

Outcomes and Acceptability of Telehealth-Based Coaching for Caregivers in Asian Countries

Behavior Modification

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Abstract

Recent studies evaluating the effectiveness of using telehealth to train caregivers across large geographical distances in the United States and internationally indicate that this modality can increase families' accessibility to evidence-based interventions for problem behavior. In this study, experimenters and interpreters in the United States remotely coached nine caregivers of children with disabilities residing in three countries in Asia to implement functional analyses (FA) and functional communication training (FCT). Five of the nine families were culturally matched to either the experimenter or the interpreter. Problem behavior was reduced to near-zero levels for all but one participant. Furthermore, all caregivers implemented the procedures with high levels of integrity and rated the assessment and treatment as highly acceptable, regardless of cultural matching or use of interpreters. Overall, findings suggest telehealth-based caregiver coaching and caregiver-implemented FA plus FCT is feasible and acceptable in Asia.

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Over the last decade, the number of individuals diagnosed with developmental disabilities (e.g., autism spectrum disorder [ASD] and intellectual disability) has risen globally (Global Research on Developmental Disabilities Collaborators, 2018; Qiu et al., 2020). Consequently, the demand for Board Certified Behavior Analysts (BCBAs) specializing in behavioral treatment and intervention has also dramatically increased (Behavior Analyst Certification Board, 2020). Between 2015 and 2020, the number of individuals certified as BCBAs annually grew by approximately 156%. However, this rate of growth does not extend beyond the United States. In particular, few evidence-based interventionists are available in Asia, the largest continent on Earth (Duggal et al., 2020; Imran et al., 2011; Sullivan & Wang, 2020; Tran & Weiss, 2018).

According to the Behavior Analyst Certification Board (BACB), only 3,343 of the total 51,737 BCBAs at the doctoral and master's level reside outside of the United States (retrieved from <https://www.bacb.com/services/o.php?page=101134> on December 20, 2021). As a result, 93.5% of BCBAs serve merely 4.25% of the total world population. This is particularly striking in Asia, which is geographically the largest and most populated continent, consisting of 48 countries. For example, only one BCBA resides in Vietnam, a country with a population of more than 102 million, according to the U.S. Census Bureau, (n.d., retrieved from <https://www.census.gov/popclock/world> on December 20, 2021). Likewise, five BCBAs reside in Pakistan with a population of more than 238 million and 31 BCBAs reside in India with a population of more than 1.3 billion. The disparate distribution of BCBAs makes behavior analytic services inaccessible to many individuals residing in countries with few BCBAs. Although other types of interventionists provide services to families in Asia, research findings indicate a shortage of qualified professionals, particularly those with formal training in evidence-based practices (Duggal et al., 2020; Imran et al., 2011; Sullivan & Wang, 2020; Tran & Weiss, 2018).

One way to increase the accessibility of behavior analytic services is for behavior analysts to extend their reach internationally. Recently, behavior analysts have overcome geographical obstacles through the use of telehealth, a method of providing healthcare services and education using telecommunication technology such as videoconferencing software (Heitzman-Powell et al., 2014; Schieltz & Wacker, 2020). A growing literature base has evaluated the

efficacy of coaching caregivers and educators via videoconferencing to implement behavior analytic assessments and interventions, including functional analyses (FAs), function-based treatments for problem behavior, and skill-based teaching procedures (Barkaia et al, 2017; Benson et al., 2018; Ferguson et al., 2018; Neely et al., 2021; Suess et al., 2014; Tomlinson et al., 2018; Unholz-Bowden et al., 2020). The current literature base, while limited, provides evidence that telehealth may be an effective and viable alternative when in-person services are not available or not preferred.

With the established efficacy of telehealth services, experimenters have replicated and extended this work to individuals residing in countries with limited access to behavior analytic services. For example, Tsami et al. (2019) extended telehealth services and caregiver-implemented treatment to families residing in Greece, Turkey, Saudi Arabia, Costa Rica, Mexico, Ukraine, and Russia. Behavior analysts coached caregivers via videoconferencing to conduct FAs and implement functional communication training (FCT) with children with autism who engaged in problem behavior. Moreover, this study sought to evaluate the use of interpreters when delivering services via telehealth. Unlike previous studies, Tsami et al. relied on interpreters to bridge communication between the behavior analysts and families who did not speak Greek or Turkish. The experimenters addressed potential cultural barriers by selecting interpreters who either resided in the same countries as the participants or who were familiar with the culture of those countries. In addition, these interpreters were located either (a) in the same location as the behavior analyst, (b) in the same location as the participants, or (c) in a third location separate from both the behavior analyst and the families.

Outcomes of Tsami et al. (2019) indicated that the use and location of interpreters did not impact the results and that caregivers, on average, perceived the services received as acceptable. Recruiting interpreters who had previously resided in or currently resided in the participant family's country also proved to be advantageous. For example, the experimenters reported that the behavior therapist originally from Greece identified a culturally significant practice that may be an antecedent to problem behavior for a participant in Greece. Thus, the experimenters modified the FA accordingly. The inclusion of interpreters in this study and the implications of culturally matched experimenters highlighted the need for more research into cultural and language barriers when providing services internationally.

In response to the growing body of literature on the global applications of telehealth, Sivaraman and Fahmie (2020) conducted a review of the cultural adaptations that have been made by behavior analysts who have provided services outside of the United States. Results of this review found that the most common cultural adaptations included recruiting members of the

participant's cultural community to aid in the development of the training materials, conducting additional rapport building sessions with the caregivers, culturally matching the caregiver and provider, and providing translated training materials. In particular, Sivaraman and Fahmie cited several studies that matched the caregiver to the experimenter by gender, ethnicity, place of birth, or language. For example, Neely et al. (2020) recruited an individual who resided in the same country, was of the same ethnicity, and spoke the same language as the participants to assist with training. However, it may not always be possible to recruit a culturally matched individual when providing services via telehealth. In addition, limiting available behavior analytic providers to those that culturally match the caregivers may further restrict the availability of services to these families. Thus, additional research examining differences in the efficacy of remote coaching when provided by culturally matched experimenters compared with non-culturally matched experimenters is warranted.

Despite the growing interest in evaluating the use of telehealth, few prior studies have extended research on telehealth-based, behavior analytic service provision to individuals living in Asia. Even more limited are studies examining the generality of skills acquired by individuals living in Asia through telehealth-based coaching. Zhu et al. (2020) used video conferencing to provide performance feedback to three interventionists in China who worked with children with autism. Using an adapted alternating treatment design, Zhu et al. (2020) examined the effects of providing feedback on the procedural integrity of the interventionists. Each interventionist was assigned to receive either feedback or no feedback while implementing discrete trial teaching (DTT) or incidental teaching (IT). For example, one interventionist received feedback when implementing DTT and no feedback while implementing IT, whereas another interventionist received feedback when implementing IT but not when implementing DTT. Results indicated that the interventionists' procedural integrity only improved when they received remote feedback. However, the authors did not assess the acceptability of telehealth-delivered feedback. It was additionally unclear whether or not cultural or linguistic barriers existed between the behavior analysts and the participants and if these barriers were addressed. Therefore, further research is needed to examine whether telehealth-based coaching remains effective despite cultural and linguistic differences when behavior analysts deliver services internationally. Particularly, it is essential that future studies evaluate the acceptability of telehealth (with or without interpreters) cross-culturally. Research into this area of service delivery is limited and more in-depth studies are warranted to examine how services via telehealth are perceived by families worldwide (Schieltz & Wacker, 2020).

The purpose of the current study was to extend Tsami et al. (2019) by coaching caregivers to implement treatment packages consisting of FA and FCT in three Asian countries with distinct cultures. While telehealth-delivered FA and FCT procedures have been replicated in many countries outside of the United States, few studies thus far have extended the use of telehealth-based services to families residing in Asia. Even fewer studies have attempted to obtain social validity measures to assess the acceptability of telehealth service delivery. Additionally, a goal of this study was to compare the procedural integrity of caregivers who did and did not require the assistance of interpreters to further evaluate the extent to which language barriers may affect treatment.

In this study, we evaluated the efficacy and acceptability of telehealth-delivered services to families residing in Pakistan, India, and Vietnam with and without the use of interpreters. For a portion of the participants, we also assessed whether the caregivers' behaviors generalized to other settings and materials in the absence of the behavior analyst. Finally, we compared the procedural integrity and the acceptability ratings of caregivers who received services via a culturally matched experimenter or interpreter to those of caregivers who received services from an experimenter with a different cultural background to examine whether cultural differences between the caregiver and the provider impacted the outcomes.

Method

Participants and Settings

Participants included nine caregiver-child dyads. An additional four dyads enrolled in but did not complete the study. All completed participants' caregivers were their mothers. The children were between the ages of 4 and 10 years and had various diagnoses (i.e., intellectual disability, Down syndrome, and ASD). The experimenters identified families through flyers posted online on Facebook disability groups in Vietnamese, Urdu, and English as well as flyers distributed at autism centers in India and Pakistan. To be eligible for the study, the child had to be at least 2 years old, have a developmental disability confirmed via medical records, and engage in moderate to high rates of problem behavior daily as indicated through the Aberrant Behavior Checklist (ABC) completed by caregivers (Aman et al., 1985). Moreover, the family had to have access to high-speed internet in their home (minimum download/upload speed 400 kbps/400 kbp) and own a smartphone, tablet, laptop, or desktop computer. The first families from each region who sent the requested documents including the consent form participated in the

study. Table 1 depicts each participant's age, sex, diagnoses, target behavior, ABC score, and communication modality. Table 2 depicts each caregiver's age and education level, the family's location, hardware used, language of service delivery, and assigned experimenter.

Only one participant (Arjun) received therapeutic services outside of school. Arjun attended a school that provided behavioral intervention services and targeted adaptive and communication skills. Jannat's mother received online training about applied behavior analysis to better understand her daughter and was certified as a registered behavior technician. The experimenters offered interpretation services to all families prior to service provision. Four caregivers (Quang, Danh, Nhung, and Ali) accepted interpreters and five (Faizan, Iffat, Zaheen, Jannat, and Arjun) rejected the offer. Although Danh's caregiver spoke and understood English, she accepted the interpreter and preferred that caregiver training for the assessment and treatment procedures be delivered in Vietnamese via the interpreter. Additionally, the caregivers were either culturally matched (CM) to their assigned experimenter or interpreter (Arjun, Quang, Nhung, Danh, and Ali) or non-culturally matched (NCM) to their assigned experimenter (Faizan, Iffat, Zaheen, and Jannat).

The four caregiver-child dyads who enrolled in but did not complete the study included a dyad from Jaleshwar, Nepal, who had to be dropped because of poor internet connectivity in their area due to the monsoon weather. A second dyad from Mumbai, India discontinued services due to scheduling difficulties resulting from the child's bed time routine and the unfavorable time zone difference (+11.5 hours). A third dyad located in Beijing, China was excluded from the study as there were no occurrences of problem behavior during the FA and the mother reported that it was no longer a concern. Finally, a fourth dyad from Islamabad, Pakistan withdrew due to internet connectivity issues.

A master's-level experimenter (experimenter A) or graduate student (experimenter B) coached the caregivers either directly in English (for Faizan, Iffat, Zaheen, Jannat, and Arjun) or through a Vietnamese-speaking interpreter (for Quang, Danh, and Nhung), or an Urdu speaking interpreter (for Ali) during 1-hour appointments, typically conducted once per week. Experimenter A was a BCBA who had 6 years of experience working with children with autism and other developmental disabilities and 4 years of experience providing services via telehealth. She was born and raised in Greece and had resided in the United States for 16 years. Experimenter B had 3 years of experience providing behavior analytic services to families and 1 year of experience providing services via telehealth. She was born in India to Indian parents, raised in the Middle East, and identified as Indian American. She had resided in the United States for 14 years with her family and had

Table 1. Characteristics of Completed Participants.

Child	Age	Sex	Diagnoses	Target behavior	ABC score	Communication modality
Ali	7	Male	Intellectual disability	Screaming, aggression, and property destruction	35	Short phrases using vocal speech
Faizan	8	Male	ASD and epilepsy	Screaming, aggression, and property destruction	28	Simple sentences using vocal speech
Iffat	4	Female	Down syndrome	Screaming, aggression, and property destruction	23	Non-verbal
Quang	10	Male	ASD	Self-injury and flopping	29	Simple sentences using vocal speech
Danh	6	Male	ASD	Property destruction	19	Word approximations
Nhung	5	Female	ASD	Property destruction	24	Non-verbal
Zaheen	7	Female	ASD	Self-injury, aggression	35	Gestures and occasional words
Jannat	6	Female	ASD	Screaming, aggression, and property destruction	20	Gestures and one-word mands
Arjun	6	Male	ASD	Aggression and property destruction	35	Gestures

Note. ASD = autism spectrum disorder; ABC = Aberrant Behavior Checklist.

Table 2. Characteristics of Completed Participants' Caregivers, Hardware Used, and Assigned Experimenter.

Child's name	Caregiver age	Caregiver education	Residence	Hardware	Language of service delivery		Expt.
					Hardware	Expt.	
Ali ^a	32	High school diploma	Karachi, Pakistan	Phone	Urdu		A
Faizan	34	Ph.D.	Rawalpindi, Pakistan	Laptop	English		A
Iffat	43	Bachelor's degree	Karachi, Pakistan	Phone	English		A
Quang ^a	35	High school diploma	Hanoi, Vietnam	Phone	Vietnamese		A
Danh ^a	38	Bachelor's degree	Hanoi, Vietnam	Desktop computer	Vietnamese/English		A
Nhung ^a	38	Master's degree	Hanoi, Vietnam	iPad	Vietnamese		A
Zaheen	41	Master's degree	Peshawar/Karachi, Pakistan	Phone & laptop	English		B
Jannat	35	Ph.D.	Peshawar Pakistan	Phone & laptop	English		B
Arjun	35	Master's degree	Hyderabad, India	Two phones	English		B

Note. Expt. = experimenter

^aAccepted interpreter.

strong ties to Indian culture. To ensure consistency between experimenters, experimenter A supervised experimenter B. In addition, experimenter A was present during the majority of experimenter B's sessions with the participants (i.e., Arjun, Jannat, and Zaheen).

The interpreters included a doctoral student in school psychology who was raised in Vietnam for the first 14 years of her life and was attending a U.S. university and a graduate student in family therapy who was raised in Pakistan for the first 12 years of her life. The Urdu interpreter had no training, coursework, or experience in applied behavior analysis. The Vietnamese interpreter had taken a graduate class on assessments that included FAs but had no experience conducting this assessment or treatment.

During the appointment times, the experimenters were located at their office in a university clinic, the interpreters were located in a third location (i.e., the Vietnamese interpreter was in her apartment, the Urdu interpreter in her office), and the families at their homes. The caregivers conducted sessions in the living room (Faizan and Quang), in a study/sensory room (Danh), the caregivers' bedroom (Iffat), child's bedroom (Nhung) or a combination of the child's bedroom and kitchen (Ali). Zaheen, Jannat, and Arjun participated in both training and generalization sessions. Thus, they had designated separate rooms in their homes for the training and generalization sessions (i.e., sessions conducted by caregivers independently). Arjun's coached appointments were conducted in an additional bedroom (converted into a playroom) in the house that consisted of across-the-wall wardrobes, a fridge, and a small blue table and chair set. Generalization sessions were conducted in the master bedroom, which contained a bed, wardrobes, a rocking chair, and a table with miscellaneous items, and in the living room, where Arjun and his mother sat on a couch with a coffee table beside them. Items that were available during the generalization sessions were chips, candy, and the tablet. Jannat's coached sessions were conducted in the master bedroom, which contained a bed, wardrobes, a bedside table, bookshelf, desk, a kid's bed, and a sliding door that had access to the other bedroom and the living room. She played with a number of dolls while also reading some books during these appointments. The generalization sessions were conducted in Jannat's bedroom. The pink-walled bedroom included a bed, a nightstand, and a wardrobe; the items available in these appointments were balloons, chips, and a toy phone. Zaheen's family had to switch homes for a few weeks during the treatment phase so appointments were conducted in two different houses. Her coached sessions were conducted in the lounge area of the first house that included couches, a coffee table, an entertainment center wall unit, and a standalone fireplace. Sessions were also conducted in a bedroom (second house) that included a bed, bedside table, across-the-wall wardrobes, a wall mirror, and a

toy corner. The mother used a camera stand during some of the appointments to prop up the phone. She played with her phone, sticker books, blocks, and ate snacks during the FCT and scheduled thinning sessions. Generalization sessions were conducted in the master bedroom which included a bed, across-the-wall wardrobes, floor mattresses, a couch, bedside tables, and an indoor hanging swing chair. Zaheen played with stuffed animals and consumed jelly beans during these appointments.

The experimenters used Vidyo™, Ring Central™, or Zoom™, three HIPAA-compliant video conferencing software, and a desktop computer or a laptop to conduct the telehealth sessions. They recorded all appointments via Debut™ software or Zoom™ and saved them on a secure drive for data coding and analysis.

Response Measurement, Procedural Integrity, and Interobserver Agreement

For the child participants, screaming was defined as vocalizations above conversation level, property destruction was defined as throwing or hitting objects, flopping was defined as throwing the body on the floor from a standing position, aggression was defined as hands or other body parts forcefully coming in contact with the caregiver's face or body, and self-injury was defined as the participant's body or face forcefully coming in contact with his/her hands, objects, or surfaces. Independent mands were defined as picking up the communicative card and handing the card to the caregiver or emitting a vocal request without gesture, model, or physical prompts. Trained observers watched videotaped recordings of the participants' sessions and used laptops to record data on problem behavior using frequency recording for Zaheen, Jannat, and Arjun and 10-second partial interval recording for Ali, Faizan, Iffat, Quang, Danh, and Nhung. For all participants' independent mands, the observers used frequency recording. Data on problem behavior were converted to responses per minute (RPM; Zaheen, Jannat, and Arjun) or percentage of intervals (Ali, Faizan, Iffat, Quang, Danh, and Nhung). Data on independent mands were converted to a percentage of trials. The beginning of each trial was defined as the presentation of the relevant antecedent (i.e., removal of attention, removal of a tangible, or presentation of a demand). The end of the trial was defined as the caregiver providing the functional reinforcer to the child.

Caregiver behavior was measured as treatment fidelity based on the individual procedure for each participant. The experimenters individualized a task analysis for each caregiver depending on the function of the participant's problem behavior (see further description in Procedures below). Each step of

the task analysis was considered an opportunity and the caregiver's behavior was recorded as correct, incorrect, or not applicable. Procedural fidelity data were collected for at least 32% of FA sessions and 54% of FCT sessions for each participant. Procedural integrity data were calculated by dividing the number of correct antecedents and consequences by the total number of opportunities and converting the result to a percentage. For all caregivers except those of Zaheen, Jannat, and Arjun, a correct response during the implementation of FCT was scored when the caregivers independently implemented the correct step as well as when the caregiver correctly implemented the step following a verbal prompt. A more stringent method of calculating procedural integrity was used for the caregivers of Zaheen, Jannat, and Arjun, who also conducted generalization sessions. For these caregivers, a correct response was only scored if the caregiver independently implemented the correct step of the task analysis. If the experimenter provided a verbal prompt (during coached sessions) prior to the caregiver implementing the step, this step was marked as not applicable and did not count toward the denominator during fidelity calculations. This more stringent method permitted a direct comparison of procedural integrity data across the coached and generalization sessions because the experimenter was not present during the generalization sessions.

Secondary trained observers independently collected data for a minimum of 30% of all FA and FCT sessions, including generalization sessions, for the purposes of calculating interobserver agreement (IOA). To calculate IOA for participant behavior, sessions were divided into consecutive 10-second intervals. Agreements were defined as intervals for which the observers scored the same number of responses (for frequency measures) or agreed on the nonoccurrence or occurrence of the response (for interval measures). IOA data on problem behavior, independent mands, and caregiver behavior were calculated as the number of agreements divided by the number of agreements plus disagreements (i.e., intervals for which the observers did not agree), and the results were converted to a percentage of agreements. IOA data for problem behavior during the FA and FCT sessions were collected for 34% and 36% of sessions, respectively, and averaged 99% (range, 85%–100%) and 97% (range, 82%–100%), respectively, across the nine participants. IOA data for independent mands during the FA and FCT sessions were collected for 33% and 36% of sessions, respectively, and averaged 100% and 98% (range, 67%–100%), respectively, across the nine participants. IOA data for caregivers' procedural integrity during the FA and FCT sessions were collected for 45% and 36% of sessions, respectively, and averaged 99% (range, 90%–100%) and 95% (range, 68%–100%), respectively, across the nine participants.

Following treatment implementation, the first author asked each caregiver to complete a modified version of the Treatment Acceptability Rating Form (TARF) via email (Reimers & Wacker, 1988). The questionnaire evaluated the caregivers' acceptance of the assessment and treatment procedures as well as use of telehealth. The interpreters translated the survey for the Urdu, Vietnamese, and Mandarin-speaking participants. The English version of the survey is displayed in Table 4.

Experimental Design and Procedures

The experimenters used a multielement or pairwise (for Arjun and Jannat) design for the FA and a non-concurrent multiple baseline design across participants to evaluate the effects of treatment with FCT. Before the first session, the experimenter provided the caregivers with an initial caregiver questionnaire packet as a form of an indirect assessment. The caregivers filled out all relevant information about the participant's problem behavior, communication skills, preferred tangibles, and problematic situations they encountered due to the target behavior. For the non-English speaking families, all documents were translated to their language (i.e., Urdu or Vietnamese).

To provide services with cultural humility, the experimenters used the following four strategies. First, the experimenters offered interpreters who were culturally matched to the families and encouraged those interpreters to educate the experimenters about the culture, when applicable. Second, the experimenters learned about the culture of the country and city in which the families resided prior to the appointment. During the appointment, the experimenters made comments about current events in the city and discussed culturally significant foods, traditions, and local attractions with the caregivers. The experimenters learned of these culturally significant foods and traditions by conducting an internet search and by consulting the interpreters (when applicable) and third-party individuals with the same cultural background. Third, the experimenters learned greetings, compliments, and phrases in the caregivers' native language and consulted the interpreters or third-party individuals who spoke the caregivers' native language regarding pronunciation. Finally, the experimenters organized educational presentations for caregivers and teachers in the local communities. Specifically, the experimenters organized a series of four webinar presentations in Vietnam with the help of Quang's caregiver, who served as the local contact. The other two caregivers from Vietnam also attended these presentations and encouraged their local community to do the same. The experimenters also organized a series of presentations in Karachi, Pakistan with the help of Iffat's caregiver who served as the coordinator and Urdu interpreter. Similarly, Faizan's caregiver and

Jannat's caregiver respectively organized educational presentations in Rawalpindi and Peshawar, Pakistan. Ali's caregiver and Zaheen's caregiver attended several presentations and helped recruit attendees.

In addition to these four strategies, the experimenters maintained positive therapeutic relationships with the caregivers by providing positive comments about the caregiver's and child's behaviors, allocating additional time both before and after the session to listen to the caregiver's thoughts, and adjusting the procedures according to caregiver preference. The experimenters consulted the caregivers during the development of the assessment and intervention. For example, the caregivers provided input on the design of the FA conditions (e.g., the caregivers specified conditions under which the target behavior was most concerning for their families). At the beginning of each appointment, the experimenters allotted time for the caregivers to express their thoughts and experiences with the treatment package and incorporated these concerns into the assessment or treatment design. During the appointment, the experimenters also provided consistent positive statements regarding both the child's and the caregivers' behaviors and paused throughout the appointment to ask the caregivers to express their feelings about the child's progress. Finally, the experimenters allowed time at the end of every appointment to reflect on the sessions and allot time for discussion. These strategies have also been outlined by Taylor et al. (2019) as core components of providing services with compassion.

The experimenters used the same method as Tsami et al. (2019) to familiarize the interpreters with the protocol by explaining the rationale and procedure. The interpreters and experimenters had a total of two 1-hour meetings, one before the first appointment with the family and one before the first FCT appointment. During the meetings, the experimenters evaluated the interpreters' progress using an open-ended test consisting of 20 questions until all questions were answered correctly. The experimenters did not teach the interpreters to coach the caregivers independently, as the training's purpose was to familiarize the interpreters with the protocol. In addition, the interpreters were encouraged to provide feedback to the experimenters regarding treatment components that may not be culturally appropriate. For example, the Vietnamese interpreter explained to the experimenter that it was not appropriate, according to cultural norms in Vietnam, to ask the caregivers to provide praise by hugging and kissing the participant. Moreover, the interpreters coached the experimenters regarding pronunciation of names and words in the caregiver's language.

During the first telehealth session with the caregiver, the experimenter discussed the questionnaire and results from the checklist and created operational definitions for the target behavior. The experimenter used this information to

individualize the conditions of the FA (e.g., select the instructions for the demand condition, identify the items to include in the tangible condition, etc.). In the second appointment, the experimenter explained the purpose of the FA and the importance of an FCT treatment package. Additionally, the experimenter explained the caregiver's role in each condition. The caregivers then implemented the FA and FCT sessions with their children with coaching and feedback from the experimenters using procedures similar to those described by Wacker et al. (2013a, 2013b).

Functional analysis/baseline sessions. The FAs were conducted using procedures similar to those described by Wacker et al. (2013a). The experimenters coached the caregivers directly or through the interpreters and provided prompts as needed during the session. The multielement FA sessions included play, tangible, attention, and escape conditions and each session lasted 5 minutes. The pairwise FA consisted of 10-minute tangible and play sessions. Arjun's caregiver reported that the tangible function of his problem behavior was most concerning. After considering Arjun's FA data and his caregiver's feedback, the experimenters conducted a pairwise FA with the tangible condition, although FA data indicated that the target behavior was maintained by multiple variables. Sessions under the condition with the highest levels of problem behavior also served as the pre-treatment baseline sessions. For families who participated in the generalization analysis (see further description below), caregivers conducted additional sessions under the condition with the highest level of problem behavior but with different stimuli (e.g., different preferred items for the tangible condition) and in a different room (described above) to obtain pre-treatment baseline sessions in the generalization context.

Functional communication training (coached sessions). All coached sessions were conducted once a week during 1-hr telehealth appointments. Each FCT session lasted 5 or 10 minutes (depending on the participant), and the procedures were similar to those described by Wacker et al. (2013b). During schedule thinning appointments, sessions were extended to approximately 11 minutes to incorporate the 5 minute delays for two participants (Arjun and Zaheen). FCT procedures were individualized for all participants based on their FA results, and the experimenter consulted the caregiver when creating the communication card. Written instructions were also emailed to the caregivers on how to conduct the FCT protocol. The experimenter began FCT sessions by vocally prompting the caregiver to implement the components accurately and provided immediate positive and corrective feedback. After the participants' caregivers conducted two consecutive FCT sessions with at least 80% integrity, the experimenter began to delay feedback until the end of

the 5- or 10-minute session. All caregivers were taught to implement extinction for the target problem behavior and provide no programmed consequences for all non-target problem behaviors.

For the participants whose problem behavior was maintained by access to tangibles, the caregivers blocked access to the participant's highly preferred item and immediately physically guided the participant to exchange the communication card (0 second prompt delay). To promote independent responding, the experimenter individualized the prompt delay for each participant so the caregiver's physical prompts were gradually delayed. During sessions with edibles, the participants received a smaller amount of the edible (e.g., one whole or half a chip) for prompted responses and a larger amount (e.g., three chips from the bag) for independent responses.

Following at least two consecutive sessions with no occurrences of the target behavior and with independent mands occurring at or above 80% of opportunities, the experimenters coached the caregivers to implement schedule thinning and work toward the terminal goal. After the caregiver removed the relevant reinforcer and the participant manded for it, the caregiver was instructed to state a delay instruction (such as "wait," "hold on," or "in a moment") and the picture card was not available for the target delay period (e.g., 5 seconds). During the delay period, the caregiver withheld the functional reinforcer. After the delay period elapsed, the caregiver placed the card in the participant's view so they could independently mand for the reinforcer again. After one session where the participant emitted independent mands above 80% of opportunities and did not engage in the target problem behavior, the caregiver increased the duration of the delays. The increase in delay duration was individualized for each participant.

For the participants whose problem behavior was maintained by escape from demands, the caregivers sat next to the participant and presented an instruction to complete a task. Following the participant's compliance, the caregiver used most-to-least prompting to guide the participant to exchange the communicative card that was available next to them. After the card exchange, the caregiver removed the instructional material and provided a 30-second break. This sequence of task presentation, prompt to exchange the card as needed, and removal of the instructional material for 30-second repeated for the duration of the session. The caregivers used three-step prompting for noncompliance or problem behavior.

After two consecutive sessions with no occurrences of the target behavior as well as independent manding above 80%, the number of tasks presented by the caregiver before the participants could mand for a break gradually increased. The caregivers set the terminal goal for each participant. Once the specified number of tasks were completed, the caregivers were instructed to place the

communicative card in front of the participants. Contingent on the participant's mand, the caregivers removed all instructional materials and provided a 30-second break. After one session without occurrences of the target behavior and with mands above 80%, the caregivers were instructed to increase the number of tasks presented before the participants' mands for breaks were honored. Schedule thinning was individualized for each participant.

For the participants whose problem behavior was maintained by both access to tangibles and escape from demands, the caregivers started the session by removing access to the participants' target tangible and at the same time presenting an instruction to complete a task. Following the participant's compliance, the caregiver prompted the card exchange as needed, followed by removing the instructional material and also providing the tangible for 30 second. The sequence of tangible removal, presentation of instruction, prompt to mand, removal of instructional material, and access to tangible for 30 second was repeated for the duration of the session.

After two consecutive sessions with no occurrences of the target behavior as well as independent mands above 80%, the number of tasks presented by the caregiver before the participants could mand, gradually increased to a specific goal set by each caregiver. The schedule thinning procedures were identical to the procedures used for participants whose target behaviors were maintained by escape from demands, except that the caregivers were also instructed to provide access to the functional tangible during the 30-second break.

Functional communication training (generalization sessions). Generalization sessions were conducted for Arjun, Jannat, and Zaheen to assess caregivers' procedural integrity in the absence of the experimenter and to evaluate generalization across stimuli and settings that were not included during coached sessions. After the caregiver's treatment fidelity was at least 80% for two consecutive sessions, the caregivers began conducting independent sessions outside of the coached telehealth appointments. A research assistant observed and video recorded all sessions through Zoom™ at the university campus office, but with their audio and video turned off to reduce potential reactivity. At least two sessions were conducted during each generalization appointment. If the experimenter noticed that the procedural integrity of the caregiver decreased below 80% for four consecutive sessions, additional training would have been provided; however, this did not occur.

Results

Results of the initial FAs identified maintaining variables for seven of the nine participants who completed the study. For two participants (Arjun and

Jannat), pairwise FAs following the standard FAs demonstrated functional relations between the target behavior and the tested maintaining consequence. As noted previously, problem behavior during the FA served as the baseline. Several participants' target behaviors were also shown to be multiply controlled (Iffat, Zaheen, and Arjun). For these participants, the experimenters consulted the caregivers to identify the most significant conditions under which the target behavior occurred at home. Thus, the experimenters targeted the behaviors and contexts according to the caregivers' feedback. Problem behavior was maintained by access to tangibles for five participants (Zaheen, Jannat, Arjun, Iffat, and Quang), by escape from demands for two participants (Ali and Danh), and by multiple consequences for two participants (Faizan and Nhung). Faizan's problem behavior was maintained by access to attention, tangibles, and escape from demands. However, the attention function for Faizan's problem behavior was not addressed because her caregivers reported that they preferred to prioritize the escape and tangibles function. Nhung's problem behavior was maintained by access to tangible and escape from demands.

Figures 1 and 2 show baseline and treatment data for all participants. The numerals on either side of the arrows above the graphs indicate the initial and terminal number of completed tasks or delay duration (in seconds) required during the schedule thinning phase. During FCT, problem behavior for all participants except Arjun decreased to zero levels and remained low when the caregivers delayed access to the functional reinforcer for manding. Additionally, all participants except Arjun emitted independent mands during at least 90% of opportunities by the end of the FCT sessions.

Figure 2 also depicts the data obtained from the generalization sessions for Zaheen, Jannat, and Arjun. During the generalization sessions, Zaheen independently manded for novel items an average of 93.5% of opportunities and engaged in the target behavior at a rate of 0.1 RPM. Jannat's mands for novel items, on average, were at 99% and she did not engage in problem behavior. Finally, Arjun emitted independent mands for novel items an average of 92% of opportunities and engaged in the target behavior an average rate of 0.78 RPM.

Table 3 depicts the procedural integrity data for all caregivers. Although a more stringent definition of correct procedural integrity was used for three participants (one of whom was in the CM category and two of whom were in the NCM category), results showed similar mean levels of integrity across caregivers, regardless of cultural matching. Likewise, procedural integrity measures were similar for participants who required assistance from an interpreter (Ali, Quang, Nhung, and Danh) and those who did not. On average, the procedural integrity data for Arjun, Zaheen, and Jannat's caregivers during

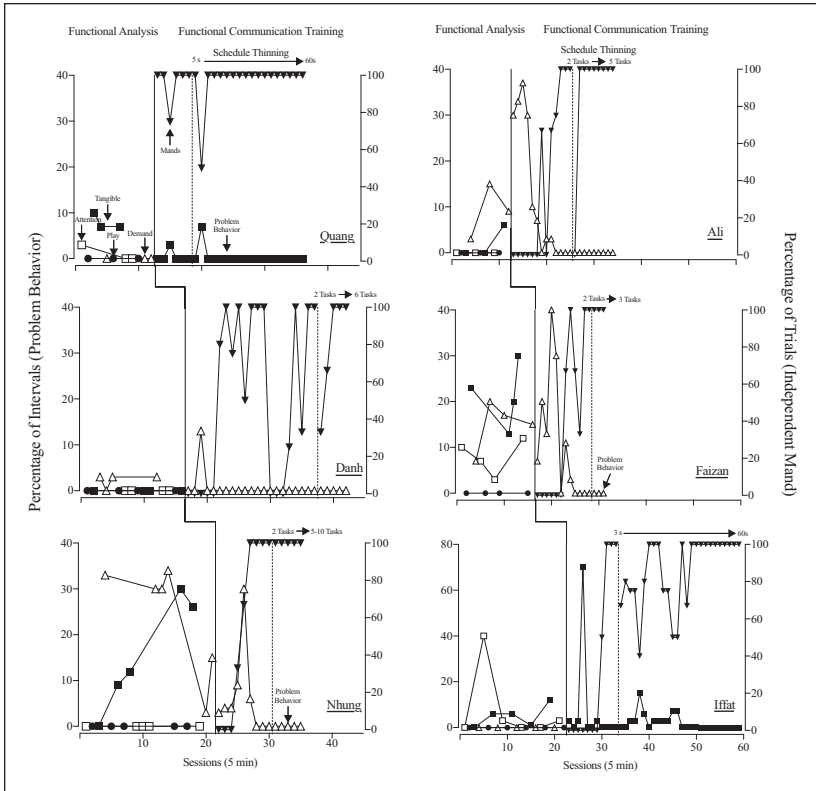


Figure I. Problem behavior and mands of three completed participants from vietnam and three completed participants from Pakistan.

generalization sessions were 96% (range 91%–100%), 93% (range 83%–100%), and 93% (range 78%–100%), respectively. Hence, procedural integrity did not differ between coached and uncoached independent sessions for those caregivers. Finally, mean TARF ratings, displayed in Table 4, indicate high levels of caregiver acceptability, with similar outcomes for CM and NCM participants.

Discussion

This study examined the efficacy and acceptability of telehealth-based FA and FCT procedures in three Asian countries using several methods. First, we evaluated whether the treatment package was effective at decreasing problem

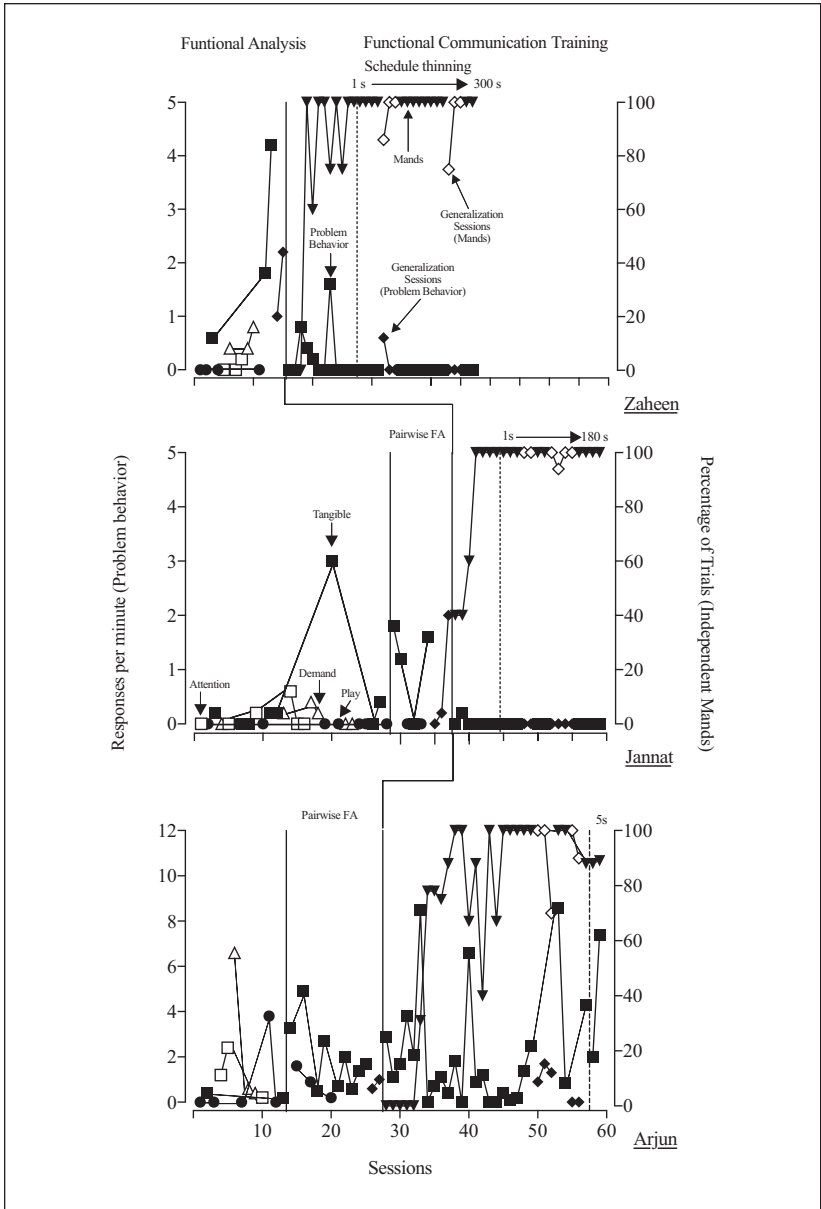


Figure 2. Problem behavior and mands of three completed participants from India and Pakistan.

Table 3. Mean Parent Procedural Integrity (With Ranges) During FA And FCT.

Participants	FA (%)		FCT (%)	
	Mean	Range	Mean	Range
Culturally matched (CM)	99	68–100	98	53–100
Arjun ^a	96	68–100	93	53–100
Quang ^b	100	—	99	94–100
Danh ^b	100	—	100	—
Nhung ^b	100	—	99	95–100
Ali ^b	99	97–100	97	87–100
Non-culturally matched (NCM)	97	83–100	93	43–100
Faizan	94	83–100	95	88–100
Iffat	98	86–100	99	90–100
Zaheen	96	87–100	85	43–100
Jannat	98	83–100	93	41–100

Note. FA = functional analysis; FCT = functional communication training.

^aCulturally matched via experimenter.

^bCulturally matched via interpreter.

behavior and increasing independent mands for the child participants. Second, we assessed whether the skills taught to some caregivers generalized across settings and materials and in the absence of the experimenter. Third, we administered a modified TARF to examine the acceptability of caregiver coaching delivered via telehealth. Finally, we evaluated whether the use of interpreters and cultural matching affected the delivery of services by comparing the treatment fidelity and acceptability rating data obtained for caregivers in each category. Reductions in problem behavior were obtained for all participants except Arjun, and all caregivers rated the procedures as acceptable. In addition, our findings indicated that treatment fidelity did not differ between indirect and direct coaching sessions, between CM and NCM participants, and between coached and uncoached sessions. Hence, we provided further evidence that FA and FCT procedures delivered via telehealth may be an acceptable and effective modality for families in Asia.

Sivaraman and Fahmie (2020) reported several cultural adaptations that have been made during the global delivery of telehealth-based behavior analytic services. One of the most common adaptations consisted of culturally matching the service provider to the caregiver. However, the current study provided evidence that this adaptation per se may not be necessary to obtain positive outcomes. For example, treatment integrity and acceptability rating data did not differ between caregivers who received coaching via a non-culturally matched provider or

Table 4. Mean Caregiver Ratings on Modified TARF Administered Post-Treatment.

Items	CM	NCM
1. How acceptable do you find the functional analysis assessment? (1 = unacceptable; 7 = very acceptable)	7	6.75 (6-7)
2. How acceptable do you find the treatment to be regarding your concerns about your child? (1 = unacceptable; 7 = very acceptable)	7	6.75 (6-7)
3. How likely is this treatment to make permanent improvements in your child's behavior? (1 = unlikely; 7 = very likely)	6.2 (5-7)	6.5 (6-7)
4. How costly will it be to carry out this treatment? (1 = not at all costly; 7 = very costly)	1	1.5 (1-3)
5. How willing are you to carry out this treatment? (1 = not at all willing; 7 = very willing)	6.8 (6-7)	7
6. How much time will it be needed each day for you to carry out this treatment? (1 = little time; 7 = much time)	5.6 (2-7)	2.25 (1-3)
7. How confident are you that the treatment will be effective? (1 = not confident; 7 = very confident)	6.6 (6-7)	6.5 (6-7)
8. How willing would you be to change your family routine to carry out this treatment? (1 = not at all willing; 7 = very willing)	6.8 (6-7)	6.75 (6-7)
9. How disruptive will it be to your family (in general) to carry out this treatment? (1 = not at all disruptive; 7 = very disruptive)	1.8 (1-5)	2 (1-3)
10. How effective is this treatment likely to be for your child? (1 = not at all effective; 7 = very effective)	6.2 (5-7)	6.75 (6-7)
11. How well will carrying out this treatment fit into your family routine? (1 = not at all well; 7 = very well)	6.2 (5-7)	6 (5-7)
12. How much do you like using your computer for assessment and treatment? (1 = not at all; 7 = very much)	5.4 (4-7)	6.25 (4-7)

Note. Mean ratings (with ranges) on a 7-point scale for each item on the social validity survey (i.e., modified TARF) completed after the caregivers implemented FCT with their children.

CM = culturally matched therapist/interpreter; NCM = non-culturally matched therapist.

interpreter (i.e., Faizan, Iffat, Zaheen, and Jannat) and caregivers who received coaching via a culturally matched experimenter or interpreter (i.e., Arjun, Quang, Danh, Nhung, and Ali). In fact, outcomes did not differ for Jannat's and Zaheen's caregivers, even though the provider and the caregivers, respectively, were from India and Pakistan, two countries that have historically been in conflict (Kadir & Jawad, 2020).

These findings suggest that culturally matching per se is not required to provide culturally responsive care. Rather, results may reflect our focus on cultural humility, compassion, and rapport building strategies (Taylor et al., 2019). Rapport building also has been reported as a cultural adaptation in several studies (Sivaraman & Fahmie, 2020). In addition to the strategies described in the Method, the experimenters in the current study began every appointment with a warm greeting and asked how the caregiver was doing. During this time, the experimenter also inquired about possible challenges the caregivers may have faced during the prior week in regards to their child in general or to the implementation of the intervention. The experimenters gave the caregivers time to share concerns and demonstrated empathy and compassion by implementing the subskills described by Taylor et al. (2019; e.g., acknowledging the caregiver's feelings, reassuring the caregivers when needed, and modifying treatment procedures based on caregiver preferences). During the appointments, the experimenter continued to build rapport by allowing time for the caregivers to ask questions throughout the appointments and by providing positive comments regarding the caregiver's implementation of the intervention or the child's behavior. This alone may have contributed to the high acceptability ratings across all caregivers. Interestingly, Arjun's caregivers rated the assessment and treatment as highly acceptable despite the absence of reductions in the participant's problem behaviors.

Despite the overall positive outcomes, treatment appeared to be ineffective for one participant (Arjun). Some potential reasons include the high number of canceled appointments (60% of scheduled appointments) and a potential automatic function of Arjun's problem behavior, which the experimenters planned to address with continued services. The caregiver reported that they were experiencing health problems that contributed to the appointment cancellations as well as the early termination of services.

Several additional limitations of the study should be considered. First, the assignment of participant families to the CM or NCM group was not randomized. Second, the majority of caregivers were highly educated and thus may not be a representative sample of caregivers needing services in their countries. Third, participants needed access to high-speed and stable internet connections as well as multiple technological devices. However, populations with limited access to internet connections and technology are also likely to be

under-resourced when it comes to behavioral service provision. This was one of the limitations for the participants from Nepal and Pakistan, who despite being motivated to participate in this project, did not have the needed high-quality internet speed in their village and city to continue having sessions.

Disruptions in appointments may also occur when participants reside in countries with increased rates of natural disasters or extreme weather. Such was the case for one participant who could not complete the study due to monsoon weather. Thus, telehealth may be a more challenging option for families who live in rural areas or who live in zones that regularly experience extreme weather. Fourth, the caregivers were asked to complete and send the modified TARF via a non-anonymous email to the first author. Fifth, procedural integrity data were not collected on the experimenters' behavior as they coached the caregivers. Lastly, follow up sessions were not conducted to determine whether the caregivers' high levels of procedural integrity would maintain over time.

Future research should address these limitations and continue to evaluate the efficacy of and, most importantly, the acceptability of other treatment packages when delivered globally using telehealth modalities. This includes recruiting families of more diverse socioeconomic backgrounds as well as extending services to more countries. Further research also is needed on necessary and sufficient cultural adaptations when providing telehealth services, including more direct comparisons of service provision under culturally matched versus non-matched therapists and caregivers. Moreover, all interpreters in this study were culturally matched to the caregivers. However, culturally matched interpreters may not always be available in practice. Future research could explore other facets of interpretation services, such as the use of non-culturally matched interpreters or the implementation of interpretation software.

Overall, our findings suggest that a treatment package of FA and FCT procedures delivered internationally via telehealth is effective and acceptable in several Asian countries. Caregiver generalization data also suggest that the skills acquired through telehealth-based coaching were valuable to the caregivers as they continued to implement the treatment with high accuracy in the absence of the experimenter. Procedural integrity remained high and did not significantly differ across participants whether the participants used interpreters or whether the experimenter or interpreter was culturally matched to the caregivers. This preliminary evidence supports the use of interpreters when providing this assessment and treatment package via telehealth.

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References

- Aman, M. G., Singh, N. N., Stewart, A. W., & Field, C. J. (1985). The aberrant behavior checklist: A behavior rating scale for the assessment of treatment effects. *American Journal of Mental Deficiency, 89*(5), 485–491. <https://pubmed.ncbi.nlm.nih.gov/3993694/>
- Barkaia, A., Stokes, T. F., & Mikiashvili, T. (2017). Intercontinental telehealth coaching of therapists to improve verbalizations by children with autism. *Journal of Applied Behavior Analysis, 50*(3), 582–589. <https://doi.org/10.1002/jaba.391>
- Behavior Analyst Certification Board. (2020). *Certificant registry*. <http://www.bacb.com/index.php?page=100155&by=state>
- Benson Dimian, A. F., Elmquist, M., Simacek, J., McComas, J. J., & Symons, F. J. (2018). Coaching parents to assess and treat self-injurious behaviour via telehealth. *Journal of Intellectual Disability Research, 62*(12), 1114–1123. <https://doi.org/10.1111/jir.12456>
- Duggal, C., Dua, B., Chokhani, R., & Sengupta, K. (2020). What works and how: Adult learner perspectives on an autism intervention training program in India. *Autism, 24*(1), 246–257. <https://doi.org/10.1177/1362361319856955>
- Ferguson, J., Craig, E. A., & Dounavi, K. (2019). Telehealth as a model for providing behaviour analytic interventions to individuals with autism spectrum disorder: A systematic review. *Journal of Autism and Developmental Disorders, 49*(2), 582–616. <https://doi.org/10.1007/s10803-018-3724-5>
- Global Research on Developmental Disabilities Collaborators. (2018). Developmental disabilities among children younger than 5 years in 195 countries and territories, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. *The Lancet. Global health, 6*(10), e1100–e1121. [https://doi.org/10.1016/S2214-109X\(18\)30309-7](https://doi.org/10.1016/S2214-109X(18)30309-7)
- Heitzman-Powell, L. S., Buzhardt, J., Rusinko, L. C., & Miller, T. M. (2014). Formative evaluation of an ABA outreach training program for parents of children with autism in remote areas. *Focus on Autism and Other Developmental Disabilities, 29*(1), 23–38. <https://doi.org/10.1177%2F1088357613504992>

- Imran, N., Chaudry, M. R., Azeem, M. W., Bhatti, M. R., Choudhary, Z. I., & Cheema, M. A. (2011). A survey of Autism knowledge and attitudes among the healthcare professionals in Lahore, Pakistan. *BMC Pediatrics, 11*(1), 107. <https://doi.org/10.1186/1471-2431-11-107>
- Kadir, J., & Jawad, M. (2020). The role of emotions in interstate relations: Using an interpersonal conflict model to reconceptualize Pakistan's obsession vis-a-vis India. *Asian Journal of Comparative Politics*. Advance online publication. <https://doi.org/10.1177/2057891119900651>
- Neely, L., Hong, E. R., Kawamini, D., Umana, I., & Kurz, I. (2020). Intercontinental telehealth to train Japanese interventionists in incidental teaching for children with autism. *Journal of Behavioral Education, 29*(2), 433–448. <https://doi.org/10.1007/s10864-020-09377-3>
- Neely MacNaul, H., Gregori, E., & Cantrell, K. (2021). Effects of telehealth-mediated behavioral assessments and interventions on client outcomes: A quality review. *Journal of Applied Behavior Analysis, 54*(2), 484–510. <https://doi.org/10.1002/jaba.818>
- Qiu Lu, Y., Li, Y., Shi, J., Cui, H., Gu, Y., Li, Y., Zhong, W., Zhu, X., Liu, Y., Cheng, Y., Liu, Y., & Qiao, Y. (2020). Prevalence of autism spectrum disorder in Asia: A systematic review and meta-analysis. *Psychiatry Research, 284*, 112679. <https://doi.org/10.1016/j.psychres.2019.112679>
- Reimers, T., & Wacker, D. (1988). Parents' ratings of the acceptability of behavioral treatment recommendations made in an outpatient clinic: A preliminary analysis of the influence of treatment effectiveness. *Behavioral Disorders, 14*(1), 7–15. <https://doi.org/10.1177/019874298801400104>
- Schieltz, K. M., & Wacker, D. P. (2020). Functional assessment and function-based treatment delivered via telehealth: A brief summary. *Journal of Applied Behavior Analysis, 53*(3), 1242–1258. <https://doi.org/10.1002/jaba.742>
- Sivaraman, M., & Fahmie, T. A. (2020). A systematic review of cultural adaptations in the global application of ABA-based telehealth services. *Journal of Applied Behavior Analysis, 53*(4), 1838–1855. <https://doi.org/10.1002/jaba.763>
- Suess, A. N., Romani, P. W., Wacker, D. P., Dyson, S. M., Kuhle, J. L., Lee, J. F., Lindgren, S., Kopelman, T., Pelzel, K., & Waldron, D. B. (2014). Evaluating the treatment fidelity of parents who conduct in-home functional communication training with coaching via telehealth. *Journal of Behavioral Education, 23*, 34–59. <https://doi.org/10.1007/s10864-013-9183-3>
- Sullivan, O. A., & Wang, C. (2020). Autism spectrum disorder interventions in mainland china: A systematic review. *Review Journal of Autism and Developmental Disorders, 7*(3), 263–277. <https://doi.org/10.1007/s40489-019-00191-w>
- Taylor, B. A., LeBlanc, L. A., & Nosik, M. R. (2019). Compassionate care in behavior analytic treatment: Can outcomes be enhanced by attending to relationships with caregivers? *Behavior Analysis in Practice, 12*(3), 654–666. <https://doi.org/10.1007/s40617-018-00289-3>
- Tomlinson, S. R. L., Gore, N., & McGill, P. (2018). Training individuals to implement applied behavior analytic procedures via telehealth: A systematic review

- of the literature. *Journal of Behavioral Education*, 27, 172–222. <https://doi.org/10.1007/s10864-018-9292-0>
- Tran, C., & Weiss, B. (2018). Characteristics of agencies providing support services for children with autism spectrum disorders in Vietnam. *International Journal of Social Science and Humanity*, 8(4), 116–121. <https://doi.org/10.18178/ijssh.2018.V8.946>
- Tsami, L., Lerman, D., & Toper-Korkmaz, O. (2019). Effectiveness and acceptability of parent training via telehealth among families around the world. *Journal of Applied Behavior Analysis*, 52(4), 1113–1129. <https://doi.org/10.1002/jaba.645>
- Unholz-Bowden, E., McComas, J. J., McMaster, K. L., Girtler, S. N., Kolb, R. L., & Shipchandler, A. (2020). Caregiver training via telehealth on behavioral procedures: A systematic review. *Journal of Behavioral Education*, 29(2), 246–281. <https://doi.org/10.1007/s10864-020-09381-7>
- U.S. Census Bureau. (n.d.). *U.S. and world population clock*. U.S. Department of Commerce. Retrieved December 20, 2021, from <https://www.census.gov/popclock>
- Wacker, D. P., Lee, J. F., Padilla Dalmau, Y. C., Kopelman, T. G., Lindgren, S. D., Kuhle, J., Pelzel, K. E., & Waldron, D. B. (2013a). Conducting functional analyses of problem behavior via telehealth. *Journal of Applied Behavior Analysis*, 46, 31–46. <https://doi.org/10.1002/jaba.29>
- Wacker, D. P., Lee, J. F., Padilla Dalmau, Y. C., Kopelman, T. G., Lindgren, S. D., Kuhle, J., Dyson, S., Schieltz, K. M., & Waldron, D. B. (2013b). Conducting functional communication training via telehealth to reduce the problem behavior of young children with autism. *Journal of Developmental and Physical Disabilities*, 25, 35–48. <https://doi.org/10.1007/s10882-012-9314-0>
- Zhu, J., Hua, Y., & Yuan, C. (2020). Effects of remote performance feedback on procedural integrity of early intensive behavioral intervention programs in china. *Journal of Behavioral Education*, 29(2), 339–353. <https://doi.org/10.1007/s10864-020-09380-8>

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