

 Burcu AKTAS¹
 Ilknur CİFTÇİ-
TEKİNARSLAN²

The Effectiveness Of Parent Training A Mothers Of Children With Autism Use Of Mand Model Techniques

Abstract

The present study examined the effectiveness of the parent training program that was designed for the mothers of children with Autism Spectrum Disorders in enabling them to use the mand-model procedure. The study was conducted with the participation of 3 boys with Autism Spectrum Disorders and their mothers. As part of the study, the mothers were taught the mand-model procedure, which is one of the milieu teaching techniques. As a research method, the present study employed the subject research models of between-subject and multiple probe design models. The findings of this study suggested that the parent training program designed with a view to teaching the mand-model procedure was effective and consequently the mand-model procedure used by the mothers was also effective in teaching new words to the children with Autism Spectrum Disorders and enabling them to maintain such words over time.

Keywords: Autism Spectrum Disorders, Milieu Teaching, Mand Model, Parent Training.

Introduction

Autism Spectrum Disorder (ASD) is a neuro-developmental disorder, which is characterized by the insufficiency and limitation of communication and social interaction and repeated stereotypical behaviors (Allen, & Cowdery, 2009; DSM-V, 2013; Heward, 2009). Despite the broad nature of the symptoms associated with the ASD, the insufficiencies observed in regaining speech and developing communication skills are almost the common characteristics of all the children with ASD (Kaiser, & Hancock, 2002; Montgomery, 2003). The most striking feature among the language patterns of the children with ASD is the diversity of the language itself (Tager-Flusberg, Joseph, & Folstein, 2001; Wilkinson, 1998). The children with ASD demonstrate various different language patterns ranging from highly advanced syntactic skills and functional speech to limited speech (Bishop, 2003; Lord, & Richler, 2006; Wilkinson, 1998).

Kanner (1943) explains such differences in the development of language skills among children with delayed speech, no speech, echolalia, non-contextual speech, inverse or erroneous use of pronouns, vocabulary regarding limited areas of interest. While typical developed children learn the contextual, formal and usage aspects of the language quickly and easily as a result of their natural lifestyle and social interaction with their environment and put their language skills to use effortlessly in their daily life (Yakın, 2009), the children with ASD are in need of certain arrangements for acquiring the formal and contextual characteristics and the pragmatic use of the language (Lewis, & Norwich, 2005). It is suggested that the use of structured teaching techniques (such as teaching through discrete trial training etc.) and naturalistic language teaching methods are effective in enabling children with ASD to acquire such skills. Structured language teaching methods are considered to be effective methods in teaching children with ASD particularly the fundamental words and word

¹ M. A., Res. Assist., Bolu Abant İzzet Baysal University, Faculty of Education, Department of Special Education, Bolu, TURKEY
e-mail: burcuaktas@ibu.edu.tr

² Ph. D., Assist. Prof., Bolu Abant İzzet Baysal University, Faculty of Education, Department of Special Education, Bolu, TURKEY.
e-mail: ecifci_i@ibu.edu.tr

* This study was produced from the master's thesis which is carried out under the consultancy of Ilknur Ciftci-Tekinarslan. It was also presented as a poster at the 2016 UDEMKO.

formations and reducing echolalia or other behaviors that fail to conform to the peculiar language forms and usage (Lord, 1985; Paul, 2008). However, due to their adult centric (mothers, teachers) nature, such methods limit the spontaneous communication capacity of the children with ASD, who are inclined to seek instructions, and may cause them to be dependent on adults for prompting before engaging in interaction (Carr, 1985). Structured teaching programs conducted on a one-on-one basis cause children to experience limitations in terms of putting their acquired skills into practice in their daily lives and have difficulty in making generalizations (Charlop-Christy, & Carpenter, 2000; Lord, 1985). It is suggested that the language teaching programs should include methods that will help reduce the limitations in maintaining and generalizing the skills acquired through structured teaching methods, and enable children with ASD to initiate interaction spontaneously and generalize their acquired skills with regard to new environments and persons, and which will involve less supervision on the part of the adults (Paul, 2008). The natural teaching methods that are effective in enabling children with ASD to learn new skills and develop and generalize communication skills spontaneously are considered to be the alternative methods that will help reduce the limitations of structured teaching methods (Christensen-Standford, & Whinnery, 2011).

Naturalistic language teaching methods are one of the evidence-based practices employed in the training of children with ASD, which is included in the National Standards Reports published by the National Autism Center (NAC, 2015; 2009). Naturalistic language teaching methods employ behavioural principals that support the pragmatic use of language and are consistent with natural environments through the use of functional social interactions, instead of using a stimulus-response method (Choi, & Kim, 2005; Paul, 2008). The main purpose of the teaching process is to pique the child's interest and ensure his/her involvement in the activity.

Naturalistic language teaching methods include milieu teaching (Halle, Baer, & Spradlin, 1981), incidental teaching (Hart, & Risley, 1968), and pivotal response training (Koegel, & Koegel, 2006) (Ingersoll, 2011; Rogers, 2006). Milieu teaching is a naturalistic language intervention. Milieu teaching include modeling procedure, mand-model

procedure, time delay procedure and incidental teaching procedure. Of those milieu teaching, the mand-model - model procedure is an effective technique for the children with ASD who lag behind in terms of language development skills and have difficulty in initiating interaction spontaneously (Rogers-Warren, & Warren, 1980). In this procedure, the number of interactions to be held between the adult and child is supervised by the adult, but the materials to be used in such interactions are solely chosen on the basis of the child's interests and requests and the environment is arranged in such a way as to encourage the child to speak (Charlop-Christy, LeBlanc, & Carpenter, 1999).

The literature contains a good number of studies demonstrating to the effectiveness of the use of milieu teaching as a natural teaching method for supporting the communication skills of children. The studies conducted on the children with intellectual disabilities (Halle, Marshall, & Spradlin, 1979; Yoder, & Warren, 2002; Warren, & Gazdag, 1990; Kaiser, & Roberts, 2013), language delay (Yoder et al. 1995), developmental delay (Kaiser, Hemmeter, Ostrosky, Alpert, & Hancock, 1995), ASD (Charlop, Schreibman, & Thibodeau, 1985; Hart, & Risley, 1974; Laski, Charlop, & Schreibman, 1988) as well as on the children of families at risk (Peterson, Carta, & Greenwood, 2004) all suggest that the milieu teaching methods are effective in teaching communication skills. Moreover, the literature also includes studies suggesting that the milieu teaching methods are employed in various different teaching environments such as nurseries (Halle et al., 1979), kindergartens (Hart, & Risley 1975, Warren, & Gazdag, 1990) and the actual home environment (Hancock, & Kaiser, 1996) by instructors (Christensen-Standford, & Whinnery, 2011; Halle et al., 1981; Rogers-Warren, & Warren, 1980; Toğram, 2004) and siblings (Hancock, & Kaiser, 1996). The application of natural teaching methods by adults is beneficial in terms of providing natural patterns in the interaction between the mother and child; quick learning of functional skills during the interaction; consistent teaching of skills and applying thus acquired skills into other situations that arise spontaneously (Kaiser, Hester, Alpert, & Whiteman, 1995). The studies conducted in the field suggest that natural teaching methods are easily learned and implemented by parents and can be generalized

to teach various different skills by parents and are ultimately effective in teaching children the intended communication skills (Alpert, & Kaiser, 1992; Kaiser, Hancock, & Nietfeld, 2000). Moreover, it is reported that such interventions have positive effects on the interaction between the mother and child (McCathren, 2010). The literature includes studies in which the milieu teaching methods are taught to parents in order to support children's language development and teach additional communication skills. The studies conducted show that mothers learn the techniques included in the milieu teaching (Alpert, & Kaiser, 1992; Kaiser et al., 1995; Laski et al., 1988; Peterson et al., 2005; Yeh, 1994), and that there is progress in children's language development (Kaiser et al., 2000; Kaiser et al., 1995) and that the procedure has a positive effect on the interaction between the mother and child (McCathren, 2010).

The present study differs from other studies in the literature in that it studied the effectiveness of a parent training program that is designed solely based on one particular milieu teaching method, namely the mand-model procedure, in enabling mothers to use the said procedure. In line with the general purpose of this study, answers were sought to the following questions: i) Is the parent training program effective in enabling Nur, Gül and Oya to acquire, use and maintain the mand-model procedure even after the training is over? ii) Is the parent training program effective in enabling Ali, Efe and Ege to learn the designated target words? iii) What is the opinion of mothers regarding the effectiveness of the parent training program?

Method

Participants

This study was conducted with the participation of three children diagnosed with ASD with limited expressive language skills and their mothers. In choosing the participants of this study, certain preliminary conditions were identified for the participants. The preconditions sought for choosing the children for this study: being at least six months behind the required level of expressive language (based on the Test of Early Language Development (TELD) results), ability to imitate verbal expressions (words), possessing a vocabulary of at least 10 words and being able to use them spontaneously,

having no additional disability (in terms of hearing and seeing), having no problematic behavior that preclude their participation in the study, being aged 4 to 7, having been diagnosed with ASD. The preconditions sought for choosing the mothers for this study: having no history of participating in any parent training program prepared for teaching communication skills, participating in this study on a voluntary basis, agreeing to be filmed on camera, participating in all training sessions.

Nur, 32, is a housewife and an high school graduate. Ali, 5, attends an inclusive class (at a day nursery) and is being educated in a special training and rehabilitation center. He was diagnosed with ASD when he was 4 years old and started his education since then. Ali's the Test of Early Language Development score suggests that he is at the level of 3 years 4 months in terms of receptive language and of 3 years 1 month in terms of expressive language.

Gül, 36, is a housewife and an high school graduate. Efe, 5, attends an inclusive class (at a day nursery) and is being educated in a special training and rehabilitation center. He was diagnosed with ASD when he was 4 years old and started his education since then. Efe's the Test of Early Language Development score suggests that he is at the level of 2 years 3 months in terms of receptive language and of 2 years 1 month in terms of expressive language.

Oya, 32, is a housewife and a primary school graduate. Ege, 7, was diagnosed with ASD when he was 2 years old and started his education since then. He attends an inclusive class (first form) and is being educated in a special training and rehabilitation center. Ege's the Test of Early Language Development score suggests that he is at the level of 4 years 3 months in terms of receptive language and of 4 years 2 month in terms of expressive language.

Setting

The interviews for choosing the participants were held in the individual training rooms of the Special Training and Rehabilitation Center, while the actual implementation of the study took place at the mothers' homes.

Dependent – Independent Variables

The independent variable of the study is the parent training program, which is designed with a view to teaching the mothers the

“mand-model” procedure, which is a milieu teaching method. There are two dependent variables of the study. The first dependent variable is the frequency of correct use of the mand-model procedure by the mothers of children with ASD who possess limited expressive language skills. The second dependent variable is the percentage ratio of the children with ASD to produce the targeted words.

Mand Model Procedure

The mand-model procedure, the number of interactions to be held between the adult and child is supervised by the adult, but the materials to be used in such interactions are solely chosen on the basis of the child's interests and requests and the environment is arranged in such a way as to encourage the child to speak (Charlop-Christy, LeBlanc, & Carpenter, 1999). In the mand-model procedure, the participant,

1. Makes the necessary environmental arrangements for initiating the interaction in which the intended skill is to be taught, a) It chooses objects that are appropriate for the child's age, loved, and remarkable; b) Makes objects incomprehensible; c) Give it in a limited amount; d) It offers a choice; e) It creates amazing situations; f) She creates situations that she might want help with.
2. Watches the child and establishes a mutual interest with the object in which the child is interested,
3. Elicits response from the child,
4. Broadens the child's vocabulary by adding new words to the correct responses provided by the child and commends and rewards the child as a result of his efforts,
5. Serves as a model for the erroneous responses provided by the child and asks for corrective responses instead,
6. Broadens the child's vocabulary by adding new words to the correct responses provided by the child and commends and rewards the child as a result of his efforts.

Parent Training Program

A parent training program, consisting of two stages, was prepared in order to enable the mothers of children with ASD to use the mand-model procedure. The first stage of the parent training program involved lectures and video tutorials regarding the mand-model procedure and engaging mothers in roleing activities and preparing sample training sessions on the designated days. The mothers were lectured on the subject of mand-model procedure through PowerPoint presentations. Following the lecture, the mothers were shown sample training session videos prepared by the researcher in order to give them an idea as to how the mand-model procedure was actually implemented. After having watched the sample training sessions, the mothers were asked to prepare their own training sessions and the training sessions thus prepared were enacted. An assessment test was prepared to measure the mothers' levels of knowledge regarding the mand-model procedure. The assessment test consists of 15 multiple choice questions. The test in question was prepared based on the specified subject matter and an expert opinion was sought for the test.

The second stage of the parent training program involved the play sessions in which the mothers could engage in interaction with their children. All the training sessions performed throughout the study were conducted individually with the participants. The first stage of the program was completed in 4 sessions with each mother. In the study, a number of tool sets -consisted of interaction based plays that would enable the mother and child to speak to each other- were identified to be used in the interactions between the mother and child. Moreover, the tool sets also included the usage of words and sentences that were intended to be taught to the children. Table 1 shows tool sets used in the interaction between the mother and child.

Table 1.

The tool sets used in the interaction between the mother and child.

Mother	Tool Set
Nur	Fruit seller game, fruit magnets, market stand
Gül	Clothes, laundry basket, gift-wrap
Oya	Professions, a street stand where the businesses related to the professions are located, human magnets

In this study, teaching targets were set in accordance with the individual performance of each child. Such targets included teaching words to the children number one and two and enabling the child number three to form three word sentences. In setting targets for children, consideration was given to their individual language performance (as provided in the parent interview forms) and the requirements of their mothers. While choosing the targets, the names related to

the designated subjects (clothes, professions, fruits) were listed and the children were asked to pronounce the names of the objects shown to them. An additional list was made of the words that children failed to express. The aim was then set to pick 5 words off that list and teach them to the children. In setting the target for the child number three, however, the words in that list were asked to be used in a sentence. Table 2 shows target words for the children.

Table 2.

Target words

Children	Target words
Ali	Cherry, Grape, Watermelon, Plum, Pear
Efe	Jacket, Jumper, Shirt, Pants, Shorts
Ege	A tailor sews, a butcher sells meat, a baker sells bread, a constructor builds houses, a fruit seller sells fruits.

Data Collection Tools

Test of Early Language Development (TELD)

The Test of Early Language Development (TELD) in Turkish language was performed to determine the levels of children's receptive and expressive verbal language skills. The Test of Early Language Development in Turkish language is the version of the Early Language Development Test-Third Version (TELD-3) that is translated into Turkish language and adapted into the Turkish cultural context. The adaptation of the Test of Early Language Development - which is used for assessing language development in children aged 2 to 7- into Turkish language and culture as well as the validity and reliability studies regarding the same were performed by Güven and Topbaş (Güven, & Topbaş, 2014). A sample of TELD 359 was applied. In the validity study, it was found that the test was able to distinguish the groups with and without normal language development, the alternative forms were sufficiently compatible with each other, and the correlation with age was high as it was a developmental test (Güven, & Topbaş, 2014).

Experimental Design

The present study employed the multiple probe designs one of which was single subject research models. The implementation process of this study consisted of full probe

sessions, probe sessions, intervention sessions and maintenance sessions.

Baseline

Baseline was done in two stages. The first is the full probe phase, the second is the probe phase

Full probe sessions

The full probe sessions were conducted before and after each training session with each mother in order to collect baseline data. When the baseline data provided by all mothers was found to be stable, the parent program was implemented for mother number one. When the data gathered from mother number one was found to be 100% stable at the end of the intervention session, a full probe session was held with the participation of all mothers. When the data obtained from all the mothers at the full probe session was found to be stable, the program was implemented for mother number two. This process was maintained until the required criterion was met with every mother. In the probe sessions, the mothers were told to "with their child as they would in their everyday life". The interaction between the mother and child was recorded on video for 5 minutes. No feedback was given to the mothers regarding their implementation performance throughout the session.

Probe Sessions

Although the probe sessions were conducted in a manner similar to the full probe sessions, they were only meant for the mothers that were under training. The data obtained during those sessions constituted the implementation stage of the study. In the probe sessions, the mothers were given the tool sets that included the designated target words. The mothers were told to “with their child in such a way as to use the designated target words”. The interaction between the mother and child was recorded on video for 5 minutes. All three mothers were given feedback regarding their shortcomings and errors observed during the first three probe sessions. The probe training sessions were ended once all the mothers were able to fulfill the steps of the mand-model procedure at 100% efficiency consecutively for three sessions.

Intervention Sessions

The intervention sessions were held on a one on one basis with all mothers. The intervention sessions were completed in two stages. The first stage involved lectures and video tutorials on the mand-model procedure and the mothers were asked to prepare sample intervention sessions and engage in roleing activities. Before proceeding to the second stage and after the completion of the first stage, the mothers were asked to take an assessment test to determine their levels of fulfilling the training objectives with respect to the mand-model procedure. Once the mothers achieved a 90% success rate at the end of training assessment test, it was proceeded to the next stage.

The second stage of the intervention sessions involved interactions between the mother and child. Such sessions lasted for approximately 20 minutes. During the first 10 minutes of those sessions, the questions raised by mothers regarding the mand-model procedure were discussed, and in the following 5 minutes the play activities were performed using the mand-model procedure. During the sessions, trials were conducted in which each of the 5 target words were produced on every occasion. Five of the trials were recorded. In the second stage of the intervention sessions, mothers made *environmental arrangements* for pre and during play activities with regard to the play to be ed. During those activities, whenever the child’s interest arose,

they requested response from the child by asking him questions (such as “what do you want”, “what do you have in your hand”, “what is in here”) or providing him with options (such as “do you want to buy a jacket or a pair of pants”). When the child gave the correct response, they gave him the object he asked for by extending the length of the sentence such as “let us buy a jacket” or “blue pants”. When the child remained silent or gave the wrong response, the mother set herself as a model for the right response or asked for a corrective response. When the child gave the correct response, however, the things he said were extended to include more words and then he was allowed to receive the object he wanted. The mothers were given materials regarding the designated target words before the play sessions. However, no intervention was made with respect to the play contents and environmental arrangements. The mothers came up with various different plays using the same tool set (for instance; one mother was given fruit magnets, with which she fashioned a fruit picking play in one session and a fruit selling play in another).

The researcher was present during the play sessions. The errors committed by mothers during the activities regarding the implementation steps were discussed at the end of the session. The researcher provided the mothers with feedback regarding the incomplete or incorrect parts during the first three play sessions. Examples were provided for the correct implementation of the incorrect steps. In the later sessions, the mothers were asked to evaluate the session in terms of their environmental arrangements, the steps they implemented and the parts which they believed were incomplete or incorrect, and to state their opinion as to how they would go about correcting the incomplete-incorrect parts. The play sessions continued until the mothers were able to fulfill the steps of the mand-model procedure correctly and consecutively for three probe sessions.

Maintenance Sessions

Maintenance sessions were organized by the researcher in the 2nd week following the end of the training. They were held in the form of group sessions with a view to examining to what extent the mothers maintained the knowledge they acquired from the training sessions after the completion of the training. No maintenance session was held

with the mother number three due to family reasons.

Data Collection

The reliability data of the study were collected by two research workers working in the field of special education. Observers are doing master's degree in Abant İzzet Baysal University Special Education Department, Department of Mentally Handicapped Teaching.

Interobserver Agreement

For ensuring interobserver reliability in this study, a neutral appointment was made and at least 30% of the total number of experimental sessions. In calculating interobserver reliability, the following formula was used: "Total Agreement \ Agreement + Disagreement x 100". In this study, interobserver reliability was established as follows: for Nur 96.66%, for Gül 93.33%, and for Oya 100%.

Fidelity of Implementation

Implementation reliability data was collected for the purpose of ascertaining whether the parent training program prepared in this study was implemented correctly by the researcher. In order to ensure implementation reliability, a neutral appointment was made and at least 30% of the intervention sessions. The collected data was calculated by employing the following formula: "observed practitioner's behavior \ planned practitioner's behavior x 100". In the end, the implementation reliability regarding the correct implementation of the parent training program designed for teaching the mand-model procedure was established as follows: for Nur 100%, for Gül 98%, and for Oya 100%.

Social Validity Data

In this study, social validity data was collected from mothers for the purpose of ascertaining whether the parent training program, designed for enabling mothers to teach the targeted language skills to their children, was suitable and determining the importance of the prospective results of this study for mothers and their children. The social validity form consisted of 8 questions. An expert opinion was sought with respect to the questions. The social validity data was analyzed using descriptive analysis

method. The obtained data was then converted into written text format in the computer environment by the researcher, after which themes were created and the findings interpreted.

Data Analysis

The data obtained from mothers was shown in a line chart, the data obtained from children with ASD was shown in a column chart. The charts were analyzed through visual analysis method. The "y" axis of the chart represents the percentage of the correct responses given by the participants, while the "x" axis represents the number of sessions held.

The social validity data obtained from mothers was analyzed using descriptive analysis method. The obtained data was then converted into written text format in the computer environment by the researcher, after which themes were created and the findings interpreted.

Results

The data regarding the effectiveness of the parent training program designed for teaching mothers the mand-model procedure, a milieu teaching technique, is shown for all mothers in the figure 1 below.

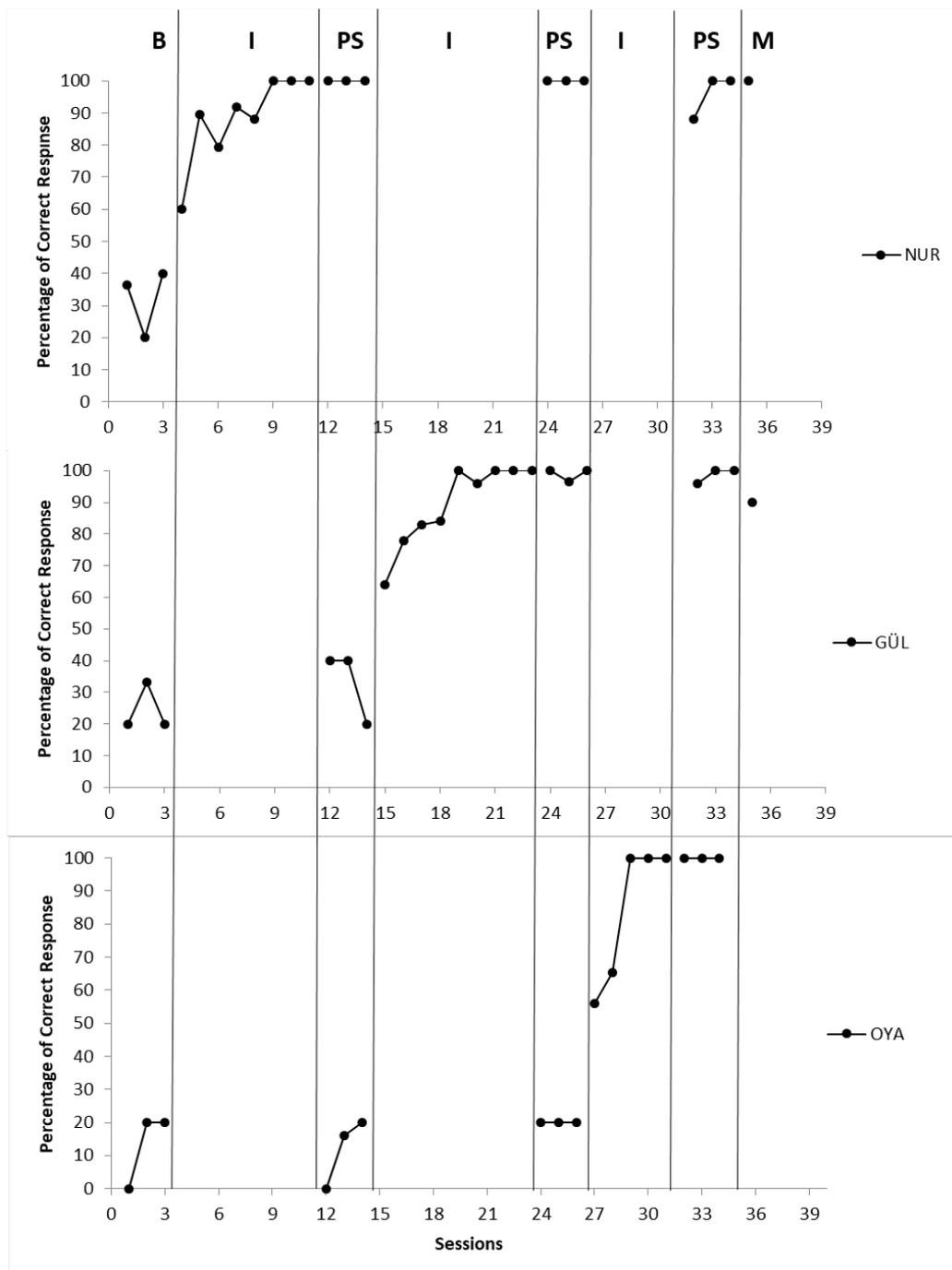
While the responses given by Nur, the first participant, with respect to the implementation steps of the mand-model procedure were approximately 33% correct during the baseline sessions, her responses were 100% correct during the intervention sessions. Stable data was achieved with Nur in 8 intervention sessions. An observation study was conducted with Nur in order to ascertain whether she still maintained her acquired skills two weeks after the completion of the intervention sessions. The data obtained from the observation study suggested that she still maintained the level (100%) she reached during the intervention sessions. While the responses given by Gül, the second participant, with respect to the implementation steps of the mand-model procedure were approximately 24% correct during the baseline sessions, her responses were 100% correct during the intervention sessions. Stable data was achieved with Gül in 9 training sessions. An observation study was conducted with Gül in order to ascertain whether she still maintained her

acquired skills two weeks after the completion of the training sessions. The data obtained from the observation study suggested that she still maintained the level (90%) she reached during the intervention sessions. While the responses given by Oya, the third participant, with respect to the implementation steps of the mand-model procedure

were approximately 13% correct during the baseline sessions, her responses were 100% correct during the intervention sessions. Stable data was achieved with Oya in 5 training sessions. No observation study was conducted with Oya due to parent reasons and as she had to move her house elsewhere.

Figure 1.

The percentages of correct responses given by Nur, Gül and Oya at the baseline, intervention, full probe and maintenance sessions with respect to the effectiveness of the training program designed for teaching the mand-model procedure, a milieu teaching technique.

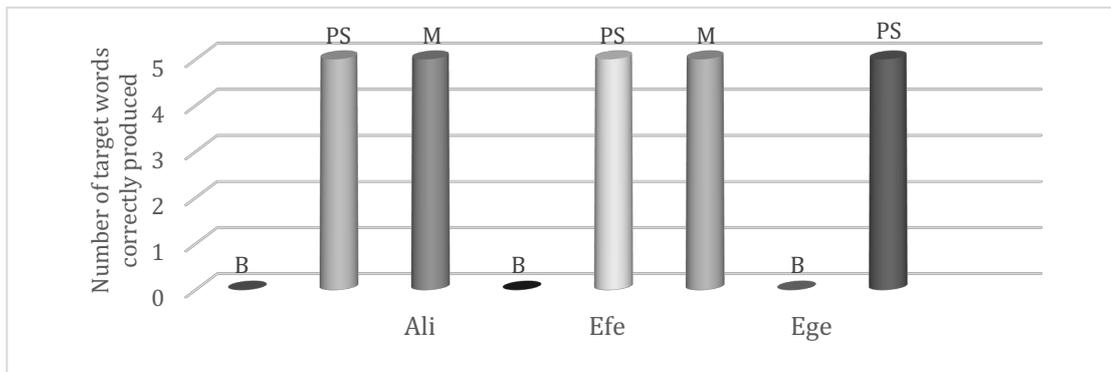


The findings regarding the effectiveness of the mand-model procedure, as implemented by mothers, in children with ASD's

learning and maintaining the target words are shown in the figure 2 below.

Figure 2.

Number of correctly produced words by Ali, Ege and Efe during the baseline, probe sessions and maintenance sessions.



The figure 2 suggests that while none of the children had been able to produce the target words prior to the implementation of the mand-model procedure by their mothers, they were able to produce all of the target words correctly during the final full probe session. The maintenance sessions held with Ali and Efe demonstrates that they were able to produce all of the target words even after the completion of the training program. No maintenance session was held with Ege due to parent reasons.

At the end of the study, mother's opinions were sought regarding the study in which they had just participated and the social validity of the study was established. All three mothers stated that they were happy to have participated in the parent training program designed for teaching them the "mand-model procedure", a milieu teaching technique, and that they could recommend this program to other mothers as well. The mothers reported that they could easily use the mand-model procedure in teaching various different skills to their children and that the procedures in question met the requirements for developing their children's language skills.

The mothers reported that the present study affected their interaction with their children in a positive way and that they were now doing more purposeful plays with their children, and that their children started to show more interest towards them and that their children started to learn new things and improve on their vocabulary as a result of this process. The mothers shared their thoughts regarding the interactions with

their children as follows: Nur: "I and my husband were constantly trying to get Ali to say some words" We were being insistent when he declined to do so. Now I am trying to teach him words while doing with him. I am not being insistent with him anymore. I'm only talking about the correct pronunciation of words. Now I know how I should talk and what I should be careful about when interacting with him, Gül: "Efe has started to show more interest towards me. His vocabulary increased. He has started asking questions. He has started to learn while doing, Oya: "We did not use to with Ege very often. He used to with his sibling instead. Now I join them when I have the time. Even if I am not doing with them, I give them a shout from the kitchen while doing my chores. I try to talk to him then."

Discussion

The present study examined the effectiveness of the parent training program that was prepared for the mothers of children with ASD in enabling mothers to use the mand-model procedure. The parent training program was examined in terms of whether it was effective in enabling mothers to teach the targeted communication skills to their children. The findings of the study suggest that the parent training program prepared with the aim of teaching mothers the mand-model procedure, a milieu teaching technique, was in fact effective in achieving the intended objective, and that the mand-

model procedure implemented by the mothers were effective in enabling them to teach the target words to their children with ASD, and that both the mothers and children maintained the skills they learned even 2 weeks after the completion of the training. The study results also show that the opinions of the mothers participating in the study were positive about the mand-model procedure.

A detailed examination of the study findings suggests that the mothers fulfilled the steps of the mand-model procedure 0 to 40 percent correctly during the baseline sessions. The baseline data shows that the mothers did not use the mand-model procedure in the interaction they maintained with their children with ASD and they did not establish any interaction that would help improve the communication skills of their children with ASD. However, the fact that mothers used some of the procedural steps - such as making environmental arrangements while maintaining a full interaction with their children with ASD- randomly resulted in the baseline data to vary between 0 to 40%. The baseline data suggests that the mothers had difficulty in putting together interesting activities and materials in their interaction with their child; they failed to facilitate the arrangements that would enable them to engage in verbal communication with their children during the play; they mostly selected to watch their children rather than talking to them during the play and had a hard time getting their children interested in the play. Such data appears to be similar to the findings of Yakin's (2009) and Kaiser and Hancock's (2002) study.

It was observed during the intervention and probe sessions that the mothers were able fashion different plays by using the tool sets they were given during the baseline stage and employed the environmental arrangement strategies in an effective and creative manner and performed multiple trials regarding the targeted language skills in a single intervention session. Such observations suggest that the mothers learned the mand-model procedure through the parent training program and implemented the said procedures effectively in teaching communication skills to their children with ASD. The fact that the mothers were able to teach their children the targeted language skills by using the mand-model procedure was established by this study as well. This result appears to be consistent with the findings of

other studies regarding the teaching of various skills and techniques to families through parent training programs (Özcan, 2004) and the studies where the milieu teaching procedures were implemented through the collaboration of families (Alpert ve Kaiser, 1992; Kaiser, Hancock ve Nietfeld, 2000; McCathren, 2010).

It is believed that the contents of the parent training program, the number of sessions held and the way they were conducted have been effective in enabling mothers to learn the methods and procedures in question and maintain them even after the completion of the trainings. In their study, Kaiser et al. (1995) aimed at teaching the families the milieu teaching techniques of modeling, mand modeling, time delay teaching and incidental teaching along with 7 environmental arrangement strategies within 8 training sessions. The findings of their study suggested that 8 training sessions were not enough for teaching mothers the said 4 milieu procedures and 7 environmental arrangements strategies. The present study focused exclusively on the mand-model procedure and the environmental arrangement strategies rather than teaching the mothers all of the milieu teaching techniques in consideration of the limitations presented by the study conducted by Kaiser et al. (1995). The present study aimed at teaching only one of the milieu teaching techniques, namely the mand-model procedure, and the environmental arrangement strategies. The literature also includes studies examining the teaching of targeted language skills by implementing the mand-model procedure on an exclusive basis (Mobeyed, Çollins, Strangis, Schuster, & Hemmeter, 2000; Rogers-Warren, & Warren, 1980; Toğram, 2004).

The mand-model procedure is an easy method as it involves the creation of opportunities that will prompt the child into engaging in interaction through the activities that interest him/her and while allowing the adult to gain full control of the teaching opportunities. Similarly, in his study, Yeh (1994) reported that the mothers preferred the mand-model procedure over other milieu teaching techniques as it allowed them to gain control over the interaction opportunities and easily predict the responses of the child. Additionally, the mand-model procedure is implemented in a natural environment by using natural reinforcers. The fact that no additional reinforcer is required to be determined for the children prior to the training

and that the trainings are held with mother in their home environment is believed to have facilitated the implementation of the procedure easily and contributed to the maintenance of such skills over time. The effectiveness of the parent training program implemented in this study is attributed to the fact that the focus is shifted on teaching only one of the milieu teaching techniques and that the parent training program included both theoretical and practical stages and that the training sessions were held with each mother in their own home environment.

Secondly, the effectiveness of the parent training program is attributed to the inclusion of theoretical and practical stages in the said program. The parent training program consisted of both the theoretical and practical stages, where the theoretical stage involved providing information regarding the mand-model procedure and the language development characteristics observed in both normally developed children and the children with ASD and included the natural teaching methods intended for the children with ASD. The information provided in the theoretical part of the program is believed to have enabled mothers to gain knowledge regarding the developmental characteristics of their children, to get to know their children better, to compare their children's language development and see their retardation/delay in terms of language development. During the implementation stage, the mothers were shown videos about the implementation of the mand-model procedure and environmental arrangements in the full interaction between the mother and child. It is believed that watching instructional videos, preparation of sample play interactions by mothers and the enactment of such sample play interactions by the researcher and mother all contributed to the mothers' learning and implementation of the said procedure in a correct manner. It is believed that letting mothers watch the videos covering the implementation of the steps of the mand-model procedure helped them set an example in their interaction with their children. Moreover, a test training session was prepared for the mother which they enacted with the participation of the researcher. This way, they had the opportunity to control their attitudes and identify their shortcomings prior to the play interactions to be held with their children. In a similar fashion, in their studies conducted with mothers, Ünlü (2012) included video

tutorials and role activities, while Toğram (2004) included lecturing, video tutorials and role ing activities. Such efforts are believed to have been instrumental in converting theoretical information into applied skills.

Thirdly, the effectiveness of the parent training program is attributed to the fact that the training sessions were held with each mother in their own home environment. The fact that mothers participated in this study voluntarily and the study was conducted in their home environment helped mothers to feel more comfortable about themselves. Moreover, it was observed that mothers were quite enthusiastic about participating in the study and willing to apply the knowledge they learned throughout the study. The fact that the mothers were enthusiastic about the study, and that the study was conducted with the activities that children seemed to like in a familiar environment, and that the designated communication partners of children were none other than their mothers are all believed to have been influential in enabling children to learn and maintain the targeted language skills.

The stable data suggesting that the steps of the mand-model procedure are met was achieved in a total of 8 sessions with Nur, in a total of 9 sessions with Gül and in a total of 5 sessions with Oya. Despite there being no statistically significant difference in terms of Nur and Gül's learning curves, Oya learned the steps of the procedure faster than the other two mothers. The fact that Oya made the same environmental arrangements in every session and learned the targeted language skills of the children faster than other children is believed to have been influential in enabling her to learn the steps of the mand-model procedure faster and more correctly than the others. Such findings appear to be consistent with the findings of Alpert and Kaiser's study (1992) in terms of the child's level of language development being influential on the number of sessions held, but differ in terms of higher education level of mothers being influential in enabling them to learn the steps of the procedure. Of the mothers participated in the study, Nur and Gül are high school graduates, whereas Oya is a primary school graduate. On the strength of this finding, it can be suggested that the parents' education levels is not the primary determining factor in enabling them to learn and implement the milieu teaching procedures. This fact is also supported by the findings of

McCathren's study (2009) where a mother with slight developmental retardation was taught the pre-language milieu teaching techniques.

Another important factor that rendered this parent training program effective is attributed to the fact that the targeted language skills were identified in accordance with the developmental characteristics of each child. Suitability of the targeted language skills with the developmental levels of children is believed to have influenced their learning curves positively. This also bears similarities with the findings of the study conducted by Kaiser et al. (1996). Moreover, the children participating in the study also learned new words in addition to the targeted language skills. The mothers reported that their children started asking more questions and extended their sentences while pronouncing the names of the objects on their own and showed more willingness to with their mothers. Moreover, the mothers reported that they now felt more comfortable than before while engaging in an activity with their children. This leads us to believe that, in addition to the effectiveness of mand-model procedure in enabling mothers to teach the target words, the program also affected the quality of interaction between the mother and child in a positive way.

As a conclusion, the findings of this study suggest that the parent training program designed with a view to teaching the mand-model procedure, a milieu teaching technique, is effective and consequently the mand-model procedure implemented by the mothers is effective in teaching new words to the children with ASD and enabling them to maintain such acquired words over time. Like all studies, however, this study also presents certain limitations. The first limitation in this regard is the failure to generalize the steps of the mand-model procedure to the teaching of other skills to the children by the mothers. Another limitation is the limited number of targeted skills chosen for the children. Based on these findings and limitations, it is recommended that future studies implement the mand-model procedure by preparing training programs designed to teach such skills to the special education instructors and other parent members (such as fathers, siblings). Moreover, it is recommended that future studies be conducted with the aim of extending the parent training program, which is designed for teaching the milieu teaching technique of mand-model

procedure, to a larger number of mothers by way of small group trainings or distance education methods.

References

- Allen, K. E., & Cowdery, G. E. (2009). *The exceptional child inclusion in early childhood education*. (6th Edition). U.S.A.: Thomson Delmar Learning.
- Alpert, C. L., & Kaiser, A. P. (1992). Training parents as milieu language teachers. *Journal of Early Intervention, 16*, 31-52.
doi:10.1177/105381519201600104
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders (5th Edition)*. Arlington, VA, American Psychiatric Association.
- Bishop, D. V. M. (2003). Autism: Neural basis and treatment possibilities. In Bock, G. & Goode, J. (Eds.), *Novartis foundation symposium* (pp.213-223). Wiley, Chichester. doi: 10.1002/0470869380
- Carr, E. G. (1985). Behavioral approaches to language. In Schopler, E. & Mesibov, G. B. (Eds.), *Communication problems in autism* (pp. 37-54). NewYork: Plemn Press.
- Charlop, M. H., Schreibman, L., & Thibodeau, M. G. (1985). Increasing spontaneous verbal responding in autistic children using a time delay procedure. *Journal of Applied Behavior Analysis, 18*, 155-166.
doi: [10.1901/jaba.1985.18-155](https://doi.org/10.1901/jaba.1985.18-155)
- Charlop-Christy, M. H., & Carpenter, M. H. (2000). Modified incidental teaching sessions: a procedure for parents to increase spontaneous speech in their children with autism. *Journal of Positive Behavior Interventions, 2*, 99-112.doi:10.1177/109830070000200203
- Charlop-Christy, M. H., LeBlanc, L. A. & Carpenter, M. H. (1999). Naturalistic teaching strategies (nats) to teach speech to children with autism: historical perspective, development, and current practice. *The California School Psychologist, 4*, 30-46.
doi:10.1007/BF03340868

- Choi, H. S., & Kim, U. J. (2005). Autism: using milieu teaching strategies to instruct functional and generalized language. *The Journal of Special Education: Theory and Practice*, 6, 357-375.
- Christensen-Sandfort, R. J., & Whinnery, S. B. (2011). Impact of milieu teaching on communication skills of young children with autism spectrum disorder. *Topics in Early Childhood Special Education*, 32, 211-222. doi: 10.1177/0271121411404930
- Güven, S., Topbaş, S. (2014). Erken dil gelişimi testi-üçüncü edisyon'un uyarlama, geçerlik ve güvenilirlik ön çalışması. [Test of early language development-third edition (TELD-3) of adaptation, reliability and validity of the preliminary study.] *International Journal of Early Childhood Special Education*, 6 (2), 151-172.
- Halle, J. W., Baer, D. M., & Spradlin, J. E. (1981). Teachers' generalized use of delay as a stimulus control procedure to increase language use in handicapped children. *Journal of Applied Behavior Analysis*, 14, 389-409. doi: [10.1901/jaba.1981.14-389](https://doi.org/10.1901/jaba.1981.14-389)
- Halle, J. W., Marshall, A. M., & Spradlin, J. E. (1979). Time delay: a technique to increase language use and facilitate generalization in retarded children. *Journal of Applied Behavior Analysis*, 12, 431-439. doi: [10.1901/jaba.1979.12-431](https://doi.org/10.1901/jaba.1979.12-431)
- Hancock, T. B., & Kaiser, A. P. (1996). Sibling's use of milieu teaching at home. *Topics in Early Childhood Special Education*, 16, 168-190. doi:10.1177/027112149601600204
- Hart, B. M., & Risley, T. R. (1968). Establishing the use of descriptive adjectives in the spontaneous speech of disadvantaged children. *Journal of Applied Behavior Analysis*, 1, 109-120. doi: [10.1901/jaba.1975.8-411](https://doi.org/10.1901/jaba.1975.8-411)
- Hart, B., & Risley, T. R. (1974). Using preschool materials to modify the language of disadvantaged children. *Journal of Applied Behavior Analysis*, 7, 243-256. doi: [10.1901/jaba.1974.7-243](https://doi.org/10.1901/jaba.1974.7-243)
- Hart, B., & Risley, T. R. (1975). Incidental teaching of language in the preschool. *Journal of Applied Behavior Analysis*, 8, 411-420. doi: [10.1901/jaba.1975.8-411](https://doi.org/10.1901/jaba.1975.8-411)
- Heward, W. L. (2009). *Exceptional children an introduction to special education*. (9th Edition). U.S.A.: Pearson Prentice Hall.
- Ingersoll, B. R. (2011). The differential effect of three naturalistic language interventions on language use in children with autism. *Journal of Positive Behavior Interventions*, 13, 109-118. doi: 10.1177/1098300710384507
- Kaiser, A. P., Hemmeter, L., Ostrosky, M. M., Alpert, C. L., & Hancock, T. B. (1995). The effects of group training and individual feedback on parent use of milieu teaching. *Communication Disorders Quarterly*, 16, 39-48. doi:10.1177/152574019501600206
- Kaiser, A. P., Hester, P. P., Alpert, C. L., & Whiteman, B. C. (1995). Preparing parent trainers: an experimental analysis of effects on trainers, parents, and children. *Topics in Early Childhood Special Education*, 15, 385-414. doi: 10.1177/027112149501500401
- Kaiser, A. P., & Hancock, T. B. (2002). The effects of trainer-implemented enhanced milieu teaching on the social communication of children with autism. *Topics in Early Childhood Special Education*, 22, 39-54. doi: 10.1177/027112140202200104
- Kaiser, A. P., & Roberts, M. Y. (2013). Parent-implemented enhanced milieu teaching with preschool children who have intellectual disabilities. *Journal of Speech, Language, and Hearing Research*, 56, 295-309. doi:10.1044/1092-4388(2012/11-0231)
- Kaiser, A. P., Hancock, T. B., & Nietfeld, J. P. (2000). The effects of parent-implemented enhanced milieu teaching on the social communication of children who have autism. *Early Education & Development*, 14, 423-446. doi: 10.1207/s15566935eed1104_4
- Kaiser, A. P., Hemmeter, M. L., Ostrosky, M. M., Fischer, R., Yoder, P., & Keefer, M. (1996). The effects of teaching parents to use responsive interaction strategies. *Topics in Early Childhood Special Education*, 16: 375-406. doi:10.1177/027112149601600307
- Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, 2, 217-250.

- Koegel, R. L., & Kern-Koegel, L. (2006). *Pivotal treatments for autism: communication, social and academic development*. Brookes Publishing Company, 312. ERIC No. ED491793.
- Laski, K. E., Charlop, M. H., & Schreibman, L. (1988). Training parents to use the natural language paradigm to increase their autistic children's speech. *Journal of Applied Behavior Analysis*, 21(4), 391-400. doi: [10.1901/jaba.1988.21-391](https://doi.org/10.1901/jaba.1988.21-391)
- Lewis, A., & Norwich, B. (2005). *Special teaching for special children? Pedagogies for inclusion*. England: Open University Press.
- Lord, C., & Richler, J. (2006). Social and communication development in early identification diagnosis and intervention. In Charman, T. & Stone, W. (Eds.), *Early diagnosis of children with autism spectrum disorders* (pp. 35-59). NewYork-London: The Guilford Press.
- Lord, C. (1985). Contribution of behavioral approaches. In Schopler, E. & Mesibov, G. B. (Eds.), *Communication problems in autism* (pp. 59-67). NewYork: Plenn Press.
- McCathren, R. B. (2010). Case Study: Parent-implemented prelinguistic milieu teaching with a high risk dyad. *Communication Disorders Quarterly*, 31, 243-252. doi:10.1177/1525740109337733
- Mobayed, K. L., Collins, B. C., Strangis, D. E., Schuster, J. W., & Hemmeter, M. L. (2000). Teaching parents to employ mand-model procedures to teach their children requesting. *Journal of Early Intervention*, 23, 165-179. doi: 10.1177/10538151000230030601
- Montgomery, D. (2003). *Gifted & talented children with special educational needs double exceptionality*. London: David Fulton Publishers.
- Özcan, N. (2004). *Zihin Özürlü Çocuklara Tuvalet Becerisi Öğretimine Yönelik Aile Eğitimi Programının Etkilliliği [The Effectiveness of toilet skill trained to mental retarded children parent trained program]* (master's thesis). Anadolu University Institute of Educational Sciences, Eskişehir. Retrieved from <https://tez.yok.gov.tr/UlusalTezMerkezi>
- Paul, R. (2008). Interventions to improve communication. *Treating Autism Spectrum Disorders*, 17, 835-836. doi: [10.1016/j.chc.2008.06.011](https://doi.org/10.1016/j.chc.2008.06.011)
- Peterson, P., Carta, J. J., & Greenwood, C. (2005). Teaching enhanced milieu language skills to parents in multiple risk families. *Journal of Early Intervention*, 27, 94-109. doi:10.1177/105381510502700205
- Rogers, S.J. (2006). Social and communication development in early identification diagnosis and intervention. In Charman, T. & Stone, W. (Eds.), *Evidence based interventions for language development in young children with autism* (pp. 143-179). NewYork-London: The Guilford Press.
- Rogers-Warren, A., & Warren, S. F. (1980). Mands for verbalization facilitating the dis of newly trained language in children. *Behavior Modification*, 4, 361-382. doi:10.1177/014544558043006
- Tager-Flusberg, H., Joseph, R., & Folstein, S. (2001). Current Directions in Research on Autism. *Mental Retardation and Developmental Disabilities Research Reviews*, 7, 21-29. doi: [10.1002/1098-2779\(200102\)7:1<21::aid-mrdd1004>3.0.co;2-3](https://doi.org/10.1002/1098-2779(200102)7:1<21::aid-mrdd1004>3.0.co;2-3)
- Toğram, B. (2004). *Doğal dil öğretim tekniklerinden tepki isteme modelinin öğretilmesinin etkililiği [The effectiveness of instruction on mand model-one of the milieu teaching techniques]* (master's thesis). Eskişehir, Anadolu University, Institute of Health Sciences, Eskişehir. Retrieved from <https://tez.yok.gov.tr/UlusalTezMerkezi>
- National Autism Center (2009). *National standards report*. NAC. National Autism Center 41 Pacella Park Drive Randolph, Massachusetts 02368 02 Ağustos 2015 tarihinde <http://www.nationalautismcenter.org/> sitesinden alınmıştır.
- National Autism Center (2015). *National standards report*. NAC. National Autism Center 41 Pacella Park Drive Randolph, Massachusetts 02368, 02 Ağustos 2015 Pazar tarihinde <http://www.nationalautismcenter.org/> sitesinden alınmıştır.
- Ünlü, E. (2012). *Anne Babalara Sunulan Otizm Spektrum Bozukluğu Gösteren*

- Çocuklara Yönelik Ayrık Denemelerle Öğretim (ADÖSEP) Etkliliği [Effectiveness of discrete trial teaching training program for parents of children with autism spectrum disorder] (Doctoral dissertation). Anadolu University, Institute of Educational Sciences, Eskişehir. Retrieved from <https://tez.yok.gov.tr/UlusalTezMerkezi>
- Warren, S. F., & Gazdag, G. (1990). Facilitating early language development with milieu intervention procedures. *Journal of Early Intervention, 14*, 62-86. doi:10.1177/105381519001400106
- Wilkinson, K. M. (1998). Profiles of language and communication skills in autism. *Mental Retardation and Developmental Disabilities Research Reviews, 4*, 73-79. doi:10.1002/(SICI)1098-2779(1998)4:23.3.CO;2-1
- Yakın, M. (2009). *Aile Eğitiminin Annelerin Doğal Dil Sağaltım Tekniklerini Kullanmalarında Etkliliği [Efficiency of parent training on mothers? use of naturalistic language treatment procedures]* (master's thesis). Gazi University Institute of Educational Sciences, Ankara. Retrieved from <https://tez.yok.gov.tr/UlusalTezMerkezi>
- Yeh, C. H. (1994). *Using milieu language teaching to facilitate the communication skills of children with severe disabilities in home environments* (Doctoral dissertation). Retrieved from <http://ir.ncue.edu.tw/ir/handle/987654321/9342>
- Yoder, P. J., & Warren, S. F. (2002). Effects of prelinguistic milieu teaching and parent responsivity education on dyads involving children with intellectual disabilities. *Journal of Speech, Language and Hearing Research, 45*, 1158-1174. doi:10.1044/1092-4388(2002/094)
- Yoder, P. J., Kaiser, A. P., Goldstein, H., Alpert, C., Mousetis, L., Kaczmarek, L., & Fischer, R. (1995). An exploratory comparison of milieu teaching and responsive interaction in classroom applications. *Journal of Early Intervention, 19*, 218-242. doi:10.1177/105381519501900306