Chapter 9
Beyond Monolithic Packages: Important Strategies Across Early Interventions for Children with Autism

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Promoting Active Child Engagement

As described in Chaps. 3 and 6, children's development can be supported by engagement with caregivers and other social partners. In these interactions, caregivers scaffold increasingly complex forms of social interaction often in the context of play activities (Bakeman & Adamson, 1984; Bruner, 1982). Developmental theory has long suggested that the mechanism by which caregiver–child play and other forms of social engagement has beneficial impacts on development involves children's active role in shaping and sometimes leading the interactions and activities in which they are engaged (Piaget & Inhelder, 1971). This principle also applies to development in children with ASD. As such, active child engagement is the premise of many early interventions, especially those targeting social communication development (e.g., Kasari et al., 2015).

To ensure that children with ASD are actively engaged within intervention contexts, interactions with interventionists or caregivers should be characterized by shared control, mutual regulation, and creativity. This can mean that adults do things such as follow the child's lead during toy play activities (imitate the child's actions on toys, or take on a play persona parallel to the child's selected persona), verbally expand on the child's spontaneous interactional overtures (following a child point by saying, "yes, I see the duck!"), and engage in creative word play using onomatopoeic sounds to draw the child into the interaction (playfully animating the duck and saying "quack quack quack!" in a back and forth exchange). Intervention research has also shown that "responsive" practices such as mirrored pacing (imitating the children's actions shortly after the child has produced them) and communicative

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synchrony (communicating about what the child is doing) are linked to children's gains in language (Green & Garg, 2018). Further, the intervention context itself should incorporate preferred materials and child interests into activities (Gulsrud et al., 2016; Schreibman et al., 2015). Capitalizing on the child's interests will maximize children's motivation to communicate with caregivers about materials in the environment, enact complex play schemes during play, and actively participate during daily activities.

Importantly, although interventionists and caregivers may have explicit goals in mind when scaffolding engagement with children with ASD, the specific details of how the interaction is to proceed should not be entirely defined in advance or expected to strictly conform to a "correct" standard. Interactions that are overly constraining in terms of children's expected modes of participation can lead to passive participation, suppress active engagement, or can even be met with resistance which will ultimately undermine children's display of interactional competence (Sterponi & Fasulo, 2010).

Caregiver Coaching

Many early interventions that were originally developed in clinics with trained professionals acting as interventionists have now been adapted so that they can be implemented by caregivers in the child's home; these are referred to as parent-mediated interventions. Nevill, Lecavalier, and Stratis (2016) recently conducted a meta-analysis of these interventions and showed positive albeit modest effects on overall symptoms associated with ASD, socialization, communication, and cognition. A benefit of caregivers acting as interventionists is that, at least theoretically, intervention strategies can be used much more frequently and fused into family routines (more on this in the next section). In order for caregivers to effectively carry out intervention procedures, they must be adequately coached by professionals who have expertise in intervention techniques. This type of training is usually referred to as caregiver coaching and is now an emerging area within early intervention research. Much of the caregiver coaching research has focused on NDBI or developmental interventions (see Chap. 6) that focus on caregiver–child interactive routines as the primary intervention context (e.g., Green et al., 2010; Kasari et al., 2015). As such, one of the primary areas of focus for caregiver coaching is maximizing caregiver responsivity to children's interactional overtures.

Caregiver coaching can be delivered in a variety of modalities, such as in-person or via video conferencing or other online technologies (see Sutherland, Trembath, & Roberts, 2018), and in a variety of instructional formats, including 1:1 or small group sessions. Most coaching models involve some amount of instruction on intervention strategies, multiple opportunities for the caregiver to practice using the strategies with the child, and feedback on the quality of caregiver's implementation of each strategy. The "dose" of caregiver training can also vary considerably with sessions lasting 30 min to 3 h and occurring weekly to monthly over several months.

Many parent-mediated intervention programs emphasize that similar to young children who are the ultimate receivers of the intervention caregivers must have an active role in the coaching process to effectively learn to implement intervention strategies (Wetherby et al., 2018). This means that caregivers are involved in setting appropriate child goals, specifying how general intervention procedures will be adapted to the individual child, characterizing their own responsivity to children's overtures, and identifying children's responses to the intervention procedures (Nevill et al., 2016). In a randomized controlled trial, Shire, Gulsrud, and Kasari (2016) demonstrated that an intervention actively engaging parents in ways to be more responsive interaction partners produced superior outcomes to a didactic teaching approach that focused on similar content (see also Rogers et al., 2019).

Incorporate Interaction Strategies into Everyday Routines

As caregivers learn interaction strategies that accommodate their child's cognitive, communicative, and sensory profiles, these strategies can be incorporated into everyday routines and activities that already, or could potentially, involve the child (Landa & Sharpless, 2018; Rogers et al., 2019). For example, caregivers might expand on children's initiations during meal and snack times, imitate children's actions on toys during play routines at home, or incorporate visual supports into bathing, dressing, or clean-up routines.

There are several advantages to leveraging the child's everyday environment to support children's development as compared to exclusively relying on intervention sessions in clinical or other decontextualized settings. First, when caregivers are able to adapt everyday routines to be more accommodating to their children with ASD, it improves the child's ability to access and participate in routines that have cultural and familial significance. Second, as mentioned in Chap. 6, clinical environments can be overly stripped down (i.e., exclude any stimuli thought to be superfluous to learning) and can utilize stimuli that do not change in quality from session to session. This can make it difficult for children to generalize what they have learned in clinical settings to settings that are more relevant to the child's life, such as the home (Schreibman et al., 2015). Third, everyday routines by definition occur with high frequency and are repeated across days and weeks, giving children many more learning opportunities than can be provided in clinic visits. At least theoretically, more learning opportunities will translate to greater developmental gains.

While initial research into interventions that include a strong home component has shown some promise (e.g., Green et al., 2010; Kasari et al., 2015), there is a caveat to recruiting caregivers as interventionists. Doing so can lead to situations where caregivers are made to feel that *all* interactions with the child should serve a therapeutic role, requiring caregivers to exclusively function as therapists (with children always positioned in the role of pupil). To avoid this outcome, special effort should be made by intervention providers so that the strategies caregivers are encouraged to use are culturally relevant, acceptable to the family, and easily integrated into the caregivers' natural interaction styles and daily routines (Vivanti, 2019).

Thoughtful Environmental Arrangements

Interventionists and caregivers can arrange the physical intervention and home environment in a thoughtful way that accommodates the cognitive and sensory profiles of the child. The TEACCH approach, described in detail in Chap. 7, is based on a set of instructional strategies and systematic arrangements of the environment that account for the individualized needs and preferences of children with ASD (Mesibov & Shea, 2010). Although this approach is typically used in classroom settings, the visual support strategies and environmental arrangements can be adapted for early intervention contexts. In particular, these supports can foster meaningful interactions between the child and adult, help children more independently engage in important tasks, and have better access to their environment (Welterlin, Turner-Brown, Harris, Mesibov, & Delmolino, 2012).

Arrangements to Support Sensory Differences

Some individuals with ASD are reported to have differences in their perception of and response to sensory information. Interventionists and caregivers should be mindful about the child's' sensory processing patterns and adapt the physical organization of the setting to accommodate their individual sensory profiles (Ganz, 2007). Children who display a hyporesponsiveness to sensory stimuli are less likely to process sensory information from the environment and could benefit from more intensive stimulation in intervention settings and within the home. Using brightly colored materials, playing music, or promoting physical activity can help children become actively engage with others (Dunn, 2007).

On the other hand, children who are hyperresponsive to sensory stimuli can be more easily distractible and sensitive to sensory information from the environment. Interventionists can cover windows or have the children sit with their backs to doors and windows to accommodate visual sensitivity (Mesibov & Shea, 2010). In addition, caregivers could plan for more quiet time throughout the day if children can become overstimulated by noise and physical activity.

Supporting Transitions

The restricted and repetitive behaviors or interests that are characteristic of ASD can include an insistence on sameness or inflexible adherence to routines (American Psychiatric Association, 2013; Chap. 4). These features can make it difficult for children to transition between activities OR cope with unexpected changes in their schedule. However, the implementation of multimodal supports such as text, visual cues, and oral language can be used to convey expectations and serve as reminders regard-

ing the child's schedule of activities (Sterling-Turner & Jordan, 2007). For example, a timer can be used for the child to visualize how much time is left in a particular play activity, and visual schedules comprised of picture cards arranged in a sequence can be implemented to help children anticipate future activities (D'Elia et al., 2014).

Balancing Between Structure and Novelty

Young children with ASD often show a preference for sameness in their environment, activity schedules, and interactional routines with others (APA, 2013). Intervention programs may seek to accommodate this preference by maintaining a uniform physical arrangement of the intervention space, providing similar materials such as the same set of toys from session to session, engaging in consistently ordered intervention activities, and encouraging interventionists to use similar interaction styles tailored to individual children's preferences. Providing such structure can be critical for ensuring that children are comfortable with intervention routines (especially for children who may become dysregulated with unexpected schedule changes or sensory stimulation). However, maintaining too much structure can result in overdependence on sameness that can prevent the child from learning new skills, generalizing the skills they have learned to contexts outside the intervention, or developing an ability to be flexible.

To mitigate this concern, intervention programs should promote a balance between providing structural adaptations that maintain the child's emotional regulation while also introducing novelty that will encourage growth and development. This can be both at a "macro" level, such as changing the sequence of intervention activities or providing new sets of toys in addition to more familiar toys or the "micro" level such as expanding on the child's existing play and language routines to introduce new elements (Chang et al., 2016).

Developmental Sequencing of Intervention Goals

Interventions that are able to influence children's growth beyond what is directly taught in the intervention tend to focus on goals that are developmentally sequenced (Yoder et al., 2013). Appropriate goals are initially selected to reflect the child's cognitive, social, and communication profile (see Chaps. 3 and 6), which should be established using assessment procedures that have been validated for developmental domain. Vygotsky's concept of the "Zone of Proximal Development" (ZPD; Vygotsky, 1930–1934/1978) is helpful for determining appropriate starting points for intervention (see Chaps. 1 and 6). The ZPD is defined as competencies just beyond what the child can do independently but can achieve with support (often provided by the interventionist, or some other more competent social partner). Once these goals are achieved, new goals are then set that reflect progression through a

cascading developmental trajectory where subsequent milestones build on previously achieved milestones. Descriptions of developmental trajectories are usually based on research conducted on typical child populations but can also include deviations from typical paths that commonly occur in ASD populations (Rogers, 2006).

While this approach is promising for facilitating children's long-term growth, there are two potential barriers to implementing developmental strategies within interventions for children with ASD. First, developmental pathways are better described in some domains as compared to others. For example, much is known about the development of social communication in both child development, more generally, and in children with ASD, in particular (see Chap. 3 for a description of this trajectory). On the other hand, there is less consensus on the developmental origins or pathways of processes with the RRB domain (see Chap. 4) in children with ASD (Poljac, Hoofs, Princen, & Poljac, 2017; Rogers & Ozonoff, 2005). This means that for some domains of development, there is an insufficient understanding of how developmental milestones build on one another to appropriately sequence intervention goals using this framework.

Second, there is some evidence that children with ASD do not always follow (or need to follow) a typically developing sequence for some domains, and there is significant variation within the ASD population in terms of developmental trajectories (Lord, Bishop, & Anderson, 2015). While there is evidence that interventions can be implemented that support children with ASD in achieving social communicative milestones that follow a typical child trajectory (Wetherby et al., 2018), there is also some evidence that "environmental demands" can guide intervention targets in many cases with less emphasis on developmental pathways (Bottema-Beutel et al., 2014). That is, interventionists can consider the types of new skills or competencies that will aid the child in better accessing their environment, regardless of a known developmental progression of these skills. This is especially the case when developmental sequences are not well defined.

Data Collection to Guide Goal Selection and Inform Decision Making

All early intervention programs for children with ASD should involve some means of collecting and analyzing data on child progress to ensure that the intervention is working as intended. Specific data collection procedures will vary depending on the nature of the intervention and the targeted developmental domain or child behavior. Some intervention traditions, such as EIBI (see Chap. 5), have highly developed methods for operationalizing and measuring target behavior and for making intervention decisions based on collected data. These interventions typically use observational procedures to assess children's current behavioral profiles as well as the environmental variables that influence the child's behavior. Once the intervention has been implemented, these methods are also used to determine if there are decreases or

increases in the level, trend, or variability of the occurrence of a specific behavior or set of behaviors to determine whether or not an intervention was successful.

Other traditions, especially those that do not target discrete behaviors, may take a more eclectic approach to data collection. Informal and formal observations, interviews, standardized assessments, and document reviews may be used to determine children's developmental levels across a variety of domains, and developmentally appropriate goals are then selected. Similar procedures may be used to monitor intervention progress although it is important that a specific protocol is established to consistently measure the phenomena of interest before, during, and after intervention implementation to monitor children's development. Similar to behavioral approaches, developmental interventions should attend to the absolute value indicated by measurement procedures (e.g., a child's standardized score on an assessment of social functioning to determine whether the child is at the expected level given their age) as well as growth rates to determine if progress is being made at a sufficient pace.

During and after the implementation of an intervention, formative and summative assessments are also used to determine if intervention procedures should be modified or discarded and replaced by entirely new interventions to better meet children's needs. Decision making should use data collected from a variety of stakeholders in addition to direct observation of the child with attention paid to the feasibility of implementing the intervention as well as its effects on the child. Finally, it is important to measure intervention *fidelity*, that is, the extent to which the intervention was implemented as planned (see Chap. 8). This is usually done by observing the intervention in progress by someone other than the interventionist. If the intervention did not follow prespecified procedures or was not administered in the correct "dosage" or level of intensity, this should be addressed before a determination is made about the adequacy of the planned intervention.

Providing Meaningful, Natural Reinforcement

A critical component of behavioral interventions is the provision of reinforcement. As described in Chap. 5, reinforcement is any stimulus following a child behavior that increases the probability that the child will produce the behavior again in the future (Skinner, 1963). Originally, extrinsic reinforcers that were unrelated to the behavior the child produced, such as treats or stickers, were the primary means of reinforcement (Lovaas, 1987). However, interrupting social routines by providing external rewards unrelated to the activity may result in overdependence on the reinforcement, disruption of the activity flow, and an inability to generalize newly learned skills to contexts that do not involve reinforcement.

Instead, caregivers or interventionists should aim to naturalistically embed reinforcement that the child perceives as internally motivating into social activities (Schreibman et al., 2015). For example, if a caregiver and child are engaged in a play routine and the child spontaneously requests a doll, the adult should help the child retrieve the doll as a means to reinforce the child's request for help. In addition

to responding to the child's request, the caregiver should be socially attentive to the child, which will reinforce joint engagement more generally (Rogers, 2013). In contrast to external reinforcement, naturally embedded reinforcement is contextually meaningful. When activities provide opportunities to engage in interactions that are inherently reinforcing, this provides a context for the child to understand the social-interactive functions of their behavior and develop agency in shaping joint engagement routines. However, external reinforcement should be considered when children show limited learning in response to intrinsic reinforcement, and failure to learn a new behavior/refrain from a current behavior pose an immediate danger to the child (e.g., if a child is being encouraged to wear protective clothing or sunscreen during outdoor time on a sunny day). Some interventions (e.g., Rogers & Dawson, 2010) include a decision tree to guide selection of reinforcers based on intervention progress, following a hierarchy from more intrinsic to more external reinforcers.

Task Analysis to Teach Functional Skills

Many EIBI strategies for young children with ASD involve the adult explicitly providing the child with instructions on how to accurately produce a new behavior. To teach more complex skills, it may be necessary to use task analysis, a procedure in which skills are broken down into simpler components or steps. Learning complex skills in smaller components that systematically build on one another, as opposed to learning skills in a single step, can be less overwhelming for the child and can ultimately improve skills acquisition.

When task analysis procedures are developed, a few key ideas should be kept in mind. First, steps can be represented using photographs or other pictorial systems for children who are not yet reading text or able to identify sight words (see Chap. 7). This will provide the child with visual reminders of how to complete each step (Eldevik, Hastings, Jahr, & Hughes, 2012). Second, task analyses are often paired with prompt hierarchies to cue the child to complete each step and reinforcement systems to shape the child's correct execution of task components. Prompt hierarchies often proceed with a "least to most" progression, beginning with gestures (e.g., pointing at the tooth brush holder to remind the child to retrieve the tooth brush) and ending with hand-over-hand assistance (e.g., guiding the child's hand to grasp the tooth brush). This ensures that the child receives just enough but not too much support in completing the task (Gulsrud et al., 2016). Finally, task analyses are most effective for teaching functional skills that can be sensibly broken down into discrete steps, such as bathing, dressing, brushing teeth. For some domains, particularly those involving social engagement, breaking processes down into discrete components changes the meaning of the social experience. For example, teaching the child to rotely memorize a social script can result in interactions that appear ritualized and stilted and bear little resemblance to naturally occurring interactions that are dynamic and fluid (Bottema-Beutel, Park, & Kim, 2018).

Fading Intervention Supports Over Time

Prior to the implementation of an intervention, plans should be made to systematically fade interventionist or caregiver provision of supports where possible. This can include decreasing the amount, intensity, or adult control over several different types of supports, including environmental supports (e.g., allowing the child to organize and initiate the use of visual schedules and sensory accommodations), reinforcement (providing longer intervals between reinforcements, especially extrinsic reinforcement not related to a given activity), and scaffolding provided by caregivers during engagement routines (e.g., allowing the child to retrieve and arrange activity materials, waiting for the child to initiate turn-taking routines).

Gradually fading supports over the course of early intervention is important for several reasons. First, failure to do so can result in overreliance on adult-provided support, which can unnecessarily limit children's independence (Hume, Loftin, & Lantz, 2009). This also means that children may have difficulty transitioning between early intervention and K–12 education, a context where children are expected to be more independent. Finally, fading caregiver scaffolding during joint engagement routines can allow the child greater agency and control of the interaction with less reliance on the caregiver to initiate and maintain interactions. This will prepare the child for eventually engaging with same-age peers, who may be less apt to provide scaffolding during joint engagement.

Conclusion

To date, there are a variety of early intervention strategies that appear to be associated with positive adaptive and/or developmental outcomes for children with ASD. High-quality interventions may use some or all of the strategies described in this chapter, which are then individualized to meet the unique needs of children and families. Intervention strategies should also be selected and adapted according to the social and cultural context as well as the specific environment in which the intervention is to be implemented.

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