Invited Research to Practice Brief

Fostering Communication Through Physical Activity: Fit Families and the Cycle of Communication

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Abstract

Many individuals with autism experience difficulties with reliable, meaningful communication often impacting their academic and social engagement. As the first and most frequent communication partners, parents of children with autism may struggle initiating or maintaining meaningful communicative interactions, and thus require training, tools, and support. This article describes an approach to coaching parents in fostering meaningful, reciprocal communication through recreational activities as part of a larger physical activity program for parents and families of children with autism. It describes a Cycle of Communication framework as a tool for parents to recognize opportunities to structure and support their children's communicative attempts and are discussed herein for educators, families and practitioners to adapt and use within their local contexts.

Keywords
Autism, Communication, Parent Coaching, Autism and Movement, Play-Based Interventions

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Parents and guardians are the first, and most frequent, communication partners for children with autism. But many struggle initiating and maintaining meaningful communicative interactions, particularly with children that demonstrate complex communication needs and/or do not have reliable verbal speech. This article describes an approach to supporting communication through physical activity as part of a larger project on physical activity and autism, the Syracuse University Fit Families program (SUFFP).

For many individuals with autism, communication is an identified area in need of sustained and dynamic support. Not only are differences or delays in verbal communication defining characteristics of autism (American Psychiatric Association, 2013; Kluth, 2010), research and personal accounts suggest that sensory and motor challenges are core components of autistic peoples' experiences that impact social interaction and communication (McCleery et al., 2013). This could involve the production of speech or use of Augmentative and Alternative Communication (AAC) systems, or both (Donnellan et al., 2012; Hannant et al., 2016; Torres et al., 2013). Yet, communication does not happen in a vacuum; the construction and support of interactions by communication partners also play a role in the opportunities, experiences, and communicative performance of individuals with autism.

There is a need to equip parents with training and tools to foster meaningful communicative interactions across varied contexts and activities. The Syracuse University Fit Families Program (SUFFP) is an interdisciplinary research effort geared toward engaging children with autism (ages 5-11) and their families in recreational opportunities. The program promotes the use of sensory motor activities among families of children with autism by providing interactive workshops to parents related to (a) sensory integration; (b) communication; (c) physical activity and sensory motor skills; (d) aquatic opportunities; and (e) sports (Davis et al., 2017). Drawing on the inherently interconnected nature of communication, sensory movement differences, and motor planning as critical elements of experience, as well as the important role parents play in supporting these areas, SUFFP was a fitting context in which to coach parents around constructing interactive opportunities with their children through recreational activities.

The examples provided in the remainder of this paper were generated through the communication component of the SUFFP in which the authors led a workshop introducing parents to strategies for fostering meaningful, reciprocal interactions with their children through engagement in physical activity and practice with a cycle of communication. We begin with a brief review of research literature on autism, movement, and communication. We then introduce a Cycle of Communication as a framework to structure interactions through engagement in physical activity and play. This approach is intended for use by families and educators alike in reframing how communication happens with individuals for whom verbal speech is not always reliable, illustrated through vignettes of interactions between SUFFP parent/child pairs.

Autism and Communication

Individuals with autism that develop reliable access to communication tend to have better outcomes for education, work and social life (Charman et al., 2013; Vivanti et al., 2013). Provision of communication tools (i.e., picture exchange, functional communication, or access to voice output devices and training to point reliably to targets) and support to use them has shown to decrease challenging behavior, as well as an increase social and academic opportunities in autistic peoples' lives (Durand & Merges, 2001; Frea et al., 2001; Hutchins & Prelock, 2013; Mirenda, 2007). Yet despite access to early interventions, a

significant proportion of individuals with autism have difficulty acquiring functional speech, typically defined as less than 20 spontaneous, functional words or phrases (Kasari et al., 2013). It is also important to note that not all speech is functional. One common feature of speech for individuals with autism is echolalia, which is repetition of speech or vocalizations not generally meaningful or useful for the individual at the time of repetition. Considering challenges with verbal speech and often limited access to AAC, 25% to 30% currently do not have a reliable way to communicate at all (DeWeerdt, 2013).

The Connection to Movement

The significance of a sensorimotor component in the experiences of individuals with autism is becoming more widely recognized and researched. These differences in motor skill development, motor planning and motor resonance, and sensorimotor integration can impact social communication and language development (McCleery et al., 2013). Children with less developed motor skills are at greater risk for communication challenges (MacDonald et al., 2013). Research on the connection between dyspraxia and difficulties with speech (Donnellan et al., 2013; Dziuk, et al., 2007; Mostofsky et al., 2007) underscores the importance of considering a motoric base for challenges with speech. Further, researchers find that the development of improved motor planning and more organized intentional movement is heightened with training and appropriate support (Torres et al., 2013). Interventions that help to engage children with autism in recreational, movement-based activities can have a positive impact on social communication and language (Koegel & Koegel, 2006; McCleery et al., 2013) and "may facilitate the activation of social brain networks, including the motor-resonance system" (McCleery et al., 2013, Conclusion, para. 1).

Supporting Communication in Context of Movement and Play

Approaches to teach and practice more effective communication are often based in therapeutic or classroom settings, leaving parents unsure of how to translate strategies to support spontaneous engagement and communication development with their children through everyday activities. In light of the connection between communication and movement, contexts that facilitate play, such as SUFFP, provide more natural opportunities for parents to practice constructing interactive opportunities with their children through recreational activities. The cycle embeds naturalistic teaching components such as: following the child's lead, building on interests and shared engagement, teaching communication in context, structuring opportunities for interaction and supporting communicative success through positive, natural reinforcement (Greenspan & Wieder, 2006; Ingersoll & Dvortcsak, 2010; Koegel & Koegel, 1987) . Building on these components of naturalistic approaches, SUFFP centers interests of the child and provides consistent opportunities to interact with those things that are motivating and reinforcing.
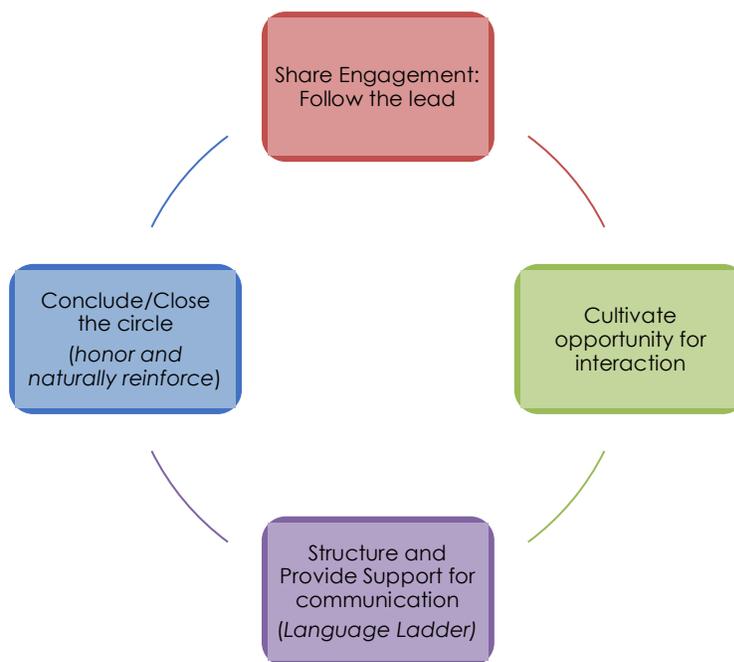
The Cycle of Communication Framework

The Cycle of Communication comes from collaborative research efforts between the Institute on Communication and Inclusion and the Hussman Institute for Autism. The framework is grounded in a commitment to the presumption competence of individuals with autism across a range of

communicative diversity, an approach that stresses the importance of interpreting difficulties with communication as challenges in performance, rather than equating such with evidence of lack of interest or ability to participate in interaction (Biklen & Burke, 2006; Biklen & Kliewer, 2006; Ashby & Kasa, 2013).

The cycle of communication, used within the context of the SUFFP, supports the development of natural opportunities for reciprocal parent/child interactions by: (a) establishing attention to what the person is doing by following their lead; (b) cultivating an opportunity for interaction; (c) offering structure and support through modeling and prompts to express that thought; and (d) reinforcing by honoring the communication to lead to desirable outcomes and/or expansion of interaction. The remainder of this paper describes the cycle of communication, using illustrative vignettes to highlight the strategies, tensions and ongoing learning inherent in building communication through interaction and play.

Figure 1
The Cycle of Communication

Fostering interaction with the Cycle of Communication

Step 1: Shared Engagement: Following the Lead. The goal of the first step in the cycle is to draw attention to and engagement with activities of children's choice and focus on what is motivating for them, as an entry point for initiating interactions. The purpose of this step is not necessarily to generate communication, but to build connection and demonstrate interest in new ways; these actions set the stage for interaction as the child is engaged in an activity that seems enjoyable for them. This step encourages parents to recognize that an activity might be meaningful for the child, even if that meaning is not immediately apparent to or shared by the interactional partner.

Given that we were teaching parents to foster interactions through their participation in the SUFFP, our examples are grounded in physical activities that would be available for their children to choose as part of them program. Figure 2 summarizes Step 1 of the cycle with examples taken from the SUFFP activities.

Figure 2
Shared Engagement: Following the Lead

Looks like/Sounds like	Example Strategies
Partner **joins the activity** initiated by the child, in the way the child is engaged, regardless of perceived meaning of the activity. This may or may not involve spoken words!	**Mirror and map**: (*Race the Ball Activity*) "You are rolling that ball very far!" (pick up a ball, match child's actions). **Take a turn**: (*Twist and Pass*) (Child is tossing ball in the air. You join:) "I'll pass to you" (hand ball to child by standing back to back and twisting) "now, you pass to me." **Point & Comment**: *(Rolling Activity)* "Look, at those big circles on the ground over there. I don't know what they are but they look like fun!" **Draw connections**: (*Jungle Adventure*) "Here we are in this Jungle game. There are so many cool animals that live in Jungles. I wonder if we will see any monkeys like we did at the zoo!"

Christopher and Stephanie: Shared engagement, shared goals. Christopher, a spunky 9-year-old, walked into the gymnasium with a stuffed animal in one hand and his iPad in the other, followed by his mother, Stephanie who greeted other parents and children. Chris communicates through gestures and few words, but does not have reliable, expansive use of verbal speech. During one session, Chris decided that he wanted to play out in the hallway and corralled a collection of balls (bouncy balls, a basketball and a soccer ball) with him. Out in the hallway, Chris kicked a soccer ball into a goal for a while, but then found a ball that made a jingly noise when rolled. He picked this ball up and walked over to his mom, Stephanie. She took the ball from him and asked, "What do you want mom to do with it?" Chris didn't provide a clear response, and so Stephanie dropped the ball onto the floor and looked at him expectantly. Chris then kicked the ball into the goal. Of course! Chris wanted to play soccer with the ball!

The interaction between Christopher and his mother illustrates the importance of shared engagement. Christopher brought a ball to his mom and his mom responded back to him, engaging him in a conversation around the activity he initiated. Since Christopher did not respond to her question, she expanded the activity by dropping the ball on the floor where Christopher then proceeded to kick the ball. Stephanie followed Christopher's and then engaged in the activity with him, thus accomplishing the first step of the cycle.

Step 2: Cultivating Opportunities for Interaction. Once a parent has joined the child in the activity of choice, the next step is cultivating opportunities for interaction. The goal here is to bring shared engagement into the realm of interaction. This step brings language and expectations of participation through communication to the activity. We focused on teaching parents to reduce their use of questions that "quiz" and instead aim for questions and comments based on preference, choice, or opinion. This step is vital in that it connects communication to naturally engaging activities.

Figure 3
Step 2: Cultivate Opportunities for Interaction

Looks like/Sounds like	Example Strategies
• Partner makes observational comments about individual's actions and asks questions/creates openings for conversations. • Partner asks child to make a choice of how to engage in the activity • Comments and questions are opinion-based rather than fact-based.	**Comment and extend activity:** "I know you love running. Look at how much space there is here to run! Do you want to race?" (*instead of "is this a gym or a classroom"*) **Choice making**: Building interaction around options such as color ball to toss, whether child wants to sit or stand on the disk, etc. Example: "I noticed you looking at those frisbees over there. Do you want to throw or catch?" (*instead of "what color is that frisbee?"*) **Playful obstruction:** Lightheartedly interrupt the obstacle course, or reference an existing barrier, and prompt for a response: "Our path is blocked, what should we do now?" **Silly situations:** Use an object differently than intended and wait for response. For example, you could run with the ball instead of rolling it, giving the child an opportunity to correct you based on the instructions for the activity.

Jose, Mario and Paula: Connecting the Physical to the Communicative. Jose is an energetic Kindergartener at a local elementary school. Jose's parents (Mario and Paula) speak Spanish as their first language and much of the interaction at home is in Spanish. Jose uses limited verbal speech to communicate--mostly in one word or two word phrases--or he physically gestures to the things he wants or the activities with which he wants to engage.

Jose was pulling Paula (mom), who was seated on the scooter, in circles around the gym. When he paused his movements, Paula recognized an opening and asked, "Do you want to switch?" Jose did not respond verbally, but physically relocated himself to sit on the scooter. After a few breathless seconds of pulling him, she paused and asked, "Do you like this better?" to which Jose responded, "Wow!"

Early on, like many of the parents, Jose, Mario (dad) and Paula (mom) struggled to bring communication into the interaction after establishing shared engagement. They tended to focus on supporting Jose to complete the desired physical activity, rather than on engaging in a communicative interaction. We encouraged Paula and Mario to build in additional opportunities for choice within each activity so that they could build interactions that allowed Jose to take an active role in communicative exchanges and constructing the activities around his preferences. The vignette above illustrates those efforts. Paula built on shared experience and cultivated an opportunity for engagement by providing choice in the activity (Step 1 and Step 2), bringing communication into the exchange.

Step 3: Structure and Provide Support for Communication (Language Ladder). In Step 3 parents explore tools to structure and provide support for communication through wait time, modeling and prompting. By focusing on the key tenets and strategies below, parents can work to determine and adjust, if necessary, the level of structure and what kinds of supports they provide to ensure their interaction with their child is complete and successful. Through this practice, parents learn to navigate moments when their initial interactive opportunity does not elicit a response. We introduced a Language Ladder as a tool for parents to use in structuring opportunities with varying levels of

complexity to ensure complete and successful interactions. One of the key points we emphasize is that this ladder is not a hierarchy; communication partners can and should move up and down in complexity from moment to moment depending on context. It is a tool that spans all age ranges and communicative needs and preferences. See Figure 5 for examples from the Language Ladder.

Figure 4
Step 3: Structure and Provide Support for Communication

Looks like/Sounds like	Example Strategies
• If the child does not respond to the question or comment spontaneously, or after ample wait time, provide a cue (prompt) to support a response you can reframe, or restructure the question using the language ladder	**Prompt for choices:** hold out two colored balls and say "point to the one you want to play with" or, "of all of the games set up in the gym, point to which one you want to try first" **Model:** If no response, model "you could say 'I want the red ball' or point to it like this (model point) **Reframe or adjust the level of structure:** Move from a more open-ended question "*What did you like about the Jungle game?*" to a multiple choice or fill in the blank "*one thing I like about playing the jungle game was___*"

James, Mike and Cindy: The Art of Playful Obstruction. James is a lanky 9-year-old with spikey blonde hair who loves numbers and all things water. Although he uses speech as his primary mode of communication, his parents Cindy (mom) and Mike (dad) noted that James' meaning is often unclear to them and others. During practice time at SUFFP, James bounded into the gymnasium and ran directly to the collection of colored balls along the back wall, selecting the red one and bouncing. Mike joined him in the activity, observing: "Wow buddy, you're really bouncing that ball fast!" James smiled at Mike and threw the red ball to him. Mike recognized this opportunity to engage with James around a shared activity and slyly put the ball in one hand, hidden behind his back. James laughed and ran around Mike's back, looking for the ball. Lightheartedly, Mike kept the ball away from James and said, "Ok, you have to guess which hand the ball is in…what do you think?" James continued to giggle, and considered his choice. Mike waited a few moments and, when James did not offer a guess, gave him a choice: "Do you think it's in my right hand, or my left? Point to which one." James pointed to Mike's left and Mike revealed the red ball, handing it to James who jumped up and down to celebrate, pausing only to reciprocate Mike's high five.

In the vignette above, James and Mike move through all steps in the Cycle of Communication, with a particularly adept use of wait time, restructuring and prompting. Mike followed James' lead and joined him in the activity (Step 1). He then made an observational comment about James bouncing the ball, cultivating an opportunity for interaction (Step 2). To further encourage James to interact about this shared activity, Mike playfully obstructed James' play and hid the ball behind his back, posing a question about which hand it was in (Step 2). After allowing some wait time, Mike provided structure and support for James to pick a hand by asking that he point, rather than generate a verbal response (Step 3). Mike celebrated James' successful communication by returning the ball, punctuated by an enthusiastic high five (Step 4).

Figure 5
The Language Ladder

Activity	Unpredictable	Predictable
Conversation and commentary	*How was Fit Families today?*	*I heard you had a great time playing on the scooter. Fit Families today. Tell me about that!*
Response to structured open ended questions	*What did you like about the games you played at Fit Families?*	*Tell me what happened at the end of Fit Families today?* (participants all receive games to take home)
Constrained choices	*What is your favorite kind of physical activity?*	*I see you are looking around the room at all the games, what is the one you want to start with?*
Response to multiple answer questions	*This weekend we can use your new game from Fit Families at the beach, at the part, at grandma's house or somewhere else, what would you rather do?*	*Your new game needs to be played in the water. Should we play it in grandma's house or at the beach?*
Fill in the blank	*At Fit Families, I want to ___.*	*I am going to ____ at Fit Families.*
Typed/spoken response to YES/NO questions	*Did you have fun during the jungle game at Fit Families?*	*Did you play the jungle game at Fit Families?*
Phrase and word copying	N/A	*I played with the parachute today.*
Pointing to whole words multiple choices	*We can have some free time after the workshop, what do you want to do?* (Show cards with text-based choices: eat, go for walk, play catch, something else).	*What is next on your schedule today?* (Show cards with choices: home, walk, lunch)
Pointing to YES/NO choices	*Are you excited about going to Fit Families today?*	*Are you going to have crackers during the snack break?*
Pointing to pictures	*We can have some free time after our Fit families, where would you like to go?* (Show pictures of the pool, the park, or home).	*Where should we go swimming?* (Show two cards one of a pool, the other of a library)
Pointing to objects	*You can throw the red or yellow ball, which one do you want?*	*Show dad which ball you played with today (given finite set of options).*

Step 4: Conclude/close. The last step in the Cycle of Communication is to conclude or close the interaction. Parents were given strategies and practice time to honor the communicative bids made by their children. For example, if a child indicated a preference for playing with scooters rather than going through the obstacle course, parents were coached to identify and celebrate his communication as one of choice, honor it by going with him over to the scooters, and look for ways to extend this interaction: "Great idea! When we get to the scooter station, who do you want to race on the scooter first?" Consistent with its name as a "cycle," Step 4 leads directly back to Step 1 as a new opportunity for communication.

Figure 6
Step 4: Conclude/Close

Looks like/Sounds like	Example Strategies
- Facilitating each interaction for success - Honoring communicated choices - Celebrating and reinforcing - Reframe (move up or down language ladder), if necessary - Build on communicated choices/comments	**Verbal encouragement and praise for** *communication* ("That's a creative idea, we can jump over the obstacle! Thanks for sharing!") **Providing requested activity or item** (If the child asked for the red ball, provide the red ball) **Expanding on the interaction** ("You chose the red ball, so I will use the yellow one for the race. Let's see who wins!")

Kevin and Linh: Imagined endings, new possibilities. Kevin is an inventive 8-year-old who loves constructing things. He uses speech to communicate, alternating between English and Vietnamese. His mom, Linh, described that Kevin uses "few words" for communicative purposes, but is more expansive when telling others about his creations. She acknowledged that though he speaks, she often has trouble understanding his intended meanings. We worked with Linh to meet Kevin in his world of imagination, construction, and story as a jumping off point for expanding interactions in other contexts. During one session, Kevin carried an object made of foam blocks around with him to each activity. Kevin described this object differently at each station: "It's a bomb! It explodes in 20 seconds" during a foam noodle battle; "It's a command center" during a rocket launch game. He also accepted others' interpretations. For instance, when, in the midst of an imaginary sword fight, a student volunteer declared "your bomb is now a shield!" Kevin took it from her, threw it to his mom and instructed, "here, hold this shield." Linh not only honored his communication and story, but built on it: "thanks Kevin, you saved me!" Moments later, she intercepted the noodle sword fight, tossed the shield back to Kevin and reassured him, "I got you."

Here, we see Linh and Kevin seamlessly moving through all steps taught in the Cycle of Communication. Linh shares in Kevin's engagement with the shield and follows his lead through the plot of his story (Step 1). While Kevin does not necessarily require Linh to cultivate additional opportunities for him to communicate (in this example he is quite communicative and generates substantial language, thus Step 2 is a given) her participation in his story supports, honors and naturally expands upon this interaction (Steps 3 and 4).

Conclusion

Throughout our time with the SUFFP we observed successes and challenges as parents practiced implementing the elements of the Cycle of Communication and engaging in new forms of meaningful interaction with their children. We saw many examples of parents following their children's lead and entering into meaningful interactions around shared activities; the creative materials and engaging games were natural boons to interaction and engagement. However, it initially proved more challenging for some of the parents to bring communication into the exchanges. The focus was often on the completion of a physical task and reinforcement of the motoric or game-based activity, rather than fostering reciprocal communicative interactions. With guidance and modeling we observed more completed circles of interaction over the course of the semester-long program. As one parent reflected at the end of their participation in SUFFP:

> The biggest thing I took away from the program is being more aware of how I speak to him...When we talk to our son, we use very simple communication techniques and we don't necessarily give him an opportunity for back and forth. We need to work on that and this is how I was thinking we could do it.

> It is important to note, that the Cycle of Communication strategies presented and practiced as part of the SUFFP program require ongoing use and expansion. Coaching, modeling and practice are necessary for parents and other communication partners to enact new ways of interacting and generalize those into everyday contexts. However, as a starting point for change, the Cycle of Communication is a useful tool for reminding communication partners of the ways in which intentional, reciprocal communication can be broken down and supported during motivating shared activities. It also shifts some responsibility for the (re)construction and success of interactions to the communication partner, rather than perpetuating the expectation that the child with autism conform to pacing, expectations and social conventions that often go unquestioned in spoken interactions. At its core, this approach aims to not only empower both communication partners and children with autism to build engaging communication practice into their interactive relationships, but also demonstrates ways to understand, negotiate and bridge communicative diversity.

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