Milieu Therapy as a Communication Intervention: A Review of the Literature Related to Children with Autism Spectrum Disorder

G. Richmond Mancil
Western Kentucky University

Abstract: Several researchers have employed milieu therapy to address the communication needs of children with autism spectrum disorder (ASD). Thus, the purpose of this review is to examine milieu therapy, particularly, the environments and individuals involved in the training and the effectiveness of milieu therapy with children who have a diagnosis of ASD and to provide suggestions for practitioners and researchers. Milieu therapy consistently increases communication and generalizes to other settings, while maintaining over time; however, milieu therapy does not analyze connections to challenging behaviors and few studies have focused on teachers in the classroom or peers. Future research teams should continue to train parents and teachers while addressing the connection to challenging behavior and including peers in the interventions.

ASD is a developmental disorder affecting the lives of thousands of children. ASD was first described by Leo Kanner in 1943 through the case histories of 11 children. Kanner observed that the characteristics of these children differed significantly from other children; therefore, he suggested a separate diagnosis entity was needed to describe their unique characteristics. Since Kanner’s first description of autism, the disorder has evolved into a spectrum disorder (i.e., ASD) with the number and percentage of diagnoses increasing each year (Autism Society of America, 2007).

According to the Autism Society of America (2007) and the Centers for Disease Control and Prevention (CDC), 1 in 150 children born today will eventually be diagnosed with ASD (Autism Society of America). The Autism Society of America (ASA) also notes that 1.5 million Americans including children and adults have ASD, while another 15 million Americans (e.g., family, educators, and health care workers) are affected by this disorder. In sum, the incidence and prevalence rates of ASD appear to be growing at high rates.

The essential features of ASD include significant impairments in social interaction and communication skills and a highly restricted area of activities and interests (American Psychiatric Association, 2000). Social interaction problems may be exhibited through an impairment in nonverbal behaviors (e.g., eye to eye gaze, body postures, facial expressions) and/or failure to create developmentally appropriate peer relationships. For example, a child with ASD is less likely to initiate peer-related social interactions or respond to social bids from peers.

In addition to social interaction problems, children with ASD have communication skill deficits. Often, these deficits include a delay in or absence of spoken language (e.g., 40% never obtain speech). Children that do develop speech may have difficulty initiating or sustaining conversations with others. Further, these children may develop stereotyped and repetitive use of language or idiosyncratic language (e.g., repeating nonfunctional phrases over and over).

Coinciding with impairments in social interaction and communication, children with ASD may exhibit restricted, repetitive, and stereotyped patterns of behavior, interests, and activities. They often demonstrate a preoccu-
pation with idiosyncratic interests to a level considered abnormal in intensity and focus (American Psychiatric Association, 2000). For example, a child may know every fact about the makes and models of cars and sustain conversations related to this topic for hours, but remain unable to hold conversations about any other topic. They also may engage in inflexible, nonfunctional rituals and routines such as turning a doorknob over and over in each direction before leaving their home. Although these rituals and routines initially may appear to decrease anxiety, the routines typically impede an individual’s ability to socialize and function properly within society (Heflin & Alaimo, 2006). Further, many children with ASD have stereotyped and repetitive motor mannerisms (e.g., hand flapping). For example, a child may engage in repeated hand flapping, for no apparent purpose.

Concurrent with the aforementioned features, many children with ASD exhibit high levels of challenging behaviors toward others or themselves that interfere with their learning, such as screaming, hitting, and biting (Sigafoos, 2000). For instance, some children may repeatedly bite themselves or they may aggress toward other children or adults (e.g., scratch others). Challenging behaviors such as biting create substantial obstacles for individuals responsible with their education and care (Durand & Merges, 2001). Many parents experience stress when their children engage in aggression or tantrums. Unlike other parents, parents of children with ASD may have difficulty determining the reason for the tantrum because of the child’s deficits in communication. It is difficult for an individual who does not have any communication skills to explain what may be the cause of the tantrum. These characteristics (i.e., social interaction impairments, communication deficits, repetitive behaviors, and challenging behaviors) and their negative effects on the children and families combined with the increase in the prevalence of ASD present a critical demand for the field of special education to respond and provide effective practices to meet these children’s needs at home and in educational settings.

One area of important research is investigating methods aimed at increasing communication skills, decreasing challenging behaviors, and determining the relation between communication abilities and challenging behaviors. A number of researchers have responded by examining the relation between challenging behaviors and communication abilities of children with ASD (e.g., see Bott, Farmer, & Rhode, 1997; Chung, Jenner, Chamberlain, & Corbett, 1995; Sigafoos, 2000; Schroeder, Schroeder, Smith, & Dallold, 1978). Chung et al. found an inverse relation between communication ability and the display of challenging behaviors such as self-injury and aggression in children with ASD. Similarly, Bott et al. (1997) determined that individuals with more developed speech skills exhibited a lower rate of challenging behaviors than those with impaired speech skills. Further, Sigafoos hypothesized in a more recent study that impaired communication development in children with ASD and other developmental disabilities may actually cause challenging behaviors. He suggested that when children lack the appropriate skills to communicate, they might actually use challenging behaviors for communication purposes.

To address the communication needs of children with ASD, several researchers employed milieu therapy. Milieu therapy is supported by a plethora of studies demonstrating that it has been effectively used to teach communication skills to children with developmental disabilities and/or communication disorders (e.g., Hester, Kaiser, Alpert, & Whiteman, 1995; Yoder & Warren, 2002) and to a lesser extent, children with ASD (e.g., Hancock & Kaiser, 2002; Ross & Greer, 2003). In milieu therapy, the focus is teaching children new skills and behaviors within their natural environments (Kaiser, 1993). The natural environment may refer to any setting that the child would naturally spend time regardless of his or her disability, including the home, school, or an inclusive educational setting (Schwartz, 2003). As demonstrated in the literature, teaching communication skills in natural environments has many advantages including: (a) increases in vocabulary (Yoder et al., 1995), (b) generalization (Hancock & Kaiser), (c) maintenance (Spradlin & Siegel, 1982), and (d) unprompted use of language (Yoder & Warren).

Milieu therapy includes the following basic procedures: (a) providing a model of desired
responses and correcting child responses, (b) providing a mand and then modeling/correcting if needed, (c) using a time delay, and (d) employing incidental teaching strategies (Hancock & Kaiser, 2002). One of the strategies used in milieu therapy to promote communication in natural environments is modeling correct responses and correcting the target child’s responses. This involves modeling a target behavior and then providing correction to the child as necessary (Alpert & Kaiser, 1992). For example, while outside on the playground, a child may tap on the adult’s arm and look at the toy dump truck. The adult gains the child’s attention and provides a verbal prompt that matches the child’s communication skill level, such as *Want truck?* If the child says, *Want truck*, the adult provides praise, repeats the child’s phrase (e.g., says *yes, want truck*) and provides the child the toy dump truck. Otherwise, the adult provides a corrective model repeatedly, *Want truck* until the target child correctly models the response. However, if the child does not respond in a reasonable time frame (e.g., two to three seconds), as predetermined by the researcher, parent, and/or teacher, the adult provides a model and gives the object to the child. The purpose of modeling and correcting responses is to provide the target child the necessary prompts and instructions in natural situations to assist in skill development.

Another component of milieu therapy is the mand-model technique. The mand-model technique involves giving a direct instruction (commonly referred to in the literature as a mand) within a naturally occurring activity and context (Charlop & Walsh, 1986). The mand is a vocal operant that is maintained by a reinforcer (e.g., obtaining a preferred item such as a toy car) and is evoked by the discriminative stimuli for that reinforcer (Skinner, 1957). For example, if a child says, *Water please* and receives the water, it is likely that this is a mand. Also, it is important to recognize that responses are deemed mands based on their controlling variables and not on their topography. Sign language and picture cards can function as mands the same as vocal responses function as mands. When necessary, this mand would be followed by a model and a correction similar to the description above. The mand-model is performed by first gaining the child’s attention and then providing a prompt for a target behavior. After the prompt, a guided model (i.e., assisting the child in performing the target behavior) is provided when necessary. For instance, a child is given apple juice for snack and reaches to pick it up with his hands. The adult provides a response block (e.g., blocks his hands), obtains the child’s attention, and says, *Tell me what you want* (mand), places the communication card with the picture of juice on it in the child’s hand, and physically guides his hand to the adult who has the apple juice (corrective model). If the child continues to ask for juice by using the picture card, the adult provides the juice paired with positive praise (e.g., *Good job asking*). If the child attempts to grab the juice again without using the communication card, the adult repeats the process. The purpose of the mand/model strategy is to develop independent skills by providing the child with a prompt and an example of performing the communicative response correctly. The adult continues with this procedure until a performance criterion is met (e.g., child perform the task correctly for two days).

Time delay is another procedure often used in milieu therapy that involves the adult providing a stimulus and then waiting approximately 5 to 30 seconds, based on the child’s developmental and mental age, for a child-initiated response (Kaiser, 1993). Time delay typically is combined with other techniques such as the mand-model. If the child does not respond, the adult provides a mand-model. For example, a child may want his coat, but need help getting it from the shelf. While attending to the child, the adult waits for a period of 5 to 30 seconds (depending on the child’s developmental level) for the child to request help. If the child requests by using a communicative response such as a picture card or vocalization, the adult provides immediate praise and a correct model, *you want your coat?* If the child does not independently request help within the time delay, the adult provides a mand-model. The amount of time delay chosen depends on the child’s level. The longer the wait period, the greater the chance of losing the child’s interest; therefore, care is needed in choosing the appropriate time delay. The purpose of time delay is to decrease the child’s dependence on adult
prompting, instructions, and models; thus, promoting independent and spontaneous (i.e., unprompted) communication.

Incidental teaching is another strategy often employed within the framework of milieu therapy. Incidental teaching is a process where communication skills are learned in naturally occurring interactions or interactions arranged in natural contexts, which may be the reason the terms incidental teaching and milieu therapy have been used interchangeably at times. Hart and Risley (1968; 1975) described incidental teaching as an interaction between an adult (e.g., parent) and a child during unstructured situations such as free play where the child controls the incidences in which teaching occurs by signaling interest in the environment. For example, while playing with toy cars, a child may point to a car and say, "ca." The adult reinforces this behavior by providing positive praise and giving the child the toy car. Incidental teaching typically is combined with the other procedures and is applied during situations when children are requesting either vocally or non-vocally. Prompts are provided if necessary. Further, access to desired objects is contingent upon correct responses, which are followed by behavior specific praise. For example, an adult may create a situation by "accidentally" forgetting to give a child her milk during snack (i.e., sabotaging the environment). The adult then would use the aforementioned techniques to enhance communication by giving a prompt when needed, praising the child for correct responses, and giving the child the milk (contingent access) for correct responses. The purpose of incidental teaching is to promote fluency and expand skills of children with delayed language skills, which may include children with ASD (e.g., see Hart & Risley, 1975; MacDuff, Krantz, MacDuff, & McClannahan, 1988).

In sum, milieu therapy is one practice that researchers have used to successfully demonstrate an increase in communication skills of children with ASD. The focus in milieu therapy research has been teaching children new skills and behaviors within their natural environments (e.g., home and school). The research has been done using various combinations of the four procedures described above, which has resulted in skills generalizing to other settings and people. The majority of the research, however, has been conducted with children with language delays, not solely identified as having ASD, thus, making it difficult to generalize findings to children with ASD. Further, research has not focused on involving peers, which is crucial to increasing the social network of individuals and improving overall quality of life (Wagner, 1999). Thus, the purpose of this review is to examine milieu therapy, particularly, the environments and individuals involved in the training and the effectiveness of milieu therapy with children with ASD. First, analysis of the characteristics of the participants, environment, research designs, behaviors, interventions, major findings, reliability, and treatment fidelity across studies are provided. Second, a critique of the findings to address limitations and implications for future researchers and practitioners are provided.

Method

The literature review of research conducted in the area of milieu therapy began with searches of ERIC, Education, PsycINFO, and Academic Search Premier electronic data bases using various combinations of the following terms: milieu therapy, incidental teaching, time delay, embedded instruction, autism, autism spectrum disorder, and communication. Following the electronic data base search, a hand search was conducted of the following journals, covering the span of 1968 to the present: Education and Training in Developmental Disabilities, Focus on Autism and Other Developmental Disabilities, Journal of Applied Behavior Analysis, Journal of Early Intervention, Journal of Positive Behavior Intervention, and Topics in Early Childhood Special Education. Finally, after reviewing the retrieved articles, an archival search was conducted. These searches produced 28 articles in which components of milieu therapy were the primary intervention for increasing communication in children, of which eight included children with autism spectrum disorders. The following criteria were used for inclusion in this review: (a) at least one participant of the study was a child with an autism spectrum disorder diagnosis, (b) the
primary intervention involved at least one of the identified milieu therapy techniques, and (c) the primary intervention was to increase communication in children.

The eight articles that met the criteria were reviewed to determine the effectiveness of milieu therapy with children with ASD. Particularly, the studies were analyzed to determine the characteristics of the study participants, research setting, behavior, interventions, research designs, reliability, treatment fidelity, and major findings across studies are provided. These data are presented in Tables 1, 2, 3, and 4.

TABLE 1
Characteristics of the Study Participants of Milieu Therapy

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>CA*</th>
<th>LA*</th>
<th>MA*</th>
<th>M</th>
<th>F</th>
<th>Diagnosis</th>
<th>Prior Speech Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charlop, Schreibman, &amp; Thibodeau (1985)</td>
<td>7</td>
<td>5.1–10.9</td>
<td>N/A</td>
<td>U–6.1</td>
<td>7</td>
<td>7</td>
<td>Autism</td>
<td>2-Nonverbal; 5-Echolalic</td>
</tr>
<tr>
<td>Charlop &amp; Walsh (1986)</td>
<td>4</td>
<td>6–8.8</td>
<td>N/A</td>
<td>3.6–6.2</td>
<td>4</td>
<td></td>
<td>Autism</td>
<td>2-Echolalic</td>
</tr>
<tr>
<td>Hancock &amp; Kaiser (2002)</td>
<td>4</td>
<td>2.9–4.5</td>
<td>1.7–2.2</td>
<td>N/A</td>
<td>3</td>
<td>1</td>
<td>Autism</td>
<td>1-Limited speech</td>
</tr>
<tr>
<td>Johnson, McDonnell, Holzwarth, &amp; Hunter (2004)</td>
<td>1</td>
<td>8</td>
<td>N/A</td>
<td>N/A</td>
<td>1</td>
<td>1</td>
<td>Autism</td>
<td>1-Extensive speech</td>
</tr>
<tr>
<td>Laski, Charlop, &amp; Schriebman (1988)</td>
<td>8</td>
<td>5–9.6</td>
<td>N/A</td>
<td>1.7–3.1</td>
<td>7</td>
<td>1</td>
<td>Autism</td>
<td>4-Nonverbal</td>
</tr>
<tr>
<td>McGee, Krantz, Mason &amp; McClannahan (1983)</td>
<td>2</td>
<td>12.6–15.8</td>
<td>N/A</td>
<td>5–5.7</td>
<td>1</td>
<td>1</td>
<td>Autism</td>
<td>4-Echolalic</td>
</tr>
<tr>
<td>McGee, Krantz, &amp; McClannahan (1985)</td>
<td>3</td>
<td>6–9</td>
<td>3.0–5.7</td>
<td>2.2–5.3</td>
<td>3</td>
<td></td>
<td>Autism</td>
<td>Limited speech, often echolalic</td>
</tr>
<tr>
<td>Ross &amp; Greer (2003)</td>
<td>5</td>
<td>5.5–6.9</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>Autism</td>
<td>Limited speech</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td></td>
<td></td>
<td>m = 7.3</td>
<td>m = 2.8</td>
<td>m = 3.9</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>Range</td>
<td>(2.9–15.8)</td>
<td>(1.6–5.7)</td>
<td>(2.7–6.2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. CA = chronological age; LA = language age; MA = mental age; N/A = not available; U = untestable; func. = functional; M = male; F = female; m = mean
* age in years

primary intervention involved at least one of the identified milieu therapy techniques, and (c) the primary intervention was to increase communication in children.

The eight articles that met the criteria were reviewed to determine the effectiveness of milieu therapy with children with ASD. Particularly, the studies were analyzed to determine the characteristics of the study participants, research setting, behavior, interventions, research designs, reliability, treatment fidelity, and major findings across studies are provided. These data are presented in Tables 1, 2, 3, and 4.

TABLE 2
Characteristics of the Environment of Milieu Therapy

<table>
<thead>
<tr>
<th>Study</th>
<th>Therapy Implementer</th>
<th>Therapy Training Location</th>
<th>Description of Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charlop et al. (1985)</td>
<td>Researcher</td>
<td>Separate class</td>
<td>Partitioned area of classroom and clinic room</td>
</tr>
<tr>
<td>Charlop &amp; Walsh (1986)</td>
<td>Researcher/Parent</td>
<td>Typical play area</td>
<td>Play room w/toys, outside in grass area</td>
</tr>
<tr>
<td>Hancock &amp; Kaiser (2002)</td>
<td>Parent</td>
<td>Separate class</td>
<td>Clinic room</td>
</tr>
<tr>
<td>Johnson et al. (2004)</td>
<td>Paraprofessional</td>
<td>Classroom</td>
<td>N/A</td>
</tr>
<tr>
<td>Laski et al. (1988)</td>
<td>Primary caretaker*</td>
<td>Home</td>
<td>Various rooms of typical home</td>
</tr>
<tr>
<td>McGee et al. (1983)</td>
<td>Teacher</td>
<td>Group Home</td>
<td>Various rooms of typical home</td>
</tr>
<tr>
<td>McGee et al. (1985)</td>
<td>Teacher</td>
<td>Classroom</td>
<td>Typical classroom</td>
</tr>
<tr>
<td>Ross &amp; Greer (2003)</td>
<td>Teacher</td>
<td>Classroom</td>
<td>Typical classroom</td>
</tr>
</tbody>
</table>

Note. N/A = not available.
* Primary caretaker is a resident home parent
Characteristics of Study Participants

The majority of researchers reported gender along with chronological and mental ages, with only two research teams reporting language age. Twenty-five out of 34 (74%) of the participants were male; four (12%) were female, and the gender of five participants (14%) (Ross & Greer, 2003) were not reported. As shown in Table 1, participants ranged in age from 2.9 to 15.8 years, with the average age being 7.3 years. Mental age was not reported consistently across studies. The authors of one study reported IQ scores with a range of <50 to 95, with an average of 61 (Hancock & Kaiser, 2002). The authors of five other studies reported a mental age score with a range of 2.7 to 6.2 years, with an average of 3.9 years. Language/communication age was reported for two studies with a range of 1.6 to 5.7, with an average of 2.8 years. Participants differed in their language levels prior to the studies, with all participants reported to have diagnoses of ASD. Of the prior speech levels reported for 20 participants, nine participants (9/20, 45%) demonstrated echolalia (i.e., repeated phrase over and over), four participants (4/20, 20%) were nonverbal, and six participants (6/20, 30%) had limited speech (i.e., one to two word phrases requesting basic needs such as food), one individual (1/20, 5%) had extensive speech and spoke spontaneously.

Characteristics of Research Setting

The type of settings the studies were conducted in was similar across the majority of the studies. Most studies were conducted in the

TABLE 3
Research Designs and Interventions of Milieu Therapy

<table>
<thead>
<tr>
<th>Study</th>
<th>Research Design</th>
<th>Milieu Procedures</th>
<th>Dependent Measures</th>
<th>Communication Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charlop et al. (1985)</td>
<td>Multiple baseline across participants</td>
<td>Time delay (2s–10s)</td>
<td>CS Basic needs (e.g., “I want _____”)</td>
<td></td>
</tr>
<tr>
<td>Charlop &amp; Walsh (1986)</td>
<td>Multiple baseline across participants</td>
<td>Time delay (2s–10s), Model/Correct, and Mand/Model/Correct</td>
<td>CS Emotion phrase (i.e., “I like you”)</td>
<td></td>
</tr>
<tr>
<td>Hancock &amp; Kaiser (2002)</td>
<td>Multiple baseline across participants</td>
<td>Time delay (N/A), Mand/Model/Correct</td>
<td>CS MLU</td>
<td></td>
</tr>
<tr>
<td>Johnson et al. (2004)</td>
<td>Multiple baseline across CS</td>
<td>Time delay (4s), Model/Correct</td>
<td>CS Basic needs (Use of device to request help, break, and snack)</td>
<td></td>
</tr>
<tr>
<td>Laski et al. (1988)</td>
<td>Multiple baseline across participants</td>
<td>Mand/Model/Correct</td>
<td>CS Basic needs (i.e., “I want cat”); Description (i.e., “Block is big”); and Questions (i.e., “What do you want?”)</td>
<td></td>
</tr>
<tr>
<td>McGee et al. (1983)</td>
<td>Multiple baseline across sets of objects</td>
<td>Incidental teaching</td>
<td>CS Receptive labeling of objects</td>
<td></td>
</tr>
<tr>
<td>McGee et al. (1985)</td>
<td>Multiple baseline across participants and pairs of prepositions</td>
<td>Incidental teaching</td>
<td>CS Pairs of prepositions (on/under, inside/next to, and in front of/in back of)</td>
<td></td>
</tr>
<tr>
<td>Ross &amp; Greer (2003)</td>
<td>Multiple baseline across participants</td>
<td>Time delay (5s), Mand/Model/Correct</td>
<td>CS Basic needs/Vocal limitations</td>
<td></td>
</tr>
</tbody>
</table>

Note. MLU = mean length of utterance; N/A = not available; CS = communication skill
child’s natural environment (i.e., home and community setting) and the change agents included individuals who naturally interact with the target child (e.g., parents, teachers).

Trainers. As shown in Table 2, teachers, paraprofessionals, and parents implemented the majority of milieu therapy training. Only one study (12.5%) involved a researcher as the sole implementer, which was one of the earlier investigations with milieu therapy techniques (Charlop, Schriebman, & Thibodeau, 1985).

Training sessions. The majority of trainers conducted training sessions in the natural environment. For example, 75% (i.e., 6/8 studies) of the studies occurred in the target child’s natural environment, that is, two studies were conducted in homes and four in classroom settings. However, two studies (2/8, 25%) were conducted in settings that were not the child’s natural environment. For example, Charlop and colleagues (1985) conducted their study in clinic rooms arranged like classrooms and partitioned areas of classrooms while Hancock and Kaiser (2002) conducted sessions in a playroom in a university setting. However, Hancock and Kaiser then measured generalization in the home and demonstrated that three out of four children generalized training from the university’s playroom to the children’s respective homes.

### TABLE 4

<table>
<thead>
<tr>
<th>Study</th>
<th>TxF</th>
<th>Reliability</th>
<th>IR</th>
<th>How Reported</th>
<th>Results</th>
<th>Gen.</th>
<th>Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charlop et al. (1985)</td>
<td>High</td>
<td>98%</td>
<td>Trial and blocks of 10</td>
<td>All acquired CS within 60 trials</td>
<td>I, R, S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Charlop &amp; Walsh (1986)</td>
<td>High</td>
<td>100%</td>
<td># of correct responses per day</td>
<td>2-CS quickly increased to criteria level</td>
<td>S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Hancock &amp; Kaiser (2002)</td>
<td>High</td>
<td>N/A</td>
<td>% of opportunities, MLU diversity, and PPVT-R</td>
<td>% of opportunities w/correct response increased, MLU increased</td>
<td>P, S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Johnson et al. (2004)</td>
<td>High</td>
<td>97–100%</td>
<td>% of correct responses</td>
<td>Help (100%), break and snack (80–100%)</td>
<td>I</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Laski et al. (1988)</td>
<td>Low</td>
<td>79–98%</td>
<td>% of intervals</td>
<td>All children increased % of intervals in which vocalized</td>
<td>S</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>McGee et al. (1983)</td>
<td>High</td>
<td>94–100%</td>
<td>% of correct responses</td>
<td>75–100% for all sets of objects for both participants</td>
<td>S, A</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>McGee et al. (1985)</td>
<td>High</td>
<td>87–100%</td>
<td>% of correct responses</td>
<td>90–100%</td>
<td>S, A</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Ross &amp; Greer (2003)</td>
<td>High</td>
<td>89–100%</td>
<td>% of correct responses</td>
<td>20–100% range, all increased dramatically from baseline</td>
<td>N</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

Note. Tx = treatment; CS = communication skills; TxF = treatment fidelity; IR = interrater; Gen. = generalization; Main. = maintenance; Y = yes; N = no; S = settings; P = Parents; I = items; A = activity
Participants. Differences identified across the studies can be organized in the following categories: (a) targeted communication skills taught (i.e., behavior), (b) interventions (i.e., milieu procedures used), and (c) research designs.

Target behaviors. Since communication levels of participants varied, researchers taught different communication responses (i.e., behavior) to various participants and focused on a variety of communication skills across studies (see Table 3). These included basic need phrases (e.g., I want snack); emotional phrases (e.g., I like you); descriptive phrases (e.g., Block is big); pairs of prepositions (e.g., on, under); questions (e.g., What do you want?); receptive labeling (e.g., handing correct food item to teacher); and increases in the mean length of utterance (i.e., number of words spoken together in one phrase). As shown in Table 3, basic need phrases were taught to a higher percentage of participants (62%, 21 participants), while receptive labeling was taught to only two participants (6%). For example, Charlop et al. (1985) taught seven participants to say, I want cookie. Also, Ross and Greer (2003) taught five participants to say, cookie.

Interventions. Researchers used various milieu therapy techniques to address the communication difficulties of the participants in their respective studies. Typically, one or more of the following milieu techniques were used: (a) model/correct, (b) mand/model/correct, (c) time delay, or (d) incidental teaching. The strategies varied across studies. However, the majority of researchers used time delay and/or the mand/model/correct technique (i.e., 6/8, 75%). As shown in Table 3, time delay was used to teach twenty-one participants (62%) communication skills. For example, Charlop et al. (1985) used a 2s to 10s time delay and Johnson et al. (2004) used a 4s time delay to teach communication skills. Similarly, twenty-one participants (62%) were taught using the mand/model/correct technique. Laski, Charlop, and Schreibman (1988) used mand/model/correct to teach basic need phrases, description phrases, and questions. Also, Charlop and Walsh (1986) used mand/model/correct to teach emotional phrases. Further, time delay and mand/model/correct were used simultaneously for 13 participants (38%). For example, Hancock and Kaiser (2002) and Ross and Greer (2003) used both techniques to teach communication skills. In contrast, only one participant (3%) was taught using the model/correct technique, which was done by Johnson et al. simultaneously with a 4s time delay.

Research designs. In the studies reviewed, all researchers used a multiple baseline single subject methodology to evaluate the effectiveness of the milieu therapy intervention. The baseline phases in the studies were across participants, communication skills, and/or sets of objects. As shown in Table 3, five of eight (62.5%) research teams analyzed the intervention using a multiple baseline across only participants, one (12.5%) research team analyzed the intervention using a multiple baseline across only communication skills, one (12.5%) research team analyzed the intervention using a multiple baseline across participants and communication skills, and one (12.5) research team analyzed the interventions using a multiple baseline across sets of objects (i.e., receptive language where children chose the correct object).

Major Findings

Regardless of the milieu strategies used, research teams reported similar findings, in that they were all successful in teaching children with ASD communication skills regardless of the combination of techniques used or the communication skills targeted. Further, the majority of the children with ASD participating in these studies generalized their communication skills across people and/or settings.

As shown in Table 4, the success of milieu therapy was demonstrated by an increase in targeted communication skills for all 34 participants. For example, Charlop et al. (1985) noted that all seven participants in their study achieved the targeted communication skills at 90% accuracy or higher. In another study, Hancock and Kaiser (2002) noted that all four participants mean length utterance (MLU) and diversity of words (i.e., nouns and verbs) increased following training. Similarly, McGee, Krantz, and McClannahan (1985) noted that all three participants achieved targeted communication skills. In addition to increasing targeted communication skills in the train-
ing setting, several researchers noted that these skills generalized. For example, Charlop and colleagues noted that six participants (86%) generalized communication skills to untrained objects and two participants (29%) generalized the communication skills to unfamiliar settings. Similar to the Charlop et al. study, generalization to another setting occurred in a study conducted by Hancock and Kaiser (2002). However, three participants (75%) generalized communication skills to another setting as compared to only 29% for the Charlop et al. study. One explanation could be because Hancock and Kaiser included the mand/model/correct technique in their study. Additionally, the parent conducted the trainings (see Table 4). In addition, McGee et al. noted that all three participants achieved generalization to another classroom after acquisition was achieved during teaching sessions.

Similarly, several researchers noted maintenance of targeted communication skills. For example, Hancock and Kaiser (2002) demonstrated that increases in target language were maintained for the four children in their study as indicated through follow-up observations conducted six months after the study ended. Similarly, Ross and Greer (2003) demonstrated that all participants in their study showed maintenance of vocalization skills during a follow-up probe three months after the study was completed.

**Reported Reliability and Treatment Fidelity**

Research results would be compromised unless the procedures were implemented with fidelity and observations were reliable. Fortunately all research teams with the exception of Laski et al. (1988) reported high treatment fidelity (i.e., consistency of implementation of the methods and procedures of treatment) within their prospective studies. The research teams reported that treatment fidelity was high based on direct observations. However, research teams did not report a percentage of steps completed correctly and simply stated that the treatments were implemented with high fidelity without providing the treatment data. They also reported high inter-rater reliability. For example, Charlop et al. (1985) reported reliability of 98% or greater for all behavioral categories. Similarly, Johnson et al. (2004) had an average reliability of 99%, with a range of 97 to 100%. The other studies had similar findings.

**Discussion**

Children with ASD have significant impairments that influence their daily functioning. Two interrelated impairments typically exhibited are deficits in appropriate communication and behavior. Children with ASD typically have deficits in appropriate use of functional communication skills and often engage in challenging behaviors that serve a communicative function (Sigafoos, 2000). In an attempt to address communication and behavioral needs, researchers independently have addressed one or both of these problems.

Milieu therapy is an area of research that has focused on the development of communication skills, without attention to behavioral challenges. Milieu therapy is an approach researchers have used to improve communicative functioning of children with ASD. Researchers in this area have focused primarily on increasing targeted communication skills. They have investigated the effects that techniques such as time delay and incidental teaching have on the communication of children with ASD. As researchers examined milieu therapy, they successfully implemented the milieu intervention strategies in the natural environment, which resulted in an increase in communication skills. Although milieu therapy research has produced positive child outcomes, there are a few limitations. The strengths and limitations will be discussed next.

**Strengths**

Several strengths of milieu therapy are evident. First, various techniques such as time delay (Johnson et al., 2004) and mand/model/correct (Ross & Greer, 2003) have produced positive results such as increasing the response variation of children’s communicative skills (Warren & Gazdag, 1990; Yoder & Warren, 2002). For example, Hancock and Kaiser (2002) showed an increase in the MLU (complexity) and vocabulary (diversity) of children with ASD. Second, the majority of
the milieu therapy research has been conducted in the children’s natural environment. Six out of eight (75%) studies were conducted in a natural environment. Third, parents and teachers have demonstrated the ability to be effective natural change agents using milieu therapy (7 out of 8, 88%, research studies reviewed). For example, a mother implemented milieu therapy interventions in a study conducted by Hancock and Kaiser (2002). In a study conducted by Ross and Greer (2003), a teacher implemented the milieu therapy interventions. Finally, researchers consistently have demonstrated that communication skills taught to children with ASD using milieu therapy procedures generalize to other people and settings (McGee et al., 1985) and have greater maintenance than discrete trial procedures (Miranda-Linne & Melin, 1992).

**Limitations**

Although milieu therapy researchers have demonstrated numerous strengths of this intervention, a few limitations should be addressed. First, researchers have not evaluated milieu therapy’s effects on challenging behavior. Research consumers do not know if improvements in challenging behavior occurred, which may effect decisions of consumers who are looking for comprehensive interventions. Second, there is a paucity of milieu therapy research involving peers of children with ASD. Researchers have not examined generalization to peers or training of peers. As shown in Table 4, although generalization occurred for seven of the eight studies, generalization was not checked to peers. The majority of generalization was done for items and settings. Thus, the social network (i.e., individuals that communicate and/or socialize with the child) of the children with ASD remains limited.

**Implications for Researchers and Practitioners**

Since one of the goals of education is to improve the quality of life for the child, research and training should address multiple domains and occur across settings and people. When considering this and the aforementioned strengths and limitations described of the milieu therapy literature, a logical extension of the milieu therapy research is to examine the connection to challenging behavior and the involvement of peers with children with ASD.

**Connection to Challenging Behavior**

As described previously, milieu therapy researchers have not systematically analyzed the relation between acquisition of communication skills and challenging behavior. One question for future researchers to consider is whether challenging behaviors continue to decrease across settings as the child’s communication repertoire increases? The field cannot conclude what influence if any that milieu therapy has on children’s challenging behavior, particularly for children with ASD.

The connection between milieu therapy and challenging behaviors can be accomplished by measuring the frequency and/or duration of challenging behaviors after the implementation of milieu therapy interventions. For example, as a child’s communication increases, the researchers may examine if the challenging behavior typically observed diminishes. The researchers also may measure the challenging behavior as they train parents and teachers who then implement the interventions in the classroom. In addition, the researchers may examine the effects the inclusion of peers in the milieu therapy interventions has on challenging behaviors.

**Involvement of Peers**

The communication between children with ASD and their age appropriate peers is needed to increase the social network of children, which can help lead to an improvement in their overall quality of life (Koegel & Koegel, 2006). Researchers can address the communication between children with ASD and peers by checking for generalization to peers and involving peers in interventions with children with ASD. As aforementioned, the majority of studies checked for generalization to adults. The researchers did not analyze whether the communication skills obtained by the children with ASD generalized to peers or the effects on the overall social interaction between children with ASD and their peers. It is important for children with ASD to have
regular and planned interactions with peers (Koegel & Koegel, 2006). Researchers and practitioners may schedule these interactions with peers to check for the generalization of learned communication skills obtained with milieu therapy interventions. Merely placing a child with ASD in the same place as typically developing peers, however, does not ensure acquisition of social and communication skills (Wagner, 1999).

Involving peers in other ways than checking for generalization also may prove beneficial in improving the overall quality of life for children with ASD (Lee & Odom, 1996; Royers, 1996). Including peers as part of the intervention is recommended by numerous researchers and clinicians who work with children with ASD (Koegel, & LaZebnik, 2004; Shaked & Yirmiya, 2003; Tager-Flusberg, 2003). Researchers can involve peers in the intervention at the child’s school and home.

**School.** One way this inclusion can be accomplished is embedding interests of children with ASD in classroom activities and subsequently teaching the children to mand for the interests, thus enhancing communication. The children with ASD may be paired with other children in activities where they must mand for the interests. The peer also must request items, thus, modeling the reciprocity of communication and social interactions. For example, a child with ASD may have a restricted interest of cars. The peer may play with a toy car and require the child with ASD to request the car. After the child with ASD plays with the car for a period of time, the peer would request to play with the car. Prior to beginning, the teacher should train the peers how to respond to requests for items and request items from their peers with ASD. During the interactions, the teacher may need to prompt the children with ASD and their peers while reinforcing both children for appropriately interacting.

In addition to including interests in activities, teachers may use routines in the classroom to teach mands. For example, during coloring activities, the students may mand for markers or other desired tangibles from their peers. Once again, teachers may need to prompt peers to use their initiation strategies to facilitate play with their peers with ASD. While prompting, the teacher should deliberately fade assistance to allow students to interact as naturally as possible.

**Home.** Similar to involving peers in the interventions in the school, researchers may involve peers and siblings in the training with parents at home. Perhaps the most promising way to accomplish this in the home is through play activities. Since many children with ASD like swinging (Crollick, Mancil, & Stopka, 2006), the parent could arrange for the child with ASD and the peer to take turns pushing one another on the swing. For example, the child with ASD could request to get on the swing and then request to be pushed. Similarly, the peer would request access to the swing and to be pushed by the child with ASD. However, the child with ASD may first need to be taught how to push someone on the swing. When designing the interventions, it is important to choose activities that the child with ASD is physically capable of performing. During the play activities, parents may need to prompt peers to facilitate play with the child with ASD. The parent, however, should deliberately fade assistance to allow children to interact as naturally as possible. These type peer-mediated interventions in the school and home may be promising practices for increasing social and communication skills (Royers, 1996; Strain, Kohler, & Goldstein, 1996).

**Conclusion**

In summary, milieu therapy is one approach researchers have used to address the communication needs of children with ASD. As researchers investigated the use of milieu therapy with children with ASD, they provided interventions in natural environments where parents and/or teachers conducted the majority of training. When implementing various milieu therapy procedures across research studies, researchers demonstrated that children with ASD improved their communication skills. Although Sigafoos (2000) has noted that poor communication skills and challenging behaviors in children with ASD are highly linked, this review found no mention of challenging behaviors in the milieu therapy literature. Thus, readers may acknowl-
edge that milieu therapy increases communication skills and for many individuals, generalizes to other adults, items, and settings when training is conducted in the natural environment. Future research teams should continue to train parents and teachers, while simultaneously addressing the connection to challenging behaviors and including peers in the interventions.

References


