



# **The Impact of Implementing Enhanced Milieu Teaching Strategies on the Communication Skills of Young Children with Autism Spectrum Disorder**

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## **Abstract**

*The purpose of this study was to explore effect of implementing Enhanced Milieu Teaching Strategies on the Communication Skills of Young children with Autism Spectrum Disorder. Children participants diagnosed using Autism Spectrum Disorder Evaluation Inventory (Mohammed, 2006), were invited to participate. The sample was randomly divided into two groups; experimental (n=5) and control (n=5). Findings from this study indicated the effectiveness of the program employed in math skills in the target children. On the basis of the findings, the study supports the idea of Touch Math as a powerful intervention for children.*

**Keywords :** *Touch Math program, children with autism, academic achievement, math addition*

## **Introduction**

Autism is a developmental disability usually diagnosed in children within the first 3 years of life (Volkmar & Klin, 2005). There is no cure for autism (Schreibman, 2005). Symptoms are grouped into the three broad areas that include communication, social interaction, and restricted patterns of behavior (Tsatsanis, 2005). Treatment to remediate symptoms is frequently delivered as language instruction. Addressing language growth helps make a significant improvement in the quality of life (Adel Abdulla Mohammed & Mourad Ali Eissa, 2014).

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 preoccupation 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 aberrant behaviors toward others or themselves that interfere with their learning, such as screaming, hitting, and biting (Sigafos, 2000). For instance, some children

may repeatedly bite themselves or they may aggress toward other children or adults (e.g., scratch others). Aberrant 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 aberrant 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.

Milieu Teaching a strategy with 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, 1995; Yoder & Warren, 2002) and to a lesser extent, children with ASD (e.g., Hancock & Kaiser, 2002; Ross & Greer, 2003). In milieu Teaching, 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, 2002), (c) maintenance (Spradlin & Siegel, 1982), and (d) unprompted use of language (Yoder & Warren, 2002).

Milieu Teaching 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 teaching 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. 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 teaching. 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).

Considering the limited research with children with autism disorder, this study aims to further explore the effect of implementing enhanced milieu teaching strategies on the communication skills of young children with autism spectrum disorder.

## **Method**

### *Participants*

Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities (Tarbya Fekrya). All children attended the same classroom within the school. Parental informed consent forms were sent home by the school director and school psychologist to parents of potential participants telling them about the study and requesting them to give permission for their children to participate. Through a previous comprehensive psychological evaluation each targeted child had received a primary diagnosis of Autistic Disorder. All children were also capable of communication using speech assessed through a combination of teacher report and observation. They were so-called high functioning.

Each child also had the following characteristics: (a) meet the full criteria for autism according to The Scale for Screening Autism Disorder (Mohammed, 2003) (b) functional verbal communication, (c) able to read and comprehend words, and (d) ability to follow directions.

### *Instrument*

*Verbal communication questionnaire:* a 20-item teacher-report questionnaire. It is based on the Autism Diagnostic Scale (Adel Abdulla Mohammed, 2003). Respondents are asked to rate their level of agreement using a five point Likert response scale (3=Always, 2=Sometimes, 1=Never). The Cronbach alpha value was high (0.89) indicating excellent internal consistency.

### *Procedures*

*Screening:* Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities. Each child also had the following characteristics: (a) meet the full criteria for autism according to The Scale for Screening Autism Disorder (Adel Abdulla Mohammed, 2003), (b) functional verbal communication, (c) able to read and comprehend words, and (d) ability to follow directions.

*Pre-intervention testing:* Teachers were asked to rate child's Verbal communication skills on Verbal communication questionnaire.

*General Instructional Procedures:* The intervention implemented in this study, Enhanced Milieu Teaching (EMT) is a hybrid naturalistic teaching procedure that includes four components: (a) environmental arrangement, (b) responsive interaction, (c) specific language modeling and expansions, and (d) milieu teaching prompts. When implementing EMT, the adult: (a) arranges the environment to set the stage for adult-child interactions and to increase the likelihood that the child will initiate to the adult (environmental arrangement); (b) models specific language targets appropriate to the child's skill level in response to the child's communication and connected to the child's play and focus of interest (modeling, responsive

interaction); (c) expands child communication forms by adding words to child utterances (expansions, responsive interaction); and (d) responds to the child's requests with prompts for elaborated language consistent with the child's targeted skills and functional reinforcement of the child's production of prompted target forms by providing access to requested objects and verbal feedback for communication (milieu teaching prompts).

The Post test was administered on all the students of Control Group and Experimental Group at the end of 20 sessions. Responses were carefully recorded and scored.

## Results

The first objective of the study was to determine if implementing enhanced milieu teaching strategies would be more effective for the treatment group compared to the control group. For this purpose, the post intervention scores of both treatment and control groups were analyzed. Table 1 shows Z Value result for the differences in post- test mean rank scores between experimental and control groups in communication skills. The table shows that (Z) value was (-2. 627). This value is significant at the level (0.05) in the favor of experimental group .

Table 1. *Mann-Whitney test results, rank mean values for both groups (experimental and control), Z test statistical values, and observed significance*

Variables	group	N	Mean Rank	Sum Of Ranks	Mann Whitney	Z	Sig.
Communication Skills	Ex	5	8	40	zero	-2. 627	0.05
	con	5	3	15			

The second objective of the study was to determine the effect of implementing enhanced milieu teaching strategies on the communication skills of young children with autism spectrum disorder. The children's performance on communication skills was measured pre and post intervention. Table 2 shows Z Value result for the differences in pre- post- test mean rank scores of experimental group in communication skills. The table shows that (Z) value was(-2.032 ). This value is significant at the level (0.05).

Table 2. *Z Values results for the comparison of mean rank scores of experimental group at pre- and post intervention in communication skills*

Variables	Negative Ranks		Positive Ranks		Z Value	Sig.
	Mean	Sum	Mean	Sum		
Communication Skills	3	15	Zero	Zero	-2.032	0.05

## Discussion

The present study evaluated the effects of implementing enhanced milieu teaching strategies on the communication skills of young children with autism spectrum disorder. The study results showed that the enhanced milieu teaching strategies was effective in increasing communication skills of all children participated in this study.

This study supports and extends the literature regarding enhanced milieu teaching strategies (Hancock and Kaiser ,2002; McGee et al., 1985; Miranda-Linne & Melin, 1992; Ross and Greer ,2003; Warren & Gazdag, 1990; Yoder & Warren, 2002 ).

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.

## **Implications**

Several strengths of enhanced milieu teaching strategies 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 8 (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 enhanced milieu teaching strategies 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 enhanced milieu teaching strategies generalize to other people and settings (McGee et al., 1985) and have greater maintenance than discrete trial procedures (Miranda-Linne & Melin, 1992).

## **Limitations**

One limitation of this research that is thought to have an effect on the results of the research is that the number of participants makes it difficult to support arguments for generalization to other populations. So, larger samples must be investigated before broad conclusions can be made.

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