

Spring 2017

A Guide to Functional Communication Training and Autism

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Connolly, Elizabeth M., "A Guide to Functional Communication Training and Autism" (2017). *Honors Research Projects*. 500.

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A Guide to Functional Communication Training and Autism

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Introduction

People who are diagnosed with autism spectrum disorder (ASD) have social interaction and communication deficits, repetitive and restrictive behaviors, and over-sensitivity to changes in routines and environment, according to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5, 2013). In order for an ASD diagnosis, individuals must have symptoms present from early childhood. According to the Centers for Disease Control and Prevention (CDC), one out of every sixty-eight children fell on the spectrum in 2012. ASD is one of the most rapidly-growing developmental disorders in the United States, with a 269% increase in prevalence between the years of 1996 and 2010 (Van Naarden Braun, Christensen, Doernberg, Rice, Schendel, Schieve, Wiggins, & Yeargin-Allsopp, 2015).

Not only do individuals with ASD experience impairments with communication skills, they often demonstrate various behaviors, such as head banging, biting, and screaming (Mancil & Boman, 2010). These behaviors are sometimes referred to as challenging, self-injurious, or assaultive and tend to occur more frequently in individuals with ASD when compared to individuals with other disabilities (Durand, 2008). These characteristics are believed to be the result of impaired speech and language skills, and they negatively affect the child's ability to express wants, needs, thoughts, and feelings.

Functional Communication Training (FCT) is one potential therapy technique to help individuals with ASD communicate more effectively by reducing the instance of challenging behaviors (Durand, 2008). The overall goal of FCT is to substitute an appropriate form of communication for the challenging behavior, and the training follows a three-step process (Mancil & Boman, 2010). The first step is for the practitioner to complete a Functional Behavior Assessment. This assessment ultimately helps the clinician determine what function the

challenging behavior serves. For example, a child may hit his fists on the table to communicate that he is bored. The function of the behavior is to escape the task and avoid boredom. Next, the speech-language pathologist and education team select a more appropriate and universally understood communicative response, such as verbal language, sign language, picture communication, or an augmentative-alternative communication (AAC) device. This new form of communication will allow the child to communicate his or her intended message (e.g., using the speech generating AAC device to say, “I’m bored and want to stop this”), and reduce the need for the challenging behavior. The last step in the FCT process involves the development of a treatment plan to teach the acceptable communicative response to the individual. When the client uses a challenging behavior to obtain a stimulus, the clinician, instead of providing that stimulus, will cue the acceptable communicative response. Cues may include verbal prompts, visual prompts, or hand-over-hand assistance. These cues will be phased out as soon as the client can perform the communicative response independently. When the child uses the correct communicative response, whether independently or with prompts, the clinician positively reinforces the behavior by providing the desired outcome.

If FCT is effective for the child, the self-injurious or assaultive behaviors should be extinguished, and the targeted functional communication skill should to be used with increasing accuracy. As the client becomes more comfortable with the appropriate communicative response, the clinician will begin to eliminate the client’s usage of the challenging behavior (Mancil & Boman, 2010). This is accomplished by ignoring the problem behavior and only responding to the communicative response.

For this study, a child with ASD, who demonstrates self-injurious behaviors (SIBs) will be taught FCT. The research question: If after a child is taught to request a break using a picture

symbol, will the number of head bangs decrease? It is hypothesized that FCT will result in a decrease in self-injurious behaviors.

Literature Review

Behavior

Behaviors serve as a means of communication. When behaviors, whether challenging or socially acceptable, occur, they are interpreted as having a function. There are four functions that individuals with ASD attempt to utilize when displaying challenging behaviors: escape/avoidance, attention-seeking, tangible/request for an object, or sensory-seeking (Durand, 2008).

Challenging, or self-injurious, behaviors may serve any one of these four functions of behavior. SIBs can be both mentally and physically harmful to an individual with ASD and can lead to depression, early school failure, and major injuries (Durand, 2008). SIBs could also be used as ineffective ways of communicating wants and needs as they are often misconstrued. For example, a head bang may be interpreted as frustration with an activity, when its true purpose was gain attention. Caregivers often mistake the intent of the SIB which leads to more frustration and challenging behaviors.

Functional Communication

Functional communication is comprised of behaviors that are socially acceptable and universally understood (Durand, 2008). American Sign Language (ASL), word approximation, speech generating devices (SGDs), and picture communication (e.g., Picture Exchange Communication System [PECS]), are all forms of functional communication (Mancil & Boman, 2010). ASL is recognized as a form of visual language that utilizes manual hand shapes and placement, body language, and facial expressions. Word approximation is when an individual uses a word or sound that is similar to the target word. An example of this would be saying “bana” for “banana.”

PECS, a form of AAC-based functional communication, involves printed squares with pictures of everyday items and tasks on them (Nunes, 2008). PECS requires the individual with ASD to manually select a picture and show it to a communicative partner. The partner then rewards the individual with what they have asked for. PECS starts by focusing on one picture that shows something that the individual needs, such as “Food” or “Help,” and moves on to discrimination and selection of multiple pictures. Sentences can be created in the later stages of the intervention.

Another effective form of functional communication includes the use of SGDs. SGDs can be programmed to include as many or as few symbols or words as the individual needs, and then turns these symbols into understandable spoken language (Nunes, 2008). SGDs can be anything from stand-alone devices to downloadable iPad apps. The individual with ASD is able to select icons with a joystick, their fingers, eye gaze, etc. which prompts the device to “speak” the word or phrase out loud. After the individual has mastered using one word at a time to communicate needs, clinicians can start to work on building sentences.

Process

FCT helps to convert challenging behaviors into effective communication, using any of the functional communication techniques listed above. A three-step process is followed by clinicians, which identifies, targets, and eliminates the challenging behavior (Mancil & Boman 2010). A Functional Behavior Assessment (FBA) is conducted to determine the function of the SIB and is completed using indirect assessments and direct observations. Indirect assessments tend to include the help of multiple people; for example, parents, caregivers, and teachers may fill out a checklist or questionnaire about the client. The clinician may interview these people as well, to gain better knowledge of the function of the SIB.

Direct observations involve the researcher or clinician observing the client in their natural environments. The “ABC,” or “Antecedent, Behavior, Consequence,” model is frequently used (Mancil & Boman, 2010). When a SIB is performed, clinicians record what occurred before and after the behavior. This recording of the precursor to (i.e., antecedent) and the outcome of (i.e., consequence) the behavior helps the clinician formulate a hypothesis about the function of that behavior. The intensity and severity of the behavior is recorded, as well as the clinician and client’s responses to the SIB. Clinicians and researchers can look at data logs to see which activities trigger the SIB. From this point, clinician responses to the challenging behavior may help researchers isolate the function and communicative intent of the SIB.

The second step in FCT is identifying an appropriate communicative response. Several things must be taken into consideration when selecting a target response including the client’s capabilities, the ease of teaching the selected response, the universality of the response, and the efficiency of the response as a whole (Mancil & Boman, 2010). If the client does not have the dexterity to move their fingers and hands, then ASL is not a viable option. Likewise, if the client does not have the patience or capability to follow SGD instructions, then something less technical may be needed.

The third FCT step is the development of a treatment plan. Mancil and Boman (2010) suggest performing discrete trial procedures to measure the effectiveness of the treatment. During discrete trial teaching (DTT), the individual with ASD attends sessions in a therapy center, clinic, or somewhere else outside of his natural environment. This allows clinicians to manipulate the environment so that the client is required to request the desired target multiple times via the new communicative response. Clinicians carry out DTT through repetitive trials and provide the client with any necessary and appropriate prompting (Kurt, 2011). These

prompts allow the client to respond correctly, and are faded out as the client learns the new communicative response.

Literature on Effectiveness

Several research studies have shown FCT to be an effective strategy for teaching functional communication. For example, Carr and Durand (1985) show that FCT is effective and successful when used with individuals with ASD, regardless of age, cognitive level, or expressive communication abilities. A meta-analysis of FCT on single case studies was constructed by Amy Heath and published in 2012. Heath surveyed thirty nine studies altogether. She used four academic databases to find studies relating to FCT. Then, she compiled the data from each of the studies in an attempt to isolate and analyze six variables.

Variables. The first variable studied was the type of functional analysis. Functional analysis determines the function of the challenging behavior (Wacker, 1990). Complete functional analysis (CFA) was compared to brief functional analysis (BFA). The difference between these two methods is that BFA is often performed under time constraints. Heath found that the BFA had an 83% success rate at identifying the function of the challenging behavior, while the CFA had a success rate of 68%. The confidence intervals of these two did not overlap at all, implying that, while both BFA and CFA had success with correctly labelling the intent of a challenging behavior, BFA had measurably better effectiveness.

The second variable was the mode of communicative response. Modes of communicative responses are the specific aids that help the client learn how to effectively communicate. Heath compared these to identify which led to greater success when implementing FCT. Three such modes of communication compared were verbal language, Aided Augmentative and Alternative Communication (A-AAC) use, and Unaided Augmentative and Alternative Communication (U-

AAC) use. The A-AAC usage category included case studies utilizing an SGD or picture cards, while the U-AAC category included studies that involved sign language and gestures, (Heath, 2012). Verbal language and FCT were shown to have the highest success rate, at 83%. A-AAC use was second, at 74%, while U-AAC usage had a 48% success rate. While the Verbal category had the highest success rate, nonverbal language, such as A-AAC and U-AAC, is required when the child is nonverbal, (Nunes, 2008). This study showed success in A-AAC and U-AAC usage.

Next, Heath investigated whether the location of the FCT process affected the success of the newly taught mode of communication. When comparing data taken in a natural environment to data collected at a contrived, unnatural environment, Heath found that location does not impact the success of FCT. Based on this, one could infer that an unnatural environment, like a therapy room or clinic, allows for the same amount of success as a natural environment does, (Tiger, Hanley, & Bruzek, 2008). Tiger and associates (2008) support this claim by noting that there are benefits and limitations to both contrived and natural environments, which may balance each other out.

The fourth variable was the function of the behavior. Challenging behaviors served as a means of communication, and they allowed the client to escape/avoid or request a sensory or tangible stimulus (Durand, 2008). Heath compared the effectiveness of FCT across behaviors intended to seek attention, access tangible objects, or escape from a stimulus. She found that, while all had a majority of success, attention-seeking problem behaviors were most successfully targeted by FCT. When using FCT on someone with a challenging behavior that was maintained by attention or access to tangible objects, the researchers had an overall success rate of 81%. Using FCT with individuals with escape behaviors was shown to have a 66% success rate.

A fifth research variable centered on the effect of FCT on people of different ages. Four age groups were compared. Twenty-three children fell into the primary group, and were aged zero to five years. Thirty-three children, ages six through twelve, belonged to the elementary age group. Thirteen individuals, ages thirteen to twenty one, were in the secondary group, and the remaining thirteen people were adults over the age of twenty two. After careful analysis of the data, Heath found that FCT was similarly effective for the primary, elementary, and secondary groups, with an approximate 80% success rate. With a 64% success rate, the use of FCT with the adult group, however, was less effective.

The final variable that was studied was the type of disability. Three categories were created (autism, intellectual disability, and other), and each case study was categorized. Individuals with autism had the highest success rate of 79% when using FCT. Heath (2012) noted that the confidence interval for the success of individuals with autism did not overlap with the success of those with intellectual disabilities or other disabilities, which implied that FCT had a significantly greater impact when it was used with individuals with ASD.

Summary. Heath's meta-analysis compared thirty nine studies measuring the effectiveness of FCT. She had six variables and consequent research questions that she aimed to answer during the course of her study. She found that several factors improved the success of FCT. A brief functional analysis was the most effective in identifying and analyzing the behavior, which lead to greater success. When verbal communication was targeted, FCT was shown to be the most successful, but, when a client was nonverbal, AAC usage had a high success rate. Location of services was not shown to matter, which meant that FCT was equally effective in natural and artificial settings. Targeted attention-seeking behaviors had better success than behaviors with other intentions, although targeted escape/avoidance behaviors were also

reduced with the use of FCT. The three younger age groups, ranging from zero to twenty-one years old, had greater success than the adults, and individuals with autism made greater improvements than those with other disabilities.

Limitations. Heath acknowledges that her meta-analysis had some limitations that should be addressed in future studies. She stated that even though her analysis found some variables to be more successful than others, each individual is unique. Clinicians should use whichever methods they feel will benefit their client the most. Heath's meta-analysis of single case studies had shown FCT to be more effective in certain populations than others. Despite these findings, continued research was needed. In the meta-analysis, Heath was not explicit as to whether the term "contrived/unnatural environments" symbolized average pullout therapy rooms, or therapy rooms that were designed to look like a natural environment. Lastly, Heath did not research if low technology forms of AAC (e.g., picture symbols) were effective.

Methods

Participant

The participant in this study was George, and he was chosen by means of a convenience sample. George was already a client on the supervising clinician's caseload, and he attended weekly 45 minute sessions. He was an 11 year old African-American male, who was diagnosed with severe ASD.

He was nonverbal and used the ProSlate AAC device with TouchChat HD to communicate. His goals focused on using picture symbols, the QWERTY keyboard, and symbol sequences to express novel messages using grammatically correct sentences. George received therapy at two university-based outpatient clinics. When George became frustrated, he would display several SIBs that included head bangs on his AAC device, table, wall, and floor. He would also vocalize loudly, take off his glasses, and get up from the therapy table.

Setting

Therapy occurred in a one on one setting. The therapy room was made to look like a home kitchen, and the actual therapy occurred at the kitchen table, which was located next to a sink. There were two couches at the other end of the room. The room also had a small trampoline inside, which George liked to jump on during his breaks. George's mother observed from within the therapy room, and the Honors College student researcher observed unobtrusively through a video monitor.

Research Design

The research design was a single case design. This research design allowed the researcher to determine George's progress during and at the end of the intervention.

Reliability and Validity

Functional behavior assessment. The researcher was able to determine the function of the SIBs through observation. The researcher also spoke with the supervising clinician to verify that the assessment of the function of George's behavior was accurate. It was determined that George's SIBs served to escape or avoid a task. When he became frustrated and wanted to escape a task, he would bang his head on the table, the floor, the wall, or his AAC device. Certain stimuli, such as new or difficult tasks and unorganized moments during therapy, tended to trigger the SIBs.

Intervention. Two graduate students, who were trained in FCT, worked directly with George. During therapy, he received intermittent sensory integration in the form of deep pressure to the shoulders and arms. George was expected to complete five activities throughout the session. These activities targeted his communication goals and involved the use of George's SGD. Clinicians prompted George to use the SGD to create a sentence, use vocabulary words, create novel phrases, and identify prepositions. A prompting hierarchy, including physical prompting (i.e., hand-over-hand assistance), was used when George did not know the answer or refused to respond.

When SIBs would occur, the graduate students began to implement FCT. They would attempt to minimize the impact of George's head hitting something, and then would prompt George to touch the "This is Hard" icon, by means of verbal, visual, and physical prompts. When George complied, and touched the icon, they would take a ten second break. George would not receive a break until he used his icon to request it. This assisted in the reinforcement of functional communication, while it worked to eliminate challenging behaviors.

Data Collection. Data were collected before and after intervention by graduate student clinicians and the researcher. The researcher was trained by the supervising clinician, and a structured data sheet was used to document George's use of FCT. Data were collected on the number of times he banged his head, the intensity of those head bangs, and the number of times he used AAC or a picture symbol to request a break.

The accuracy of the researcher's data was verified by the graduate students, and inter-rater reliability was believed to be adequate. When there was a difference in the data between the researcher and the student clinicians, the researcher used the data points collected by the graduate students.

Results

Baseline data were collected by the supervising clinician during three sessions prior to the start of the researcher's project. Before intervention, George demonstrated SIBs (i.e., head banging) an average of 20 times per session. He did not communicate his frustration or the need for a break on his SGD.

A data sheet was used (Table 1) to organize the various pieces of data. The data sheet had three columns: One for the date of the session, one for the number of times that George touched the "This is Hard" icon, and another for the amount of head bangs observed during each session. Data were collected by the researcher through observation. The researcher made tally marks as she observed George working with the clinicians. During the later sessions, George began to stop himself before his head hit the table, so a new column, "Stopping," was added and tallied.

The researcher was able to determine that FCT was effective in this trial by comparing baseline data to data collected at the end of the intervention. Baseline data indicated that George was performing SIBs an average of 20 times per session. During the last session, George only performed SIBs 5 times. This is a 75% decrease from the baseline. At baseline, George did not use the "I need a break" button at all, but, during the last session, he used it 8 times.

The intensity of the head bangs decreased as the therapy progressed. During the first few sessions, George would throw his head onto the table with great force. During later sessions, the movement was much slower and less forceful than it initially was. Also, about halfway through the progression of therapy, "Stopping" emerged. George began to stop himself from head banging, as he would catch his head in his hands before it could hit the table, wall, or SGD.

Table 1

Requests for a Break (Touches) and Self-Injurious Behaviors

<u>Session Number</u>	<u>Touches</u>	<u>Head Bangs</u>	<u>Stopping</u>
Baseline Session 1	0	21	No data
Baseline Session 2	0	23	No data
Baseline Session 3	0	17	No data
Session 1	4	14	No data
Session 2	6	25	No data
Session 3	5	17	No data
Session 4	8	15	No data
Session 5	18	22	0
Session 6	10	21	4
Session 7	7	19	5
Session 8	5	21	6
Session 9	4	3	1
Session 10	8	5	No data

The table below shows a more detail about the touches. As therapy progressed, the frequency of independent touches increased, while the frequency of touches after physical prompting decreased (TABLE 2).

George began to touch the icon independently with greater frequency in the later sessions. For the first four sessions, George touched the “This is Hard” icon after prompting 100% of the time. During sessions 5-7, George touched the icon after prompting 57% of the

time. However, for the last two sessions, George only had to be prompted for 20% and 0% of the touches, respectively, which meant he was communicating more independently.

Table 2

Level of Independence with Requests for a Break

<u>Session Number</u>	<u>Independently</u>	<u>With Physical Prompts</u>
Session 1	0	4
Session 2	0	6
Session 3	0	5
Session 4	0	8
Session 5	6	12
Session 6	6	4
Session 7	3	4
Session 8	2	3
Session 9	4	0
Session 10	No data	No data

Discussion

Through this study, the researcher was able to determine that FCT was effective for this client. When compared to the baseline data, the participant made great improvements with regards to decreasing SIBs and increasing functional communication. In this case, the researcher observed a 75% decrease in SIBs from the baseline. The researcher also found an increase of 4 independent touches between the baseline and the last therapy session with qualitative data, and an increase of 8 touches between the baseline and the final therapy session. The intensity of the head bangs decreased as the therapy progressed. Stopping, which occurred when George would catch his head in his hands before it could hit anything, increased from happening 0% of the time at baseline to 30% of the time that George attempted to engage in a SIB during the final sessions. In conclusion, the client made positive improvements using functional communication through the use of FCT.

Limitations

There are several limitations to this study. First, since only one case was involved, this study does not allow for generalization, which would permit the results to be interpreted as an accurate representation of the larger population of similar cases. Single subject designs are unable to be generalized, because they do not contain a representative population, (Nissen, Trygve, & Wynn Rolf, 2014). Additionally, the study did not investigate if the positive gains were maintained after the intervention ended, because the client stopped services at the clinic due to changes in funding.

Future Research

Future studies should be conducted with a larger group for more representative results to be collected. These studies should ensure that participants are provided with FCT for a longer period of time. Research regarding FCT in a natural environment should be conducted, and researchers should investigate if the skills learned during FCT were maintained after therapy sessions have stopped. In the future, investigators should focus on the effects of a multifaceted approach to FCT. This study focused on the integration of both SGD and picture communication. The results of this study imply that the multifaceted approach is effective when used with a child with ASD in a non-natural environment. Other studies should consider the impact of teaching more than one form of functional communication at the same time.

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