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Foreword

The Early Start Denver Model (ESDM) was introduced to Australia in 2009, when Prof. Sally Rogers, together with Dr. Cynthia Zierhut and Dr. Laurie Vismara, graciously accepted my invitation to travel here to train three teams. I had observed delivery of the ESDM on my visit to the MIND Institute at University of California Davis in 2007 and was aware of the developing evidence base underpinning it. At that time, it was the only comprehensive early intervention approach suited for infants as young as 12 months of age who were developing autism. The need for an intervention approach designed for very young children was growing in Melbourne given our early identification work at La Trobe University using Social Attention and Communication Surveillance, which had commenced in 2006.

In 2010, the federally funded Victorian Autism Specific Early Learning and Care Centre was established at La Trobe University. Named 'The Margot Prior Wing' (after distinguished La Trobe University Alumni and leading autism researcher in Australia, Professor Margot Prior) of the long-standing La Trobe Community Children's Centre, children with autism were to receive early intervention within a long-day care setting. The Margot Prior Wing provided the ideal environment for the implementation of the ESDM where early childhood educators and care professionals were to work alongside allied health professionals to deliver early intervention in a group setting. Professor Rogers thus returned to Melbourne to train this team.

Reaping benefit from Prof. Rogers own team, Dr. Giacomo Vivanti and Dr. Cynthia Zierhut joined the Victorian ASELCC to establish and lead the research and implementation of a sustainable group-based ESDM program. The program has, and continues to, benefit numerous families and their children in Melbourne. These children make substantial gains alongside their peers whom they befriend and, together, become a community. Their outcomes have been reported in a number of scientific publications, and without them and the staff who deliver their therapy, this manual would not have been possible.

The outstanding transdisciplinary team at the Margot Prior Wing have fine-tuned and adapted the group-based ESDM for our young clients over many years, and it is upon their stellar work that this manual is based. I strongly recommend it to you.

Cheryl Dissanayake, Ph.D., MAPS
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Acknowledgments

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About the Authors

Giacomo Vivanti, Ph.D. is an Assistant Professor in the Early Detection and Intervention Research Program at the A.J. Drexel Autism Institute, Drexel University, Philadelphia. His previous experience includes a visiting fellowship at the Yale Child Study Center and a postdoctoral fellowship at the University of California Davis MIND Institute under the mentorship of Dr. Sally J. Rogers. During 2010, he became a research fellow at the Olga Tennison Autism Research Centre in Melbourne, Australia, where he worked on a federally funded five-year project on the implementation of the Early Start Denver Model (ESDM) in a group-based early intervention setting. Dr. Vivanti serves on the editorial board of the *Journal of Autism and Developmental Disorders* and the *Encyclopedia of Autism Spectrum Disorders*. He is also a member of the Department of the Health Committee to establish evidence-based guidelines for autism treatment in Italy, and a certified ESDM therapist and trainer. He is the author of approximately 50 peer-reviewed journal articles and book chapters about autism spectrum disorder.

Ed Duncan, B.S., M.B.A. is a clinical director of the Autism Specific Early Learning and Care Centre (ASELCC) at La Trobe University, Melbourne, Australia. Ed has worked at this federally funded service on the implementation of the Early Start Denver Model in a group-based early intervention program since it began in 2010. His previous experiences include working as a manager and speech pathologist in several nonprofit organizations, specializing in working with young children with autism who are minimally verbal. He has held representative positions with AGOSCI (an organization supporting the needs of people with complex communication needs) and more recently joined the Australian National Disability Insurance Agency. Mr. Duncan has contributed scientific articles to the *Journal of Autism and Developmental Disorders* and entries within the *Encyclopedia of Autism Spectrum Disorders*.

Geraldine Dawson, Ph.D. is a Professor, Departments of Psychiatry, Pediatrics, and Psychology and Neuroscience, Duke University. She is the director of the Duke Center for Autism and Brain Development, where she oversees interdisciplinary autism research and clinical services for individuals with autism spectrum disorder. She has published extensively on early detection, brain development, and treatment of autism. Dawson is the president of the International Society for Autism Research (2015–2017) and serves on the NIH Interagency Autism Coordinating Committee, which develops the federal strategic plan for autism research. Dawson received a Ph.D. in Developmental and Child Clinical Psychology from University of Washington and completed a clinical internship at UCLA.

Sally J. Rogers, Ph.D. is a developmental psychologist, clinician, professor of Psychiatry and Behavioral Sciences, and director of Training and Mentoring at the MIND Institute, University of California Davis. She has been the principal investigator of several NIH funded multisite autism research projects, including a 10-year CPEA program project and two funded Autism Centers of Excellence (ACE) network projects. She has served as a president of the International Society for Autism Research, an associate editor of the journal Autism Research, a member of the Autism Speaks Global Autism Public Health Initiative, a fellow of the American Psychological Association, Division 33, and a member of the Autism, PDD, and Other Developmental Disorders Workgroup for the DSM 5. The Early Start Denver Model that she developed with Geri Dawson and other colleagues at University of Colorado Health Sciences Center, University of Washington, and University of California Davis is internationally known and recognized by Time.com and Autism Speaks as one of the 10 most important scientific findings of 2012.

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Chapter 1
Early Learning in Autism

Giacomo Vivanti, Geraldine Dawson and Sally J. Rogers

Why is learning so difficult for many children with autism? And how can we teach them so that they learn more easily? The first step to answering these questions is to consider how children without autism learn from their caregivers and their peers during early childhood.

Early Development and Learning

When children come into this world, there are very few things that they can do independently. Compared to most animal offspring, human babies need more time and more support from others before mastering the set of skills that will allow them to navigate their environment without relying on others' assistance. However, from birth, they are equipped with a powerful tool to support their development—learning.

During early development, children learn through their discoveries and experiences in the physical and social environment, acquiring new skills and broadening their knowledge of the world in the framework of playful social interactions with others and everyday routines, long before they have fully developed cognitive and linguistic capacities. While other species, such as birds, dogs, and apes, can also learn novel behaviors through exploration of the environment and interaction with others, human learning is unique in many aspects.

First, children, from infancy onward, are rapid learners—they learn novel behaviors, novel words, and novel concepts at an extraordinarily fast pace. The speed of their acquisition of new information relies partially on their preference for everything that is novel—a new action, a new word, a new object, and a new sound; all of these will tend to capture the child's attention. Novelty, however, is not enough to ensure rapid learning.

A second influence on the speed of human learning concerns the motivation for social interaction. Infant learning is driven by a special kind of curiosity, a natural fascination for people—their faces, their actions, and their emotions. Children are more inclined to do things with others than doing things by themselves, and normally, they experience participation in social exchanges as more rewarding and motivating than solitary activities. Children's preference and motivation to be with others (and being *like* others) also affect the nature of their partners' interactions with them, fostering attention and engagement from others. As a consequence, early social motivation provides young children with a wealth of opportunities to learn new skills that they might not learn through chance experiences.

A third influence involves children's propensity to learn selectively from others. Young children, just like adults, can be very particular in terms of what they learn, whom to learn from, and when to learn. Rather than indiscriminately incorporating everything that they are exposed to in their own behavioral repertoire, they tend to learn new actions and words when (a) they experience emotional connectedness with the person they are learning from and (b) when they see positive effects of new behaviors on goals that are important to them. Recent research shows that children are more likely to imitate a person who is looking at them, rather than someone who is ignoring them, because the establishment of eye contact creates social connectedness and affective engagement between the adult and the child (Vivanti & Dissanayake, 2014; Over & Carpenter, 2012). Imagine, for example, a child who sits next to his mother while she writes a shopping list. If the mother looks at the child and smiles while she is writing her list, the child might start scribbling on the piece of paper himself—however, this imitative response is less likely to occur if the mother is writing her shopping list while talking on the phone or looking at her recipe book and ignores the child.

Similarly, children are more likely to learn a new language if they play with someone who speaks that language, than if they are merely being exposed to the language through the TV and have no opportunity to interact with the speaker (Kuhl, 2007). Finally, children are more likely to learn a skill that solves a problem and achieves a goal than one that does not (Williamson, Meltzoff, & Markman, 2008). Therefore, the framework of social curiosity, playfulness, affective engagement, and interest in the goals that new actions can achieve in which early development takes place is not just something happening around and outside the act of learning—rather, these are active ingredients in the process of cognitive development. Regular child–caregiver interactions during household routines and play activities are the contexts in which the combination of these factors gives rise to daily learning experiences in early childhood.

Learning from Peers

Caregivers are not the only source of social learning opportunities. From infancy onward, young children are naturally inclined to attend to and play with their peers (Sanefuji, Ohgami, & Hashiya, 2006). Peers provide a multitude of opportunities for learning, in particular in the context of play. Peer play in preschool years is driven by the desire to engage in *joint* activities (i.e., shared social activities involving two or more play partners), as well as interest in the outcomes or goals of the activity. For example, when two children build a big tower with blocks, their pleasure derives from the mutual social engagement in the activity (e.g., sharing the suspense when the last block is added to the stack), combined with the pleasure of achieving the goal of having a tower built.

By toddlerhood, children are already well equipped to participate in basic play exchanges all on their own, without adult instruction. They are able to organize their behavior around *shared* goals, behaviorally coordinating their actions and sharing their emotion with their play partners (Tomasello & Hamann, 2012). For example, they often engage in chase/follow games, while also exchanging gazes, and laughing together. Even before children can engage in verbal exchanges, they communicate all the time, sharing ideas, emotions, and intentions through gestures, facial expressions, body postures, and reciprocal imitation. Imagine a situation in which three toddlers are playing chase on the playground, and one of them grows tired and sighs, has a look of exhaustion on his face, and sits down to indicate that he has finished. The other boys, seeing this, might sit down with him and take turns rolling in the grass. In this example, two children coordinate their behavior by observing actions and emotions of another child. Play routines with peers provide a wealth of learning experiences by affording opportunities to experiment with complex social and cooperative behaviors, including turn-taking, imitation, sharing of affect, and consensual decision-making.

Repeated engagement in play routines with peers is also related to the development of sophisticated cognitive processes such as empathy and social understanding. For example, children who grow up with siblings of a similar age show more advanced understanding of others' thoughts and feelings compared to children who do not have siblings and therefore have fewer opportunities to practice their social knowledge through peer play (McAlister & Peterson, 2007). Engagement in play routines with peers is also associated with the development of the ability to form and maintain friendships. During early childhood, early learning environments such as childcare centers can provide the optimal setting to facilitate engagement in joint activities with peers, and research indicates that high-quality childcare environments enhance children's cognitive, language, and social development (National Institute of Child Health and Human Development Early Child Care Research Network, 2000, 2003). Peers provide learning opportunities that adults cannot provide, simply because children see peers as similar to themselves, with similar levels of cognition, preferences for materials, motor skills, and emotional reactions. Understanding a peer's behavior gives a child insight into themselves in a special way.

Brain and Cognitive Foundations of Early Learning

The human brain is equipped with a set of systems that facilitate these early learning experiences.

One such system involves brain networks specialized for detecting and responding to stimuli that are novel versus those that are already known. This allows the child to focus attention on new potential sources of learning, tuning out unnecessary information. Importantly, brain areas that are activated in response to unexpected and novel stimuli are linked to regions that process the emotional significance and the reward value of the novel stimulus and enable learning. For example, when a child watches for the first time a peer who is banging on a drum, not only this information is registered as more relevant compared to already-known information, but also as more exciting. As a consequence, full attention is given to the child playing the drum, and very little attention will be given to the (not so relevant and not so exciting) children who are playing with toys that the child is already familiar with. Therefore, the new action is more likely to 'stand out,' be remembered and imitated.[1] This neural network reflects a mechanism that links attention to novelty with the motivation to explore novel stimuli in the search for rewards (Bunzeck & Düzel, 2006). By dismissing the 'already known' in favor of the 'still unexplored' (with its promise of potential reward), the human brain is optimally equipped for active learning through the exploration of the physical and social word.

A second such mechanism involves neural programs that are active from birth on to bias children's attention toward social information—people and their actions, the most important source of learning opportunities. Hardwired, specialized neural circuits are dedicated to identify biological motion (e.g., a person smacking their lips, or clapping hands) and distinguish it from nonsocial information (e.g., windscreen wiper movement). Social information is attributed a 'special status' from very early in development—children's attention is captured by faces, voices, and biological movements from birth (Johnson, Grossmann, & Farroni, 2008). During the first hours of life, a newborn looks more often to her caregiver's face compared to her clothes, or the fan spinning on the ceiling.

This social attention bias is linked to a third neural system that contributes to the origins and development of learning—imitation. From the first hours of life and throughout the life span, children have the capacity to imitate human actions (such as protruding the tongue). Several interconnected neural systems enable the critical process of imitating novel behaviors, including the specialized brain network called 'mirror neuron system.' Cells in this brain network respond in the same manner

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[1]Importantly, the emotion processing centers of the brain do not process any novel information as 'exciting'—some information (like a dog barking) is typically experienced as scary. While the link between attention and emotion processing centers enables a quick emotional response to new stimuli, the specific emotion experienced by the child depends by the nature of the event and by the child's observation of the caregivers' and other children's response to the event.

when one executes a given action and one observes the same performed by others (e.g., when one grasps a cup or observes another person grasping a cup), and this results in stimulation of the same motor pathways that are involved in performing the action. According to many scholars, this process allows the child to understand others' actions as if s/he would be doing a similar action (Rizzolatti & Sinigaglia, 2008). Similarly, there are brain areas that respond to both the observation and the experience of particular emotions and sensations—enabling children to take on the emotions and moods of people around them (adults and other children) from very early developmental stages (Thioux & Keysers, 2010).

Not only is the infant brain equipped with systems to detect and learn actions performed by other people, but in addition, other interconnected brain networks are specialized in recognizing and reading people's communicative goals—the fourth neural system involved in rapid infant learning. Through these dedicated networks, direct gaze is processed as a communicative signal, conveying the feeling of being the target of the other person's attention. From infancy onward, when someone is looking at us, we read this as a message that says 'I'm going to communicate something to you' or 'you are the target of my next actions.' Conversely, a gaze directed toward a specific object indicates that *that* object will be the target of the person's future action. Such understanding reflects the child's processing of two points of view—the child's own (she is going to talk to ME) and the partner's (SHE is going to talk). This early emerging ability to mentally coordinate another's behaviors and intentions with one's own behaviors and intentions—technically called joint attention—is a critical organizer of infant and adult cognition, allowing the child to see others' behavior as purposeful and to experience the other and the self as sharing the same physical and emotional 'space.' This is a critical platform for learning *from* people and *about* people (Csibra & Gergely, 2007; Mundy, 2016).

Different neural pathways that work in parallel in the front and back parts of the brain support these abilities to guide and coordinate another's and one's own attention toward objects/events of interest (e.g., looking at the caregiver and pointing to an airplane in the sky) as well as the ability to follow people's direction of gaze and gestures (e.g., looking at a particular figure in a book that the caregiver is pointing to). These early emerging behaviors, initiating and responding to joint attention, enable the mutual sharing of information between the child and other people, thus providing an optimal platform for learning (Tomasello & Farrar, 1986; Bruner, 1975). Without a framework of coordinated attention between learner and teacher, the process of social learning would be quite limited.

Finally, the style in which information is directed to the child has an important role in learning, as the infant brain is equipped to respond optimally to actions and words that are conveyed in a 'child-directed' style. For example, a young child who sees her caregiver watering the plants is more likely to notice, remember, and learn the new words and actions involved in the scene if the caregiver is using a larger, exaggerated range of motion (making the actions more 'dramatic'), and narrating the actions using a simple language, and accompanying actions and words with positive affect (e.g., smile and eye contact directed to the child). This style, which is often accompanied by playful verbal and nonverbal communication, triggers

enhanced attention, social connectedness, and learning (Weisleder & Fernald, 2013; Brand & Shallcross, 2008). If the same actions and words are used in a 'neutral' style and without all the nonverbal communication signals, imitation and learning are less likely to occur. At the brain level, the effect of this child-directed style reflects the link between emotional and reward processing regions and structures associated with learning.

Summary of Early Learning in Typical Development

In summary, the infant brain is built to support rapid learning from everyday experiences with people and objects. Human infants come into the world equipped with attentional preferences for novel events, others' goal-directed actions, and communication cues. They have unique early maturing abilities in sharing attention with their partners, imitating them, understanding their emotional cues, and developing close connections. In addition to this early preparation for learning, infant learning experiences in turn contribute to further development of brain functioning. During early infancy, the brain has an overabundance of brain cells and connections between brain cells (called synapses). These cells and connections are stimulated by repeated experiences that the infant has, both with people and with objects, and these repeated experiences strengthen the connections among the different brain areas that are engaged by the particular experience. As connections become stronger over time, those cells and pathways become part of the brain's permanent architecture. Conversely, neural cells and connections that are not stimulated by experiences are pruned away over time as the brain reorganizes itself based on the skills and knowledge engaged by the child's environment. Through this process, the brain becomes further specialized to handle the events of the child's daily life, and such specialization borrows neural equipment from other areas of the brain to allow for further, in-depth learning in these specialized areas. This is the process by which children's repeated experiences in playful and daily social interactions during early development literally sculpt their brains to become increasingly fast and skilled at processing social information and carrying out everyday tasks. The child's history of active experiences in her physical and social environment plays a major role in sculpting both brain and interests, talents, and skills.

Learning in Autism Spectrum Disorder

It is this well-tuned infant system for social learning that goes awry in children with autism spectrum disorder (ASD, which we will refer to as 'autism' throughout this text).

When Austrian psychiatrist Leo Kanner published the first scientific report on autism (in 1943), he emphasized two essential features: difficulties in the ability to communicate and relate to others and a tendency to engage in repetitive, stereotyped activities (reflecting an 'insistence on sameness'). He suggested that these were linked together through a disorder in the biological systems that allow people to have typical social interactions, empathy, and attunement.

These two characteristics that are still considered cardinal features of autism (American Psychiatric Association, 2013), and the other main features of this complex syndrome, reflect differences in the early emerging processes that we have described above.

Compared to typically developing peers, children with autism are less inclined to observe and imitate other people, to seek out and play with their peers, to initiate social and communicative interactions just for the purpose of being social, and to respond to social initiations directed to them. These differences emerge very early in the development and become noticeable in most cases during the second year of life.

Similarly, unusual patterns of repetitive behaviors become clear in the second year of life, expressed in difficulties with changes, rigid adherence to routines (such as eating the same food every day, or wanting to watch the same episode of a TV show repeatedly), and actions with body parts or objects (motor stereotypies such as hand flapping, jumping, or moving objects while watching them). The concept of autism involving a 'spectrum' of behaviors, rather than a single set of symptoms, was introduced by the British psychiatrist Lorna Wing (Wing & Gould, 1979). Her landmark contributions highlighted the striking variation in how symptoms in differing individuals with autism are manifested, describing a continuum (spectrum) of effects from very severe (children who rarely or never engage in any social-communicative behaviors and who are constantly absorbed in repetitive behaviors and movements) to mild (children who differ in the frequency and quality of their social responses and initiations and are little more repetitive than normal, but do not show 'classic' autism). The level of severity of most children with autism falls in between these extremes, and the expression and seriousness of various symptoms can change greatly over time.

What Causes Autism?

There is not one single cause of autism. The symptoms of autism can be the expression of many different biological causes, involving a complex interplay of genetic and environmental risk factors that affect brain development and can begin from the earliest days after conception (Minshew et al., 2011). Atypical brain development in autism involves many levels, from the chemicals that affect brain cells to the structure of cells, the connections among cells, the networks that get linked together, the different areas of brain that specialize in different functions, and the connections between those areas. Despite the variability in the causes and in the

symptoms of autism, one of the characteristics that all children on the spectrum have in common is that they do not seem to learn as easily from others as their peers without autism do.

How Does Autism Disrupt Learning?

Autism does not affect all areas of learning; it is neither a general learning problem nor a learning disability. Children with autism learn many skills, and in some children, learning abilities can be outstanding. For example, some children might be able to recite very long passages from their favorite TV shows or books or might be able to remember the exact route, or the number and names of train stops from home to school. We mentioned earlier that children with autism often spend less time than other children attending to people and more time attending to other aspects of their environment. This can result in learning a great deal about the objects that draw their interest (e.g., how to operate an iPad, or how to spin a bicycle pedal).

What is difficult for children on the autism spectrum is *social* learning—that is, learning from the actions and communication of other people. By not giving special attention to others' actions and words, as typically developing children do, children with autism miss opportunities to learn from and about their environment (Dawson & Bernier, 2007; Nuske, Vivanti, & Dissanayake, 2016; Rogers & Dawson, 2010; Vivanti, Hocking, Fanning, & Dissanayake, 2016). Without a special bias, or preference, to attend to people, it naturally follows that children will likely spend more time attending to other things, literally 'things' and other types of experiences in the environment: objects, perceptions, sounds, textures, tastes, and smells. Additionally, many children with autism have atypical responses to various kinds of sensory information as well, which will also affect their behavior and consequently their learning experiences (Baranek et al., 2013). For example, a child who is very sensitive to noises might be less inclined to participate in play activities in a busy swimming pool or in a 'loud' playground, thus missing learning opportunities. Similarly, a child who takes particular pleasure from the sensory feeling of playing with the sand might get completely absorbed into that activity and pay little attention to what other children around her do—again missing opportunities for social interaction and social learning.

Difficulties in responding to and initiating joint attention behaviors exemplify the link between early social deficits and learning. Often children with autism do not follow adults' gaze or pointing toward objects or events of interest. For example, when an adult points and says 'Look, an airplane!' the child with autism might not follow the point, thus failing to connect the word 'airplane' onto the object indicated by the speaker. It has been shown that the more difficulties the child has in following others' pointing or gaze direction (i.e., a deficit in the *response to joint attention*), the more difficulties she or he will have with learning language (Sigman, 1998; Mundy, 2016). Similarly, most children with autism make limited effort to

direct and maintain their caregivers' attention to what they are interested through eye contact, vocalizations, gestures, and/or facial expressions and by bringing objects to show them (i.e., a deficit in the *initiation of joint attention*). Decreased sharing of interests translates into decreased opportunities for children to learn from their caregivers' responses—to learn words and actions and concepts and habits associated with their interests and the events that occur in their everyday life. Finally, reduced propensity to imitate, take turns, and share experiences with peers during play 'deprives' the child from precious opportunities to learn new skills from their peers or to develop friendships, further exacerbating social difficulties.

In addition to social-communicative difficulties, another aspect of autism that interferes with learning new skills is the behavioral rigidity, or 'insistence in sameness.' As we mentioned earlier, typically developing children are naturally attracted by novelty—for example, they pay more attention to events, words, and actions that they have never seen before compared to familiar ones. As a consequence, they are drawn to new experiences. Children with autism seem to be more attracted by familiarity and repetition than novelty (Brock et al., 2012). Many children with autism are wary of new places, foods, objects, and experiences and may want to avoid situations and experiences that are new or unfamiliar. As a consequence, they miss opportunities to learn new skills to fit the new experiences. Having fewer interests and experiences competing for their attention is likely to be another reason why children with autism can learn so much about their areas of interest (e.g., the names of the characters of a TV show).

A third autism-specific characteristic that disrupts learning involves the important ability to tune out distractors when focusing on a learning task. Children with autism as a group tend to have difficulties with maintaining their focus while ignoring distracting or irrelevant events. Typically developing children can learn many new things during early play activities (e.g., reading a picture book with the caregiver) because they focus on the pictures in the book and the play partners' words and actions and they tune out unrelated stimuli (the sound of the TV in the living room, the fan spinning in a corner, and the lights of the cars passing in the distance). For children with autism, it can be extremely difficult to stay 'on task' and tune out the 'background noise'—some adults on the spectrum reported that as children they would often feel like they were 'bombarded' by a confusing mass of visual and auditory stimulations. It is not hard to imagine that a child in a group learning setting who cannot tune out distractors, who has trouble tuning into people, and who is more drawn to familiar aspects of the environment than novel ones might feel disoriented, or assailed by all the competing demands for attention, and may respond with emotional distress and disorganized behavior—which then creates yet another obstacle to learning.

In conclusion, while children with autism demonstrate areas of learning capability, their biologically based difficulties in processing social information, their insistence in sameness, and their attentional, cognitive, and emotional difficulties can 'deprive' them from taking advantage from the many learning opportunities that naturally occur in their environment during everyday events and daily routines with adults and children. This is particularly relevant with regard to learning in peer

groups—a situation that places exceptional demand on attending to and understanding people, flexible attention and behavior, and the ability to maintain one's attention to learning experiences and ignore distractors.

From a biological perspective, autism's core symptoms involving decreased attention and engagement in early social learning experiences reflect differences in the 'built-in' preferences and responses that support social learning in infants and toddlers. These early abnormalities, in turn, result in a child who is not receiving the types of learning experiences needed to stimulate the organization and specialization of the neural networks that support the development of social communication and more advanced forms of social learning (Dawson, 2008; Vivanti & Rogers, 2014). Luckily, however, early implementation of specialized educational programs can play a major role in decreasing these early learning disruptions in children with autism.

Autism and Learning: What Is the Role for Education?

The social learning difficulties of children on the autism spectrum described above are rooted in a variety of biological factors that affect brain functioning from early on. How can educational programs address these biologically based difficulties? Fortunately, the human brain is a marvelous learning machine. Learning results from experiences, and learning changes brain structure and function. This phenomenon is called 'neural plasticity,' and research shows that the organization and specialization of the brain are particularly plastic, or 'open to change,' during infancy and early childhood. This is as true for children with special needs as it is for other children. For example, recent work in the field of autism and dyslexia has documented functional 'normalization' of brain activity in children receiving a targeted behavioral intervention (Dawson, 2008; Dawson et al., 2012; Davis et al., 2011; Gabrieli, 2009). The notion that a specialized intervention is capable of stimulating learning, changing behavior, reducing symptoms, and enhancing brain function is the foundation of the Early Start Denver Model, which we will discuss in detail in the next chapters.

Conclusions

Typically developing children are well equipped to learn from their social environment from infancy. Early learning experiences are supported by biological processes that facilitate special attention to novel versus familiar information; interest for people over objects; and an early inclination to engage in playful social interactions that are conducive to learning. Children with autism are capable of learning, but their biologically based difficulties in processing social information, their insistence in sameness, and their attentional difficulties can hinder their ability

to learn both from adults and from other children. Specialized early intervention approaches can address these difficulties. The rest of the chapters in this text will explain the strategies that our studies and our experiences have found to be most helpful to support learning in young children with autism within a group setting.

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Chapter 2
The Group-Based Early Start Denver Model: Origins, Principles, and Strategies

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Since children with autism are special in the way they learn, teaching techniques used by teachers, therapists, and caregivers must be special too. Current research indicates that the best approach to promoting learning and development for young children with autism is to provide intervention that (1) starts early in life, (2) is implemented throughout the child's day, (3) draws on evidence-based strategies, (4) is tailored on the individual child's profile of strength and needs, (5) targets the core features of autism and addresses functional/adaptive skills, (6) includes systematic monitoring of progress, and (7) involves caregivers in decision-making (National Research Council, 2001).

The Early Start Denver Model (ESDM) is an evidence-based intervention approach that meets the criteria for best practice in early intervention listed above. It is unique in the way it incorporates knowledge from different disciplines (including developmental science, applied behavior analysis, and social-affective neuroscience) to facilitate learning and development in young children with autism. This volume describes an approach we developed at La Trobe University for delivering ESDM in a group day care setting—the group-based Early Start Denver Model, or G-ESDM.

The origins of this program date back to the early 1980s, when an intervention called Denver Model was developed by Sally Rogers and colleagues at the University of Colorado Health Sciences Center. Recently, Sally Rogers and Geraldine Dawson developed the 'Early Start Denver Model' (ESDM; Rogers & Dawson, 2010a), which involves the expansion and adaptation of the original Denver Model curriculum to address the developmental needs of toddlers and to include additional empirical findings on the core areas affected by autism. Additionally, a curriculum checklist (ESDM Curriculum Checklist; Rogers & Dawson, 2010b) was developed to design individualized intervention targets.

In this chapter, we discuss the guiding principles underlying ESDM practices, including the rationale behind early intervention in general and the ESDM in particular, as well as the foundations for implementing these principles and procedures in a group setting.

Why Treat Autism?

Until recently, autism has been associated with negative connotations and regarded as a set of problems to fix. This notion has had dramatic implications for treatment —for example, the use of electric shocks to 'punish' autistic behaviors. Only recently have the strengths of children with autism, their unique ways of expressing themselves and experiencing in the world, and their contributions to families, communities, and society begun to be seen in a positive light. Then, why do we need intervention for autism? A number of self-advocacy organizations question the need for treating autism, based on the idea that autism is a way of being in the world, and a culture, that should be supported and appreciated rather than 'fixed.'

The ESDM philosophy fully embraces the notion that the uniqueness of each individual with autism should be valued, but at the same time considers early treatment as a tool to empower children with autism and to provide them with the opportunity to express their full and unique potential, by maximizing their developmental skills, preparing them to participate alongside their family and peers in everyday environments, and addressing those areas of need that limit their social participation. This view is consistent with a shift from a medical model, which aims at curing or eradicating deviations from normality, to a social model, which focuses on environmental and social barriers to civil rights, inclusion, and expression of one's identity and potential. Therefore, in the ESDM philosophy, we believe that children with autism should receive needed interventions to address areas of delay and impairments, so that the acquisition of critical social, communicative, and adaptive skills can provide children with the tools they need to be active members of their community (rather than being passive recipients of treatment). Consistent with the principles of the United Nations Convention to the Rights of Persons with a Disability (United Nations, 2006), this philosophy is embedded in the ESDM principles and practices by taking into account preferences, motivations, and choices of children with autism, and using those to expand their motivation and ability to navigate the real world of social interactions, with its challenges and opportunities.

This notion is fully consistent with recent literature documenting how children with autism, just like all other children, learn best when their motivations, strengths, and interests are taken into account in their interventions.[1]

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[1]This notion reflects a significant departure from earlier conceptualizations of learning in autism. Historically, the field has been positing for decades that persons with autism simply could not learn. In the 1960s, this assumption started to be reconsidered thanks to the first studies documenting learning through behavioral techniques. However, at the time and in the following decades, it was believed that learning in autism was possible only through processes that differed from the ones supporting 'normal learning'. Only recently the idea that learning in autism can be supported through play and social learning during naturalistic interactions like in typical development is being given credit (see Schreibman 1988, and Ashbaugh & Koegel, 2013 for an historical overview).

Why Early and Intensive Treatment?

There are many reasons why it is advisable to start treatment earlier rather than later. As mentioned in the previous chapter, some differences associated with autism, such as the diminished inclination to engage in joint activities, preclude children on the autism spectrum from taking advantage of social learning opportunities that are critical for the development and organization of the social communication circuitry of the brain.

The ESDM addresses the need for social learning by facilitating joint engagement and participation in social exchanges, so that the brain can receive the input that is needed during the critical period of infancy and toddlerhood. As the child gets older, brain development is less 'open to change' (although some degree of brain plasticity is maintained throughout the life span, and individuals with autism, like those without autism, can learn new skills at any point during their lifetime). Moreover, as the number of children receiving a diagnosis of autism prior to age 3 continues to increase thanks to early detection efforts (Barbaro & Dissanayake, 2010; Robins et al., 2014), it is crucial that appropriate intervention is available in all community settings that provide early childcare—homes and out of home care settings such as childcare programs that are dedicated to early learning and care of infants and toddlers. Research data indicating better outcomes for children with autism who are younger at age of entry into intervention attest to the importance of an early start (Makrygianni & Reed, 2010; Perry et al., 2008; Vivanti et al., 2016; Rogers et al., 2012; Smith et al., 2015).

Likewise, the guideline of providing interventions across children's daily experiences—rather than a few hours per week with therapists—reflects the need to address the learning deficits that have already accumulated over time as a consequence of difficulties affecting social learning during infancy. As symptoms of autism often result in missing many learning opportunities, in order to reverse this pattern, it is necessary to provide an enhanced number of learning opportunities throughout the day, every day. It is critical to remember that typically developing children are engaged with others and take in social learning opportunities throughout all of their waking hours, which numbers 75 or more per week. If it takes this much exposure to social learning for children without any developmental challenges to develop typically, then it is only logical that young children with autism would also need that level of learning opportunities to maximize their development. In working to get intervention techniques into all of a child with autism's waking hours, we are trying to level the playing field for them.

Why the Early Start Denver Model?

Most early intensive intervention approaches for young children with autism share some basic features, such as the active engagement of the child for many hours per week (usually 20+) in a planned educational treatment involving the use of behavioral techniques, with specific goals derived from assessment results, manualized instructional procedures, and a data collection system to facilitate progress and outcome measurement (National Research Council, 2001). This approach to autism treatment has sound empirical support, with research indicating that programs with such characteristics can be efficacious in improving language, cognitive skills, and social skills in young children with autism (Vivanti et al., 2014; Reichow et al., 2011).

Within this framework, however, there are different approaches to choose from, which vary according to goals and procedures. The program described in this book, the group-implemented Early Start Denver Model (G-ESDM), is characterized by a unique set of principles, objectives, and strategies. Before discussing why this can be considered an ideal option for a group setting (such as in a childcare program), we will summarize the unique principles, objectives, and strategies of the ESDM below.

Principles of the ESDM

A seminal paper published 25 years ago (Rogers & Pennington, 1991) details some of the key concepts underlying the ESDM principles. The most important notion introduced in this article (which is now supported by empirical evidence; Pennington, Rogers & Williams, 2006) is that autism creates a barrier to the development of the processes that facilitate bodily and affective synchrony during early interactions, such as imitation, reciprocal vocalization, and sharing of affect. Lack of engagement in these early social exchanges, in turn, prevents the child from constructing shared meanings and an understanding of the social partner's actions and emotions—their attentional focus, the sources of their emotional responses, their motives, and the meaning of their behaviors. At the brain level, this is reflected in the lack of cortical organization and specialization in the social domain (Dawson, 2008). This idea recognizes that cognition and language are grounded in bodily actions that are social and playful in nature and occur through the participation in meaningful social exchanges during daily routines (Bruner, 1975).

Another important influence in the ESDM was the work of Dawson and colleagues (Dawson et al., 2005, 2002; Dawson & Bernier, 2007; see also Mundy & Burnette, 2005) which introduced the notion that autism might be linked to a biologically based deficiency in experiencing social engagement as intrinsically rewarding, with downstream consequences on brain development.

In addition to these principles derived from developmental science, ESDM is built on the naturalistic application of principles from applied behavior analysis (ABA) to address the learning needs of children with autism. The practice of naturalistic application of ABA was articulated early on by Schreibman and Koegel et al. (1989) in their work on pivotal response training (PRT), an intervention approach that emphasizes the use of operant learning strategies carried out in the context of activities built on the child's interests and motivation. In a similar way, ESDM incorporates the strategies of naturalistic applied behavioral analysis within a broader framework of social engagement and child-initiated learning. Additionally, the Early Start Denver Model toolkit involves the following intervention strategies.

Developmental Sequences

As detailed in the ESDM Manual (Rogers & Dawson, 2010a), the ESDM involves a distinctive curriculum checklist that assesses current developmental skill levels. The curriculum covers developmental domains that are critical to early social learning, such as imitation, verbal and nonverbal communication, joint attention, sharing of affect, and play, as well as motor, adaptive, and cognitive aspects, and is thus a comprehensive developmental tool for assessing child strengths and weaknesses (Rogers & Dawson, 2010b).

All children with autism, by definition, are impaired in some of the abilities that facilitate learning from others, and therefore, the chief objective in the ESDM is to build the foundation for spontaneous social learning, so that the child can learn from others in all everyday experiences and settings, as other children do. The idea is that the expertise in social learning gained through improved communication, imitation, and reciprocity will lead to the ability to learn during everyday life social exchanges. A corollary of this idea is that by providing children with the foundations for social learning, and by 'normalizing' the frequency of meaningful and rewarding social interactions for a child with autism (which is reduced by the nature of autism itself) and, consequently, the frequency of social learning opportunities, we can minimize the detrimental impact of autism on child social learning. As mentioned above, this is particularly relevant in the case of younger children, as neural plasticity during early developmental stages might allow for a deeper impact of social learning experiences on the developing brain.

While this overarching goal is relevant for all children with autism, the ESDM recognizes that each child with autism is different, and therefore, the curriculum assessment tool is used to determine the specific strength and weakness of the individual child within each domain, so that learning experiences can be individually tailored to maximize learning progress.

In the ESDM, the intervention objectives are built following the sequence in which skills develop in typical development. For example, the use of 1–2 words will be targeted only after the child mastered basic precursors of expressive

language, such as directed use of communicative gestures, phonological maturity, spontaneous vocalization with communicative intent, imitation of sounds, and integration of gaze, gestures, and display of affect. By following the typical developmental sequence of social-cognitive functions, the ESDM aims to build a social foundation for the development of language and cognition so that complex behaviors such as word use are not simply memorized and emitted 'on demand' (e.g., labeling words in response to an adult showing a picture), but rather built on the communication foundations involving joint attention, emotion sharing, and spontaneous use of sounds and words for multiple pragmatic functions and generalized across multiple environments, materials, and partners, as seen in children without autism (Akhtar & Tomasello, 2000).

Accordingly, the ESDM aims to develop the acquisition of the *spontaneous* and *social* use of language, as well as imitation, gestures, eye contact, and other behaviors that are critical for social-cognitive development. Details on the organization of the curriculum checklist and the definition of learning objectives are reported in Rogers and Dawson (2010a, b) and in the following chapters.

Joint Activity Routines

The intervention strategies of the ESDM are based on the notion that (1) early social, communicative, and cognitive skills are best taught and learned within the context of meaningful and rewarding social-emotional exchanges, and (2) lack of early social engagement is the main obstacle to learning in children with autism. As a consequence, the basic mission of an ESDM therapist is to involve the child in social routines characterized by joint engagement and shared positive affect to support spontaneous social learning. These are called joint activity routines (Bruner, 1975). In a joint activity, two or more partners join together to carry out an activity (books, social games, play with toys, mealtime, etc.). The partners join to set up the activity and land on the initial theme of the routine. Then, they share the theme through back-and-forth rounds, during which they share their pleasure in the activity through communication exchanges. Often, one partner adds some component to the routine (variations) to keep interest up. When one or another partner no longer wants to continue, the activity ends and the partners transition into another activity. The structure thus includes a set up that involves mutual interest, a theme that involves rounds of back-and-forth turns, often some variations on the initial theme, and then a 'closing and transition' component. The communication framework involves shared interest, shared pleasure, shared goals, and reciprocal acts. Both partners are aware of the interest, affect, and goal of the other as well as the self, thus experiencing a sense of mutuality, of two people joining together metrically and emotionally. This is a framework for joint attention and for social communication.

The use of joint activity routines as the basic context for teaching is a critical point that distinguishes the ESDM from many other models. ESDM does not try to

work around the weaknesses often seen in autism by replacing socially mediated learning with nonsocially mediated forms of teaching, such as using visual cues rather than a social model, or using picture schedules rather than verbal instruction so that a social interaction is not required to accomplish a task. Rather, the ESDM emphasizes social learning as an intervention core for young children with autism, and as a consequence, social-affective engagement is a crucial ingredient in all the intervention procedures. In other words, ESDM strategies do not attempt to *simplify* learning by eliminating its social component—instead, the idea is to *amplify* the social framework of learning in order to bring the child into the 'social loop.' One strategy used to accomplish this (in addition to the developmental sequence strategy described earlier) is by engaging the child in rewarding and meaningful joint activity routines.

Use of Child-Preferred Activities for Meaning, Motivation, and Reward

Before describing how to embed teaching episodes within these routines, it is worth analyzing the concepts of 'rewarding' and 'meaningful' in more depth. As we mentioned above, typically developing children experience social interactions as intrinsically rewarding, while this component is less strong for those who have autism. As a consequence, many intervention approaches use rewards for learning that are not actually related to the learning task at hand—we will term this 'external rewards'—based on the logic that if children with autism are not intrinsically rewarded by social attention and praise, then a substitute reward is needed.

The ESDM strategies, however, are based on empirical findings showing that children with autism do find social exchanges interesting and motivating, under certain circumstances. Young children with autism typically have favorite adults and turn to them for help to get their needs met, for comfort, and for fun. They also find many other activities pleasurable, though those activities may be quite different from preferred activities of most children of their age. The task of the ESDM therapist is to identify those social and nonsocial rewards for children and then incorporate these into intervention activities, which induces children's positive emotions. By inducing positive emotion in children during social engagement through movement, touch, and gesture songs, and other types of positive sensory social input, the child begins to associate these activities with pleasure and reward and is inclined to participate more readily, seek out more such experiences, and approach people for more. By building up joint activity routines from the initial interest of the child (e.g., spinning a toy), the therapist constantly attempts to turn the excitement and reward value for the activity into *shared* excitement with a social partner for doing the activity, so that the social communication aspect of the activity is highlighted.

These joint activities need not only to be rewarding, but also to be meaningful in order to promote spontaneous learning. What do we mean by meaningful, exactly? We mean that the child fully understands what is being asked of him and why. Much of what is expected of young children with autism often makes no sense at all to the child, because children with autism, as mentioned in Chap. 1, are not well equipped to 'make sense' of others' actions (Vivanti et al., 2011, 2014), might not understand others' language or emotions, and so cannot grasp the context of what is being asked. To ask a child to imitate an arbitrary movement (touch nose) with the instruction 'do this' might not have deeper meaning to the child. It is a random association that has to be built up from many trials. However, putting stickers on each other's bodies and pointing to body parts as a way of indicating where the sticker goes or where the therapist will put it is a game that is very graspable for most young children with autism, after one or two experiences. Pointing to body parts now has 'meaning,' and the child often learns to imitate the adult and points to a body part in a few minutes of this game, because the request is now 'meaningful' for the child.

Children without autism do not happily learn things that are arbitrary either, nor do adults. We are all motivated to engage in meaningful activities. However, those without autism experience others' actions, emotions, and communication as conveying meaning partly because typical brains are wired to facilitate this process, and partly because they can quickly 'put together' information from others' communication, from the context, and from the attentional cues involved in a social exchange. Just like expert chess players, when observing a chess game in progress, children without autism can understand (and remember) why the pieces are arranged in a certain way on the board, where the pieces came from, and where are they likely going next.

Understanding others' actions, emotions, and communication, to a child with autism, is like understanding a chess game for someone who does not know anything about chess—the arrangement of the pieces on the board, the movements, and the changes do not convey clear meaning and therefore do not provide a platform for building learning. When there is no meaning, all acts seem arbitrary. A very important task for the ESDM therapist is to develop activities that convey meaning for an individual child, so that actions, emotions, and words occurring during joint activity routines are not perceived by the child like a random stream of sights and sounds, but like a purposeful, organized, and cohesive sequence of goal-directed behaviors.

This is accomplished through the establishment of everyday routines with everyday materials (the use of everyday items is critical for generalization outside the treatment setting). The activities are organized around a clear theme and capture motivation and goals that 'speak to' an individual child. The therapist creates a clear 'narrative' for the activity by describing actions, people, objects, and emotions involved in the activity with simple and consistent words (as we will detail later on, the language complexity is based on the child's level—see Chap. 6).

For example, the establishment of a simple theme based on the child's spontaneous interest in building and crashing a tower with blocks carries meaning about

the goals of the child's and the therapist's actions (picking up a block and adding it to the stack). The therapist sits across from the child, face to face, so that actions, words, and facial expressions and communicative signals are easily shared, including the words used by the therapist (e.g., 'put it on'; 'goes on top,' 'I need a block' before putting the next block on the tower) and the emotions expressed (smiling expectantly and saying 'uh'oh' as the tower starts to sway to communicate a feeling of 'suspense'). The crash becomes surprising, exciting, and noisy and provides the needed climax and ending for the repeated activity, and additional words, actions, and emotions mark it. The shared emotional experience between the partners, conveyed through gaze, expressions, and perhaps gestures and sounds as well, marks the ability of these two minds to come together in an experience, and all the words, expressions, and gestures used are made socially meaningful through the object activity and the therapist's ability to create an experience of shared emotion, shared goals, and shared meanings, for the child.

The ESDM toolkit includes joint activity routines that involve objects, as we just described, and also joint activities that do not involve objects—these are called *sensory social routines* (Rogers, 1999). Sensory social routines are based on face-to-face interactive games (e.g., tickle games, movement routines, songs, high-five routines, pick-a-boo games) during which actions and attention of the two play partners are not focused on objects, but on the partner who is sharing the interaction. The pleasurable and predictable nature of these routines creates a meaningful and rewarding social framework that facilitates social engagement, decoding body language, using nonverbal communication, sharing emotions, and optimizing the arousal level on the part of the child (strategies on modulating arousal are covered on Chap. 6). The more sensory social routines the child and partner evolve, the more the child will play an active role in cocreating the activity by initiating, responding to, and continuing social exchanges through bodily actions, facial expressions, sounds, and words.

Thus, ESDM strategies involve use of intrinsically rewarding and meaningful social interactions, with the idea that intensive participation in socially rewarding and purposeful shared experiences will lead children to become attuned to their social environment. The process of learning *from* others is therefore parallel to learning *about* others, and it is based on the participation in shared sensorimotor and social-affective reciprocal exchanges. Children learn the procedures and outcomes of the social activities that they are sharing with others while learning about the process of doing things together, which involves the appreciation of the partner's social-communicative and emotional facial and bodily cues.

Embedded Learning Within Joint Activity Routines

While this framework is a necessary foundation in the ESDM, it is not sufficient to promote learning. Within these joint activity routines, ESDM therapists insert carefully tailored teaching episodes. These are based on the science of applied

behavioral analysis, with an emphasis on the application of the A-B-C (Antecedent–Behavior–Consequences) principles. Human learning occurs in the framework of A-B-C, where a specific stimulus or event (**antecedent**) sets in motion a specific **behavior,** which results in a specific **consequence**. If the consequence is rewarding to the child, we say that the behavior was 'positively reinforced'—when this happens, the child will be more likely to produce the behavior in the future in the presence of the specific antecedent, since the neural pathways that connect the B (Behavior) to the A (Antecedent) are strengthened by the reward. While any reward, external or intrinsic, will operate to strengthen AB connections, in the use of motivating activities, the rewarding consequence comes from the achievement of one's goal. Goal achievement is inherently rewarding; thus, when children are learning inside meaningful, motivating activities, the reward is inherent in the activity itself, which greatly helps children generalize skills to other settings (as long as the activities naturally occur in different settings!).

In the ESDM, teaching episodes consist of naturalistic ABC sequences embedded within the different parts of the joint activity routines. For example, during a routine involving a preferred song, the adult might pause expectantly when saying 'We all fall…' (antecedent), the child responds by looking at the adult and saying 'down!' (behavior), and then, the child and adult fall together on the floor laughing (consequence). Since the child enjoys the song and laughs at the ending—the rewards—it is more likely that s/he will use language, eye contact, and sharing of affect (the target behaviors in this example) again in the future.

Other strategies derived from ABA and used extensively in ESDM include prompting (clues given by the adult to facilitate the emission of the target behavior in the child), fading (gradually removing the prompts used to support the spontaneous occurrence of the target behavior, so that the behavior does not become dependent on the adults' helping prompts), shaping (reinforcing immature attempts that progressively approximate the target behaviors), chaining (linking simple behaviors into complex sequences), the use of functional behavior assessment and positive behavior strategies to treat challenging behaviors, and the use of a rigorous data collection system to monitor the child's learning, evaluate progress, and adjust teaching strategies as needed. Within the ESDM approach, interventionists will use these and many other empirically supported strategies that can help the child—see Wong et al. (2015) for a comprehensive list of procedures demonstrated to be successful in teaching specific skills with young children with autism.

Using these teaching strategies, child intervention objectives are systematically incorporated into the joint activity routines, and over time, the child increases his or her repertoire of flexible, adaptive, generalized, and age-appropriate skills and knowledge through the systematic elaboration of joint activities in typical routines throughout the day. This will provide the child with opportunities to learn and practice the child's target skills across a variety of contexts.

From ESDM to G-ESDM

In the following sections, we will describe the rationale and principles that lead to the adaptation of the ESDM for a group context.

One critical factor underlying the need for developing group-based effective interventions is that the number of children with special needs receiving early intervention programs has risen dramatically in the past 10 years (Aron & Loprest, 2012). Early intervention, according to the US Federal regulations, should be 'provided in natural environments, including the home and community settings in which children without disabilities participate' (Individuals with Disabilities Education Act, 34 CFR Part 303). Given the relatively widespread availability of preschool programs in the community, implementing early intervention programs within community childcare, preschool, and playgroup services seems to be an ideal solution to meet this requirement. Nevertheless, literature documenting procedures and outcomes of early intervention for children with special needs delivered in such programs is limited (Stahmer & Ingersoll, 2004; Vivanti et al., 2014).

One of the major objectives in the development of the Group-based ESDM (from here on G-ESDM) was to create a sustainable evidence-based early intervention program for children with autism that could be delivered in regular preschool and group settings. While the majority of the existing literature on ESDM focuses on 1:1 implementation (one interventionist delivering therapy to one child, usually at the child's home), in many contexts, such practice is not feasible. The main barrier to 1:1 early intervention programs involves the scarcity of resources in public health care and education and the high costs associated with organizing treatment delivery through private practitioners. Another issue concerns the impact of home-based intervention on the family's everyday life—this includes the need for at least one family member to be home during therapy hours, and the practical and emotional challenges that are inherent to having many therapists being in the family's home for many hours per week. For example, the following is a parent testimonial based on a real-life example:

> When ** was diagnosed with autism and I was told by the doctor that the treatment was going to have to be at my home I felt more stressed and pretty embarrassed. **'s dad is not in his life and I recently moved into my mom's house, she is a great grandma but she won't want strangers in the house. She is still adjusting to us being there and I can't put that one on her especially when I am barely contributing. I asked the doctor if there was a preschool that my son could go to so I could get a job. That way I could help my son and my mom out.

Clearly, there are other situations in which home-based treatment is feasible and preferred by the family. However, the goal of developing additional autism intervention approaches is to offer flexibility, so that the needs of individual families can be met, and to demonstrate scalability, so that intervention services can reach as many children as possible.

The implementation of early intervention in childcare and preschool settings provides a sustainable alternative, allowing children to receive treatment within

existing community programs without posing constraints to the family work and daily commitments. Furthermore, the group environment provides opportunities that are not available in a 1:1 setting, including the many more opportunities to target educational goals in the social domain, e.g., participation in cooperative activities, engagement in purposeful play with peers, and intentional communication with peers. As childcare and preschool programs are designed to promote early learning and socialization in young children, they offer ideal environments within which to apply the ESDM. Unlike clinic-based therapy settings, childcare and preschool programs provide constant opportunities for play and interaction with typically developing peers, thus maximizing learning opportunities and reducing the risk of social isolation.

Additionally, the G-ESDM can be applied in the context of therapeutic playgroups. These are small groups organized and conducted by a therapist in a clinic environment, involving children with autism and peers, with the aim to target specific social and communication objectives. This format allows to reach more children in a therapy hour and to address goals that are difficult to target in 1:1 settings, as reflected in the following therapist testimonial:

> As an ESDM Therapist I chose to use the G-ESDM Therapeutic Playgroup model over the preschool model in my community as the demands of licensing a childcare center seemed overwhelming. My playgroups consist of both children with autism and typically developing peers in different sizes. With the playgroup model I can choose the size and configuration of the group based on the needs of my clients with autism. The downside to a playgroup model is finding peers and motivating their parents to participate. I often try to utilize naturally occurring social circles of the families I work with but I also found that conducting my playgroups near a preschool helps. I work closely with the preschool director and she encourages the participation of her students in the program.

Potential Concerns About Group Interventions for Autism

Despite these benefits, the implementation of early autism intervention in community group settings poses challenges that may discourage professionals from setting up group programs and families from enrolling their children in such programs. The most frequently voiced concerns include the following:

- How is it possible to address the specific and unique learning needs of each individual child in a group setting? (the issue of treatment individualization),
- How can we ensure that the rigor and quality of the therapy do not get diluted in the context of the many duties, tasks, and constraints of a preschool setting? (the issue of treatment integrity),
- How can we avoid the risk of segregation when many children with disability are grouped under the same roof? (the issue of social inclusion), and
- How can we ensure that families are involved in the therapy? (the issue of caregiver–professional partnership).

In the G-ESDM, there are specific procedures developed to address these issues, which we will cover throughout this book. In the following section, however, we will briefly discuss these frequently voiced concerns, which need to be understood and communicated to families and staff prior to and during the implementation of the G-ESDM.

Individualization Is not Incompatible with Group Implementation

The issue of individualization reflects the most apparent difference between receiving individual versus group-based therapy, and it is often a cause of concern because, as caregivers and professionals know, each child with autism has a unique way of functioning, learning, and approaching his or her daily routine that requires an individually tailored program. Moreover, lack of individualization is a major threat to the quality of any educational program for special needs (National Research Council, 2001; Schreibman & Ingersoll, 2005).

Importantly, delivering the ESDM in a group environment does not mean that all children in the group are expected to be similar and to learn in the same way. The G-ESDM includes specific procedures to individualize treatment goals (see Chap. 3) and treatment strategies (see Chap. 8) and to track progress within the group implementation framework, so that each child has an individualized program that is built on his or her individual profile of strengths and weakness, with ongoing monitoring of treatment response.

The Group Delivery of the ESDM Is not a Diluted Version of the 1:1 Delivery

The issue of treatment integrity reflects the risk that the 'active ingredients' of the therapy can be diluted when programs are implemented within the constraints of community settings and without the resources needed for a 1:1 delivery. Common issues underlying this risk include limited resources, limited training, high ratios of children to staff, and limited time for planning, review, and systematic monitoring of treatment integrity (Akshoomoff & Stahmer, 2006).

To address this risk, the G-ESDM includes a specific fidelity system, which was developed to establish whether therapists were delivering the therapy as intended. This tool has two functions—determining whether the therapists and the site are ready to deliver the G-ESDM, and monitoring the quality of the treatment to avoid treatment 'drift' (i.e., gradual alteration of the treatment protocol). This fidelity system and other resources to ensure that treatment is implemented as intended in the G-ESDM are provided in the Appendix.

A related concern is that even well-trained therapists might not be successful in maintaining treatment quality and integrity if the staff-to-child ratio is lower than 1:3. A high staff:child ratio is critical in producing positive outcomes in both typically developing children and those with special needs (Frede, 1995; Graham & Bryant, 1993), and our research (Vivanti et al., 2014, 2016) documents positive effects of the program with a minimum of 1:4 ratio across the day. However, in order to address the dynamic needs of the group and to maximize learning opportunities, a higher ratio is often needed for specific activities or to address specific aspects of the program. Therefore, a staff:child ratio of between 1:2 to 1:4 is recommended to implement the G-ESDM.[2]

Receiving Therapy in a Group Setting Is not Incompatible with Mainstream Inclusion

Caregivers and professionals are often concerned that environments in which children with autism are in groups together involve the risk of segregation. This concern should not be underestimated, as research shows that children (or adults) in segregated settings are at risk of being devalued or seen as dangerous (Marini & Stebnicki, 2012) and that socially inclusive settings are more beneficial than segregated ones in promoting positive outcomes in children with special needs (Buysse & Bailey, 1993). Being aware of this risk, we advocate the use of the G-ESDM in inclusive settings (i.e., settings where children with and without autism share the same space and participate in shared activities), and we discourage the use of segregated settings for therapy delivery. In developing and implementing the G-ESDM, we have developed a number of procedures to facilitate social inclusion and participation, which will be covered in Chap. 7.

Children with Autism Do not Copy Each Other's Maladaptive Behaviors in Group Settings

A related concern that is often expressed by caregivers is that exposure to other children with autism will encourage children to imitate maladaptive behaviors displayed by other children with autism. This is an unfounded concern, and there is no evidence that children with autism tend to imitate maladaptive behavior (e.g., aggression) of other children (Stahmer & Carter, 2005). In fact, children with

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[2]This recommendation refers to actual ratios of between 1:2 and 1:4, not ratios that can occur if every staff member assigned is present. The planned and funded ratio has to be higher in order to assure adequate coverage when staff members are sick, on vacation, at trainings, in meetings, and so on.

autism are less inclined than typically developing peers to imitate what other children are doing (Vivanti & Hamilton, 2014). Similarly, there is no evidence that children with autism are more aggressive when together—children with autism, as a group, are less likely than their typically developing peers to intentionally hurt others (Rogers et al., 2006).

Delivering Therapy in a Group Setting Does not Mean that the Caregivers Are not Involved

Another important issue that needs to be taken into account is that a preschool setting can be less conducive to caregiver–professional contact and communication than a home-based individualized program. Group programs have the advantage of relieving families from the continuous care of the child with autism and allowing them to work or to focus on other commitments. Indeed, one of the historical missions of childcare programs is to enable caregivers to work outside the home if they desire to do so, and implementation of the G-ESDM should not affect this important purpose. However, the G-ESDM places a high priority on the caregiver–professional partnership. This is based on the belief that children with autism should not learn only during 'therapy hours' with a specialist—rather, they can, and should, learn a great deal during daily routines, just like typically developing children. Caregivers, therefore, play the most important role in facilitating child learning opportunities by using ESDM strategies during caretaking routines at home. Moreover, input from the caregivers is crucial in constructing each child's individualized education plan. Consistent with the principles of the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA), the G-ESDM program takes family values, goals, and priorities into account in the definition of both educational goals and educational strategies. Therefore, therapists in the G-ESDM need to facilitate open communication, trust, and mutual respect with caregivers and address barriers to caregiver–professional partnership.

Conclusions

In this chapter, we have discussed the guiding principles and strategies of the Early Start Denver Model (ESDM) and its implementation in group settings (G-ESDM). Consistent with other approaches, the ESDM emphasizes the importance of starting intervention early in life, providing intervention throughout the child's day, drawing from evidence-based educational strategies, individualizing the program, and involving caregivers in decision-making. As we will discuss in detail throughout the book, caregivers play a critical role in the G-ESDM. They provide guidance on 'what to teach,' thus working with the intervention team in generating

treatment goals, and when possible, they use the ESDM strategies during caretaking routines at home, under the supervision of the team. The ESDM has a distinctive focus on early social learning experiences as the critical ingredient to positive cognitive, adaptive, and social outcomes. Therefore, the ESDM is not aimed at 'replacing' socially mediated learning using alternative forms of teaching—rather, it focuses on how to make early social interactions meaningful, rewarding, and conducive to learning. Strategies to achieve successful social learning draw from the Denver Model, pivotal response training, as well as applied behavior analysis.

The group delivery of ESDM (G-ESDM) has a number of advantages compared to the 1:1 implementation, including feasibility and potential to facilitate peer-mediated learning and 'learning to learn' in a group setting. There is more potential for quality control and oversight in a group setting, and families are less burdened. Group setting represents a natural environment for children, unlike long periods of 1:1 therapy at home with therapists. And group programs prepare children for the school environment that is coming. At the same time, the use of group programs presents challenges in several areas: ensuring individualization of objectives and strategies, achieving and maintaining treatment integrity, facilitating social participation and avoiding segregation, and building caregiver–professional partnerships. Procedures to address these four issues are vital and distinctive components of this program, and the positive outcomes of the G-ESDM documented in research (see Chap. 9) are unlikely to be achieved if the ESDM is used in a group setting without ensuring that learning goals are individualized, teaching strategies are implemented to a high level of rigor, children actively and independently participate in activities with typically developing peers, and caregivers are involved in the program. Each group that is delivering G-ESDM needs to work through these challenges in a successful way and then present their solutions to key stakeholders (caregivers, service providers, and staff) in order to allay concerns of families, referring professionals, and other service providers on a child's team.

The scientific evidence supporting the efficacy of the ESDM across delivery models is covered on Chap. 9.

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Chapter 3
Creating Treatment Objectives in the G-ESDM

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In the G-ESDM, like in the ESDM delivered in a 1:1 fashion, each child has individual learning objectives. The basic procedures used to develop learning objectives are consistent with the guidelines detailed in Rogers and Dawson (2010a): (1) Measurable learning objectives covering core developmental domains are generated every 12 weeks on the basis of assessment results; (2) learning objectives are broken down into small teachable steps that describe what is to be learned; (3) child progress is systematically recorded; (4) mastery of all objectives is assessed every 12 weeks; and (5) new learning objectives are generated based on the assessment results. Within this framework, the G-ESDM includes specific procedures to generate individualized learning objectives that (1) can be addressed within the constraints and opportunities of group settings and (2) ensure that the different adults involved in treatment delivery, whether as part of the group program or not, have access to a child's objectives, are collaborating to target the same learning goals, and are efficiently collecting data. This chapter illustrates these procedures in detail.

Individual Learning Objectives in G-ESDM

In the G-ESDM, the curriculum and objectives for each child in the program are individually constructed on a quarterly basis. The role of the team is to collaborate to actively target individualized learning objectives and record progress on a daily basis. The systematic instruction and tracking of a child's progress allow for daily reflection on each child's intervention response, so that the team can ensure that all the children's programs are ideally customized to their unique learning needs and strengths and adjusted as needed.

Individual goals are derived from an assessment of the child's strengths and weaknesses and selected through a collaborative process involving different

members of the team, led by the team leader (or 'keyworker'; see Chap. 4 for further details of this role) and the child's caregiver.

The assessment process is based on the ESDM Curriculum Checklist (Rogers & Dawson, 2010b), a developmental assessment tool that measures the child's skill level across a range of learning domains. These include communication (expressive and receptive), joint attention, imitation, social skills, play, cognition, fine motor, gross motor, and personal independence. It is divided into 4 different levels that roughly correspond to the developmental age periods 12–18 months (Level 1), 18–24 months (Level 2), 24–36 months (Level 3) and 36–48 months (Level 4). The evaluation and determination of the child's strengths and weaknesses across the different skills listed in the checklist are based on the direct observation of the child's behavior during a 1:1 play-based session, as well as information obtained from the family and professionals who work with the child (see Rogers & Dawson, 2010b, for details on the administration of the ESDM Curriculum Checklist). On the basis of the ESDM Curriculum Checklist results, the child's team leader/keyworker and the caregiver identify together approximately 16 measurable learning objectives (i.e., 1–3 objectives from each relevant learning domain) to be targeted over a 12-week intervention cycle. Daily data collection is used to measure each child's progress on these objectives. This allows the child's learning to be monitored, analyzed, and modified as needed to optimize outcomes.

The other source of learning objectives comes from an assessment of the functions of unwanted child behaviors. For children with marked behavior problems that interfere with learning and participation, a functional assessment of behavior is carried out and a positive behavior plan is developed. We will address this important area in more depth in the next chapters.

Important considerations when the ESDM Curriculum Checklist is used in the group context of the G-ESDM are the following:

- The ESDM Curriculum Checklist includes observations of the child's behavior in the group environment (especially for peer interactions), but is primarily conducted in the context of a 1:1 child–adult interaction in a separate space, to facilitate the adult's focus on the child's unique profile of strengths and weaknesses;
- When completing the ESDM Curriculum Checklist, i.e., the adult conducting the evaluation will involve other specialist team members as needed to support the evaluation of the child's strengths and weaknesses within specific domains. For example, the adult conducting the ESDM Curriculum Checklist might be a teacher, and a speech pathologist comes into the assessment for 10–15 min to observe and provide insight into the child's communication skills.
- Objectives are developed for each of the developmental domains covered in the ESDM Curriculum Checklist, regardless of the children's relative strengths and weaknesses across domains. For example, it is not uncommon to see a child who is at 'Level 3' in the fine motor domain (indicating that her or his fine motor functioning is the one expected for a typical 24–36-month-old child) and at Level 1 in the expressive communication domain (the language functioning

expected for a 12–18-month-old typical child). In this case, the team will still develop fine motor objectives, despite the child's relative strength in fine motor skills. The only exception to this rule occurs when the child is already at the age appropriate level for a particular domain.

- Importantly, some skills that are not explicitly listed in the ESDM Curriculum Checklist are important for children in group settings (e.g., crossing a distance to ask for help from an adult who is not attending to the child). It is therefore recommended that the team leader consults with the teacher and considers the skills that typically developing children use in group environments when generating learning objectives.

Constructing Learning Objectives

Following the administration of the ESDM Curriculum Checklist assessment, the child's team leader is responsible for generating the 12-week learning objectives in partnership with the caregivers and the team. Each objective is designed to be mastered within the 12-week intervention cycle, based on the best estimate of the learning that can be achieved by the child during that period. When formulating the learning objectives, the team should consider the intensity of teaching provided in the program as well as the child's individual learning rate to optimize the child's capacity to master the targeted skill within the designated period. We have used a maximum of 16 objectives per 12-week period (between 1 and 3 objectives per domain). Placing such restriction on the number of objectives for each child ensures that there is enough time to teach each objective and that consistent teaching and systematic data collection occur within the intervention cycle.

Importantly, objectives are not individual curriculum items and do not reflect the first item scored as 'fail' in the Curriculum Checklist. Rather, they are informed by priorities identified by the caregivers and the team during the Curriculum Checklist evaluation process and often represent skills that combine different Curriculum Checklist items. The learning objectives and teaching steps are formulated according to a very specific format, which is designed to support both the child's learning the skill and the adult's teaching. The G-ESDM uses the same format. As outlined in Rogers and Dawson (2010a), learning objectives have four main characteristics: (1) a statement of the 'antecedent stimulus' or event that precedes and elicits the target behavior; (2) specification of an observable, measurable behavior (the skill to be taught); (3) the criterion that defines mastery of the objective; and (4) a criterion that involves functional, generalized performance of the target behavior (for details, see Rogers & Dawson, 2010a, p. 70). For example, a learning objective can be defined as follows:

[Antecedent] During natural opportunities and play activities with *motivating* materials that involve multiple pieces (e.g., pencils, blocks, or balloons), when a familiar peer joins in parallel play alongside or across from Jane less than 1 m

away, [Behavior] Jane will remain engaged in the play for 5 min or more, [Criterion] 2 or more times per day, [Generalization] over 3 consecutive sessions and with 2 or more peers.

The learning objectives are then broken down into teaching steps that build toward mastery of the target behavior. These learning steps (generated from a task analysis process) guide adult teaching and data collection on a daily basis (Rogers & Dawson, 2010a). The first step reflects current baseline performance (what the child does at the time of the assessment), and the second step indicates the behavior that we will target immediately. Once this is mastered, the third step will be the new behavior to be taught and so on, until the last step, which represents the skill that we want the child to achieve by the 12th week of therapy. For example, the teaching steps for the learning objective described above could be defined as follows:

Learning steps	
1	Jane continues activity for 2+ min when peer plays with their own separate set of materials (e.g., pencils, blocks, or balloons) within 2+ m; adult supervises activity and redirects Jane when needed, 1+ time per day
2	Jane continues activity for 2+ min when peer plays with their own separate set of materials (e.g., pencils, blocks, or balloons) from less than 2 m; adult supervises activity and redirects Jane when needed, 1+ time per day
3	Jane continues activity for 3+ min when peer plays with their own separate set of materials (e.g., pencils, blocks, or balloons) within 1 m; adult supervises activity and redirects Jane to the continue activity only 1–2 times, 2+ time per day, with 2+ peers
4	Jane continues activity for 3+ min when peer plays within 1 m, using same materials (e.g., pencils, blocks, or balloons); adult supervises the activity to ensure Jane has access to desired pieces, 2+ time per day, with 2+ peers
5	Jane continues activity for 5+ min when peer plays within 1 m, using same materials (e.g., pencils, blocks, or balloons); adult supervises the activity to ensure Jane has access to desired pieces, 2+ time per day, across 3 consecutive sessions with 2+ peers

The language used to define the components of the learning objective and teaching steps needs to be unambiguous and provide clear directions on (a) what the antecedent for child behavior is to be; (b) what the adult needs to do; and (c) the response expected from the child. This should facilitate 'quick processing' by the different team members working with the child, regardless of their background and expertise. A number of strategies are used in the G-ESDM to achieve this goal, including:

- Using headings to differentiate the antecedent, target behavior, and criterion in each objective.
- Describing in detail what the adults and/or peers need to do. This involves the 'antecedent,' i.e., the action, instruction, or situations, and precedes or elicits the target behavior and the 'prompt,' i.e., help that the adults provide to facilitate the target response if the child does not emit the target behavior independently. Importantly, the antecedent needs to indicate the stimulus that 'triggers' the

target behavior (e.g., saying 'ready, set…' to elicit the response 'go!'), not simply the context in which the behavior should occur (e.g., 'during play routines with the adults').

- Using simple language and avoid using clinical jargon in all objectives (i.e., instead of saying 'when adult gives an instruction to the child that contains prepositions' say 'when adult gives an instruction to 'move,' 'put' or 'gather' an object and this instruction includes either 'in, on, or under,' the child will…)
- Making sure that the target behavior is specified using measurable definitions, for example 'matches 3 sets of objects on the basis of color, red versus green,' as opposed to 'has the concept of colors' or 'understands colors.'
- Making sure that team members and caregiver agree with and understand the learning objectives and steps.
- Avoiding acronyms (no matter how universal you think the acronym is). Acronyms can be misinterpreted and lead to teaching and data collection errors, especially when new or replacement staff are working with the children.

For example, rather than writing 'When Aaron is holding something and the adult says 'show me,' he will extend the object toward the adult 80 % of opportunities, over 3 consecutive days with 2 or more people,' we suggest defining this objective as follows: '[Antecedent] When Aaron is holding something that he has made (e.g., building/drawing etc.) or that is special (e.g., brought from home) and the adult standing in front of child says 'show me,'

[Behavior] Aaron will independently extend the object toward the adult and make eye contact.

[Criterion] on 80 % of opportunities.

[Generalization] over 3 consecutive days with 2 or more people.

Similarly, rather than writing a teaching step as follows: 'Anna will extend objects with a PPP [an acronym for 'Partial Physical Prompt']—80 %,' and in G-ESDM, we would explicitly describe the partial physical prompt, for example, 'Anna will extend objects when adult taps the elbow of the arm that Anna is holding the object with 80 % of opportunities.'

Identifying the Criterion that Defines Mastery of the Objective and Steps

The criterion for determining whether in fact the child has mastered an objective needs to be defined very clearly. A basic rule for us when setting the mastery criterion is to think about what a typically developing child of the same age would usually do. There are several ways to define mastery criteria in the G-ESDM, which include the following:

(1) a 'percentage/opportunity statement' (e.g., 'Brian will respond by imitating the action in 80 % of opportunities' and 'Brian will respond by imitating the action in 4 out of 5 opportunities),

(2) a 'quantity statement' (e.g., 'Brian will imitate sounds 2–3 times in a 10-min period,' or 'child will put 3 puzzle pieces in the puzzle'),

(3) the latency of the response (e.g., 'Brian will respond to greeting within 1 s of adult greeting them'),

(4) temporal duration (e.g., 'Brian plays independently and appropriately with toys without prompts for 10 min'),

(5) accuracy of a skill (e.g., 'Brian will trace, staying on the line for 75 % of the line').

In the group setting context of the G-ESDM, the use of percentage statements as mastery criteria such as '*James will spontaneously imitate the adult's actions in 80 % of opportunities*' or '*in 4 out of 5 opportunities*' can be problematic at times, due to the challenge of targeting multiple objectives, multiple times within inter-actions that involve multiple children. Imitating the adult's actions in 80 % of opportunities means that adult needs to provide at least 5 opportunities, and the child is expected to imitate in response to at least 4 out of the 5 opportunities. In this context, if the adults do not have the opportunity to reach the required number of trials (5 or more) to be able to evaluate whether the objective is mastered, it can be beneficial to think about the 80 % criterion as simply reflecting 'the target behavior is observed in most opportunities' and collating observations from multiple adults to determine mastery level. Percentage statements, in our experience, facilitate teaching and evaluation of mastery criterion when:

(a) The antecedent can be clearly controlled by the adult (this would be the case for a learning objective targeting *elicited*, rather than spontaneous, imitation, e.g., 'the child will imitate in response to the adult's demonstration of novel gestures in 80 % of opportunities').

(b) The targeted behaviors occur frequently in the group environment (e.g., requesting and following instructions).

(c) The criterion describes the level of independence in which the child will perform the skill (e.g., 'Harry will eat 80 % of his meal independently').

(d) The target behavior is typically one that occurs multiple times within one activity, such as putting puzzle pieces in, or drawing lines, or stringing beads, or imitating actions in a song, or pointing as pictures in a book.

Conversely, percentage statements pose challenges or make no sense when the targeted skill is a spontaneous behavior, such as spontaneously pointing in response to interesting events or making eye contact, or when it is a low-frequency behavior even in typically developing children. In these cases, the number of events that might elicit the target behavior is not within the adult's control. Consider, for example, the goal of pointing to interesting objects. If the objective is expressed as follows: 'Points to interesting object/events and looks to play partner adult in 80 % of opportunities,' at least 5 interesting objects/events need to occur to evaluate

whether the child masters the targeted skill. As this will not happen on a regular basis, this behavior is likely to be only inconsistently targeted at best (e.g., whenever a plane flies overhead).

One way to overcome this challenge is to add information on the contexts that are likely to facilitate the occurrence of the target behavior for each individual child. When these details are explicitly written into an objective, spontaneous behaviors can be targeted more consistently and evaluated more accurately. The objective described above can be expanded by including details of personally motivating items and people, as highlighted below.

> [antecedent] When Harry is playing with an adult and Harry sees an interesting (i.e. highly motivating) object or person (including his family, friend Sam, Thomas toy, iPad, or plane, truck) and the adult pretends they are not aware of this object/person, [behavior] Harry will spontaneously point to object/person, look back at adult to ensure that they are looking and wait for adult to label it, 3 times a day, 3 consecutive days, with 3 or more people.

Defining mastery criteria as 'quantity statements' can also pose some challenges. Within the ESDM Curriculum Checklist, many skills involve the child demonstrating a specific behavior repeatedly across different materials, context, and/or people. For example, items of the checklist include '[the child] plays with 10 + one-step toys' or '[the child] uses 20+ names of objects.' In these cases, the evaluation of mastery level involves monitoring the frequency of the target behavior in a set time period. For example, in a 1:1 implementation setting where the adult is working with the same child for a continuous period of time for example, the target behavior and mastery criterion might be written as '[the child] will use 20 names of objects in a 60-min period.' In the G-ESDM, the adults are working with multiple children at a time at different points during the day; therefore, it is easier to monitor the occurrence of the target behaviors during more frequent but shorter time periods—accordingly, the mastery criterion might be defined as '[the child] will use 5 or more names of objects during each 15-min interaction with 3+ adults a day.'

Environmental Considerations—Not All Settings Provide the Same Opportunities to Target Individual Goals

When developing learning objectives, staff need to consider the opportunities (or lack thereof) offered by the activities that occur in the group program. For example, in a group environment, adults will not have difficulties setting up opportunities to target behaviors such as following a simple instruction, requesting an item, imitating peers, or using a shape sorter. Conversely, setting up opportunities to target some advanced play, cognitive, and self-care skills can be challenging within the group setting due to resourcing issues. To increase the opportunities to develop these skills, it is important that the team organizes ad hoc activities that make it easier to meet these objectives. For example, when targeting a child's capacity to

match or sort across two dimensions (i.e., by size and shape or color and size) or learning the difference between 'least, most, few, and many,' access to specific materials is critical in optimizing teaching opportunities. Within a naturalistic early learning setting, where children have free access to lots of materials, it can be difficult to ensure that materials necessary for targeting these specific objectives are readily accessible. To address these issues, the team should consider the creation of specific resources that can be used to target these skills—for example, play materials for targeting 'matching' and 'sorting' goals, or books to target understanding of language concepts as required (e.g., physical relationships, gender pronouns, passive voice, or past and future tense). These will be made available only at set times to address specific intervention targets.

What Gets Measured Get Improved: Collecting Data in the G-ESDM

As for the ESDM, within the G-ESDM, there is a strong emphasis on daily tracking of a child's progress against each of their allocated learning objectives. Within a group environment, recording and tracking each individual child's progress pose some logistical challenges, and an efficient data collection system should be organized to promote information exchange, collection, and storage of data and minimize administrative load on the team. Importantly, the system also needs to be readily 'usable' within the staff's everyday routines to increase frequency and accuracy of teaching and collection of data.

When to Take Data

Consistent with the procedures detailed in Roger and Dawson (2010a), within the G-ESDM, the child's response to each learning opportunity is not recorded trial by trial, but according to a time interval recording system, with adults taking data in between 5- and 15-min intervals depending on the frequency and intensity of teaching opportunities. During interactions involving multiple children, it is recommended that adults take data every 5–10 min and ensure that they take time at the beginning of an activity to review individual children's objectives. For 1:1 interactions, collection of data at approximately 15-min intervals can be sufficient. Within these time reference points, the adult should wait for the natural conclusion of the current activity to stop interacting with the child and take data. During the few minutes needed to record the data, the adult needs to ensure that the children are safe and engaged in another activity.

How to Take Data

The process of recording the child's daily learning in response to the teaching program is based on the procedures detailed in Rogers and Dawson (2010a). Each child has an individualized data sheet developed from his or her objectives. For each objective, the learning step that is currently being targeted is highlighted. Using this as a reference point, the adult records the level of child performance against the relevant learning step. While it is not expected that every objective would be targeted during each data recording interval, 2 or more objectives for each child should be targeted at any one time. The coding system used to record the child progress must be one that the team agrees upon and uses consistently. One example of the coding system, described in Rogers and Dawson (2010a), is reported below.

Performance level	Code
Child performs step consistently during teaching opportunities	'+' or 'P' (pass)
Child did not perform step during teaching opportunities	'−' or 'F' (fail)
Child performed the step partially or inconsistently during teaching opportunities	± or P/F (pass/fail)
Objective not targeted	Leave blank
Child refuses to participate in the activity	NC (noncompliant)

Data at the End of the Day

The team summarizes the data collected throughout the day on the child's 'data summary sheet' on a daily basis. As described in Rogers and Dawson (2010a), the data summary sheet summarizes data for each learning objective across multiple teaching episodes, thus providing an efficient visual summary of the child's response to the daily teaching activities. For example, if four different adults have targeted the behavior of 'imitating 2–3 sound effects' during different 15-min intervals across the day, the data summary sheet will summarize the consistently successful performance of the child. Again, this can be expressed using different coding systems, as long as they are clear to all team members—a simple way to code the child performance, described in Rogers and Dawson (2010a), is to use an 'A' for acquired (behavior performed consistently, 80 % or more), an 'R' to indicate refused/noncooperative (0 %), and other codes to indicate different levels of mastery in between. The data summary sheets are then made readily available for team leaders to regularly review and reflect on the child's progress and make decisions on 'where to go next.' For example, if the summary sheet indicates that the child is consistently showing the targeted behavior in response to the teaching step of 'imitating 2–3 sound effects' (3 'A' in a row across 3 days), the team leader will

move the child to the next teaching step (e.g., 'imitating 4–5 sound effects'). Conversely, if the data summary sheet shows little progress, the team leader might decide to keep targeting the same step or alter the program when lack of progress persists over long periods (specific procedures to guide this decision-making process are detailed in Chap. 8).

Data Tracking in G-ESDM—Some Practical Considerations

It is critically important that all staff working within the group setting have immediate access to each child's individual objectives and current learning steps. Given that each child with autism has 16 learning objectives in the G-ESDM, within any group program, a protocol must be put in place to quickly remind the adult what is the current teaching step being targeted for each child and to allow for efficient data recording. One common strategy is to use 'objective cheat sheets,' that is, posters or sheets summarizing current teaching steps that are placed strategically around the classroom. For example, a gross motor cheat sheet can be placed on the door leading to the courtyard, and individual activity cheat sheets (such as motor imitation using play dough) can be located with the activity materials (e.g., in the play dough box)—this will allow adults to quickly reference individual child's objectives by glancing to the wall or to the sheet in front of them without disrupting the flow of the ongoing activities.

Within this framework, different systems can be used to remind the adult what to teach and record the child response, including paper-and-pencil/manual entry systems (such as described in Rogers and Dawson 2010a), or electronic systems (see below). Whatever data recording system is used, it is critical that it does not place undue administrative pressure on the team—it is up to each team to identify a sustainable and effective data capture system based on the characteristics of their setting. In the box below, we outline an example of how technology can be utilized to support the collection of data in a G-ESDM program.

Information Technology Solutions—An Example

The challenge of manage relevant information in a G-ESDM program, including collecting and analyzing data, can be addressed through information technology solutions. One system currently in place in the Victorian ASELCC G-ESDM setting involves the use of both a web-based database and linked 'app' that receives and sends information to the database about each child in the program. The app is compliable with both android and iOS devices. With all adults having access to a handheld device, little effort is required to review the children's learning objectives, record progress, and take notes. At the end of each day, this information is then synchronized to the database where team leaders can review progress, move children through

learning steps and modify objectives if required. At the beginning of every day, the updated programs are again synchronized with the 'app' so that staff can access the child's latest program, target current objectives and record progress. A schematic representation of the system is shown in diagram 7.1. A screenshot of the app is also shown in diagram 7.2.

One potential benefit of using this type of technology solution is that certain functions can be automated to reduce the administrative load on the team. For example, this system uses automatic alerts to notify the team when a child has shown the targeted behavior across 4 consecutive days, prompting the key-worker to focus on the next teaching step. Similarly, the system provides alerts when a child's progress is inconsistent (i.e., objective review is required) or when the team isn't targeting the objective consistently (i.e., data missing).
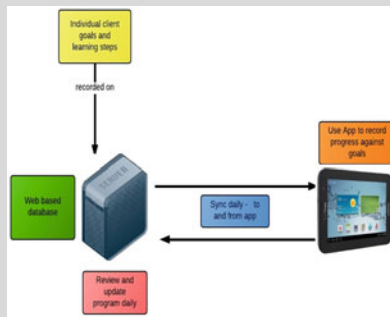
Another practical consideration is that all information about a child's response to teaching, no matter whether it is positive or negative, is critically important in the G-ESDM. Often, adults tend to record a higher quantity of data when the child responds positively to the teaching, but fails to do so when the child is unable or unwilling to perform a particular target behavior. It is important that the team builds a culture that highly values data collection as a means to optimize teaching and program quality, by both celebrating successes and reflecting on challenges, so that teaching can be responsive to the child's needs. When progress is slower than expected, the team leaders need to explore alternative teaching techniques to optimize learning potential—this can only happen through accurate data recording and reflections.

Conclusions

While teaching in G-ESDM takes place in a group context, learning objectives are individualized. One of the key features of the ESDM, and by extension of the G-ESDM, concerns the 'very structured and practical approach to building a daily

teaching plan' (Rogers & Dawson, 2010a, p. 94) and the focus on ensuring that data drive the adults' reflections and decision-making on each child's program. This chapter describes the process of generating individual learning objectives informed by systematic evaluations of the child's behavior and discusses the challenges (and solutions) to collecting data within the G-ESDM. In the next chapters, we will discuss the teaching strategies that adults use to target these objectives within a G-ESDM program.

References

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Chapter 4
Setting up the G-ESDM Team and Learning Environment

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Thus far, we have highlighted the science and the principles of the G-ESDM. From this chapter forward, we will detail strategies and procedures to successfully implement the G-ESDM in the context of ordinary group settings such as day care centers, preschools, and similar early childhood programs. In this chapter, we will focus on two major steps that serve as the foundation for the rest: assembling and then building the transdisciplinary team, and setting up the physical and temporal environment.

Designing the G-ESDM Team

The combination of professional backgrounds of the team members in the G-ESDM is dictated by the different areas of needs that characterize learners with autism. A G-ESDM team typically involves professionals from early education, psychology, behavior analysis, speech and language pathology, and occupational therapy. Some families will also need supports from child psychiatry and developmental and behavioral pediatrics.

Early childhood educators contribute expertise on the teaching program and classroom schedule, including development of a group curriculum that addresses each child's objectives. Additionally, they contribute expertise to the management of resources, including the setup of the environment and the allocation of staff roles and responsibilities across the curriculum. Early childhood educators often assume the role of 'Leaders' in their particular classroom; they are responsible for developing and supervising the implementation of the classroom curriculum, liaising with families and specialists regarding individual children, and supporting and supervising other classroom staff.

The psychologist contributes information about the behaviors and skills that should be expected at different developmental stages, learning processes and profiles of individual children, social–environmental influences in an individual child's development, family structure and dynamics, emotional regulation, attachment relations, and the developmental domains and processes that must be targeted to fill in the learning gaps.

Knowledge from applied behavior analysis is critical in three domains: (1) implementation of empirically derived strategies for effective teaching; (2) measurement of child progress, and (3) use of functional assessment and behavioral plans to manage challenging behaviors.

Speech and language pathology provides crucial input on the sequence of verbal and nonverbal communication development, the varied functions of communication, and when and how to use augmentative and alternative communication approaches.

Occupational therapy informs objectives and procedures in the areas of motor and self-care skills, personal independence, optimization of arousal to facilitate attention and engagement, and strategies to help children to adapt to their physical and sensory environment.

Support from professionals in developmental and behavioral pediatrics and child psychiatry might be necessary to address the health and behavioral concerns of individual children that can interfere with successful participation in the intervention (e.g., epilepsy, gastrointestinal problems, severe anxiety; Rogers & Dawson, 2010).

Transdisciplinary Team Approach

While the G-ESDM team consists of professionals from a diverse range of backgrounds, there are significant common areas of practice among team members. In order to ensure that the intervention meets the needs of each individual child, a collaborative team culture consistent with a *transdisciplinary team approach* is used to optimize resources and efficiently integrate areas of knowledge across the team.

The transdisciplinary approach utilizes collaboration, consensus building, and expanding, sharing, and releasing disciplinary roles to plan and integrate services for children and families (Woodruff & McGonigel, 1988). While this involves significant challenges, there is a general consensus regarding the benefits of this practice. Specifically, the use of a transdisciplinary team structure confers benefits in the following areas (King et al., 2009; McWilliam, 2010);

- Limits service fragmentation
- Emphasizes the centrality of the family as contributing members of the team

- Reduces demands on the family (i.e., support primarily provided from one person)
- Promotes service efficiency
- Promotes service cost-effectiveness
- Facilitates professional development among professionals

Delivering autism-specific services to a group requires far more teamwork than providing 1:1 programs. A group setting is a dynamic context changing from moment to moment, requiring multiple adults to work with multiple children all together to accomplish preplanned goals. The skills of the team at coordinating their behaviors, cognitions, and affect determine the success of the learning environment moment to moment and day by day. How does a team develop this kind of transdisciplinary, role-sharing culture and skill? Critical factors include clinical supervision and work processes that support both individuals and the team to work within active two mindsets: (1) as part of a collaborative role-sharing team, and (2) as an expert responsible to families and team members for their professional expertise.

Transdisciplinary Practice in Action—Going Beyond the 'Specialist Role'

The majority of the team members that work within the G-ESDM program are early childhood educators (or similar) who are assigned to a specific classroom (group) to optimize delivery of teaching for children within that setting. Often, professionals from education play the role of team leader, or key worker (Boyer & Thompson, 2014). This role involves the management and responsibility for a particular child's program. Additionally, the team leader is the primary contact both for the child's families and for the professionals involved in the child program and facilitates active collaboration among the team members.

While the role of the specialist therapists (i.e., psychologist, speech pathologist, occupational therapist) can be more fluid in the G-ESDM (i.e., they will not be assigned to only one specific classroom or child), they do not work separately on objectives relevant to their specific areas of expertise when delivering intervention within the group setting. Everyone in the team is expected to target a diverse range of ESDM objectives within all activities. Therefore, individual team members within the G-ESDM therefore need to commit to expanding and releasing roles across professional boundaries, thus acquiring new skills (with training and support) from a broad range of disciplines. The sharing and integration of team members' expertise is a defining feature of a transdisciplinary team. Additionally, specialist therapists can also play the role of team leader/key worker.

Nevertheless, the unique skill set of each staff member is needed when particular therapeutic issues arise. For example, decisions around issues in toilet training or self-feeding issues might be primarily handled by the occupational therapist in the team, and the management of challenging behaviors will rely on the expertise of the behavior analyst. Thus, each staff member provides both disciplinary and trans-disciplinary support to the team and to each child.

Taking on more than a purely 'specialist role' and going beyond the traditional boundaries of specialist training can be anxiety provoking for some, frustrating for others, and puzzling to many at first. However, in our experience, the transdisci-plinary team approach fosters team members' abilities to work together in a cohesive and cooperative ways, with positive effects on work satisfaction and motivation (Duncan & Vivanti, 2013). A key ingredient to building a strong transdisciplinary G-ESDM team involves establishing procedures and practices to support team communication and planning. Practices we have used are described in Chap. 9. However, the availability of various disciplinary staff members varies widely from one program to another, and each group program using G-ESDM will work out how the team staffs and organizes itself.

Designing the G-ESDM Classroom

The arrangement of the physical environment is perhaps the most obvious differ-ence between the naturalistic G-ESDM and structured teaching approaches for autism that are often used in early childhood autism classroom settings. Often, autism-specific teaching settings modify the classroom environment by using a great deal of visual support and by reducing sensory inputs in the environment. One often sees visual schedules to communicate to the students 'what happens next' or 'how to accomplish a task independently', physical barriers, e.g., tall shelves facing away from the rest of the room, noise-reducing headphones, cubbies, tables and chairs, and relatively sparse surroundings to protect children from distraction in order to facilitate their concentration on tasks. Additionally, it is common to see 'calming centers' or 'sensory friendly' rooms to help children avoid stress asso-ciated with the social and sensory demands of the learning environment. Paradoxically, it is also not uncommon to see programs that use sensory-rich experiences that are not typically found in typical preschool settings, such as ball pits, rolling children up in blankets or carpets, deep pressure and brushing, to provide 'sensory input'. These adaptations are made in order to reduce verbal, sensory, and social demands that are typically present in preschool settings and replacing them with visually focused, object focused, routines focused, and sensory controlled 'autism-friendly experiences'.

In G-ESDM, we understand that children with autism may at times be motivated to by nonsocial, sensory stimulating, and nonlanguage mediated activities, but our approach is to provide the child with a meaningful and rewarding *social learning* environment to increase rewards and skills, and therefore motivation, for social learning. The physical arrangement of the classroom reflects this philosophy and is designed to support social learning from peers and adults across all developmental domains and across all activities of the day.

One's first impression when walking into a G-ESDM playroom is that of a well-organized typical early childhood education setting. The requirements for the physical space are those embedded in early childhood best practices, and the toys and materials present in the playroom are the same that one would expect to see in a typical preschool.

Organization of materials and spaces is critical, and 'naturalistic' does not mean 'disorganized'. A chaotic environment can be detrimental for children's learning and socialization. Moreover, the specific characteristics of young children with autism require careful attention to two aspects of the environment: (1) setting up learning areas and materials that cue the child about 'what is going to happen' in that particular area (2) and managing the quantity and quality of 'competing stimuli' that are present in each area. These two aspects are discussed below (Fig. 4.1).

Fig. 4.1 Physical set-up of a G-ESDM classroom

Organizing Physical Spaces Around Clear Purposes and Motivation

Consistent with the pedagogical principles introduced by Schopler and colleagues (1995), in the G-ESDM learning environment, different areas have different purposes, and the physical arrangement and the materials presented in the area should signal to the child what the purpose is, in order to facilitate children's intentional, goal-directed behavior. For example, a 'symbolic play corner' may be organized, involving play items that highlights the theme of cooking dinner, including pots and pans on the oven, plates, cups and cutlery on the table or shelf, and food and drinks in the cupboard or refrigerator. To facilitate peer interaction, multiples of particular items (e.g., plates, cutlery, and cups) will be provided. Similarly, a 'block corner' may be set up in a different area (away from areas such as the book corner where quieter play is encouraged) with materials limited to items such as blocks, cars, and people. The items should be highly organized (e.g., into tubs) to facilitate children putting the items away after they have finished playing with them.

However, while the different areas in the playroom and the materials involved in each area have clear purpose, the specific activity to be done in each area is not entirely predetermined. Therefore, there are no 'work schedules' telling the student what to do with each toy. Rather, consistent with principles first established by Montessori (1948), within each area the child needs to be able to choose between different materials and actions that are made available to them and are consistent with the theme of the activity, purpose of the area, and the individualized objectives to be addressed in this activity for this child. This approach capitalizes on the child's motivation, embedding the spontaneous interest of the child in the framework of purposeful play activities.

- Duplos have recently become a popular activity amongst the children in Jack's class. Jack has difficulties with his fine motor skills and avoids playing with construction toys such as Duplos. Jack's mother reported that Jack has been interested in roosters since a recent trip to a farm. To motivate Jack to engage in the Duplo activity with his peers, the teaching staff introduced Duplo roosters and other Duplo farm animals to the Duplo activity table. Jack came to the Duplo table and put a few blocks together to make some 'food' for the rooster.
- Clare (teacher) is running a play dough activity in her playroom. Three children in her class have chosen to join her; Hugo, Beth and Lachlan. Clare knows that Hugo enjoys engaging in pretend play, and she is aware that he has learning objectives around peer pretend play skills. Clare notices that Hugo is rolling his play dough into a ball, so she rolls her play dough into a ball, puts it on top of her rolling pin and pretends to lick it like an ice cream. Hugo laughs and copies her, making his own 'ice cream'. Clare remembers that it was Beth's birthday last week. She gets out some sticks and shows Beth how she can stick them in the play dough. She encourages Hugo to join in too. She then sings 'Happy Birthday' and Beth and Higo take turns blowing out the candles. Lachlan enjoys sensory social games such as 'tickles'. Clare picks up the long, thin piece of play dough that Lachlan has rolled and uses it as a 'tickle snake' to tickle Lachlan and herself. She then uses the snake to start to 'eat' Hugo's 'ice cream'. She hands the snake to Lachlan and he also uses the snake to 'eat' Hugo's 'ice cream'.

Importantly, while these examples focus on organizing the physical space to facilitate children's engagement, the ultimate goal of each activity and interaction is to systematically target each child's learning objectives. Procedures to implement teaching strategies are detailed in the following chapters. These, however, are unlikely to be effective is the physical arrangement of the learning environment is not organized around the naturalistic principles of the ESDM—activities are planned and well organized, but child actions are never completely predetermined. As we mentioned earlier, child engagement in activities that are planned to address learning needs and are meaningful and rewarding to the child are keys to successful learning.

Decreasing the Competition for Attention

Children with autism are often very distractible (Murphy et al. 2014). As we mentioned in Chap. 1, they may find it difficult to stay focused on one task and to tune out unnecessary information. As a consequence, one of the 'mantras' in the G-ESDM learning environment is 'decreasing attentional competition' by limiting stimuli that distract the child from learning. This is accomplished by organizing the playroom so that the stimuli and materials that are most relevant to the current activity are highlighted for the child.

Each learning area should be close to storage spaces that can contain materials that are accessible to the staff but not distracting for the child. All materials that are not relevant to the current activity are placed out of children's visual fields, whether in closed cabinets and drawers, or hidden with a curtain or blanket. The elements that need to be present in the visual field of the child are the play partners and the materials involved in the activity. If unrelated materials do not 'disappear' from view, they can disrupt the play activity and prevent learning opportunities.

Likewise, children (and staff) are encouraged to put away materials once they have completed each activity before moving on to another activity, so that two unrelated sets of materials are not present at the same time in the same space. This way, children do not have to process multiple competing stimuli and can orient all their attention resources to the one set of stimuli that are central to the learning activity.

The Different Learning Areas in the G-ESDM Playroom

The G-ESDM is based on a generalist model of intervention delivery, which means that there is one comprehensive treatment plan that is delivered by all the professionals and that covers goals across all developmental domains and skill areas, including those that are typically addressed by specific disciplines. For example, goals in the communication and in the fine motor domains are not addressed

separately by a speech therapist and by an occupational therapist in distinct sessions
—rather, those goals are embedded in a comprehensive plan implemented by a
transdisciplinary team.

This approach is reflected in the physical arrangement of the G-ESDM learning
environment. Rather than being arranged around distinct spaces dedicated to
specific therapies (e.g., occupational therapy room and speech therapy room), the
classroom learning environment is organized around typical play and self-care
activities. All the educational objectives in the G-ESDM are addressed within these
activities. To accomplish this goal, the physical organization of the learning envi-
ronment involves the arrangement of several different areas, described below.

Play-Activity Centers

Play-activity centers consist of designated floor areas or table areas that involve a
variety of naturalistic, age-appropriate play materials, set with the aim of building
learning opportunities and encourage participation in cooperative play based on
children's motivation, common interests, and treatment plans. These areas are
visually delimited but are not necessarily 'enclosed' within physical barriers, and
children have full access to the set of play materials that are arranged in each center.
The spatial arrangement of each area should be set up so that 3–4 children can play
together and will face one another.

Each center has a specific theme, which is clearly defined by a set of materials
arranged in the area. There are multiple centers within the group classroom, as in
any typical preschool: a puzzles table, a book corner, a cause-and-effect toys table, a
construction and blocks area, a toy kitchen/shopping or other symbolic play area, a
drawing/coloring center, and so on. Only materials that are relevant to the theme of
the center are made accessible at a particular day and time in each area. The
selection of the specific play materials within each activity center is based on three
principles. First, they have to be typical early childhood materials—toys and objects
that can be found in any typical preschool setting. Second, they need to be con-
ducive to goal-directed and social play. Therefore, toys that lead to meaningful
actions and cooperative play (e.g., blocks and cars) are better than toys that provide
a lot of sensory stimulation but do not necessarily elicit purposeful behavior and
shared engagement (e.g., iPads). Finally, while different themes involve different
level of play complexity and sophistication, there should be play materials suitable
for addressing treatment objectives for each child in each center, so that any child
can join in and play with something that is meaningful and appropriate for his or her
play level and will address that child's learning objectives. Importantly, materials
and themes are varied often throughout the year, generally every 3–4 weeks, to
avoid that repetitive or inflexible object routines are established (Figs. 4.2 and 4.3).

Fig. 4.2 Example of a play-activity centers

Fig. 4.3 Another example of a play-activity centers

Small Circle and Large Group Areas

Many learning objectives in the G-ESDM are targeted within small group activities, such as book-based or song-based routines, involving one therapist leading groups of 3–4 children. The lead therapist is usually supported by an adult that sits behind the children and intervenes when needed to facilitate the activity, a role that we call 'the invisible support' (see Chap. 5 for further details on staff roles and responsibilities). These types of every day playroom routine activities provide an ideal framework to target expressive and receptive language, gestural and vocal imitation, turn taking, joint attention, cognitive goals (e.g., matching, counting), social (e.g., giving and sharing materials), and play skills.

The physical set-up required to run the small groups involves a clearly defined space that is visually delimited by 'natural' boundaries (e.g., movable furniture, walkways, walls, and doors). Within that space, chairs and play materials are positioned so that the therapist sits in close proximity to the children, facing them and can have easy access to the toys or materials needed for the activity without leaving the chair (these, however, need to be inaccessible to the children). The primary goal in setting up a small group is to make the adult the primary focus of the child's attention, so that children are driven to register, appreciate, and learn from the rich information conveyed by the adult's actions and communication.

To eliminate the competition of distracting stimuli, groups can be arranged so that 'nothing is going on' behind the leading adult that can capture the children's attention. This can be achieved by arranging the groups in areas facing the playroom walls, corners, or areas that include 'natural' barriers. If multiple groups are being conducted at the same time, they should be spaced apart from each other as much as possible. Typically, the small circle groups are set up for periods of around 10–15 min and then deconstructed to allow for other activities and learning to occur (e.g., meals and activity centers). Examples of the physical arrangement of small group activities are illustrated (Fig. 4.4).

Large group activities (i.e., those that involve all or the majority of children in the classroom) provide opportunities for children to generalize the skills that they have mastered in individual learning opportunities and small group activities. This is important as large group activities are common in educational settings throughout a person life—especially within school environments. Encouraging children to sit at chairs during large group activities (like in small groups) serves as an environmental cue and during the activity provides physical supports that promote the capacity to attend and participate in the activity. Depending on age expectations, children can be supported to learn to sit on the floor by progressing from sitting on chairs, to large blocks, through to mats, and then to sitting on the floor. Just as in small circle group activities, large group activities also consist of one 'lead' therapist and a number of therapists who are 'invisible supports' (see Chap. 5). The lead may identify specific children that require additional support and seat an 'invisible support' in close proximity so that they can provide prompting as appropriate. These procedures are illustrated in the following vignette:

Fig. 4.4 Example of small group activities

John (teacher) is leading a whole group 'Music and Movement' routine based on the pre-school song 'Everybody Shaking'. John plans to lead the activity in a large, open part of the Classroom, where whole-group Music and Movement activities typically take place. Before the activity begins, John arranges all the chairs in a circle and covers all the nearby toys or puts them away, to reduce any potential distractions. John, the children and other teachers all sit in a circle on the chairs, while one teacher sits behind Becky and a second teacher sits beside Kane, to provide both students with additional support throughout the activity as required.

The interests and skills of each of the children are carefully considered in large groups, with activities designed so that each child in the group is able to actively participate in some way. The length of the activity and amount of waiting for each child is adjusted to meet the needs of all the children in the group; children who are able to attend for a longer period may remain in the activity longer than children who have limited attention span, as highlighted in the second half of the vignette.

John begins the activity by handing out the bells, with the assistance of Liz, a second teacher (John is conscious that the bells need to be passed out quickly, to reduce the amount of time that the children are waiting to begin). As John and Liz pass out the bells, they target individual communication objectives, for example John holds two bells up while he labels the colours and waits for George to point to request one. John also facilitates peer

interactions by asking Kelly (child) and Holden (child) to pass the bells to the peers sitting beside them, thus addressing language goals and social interaction goals. As soon as everyone has a bell, John sits down in the circle and begins singing 'Everybody Shaking' with an upbeat affect and tempo, while modelling a shaking action with his bell. The children are motivated to attend to John because of his playful affect, the pauses that John adds to the song, their anticipation of what is coming next, since this is a familiar song, and the clear shaking action that John is modelling with the bell. Soon many of the children are participating (i.e., singing and/or shaking their bells), with the other teachers support children to participate (for example, to imitate John's actions with their bells) as required. John adds new actions to the song across the activity to maintain the interest of the children, watching to see what his children are especially interested in or when they are beginning to lose motivation. John also actively incorporates the children's actions and choices into the song routine. For example, John sees Kyle stamping his feet and John points to Kyle and says 'Look, Kyle is stamping! Let's stamp like Kyle…. Everybody Stamping…' and as the stamping verse is finishing, John invites Carly to participate by offering her a choice on how to stamp, asking 'Carly, stamp fast or slooooow? Carly said fast…. stamp fast!', John observes that Becky is no longer imitating and appears to have lost interest in the song and signals to her 'invisible support' teacher to help Becky to transition to the next activity, while he and the other children continue singing.

This example illustrates how the physical set-up—in this case, the arrangement of the chairs is critical to 'engineer' socially engaging activities that provide teachers with the opportunity to target learning objectives.

Other Areas

Many preschool settings involve an outdoor area, which can include climbing equipment, trampolines, sandpits, ride-on toys, and other playground facilities. Outdoor areas are ideal settings to target motor and cognitive goals within large group activities and do not require any specific physical rearrangement for being used successfully in the G-ESDM. For example, obstacle course activities can be set up in outdoor areas to provide learning opportunities across different domains. To target gross motor objectives equipment such as hoops (to jump/hop between), a soccer ball/goal (to kick into), climbing equipment, and balls/beanbags (for throwing) may be included. To address individual cognitive objectives children may be encouraged to count the number of objects (e.g., number of hoops), match identical objects (e.g., pack the balls away into the correct box), and identify colors (e.g., the color of equipment). Social skills objectives may be addressed through providing opportunities for children to imitate each other as they go through the obstacle course and take turns using the equipment.

- Example 1—The children in Clare's (teacher) class have been demonstrating an interest in the outdoor obstacle course. Clare considers how she can target each child's individual learning objectives through this activity. Several children have a learning objective about jumping and hopping. Clare puts out some hoops for the children to jump and hop between, making sure that they are different colors so that they can also

be used to target cognitive objectives color recognition. For children who have the objective of kicking a ball, Clare sets up a soccer goal. Additionally, she includes tricycles to target the tricycle-riding objectives and provide opportunities for peer imitation (following each other on the tricycles).

Some areas do not require any physical modifications, but a number of measures can be taken to optimize social learning opportunities. For example, during meals times the bowls and utensils are placed on a table as would be the case in any typical environment. Children are encouraged to sit with up to 6 peers and at least one adult whose role is to facilitate communication and peer interactions during the activity.

- It is time for lunch in Clare's (teacher) playroom. She has four children at her lunch table; David, Tom, Nick and Sophie. She sets up the lunch table so that all the bowls and spoons are in front of Tom. Clare gives the children the instruction to 'sit down' and helps them to sit down at the table. Once the children are seated, they are each supported to request a bowl and spoon from Tom. Clare encourages each child to request the pasta and sauce from her. Each time they request, she gives them a small amount of food so that they have multiple opportunities to communicate with her. Some of the times she purposefully offers them food/items that she knows they do not want to encourage them to say 'no'. Nick begins to sprinkle some cheese on his meal; Clare points towards Nick's bowl and says 'Look, Nick's putting cheese on his pasta'. David follows Clare's point and looks towards Nick's bowl and then reaches towards the cheese. Clare helps David to point at the cheese to request it from Nick. David sprinkles the cheese onto his pasta just like Nick and begins to eat it. Clare also eats a bowl of pasta and comments 'I like pasta', Sophie copies her and says 'I like pasta!' David says 'I like cheese!' Clare points to Nick and says 'Nick likes cheese too!'. Tom begins using his hands to eat the pasta so Clare provides him with some prompting from behind to use his spoon. Clare notices that Nick is having some difficulty with opening his drink bottle, she looks at him and waits. After a few seconds, she puts her hand out and prompts him to pass it to her and ask for 'help'. At the end of the meal, David, Tom, Nick and Sophie are supported to put their food scraps into the bin, and to put their dirty bowls in one tub and dirty spoons in another. In this example, learning opportunities are provided across a number of different domains including receptive communication (following instruction to sit), expressive communication (requesting the pasta/cheese, commenting 'I like pasta'), social skills (requesting 'help') social skills with peers (requesting the plates/spoons from peer, imitating peers), joint attention (following a point), cognition (sorting identical spoons and bowls) and personal independence (using a spoon).

Transitions Between Areas

It is important to establish clear paths between the different areas dedicated to different activities, and the physical arrangement of the playroom is the key to facilitate smooth and independent transitions. For example, the areas where the small circle group activities are set should be fairly close to the play-activity areas where the group is scheduled to go next, and the table for snack should be close to the where the dishes are placed after the meal. This way, children can navigate

independently and purposefully from one activity to the next within clear and accessible routes.

Questions that Can Help Arranging the Physical Space

These are questions that can help with planning and evaluating the physical set-up of the learning environment

(1) Are there any safety issues in the physical arrangement of the learning environment? While safety requirements are usually highly regulated in preschool settings, additional adaptations might be necessary to ensure safety with students with autism (for example, moving light switches or door handles out of children's reach).
(2) Does the physical space adequately support large group activities, small circle groups, and play-activity centers?
(3) Are the materials in the learning environment typical for a preschool setting, age-appropriate, supportive of goal-directed play, and supportive of social learning?
(4) Is each area organized around a clear purpose/theme?
(5) Are the materials and the areas organized so to 'decrease attentional competition'?
(6) Does the physical set up of the environment facilitate independent transitions?

Conclusions

A classroom learning environment rests upon its physical, temporal, and social structure. This chapter has described a physical structure that supports the attention, interest, and provision of learning opportunities of both young children with autism and young children with typical development. G-ESDM practices are based on the idea that teaching is more powerful when embedded in the context of the real life daily routines. In this context, social communication, cognitive, motor, and language abilities are the tools by which children manage the demands of everyday life. The G-ESDM therefore has a focus on organizing spaces, with 'real life', common objects, play materials, and play areas that would be normally used in a playroom for typically developing children. Within this framework, areas are arranged to facilitate focus on relevant tasks, decreasing competition with distracting stimuli, and support social attention and social learning.

The social environment is orchestrated by the adults in the room and their interactions with each other, with the children, and with their ability to facilitate

child–child interactions. The adults in the program must have at their disposal the varied expertise needed to address the multiple complex needs of preschoolers with autism. The team that is assembled to address those needs comes together to work in a specific way, a transdisciplinary, collaborative team that includes caregivers as team members and clearly defined roles and responsibilities. The team is held together and organized for each individual child by the team leader, or key workers, that works collaboratively with the child caregivers and other team members to develop and implement individualized teaching objectives in the work environment.

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Chapter 5
Development of the G-ESDM Classroom Curriculum

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Now that we have laid down the foundations for setting up the G-ESDM learning environment and developing learning objectives, we can focus on the topic of the classroom curriculum. First, we will discuss the daily group preschool activity routines within which teaching is embedded, and how the transdisciplinary team works within the G-ESDM program to plan and deliver the curricular activities. As we detail in this chapter and throughout this book, the choreography of daily classroom activities is organized around two main themes: (1) curricular activities incorporate individual child objectives within group routines; and (2) teaching strategies based on applied behavior analysis are embedded within everyday playroom routines. As we will discuss in the last part of the chapters, a careful delineation of the staff roles and responsibilities is needed to achieve these goals.

Curricular Activities in the G-ESDM—Incorporating Individual Child Objectives Within Group Routines

As we know all too well, placing a child with autism in a typical toddler and preschool program rich with activities and interactions does not magically resolve the cognitive, social, adaptive, play, and communication difficulties that character-ize children with ASD. This kind of growth requires individualized treatment objectives and strategies. In Chap. 3, we have detailed the procedures used in the G-ESDM to generate individualized treatment plans. Translating that individualized plan into the G-ESDM group treatment setting requires that each child's learning objectives provide ideas for creating the contents of the group activities, including the materials used and the complexity of actions, language, and play involved. One of the main tasks of the team leaders and early educators is to develop group activities that address the individual objectives of each child involved. If activities are planned without taking into account the range of different skills and needs of

each child in the classroom, there will inevitably be some children who will not benefit from the activity, even if they enjoy it. Enjoyment is not learning, though it certainly motivates learning!

An example of how individual objectives are embedded into group activities is given below.

A teacher is planning a small group cooking activity with Sam, Lessie, Ruth and Rick, based on making orange juice using an electric juicer. A second adult will act as an 'invisible support' throughout the activity, i.e., she facilitates children's participation ad response to the teacher without distracting their attention from the teacher (a detailed description of the 'invisible support' role is provided later in this chapter).

While planning the activity, the teacher reviews the objectives for each child in her group to identify (a) what objectives can be meaningfully incorporated into the activity, (b) the resources that she will need to target these objectives, and (c) how the environment will need to be organized for this activity.

The teacher identifies the following objectives to incorporate into the activity;

Sam combines vocalization and gesture to communicate 'yes/no', follows 2-step instruction, shares interests with others;

Rick points proximally to request from choice of two, requests help using vocalization or gesture, washes hands, and uses pincer grasp;

Lessie uses 'me/my/you' pronouns, passes items to peers when directed, and retrieves items from around the room; and

Ruth uses language/vocalization combined with eye contact, responds to 'show me', wipes face independently, understands, and responds to 'give me/point to/show me'.

The cooking activity is set up at a rectangular table that is close to a bench, the sink, and a bin. The teacher places the cups and straws on a tray on the bench, within reach of the children in her group, and places the remaining materials on the table in front of her chair. The teacher, Sam, and Rick wash their hands together and are the first to sit, with the 'invisible support' adult helping Ruth and Lessie to wash their hands and join the activity. The teacher shows everyone how to push an orange onto the electric juicer and says 'Look! We made orange juice', while pointing to the juice that is now in the jug of the juicer. The teacher asks Lessie 'whose turn?'. Lessie responds 'my turn', and the teacher hands Lessie an orange and moves the juicer closer to Lessie. While Lessie has a turn, the teacher holds up an orange and asks the other children 'is this a banana?' and then models 'no' with playful affect. The teacher then put the orange on her head and asks 'is this a hat?', while looking at Sam. When Sam responds 'no', the teacher begins to shake her head playfully, and Sam also starts shaking his head while saying 'no!'. The teacher asks Lessie to pass the juicer to Rick and then holds up two oranges and asks Rick 'Want big or little?'. Rick points to the big orange. The 'invisible support' assists Rick to use the juicer. The teacher holds up the orange that Lessie has just juiced and asks 'is the orange all gone?' and Sam nods and answers 'yes'. Rick appears hesitant about the sensation of the electric juicer and moves his hand away from the juicer, while still holding the orange. The teacher comments 'it shakes' and waits, then extends her hand and pauses before asking 'want help?'. Rick gives her the orange and the teacher says 'squeeze' with a playful affect while using the juicer. The teacher looks at each child and asks each of them to help her. Sam and Ruth each put one hand on top of the teacher's hand and then she narrates 'squeeze' as they push onto the juicer and then lifts her hand up a little and pauses. Ruth looks at the teacher and says 'squeeze' and she then squeezes the orange again, while they all narrate 'squeeze'. Lessie joins in too when the teacher gestures for her to put her hand onto the orange. Rick

joins in with support from the 'invisible support' adult, by putting one hand on top of the teacher's hand. The teacher pulls the orange off and asks Ruth 'is it all gone now?' and Ruth answers 'yes'. The teacher then turns to Sam and says 'where should the orange go?' and Sam answers 'in the bin!'. The teacher puts the orange on the table and tells Sam 'pick up the orange and put it in the bin'. Initially, Sam does not move toward the bin, so the 'invisible support' adult acts to assist Sam to pick up the orange and to throw it in the bin. The teacher asks Ruth 'give me a little orange' and Ruth passes the little orange to the teacher, who then asks Sam 'do you want a turn?'. Sam responds 'yes' while nodding his head. The activity continues with each child taking turns to use the juicer, helping one another to squeeze the oranges.

As highlighted in this vignette, there are several components that need to be planned in addition to which objectives will be targeted for each individual child. One component concerns material choices, to ensure that the materials are motivating and appropriate to the level of play for each child, and support engagement of all children in the group activity. For example, if you are working on a construction activity with 3 children and 1 child is especially motivated by cars, it can be helpful to add cars to the set of materials to maintain the child's motivation throughout the activity.

A second component concerns how each child's individual objectives shape the course of the activity. For example, during an activity using blocks, one child might be working on color matching, another on matching quantities, and a third child on counting to ten, and the adult will differentiate the activity to target the three objectives using the same set of materials. By ensuring that the materials fit the interests, skills, and objectives for each child in the activity, we are supporting children to engage in activities in ways that move their learning forward; all children (and adults!), including toddlers and preschoolers with ASD, can become bored, discouraged, or frustrated when they are asked to perform tasks that are too difficult or too easy.

Other components that require consideration include the staff roles during the activity and child positioning in the activity. As detailed in Chap. 6, decisions about how to 'use' the adults and where to position the children are influenced both by the group needs and by the individual objectives of each child (i.e., two children with objectives around 'passing objects to a peer' should be sat near each other).

Embedding Direct Teaching for Children with Autism Within Daily Routines

In order to 'fill in' the learning deficits that have accumulated from the past lack of social learning, the adults who are leading each activity need to ensure that learning objectives for that activity are actively targeted and that enough repetition is provided to promote rapid child learning. Child progress in the moment dictates how many repetitions are needed. In a small group activity containing 2–4 children, we plan to provide learning opportunities at a rate that is greater than 1 per minute for

each child, which maintains a lively pace and keeps children attending and expecting frequent interactions.

A preschool environment provides a variety of experiences across each day and week to allow for active teaching across all developmental domains and bring the community culture into children's daily lives. While certain group activities are more conducive to targeting some objectives than others (e.g., playground activities like the obstacle course or trampoline are more suitable for targeting gross motor skills than self-care skills), in the G-ESDM, we seek to address multiple objectives from varying domains in each activity. Doing so increases the number of learning opportunities each child has and fosters generalization of skills across daily routines. Therefore, across organized group activities, play routines, and daily care routines (e.g., mealtime, hygiene, and dressing/undressing), each interaction and each moment is rich with social learning opportunities that foster imitation, joint attention, communication, language, and social play.

As an example, the communication objective of identifying possessive pronouns (i.e., 'mine' and 'yours') is easily taught in daily care routines; for instance, when retrieving belongings from around the playroom ('Where's my bottle?', 'Where's your bottle?', 'get your hat', 'get my hat') as well as toy play activities ('Where's your car?', 'get my car', 'look at my tower!'). Similarly, the objective of imitating oral facial movements can be fit into book reading routines (for example, when the teacher and children imitate the facial expressions of characters in the book), joint activity routines (for example, when children imitate a 'blow' movement to request more bubbles during a bubble routine), and meal routines (for example, when children imitate the teacher's face as she makes exaggerated 'yum!', 'yuck!' faces when eating her meal).

G-ESDM teachers, like other preschool teachers, develop daily and weekly schedules of activities to fill each day. Additionally, to ensure that curricular activities include direct teaching for children with ASD, they also need to plan how to target and embed the objectives of all children in multiple activities each day and across the entire week. Below is an example of a classroom daily schedule that highlights the developmental domains within which treatment objectives are developed for each child.

Time	Activity	Learning objectives that can be targeted
9.00–9.30	Arrival of children—transition to playroom and free play	Personal independence (e.g., hang bags, coats off, hang coats), social skills (greetings)
9.30–10.30	Play centers (can include one-to-one teaching for children who are not progressing on specific objectives; see Chap. 8)	Play, fine-motor skills, cognitive skills, receptive/expressive communication, imitation, social skills
10.30–11.00	Focused teaching and learning session 1	

(continued)

Time	Activity	Learning objectives that can be targeted
	• Group time: 'Hello' song and song/book-time	Expressive communication, receptive communication, imitation, joint attention, social skills
	• Small group activities	Expressive communication, play, fine motor, imitation, cognition, personal independence, social skills
11.00–11.15	Outside play	Gross motor, social skills (e.g., invite peers to play, sensory social routines with adults), receptive and expressive communication
	Transition to lunch	Personal independence (e.g., wash/dry hands)
11.15–11.45	Lunch time	Personal independence (e.g., using utensils, wipe faces),
		Social skills (e.g., using adult name to request), expressive communication, receptive communication, joint attention, imitation
11.45–12.15	Rest time	Personal independence, play (e.g., play independently)
12.15–1.00	Activity centers *Art, symbolic/functional play, construction*	Joint attention, fine motor, expressive communication, receptive communication,
		Cognition, play, social skills (e.g., passing items to peers)
1.00–1.30	Snack time	Personal independence, social skills, expressive communication, receptive communication, joint attention, imitation
1.30–2.00	Outside play	Gross motor, social skills, receptive and expressive communication
	Focused teaching and learning session 2	
	• Group time: book reading	Receptive and expressive communication, imitation, joint attention, social skills
2.00–2.30	• Whole group activities: special afternoon activities	Gross motor (e.g., obstacle course), social skills

Leaders can ask themselves a number of questions that will help organize the teaching component within each activity: 'What objectives am I teaching in this

activity?', 'How many opportunities am I giving the children to learn the target behavior?', 'Are teaching episodes based on the child's spontaneous interest?', 'Are the materials appropriate for targeting each child's objectives?', 'What are the roles and responsibilities of all the adults involved in this activity?', 'Are the materials motivating to the child?', 'How can this goal be targeted across the day and week?', Are there a range of different experiences and activities available as part of the curriculum?, Do the curricular activities incorporate the children's current interests? As part of the planning process, are curricular activities being adapted to meet the learning needs and interests of each child in the group?

How to Make This Happen: Team Cooperation and Daily 'Symphony'

Successful implementation of the G-ESDM curriculum relies heavily on effective team work. This involves a high degree of cooperation, planning, and communication among the team members. At any point during each curricular activity, team members need to know where they are supposed to be and what they are supposed to be doing. This is achieved by establishing clearly defined roles and responsibilities for each adult in the classroom across each curricular activity in the day. If you think of the classroom team as an orchestra, with each specialist having their own role that contributes to the overall performance, one person is required to act as the 'director of the orchestra' to coordinate the contribution of each orchestra member. This role is usually played by the classroom teacher, who will schedule and plan the daily 'symphony' of the team. This involves indicating who does what, when, and where, during each curricular activity, including the adult roles in transitioning children to and from activities. The classroom roles and responsibilities schedule can be organized into intervals, for example, 15-min or 30-min intervals or longer, depending on the individual needs of the classroom.

Roles and responsibilities need to be spelled out for every daily routine. In the example below, each adult's roles during the morning arrival routine are clearly planned out and documented in advance. One adult member is assigned to greet the children and families and support their transition into the playroom (e.g., greet child, help child to hang bag) and assists them to select a play activity. The other adults in the room are stationed strategically in designated areas (e.g., block corner, outside areas) to engage children in play and target learning objectives.

Below, we illustrate an example of the playroom roles and responsibilities schedule.

Time	Lead teacher 1	Paraprofessional 1	Paraprofessional 2	Lead teacher 2
9.00–9.15	Greet parents and children on arrival, transition children into playroom	Set up yard	Supervises play activities	Teaching during free play
9.15–10.10	Monitor overall playroom, 'floating' between groups to support engagement in activities and redirect children as needed	Teaching during free play Toileting as required	Supervises play activities Toileting as required	Teaching during free play
10.10–10.30	Transition children outside	Supervise children outside	Supervise children outside	Transition children outside
10.15–10.25	Toilet children as required	Gross motor teaching	Toileting as required	Teaching during outside play
10.25–10.30	Set up small group activity	Gross motor teaching	Supervise children outside	Set up small group activity
10.30–11:00	Conduct small group activity. When finished transition, last children. Collect data	Provides support small group activity. At the end of the activity, transition first children outside, and supervises outside play	Provides support small group activity. At the end of the activity, transition first children outside, and supervises outside play	Conduct small group activity. When finished, transition last children. Collect data

Supporting Transitions

While most of the strategies to facilitate the smooth implementation of the 'daily symphony' are based on best practice in education, some specific procedures are required in the G-ESDM to facilitate the transitions between activities that occur frequently within a group environment. This process is accomplished with the 'lead–bridge–close' transition procedure (see Rogers & Dawson, 2010), which involves a 'lead' to open the activity (e.g., getting materials out) and draw children's attention toward the new activity (e.g., saying 'look, play-doh!'), a 'bridge' to facilitate moving from the previous to new activity, and a 'close' to pack away materials from the previous activity and assist the last children to transition to the

new activity. For example, at lunchtime, the lead will 'open' the lunch activity by helping the first 1–2 children to wash their hands, walk independently to the lunch table, and sit down; the 'bridge' supervises the remaining children to wash their hands and independently transition to the lunch table; and the 'close' will close down the previous activity and may help any remaining children to wash their hands and sit at the table.

Roles and Responsibilities in the G-ESDM

Lead

One of the most important roles within any G-ESDM activity is the role of the 'Lead'. The lead is the adult responsible for leading the curricular activities, including small-group and whole-group activities. This adult is responsible for eliciting and maintaining children's engagement throughout the curricular activity, responding to children's cues, and targeting individual objectives throughout the activity. The lead is also responsible for coordinating the roles of additional staff during the activity and during transitions (e.g., the 'invisible support' and the 'float' adults; described below). While curricular activities are typically planned by teachers/educators, it is important to note that the role of lead can be played by any professional trained in the ESDM.

Invisible Support

A key role in the G-ESDM classroom is the 'invisible support', used during activities in which children are expected to attend to and receive instruction from one adult (the 'lead'). The purpose of the invisible support role is to facilitate children's participation ad response to the lead without distracting their attention from the lead. As we mentioned in Chap. 1, children with autism have difficulties processing information from multiple sources, so if two people speak to them at the same time or interact at the same time, most information will be lost. Therefore, it is important that children focus on one source of information—the lead. During small circle activities, the 'lead' faces all the children, takes center stage, and gains the children's full attention. The 'invisible support' person will be positioned behind the children, ready to help in several ways: (1) by silently prompting children from behind in response to the lead's interactions with the child when needed, (2) by managing challenging behaviors, and (3) by redirect children to the activity when directed explicitly by the lead. This role can be played by any of the staff members.

Float

Another key role to run curricular activities is that of the 'float'. During play activities (for example, art and craft activities, blocks, and symbolic play), the 'float's role is to monitor the overall playroom, and 'float' from one group to the other to support sustained engagement in activities and to redirect children to the activity centers as needed (i.e., if they are not engaged in goal directed play). This makes it easier for the activity 'leads' to engage children in uninterrupted play and learning experiences. The 'float' liaises with the leads in many ways, some of which may involve (1) providing particular materials, (2) rearranging children at the play center, (3) transitioning children into and out of the play center, (4) ensuring that the number of children at each play center is appropriate, (5) encouraging children with high needs and/or disruptive behaviors to join different groups, rather than being all in the same group, and (6) and ensuring that the lead is given time before receiving more children at the play center to take data or review objectives.

These roles are illustrated in the following vignette:

> Three play-activity areas are set up, including a 'home corner', an 'art area', and a 'construction area'. In the home corner, the adult assigned to act as the 'lead' is targeting teaching objectives during a 'washing babies' activity, while the leads in the art and construction areas are working on teaching goals during a drawing and a block activity, respectively. Carly, the adult assigned to play the 'float' role observes that while the majority of children are engaged in an activity, Kyle is lining up toys on the floor. She notices that there are four children in the home corner already, but only two children at the construction and the drawing areas, and decides to check with the 'leads' who are managing the drawing and construction activities if Kyle can join their group. When both 'leads' indicate that they have capacity to include Kyle in their groups, Carly asks Kyle 'drawing or blocks?' while pointing to each of the activities. Kyle stands and walks toward the drawing table and Carly walks with him, supporting him to settle into the activity by providing access to markers and paper while the activity lead finishes her routine with another child. Carly reminds the 'lead' about the key learning objectives for the newly transitioned child that can be targeted at the activity, which include 'following one-step verbal instructions' and 'sharing materials with peers'. In the group, Anthony is the adult playing the 'invisible support' role. He prompts Kyle from behind when he does not respond twice to the instruction of passing a marker to another child. Carly leaves the drawing table to assist other groups/children after observing that all three children, including Kyle, are engaged in the activity.

Is the Intervention Being Delivered as Planned? Fidelity Measures Within the G-ESDM

We have developed a number of implementation fidelity measures in order to assist teams to deliver the G-ESDM and provide guidance on what to do, and how to do it properly. By 'fidelity', we refer to the degree to which prescribed elements of an intervention are actually delivered. While the adults delivering the G-ESDM might

agree in principle on each teaching strategy of the model, all the complexities that arise with toddlers and preschoolers in the dynamic group setting can derail the best of plans. Research shows that in the context of the many duties, tasks, and constraints of community group settings, the 'active ingredients' provided by the teaching strategies may become diluted—this, in turn, might negatively affect the program outcomes (Magiati, Charman, & Howlin, 2007; Reichow & Barton, 2014). A fidelity tool can help adults evaluate whether the core ingredients of the program are actually being implemented consistently. Additionally, measuring fidelity frequently helps those responsible to ensure the quality and rigor of the program over time and avoid treatment 'drift' (i.e., gradual alteration of the intervention protocol). The three fidelity measures outlined below are critical to establish and maintain a high-quality G-ESDM program.

G-ESDM Classroom Implementation Fidelity Tool

The G-ESDM Classroom Implementation fidelity tool is designed to support lead educators/therapists to assess adherence to the G-ESDM procedures and curriculum standards (including physical arrangement of the classroom and staff roles and responsibilities). A copy of the tool is available in Appendix. The G-ESDM Classroom Implementation fidelity tool uses a Likert-based 3-point rating system aimed at measuring aspects of the classroom setup and delivery of the G-ESDM curriculum. It is designed to allow the team to rate the classroom's adherence to the G-ESDM principles, and it is generally completed by a trained observer within a 45-min to 1-h observations period. 'Fidelity' is achieved when all the key components of the program described below are implemented in line with the ESDM principles and standards to a high level of accuracy (80 % or above; see Appendix for details on scoring procedures and fidelity criteria). The specific classroom implementation aspects covered include classroom setup, provision of opportunities for child participation, learning and peer interaction across daily activities, management of transitions, management of group activities (including individualization of teaching within group activities), data collection, staff roles/responsibilities and teamwork, emotional atmosphere in the classroom, and program individualization. This tool should be utilized every quarter within each G-ESDM classroom.

G-ESDM Small Group Activity Fidelity Tool

The G-ESDM Small Group Fidelity Tool is designed to assess adherence to the G-ESDM treatment strategies when the adult is working with 2–4 children within an activity. This fidelity tool is briefly described below, and a copy of the tool is available in the appendix. The tool uses a Likert-based 5-point rating system and covers 13 key intervention procedures. These include management of child

attention, quality of behavioral teaching (i.e., the ability to organize teaching episodes in the context of clear antecedent-behavior-consequence sequences embedded in play routines), the accurate use of instructional techniques such as fading, shaping, and prompting, adult ability to modulate child affect and arousal, management of unwanted behaviors using positive approaches, use of strategies to facilitate peer interaction, use of turn-taking, optimizing child motivation for participation in activity, use of positive affect, sensitivity and responsivity to child communications, targeting multiple and varied communicative functions (e.g., requesting, commenting, protesting, labeling, greeting), appropriateness of adult language for child's language level, use of joint activity routines (articulated around a setup stage, the establishment of a theme, a variation on the theme, and a clear closure), and smooth transitions between activities that maximize child interest and engagement. This tool is generally completed during a live observation of the small group activity. 'Fidelity' is achieved when all the key components of the program described below are implemented in line with the ESDM principles and standards to a high level of accuracy (80 % or above). This tool should be utilized at least every quarter with all G-ESDM staff.

G-ESDM Management and Team Approach Fidelity Tool

The G-ESDM Management and Team Approach fidelity tool is designed for managers and their teams to assist with designing and reflecting on their workplace G-ESDM practices. It uses a Likert-based 3-point rating system, and it is generally completed by senior staff (including manager) on a biannual basis. Specific areas evaluated by the tool include quality of the transdisciplinary team approach, team leaders' management skills, implementation of the ESDM Curriculum Assessments and development of individualized objectives, data collection, management of allied health specialists, communication between team members and between management and team, team culture, and organizational culture. 'Fidelity' is achieved when all these keys are implemented in line with the ESDM principles and standards to a high level of accuracy (80 % or above). See Appendix for a copy of the tool.

Conclusions

In this chapter, we focused on the 'daily choreography' of the G-ESDM classroom. Consistent with the principles detailed in previous chapters, teaching in the G-ESDM program is embedded in daily routines and is based on a naturalistic format. Classroom activities must occur within in a typical learning environment and provide naturalistic learning opportunities, i.e., they are based on 'real-world' situations and materials that would normally be present in a typical learning

environment and contain elements that are meaningful and rewarding for each child involved in the activity. The aim of a naturalistic activity schedule is to engage the children in age-appropriate experiences involving routines and materials that children typically encounter in their everyday environments. The more artificial and idiosyncratic the curricular activities and materials involved are the less likely the child will be likely (1) to find peers who are familiar with those toys and activities, and (2) to have an opportunity to use the learned routines and skills outside of the teaching environment. To evaluate how naturalistic an activity is, some questions that a teacher can ask are as follows: Would a typically developing child enjoy this?, How likely is it to see an activity like this in a typical preschool program?, How likely is the child to meet someone who is familiar with the routines and objects used in the activities?, Are these materials age-appropriate and common? In this context, frequent teaching episodes take place (more than 1 every minute per child), which incorporate individual child objectives within group routines and are carried out by the team members work as a coordinated and cooperative unit. A clear delineation of roles and responsibilities and the use of fidelity tools are critical to implement the daily curriculum successfully. Within the framework of naturalistic activities, a number of treatment strategies based on developmental principles and on the science of applied behavior analysis are delivered to promote continuous learning opportunities. These strategies are the focus of the following chapter.

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Chapter 6
G-ESDM Treatment Strategies

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In Chap. 3, we focused on developing intervention objectives in the G-ESDM—the '*what* to treat' component of the intervention. This chapter is about 'how' to accomplish those objectives. As we discussed at length in the previous chapters, the basic organizing principle of the G-ESDM intervention is that individual objectives are targeted within group activities. To accomplish this, teaching strategies that were originally developed in the Denver Model and in the ESDM have been adapted for the group context.

The focus of this chapter is on 13 key intervention procedures that have been proven successful in our efforts to teach young children with autism in a group setting. Importantly, these 13 procedures constitute the core procedural components as measured by the G-ESDM group activity fidelity tool, a rating system (see Appendix) used to determine whether the program is being delivered according to the G-ESDM implementation standards described below.

The Context for Intervention

As detailed in Chaps. 4 and 5, the G-ESDM intervention is delivered in the context of daily group routines that are naturalistic, meaningful, rewarding, and interactive. Rather than 'first we work on our learning objectives and then we play' or 'first we have our meal and then we work on the learning objectives', child objectives are addressed into all the everyday daily routines and associated play activities.

The adult's role is to provide a learning environment in which materials are carefully selected to support the target skills. Adults join the child in his or her spontaneous play as a play partner. In this role, the adults facilitate and scaffold—rather than direct—the child's interactions with materials and with other children, individualizing the type of guidance used according to the child need but following

the children's lead and timing. Daily play routines provide an ideal arena to practice expressive and receptive communication, turn taking, imitation, sharing of affect, joint attention, functional and symbolic play, and motor skills—the foundations of social learning and cognitive/communicative development. To make this happen, there are a number of core elements that the adults delivering the therapy must apply. These are specified in the G-ESDM Small Group Activities fidelity tool (Appendix).

Intervention Strategies Used in the G-ESDM

In the remainder of the chapter, we will discuss each element of successful delivery of the G-ESDM, as defined in the G-ESDM Small Group Activities fidelity tool (see appendix 1 for details on scoring procedures and fidelity criteria). While most of the elements of the G-ESDM Small Group Activity fidelity tool reflect the original ESDM fidelity criteria (see Rogers & Dawson, 2010), specific procedures must be put in place for implementation in the group context, which will be discussed in detail.

Management of Children's Attention

In order for learning to happen, we must ensure that the child's attention is directed to the source of learning. Managing children's attention in the group environment refers to the adult's ability to take 'center stage' and become the primary focus of the children's attention, and/or to direct the children's attention toward peers or other relevant learning materials. As we discussed in the previous chapters, this can be challenging, as children with autism are not necessarily inclined to pay special attention to people, and even when they do they are very easily distracted. Shared attention skills require that the child pay attention to both the people and the objects in a way that facilitates shared interaction and communication. In the context of the small group activities, a number of strategies can be implemented to facilitate this process.

First, as detailed in Chap. 4, the physical setup must be organized so that the adult is always face to face with the children, while having easy access to materials involved in the activity without leaving the chair. Children are positioned strategically to support their attention to the adult, as well as to their peers. Second, the adults must maximize the children attention by increasing the 'salience' of their actions and communication: this involves using a playful, exaggerated range of motion and facial expressions to make actions and communication more intense and

'theatrical'. Levels of intensity, however, must be adjusted depending on the circumstances to sustain children's attention; e.g., increasing the 'volume' when a child is losing attention and decreasing the 'volume' when the child appears overstimulated.

To facilitate shared attention, it is important that the adult directs the child's attention not only to herself or himself, but also to other children and to the teaching activity. This can be achieved by encouraging children to notice what another child is doing, using gestures (e.g., pointing), words ('look! Carlos is opening the box!'), and facial expressions (a surprised face, and alternating gaze between the children and the objects involved in the situation).

Quality of Behavioral Teaching

Once the children's attention is captured, the actual teaching episodes can take place. Learning science (applied behavior analysis) has demonstrated that learning is facilitated when it is organized in 'Antecedent–Behavior–Consequence (ABC)' sequences. These concepts refer to a universal process of learning, whereby the A (Antecedent) specifies what stimulus in the environment typically precedes and, after learning, elicits, the child response (e.g., the adult points to a figure in a book and says 'wow look!'), the B (Behavior) is an observable learned behavior (e.g., the child follows the adult's point to the target figure in the book), and the C (Consequence) is what happens immediately after the behavior (e.g., the adult says 'yeah, it's a bear!' and engages in a playful tickling game pretending to be a bear). A clear antecedent, a well-defined behavior, and a consequence experienced by the child as positive will motivate the child to engage again in the teaching activity and will support the acquisition of the target skill.

Common errors in the delivery of A–B–C framed learning opportunities include the following

(1) The antecedent does not provide a clear cue to the target behavior (e.g., the adult waits with the book opened for the children to look at the target figure, without making it clear that following the adult's point to the bear is the target).

(2) The behavior is not clearly defined (e.g., the adult is not sure if the target response is the child following the point to the book figure or imitating the word 'Wow!', thus not knowing which behavior they are supposed to reward).

(3) The adult does not reward the target behavior with a clear positive consequence (e.g., after the child follows the point to the target figure, the adult just moves on the next page), or the consequence is not experienced as positive for the child (e.g., the tickling game is directed to a child who does not like to be

tickled—in that case, the consequence will be perceived as a punishment rather than a reward, and the target behavior will be discouraged, rather than encouraged), or it is not delivered contingently and quickly right after the target behavior occurs (the reward timing element is critical in order to establish the link between A and B).

(4) Another frequent issue is that an adult does not deliver the prescribed trial per child per minute: this can happen when the group activity is running smoothly, and children are entertained by the activity but are not required to do anything (e.g., they are quietly listening to the adult reading a book). While in this situation, it can be tempting to just enjoy the moment of quiet shared engagement, this is exactly the right time to deliver teaching episodes. It is not only important to provide learning opportunities: it critical to do so frequently, and to ensure that each child in the group is provided with one or more learning opportunities every minute. An optimal pace must be maintained to ensure that each child in the group is actively participating in the activity the majority of the time.

Finally, the number of repetitions needs to be well matched to group needs, with more repetitions delivered for new skills (acquisition) and fewer for skills that have been already practiced (maintenance)

One simple way to determine whether the teaching is well organized according to the A–B–C format is to ask an observer to indicate what the behavior the teacher is trying to elicit, and what reward the adult is providing.

Instructional Techniques Application

This element refers to the use of evidence-based teaching techniques such as shaping, fading, prompting, chaining, and error correction procedures, which facilitate learning. When an antecedent is delivered and the child does not respond with the target behavior, then additional intervention techniques are needed in order to address the treatment objective.

Prompts are adult behaviors that follow the 'A' (antecedents), precede the 'B' (behavior), and help the child to perform the target behavior so that it can be reinforced. While the antecedent is what tells the child to perform a behavior (e.g., the adult asking: 'which box should we open, the white one or the pink one?'), a prompt is something the adult does to provide assistance to the child in performing the behavior (Wolery, Ault, & Doyle, 1992). Varying levels of assistance can be provided; examples are verbally telling the child to point to one of the boxes, providing a motor model of pointing, or placing the child's hand to perform the pointing action.

When prompting is introduced to facilitate the acquisition of a particular behavior, the adult must gradually withdraw support (*fading*) to avoid prompt-dependency (i.e., the child getting used to having hand-on-hand guidance and not learning to produce the target behavior independently).

In the ESDM, these techniques are generally implemented using a 'least to most prompting' strategy;[1] in which, the adult provides the A and waits to see at what level the child responds before adding additional teaching techniques. For example, the adult asks 'which box should we open?' and then waits for the child response, then, if there is no response, verbal prompting is offered (reminding the child to point), then partial physical prompt (placing the hand on the child arm to encourage her or him to perform the pointing actions) and eventually, if the child does not respond, a full physical prompt is used (hand on hand guidance).

Physical prompting can be difficult to manage in a group intervention environment, and the 'invisible support' plays a key role in prompting strategies if the leader cannot easily provide the prompt. As detailed in Chaps. 4 and 5, the 'invisible support' sits behind the children during group activities and provides prompting as needed when cued by the adult who is leading the group. For example, in a common scenario, the 'lead adult' models an action, e.g., clapping hands. If the child does not respond, the lead adult uses a verbal prompt to encourage the target response (e.g., 'your turn!'). If this prompt is not successful, the lead adult then nods to the 'invisible support' and the invisible support, sitting behind the child, provides a partial physical prompt to help the child produce the target behavior (in this example, to clap hands). The adult should not allow the children to have more than two sequential errors before adjusting the instructional technique.

Chaining refers to the teaching of multistep skills, in which sequences of actions are taught and combined in temporal order. For example, a multistep behavior such as hand-washing can be broken down into a number of small steps; turning tap on, putting hands under water, putting soap on hands, rubbing hands together, turning tap off, and drying hands on paper towel then putting paper towel in the bin. For this task, one might choose a forward chain or a backward chaining approach (Miltenberger, 1997), whereby the child is prompted through each step of the hand-washing process except the last step, which the child will be encouraged to perform independently. For example, the child can be initially expected to just put the paper towel in the bin. As the child learns to execute the last step, she or he will be expected to complete the second to last step, for example drying the hands before putting the paper in the bin. This process continues until the child is able to execute all the steps independently.

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[1]This is an area where the ESDM differs from some other behavioral programs, which are often based on a 'most to least' prompt hierarchy.

In the context of group activities, it is critical that the adults select target behaviors of appropriate levels of difficulty for each child, and appropriate levels of guidance is provided when needed so that all the children in the group can perform the skill.

Managing Children's Affect and Arousal

The concept of 'arousal' refers to the physiological preparedness to perceive and react to environmental stimuli. The arousal level is reflected in the child's behavior, so that a child whose arousal is low will tend to be slow, passive, or even unresponsive to stimuli, while children whose arousal is high will tend to be overactive and might not settle easily into an activity. Children, just like adults, are more likely to learn when they are in an optimal state of arousal: not too passive and not too active. Children with autism are often reported to be less reactive (i.e., hypoaroused) or overly reactive (i.e., hyperaroused) to environmental inputs compared to typically developing peers. For example, they might be 'hypersensitive' to the sensory inputs of a typical preschool group settings, including the noise, smells, lights, textures, and movement level in the classroom (Lane et al., 2014; Uljarevic et al., 2016). More often, however, they are hyporesponsive, i.e., less reactive than normal to sensory stimuli (Baranek, Little, Diane Parham, Ausderau, & Sabatos-DeVito, 2014). In both cases, atypical states of arousal in response to sensory stimuli might hinder the optimal engagement in learning activities (Baron, Groden, Groden, & Lipsitt, 2006).

In the G-ESDM emphasis is placed on the adult's ability to modulate the children's arousal, bringing the level of arousal up when children are uninterested, displaying blunt affect, and/or unresponsive, and bringing the level of arousal down when children are overly active, avoidant, or 'too' excited. To do so, they can adjust their behavior based on the children's state of arousal; in particular, the tone of voice that they are using and the pace of their motion.

Additionally, the choice of activities should be based not only on the teaching contents and behavioral targets, but also on the impact that the activity will have on the arousal level of each child involved. For example, games involving water or sand can be so exciting to some children that their behavior can become disorganized, preventing any meaningful learning to happen. Conversely, a very passive child might be unresponsive during a quiet book activity but more alert and animated during games involving water and sand.

When working in small groups, the adult should be therefore responsive to the general arousal level of the group (arousal level is contagious, so the activity level is often similar across children in the same group) and help each child in the group to reach an optimal level of arousal (e.g., using more arousing motion and tone of voice when addressing a more passive child and a softer approach toward a

hyper-aroused child). The overall feeling of the group should be pleasant and playful. Activities that are calming or arousing are therefore selected based on the continuous monitoring of children's level of activity, to proactively achieve an optimal arousal level that is conducive to learning (see Chap. 9, for more details on sensory responsivity and arousal in autism).

Management of Challenging Behavior

As we will discuss in Chap. 8, a critical component of the G-ESDM is the management of challenging behaviors. This is particularly relevant in a group environment, where maladaptive behaviors of one child (e.g., aggression, self-injurious behavior, destroying materials, severe temper tantrums) can disrupt the activity of the group. Importantly, in order to prevent the occurrence of maladaptive behaviors, all the activities should incorporate elements that are meaningful and rewarding to each child, so that no child is sitting passively through an activity that they neither understand nor enjoy. This requires adapting the activity so that each child is able and willing to be an active participant and independent in at least some part of the activity.

While such well-planned learning environment will prevent the emergence of many challenging behaviors, when these issues nonetheless occur, a solid mastery of behavior management techniques is needed. These include functional assessment to determine the function(s) of the challenging behavior, and the development of a positive behavior support plan to replace the target behavior with a more appropriate behavior. While conducting a functional behavior assessment may require, in some cases, a person with a high level of training in behavior analysis, all adults on the team should be knowledgeable about the factors underlying the onset, maintenance, and management of behavioral challenges and understand how respond and structure the environment to reduce and prevent challenging behaviors. This is critical so that the adults in the treatment setting do not unintentionally elicit or contribute to maladaptive behaviors (e.g., by frustrating the child with demands that are not well calibrated to the current functioning level, or by inadvertently rewarding maladaptive behaviors through social attention; see Powers, Palmieri, D'Eramo, & Powers, 2011, Doehring, Reichow, Palka, Phillips, & Hagopian, 2014 for detailed descriptions of behavioral management techniques).

In the group context, it is also critical that other children are protected from the aggression, and that adults are well coordinated to ensure that children's challenging behaviors are addressed and engagement for learning is re-established as fast as possible, with minimal disruption of the group activities.

Peer Interaction

This element refers to adults' ability to facilitate communication and social inter-actions among children. As we detailed in Chaps. 4 and 5, the G-ESDM involves the organization of a physical set up that facilitates peer awareness and active interaction, with activities that bring children together within the same space and lend themselves to social exchanges. Art table activities, 'sensory' games such as games with water, sand, and shaving cream, group music, and movement games such as Ring Around the Rosie and parachute games are some examples of activities that encourage children to be in the same physical space.

Each child's intervention program has several peer social interaction objectives. These individual objectives guide the adults as to what types of behaviors to stimulate or prompt in the context of peer interactions. Additionally, how materials are managed can facilitate peer interaction. Situations in which the children need to share and pass materials, or help each other, and those in which the children have duplicate objects and are face to face so they can imitate one another, are all context in which the materials and their placement actively facilitate peer interaction.

Rather than always directing children through social exchanges, the adult will (1) support peer communication, play, reciprocal imitation, and sharing of affect, (2) facilitate conflict resolution as needed, and (3) provide assistance during spontaneous peer interactions that are built on the children's interest and motiva-tions. As we will detail in Chap. 8, this can be achieved through active monitoring of the amount of social reciprocity and communication occurring in the peer interactions, redirecting the children to the activity, or encouraging communication when this does not occur spontaneously, prompting social behaviors (according to the least to most prompting hierarchy discussed above), and repairing communi-cation breakdowns as needed.

Children's Motivation Optimized

This item refers to a foundational element of the approach: not only must each child be *able* to participate in the learning activities but he or she must also be *motivated* to do so. One strategy for increasing child motivation, first articulated by Schreibman and Koegel (Koegel et al., 1989, 2016; Koegel, Koegel, & Schreibman, 1991) in their influential work on Pivotal Response Teaching, is to create a balance between targeting new skills and practicing previously mastered skills. As it would be the case with children and adults without autism, interspersing the challenge of a new learning goal with engagement in familiar activities will encourage motivation, success, maintenance of previously learned skills, and active engagement with new skills. For example, acquisition of a new group-based song routine can be followed by a song that children in the group are already familiar with and motivated by. One way to organize the balance between more challenging/less motivating and

easier/more motivating activities is to use the so-called Premack Principle. This principle, sometimes referred to as 'grandma's rule', states that an opportunity to engage in a preferred behavior will reinforce a less preferred behavior. For example, if a child enjoys playing in the sandpit (preferred activity) and avoids participating in small circle group time (less preferred activity), the adults might allow the child to play in the sandpit after taking part to the small group activity.

To optimize motivation, it is also important that the frequency and the strength of reinforcers (positive consequences following the target behavior) within social activities are managed carefully. This involves making sure that the activity is in itself reinforcing for each child in the group, and if it is not, embedding additional and/or more powerful reinforcers within it. Additionally, it is critical that the adults reward the attempts and approximations of the target behaviors for each child in the group. In the G-ESDM, the emphasis is placed on intrinsic rewards—that is, positive consequences that are naturally embedded in the activity. For example, when children are playing 'Ring Around the Rosie' they are practicing communication and imitation skills, and these are rewarded by the 'we all fall down' finale, rather than external rewards such as giving the child an iPad or a token for having imitated the actions in the song. This naturalistic approach requires the adult to create activities or elements in activities that are experienced by each child as rewarding, and engender positive affect, warmth, and shared pleasure.

Another way to optimize child motivation is to incorporate the child's choices in the teaching activities—a strategy that is often summarized as 'Following the child's lead'. This strategy does not imply that children can do whatever they want, but rather that their spontaneous initiative, choices, and motivation are embedded in each activity.

In the group context, this is accomplished both by having the child choosing the activity, as described in the 'activity centers' section on Chap. 5 (e.g., offering the child a choice between the water table or the constructions table), or by providing choices within the activity (e.g., during a ball activity, asking the child 'should we throw the ball up in the air or in the water?'). The interests of each child in the group should be considered to ensure that the activity is motivating and rewarding for all. For example, a 'Wheels on the Bus' activity song may be a good choice for a group that includes a child who is motivated by transport (as the bus song can be elaborated to incorporate other forms of transport), a child who enjoys songs, a child who likes instruments or shaking things (e.g., shakers can be included for the verse 'the wipers on the bus go swish swish swish'), and a child who loves being touched (the adult could tap the child's tummy or hand and encourage peers to do the same during the verse 'the horn on the bus goes beep beep beep').

Importantly, within this context, the child and the adult have shared control on the situation—both lead and both follow. For example, if the child does not show spontaneous initiative, or even if he or she is mildly protesting when offered the activity, the adult must encourage the child to participate in the new activity by embedding familiar and motivating elements in the task. However, insisting on one particular activity when the child shows distress or disinterest will not result in spontaneous learning, and the learning objectives should be targeted in the context

of a different activity. Similarly, activities in which children are initially engaged but gradually lose interest should be ended quickly, and choices between new activities should be offered. Offering novel, interesting learning experiences through the combination of multiple objectives in one activity and the elaboration of play themes is the key to keep children motivated and engaged. The systematic use of these techniques to optimize motivation should result in learning activities characterized by warm and positive affect, shared control, and a lively pace, which are fun both for children and adults.

Adult Use of Positive Affect

Another pillar of the ESDM philosophy is that learning is built in the context of warm, positive interactions between teachers and learners. This is not only encouraged to create a pleasant learning environment: As we mention in Chap. 1, children are more likely to attend to and learn from people displaying a playful and positive affect, rather than those displaying a 'neutral' affect. Therefore, during each activity, we expect to see a warm, positive emotional tone in adults' facial expressions, voices, and interaction styles in ways that support children's engagement. The intensity of this positive emotional display has to be well matched to the overall feeling of the activity and the children in the group, and genuine to the adult. We are not describing forced affect, unnatural levels of liveliness, affection, or exuberance, but rather that each adult appears to be having a positive experience with the children and conveys that through nonverbal communication to the children.

Sensitivity and Responsivity

In the ESDM, the adults are not only teaching behaviors *to* the child, but also they are constantly building learning experiences together *with* the child. This requires continuous attunement and responsivity to the child's communication, emotional states, and feelings. The behavior of the child should be acknowledged contingently even when it does not take the form of a clear communication. For example, the child can express a feeling of frustration or enjoyment, or an interest for a particular toy (e.g., a balloon), with subtle body language or ambiguous vocalizations (e.g., moving toward the balloon and smiling or moving away from the balloon/covering their eyes)—when this happens the adult's role is to identify and acknowledge such cues, reading them as intentional communications and act accordingly. For example, in a group lunch activity, it can be very easy to allow the children who are more passive or minimally verbal to just sit and eat their lunch. In this context, it is important to read the cues of all the children to ensure that subtle communications are reinforced or used to provide additional learning opportunities. One child may

be looking at what another child is eating; this provides a good opportunity to comment on the food and to encourage the child to request some of the same food. Another child might be having difficulty opening their drink bottle and may briefly extend it toward the teacher to ask for help. It is important that these behaviors are noticed, acknowledged, and reinforced by fulfilling the child's goal.

In another example, during a song routine (e.g., the wheels on the bus) the adult, after noticing that one child is showing interest in a particular action/verse of the song (e.g., pretending to beep the bus's horn) will repeat that verse and provide another learning opportunity (e.g., encourage the child to say 'beep'). Subsequently, after noticing that another child is showing signs of distress (e.g., putting hands over ears, during the verse 'the babies on the bus go wah wah wah') the adult will say 'shhhh', encourages the unhappy child to do the same, and quiets down the group so that the noise levels are no longer uncomfortable. The adults' ability to monitor and promptly respond to each child's cue is therefore critical to facilitate learning, prevent challenging behavior, and support children's spontaneous initiative.

Multiple and Varied Communicative Opportunities

One of the most important roles for teachers and therapists delivering the G-ESDM is to provide continuous opportunities for experiencing and practicing the use of communication. Effective use if communication requires mastery of different elements, including the ability to articulate words (phonology), create grammatically correct phrases (syntax), express meanings (semantics), and using language to share meanings and shape interactions in a social context (pragmatics). This latter element is particularly emphasized in the ESDM, based on the research showing that the use of communication for social purposes is a strong predictor of social-communicative development (Akhtar & Tomasello, 2000). Typical children use verbal and nonverbal communication during social exchanges for a variety of different reasons (e.g., greet, comment, ask, and share feelings), adapting their communication to the ongoing interaction and taking turns with their social partners. As many children with autism are inclined to use language primarily for requesting and protesting and have particular difficulties in adapting their communication to the social context (Rapin & Dunn, 2003), we seek to target other functions in each activity, to ensure that communication serves social motives rather than only being instrumental for obtaining/rejecting items.

Therefore, during each daily routine and play activity, multiple communicative functions are addressed, including requesting, protesting, commenting, labeling, asking for help, greeting, and imitating the adult's sounds and nonverbal communication.

In the group context, this is accomplished within activities that require frequent communication. In order to increase child communication, adults take into account each child's communication objectives and encourage and scaffold their

communication to expand spontaneous language and gestures across different functions. At least 1 communication objective for each child is targeted within each activity. For example, in a group art activity, a number of different communication functions can be incorporated in addition to requesting and refusing. The adult may place the markers in a clear plastic container with a closed lid so that the children are encouraged to ask for 'help' to access them. When using the markers, the adult might label the colors and model sound effects as children take the lids off ('pop'!). When a child draws something, the adult can model commenting 'Wow, you drew a circle!'. One tub of glue may be provided and given to an individual child so that other children need to request it from each other. When using scissors, the adult may label their actions ('snip snip snip') to provide opportunity for the children to imitate. At the conclusion of the activity, children are encouraged to indicate that they are 'finished'. Adults can prompt children to show their drawing to others, to share materials, and to help others. Emotion words can enter when children look proud of their work, are frustrated by a jar that will not open, and are mad when another child takes the scissors. The speech pathologist on the team can help design rich 'communication temptations' (i.e., situations that motivate children to communicate) and should observe the activities from time to time to help identifying additional opportunities for increasing child communication.

Adult Language

In the G-ESDM, the adult uses natural language to model appropriate verbal communication while narrating and supporting the ongoing themes of the activities and interactions through comments, instructions, and remarks. The complexity of the language needs to fit each child's current language level and objectives. This is accomplished using the 'one up rule' (See Rogers & Dawson, 2010). According to this rule, the adult should use sentences that are approximately one word longer than the child's typical sentence. Within any group-based activity, the adult is likely to be working with children with varying levels of language understanding and use. Therefore, during group activities in which children with different levels of language skills are participating, the adult will calibrate her or his language input to match each child's individual needs.

As a general rule, when directing language to all the children in the group, initially the adult's language will match the child with the least language. However, subsequent language will be modified dynamically during the activity and match the other children in the group. For example, when playing with bubbles, the adult might introduce the activity by saying 'bubbles' or 'play bubbles'. During the activity, when directing his/her communication to a child who uses 3-word phrases, the adult will model, 'Ed blows bubbles up' while also modeling '[child's name] bubbles' for other children as they take turns. Similarly, the adult will use one-word phrases when talking to a nonverbal child ('car', 'splash!', 'finished', 'roll!', 'push!'), two-word phrases when directing communication toward a child who use

singles words, ('red car', 'rolling play-doh', 'hot water'), and sentences of approximately 6 words when talking to a child who uses sentences of 4–5 words (e.g., 'sit down on your chair Marcus', 'the baby's crying because he is feeling hungry!', 'get the book and bring it here'). Importantly, the adult's language must always be syntactically, semantically, and pragmatically appropriate. The goal is to expand the child spontaneous communication in the context of group activities in which language is naturalistic, meaningful, and rewarding. Therefore, the adult does not tell the child what to say (e.g., 'say 'dog''') and does not provide 'artificial' praise (e.g., 'good job talking'). Rather, the adult language should accompany each interaction providing continuous opportunities for registering/appreciating correspondences between words, actions, and feelings.

Joint Activity Structure and Elaboration

Joint activity routines provide the organizing framework for teaching in the ESDM. In these routines, child and adult are coconstructing activities that provide opportunities to do things together and learn from such experiences (Ratner & Bruner, 1978). There are four phases in a joint activity routine. The first is the setup phase, in which the child chooses the activity and the adult follows the child's lead without interfering (e.g., the child spontaneously picks up a book, and the adult follows the child and sits in front of him). The second phase develops the theme: the child and the adult participate equally in the activity chosen by the child, creating a theme (e.g., the theme is turning slowly the pages of the book and then naming the animal on each page), and this is repeated a few times, until the theme is solid and a clear, predictable, and enjoyable routine is established. Then there is the elaboration phase: at this stage, the adult introduces a variation or elaboration on the theme. For example, after naming an eagle, the adult models the movements of an eagle flying in a playful and interesting way—the elaboration or new theme becomes imitating the movements and the sounds of the animals in each page. Finally, there is the closing phase, in which the adult, based on a naturally occurring circumstance (the book is finished, or the game is getting repetitive, or the child is losing interest) provides a smooth ending for the current activity while engaging the child in the ending (e.g., encouraging the child to put away the book) followed by a transition to the opening phase of the next activity (e.g., the child is encouraged to make a choice for the next activity).

Joint activity routines address both the social difficulties (through the joint engagement component) and the flexibility difficulties (through the systematic introduction of variations on the theme) that characterize autism, while also providing opportunities to target multiple objectives across developmental domains. The activities are individualized to an appropriate level for each child. For example, in the book activity described before, objectives in fine motor (turning pages), motor imitation (mimicking the eagle movements), vocal imitation (imitating animal sounds), and verbal communication (labeling animals) are targeted.

In a group activity, a spontaneous joint activity might start with the initiative of a single child. For example, a child plays with a piece of material and the adult approaches her and starts to play with the same material. This is the setup phase. The adult begins to slowly shake the material, the child imitates him/her, and the adult and child begin shaking the scarf together and singing a song (e.g., 'we shake and we shake and we shake and we stop'). This is the theme. Other children watch and begin to join in with the assistance of another adult. As one child starts jumping while shaking the scarf, the adult points out that the child is jumping and also begins to jump. With some prompting, some of the other children start jumping too. When another child goes underneath the scarf, the adult counts to three, then lifts the scarf up and says 'boo'. This becomes the elaboration. After repeating the 'peek-a-boo' game a few times, the lead adult notices that some children are beginning to lose interest, so she gives the children a choice between continuing the 'peek-a-boo' game or transitioning to play with the play dough. A majority of children choose to play play dough, so the lead adult has the children clean up and put away the scarves while another adult has moved with other children to the art table. This is the closing and transition to the next activity.

Transition Between Activities

This element, while already contained in join activity structure, receives special emphasis in G-ESDM because skillful transitions foster child flexibility, temporal sequencing, and the development of a sense of the present, future, and past. Additionally, poorly managed transitions are often marked by problem behaviors, attempts to escape from activities, and difficulty engaging children in new activities, and much intervention time can be spent in trying to recover poorly done transitions.

The goal here is to facilitate a smooth transition between activities or locations, so that the children experience daily routines as having clear temporal and physical boundaries (this activity is finished, and now we are doing something different), and the motivation to move on to the next activity independently is optimized. The role of the adults is to facilitate the group's shift of interest from the closing activity to the new one, so that the attentional focus and the motivation of the group of children flow from one thing to the next at the appropriate time.

As mentioned in Chap. 4, the physical organization of the space is critical to support children's independence during transitions. The physical layout helps children move from one place to another without distractions and barriers. The goal is to have children moving from one activity to another independently and intentionally, with the next activity as a goal in mind, rather than having an adult take an inattentive child by the hand and lead him or her through the transition. In a group setting, each transition during the day needs to be well planned for in advance with adults maintaining clear roles—these are discussed in detail on Chap. 5.

Conclusions

In this chapter, we examined a range of elements highlighted in the G-ESDM fidelity tool that reflect the core intervention procedures of the G-ESDM. These elements encompass behavioral techniques and developmentally based strategies to support the child's ability and motivation to learn during social interactions with adults and peers. A common thread across these elements is that social interaction is neither 'imposed' nor expected to happen spontaneously. Rather, opportunities for doing things together are built on the spontaneous actions and interests of each child in a context where adults set up fun routines and play activities that naturally bring children together. Even if children might be initially motivated only by the activity and the materials, the repeated engagement in meaningful and rewarding activities in close proximity to the peers, under the guidance of the adult provides the ideal scenario to appreciate and practice social communication and reciprocity. In this context, the adults actively target individualized learning objectives based on evidence-based behavioral strategies.

Mastering each of the 13 aspects of delivering the therapy described here can be challenging for staff members, especially when multiple behaviors must be kept in mind at the same time and blended within existing systems and practices. The G-ESDM fidelity tool can be used to facilitate this process, by providing initial guidance on the skills to learn, as well as ongoing monitoring to determine the level of mastery of the procedures. In Appendix 1, we will illustrate the criteria used to determine if these strategies are implemented 'at fidelity level'. Importantly, in order to reach and maintain fidelity of treatment delivery, significant investment in staff training, and ongoing support and monitoring of implementation are needed. Nevertheless, there is evidence indicating that a high level of treatment fidelity is achievable by therapists in community intervention settings. This provides an optimal foundation for the successful delivery of effective treatment programs (Stahmer et al., 2015; Symes, Remington, Brown, & Hastings, 2006).

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Chapter 7
Facilitating Learning Through Peer Interactions and Social Participation

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In this chapter we will discuss the role of peers in the G-ESDM, with a focus on the educational opportunities provided by interactions with typical children and the principles, strategies and procedures used in the G-ESDM to facilitate social participation.

The Role of Peers in Early Learning

Compared to home-based, individualized programs, the G-ESDM has a uniquely powerful resource—the availability of peers in the playroom. Peer interactions provide an ideal context for practicing social, communicative, and cognitive skills during play activities and shared daily routines. Compared to the conventional teacher-directed activity format, peer interactions make learning easier (and often more fun) in a number of ways.

First, the presence of peers in the learning environment can increase the number and the duration of the social learning episodes, as children will have more opportunities to communicate, observe others' actions and communication, initiate, imitate, share, cooperate, and problem solve. Additionally, peer interactions provide children with rich opportunities for receiving feedback about the appropriateness or the effectiveness of their behavior. For example, adults often respond to the requests of children with autism even when the communication is unclear (e.g., a child who says 'Thomas' to ask for a particular Thomas the Tank Engine book). Peers are less likely to understand what their peers are requesting if the communication is not clear, and this can push children with autism to make extra-efforts in order to achieve what they want.

More opportunities for interaction also mean fewer opportunities for isolation. Children with autism do not need time alone (Rogers & Dawson, 2010), and, especially when 1:1 teacher/student ratio is not an option, the availability of peers can result in increased active engagement time and decreased solitary time.

Additionally, skills and behaviors learned through naturalistic joint activities with peers can be generalized outside of the intervention setting, in common environments where peers are present (such as playgrounds, swimming pools, and friends' birthday parties).

Recent research shows that children with autism can successfully learn a variety of skills from their peers (Bene, Banda, & Brown, 2014). The starting point to facilitate this process is setting up an inclusive environment.

Creating Social Participation in Inclusive Settings

The ideal environment for supporting peer interaction and learning is one that involves typically developing children. The G-ESDM approach is naturally suited for implementation in fully inclusive programs, for a number of reasons. First, the G-ESDM approach is consistent with international guidelines on education, which indicate that children with special needs should be provided intervention in the least restrictive environment suitable for their needs, with consistent opportunities for interaction with typically developing peers (National Research Council, 2001; United Nations, 2006). This notion has an important ethical value, as the lack of contact with peers carries the risk of social isolation, marginalization, and negative social perception (Marini & Stebnicki, 2012). Moreover, in inclusive settings, peers without autism can learn about differences among people and become more accepting of diversity from an early age.

Social inclusion, however, has a strong pedagogical value as well, as typically developing peers can be an invaluable resource in facilitating learning when socially inclusive programs are well organized. Each of the benefits listed above (increased number of learning opportunities, increased social engagement, and reduced solitary time and generalization) can be enhanced if typically developing children are present in the learning environment where the G-ESDM is implemented and are guided in their interactions with peers who have autism.

Research provides solid evidence for the effectiveness of inclusive settings in addressing educational needs of children with special needs as well as those with typical development (Bene et al. 2014; Odom & Schwartz, 2001; Rogers, 2000). However, in order to ensure that sharing the same physical space actually translates into active social participation and learning, a number of steps must be undertaken. Factors that are critical to successful inclusive programs for young children with autism include (Stainback & Stainback, 1990; Winton, 2016) the following: (1) philosophical emphasis on valuing and appreciating diversity, (2) support for ongoing adult collaboration, (3) individualization of goals and objectives, and (4) teaching strategies that involve cooperative learning. Drawing from this framework, the G-ESDM involves procedures to address each of these points.

Creating the Right Climate—Philosophical Adherence and Practical Support to Inclusion

To create the right climate for an inclusive program, the first two points listed above must be addressed. As we discuss below, these entail ensuring that all the adults involved in the program (including caregivers!) are on the same page with regard to the value of inclusion of children with autism, and that adequate resources are put in place to support an inclusive program.

Are We All on the Same Page?

Typically developing children tend to model the attitudes and behaviors of adults, especially their teachers and educators—therefore, successful implementation of an inclusive program is dependent on educators being positive about it. The first step to achieve this is to evaluate informally or through formal questionnaires the adult's views, beliefs, and attitudes toward social inclusion. If negative attitudes are present, these must be promptly addressed. In some cases, these negative views stem from the belief that educational strategies for teaching children with autism should be different from those that are used for typically developing children. A common example supporting this line of reasoning is that children who have vision impairment cannot really benefit from 'typical' learning experiences such as coloring or reading a book with their peers. Similarly, children with autism could be considered as 'blind' to social communication and social reciprocity, leading to the argument that a typical learning environment might not be beneficial to them.

However, the G-ESDM principles are inconsistent with this view, based on the rationale that children with autism can learn appropriate social communication skills. To do so, however, they need to practice the social and communicative abilities targeted by the intervention with 'competent' play partners such as typically developing children. Simply put, specialized strategies designed to address the common features of autism are needed to teach social and communication skills, and a naturalistic social context (with typical children and typical activities) is needed to put into practice, refine, and generalize those skills.

Another reason why professionals might be concerned about social inclusion is the belief that children with autism in inclusive settings might encounter peer rejection. In the G-ESDM, however, we believe that segregated settings increase, rather than reduce the risk of discrimination. By losing opportunities to communicate with, imitate and learn from typically developing children, children with autism are more likely to develop idiosyncratic and atypical behaviors which, in turn, will increase the risk of peer rejection. Additionally, the G-ESDM sees children with autism as active participants in their community, rather than disabled children who must be protected from the challenges of the real world, and their social participation in their community needs to be fostered from as early as

possible. We believe that by providing opportunities to interact with and develop friendships with children with autism; we will enrich the lives of the typical child who will be more accepting and appreciative of neurodiversity as a result of an early inclusive experience.

Importantly, proactive strategies need to be put in place to avoid the risk of a 'clash' between professionals from different backgrounds (e.g., 'mainstream' teachers and 'special education' teachers). Sources of tension in the staff might include the practical challenges with adjusting regular school routines to meet the learning needs of children with autism and those with typical development, as well as the need for additional training and resources needed to facilitate inclusion. The G-ESDM, with its emphasis on transdisciplinary team work and focus on individual differences can provide a 'common vocabulary' or framework to acknowledge and integrate the priorities and expertise of all professionals involved in the inclusive setting. In this context, it is critical that the team's efforts are validated, frequent opportunities to discuss and addresses issues around competing priorities are offered, and ongoing technical assistance is provided for all the adult (and the children!) to experience success in the socially inclusive setting (see Chap. 9 for more details). When adults are empowered with knowledge and support from the team and have the chance to experience success in an inclusive setting, their attitude toward social inclusion is likely to be positive.

Bringing Caregivers on Board

Another critical factor for creating the right climate concerns communication with caregivers. Caregivers of children with autism sometimes express concerns about inclusive settings (Lindsay, Ricketts, Peacey, Dockrell, & Charman, 2016; Whitaker, 2007). These include the possibility that their child will not receive adequate autism-specific intervention, or that their child will be left behind because daily activities will be organized around the needs of the typical children, who have more advanced cognitive, language, and social skills. Additionally, concerns are sometimes raised about the possibility that children with autism might encounter peer rejection in mainstream settings, thus worsening social difficulties. Caregivers should be encouraged to express their concerns with G-ESDM staff so that these issues can be discussed openly and addressed. In particular, it should be clarified that the presence of peers is seen as a resource, rather than an obstacle, for targeting learning objectives tailored to the individual child's needs. Additionally, it is important to provide caregivers with information about research evidence on inclusive programs, which indicates that peer-mediated strategies such as the ones described in this chapter will promote learning and socialization in children with autism (Odom & Schwartz, 2001). Additionally, our own research (Vivanti, Hudry, Duncan, Dissanayake, C, & the ASELCC Team, in preparation) indicates benefits for children with autism receiving the G-ESDM in inclusive settings across multiple domains. In our experiences, parents who have openly expressed their concerns

about inclusive settings for their child and are made aware of the available evidence, and are well placed to evaluate the pros and cons of different options.

Caregivers of typically developing children might express concerns about inclusive settings as well. These include this possibility that teaching staff would have to focus disproportionately on the children with autism and provide less attention to the rest of the class, as well as concerns about their child's safety (i.e., the risk that their child getting hit or bitten by a child with autism). Again, it is critically important that caregivers are encouraged to voice these concerns, so they can be addressed. The G-ESDM staff need to emphasize how scientific evidence indicates that inclusive settings are not detrimental to the learning and socialization experiences of typically developing peers, that successful techniques exist and will be put in place to address maladaptive behaviors of children with autism, and that inclusive settings offer the opportunity for children without disability to learn about differences among people and become more accepting of diversity from an early age.

Do We Have the Resources to Do It?

In other cases, skepticism about social inclusion reflects the concern of not having enough support, resources, and training to meet the needs of all students, rather than a genuine negativity toward the value of integrating children with special needs. The best way to address this concerns is to ask 'what knowledge and resources do adults need in order to feel positively about working in a socially inclusive setting?'. The answer to this question will depend on the background and role of each adult member and the setting in which the program takes place; however, each professional involved in the program should be provided with basic information (and professional development opportunities) about (1) *why* children with autism can benefit from peer interactions with typically developing children? (2) why children with typical development can benefit from peer interactions with children with autism? and (3) *how* each adult member, with support from the team, will facilitate this process? Specific instruction on how to facilitate peer interactions in an inclusive setting should be part of the training 'package' offered to all adults involved in the program who are being trained in the ESDM strategies.

In our experience, concerns around inclusive settings do not persist once caregivers are informed about the aims and evidence base of the program and are able to observe the G-ESDM in action. With all staff in the team highly trained to engage with children (with or without autism), parents in our program have commented on the higher quality of teaching that they have observed within an inclusive G-ESDM environment for all children. However, it is important to note that our experience in inclusive settings is framed by the following context (and the advice should be taken with this in mind)

- We have only delivered the G-ESDM using a staff-to-child ratio of 1:4. A lower staff-to-child ratio is not recommended.

- G-ESDM teams require ready access to a behavioral specialist to proactively manage any challenging behaviors that can arise within the group setting, especially those that put the children or staff at risk (and disrupt learning).

Individualization of Objectives in Inclusive Settings

Consistent with the ESDM principles, the strategies used to promote social engagement are based on a naturalistic framework, with an emphasis on spontaneous motivation to 'do things together' during naturally occurring opportunities. Nevertheless, this motivation is unlikely to develop from merely being in the same physical space together. For social engagement with peers to emerge in a group, the adults must plan activities that contain meaningful and rewarding elements for each child—with and without autism—and provide guidance to typical children.

How does one accomplish this? The starting point is the knowledge of each child's learning needs, learning goals, and preferred activities and materials. In inclusive environments, like in any environment, teaching activities that are not tailored to individual needs can result in children (with and without autism) becoming frustrated and disorganized—this, in turn, can hinder social participation and inclusion. Avoidance and escape, as well as tantrums or aggression may occur when the child is confronted with tasks that she or he does not understand (i.e., when activities are not meaningful) or does not enjoy (i.e., when activities are not rewarding; Ferraioli & Harris, 2011).

Additionally, it is important to gain knowledge on the specific barriers that might hinder social participation for individual children. Different children might be impaired in their ability or propensity to interact and learn from their typically developing peers as a consequence of different 'obstacles'—these obstacles need to be turned into learning objectives. For example, some children with autism lack the skills necessary to initiate social contact and/or respond to social overtures and/or maintain social interactions for an appropriate duration of time. When this is the case, these skills need to be explicitly defined, established as objectives, and taught and practiced with their peers. Other children with autism do initiate communicative exchanges with peers, but they may get frustrated if the peer does not respond appropriately, quickly, or in the desired way, and they may respond to these situations by throwing a tantrum or giving up quickly instead of working to repair their miscommunication. When this is the case, the ability to repair communication breakdowns should be targeted by an adult supporting the peer to peer interaction, and coaching the peer with autism in repair strategies—this, in turn, will reduce the risk of frustration and increase the chance that children's spontaneous initiations are successfully followed up. Many children with autism are inclined to initiate primarily to adults and rarely to peers (Thiemann-Bourque, 2013), and other children with autism do initiate but their initiations are atypical, and that make it difficult for the typical peer to respond. They may be too far away, not use gaze, talk too

quietly, or not know how to get the other persons' attention first. Other behaviors that may impede positive peer interactions and should be included as learning objectives when present, include being overly directive and unable to follow another child's lead, having difficulty adapting to the changes during play activity situations (e.g., switching roles during a chasing game), difficulty losing or dealing with the frustration when something does not work as planned during the social exchange. Each of these barriers to successful social engagement should be identified, included as a learning objective and targeted as quickly as possible. Adults can also use 1:1 interactions with children to simulate the conflicts that might occur with peers as a consequence of specific child difficulties and practice ways to manage the situation. This is one of the benefits of working from a framework of shared control, rather than only following children's lead. Children who have learned to share control have more foundational skills for peer interactions than those who have not yet learned both to follow and to lead.

Therefore, based on the knowledge of what each child in the group can do, likes to do, and needs to learn, play and learning activities are engineered to bring children with and without autism in the same space, where the individual goals of each child will be addressed within the overall purpose and expectations of group routines and activities. In this context, typically developing children provide feedback and practice opportunities to their peers with autism, according to the procedures detailed below.

Teaching Strategies that Involve Peers

After a positive climate is established, and each child's individual plan is defined, teaching strategies that involve cooperative learning with peers need to be put in place. Rather than creating specific teaching activities dedicated to peer interaction, cooperative learning with peers should be facilitated across all daily routines, including the curricular activities, free play time, and meals. Within each of these contexts, the goal is to create situations that naturally bring children together. Water/sand play, construction and block areas, drawing/art centers, *and* group movement games such as Ring Around the Rosie, Hokey Pokey, parachute games, and games/songs involving props are just a few examples of activities that lead groups of children to spontaneously gather in the same area. Different areas can be organized around different themes, so that children interested in the same theme will gather in the same space. Consistent with the G-ESDM principles described in Chap. 4, each area should include toys and materials that elicit cooperative play, with duplicates of the same materials (to facilitate parallel and imitative play, and avoid conflicts over access to materials) and chairs and table (or standing tables) set up so that children will face one another while playing. Play materials should also be suitable and appropriate for each child in the class/group/playroom, so that any child who has an interest in the theme of the activity can join in regardless of their functioning level. For children who do not show an interest in any of the proposed

themes, efforts should be made to introduce motivating items/materials related to the child's individual interest in the activity. For instance, a child who is not interested in construction, but likes the alphabet, may join a construction activity involving blocks with letters/numbers on them. The more meaningful and rewarding the play activity is, the more likely children are going to maintain engagement in the activity, thus maximizing the opportunities to practice their social skills.

Importantly, the spontaneous motivation to engage in the activity and the materials is the starting point to building a spontaneous interest toward the other children who are participating in the same activity. The role of the adult is to set up a context where shared activities are likely to happen and typically developing children, rather than the adults, will prompt, reward, and provide learning opportunities to their peers with autism. When a number of children are spontaneously gathered in the same area or around the same table, the adult will join in as a play partner, modeling, prompting, and facilitating the flow of the game and targeting behaviors such as giving/receiving items, showing, imitating, sharing affect, requesting, commenting, and simply looking at/noticing what each other is doing throughout the activity. Using simple language and actions, the adult will monitor the play patterns that are naturally emerging and will (1) narrate the shared play activity and draw children's attention to each other, (e.g., saying 'ready, set, go!' to highlight each child's turn), (2) 'regulate' the flow of peer interactions, e.g., saying 'William's turn', 'Your/my turn', (3) prompt peers to initiate and maintain interactions, and (4) ensure that emerging, appropriate attempts to interact are responded too quickly and appropriately.

It is important that interactions are not artificially 'engineered' to make life 'too easy' for children with autism, because we want children to learn new behaviors and new skills, rather than just practicing skills that are already mastered. To achieve this goal, adults need to provide active guidance to typically developing children on how to interact with their peers with autism in a way that promotes learning. This includes both the acquisition of new skills and the reduction of maladaptive behaviors. Typically developing children are naturally inquisitive and might be impressed by the obviously atypical behaviors of children with autism (e.g., tantrums), so adults must be ready to discourage typical peers from giving attention to inappropriate behavior of children with autism, and encourage them to notice, and respond to, positive behaviors.

Similarly, typically developing children will notice that their peers with autism are often unresponsive to their initiations and might 'give up' on playing with them. To avoid this, adults must actively encourage typical children to initiate a range of social interactions that are likely to elicit a response and instruct them (1) to initiate 'play organizers' behaviors such as proposing play activities, sharing and requesting to share play materials, and offering and asking for help and (2) to be persistent with their social initiations (McConnell, 2002; Odom & Strain, 1984; Strain & Odom, 1986; Tsao & Odom, 2006). Additionally, the adult will encourage typically developing peers to imitate and expand the actions and words of children with autism, so that children around the same table/area start copying others'

interesting actions with the toys (or without the toys, if the activity is a song routine or a gesture game) and words. This is foundation for building the more complex actions and language and sharing affect around the experience, as illustrated in the example below.

Example of a Peer Interaction in a Small Group Activity

Context: Sandpit play—multiple buckets and spades for making sandcastles
Strategies:

- When Max (child with autism) begins to develop a play theme, the adult can draw other children's attention to what he is doing and support them to participate in the play, for example, adding sticks to decorate sandcastles.
- The adult creates opportunities for the children to interact socially by strategically organizing materials—for example, encourages Jack and Jacob (typically developing children) to hold the spades and the buckets, thus creating a situation that will lead them to request and give materials.
- The adult prompts and supports Max to respond to verbal requests from his peers, for example, 'My turn', 'Your turn', 'Look!', and expanding Max's language (for example saying 'my turn with sticks').
- When a child contributes an idea or extension to a play theme, the adult can help to reinforce this by encouraging the typically developing peers to notice, participate, and when appropriate, provide further elaboration. For example, if Ethan blows the sticks in the sandcastles, the adult could say 'Happy birthday!' and clap hands, encouraging the peers to also clap their hands, and to propose new play ideas ('let's make a bigger cake'), sharing play materials (more sand for the big cake), requesting to share (sharing some sand to create the big cake), and offering/providing help (assisting with picking up the stick 'candles' that fell from the cake).

Possible objectives

- Simple to more complex imitation may be targeted in this context, including gestures, actions on objects, or sound effects,
- One step instructions may be given to individual children (i.e., 'put in', 'sit down', 'come here', and 'give me'),
- Matching quantities goals can be targeted by encouraging children to match the same number of stick candles on the sand castle cakes,
- Fine motor skills goals such as using a pincer grip can be addressed when children manipulate the stick candles.

Besides small group-activities and peer interactions are encouraged and facilitated across the other daily routines. For example, large group routines such as story time, music activities, meal times, or outdoor activities provide optimal scenarios for teachers to target joint engagement and facilitate naturally occurring interactions.

For example, during mealtimes, adults can facilitate and encourage children to:

- participate in setting the tables, passing bowls and cups to peers, serving food to each other, handing out drink bottles, helping each other to clean up spills;
- show each other what they are eating and support general conversations around food, colors, textures, comparisons, likes, dislikes etc.;
- practise waiting for their turn, for example, pouring from the water jug;
- assist each other during the hand washing process, e.g., turning on the tap.

The main challenge in teaching through peer interactions is ensuring the active participation and learning of all children involved in the activity. To make this possible, the lead adult must have a good knowledge of the specific objectives for each child in order to create opportunities for all children to participate at their own individual level. Some strategies that can facilitate this process are described in the example below involving an art and craft activity:

- Ensuring that the activity is open ended, allowing for participation in a variety of ways (e.g., include crayons for drawing at the pasting table, so that children who are not yet ready for a 2-step activity, or who may have sensory aversion to glue, can still engage in the experience of making art);
- Providing materials that suit a range of abilities, e.g., include both thick and thin paintbrushes, to cater for varying fine motor skills;
- Encourage participation by finding ways to incorporate the individual interests of children into the activity. For example, for a child who is very interested in transport, toy cars can be provided for driving through paint on the paper;
- Strategically positioning children and adults. For example, children with autism, who require a higher level of adult support, can be seated next to or opposite an adult and a typically developing peer who will role model appropriate behaviors.
- Preparing the activity to ensure that each child can successfully manipulate the materials and achieve similar goals. For example, large pieces of paper can be provided for tearing for children who are not yet ready to use scissors, while smaller pieces of paper can be made available for children who are starting to use scissors to snip or cut along a line.

If the child loses interest, or starts engaging in inappropriate behaviors, this usually indicates that he or she is not being given enough opportunities or enough support for active participation at an appropriate level. When this happens, the adult needs to think about what support is needed and what changes are needed to make the activity more rewarding and more meaningful.

Additionally, to ensure that typically developing children are providing frequent learning opportunities and persist in their efforts to engage their peers with autism,

active guidance must be provided by the adults. The level of guidance will depend on the age and characteristics of the peer and can range from prompting and reinforcing appropriate responses and initiations, to explicit instruction on 'what to do' through practice and role modeling with other typical peers or adults (see Strain & Odom, 1986 and Odom et al., 1997, for excellent ideas and resources to motivate and teach typically developing children peers to interact with their peers with autism).

When peer interactions are 'running smoothly' and all the target-social behaviors are naturally occurring as part of the play theme, the role of the adult becomes similar to the 'invisible support' role (see Chap. 5), with a focus on monitoring the amount of reciprocity and learning in the activity, redirecting children to the activity, and repairing communication breakdowns as needed. In these situations, it is important for the adult not to jump in straight away and prompt behaviors immediately—rather, children need the opportunity to create or fit into play interactions according to their own interests and motivations, before their actions are guided by the adults. For example, a child with autism might start poking some Play-Doh, and a typically developing peer might spontaneously join in and repeat the same action, and then elaborate by rolling the Play-Doh. In this case, the adult, rather than giving instructions on what to do (e.g., 'do the same') or physically prompting the child with autism, should narrate the ongoing activity with simple, playful statements, directing the child's attention to what the peer is doing (e.g., 'Look! Owen is rolling the Play-Doh!'), and making sure that some Play-Doh is available for the child to do same action. Once a play theme is developed, if no spontaneous learning episodes occur, the adult will take a more active role in guiding peer interaction.

Conclusions

An inclusive environment provides opportunities to observe and practice peer–peer positive social interactions. Successful participation in peer interactions, in turn, facilitates learning and friendships. Nevertheless, inclusion of preschoolers with autism does not occur merely by placing the child in a mainstream setting. In order to create an inclusive environment that supports peer interaction and learning, a number of challenges need to be addressed.

First, for inclusion to be accomplished successfully, all adults who work with the children with autism in their classroom must be willing to embrace the challenge, sharing a common culture, and appreciating the educational and ethical values of inclusion. Second, inclusive settings must include activities that are relevant to each child's individual objectives. Concerns of team members and caregivers of children with and without autism must be addressed, with a focus on the objectives and evidence base supporting the program, as well as the resources that will be put in place to ensure successful learning for all children in the classroom.

To support learning in a socially inclusive setting, the G-ESDM staff must design activities that are meaningful and rewarding for both children with and without autism and provide the level of support needed to facilitate the active engagement and learning of all children involved. When children play in close proximity and build interest in each other's actions, many opportunities to target learning objectives will occur. In this context, typically developing children will be encouraged to model, reinforce, and prompt appropriate behaviors for their peers with autism, with adults providing active guidance and ensuring that peers persist in their efforts.

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Chapter 8
What if the Child Does not Make Progress?

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Children with autism receiving the G-ESDM are expected to show rapid progress. However, even when every step is taken to build a successful teaching program, some children might fail to show appreciable gains in one or more areas or might be very slow. This is a very frustrating experience for the therapist, the family, and very likely the child as well, and action must be taken quickly to reorganize the teaching program. In this chapter, we will provide guidelines on how to readjust the program when things do not progress as expected within the G-ESDM framework.

Why Do Some Children Fail to Respond Readily to the Intervention Program?

With increasing advances in autism research over the past decades, it has become clear that individual variability is one of the most significant features of autism. Different combinations of genetic and environmental factors are implicated in autism, and this is reflected in a tremendous heterogeneity at the cognitive, language, and behavioral level (Waterhouse, 2013). This means that different children with autism experience the world in different ways, they learn in different ways, and as a consequence, their response to teaching techniques may differ. While this is true for all children, variability in learning and cognition is more extreme in autism compared to other populations, and the teaching strategies that are very successful for some children with autism might not be equally effective for other children.

This research points to the need to take into account individual differences and avoid assuming that a strategy that works well for one child will work well for all or even most children with autism. The idea of a single 'autistic learning style,' while very popular, is not supported by recent research (Trembath, Vivanti, Iacono, &

Dissanayake, 2015; Wei, Christiano, Yu, Wagner, & Spiker, 2015). The implication is that no single teaching technique will work for all children—and this is also true in the context of the G-ESDM strategies. Therefore, slow learning rate in a child does not mean that the child cannot learn—rather, it means that the adult is using teaching strategies that do not meet the child's learning style, and the team needs to change its approach. To this aim, the G-ESDM draws from a variety of evidence-based educational strategies derived from different approaches to provide flexible and individualized teaching programs to all children.

When Do We Have to Change Our Teaching Approach?

As we detailed in Chap. 3, the child's progress must be monitored in a systematic way to identify the areas of progress and areas of 'stagnation.' While it can be tempting to focus the attention on the areas where the child is showing gains, the G-ESDM is designed to simultaneously promote the progress in all areas of development. This helps avoid a common pattern seen among children with autism in which they have made progress in one domain (e.g., puzzle skills and letter recognition) while being far behind in another (e.g., reciprocal social relationships). Thus, failure to make good progress in achieving goals even in one domain of a child's intervention program should be readily noted, and immediate action needs to be taken.[1]

A rule of thumb is a 2-week rule (for children attending the program 3 days a week—shorter for children who attend more frequently). If the child has not progressed at all in one or more domains after 1 week of teaching, the team leader should review the objectives and steps and ensure that all the appropriate resources are in place (e.g., the materials are available, suitable activities are on the curriculum, and all the adults are aware of how to target the goal) and address the possible barriers to the successful delivery of teaching opportunities (e.g., insufficient support to junior team members with targeting more complex skills). If, after another week, the child still has not made sufficient progress on the goals, then the team should work to modify teaching procedures, using the systematic decision process described in the next sections of this chapter. This requires a coordinated communication process between the team leader, the rest of the team, and the child's caregivers, to ensure that all key players in the child's program are on the same page when changes are made to the treatment plan.

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[1]If, after making appropriate changes to the intervention program, a child is not making progress in several domains and appears sleepy, distressed, or inattentive or if a child who was previously making good progress suddenly stops doing so across several domains, then a medical consultation should be organized to determine whether sleep, eating, or other medical issues could be interfering with progress.

Importantly, professionals and caretakers can be sometimes inclined to keep using the same teaching strategies even if the child does not show an immediate response, with the hope that if one persists, sooner or later the child will learn. In other cases, some therapists might insist on using the same teaching technique because of an unquestioned faith and devotion to the philosophy of the particular approach that they are using. However, such persistence can have a number of negative implications. First, if the teaching continues without the child experiencing any learning, over time the adult's instructions become 'background noise,' i.e., they are sounds that are part of the child's daily routine that do not translate in any meaningful or rewarding experience. In the worst-case scenario, a child exposed to repeated learning failure might develop 'learned helplessness,' that is, the perception that there is nothing they can do in response to the adults' demands and expectations, and they have no control on their world. When this happens, the child can link the idea that 'this is something I cannot do' to the learning setting or materials, a mind-set that can be very difficult to change. Similarly, adults can experience the same feelings when exposed to the systematic failure of their teaching attempts and might unconsciously develop the idea that the child is hopeless and cannot learn, instead of questioning the appropriateness of the teaching objectives and strategies.

Finally, caretakers observing that their child is not learning can quickly lose confidence in the teaching program or the adults implementing it and might develop the idea that their child is not able to learn, and nothing can help address her or his disability. Considering all these risks, when the child is not responding rapidly to the teaching program, the intervention team needs to take action and modify the program using alternative strategies. In the G-ESDM, like in the original ESDM, there are specific procedures embedded in the program to guide decision-making in these circumstances.

What Can We Do if the Child Does not Learn?

In the ESDM, we use 'decision trees' to guide decision-making when the child is not learning in response to the teaching program. A decision tree is a flowchart containing a series of 'yes' or 'no' questions, with each answer moving the user to different levels. This enables us to determine 'where to go' when the child is not learning by altering teaching procedures in a systematic way, until the proper match between teaching technique and child's learning style is found. The contents of the decision tree involve a 'toolbox' of empirically based teaching practices for young children with autism to be used if needed, as well as the indication of how, when, and for how long to modify the default ESDM teaching strategies.

Importantly, this process can include the use of elements that do not, on surface, fit within the ESDM naturalistic framework. The idea remains to provide the child with meaningful and rewarding learning experiences, but strategies that are different from the ESDM basic tools will be systematically introduced as long as they have an evidence base and they facilitate learning. For example, basic ESDM rules such as the use of intrinsic reinforcers, naturalistic context of teaching, and shared control of the interaction can be temporarily changed in favor of more adult-directed procedures, separate distraction-free environments, and the use of extrinsic reinforcers. Child response will demonstrate whether this change in teaching procedure will facilitate more rapid progress. Similarly, the focus on elaboration and use of a variety of antecedents and settings within teaching episodes can be provisionally replaced with a more structured focus on rote repetition of the same instruction. Once the child is consistently responding to the teaching, these adult-directed procedures can be systematically faded, but should be rapidly reintroduced if the learning pace slows down again. These are data-driven decisions, and data are the only measure of the success of the adaptations.

In the context of a group program, two aspects should be given particular consideration before moving to the modified attention and/or teaching techniques: (1) the characteristics of the environment (e.g., is the setting too noisy/distracting for this particular child?) and (2) the frequency of learning opportunities given to the child within the setting (e.g., is this particular child unintentionally given fewer opportunities compared to others?). The data collected and reviewed on a daily basis provide a rich source of information that can assist a team to understand what factors might be negatively influencing learning, as can direct observations of the child within the group setting. When these or other critical elements that interfere with successful learning are identified, they need to be addressed quickly. If despite the fact that all the plausible factors interfering with learning have been addressed, no measurable treatment response is observed, the following steps can be taken.

First, it is advisable to increase the number of teaching episodes delivered to the child whose progress is slow. As we discussed throughout the book, each child should receive frequent and systematic learning opportunities during the G-ESDM group activities—however, the pace can be adjusted so that teaching episodes are more frequent for children who are progressing slowly. If the child is still not making good progress despite all the best efforts to provide teaching opportunities within the group activity contexts, the following G-ESDM decision tree should be applied.

Is there a lack of measurable progress on 3+ objectives in 2 weeks?

NO PROGRESS on 50% or more objectives	NO PROGRESS on 25-50% objectives

Introduce Explicit Teaching Plan Template

WHERE	WHAT	WHO
Dedicated learning space inside or outside classroom	45 min 1-2 per week 1:1 ESDM session	Certified ESDM therapist

Evaluate data gains after 3 consecutive sessions

Insufficient Gains	**Sufficient Gains**
Reduce goal quantity	Continue 1:1 sessions until next ESDM eval
Increase	

And/Or ↓ And/Or

Repetitions	Structure -Location - Set up	Reinforcers (External Reinforcers)

Introduce Explicit Teaching Plan Template

WHERE	WHAT	WHO
Classroom	15 min daily, 1:1, focus on goals with limited gains	Paraprofessional*

Evaluates data gains after 6 consecutive sessions

Insufficient Gains	**Sufficient Gains**
Goal is managed by Specialist and teaching strategies are modified by increasing either	Continue till next ESDM eval or until consistent progress is observed

Or — Or

Repetitions	Structure -Location - Set up	Reinforcers (External Reinforcers)

The first question on this decision tree is whether the child is 'getting stuck' on three to seven learning objectives or whether there is a lack of response across a majority of objectives. In cases where lack of learning is isolated to a limited number of objectives (25–50 % of objectives), the team leader organizes for targeted teaching to be conducted within the playroom on a daily basis for 15+ minutes (commonly taking the form of 1:1 teaching). In contrast, when there is a limited learning across more than 50 % of objectives, the option of organizing 1:1 teaching sessions outside of the group context should be considered. Logistical and educational issues arising must be discussed with the team and the child's caregivers on the basis of the available resources. When considering setting up individualized teaching sessions, it is important to remember that all teaching within the G-ESDM is delivered 1:1 through adults directing their attention to an individual child during the group activities. Nevertheless, for some children, it can be difficult to learn specific skills during activities that involve multiple peers. Therefore, for these children, we organize 1:1 teaching sessions in a distraction-free, separated environment (a different room if necessary, or a dedicated space within the playroom) and modified teaching in line with the original ESDM decision tree employed (Rogers & Dawson, 2010).

The child's team leader develops an 'explicit teaching plan template' for the 1:1 sessions, which describes the resources required (e.g., some of the child's favorite toys) and how these resources can be utilized to target the goals where the child is showing limited gains. It can also be helpful to create a box of toys that can be used

to target the goals, so that the adult conducting the session has the resources readily available to them.

These targeted 1:1 attention sessions are conducted by the team member whose expertise is the most relevant to the learning objective being targeted (e.g., an occupational therapist for goals in the motor domain and a speech therapist for goals in the communication domain). If measurable progress is observed within the 3 sessions, then it can be inferred that the lack of progress was not due to the ESDM teaching techniques per se, but rather to the group arrangement. This should prompt further investigation on the specific elements that might prevent this particular child to benefit from the learning opportunities offered in the group setting, such as the need for fewer distractions.

Importantly, however, the decision to use more focused 1:1 teaching sessions instead of group-based delivery should not be based on the assumption that the child 'is not ready for a group setting' or 'needs to learn the preliminary skills to be around others' or 'needs to be protected from the stress of group situations.' As we mentioned in Chap. 2, in the G-ESDM philosophy engagement in group experiences is considered to be the starting point and the framework to facilitate social interaction and social learning, rather than a goal to be achieved through many preliminary steps learnt in isolation. Given the evidence that children with autism do learn in group situations (Vivanti et al., 2014; Ledford & Wehby, 2015) and the fact that 1:1 teaching arrangement may further isolate children with social difficulties from peers, the decision of using individual rather than groups-based activities should be based uniquely on what the treatment data say about the child progress in the different settings.

What if the Child Is Still not Learning?

A different situation arises when no noticeable learning occurs despite the organization of dedicated 1:1 ESDM sessions. Three consecutive 1:1 ESDM sessions without any progress should prompt the team to (1) reduce the quantity of learning objectives (e.g., 12 instead of 16 objectives) so to provide more targeted teaching in the areas of need and (2) consider alternative teaching strategies, drawing from procedures that are more highly structured and repetitive than the initial ESDM approach. The following adjustments to the teaching program can be put in place:

Increasing structure and repetitions. When this step is taken, the joint activity routines that are used in the ESDM are augmented with strategies inspired by structured teaching and discrete trial training approaches (Mesibov, Shea, & Schopler, 2005; Lovaas 2003). This involves a decrease in variability and elaboration and an increase in consistency and predictability. Therefore, a target behavior might be practiced in one specific context using always the same antecedent and the same materials, rather than deliberately varying settings and instructions. For example, for a child who is having difficulty learning to ask for help by passing an object to an adult, the adult may place the child's favorite food in a container during

snack routine and encourage them to pass it to them to ask for help. In this example, the skill is only targeted in one context (snack), using the same antecedent (food is in the container and the child cannot get it out without help) and materials (container and favorite food). Once the child has acquired this behavior, then the skill can be generalized to include different contexts, antecedents, and materials.

Moreover, the specific task can be simplified by reducing the number and complexity of novel behaviors that are involved in the teaching episode. The number of repetitions of the same task/instruction might also be increased to facilitate the acquisition of a novel behavior, and procedures based on a discrete trial teaching (DTT) format can be used (see Smith 2001 and Lerman, Valentino, & LeBlanc, 2016, for a detailed description of this technique). This teaching format, which has a solid evidence base, involves the delivery of instructions through rote repetition of directions in contexts that might differ from those where the target behavior would naturally take place. Mass trial procedures, consisting in delivering instructions multiple times in a repetitive manner until the target behavior is mastered, might be the right option for children who do not learn in response to the default G-ESDM practices.

Modifying the physical settings and tasks. A further step that can be taken is modifying the physical setting and the tasks to minimize the distraction and increase the clarity of the tasks according to the procedures of structured teaching programs such as TEACCH (Treatment and Education of Autistic and Related Communication-Handicapped Children; Mesibov et al., 2005). This approach emphasizes the use of environmental modifications and visual means to make the sequence of behaviors involved in a task clear and predictable—this can involve the use of a visual schedule of upcoming actions (which may take the form of objects or pictures) and organizing materials so that important features of the tasks (such as where to focus attention or put materials) are highlighted. For example, for a child who is easily distracted by the pattern of the carpet on the floor, the presence of multiple toys, or the noise of other children, a workstation can be organized in a quiet area where the flooring is different, and only task-relevant materials are available.

Increasing reinforcers' strength. A further attempt to support learning in children who do not appear to benefit from initial ESDM strategies involves the introduction of external reinforcers. As mentioned in the previous chapter, a cornerstone of the ESDM is the notion that learning can and should be achieved through participation in intrinsically rewarding activity. However, for some children who do not respond to this approach, the reward value associated with engagement in a teaching episode can be made explicit through extrinsic reinforcers (i.e., rewarding objects or situations that are not related to the teaching interaction itself). This technique is used to ensure that the child, even if not motivated by the learning opportunity provided, will engage in the activity because something highly motivating (the external reinforcer) will happen as a consequence of the activity.

One first step in this direction is to use a highly desired activity (e.g., playing in the sand pit) as the reinforcer for a less desired activity (e.g., drawing). This is the 'Premack principle': A more preferred activity that follows a less preferred activity will function as reinforcement for the less preferred activity, thus increasing the probability that the child will engage in that activity. A further step that can be taken to strengthen the reward value of teaching episodes involves the use of specific preferred toys or materials as reinforcers—including electronic devices such as iPads. For example, when targeting imitation during a clapping game, if the child is not motivated by the clapping action, the adult might blow bubbles when the child imitates the action in order to reinforce the target behavior. For children who do not respond to any of these strategies, food can be used as a reinforcer as well.

While no instructional option is off-limits as long as there is evidence for its effectiveness, it is important to acknowledge that the use of external reinforcers fundamentally alters the nature of the child's engagement in the teaching exchanges —the more the reinforcement is unrelated to the teaching activity (e.g., access to preferred object as a reinforcer in a drawing task), the more the participation of the child in the activity will be instrumental to the reward, rather than reflecting a genuine desire to 'do things together.' However, even when the decision is made to

Fig. 8.1 A G-ESDM therapist 'wearing' an AAC symbol display during a play session

introduce these procedures, external reinforcers should be always associated with social reinforcer (the adult positive affect and praise), and external reinforcers might be faded and replaced by social reinforcers when the data indicate good progress. The general rule, like in the ESDM delivered in a 1:1 context, is to follow a hierarchy from more naturalistic to more adult-directed, structured, and repetitive across all the procedures as a way to modify the teaching approach (see Rogers & Dawson, 2010, p. 130).

As illustrated in Fig. 8.1, the 'dosage' and the implementation procedures of these added teaching strategies will depend on the number of goals and domains in which the child is showing little progress. In the vignette below, we illustrate how the decision tree can be applied to support learning.

> Carly has observed, through supervision of the data, that Harvey is not making progress on five objectives across multiple domain. Carly consults the G-*ESDM Decision Tree* and determines that Harvey potentially requires individual teaching sessions, in addition to the group program, to support learning progress on the identified goals. According to the G-ESDM Decision Tree Harvey should be provided with two 30 min 1:1 sessions each week until the next curriculum checklist assessment is scheduled. Carly meets with Harvey's caretakers to inform them about the lack of progress across the identified goals and to discuss the development of a Teaching Plan, to be consistently implemented across all staff, to support Harvey's learning objectives. The following Teaching Plan is developed for the initial 3 consecutive sessions;

Objective	Play Skills 1—plays with toys requiring repetitive actions
	Expressive Communication 3—vocalises with adult
	Imitation 1—imitates oral facial movements
	Social Skills—engages in Sensory Social Routines
	Receptive Communication 1—follows instructions
	Receptive Communication 2—responds to instruction 'give'
Materials	• Caterpillar ball run/wooden balls, ball run toys, Pig/coin toy, peg board, shape sorter
	• CD player
Location	Multipurpose room (small therapy room)
Transition	Engage Harvey in a Sensory social routine to help him transition to within 1 m of door of the multipurpose room, then use gestural cue ('come') to direct him to multipurpose room. If Harvey does not follow the instruction, follow through using least to most prompting
Specific reinforcers	Motivators; See 'Harvey—Motivator Box' in Classroom Office. As Harvey is motivated by matching objects use doubles, for example 2 blue blocks, 2 blue soft foam alphabet blocks, 2 blue stacking cups
Overview of activity	• Begin by doing a sensory social routine involving rough and tumble play—for example, adult lies on back and gives Harvey a plane ride (target oral-motor imitation, vocalising in rounds)
	• Receptive Communication; ask Harvey to 'give' the item he is holding

(continued)

(continued)

	• Receptive Communication C; direct Harvey to 'sit down' (use most to least prompting) when within half metre of chair and toy is already set up on table and reinforcers are on table • Play Skills 1; put reinforcer (objects Harvey was holding) on table out of reach, but in eye-sight. Model the action on the toy and wait. If Harvey does not begin to play with toy within 5 s, repeat play action on toy and use most-to-least prompting 2–3 times to support Harvey to play with toy. Model play behavior again, then hand a piece to Harvey and wait for him to complete play behavior independently 1–2+ times. Tell Harvey 'finished'. Reinforce with motivating objects (whatever object he was holding prior to sitting) and allow Harvey to leave the table for approximately 30 s—1 min and then repeat process with different toy • Repeat with different toy 4 + times in 1:1 session • Finish with a sensory social routine involving a preferred rough-tumble game with Harvey or preferred song. (record song/activity in data)
Back-up plan	Play CD player/preferred song at beginning of session if required (if Harvey is distressed)

Following the G-ESDM Decision Tree, Carly evaluates Harvey's progress after four sessions and observes that Harvey is now making progress on the target goals. It is decided to continue with current the teaching plan until the target skills are more consistent.

After 4 weeks, Carly has observed that Harvey is making consistent gains on the goals that are being targeted as part of his teaching plan, and that these gains have been maintained across multiple adults in the 1:1 sessions. Carly decides to fade the use of the additional techniques and develops a new teaching plan (see below) to facilitate the generalization of the target skills from the 1:1 sessions into the general Classroom.

As part of the new teaching plan, for the first 3 weeks Harvey's 1:1 sessions take place in the classroom while the other children are playing outside. Carly sets up preferred toys at 3–4 different play spaces around the classroom (ensuring that the toys correlate with the theme of the play spaces in the classroom and are within close proximity) and Carly transitions Harvey to each play space using naturalistic G-ESDM strategies, including drawing Harvey's attention to the toy ('Harvey, look') or, if necessary, motivating Harvey to transition by bringing the toy to him and leading him to the table with the toy. Over the 3-week period, Carly supports Harvey's independence in the classroom by fading her input as he is playing with the toys at the play stations (including by moving away once Harvey is playing with toys). In the final 2 weeks of the teaching plan, Carly does not set up the play spaces and instead uses the play spaces and play materials available in the classroom and works with Harvey while there are other children in the vicinity. Carly reduces her input further and observes that only occasional support is required to maintain Harvey's attention to the play activity and for some of the transitions between play areas. As part of the new Teaching Plan, Carly finishes each session by engaging Harvey in a Sensory Social Routine. This allows Carly to support the generalization of this target behavior into the Classroom environment.

Objectives	Play Skills 1—plays with toys requiring repetitive actions
	Expressive Communication 3—vocalises with adult
	Imitation 1—imitates oral facial movements
	Social Skills—engages in Sensory Social Routines
	Receptive Communication 1—follows instructions
	Receptive Communication 2—responds to instruction 'give'
Materials	• Caterpillar ball run/wooden balls, ball run toys, Pig/coin toy, peg board, shape sorter, caterpillar gear toy
Location	Classroom
Transition	In notes below
Specific reinforcers	Social praise + tickles
	Preferred Sensory Social Routines
Overview of activity	• Set preferred toys up at 3–4 tables in the Classroom. Transition Harvey to the table he is closest to ('Harvey, look') to sit and play with the toy • Support Harvey to engage in independent play with the toy. When he is playing independently, fade your input (move back/move away if possible) • When Harvey is finished, support him to pack away (it is ok for him to move to away from the table—to another part of the classroom) • Transition Harvey to another table in classroom by drawing his attention to the toys at the other tables ('Harvey, look!') (Can also motivate him by bringing the toy to him and leading him to another table with the toy) • Repeat—when Harvey is playing independently, fade your input • Repeat with different toys 4 + times across session • Target instructions as part of process e.g. sit down, give, come • Finish with sensory social routine; a preferred rough-tumble game with Harvey or preferred song. Target vocalisations as part of sensory social routine
Back-up plan	Use external reinforcers (e.g. blue stickle bricks) to support with transitions between activities at the tables

Specialist Input in the G-ESDM Decision Process

Importantly, while the general rules detailed above are relevant across learning domains, lack of progress in specific developmental areas will prompt input of specific specialists.

What if the Child Is not Showing Progress in the Ability to Speak and Use Language? Contributions from the Speech and Language Pathologist

Children who have no means to communicate their needs using speech can experience a great deal of frustration, which often causes challenging behaviors and hinders participation to learning activities. Therefore, if no progress in verbal communication occurs within the first 2–3 months of an ESDM program, the speech language pathologist, in partnership with the family and the team leader, should be responsible for creating an alternative speech development program, as described below. While the G-ESDM emphasizes the use of verbal language (both as a learning target and as the format used to deliver instruction), when children show little gains in their capacity to communicate verbally other approaches must be considered. This commonly includes the use of augmentative and alternative communication (AAC) strategies. AAC involves the use of symbols (i.e., signs, pictures, symbols, or written words) representing words and messages to support communication production for individuals whose verbal language is insufficient to meet their daily communication needs (Beukelman & Mirenda, 2013).

An AAC decision tree is introduced only after intervention has started, if the data show that a child's response to the teaching strategies is minimal. Therefore, it is expected that only a minority of children will need to be on the decision tree. For example, in a recent study, we documented that while approximately 60 % of children with autism had no language at intake in our program, after 12 months of intensive intervention approximately 85–90 % of children developed functional speech without the need of altering the program (Vivanti et al., 2014).

However, as outlined in the AAC decision tree, for *all* children who remain minimally verbal children after 2–3 months of G-ESDM intervention, it is recommended that language symbol displays be used by all adults who communicate with these children (Gevarter et al., 2013). The use of the language symbol displays requires a high degree of learning for the child but also for the teaching team. The adults need to employ a high level of conscious effort to alter their communication with minimally verbal children, so that they pair all their verbal communication with the symbols by simultaneously pointing to the language symbol display. Additionally, they need to have the display available and accessible so that the system can be used when they communicate with the child (i.e., during everyday routines, the adult will be able to give all verbal instructions while also pointing to the relevant symbol on the language symbol display, e.g., 'inside' and 'finish'). As illustrated in Fig. 8.1, the adult can 'wear' an AAC language symbol display while working within the G-ESDM environment.

It is beyond the scope of this book to describe all of the potential AAC options available to minimally verbal preschoolers with autism and the process of deciding which system to introduce with each child (see Ganz 2014, for a comprehensive review). As highlighted in the decision tree, the speech language pathologist, in partnership with the team, should clinically assess each minimally verbal child's

communication skill set (and other relevant information) to assist in selecting an appropriate AAC approach. This includes (but is not limited to) items in the Expressive Communication Level 1 domain of the ESDM Curriculum Checklist (e.g., 'gives object to request help' and 'points to make a choice').

AAC approaches considered in the G-ESDM may include symbol boards, signing, and/or speech-generating devices (SGD). SGD can prove especially useful in assisting minimally verbal children to communicate with their peers. More structured AAC approaches such as PECS (Picture Exchange Communication System; Bondy & Frost, 1994; Flippin, Reszka, & Watson, 2010) can also be considered for children who have less developed nonverbal communication. As outlined in the decision tree, if slow progress in achieving language gains is determined to be related to poor oral motor skills, specific methods designed to address this domain of deficit should be implemented, such as PROMPT (Rogers et al., 2006).

While the child skills and preferences must be taken into account to create an effective speech development program, the AAC decision tree illustrated in Fig. 8.2 is used in the G-ESDM to guide decision-making about what AAC system to use.

Once an AAC strategy is introduced to a particular child, everyone working with that child must be provided with sufficient training and support to ensure that the child's capacity to learn a different (and new) way of communicating is optimized. Therefore, a supportive AAC culture must be fostered in the team, in which the use of alternative forms of communication is taught, valued, and expected and the child's capacity to use AAC strategies for communicating independently and functionally is consistently supported. The social, communicative, and play opportunities for children in the AAC decision tree should be the same as the other children in the group. The team will follow all the principles and strategies of the G-ESDM to target the teaching objectives, but using the alternative language system (see also Rogers & Dawson, 2010). There is a review process built into the decision tree to encourage teams to critically reflect on child's response to any AAC system introduced and modify the program accordingly.

What if the Child Has Challenging Behaviors that Interfere with the Program? Contributions from Behavior Analysis

Preschoolers with autism can display challenging behaviors, such as aggression, self-aggression, escape behaviors, and self-stimulatory behaviors, which can disrupt teaching activities, especially in the context of group settings. While the definitions of what constitutes a 'challenging' or 'maladaptive' behavior vary, in the context of the G-ESDM, all behaviors that interfere with learning should be considered as 'unwanted' and must be readily addressed using evidence-based applied behavior analysis techniques (Horner, Carr, Strain, Todd, & Reed, 2002; Doehring, Reichow, Palka, Phillips, & Hagopian, 2014). The specialist in behavior analysis in the team
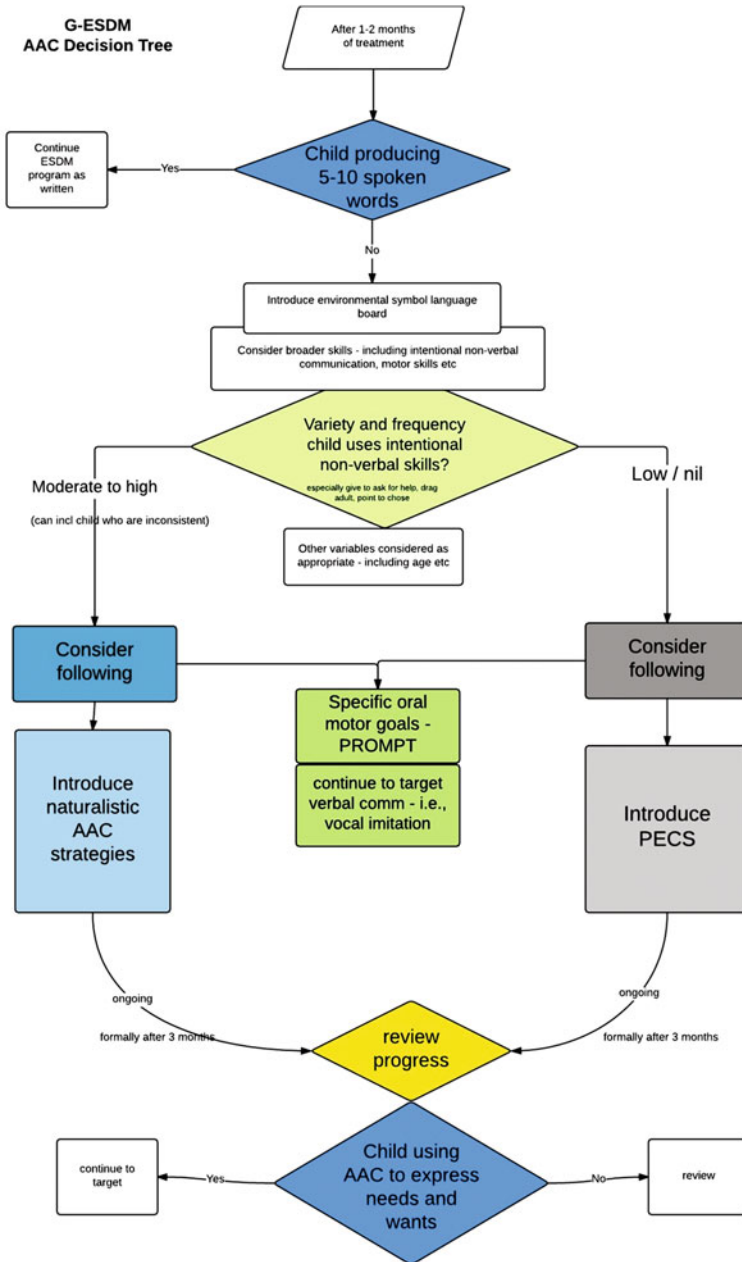
Fig. 8.2 The augmentative and alternative communication (AAC) decision tree

has the critical role of conducting a functional behavior assessment (FBA, see Machalicek, O'Reilly, Beretvas, Sigafoos, & Lancioni, 2007; Powers 2005) when the teachers or therapists indicate that a particular child is engaging in behaviors that interfere with the program. The FBA process involves the investigation of the exact events that occur immediately before and after the occurrence of the target behavior, in order to identify (1) the causes of the unwanted behavior and (2) alternative behaviors to be taught in order to allow the child to meet his or her needs using adaptive and socially acceptable means. In the group setting context, factors that might reinforce maladaptive behaviors might include the peers' responses to a child's behavior—therefore, for the intervention to be successful, both the target behavior and the behavior of peers that might reinforce the target behavior must be addressed.

Consistent with the principles of positive behavioral support, the G-ESDM philosophy entails the notion that the best way to address unwanted behaviors is to actively teach novel, functional behaviors and keep the child engaged in meaningful and rewarding activities. When maladaptive behaviors occur nonetheless, the behavioral specialist in the team will coordinate a behavioral plan based on evidence-based strategies (see, e.g., Powers, Palmieri, D'Eramo, & Powers, 2011). These plans must be discussed thoroughly with the entire team and family so that everybody is in the same page and intervention strategies are implemented consistently.

Additionally, other issues might require decision-making and input from specialists.

For example, toilet training is often a topic of interest for families and caregivers of children in the G-ESDM. Each child in the G-ESDM program who is above the age of 2 should have an individualized plan that addresses toilet skill development. The occupational therapist on the team can provide support to develop these plans using evidence-based strategies tailored on the needs of the specific child (e.g., Kroeger-Geoppinger 2013). As with other teaching procedures used in the ESDM, before any alternative plans are designed and implemented, a routine approach based on the evidence-based practices is implemented first, with additional reinforcers/structure applied if required.

Conclusions

All children with autism, when taught correctly, will learn. While rates of learning vary across individuals, lack of any learning ability is almost never seen in young children with autism. It is a helpful stance to consider that lack of child progress indicates lack of appropriate teaching and that the teaching approach that we are using is not the right one for that particular child. Some children might show lack of progress across multiple objectives—more often, children can get stuck on a specific objective or a specific domain. In both cases, it is imperative to take action and reorganize the intervention using procedures derived from evidence-based

approaches other than what has been tried already. Therefore, we begin our program using the default ESDM strategies (following the child's lead, sharing control, embedding teaching in naturalistic joint activity routines, using everyday materials, emphasizing warm, playful shared interactions as a context for learning)—if the data show that progress is slower than expected, we change the way we reinforce target behaviors, the physical environment, and the frequency of repetitions and practice opportunities. Decision trees such as the ones detailed in this chapter and the ESDM decision tree (Rogers & Dawson, 2010, p. 130) can be used to guide decisions and orchestrate changes in goals, strategies, settings, or treatment approaches. Such changes must be motivated by data on treatment progress, rather than the perception on what is the best learning environment or teaching program for the child.

One step discussed in this chapter involves increasing the amount of teaching episodes delivered to the child during group activities, and if this does not work, set up 1:1 teaching sessions in a distraction-free environment. Importantly, receiving intervention in a group setting does not mean that individual needs are not addressed—as we mentioned earlier, the construction of individualized goals and teaching plans is the foundation supporting the G-ESDM. However, when data suggest that a child struggles with mastering specific goals in the context of activities that involve multiple peers, focused 1:1 sessions might be used. Additionally, a range of evidence-based practices can be added to the program toolkit to target the goals where progress is slow, reviewed in this chapter and in the original ESDM manual (Rogers & Dawson, 2010). Therefore, the professional staff members need to be well educated in many (more than 25!) empirically supported teaching approaches for young children with autism (Wong et al., 2015).

The process of modifying the program through the decision tree procedures requires strong input from the team specialists across a variety of disciplines. The data-driven selection of teaching procedures and evaluation of pros and cons of the different options require a close and reliable communication between the team leader, the specialist involved in the modified program, and the child's caregivers. Implementing individual plans requires a high degree of support and training for all G-ESDM team members to optimize outcomes. Before decisions are made on modifying teaching strategies, it is important that the team's capacity to deliver the program effectively and consistently is assessed on a regular basis using the G-ESDM classroom implementation fidelity tool (see Appendix).

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Chapter 9
Frequently Asked Questions

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In this chapter, we will address some of the questions that, based on our experience, are likely to be relevant to most readers.

Is the G-ESDM Appropriate for All Children with Autism?

One frequently voiced concern is that the group-based settings like the G-ESDM might not be suitable for some children with autism, or that some children should first receive one to one therapy before being 'ready' for a group setting. Currently, there is no research comparing the outcomes of individualized versus group-based therapy, and not enough evidence to indicate if children with particular characteristics will benefit more from one of the two formats.

Nevertheless, research on the G-ESDM and other evidence-based group programs (e.g., Stahmer, Akshoomoff, & Cunningham, 2011) document outcomes that are similar to those reported in the individual home-based training, suggesting that overall, a group setting is a suitable learning environment for children with autism. The concern that children with autism might not be 'ready' for a group environment is inconsistent with the principles of the ESDM, which involve an individualized approach in teaching the building blocks of social, communication, and cognitive development and do not assume any prerequisite knowledge. Moreover, evidence indicates that children do not have to be 'high functioning', or to have verbal language in order to benefit from the group program (Vivanti et al., 2014). While individual differences in response to the G-ESDM have been documented and are to be expected (like for any other program), based on current evidence, we cannot conclude that there are children with autism 'unsuitable' for the G-ESDM.

If both individual and group-based ESDM programs are available, caretakers and clinicians need to evaluate the pros and cons (discussed in Chap. 2) of the two options in relation to the specific characteristics of the child and the family. Importantly, as we have discussed throughout the book, children provided with the

ESDM are expected to show rapid progress, and short term gains are systematically monitored—therefore, if the data suggest that a child learn best when teaching is delivered in a 1:1 format, therapists should discuss alternative options with the family. As discussed in Chap. 8, there are specific procedures embedded in the G-ESDM to guide decision-making in these circumstances.

In summary, current research does not indicate that some children with autism are unsuitable for the G-ESDM, and treatment benefits have been reported in children across levels of verbal and cognitive functioning. Additionally, group-based programs are the most common way of providing services and education to young children around the world, thus providing a culturally appropriate and commonly accessible setting for socialization and learning. However, decisions on whether the program is appropriate for a child when different options are available should be guided by the child and family's goals and priorities and by ongoing monitoring of progress.

Is the ESDM Appropriate for Children with Diagnoses Other Than Autism?

The systematic use of behavioral techniques within play-based, meaningful, and inherently rewarding techniques used in the ESDM should, in theory, facilitate learning for young children regardless of their specific diagnoses. Importantly, however, the effectiveness of this model has not been empirically tested in children who have diagnoses other than autism, or in children who have autism associated with co-occurring conditions like Down syndrome or fragile X.

What Is the Scientific Evidence Supporting the Effectiveness of the ESDM and the G-ESDM?

Research evidence supports the effectiveness of ESDM across different modalities of implementation (e.g., home individualized delivery, telehealth, caretaker-mediated delivery) and levels of functioning of children involved (see Ryberg 2015; Talbott, Estes, Zierhut, Dawson, & Rogers, 2016; and Waddington et al. 2015, for recent reviews).

In one of the most relevant research works in the area, evidence for the efficacy of the ESDM was demonstrated in a randomized controlled trial (Dawson et al. 2010) indicating significant gains in cognitive, language, and adaptive abilities in a group of preschoolers with autism receiving 15 h per week of individual home-based treatment over 2 years, as well as 4 h per month of individual caretaker coaching. Dawson et al. (2012) used electroencephalography (EEG) to measure brain activity patterns in response to viewing faces and objects in a group of

children receiving the ESDM versus a control group of children receiving intervention routinely available in their communities. Greater brain responses to faces over objects were found in the ESDM group compared to children with autism in the community group, who showed the opposite pattern (greater brain activity when viewing objects than faces). The brain activity pattern in the ESDM group was the same as found in an age matched typically developing group of children.

More recently, we have documented that the ESDM can be delivered successfully in the context of a community childcare setting (Vivanti et al., 2014, see also Vivanti et al., 2014). We measured the outcomes of 27 preschoolers with autism receiving 15–25 h per week of ESDM therapy over 12 months compared to those of 30 peers with autism undergoing a generic intervention program delivered in a similar community long-day care service. The ESDM was delivered within the constraints and the resources of a childcare setting, using regular childcare teachers and a child-staff ratio of 1:3. While children in both groups made significant improvements, those receiving ESDM showed significantly higher gains in language (20 Developmental Quotient points versus 10 in the control group) and cognition (14 Developmental Quotient points versus 7 in the control group). At the beginning of the program, only 40 % of the children in the ESDM program had language—after 12 months, the proportion of verbal children was 85–90 %. These results indicate that even with the adaptations of delivering the program in a childcare group environment instead of intensive individual home treatment, the ESDM is an effective intervention model for preschoolers with autism. Additionally, there is evidence that the group delivery of ESDM results in a decrease in maladaptive behaviors in children with autism (Fulton, Eapen, Črnčec, Walter, & Rogers, 2014). These findings raise optimism on the possibility to successfully target the needs of young children with autism within accessible and sustainable community childcare programs. Additionally, the teaching approach used in the G-ESDM is consistent with the best practice guidelines for early childhood education used in high quality childcare and preschool centers across the world (National Association for the Education of Young Children 2009).

What Qualification Is Necessary to Deliver the G-ESDM?

Currently, delivery of the G-ESDM does not require additional qualifications other than those needed for delivery of the ESDM. The process to become certified as therapist or coach in the ESDM is detailed in the ESDM Web site (http://www.ucdmc. ucdavis.edu/mindinstitute/research/esdm/certification.html). All the research studies documenting effectiveness of the ESDM and G-ESDM were carried out by trained and credentialed therapists and staff. A list of certified ESDM trainers and therapists is available at the following link in the UC Davis MIND Institute Web site (http://ucdmc. ucdavis.edu/mindinstitute/research/esdm/pdf/esdm_certifiedtherapists.pdf).
Background of professionals who may be trained as ESDM therapists include psychology, psychiatry, speech and language pathology, occupational therapy, early

childhood education, and special education, as well as other disciplines that involve certified expertise in early childhood development. While individuals without a professional credential cannot be certified as an ESDM therapist, they may work under the training and supervision of an ESDM-credentialed therapist. When this is the case, fidelity should be checked frequently to ensure intervention integrity and consistency.

What Roles Do Caretakers Play a Role in the G-ESDM?

Caretakers play two important roles in the G-ESDM. First, they provide critical input on what to teach. Therefore, they contribute to identification of treatment priorities and the construction of each child's individualized plan. Additionally, they can learn how to use the ESDM strategies during caretaking routines at home. Research shows that caretakers can master the ESDM strategies and successfully apply them at home if they receive appropriate coaching from certified ESDM coaches (Vismara, McCormick, Young, Nadhan, & Monlux, 2013). While caretakers' mastery of the ESDM techniques is not a 'mandatory' component of the G-ESDM implementation, combining the ESDM in the context of play routines with peers and during caretaking routines at home provides a powerful combination for optimal progress. A manual is available to help caretakers learning the ESDM principles strategies (Rogers et al. 2012).

What Is the Role of Visual Supports in the G-ESDM?

Many practitioners in the field of autism have been schooled in the concept that children with autism are 'visual learners', and the use of visual aids in the learning environment has become, in the past decades, the centerpiece around which many intervention programs are organized. Therefore, some readers might be perplexed by the indication of delivering therapy in a 'typical playroom' environment. The rationale for this suggestion is twofold. First, as mentioned in Chap. 2, the G-ESDM is based on the notion that children with autism should learn from people (social learning). People's faces, their emotional expressions, their actions, and their nonverbal communication are the visual stimuli that we provide to children in the G-ESDM environment to facilitate learning. Therefore, the G-ESDM environment is in fact very rich with visual information to support learning. Rather than dismissing children with autism's ability to process visual information and learn from visual stimuli, we focus this apparent strength toward the social environment. Consistent with the social learning emphasis of the ESDM, additional visual supports aimed at simplifying the learning environment are not core constituent of the physical environment where intervention takes place (although individualized program modification which can involve the use of visual supports is introduced

when necessary—see Chap. 9). As mentioned earlier, when the learning environment is meaningful and rewarding, children are likely to learn a great deal from it.

The second reason for not filling the playroom with additional visual supports is that communication in the G-ESDM is targeted in the framework of joint social engagement. In fact, each and every activity in the G-ESDM program involves opportunities for social communication mediated by language and nonverbal behaviors. This means that communication is a part of social exchanges that involve the appreciation of the partner's social and emotional facial and bodily cues (e.g., saying 'ready, set…go!' while smiling expectantly when stacking the last block of a tower to communicate a feeling shared 'suspense' and positive emotion). This type of communication, which is foundational to more sophisticated use of language later on, is not easily replaced by visual supports, and does not require a learning environment filled with visual supports.

There is no doubt, however, that clearly organized visual information can help individuals with autism navigating their learning environment—just like we all benefit from international traffic and road signs and pictures and symbols for accessing public services. This is why the teaching environment in the G-ESDM is not just a 'typical playroom'—it is a highly planned and dynamic social learning playroom, with materials organized around clear social purposes and physical spaces deliberately designed and arranged to optimize communication and social learning opportunities. However, within this clearly meaningful physical environment, the G-ESDM involves the continuous engagement of the child in social learning episodes in which the therapist specifically targets the use of language, gestures, and other natural nonverbal communication. As we mentioned in Chap. 7, the complexity of the language used in the program is carefully calibrated on each child's current processing ability.

Importantly, as we discuss in details in Chap. 4, the G-ESDM learning environment does not preclude the presence of natural visual supports, including areas and materials (e.g., children's chairs during meals and toy boxes) that are labeled with printed words, pictures, and symbols. Also, while the majority of children with autism can develop verbal communication when language input is provided and processed in this context of meaningful and rewarding social activities, a minority of children might not be responsive to these procedures. Therefore, decisions around introducing augmentative and alternative communication (AAC) strategies within the G-ESDM are made on an individual child bases in response to their progress against their objectives and after consultation with key team members (including the caretakers). In these instances, we certainly encourage and support the use of AAC systems in the G-ESDM learning environment. When compensatory communication tools such as speech generating devices, PECS, or other AAC systems are introduced in the G-ESDM environment, they need to be available and accessible by the student and the therapist during all activities. The specific decision-making processes, procedures guiding the introduction and support of these systems in the G-ESDM are detailed on Chap. 8.

Finally, young children are multisensory learners, and the G-ESDM environment is one that supports information processing in all sensory domains. Auditory

information, tactile and kinesthetic information, and visual information are organized and integrated in the G-ESDM setting. However, multisensory information coming from social partners is prioritized, and the adult use of gestures, facial expression, affect, and child appropriate language embedded in everyday, predictable routines is considered the most important source of information for children. Therefore, in the G-ESDM, adults are careful not to let other environmental stimuli, including pictures, picture schedules, and other such devices, reducing the need for children to process social information, and compete with children's attention to the key people in their environment and their communicative and social cues from other people. As we detail in Chap. 8, we want to accommodate teaching strategies and environmental supports as needed for individual children, without assuming that all children with autism learn the same, perceive the same, and react, in the same ways and therefore need only one type of approach to learning.

Many Activities in This Book Requires Children to Sit at the Table. What if They Only Sit for a Few Seconds or not at All?

When we set up table activities and we do not succeed in having children join us, we ask ourselves three questions: (1) Is the activity 'inviting' children to participate? (2) Was the child transitioned to the activity in a way that supported an optimal arousal level? and (3) Are we calibrating the expectations based on children's current level?

To address the first point, we need to make sure that the activity at the table is meaningful and rewarding for that particular child. If this is not the case, we have to think 'what can be added to the activity to increase motivation and "meaningfulness" to the activity?' One way to address this questions is to gather and record information (from caretakers, teachers, other staff, and direct observation) about materials and activities that the child finds interesting enough to want to play with for at least 10 s. In our experience every child with autism will respond to at least one set of materials long enough to apply the ESDM strategies (i.e., building learning opportunities on the child's spontaneous interest). This list, however, needs to be updated every month or so. While displaying repetitive behaviors is a symptom of autism, children with autism, like typically developing children, might lose interest in materials and activities that are offered repeatedly over time (unless the activity is related to special interest!).

Additionally, it is important to consider whether the transition to the table activity was experienced by the child as a sudden and unpleasant change from a more rewarding to a less rewarding activity. For example, for a child who loves building castles in the sandpit, the transition to a table activity can be experienced as a negative event if (1) there was no warning (e.g., the teacher suddenly says 'Time to go inside'), (2) the next activity is less interesting than the current one. If

this is the case, it is critical to turn the transition into a meaningful and rewarding experience in itself. For example, the teacher can go to the child who is playing in the sandpit and (1) give them at time warning (2) play with the child so that the child will increase her attention to the adult and decrease attention to the sandpit (3) involving the child in playful activities (e.g., lifting, jumping, and running really fast). Additionally, it is important to organize the physical arrangement of the playroom so that the paths between activities facilitate a smooth transition (see section 'transitions between areas' in Chap. 4).

Another important point is: Is the expectation of the amount of time sitting at the table too high, based on the child current skill level? While we do expect children to be sitting at the table when meaningful and rewarding activities are set up, we do not expect children to enter the program with skills fully developed. As indicated in Chap. 3, the expectations are always based on the 'zone of proximal development', i.e., if the child currently participates to a table activity for a duration of 10 s, we target a duration of 15 s. Therefore, Tony will be expected to sit for 15 s, because his current level is 10 s, and Adam will be expected to sit for 15 min because his current skill level is 10 min.

Finally, if the child is averse to sitting in a chair for any reason, then we would develop a specific teaching plan in which the child's preferred activities are only available when seated, and leaving the seat means leaving the materials. Most children will sit for meals, especially if they are not allowed to carry food around. Adding some preferred toys to the end of a meal, or the moments before the food is served, can begin to pair the chair with other kinds of activities as well.

How Does the ESDM Address Sensory Reactivity or Responsivity?

Children with autism often demonstrate atypical responses to sensory stimuli—for example they might be 'hypersensitive' to certain sounds or textures, or not responsive to other stimuli in the environment (Lane, Molloy, & Bishop, 2014; Uljarević, Lane, Kelly, & Leekam, 2016). As discussed in Chap. 6, these differences are reflected in difficulties with modulating sensory arousal in response to stimuli such as the noise, smells, lights, and movement that characterizes a typical preschool group setting. It is worth noting that atypical sensory processing in autism is more often associated with hyporesponsivity rather than hyperresponsivity (Baranek, Little, Diane Parham, Ausderau, & Sabatos-DeVito, 2014)—this is important for staff members to know, so that they do not overinterpret child behavior as sensory avoidant in general.

As these atypical sensory responses can disrupt learning—both when children are 'hyper' (e.g., a child who is restlessly running around the room) and 'hypo' (e.g., a child who is passive and lethargic), some strategies must be put in place to address them. First, as detailed in Chap. 4, the arrangement of the physical space

acts to facilitate processing, organization, and modulation of sensory stimuli. This is achieved through a careful management of the quantity and quality of 'stimuli', with each playroom area organized around clear purposes and themes. A space that has a clear meaning attached to it will make it easier for the child to process and organize the stimuli in the environment. Additionally, as detailed in Chap. 6 in the G-ESDM the adult optimizes the child arousal and sensory responsivity through choice of play material, tone of voice, and level of adult activity, so that the child can more optimally participate in (and learn from) naturalistic social learning activities during everyday life play-based routines.

Therefore, consistent with the naturalistic social learning focus of the ESDM, sensory abnormalities, rather than being addressed as a separate 'side issue', are dealt with within the social and physical context of daily routines and learning experiences. If, despite all the efforts to put in place the strategies described above, the child seems to experience sensory difficulties that prevents her/him from learning in the G-ESDM playroom, consultation with the team occupational therapist should be sought, and adaptations to the child's program introduced as needed.

Are IPads and/or Other Mobile Technology Tools Used to Facilitate Learning in G-ESDM?

Touchscreen tablets such as the iPad are increasingly popular as teaching tools for children with autism (Grynszpan et al. 2014). The potential advantages afforded by this type of technology include (1) the use of a medium that is often highly motivating for young children with autism, (2) the possibility to program contingent rewards within specific tasks (e.g., a video of Thomas the Tank Engine appearing after the child successfully matches/sorts items), (3) the full control on the input displayed to the child, so that the processing load is minimized and focus on 'noiseless' to-be-learned information is facilitated, and (4) the possibility to personalize stimuli according to the child's preferences.

In general, motivating objects (such as tablets) in the G-ESDM can and should be used when they help facilitating the acquisition of social-communicative skills such as joint attention, sharing of affect, imitation of novel actions, and verbal and nonverbal communication. The use of a tablet per se, detached from a meaningful shared experience, is unlikely to help accomplishing learning goals in these social and communication domains. In the worst case scenario, a strong interest in tablets can be detrimental to social attention and social engagement, thus disrupting, rather than facilitating social learning. Therefore, our clinical experience suggests caution in the use of touchscreen devices, and consideration of whether its use will be facilitative or detrimental to the achievement of each child's goals. A further note of caution arises from a recent study (Fletcher-Watson et al., 2015) showing that the use of an

iPad-based app designed to teach social communication skills to preschoolers with autism failed to facilitate improvements in 'real-world' social communication skills.

What Are the Planning and Meeting Requirements in a G-ESDM Program?

The interplay of individual objectives within the playroom curriculum and the complex choreography involved in the G-ESDM requires more staff planning and communication than what is usually required in a group childcare or preschool setting. Although each setting and G-ESDM program needs are unique, it is recommended that the following meetings are organized:

ESDM Specialist Review Meetings

The broad aim of the ESDM Specialist Review meetings is to optimize the ESDM program delivery by providing a forum for ESDM certified staff to review children's programs. These meetings are generally conducted weekly and provide a forum for the team to review individual children's progress and to discuss any program modifications. It is recommended that each case discussion is led by the relevant team leader and that the topics discussed include (but are not limited to) the following:

Topic	Brief outline
Program reflections	Allows team leaders (and others) to reflect on recent observations, the child's program (i.e., progress against objectives) and behavior in the group setting. This can include general observations and reflections of child's current interests
Specialist update	Feedback from and reflections about relevant specialist therapy programs, if applicable (i.e., positive behavior support plans for a child who has maladaptive behaviors)
Caretaker Feedback/Report	Relevant caretaker feedback should be discussed, e.g., observations from caretakers regarding the child (e.g., frequency and intensity of a specific behavior at home)
Questions	It is critical that staff are able to seek clarification about a child's program from their team leaders

It is also important that staff have the opportunity to provide timely updates about children as required. Therefore, it is suggested that opportunities are provided for emergency discussion in the meeting agenda, so that staff can discuss a child's

program as necessary (e.g., when a behavioral plan needs to be modified or implemented immediately to address a problematic behavior).

Individual Classroom Meetings

Depending on the size of the team and operational constraints of individual programs, it may not be possible for all staff to attend the ESDM Specialist Review meetings. For example, staff may be required to provide care to children during the allocated meeting time. In these circumstances, it is critical that relevant information about individual children's program is shared, and meeting minutes are reviewed within specific classroom meetings.

Caretaker Meeting

Consistent with the ESDM delivered, the G-ESDM is a family centered intervention model. As detailed on Chap. 3, G-ESDM therapists are responsible for conducting assessments and writing new objectives for each child every 3 months using the ESDM Curriculum Checklist. This provides a critical opportunity to liaise with each child's caretakers. Outside of this regular ESDM assessment and goals meeting, it is recommended that caretakers meet formally with team leaders at least every 6 weeks to discuss and review the child's program.

Team Meeting

In contrast to the ESDM Specialist Review meeting, these meeting provide a forum for the service manager/room leaders to provide the team with relevant information about the operation of the service. For example, staffing updates, training opportunities, occupational health and safety requirements, other legislative requirements, and relevant research opportunities.

How Can a Transdisciplinary Team Culture Be Established?

A transdisciplinary approach requires that each team member commit to working within a 'control with' rather than a 'control over' philosophy to facilitate continuous learning and adjustment (Samson & Daft, 2009) and positive outcomes for

the child. As stated previously, transdisciplinary practice represents the highest level of team cooperation within early intervention, and therefore, the challenge of establishing a team that commits to this approach should not be underestimated. A G-ESDM team works like a 'learning organization' (Senge 2006), i.e., an organization that facilitates the learning of its members as it continuously transforms itself in response to its environment. This approach requires that individual team members are committed to a shared vision, to the process of learning as a team, and to challenging their own personal and professional assumptions.

Within a team committed to these features, open and supportive communication between the team members is critical to foster formal and informal learning and manage the emotional demands inherent to the intervention work. Communication should therefore encourage shared experiences and focus on the learning and development that can occur through these lived experiences. This is critically important with regard to communication with caretakers of children in the program —particularly when intervention gains are slower than expected. A team culture that characterized by a commitment to working collaborative and openly is therefore beneficial to the organization (e.g., by increasing staff retention, knowledge, and work satisfaction), the children, and families.

As the Manager of a G-ESDM Program, are There Any Resources Available that can Assist in Delivering the G-ESDM?

We have created a G-ESDM Management and Team fidelity tool (see appendix). This resource is provided as a guide to assist G-ESDM teams to actively reflect on their practices and set relevant targets that will promote the quality of the G-ESDM program.

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Appendix
G-ESDM Fidelity Tools

<table>
<tr><td colspan="5" align="center">G-ESDM Classroom Group Implementation Measure</td></tr>
<tr><td colspan="5">

Location _____ **Rater**_____ **Date**_____

Time_____**Activity**_____**Staff**_____
</td></tr>
<tr><td colspan="5">

Rating scale

   1- Item is not implemented

   2- Item inconsistently implemented

   3- Item consistently implemented

   • A score of 1 in any item indicates need for additional training

   • Score of 80% (total score against the number of possible points across all items) or above indicates fidelity of implementation.
</td></tr>
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Item Description	Item Definitions	Rating	Comments
A. Classroom Set-Up: Space is well organized; routes are clear; distractions are minimal.	1. *Environmental distractions in the classroom are managed* using environmental boundaries and the positioning of the activity/group is arranged in accordance with individual needs of the children (e.g., noise and visual distractions are managed during group time)		

	2. *External distractions (e.g. phone ringing, parents/children arriving late) are managed* according to the contingency plan and center policies.		
	3. *There are clear pathways and visually obvious transition routes* between activities, and children can see the destination site.		
	4. *Physical environment is set up to support children's attention to social partners* (e.g., tables and chairs are set up so children can have face-to-face interactions with peers and adults)		
	5. *Each space is well organized and has clear play themes.* Spaces to engage in solitary/small/large group activity are available. Space for sensory social routines are provided and organized spaces are available for different types of play that are developmentally appropriate for young children (e.g., socio-dramatic play, manipulatives, gross motor)		
A. Participation: Child opportunities for participation are maximized.	1. *All children receive frequent interaction opportunities from staff.* Children are not isolated, disengaged, or participating in non-functional activity for prolonged periods of time.		
	2. *Adults offer children frequent choices and shared control* within the activities and routines, optimizing motivation for participation. Control of materials, ideas, initiations and responses is dyadic and shared between children and adults.		

	3. *Minimal waiting or passive time.* Routines and activities are managed so that unnecessary waiting is minimized. If children need to wait they are supported to do so positively, with a level of support appropriate to individual child, or group needs.		
	4. *Every child is supported to participate through individualized strategies* and adjustments are made as required.		
	5. *Length of activity is appropriate* to the activity/routine and children's individual needs, (e.g. age group, time of day, arousal level of activity, etc.).		
	6. *Children positioning in activity is planned in accordance with individual needs,* skill levels, arousal levels and goals (e.g., A child who has difficulty with transitions is seated on the meal table which is closest to the hand-washing area).		
B. Peer Interaction: Peer interaction is facilitated, positive, and frequent.	1. *Peer interactions are facilitated* during all activities and routines for all children across the day. Adults facilitate peer interactions through a variety of verbal and gestural cues, as appropriate to individual children's skills.		
	2. *Children positioned for peer interaction.* Adults consider strategies for positioning children in a way that supports maximum interactions between peers and reduce the need of their own input to support children to attend to each other.		

	3. *Materials are planned/arranged/utilized strategically to encourage and support peer interactions* (e.g., adults limit the materials to facilitate passing/receiving/sharing of items, props are utilized, etc.)		
	4. *Children are supported to resolve conflict with peers* as independently as possible, and in line with Centre policies on behavior guidance.		
C. Transitions: Child group is well organized; know schedule, anticipate routines, move through transitions independently.	1. *Adults support children's transitions* in and out of routines and activities by using coordinated strategies (e.g., use of 'Invisible Support', 'Float', 'Lead adult', 'Bridge', etc.)		
	2. *Children know routines.* The daily routines and schedule are predictable, supporting child participation and independent involvement.		
	3. *Child independence is promoted and environmental cues are used* to highlight what the child needs to do in that area, or at that time, and are individualized to children's needs (e.g., mat/chairs are arranged for group-time, placemats are set out for mealtimes, paints are displayed on table for art activities, etc.)		
D. Curriculum: Activities well planned for group as whole; allow for individualization; create	1. *Group size fits the activity,* and adult to child ratio is appropriate to facilitate participation of all children.		
	2. *Activities are planned utilizing the interests of each child* and the group as		

interest and motivation.	a whole to support child motivation.		
	3. *The duration of the activity is appropriate* and individualized for each child.		
	4. *Classroom schedule is well balanced across the day*. Activities include dyadic interactions, small and large group activities. Activities appear well balanced with respect to energy and arousal levels, and developmental domains.		
	5. *Activities provide opportunities to target each child individual objectives* and adult is able to target various goals from various levels through the same activity.		
	6. *Goals and children's interests are used to develop teaching curriculum,* which targets goals across all developmental domains, across the day and week and planning period (weekly/monthly etc.)		
	7. *Adults consistently adhere to curriculum* to provide teaching opportunities for children's learning.		
E. Data: Data collected at regular intervals by staff in the	1. *All adults take data as appropriate to their level of training.*		
	2. *Data collection is accurate.*		
	3. *Adults take data at regular and appropriate intervals* (e.g., at the		

Playroom.	*conclusion of an activity)* *4. Data devices/data sheets are easily accessible to adults within the Playroom.*		
F. Affect and Arousal levels: Atmosphere: safe, lively, comfortable, pleasant.	1. *Children's spontaneous communication bids are consistently responded to by adults* 2. *Adult warmth and enjoyment are clear* and adults consistently demonstrate rich, natural and positive affect throughout the day. 3. *Well-paced for individual children-* Staff appear to be sensitive to the arousal states of individual children and respond appropriately by varying their emotional responses or providing opportunities for modulating child's arousal. 4. *Adults monitor the overall arousal level of Playroom* and implement coordinated strategies to maintain an optimal arousal level in the Playroom (e.g. implement small group sensory activities to reduce arousal levels if the overall arousal levels of the group are becoming too high for optimal learning).		
G. Roles and Responsibilities:	1. *Adults are well positioned* and assigned to particular areas/activities/roles throughout the day, and are available for		

Staff work as a coordinated unit to support group; roles are clear, preparation is evident.	play/interactions. 2. *Roles and responsibilities are clear* and documented. Adults know and adhere to their roles, requiring minimal instruction from the Playroom Lead to coordinate activities and routines, including which adult is assigned to implement contingency plans, if required. 3. *Materials are planned and organized* and readily available for efficient set-up. 4. *Adults work as a coordinated unit -* Set up of materials, implementation, and close down of activity appears coordinated and efficient, no evidence of confusion. If changes are needed due to child behavior/absences/or other disruptions, such changes are handled smoothly.		
H. Individual Plans: Readily available, consistently implemented as appropriate.	1. *Individual plans are in place* to support children who are on the decision tree. 2. *Resources are available to implement individual plans* (e.g. if a speech-generating device is required for a child, this is readily available) 3. *Staff is informed of plan.*		

	4. Plan is implemented appropriately.		

G-ESDM Management Implementation Measure

Location _____ Rater_____ Date_____

Rating scale

1   Item poorly implemented

1.   Item partially implemented

2.   Item consistently implemented

- A score of 1 in any item indicates need for additional training.
- Score of 80% (total score against the number of possible points across all items) or above indicates fidelity of implementation

Item Description	Item Definitions	Rating	Comments
A. Transdisciplinary team	1. All children are assigned a team leader. There are contingency plans for when team leader is away for more than 1 week 2. All the team leaders are ESDM certified or undergoing certification		
	3. Team has ready access to specialists, including occupational therapist, speech pathologist, psychologist, teachers, behavioral specialist, 4. All staff is trained in the ESDM (training level is appropriate to their role and professional training), 5. ESDM fidelity checks are conducted consistently, 6. Processes are in place to facilitate team learning, up skilling and ensuring that the professionals work within their own professional competencies and standards		
B. ESDM team leaders' role	1. Formal (and informal) communication systems are in place to support proactive communication with families 2. Weekly data reviews conducted by team leader 3. Team leader proactively manage programs of children s/he is assigned to 4. The decision tree is applied as appropriate 5. Referrals to specialist are made as appropriate		
C. ESDM Curriculum Assessments and objectives	1. ESDM Curriculum Checklist is conducted every 3 months 2. Families are involved in the assessment 3. Multiple professionals contribute to assessment and		

	development of teaching program		
	4. 16 goals are written within 5 working days of assessment		
	5. Goals are drawn from a range of domains		
	6. Goals are written according to G-ESDM format		
	7. Criteria for mastery facilitate daily and accurate data collection		
D. ESDM data collection system:	1. All staff are trained in the use of the system		
	2. All children's objectives are readily accessible to all staff during day		
	3. Staff uses system consistently across the day		
	4. Data summary process is conducted daily		
	5. Additional supports are used to promote staff's knowledge of individual children's objectives (i.e., cheat sheets)		
	6. Flexible systems are in place to allow for changes in child's program as required – including step ups, notes etc.		
E. Allied health specialist:	1. Appropriate specialist is available to the team (as required)		
	2. Referral systems are in place for specialists		

	3. Response to referrals is timely		
	4. Specialist plans are devised and team is supported to implement the place		
	5. Specialist plans are linked with relevant (or new) objectives and collection of data		
	6. Outcomes of plans are reviewed and modified as appropriate		
F. Communication between team members	1. Regular playroom / team leader meetings are scheduled (each child's program discussed at least monthly)		
	2. Meeting minutes are available to all staff		
	3. Team work is facilitated		
	4. Informal communication channels are used to support staff communication		
G. Communication – management to team.	1. Regular team meetings are scheduled		
	2. Meeting minutes are available to all staff		
	3. Team work is facilitated		
	4. Informal communication channels are used to support staff communication		
	5. Staff is encouraged to participate in meetings		
	6. Relevant projects are managed and communicated as appropriate		

H. Team culture	1. Excellence in work and positive team and client focused attitude is encouraged		
	2. Staff is encouraged to challenge their personal and professional assumptions		
	3. Team problem solving is encouraged		
	4. Staff feel empowered in their work (measured through staff surveys)		
	5. Team fosters an inclusive and collaborative team culture where all staff's input is valued, encouraged and fostered (measured through staff surveys)		
	6. Staff is encouraged to be innovative and be creative in their work		
	7. Staff feel empowered to raise issues within the team (including with line-management – can be measured through staff surveys)		
I. Organizational culture	1. Organization has a clear mission, vision and values that are		

	embraced by staff		
	2. Staff have relevant individual performance and development plans (conducted at least annual)		
	3. Systems are in place to support team learning		
	4. Workplace supports and encourages the staff to have a positive work – life balance		
	5. Adequate resourcing – including for planning		
	6. High staff retention rates		

G-ESDM Small Group Activity Fidelity Coding Tool

Adult/s _____ Children _____ Rater _____

RATING DEFINITION

5= This is an example of optimal group teaching.

Adult incorporates all relevant strategies from this item

4= There are more strengths than weaknesses.

Adult consistently incorporates strategies from this item

3= Balanced strengths and weaknesses.

There is room for refinement of group teaching skills from this item

2= There are more weaknesses than strengths, however adult attempts to incorporate some teaching strategies from this item

1= Adult fails to incorporate teaching strategies from this item.

- A score of 1 in any item indicates need for additional training

- Score of 80% (total score against the number of possible points across all items) or above indicates fidelity of implementation.

- Please note- this tool is designed to evaluate group activities involving 2-4 children. For larger groups, please use the G-ESDM Classroom Measure.

Item Description	Item Definitions	Activity 1	Activity 2	Activity 3	Comments
A. Management of children's **attention**	• Children are strategically positioned to support their attention to the adult, materials				
Children are positioned to maximize their attention to the adult, peers and teaching activity. Strategies are individualized to optimize the attention of all children	and peers • Adult gains the attention of all children at the start of the activity and activity begins promptly • Distractors in the environment are minimized • The materials are interesting to all the children in the group • The adult uses individualized strategies for all children to maximize their attention • The adult facilitates the children to shift their attention between the adult, materials and peers				
B. Quality of Behavioral Teaching *The A-B-C format is clear for each behavior. Learning opportunities are provided frequently.*	• Each child receives at least 1 learning opportunity per minute • The 'Antecedent, Behavior, Consequence' format is clear • Number of repetitions well matched to individual children and to group needs **Score '1' If no objectives are targeted**				
C. Instructional Techniques	• Appropriate use of prompting (least to most), shaping (reinforcing approximations of target				

Application *Adult uses techniques including least to most prompting, fading, chaining and shaping to help children learn new behaviors.*	behavior) chaining (linking skills together) and fading (removing prompts quickly). • Invisible supports are used appropriately to elicit target behaviors • Management of Errors – adult targets appropriate behaviors for each child and does not allow the child more two sequential errors before adjusting the instructional technique				
D. Managing children's affect/arousal *Emotional atmosphere of the group is pleasant and playful and meets the needs of all children.*	• The overall feeling of the group is pleasant and playful • If arousal issues are observed, adult adjusts the activity to meet the needs of the group (e.g. change the pace etc.) • Adult uses invisible support appropriately to assist children displaying affect/arousal problems **If no arousal issues observed, score '5'**				
E. Management of unwanted behavior *Adult utilizes positive behavior*	• Adult did not contribute to the unwanted behaviors. • Uses positive techniques that successfully				

support strategies when unwanted behaviors arise.	redirect child and elicit a more appropriate behavior • Adult maintains safety of all staff and children • Strategies implemented efficiently to prevent behavior from escalating and promote learning • Adult roles when providing behavior support are clear, consistent and well communicated **Score '5' If no unwanted behaviors observed**				

F. Peer Interaction
 	
The adult uses a range of strategies including the physical environment and materials to support peer interactions. Peer interaction is facilitated across all children and strategies are differentiated for each child.
	• The materials and physical set up of the group facilitates peer interaction
	• Adult supports children to resolve conflict as independently as possible
	• Multiple strategies for peer interaction are utilized for each child throughout the group activity, for example;
	  - Passing materials between peers
	  - Peers greeting each other
	  - Peers supported to observe other peers
	  - Peers supported to imitate each other				

	- Peers supported to communicate with each other (including requesting, asking questions, commenting etc.) **Score a '1' if no peer interaction is facilitated**				

G. Children's motivation optimized
 	
The adult uses a range of strategies to maintain the motivation of individual children throughout the activity.
	• The activities are well chosen and planned according to the interests of each child.
	• Adult gives the children choices and follows their lead throughout the activity as appropriate
	• Adult targets a combination of maintenance (existing skills) and acquisition skills (new skills) for each child.
	• Adult reinforces individual child attempts and provides natural reinforcement
	• Strategies to maintain motivation are used as required, including for example;
	  - Use of Premack principle
	  - Ending the activity before the child loses interest (length of activity is appropriate for each child)
	  - Use of motivating objects				

H. Adult Use of Positive Affect *Adult displays natural positive affect throughout the activity, which is matched by the children's affect.*	• Adult displays positive affect in face, voice, style • Adult's positive affect is matched to the overall affect of the children in the group. • Adult's affect is appropriate for the needs of the group and does not over arouse the children.				
I. Sensitivity and responsivity *The adult is sensitive to the verbal and non-verbal cues of each child in the group*	• Adult makes every effort to understand the verbal and non-verbal cues of each child (including using invisible support to assist) • Adult responds to children's communication cues (without reinforcing unwanted behavior)				
J. Multiple & varied Communicative opportunities *The adult provides each child with multiple communication opportunities across a variety of functions. Each child's communication objectives are targeted.*	• Adult provides communication opportunities for 2 or more of the following communication functions per child; requesting, commenting, naming, protesting/affirming, seeking help, indicating that they finished, greeting, imitating the adult's sounds or gestures with eye contact. • The adult scaffolds child communication by				

	using the following techniques; modelling language, expanding the child's utterances and restating the child's utterances. • At least one communication objective is targeted for each child in the group activity.				
K. Adult Language *The adult adapts their use of language to meet the needs of each child in the group.*	• Adult uses the 1-up rule to expand the children's communications • If range of language levels are present, adult varies language accordingly for each child • The adult's language is syntactically, semantically and pragmatically appropriate.				
L. Joint Activity and Elaboration *The adult develops a 4-part joint activity routine that involves all the children in the group. Multiple objectives targeted.*	• Activity individualized to an appropriate level for each child • Activity has 4-part structure (Set up, theme, elaboration, close) • Adult target goals across multiple developmental domains				
M. Transition between activities *Transitions are well planned for*	• Children are supported to transition as independently as possible • The environment is structured to facilitate				

and coordinated. Children transition as independently as possible.	independent transitions • The adult roles during transitions are clear • For children who find transitions difficult, staff use individualized strategies to support the transition				

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