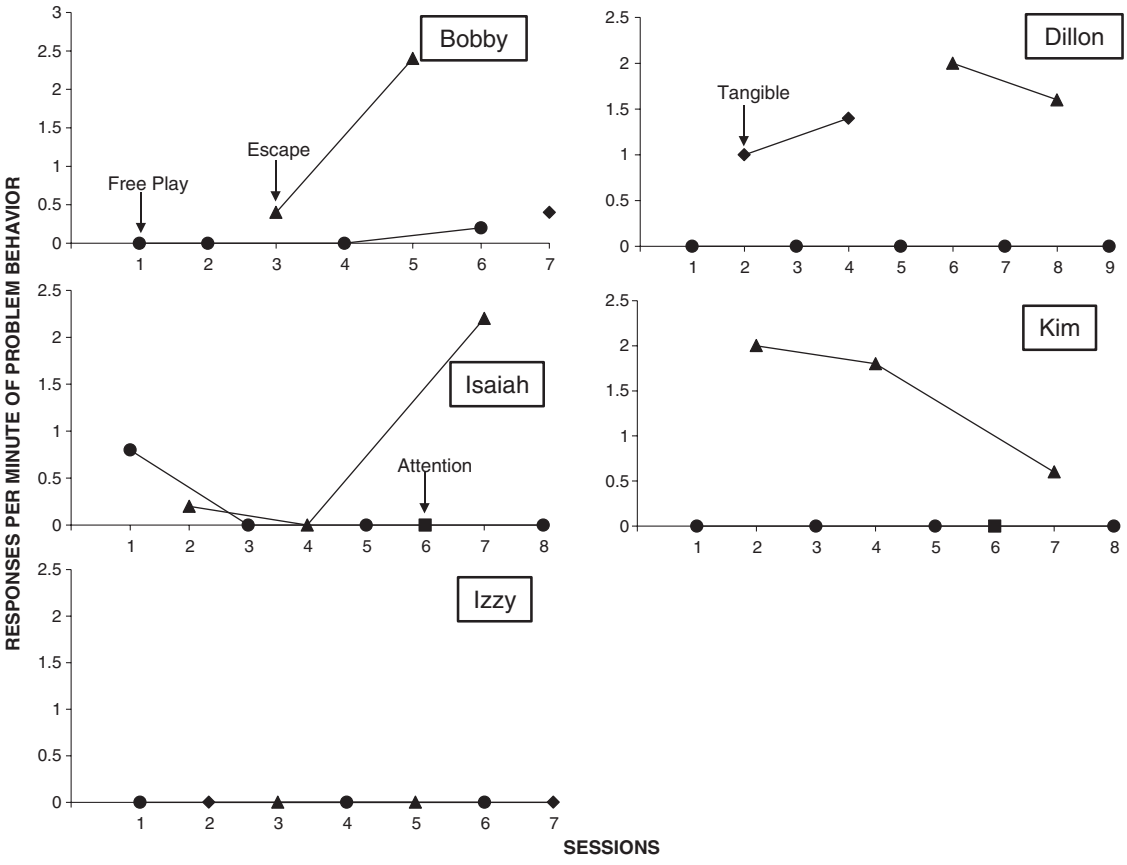

Figure 1. Responses per minute of problem behavior during FA sessions for each child.

One limitation of the current study is that we identified social functions for only four of the five children. However, it is worth noting that such false negative results also occur with some regularity during our outpatient FAs in the clinic (cf. Derby et al., 1992). A second limitation is that we did not evince a clear functional relation between FCT and the observed reductions in problem behavior due to behavioral variability during baseline and treatment and time constraints. Nevertheless, problem behavior decreased by more than 50% for every participant, and the statistical analysis supported our preliminary conclusions regarding the effectiveness of FCT.

Lindgren et al. (2016) suggest that numerous questions remain about telehealth services, especially regarding the optimal "timing and dose" of these services. Our preliminary results warrant further study in part because we achieved moderate (e.g., 52.1%) to large (e.g., 80.6%) reductions in problem behavior despite the fact that we coached the parents to implement FCT for just 45 min. One potential benefit for using telehealth during brief weekly treatment probes is that parents became familiar with implementing the procedures with telehealth coaching, then practiced the procedures at home without coaching, and finally received feedback during the next telehealth visit.

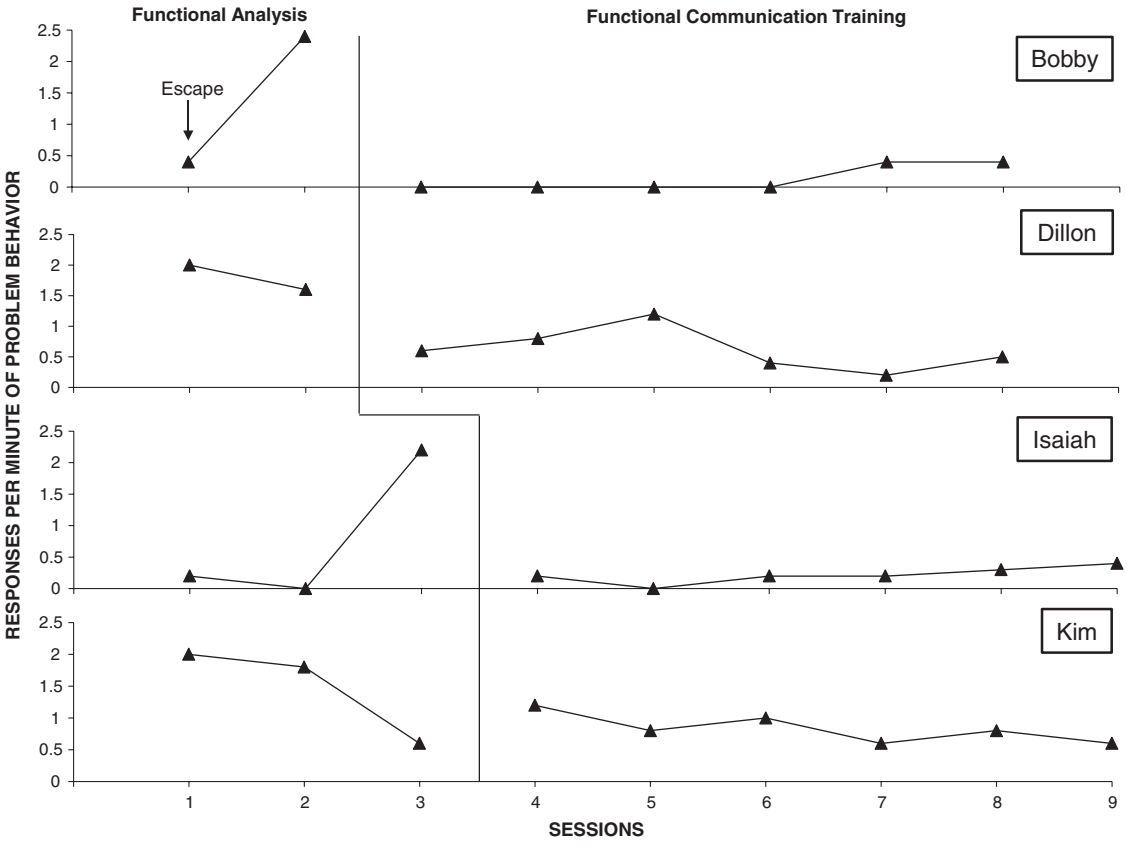

Figure 2. Responses per minute of problem behavior during FA and FCT sessions for each child.

Table 2
Summary Data

Child	% reduction in problem behavior	% increase in independent task completion	% increase in independent manding
Bobby	71.4	21	100
Dillon	80.6	50	50
Isaiah	56.3	26.3	100
Kim	52.1	40	100
M	65.1	34.3	87.5

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