

Full Length Research Paper

An evaluation of the preferences of individuals with severe and multiple disabilities and the teaching of choice-making skills

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Received 14 November, 2016; Accepted 17 January, 2017

The general purpose of the present study is to determine the relationship between direct and indirect preference assessments of individuals with severe and multiple disabilities (SMD) and the relationship between the direct preference assessments (single-stimulus, paired-stimulus, and multiple-stimulus) as applied to individuals with SMD, and to find whether it is effective to teach the skill of choice making among photographs through the constant time-delay procedure. The study group was composed of three boys aged 9 years and a 7-year old girl residing at Bolu Province who were diagnosed with severe disability; that is, a total of four subjects and their primary caregivers. The study had two phases. During the first phase, the relation between the preference assessments was investigated. There was a highly positive relationship between both the direct and indirect preference assessments and at the same time between the directly applied preference assessments based on single-stimulus, paired-stimulus, and multiple-stimulus-without-replacement. The second phase included teaching choice-making skills. It was seen that teaching through the constant time-delay procedure was effective in teaching the choice-making skill and that the participants preserved the choice-making skill 1, 3, and 4 weeks after the completion of teaching and generalized it to their primary caregivers.

Key words: Severe and multiple disabilities, individuals with severe and multiple disabilities, choice-making, choice-making skills, teaching of choice-making skills, preference assessment.

INTRODUCTION

Severe and multiple disability (SMD) has been defined as the occurrence of one or more mental, emotional, and physical problems that require educational, social, and psychological or medical services apart from the services provided by the normal classroom or special education programs in order that the affected individuals can participate in social life more

independently and use their existing potentials better (Tekin-İftar, 2005).

Individuals with SMD may be severely affected by a single disability, or affected by multiple disabilities when a disability accompanies another. In certain individuals with SMD, severe cognitive and motor disabilities coexist (Petry and Maes, 2007; Petitpierre et al., 2007; Vlaskamp

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and Putten, 2009). Individuals with SMD may display characteristics associated with severe cognitive disabilities, additional disabilities (visual, hearing disability, physical disability, etc.), sensory loss and behavioral problems (Changnon, 2002; Petry and Meas, 2007). Therefore, each individual with SMD is exclusive and unique. Thus, SMD represents a more heterogeneous group compared to the other types of disabilities (Petitpierre et al., 2007). Individuals with SMD may demonstrate many characteristics that are different from each other. Some may experience intensive physical problems and difficulties with learning, focusing, and perceiving.

The education of individuals with SMD which demonstrate different developmental traits is ignored in Turkey, although great importance is attached to it by some countries. As a matter of fact, the individuals with SMD have to receive education in order to live independently and to take on responsibility for their own living. In other words, the focus of education provided to the individuals with SMD is to ensure that they live independently and take on the responsibility of living.

Taking on responsibility for living has been defined as the right to and capacity of establishing control over and directing one's own life (Wehmeyer, 2003). Ülke-Kürkçüoğlu (2007) defined taking on responsibility of life as a general expression covering all the skills that might be necessary for the individual to self-manage his/her life. These skills include elements such as choice-making, decision-making, and problem-solving (Wood et al., 2004).

Among these elements, choice-making skill was defined by Shevin and Klein (1984) as the act of the individual to choose a preferred alternative among different familiar options. Choice and preference are generally used as interchangeable concepts. However, when their literal meanings are considered, choice points to an action of choosing one alternative over others repeatedly (Belfiore et al., 1994). In other words, while the items that appeal to individuals suggest their preference that the individuals show, point to or name the appealing one shows their choice.

The preferences and choices made according to them are very important for improving the life quality of the individuals with severe and multiple disabilities (Powers, 2005; Wehmeyer et al., 1998). This is because of the fact that preferences and choice-making may improve the life quality of the individuals by allowing them to make their choices among various options and make their own decisions in line with their requests, beliefs, values, and requirements (Martin et al., 2006). Moreover, the opportunities offered to individuals in relation to their preferences and choice-making make positive reflections on their perception of independence, dignity and self- (Guess et al., 2008).

A substantial part of an educational program intended

for individuals with severe and multiple disabilities should focus on the preference assessment and accordingly the choice-making (Coots and Falvey, 1989; Grenot-Scheneyer et al., 1989; Mirenda and Smith-Lewis, 1989; St. Peter et al., 1989; Stafford et al., 2002) due to the fact that the educational objectives of the individuals with severe mental disabilities include their participation in the educational settings and societal activities as independently as possible and extension of the same independence to their occupational setting, living environment, and social environment subsequent to the school (Alberto and Taber, 1999; Ford et al., 1989).

Preference assessment

Preference assessments can be considered in two groups based on the assesse and the assessed behavior. The preference assessments based on the assesse can be classified as direct and indirect (Hagopian et al., 2004). The indirect preference assessments are based on the views of the parents, caregivers, or the other individuals, who are familiar with the participant (Fisher et al., 1996; Matson et al., 1999). The indirect preference assessments are carried out via interviews with the parents, caregivers, or the other individuals, and check lists. The direct preference assessment, on the other hand, includes a series of stimuli presented to the individual and observation of the reaction of the individual towards them and the response time of the individual.

The preference assessments based on behaviors are classified into two groups: the approach-based and the engagement-based preference assessments. The approach-based preference assessment relies on the behaviors of pointing to, reaching for, looking at, orienting toward the stimulus, smiling-laughing (Spevack et al., 2008), and making sounds in response to the stimulus. The engagement-based preference assessment includes the method of measurement of the engagement time of the individual, whose preference towards the stimulus is to be assessed. It is applied in two ways, namely, free operant and single stimulus, in itself. In the free operant procedure, the individual, whose preference is to be assessed, is introduced to a previously set number of stimuli, with free access to all the stimuli. The preferred stimulus is then determined and the engagement time is measured (Rech, 2012). The preference hierarchy is developed based on the percentage rate of engagement. In the single-stimulus engagement, the stimuli are introduced one by one for 2 minutes and whether the engagement is maintained is recorded (DeLeon et al., 1999; Hagopian et al., 2001).

The stimuli used in the preference assessments are highly important. When the characteristics of the stimuli

which are eligible for the preference assessment are sorted from concrete to abstract, then the stimuli can be grouped as the real objects (the object itself or a part of it), photographs (genuine photographs), pictures, lines, written words, and orally presented stimuli. In addition, assisting technology is also used in the presentation of the stimuli (Dattilo, 1986; Horrocks and Morgan, 2009). The real stimuli were used in the preference assessment phase of this study, due to the fact that the study group comprised the individuals with SMD.

Another important factor that should be considered during the preference assessment is the number of the stimuli (toys, food, etc.). Single-, paired-, and multiple-stimulus can be used in the preference assessment. In the single-stimulus (SS) method, each stimulus is introduced separately. In the paired-stimulus (PS) method, the stimuli are introduced in pairs and the individual is allowed to choose one of these stimuli. The multiple-stimulus presentation has been defined as the individual choosing one of three or more stimuli presented simultaneously. The multiple-stimulus method has also been used in the form of "without replacement" in the literature (DeLeon and Iwata, 1996; Roane et al., 1998; Waldvogel and Dixon, 2008; Rush et al., 2010). In the later method, a group of stimuli (multiple-stimulus presentation) is introduced to the subject, and whenever the subject chooses a stimulus, it is removed from the series and not included in the series in the other trials during the session. Direct preference assessments based on single-, paired-, and multiple-stimulus without replacement, were used in this study.

There are studies in the relevant literature, which compared the direct and indirect preference assessments. These studies included the comparisons between the personnel views and the single-stimulus preference assessment (Green et al., 1988), the caregivers' predictions and the paired-stimulus preference assessment (Parsons and Reid, 1990), the personnel predictions and the paired-stimulus preference assessment (Newton et al., 1993), the parents' and teachers' views and the paired-stimulus direct preference assessment (Didden and Moor, 2004), the teacher and familiar personnel views and the single-stimulus direct preference assessment (Spevack, 2006), the caregivers' views and the direct observation data (LaRosa, 2007), the teacher reports and the paired-stimulus direct preference assessment (Cote et al., 2007), the multiple-stimulus without replacement and the teachers' preference assessment (Resetar and Noell, 2008), and the caregivers' views and the multiple-stimulus without replacement (Waldvogel and Dixon, 2008). As it is evident from the mentioned studies, there was no study that compared the indirect preference assessment to the directly applied three assessment methods.

It is observed in other studies that methods directly applied to individuals with differing numbers and types of stimuli are compared. Higbee et al. (2000) compared the pictorial and tangible stimuli, Davis et al. (2009) compared the data from paired-stimulus and multiple-stimulus preference assessments, Cohen-Almeida et al. (2000) compared the results of the preference assessments based on the oral and tangible stimuli, and Cecile de Vries et al. (2005) compared the results of the preference assessments based on the visual, tangible, and pictorial stimuli, where Kuhn et al. (2006) compared the results of the preference assessments in presence and absence of the real stimulus.

The first aim of the present study was to investigate the relationship between the results of the indirect preference assessments with the primary caregivers and the direct preference assessments conducted in three different trials using the real stimuli (single-, paired, and multiple-stimulus without replacement) and the relation between the results of the direct preference assessments conducted in three different trials.

Choice-making

After determining the preferences of the individuals, it was necessary to teach the choice-making skills to the individuals that could not specify their preferences. Teaching the choice-making skills is a complex and difficult task in educational terms (Clark, 2006). Unlike the normal individuals, the individuals with severe and multiple disabilities cannot learn the skill of choice-making spontaneously, but need systematic teaching to learn this skill (Clark, 2006; Stafford, 1999). The methods to be used when teaching choice-making systematically are very important. Clark (2006) suggested that individual-focused interventions would be more effective in teaching choice-making. The constant time-delay procedure is one of the individual-focused interventions. The constant time-delay procedure suggests a process in which the individual is provided with a constant time-delay between presentation of a task and tips, thus ensuring the individual achievement (Wolery ve diğerleri, 1992).

There were two studies in the literature, which employed the constant time-delay procedure in teaching the choice-making skills (Clark, 2006; Stafford, 1999). Stafford (1999) used the constant time-delay procedure in teaching the choice-making skills to individuals with severe mental disabilities. Stafford's (1999) study differs from this study in three contexts, which could be summarized as the types of disabilities of the participants, the type of choice, and the research model.

Clark (2006) investigated whether the intervention

package, which included the constant time-delay procedure as well, was effective in teaching the choice-making skills. The present study is different from that of Clark (2006) in terms of the ages of the participants, methods employed, and the model of the research. These two studies were done using real objects. Nevertheless, the teaching of choice-making skills was done through the use of choosing among photographs which represent an upper level of real objects. Another aim of this study was to investigate whether the constant time-delay procedure was effective in teaching choice-making skills to individuals with SMD.

PHASE 1: COMPARING PREFERENCE ASSESSMENT FORMAT METHODS

Research model

The purpose of the first phase of this study was to determine the relationship between direct and indirect preference assessments and the relationship between the direct preference assessment methods applied to individuals with SMD through the use of correlational research model which is among the relational research models.

Subjects and enrollment

Four individuals aged 6 to 10 years with severe disabilities and diagnosed for additional disabilities and the primary caregivers who were directly involved in the care of these individuals participated in the study. The characteristics of the individuals and primary caregivers are provided as the following.

Ufuk was a 10-year-old boy with severe mental disability and spasticity. Ufuk could not hold his head and body straight for a long time but could use the right part of his body better. He used daily medicines against epilepsy seizures. He could understand and carry out single action instructions and say a few words. Primary caregiver was her mother, who was a primary school graduate housewife.

Esin was a 7-year-old girl with severe mental disability, hydrocephaly, and spastic tetraparesis, who could not use her feet and right hand. She could say 'grandmother', 'sister', brother', 'mother', 'grandfather', and 'finished'; could understand sentences with a few words, and use her left hand. Primary caregiver was her grandmother, who is a literate housewife.

Eray was a 9-year-old boy with severe mental disability and cerebral palsy. Eray started to walk when he was 6 years old. He could not walk coordinately, had inability to control saliva and inability to verbally express himself. Eray understood and tried to carry out single word instructions. The primary caregiver was his mother. She was an illiterate housewife.

Kaan was a 9-year-old boy with medium mental disability and cerebral palsy. Kaan could use his hands and arms and walked, albeit not well coordinated. He understood and tried to carry out single word instructions, had a limited vocabulary (mother, bye bye), uttered sounds as eehaaah, had behavior problem, and attended public school. His primary caregiver was his mother, who was a secondary school graduate housewife.

The direct and indirect preference assessments were carried out in the residences of the subjects. Camera and tripod were used in

the setting.

Determination of target behavior and data collection

It was seen upon observation during the preference assessments that the subjects demonstrated approaching behaviors (catching, putting to the mouth, swallowing, asking again) for preference and avoiding behaviors (pushing, spitting, shutting mouth, and throwing out of the mouth) for non-preference. Therefore, the subjects' catching, putting to the mouth, and swallowing behaviors towards the stimulus were considered a preference in the present study. On the other hand, the subjects' pushing, spitting, shutting mouth, and throwing out of the mouth towards the stimulus were recorded as a non-preference. In the presentation of two consumables, the item shown and consumed by the subject was considered preferred, the item shown but not consumed was considered not-preferred, and the item not shown and consumed was considered not-preferred.

The primary caregiver information form, preference assessment form, and the preference sorting list were developed for the collection of indirect preference assessment data. Primarily, the primary caregivers were informed to collect the indirect preference assessment data. Thereafter, the indirect preference assessment form was applied. The preference sorting lists were created upon data obtained from the form. The literate primary caregivers sorted the items included in the form based on the scores from 5 to 1. As for the illiterate caregiver, the researcher read the stimuli included in the preference sorting list and asked the caregiver to score those items.

The single-stimulus, paired-stimulus, and multiple-stimulus without replacement assessment forms were used for the direct preference assessment data. Moreover, a set of ten consumables each, including five favored and five disfavored consumables by the subject, was used in the direct preference assessment. The favored items that the subject requested to consume were marked with a "+" and the disfavored items that the subject did not want to eat or spitted were marked with a "-."

Analysis of data

Statistical Package for Social Sciences (SPSS) for Windows software was used in the analysis of the data obtained via the direct and indirect preference assessments and the correlation between the data was reviewed. In the indirect preference assessment, the numbers as stated by the primary caregivers of the subjects were entered into the preference sorting lists as it is. Nevertheless, in direct preference assessments, the percentages were calculated upon completion of three-session preference assessments and the numbers that corresponded to the said percentage values were entered into the SPSS software. The relationship between the accordingly obtained data was calculated by Spearman Brown rank differences correlation coefficient.

RESULTS

A review of Tables 1 and 2 suggests that there was a highly positive and significant relationship between the food preference predictions of the primary caregivers and the single-stimulus direct preference assessment ($r=0.805$, $p<0.01$), paired-stimulus direct preference

Table 1. Relationship between direct and indirect preference assessment.

| Variable | r | p |
|--|-------|-------|
| Relationship between indirect and single-stimulus direct preference assessment | 0.805 | 0.000 |
| Relationship between indirect and paired-stimulus direct preference assessment | 0.862 | 0.000 |
| Relationship between indirect and multiple-stimulus direct preference assessment | 0.832 | 0.000 |

Table 2. Relationship between the direct preference assessments.

| Variable | r | p |
|---|-------|-------|
| Relationship between single- and paired-stimulus preference assessments | 0.890 | 0.000 |
| Relationship between single- and multiple-stimulus preference assessments | 0.739 | 0.000 |
| Relationship between paired- and multiple-stimulus preference assessments | 0.795 | 0.000 |

assessment ($r=0.862$, $p<0.01$), and multiple-stimulus direct preference assessment ($r=0.832$, $p<0.01$) as applied to the individuals with SMD.

As a result of the study, a highly positive relationship was found between the direct and indirect preference assessments. These findings had similarities and differences with the previous studies, which found a positive relationship (Newton et al., 1993; LaRosa, 2007; Waldvogel and Dixon, 2008). The study by Newton et al. (1993) compared the activity preferences of the caregivers of individuals with severe mental disabilities to paired-stimulus direct preference assessment results and found that the caregivers' predictions were highly accurate. The finding of the present study was similar to the results of the study by Newton et al. (1993). Nevertheless, the study by Newton et al. (1993) collected predictions for 144 activities and applied the paired-stimulus direct preference assessment to randomly selected activity pairs among them. In the present study, the caregivers' views were collected for 10 consumables and the same consumables were assessed by three direct preference assessment methods. Therefore, despite the fact that the findings of this study were similar to that of Newton et al. (1993), there were differences as regards the stimuli used in indirect and direct preference assessments, the number of stimuli, and the methods employed in the direct preference assessment. LaRosa (2007) found that the caregivers' predictions were associated with the direct preference assessment results in a study, which compared the predictions of the caregivers of individuals with multiple disabilities to the direct preference assessment results. The findings of the present study were similar to that of LaRosa (2007). Waldvogel and Dixon (2008) compared the views of the staff caring for the individuals with developmental disabilities to the results of the multiple-

stimulus direct preference assessment without replacement and found a positive relationship. The present study was similar to that of Waldvogel and Dixon (2008) in terms of the findings and the stimuli employed. Waldvogel and Dixon (2008) used 10 consumables in their study.

The present study which found a positive relationship between the direct and indirect preference assessments was not compliant with some previous studies that found no relationship between the caregivers' views and direct preference assessments (Green et al., 1988; Parsons and Reid, 1990). Green et al. (1988) assessed the preferences of individuals with severe disabilities based on the caregivers' views and three-stimulus presentation. It was found as a result of the study that the views of the caregivers did not reflect the preferences of the participants. In that context, the findings of the present study and that of Green et al. (1988) were different. It is thought in the present study that taking the primary caregivers' opinions was effective in creating this difference. Due to Turkish culture, the primary caregivers of the individuals with SMD are their kin, namely, mothers or grandmothers. The primary caregivers provide all the care for the individuals with SMD. Therefore, it was suggested that the primary caregivers predict the preferred food of the children with SMD with high accuracy for this reason.

There was a highly positive and significant relation between the single-stimulus preference assessment and paired-stimulus preference assessment ($r=0.890$, $p<0.01$), between the single-stimulus preference assessment and multiple-stimulus preference assessment paired-stimulus direct preference assessment ($r=0.739$, $p<0.01$), and paired-stimulus preference assessment and multiple-stimulus preference assessment ($r=0.795$, $p<0.01$) as applied to the individuals with SMD. Based on the foregoing, it could

be concluded that the responses of individuals with SMD were consistent when they were presented with the single-, paired-, or multiple-stimulus.

There was a highly positive relationship between the preference assessments based on single-, paired-, and multiple-stimulus without replacement in the study. These findings had similarities and differences with the previous studies, which found a positive relationship (Thomson et al., 2007; Thiessen, 2010). Thomson et al. (2007) assessed the preferences of individuals with severe and very severe disabilities by single- and paired-stimulus preference assessment methods and that the results from both methods suggested a positive relationship. The positive relationship, as found between the single- and paired-stimulus preference assessments in the present study, was consistent with the findings of the study by Thomson et al. (2007). Moreover, both studies employed the consumables as stimuli. Nevertheless, there was a limitation of the study by Thomson et al. (2007) since the said study employed only two of the direct preference assessment methods by which their study differed from the present study. Thiessen (2010) found a positive relationship between the paired- and multiple-stimulus preference assessments. The findings of the present study were similar to that of the study by Thiessen (2010).

The literature of the field suggested that studies comparing two methods used single- and paired-stimulus preference assessments and those comparing three methods used paired-, multiple-, and blended-stimulus methods. The review also suggested that there was no study, which compared the single-, paired-, and multiple-stimulus (without replacement) preference assessments in a single study. This was the original aspect of the present study.

PHASE 2: teaching the skill of choice-making among photographs with time-delay procedure

Research model

The second phase of the study employed the multiple probe design across subjects, which is one of the single subject designs. The dependent variable was the level of choice-making from among the photographs of the consumables. The independent variable was the time-delay procedure.

Subjects

The subjects involved in the first phase were also enrolled in the second phase of the study. The research was conducted at the residences of the subjects. The 10 most real-like photographs of

consumables sized 10 × 10 cm were used for each subject in teaching the skill of choice-making among photographs.

Determination of target behavior and data collection

In the study, the photographs of the preferred and non-preferred consumables were used in teaching the skill of choice-making among photographs. Showing the photographs of the stimuli by the subjects was considered the correct response.

Probe, continuity, and generalization registration forms and the registration form to record the progress during teaching were developed for data collection purposes as regards teaching the skill of choice-making among photographs.

Paired stimulus presentation was used in teaching sessions. Each target stimulus pair in the work sets (5 pairs) was presented to the individuals in the same order 3 times, in other words 15 trials were conducted. The stimuli in the work set were separately determined for each subject. The photographs of preferred (5) and non-preferred (5) food-drink items as a result of direct and indirect preference assessments were used for the purposes thereof. The item pairings in teaching the skill of choice-making among photographs was the same with the pairings used in the paired-stimulus preference assessment, and were presented in the same order.

Procedure

Probing, teaching, and generalization sessions were conducted with 3 individuals for each choice phase during the application of the study which tested the effectiveness of time-delay procedure in teaching the skill of choice-making among photographs to individuals with severe and multiple disabilities.

Baseline

Probing sessions were conducted to determine the performance of the subjects as regards the skill of choice-making among photographs before the onset of teaching the skill. During the probing session, each target stimulus pair was presented to the subjects three times in the same order. The first probing session was conducted simultaneously with all the subjects before the teaching started. The probe data were collected in inconstant intervals for the 2nd and 3rd subjects.

The probing sessions were conducted in the room where the application was carried out based on the following steps: (1) the researcher made ready the

materials to be used in the session, registration forms, and the video camera for recording the session; (2) the researcher informed the subjects about the study (I want you to make choices among the items I am going to show you); (3) the researcher provided tips in order to attract the attention of the subjects (Are you ready? Shall we start? etc.); (4) the subjects' responses indicating readiness to work were reinforced (Well done!), target stimulus was presented (Look at this, look at this, which one do you want?); (5) the subjects' working behaviors along with their responses were reinforced; (6) the researcher proceeded to the next trial.

Intervention

The subjects received training for waiting if they did not know how to wait for tips before the onset of teaching. The teaching sessions with constant time-delay procedure were organized as sessions with 0 seconds constant time-delay procedure and constant time-delay procedure.

During the constant time-delay procedures, the following was said to the child before commencing the teaching: "Now we will learn how to make choices. If you know which one to prefer show it. If you do not know the right answer wait for me to show you the right answer. Show after I show it. If you listen to me carefully and show it when I ask you to do so, you can eat/drink the items you have shown." The subjects were asked "Are you ready!" in order to attract their attention. When the subject expressed readiness via a sound (aaahhh) or any gesture or facial expression, or after high-fiving when the subject was asked to high-five, if he or she was ready, the teaching sessions started by telling "Well done, very good, so we can start working."

During the teaching sessions with the constant time-delay procedure, after the target stimulus was presented ("Look at this, look at this, which one do you want?"), the researcher started to silently count for the waiting time (1001, 1002, 1003, and 1004) and provided the controlling tip at the end of the time-delay. When the individual provided the right answer within the time-delay between the target stimulus and controlling tip, the individual was reinforced both verbally and with food, and when he/she showed the right answer after the controlling tip, the individual was reinforced verbally by for example, "Well done, very good!", and the next trial started.

If the individuals provided the wrong response before the controlling tip, the photographs were replaced and the target stimulus was presented again and the right response was reinforced both verbally and with food. If the right responses came after the controlling tip, the same were reinforced only verbally. In case of wrong responses before the controlling tip, the photographs

were replaced, target stimulus was presented again, the subject was asked to wait, and then the researcher showed the right answer first after 4 seconds and then asked the subject to show it. In case of wrong responses after the controlling tip or when the subject failed to provide a response, the controlling tip was provided again and the subject was asked to show. When the subject showed the right answer, he was reinforced verbally. If not, the choice was considered void and the next trial started.

Generalization

Interpersonal generalization was made in the study. In order to test whether interpersonal generalization was ensured, it was checked whether the individuals made choices among the items presented by the primary caregivers. The primary caregivers were provided with preliminary information as regards how to provide an opportunity for making choices. During the preliminary information, they were told where and how to place the photographs, that they should not react to wrong or right responses of their children, and that they should replace the photographs in case of wrong responses. The generalization sessions started after the primary caregivers were presented with and practiced the information earlier mentioned. During the application, necessary instructions and assistance in photograph placement were provided to the mothers. The generalization sessions were conducted in the same way as the probing sessions.

Graph-1 teaching the skill of choice-making among the photographs

As shown in Graph-1 (Figure 1), Esin's baseline performance as regards choice-making among the photographs was 33%, and it increased to 100% in 7 and 8th sessions. Eray's baseline performance was 35% and it increased to 87% in the 7th session and 100% in the 8th session. Kaan's baseline performance was 40% and it increased to 87% in 5, 6, and 7th sessions, which met the criteria. Esin and Eray retained 100% of what they had learned after 1, 3 and 4 weeks, where Kaan retained 87%. It was seen that all three subjects demonstrated this skill also when they were together with their primary caregivers.

It was seen that the curves indicating the right response levels before the tips during the teaching with time-delay procedure diverged from the horizontal axis, and that the right response levels after the tips converged the horizontal axis. As it is evident from the graph, the results imply that the teaching with time-delay procedure was associated with acquisition of the

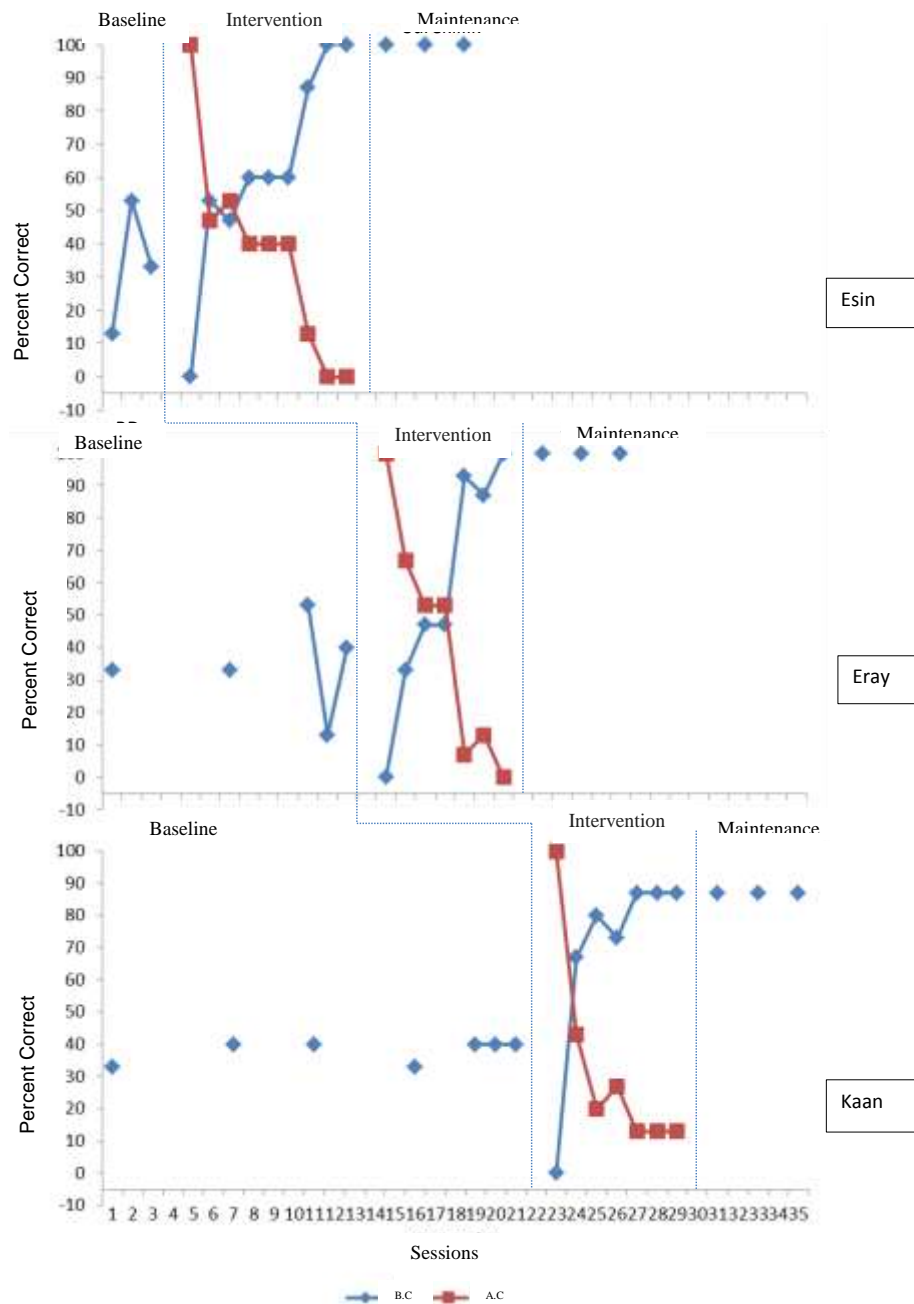


Figure 1. Graph-1 teaching the skill of choice-making among the photographs.

skill of choice-making among photographs by the subjects.

simultaneously in different settings by randomly selecting 30% of the applications during each phase of the study. The inter-observer reliability data was 100%.

Inter-observer reliability findings

Two classroom teachers working in the field of special education collected the inter-observer reliability data. They collected data as regards the dependent variable

Application reliability findings

A teacher, who worked in the field of special education and familiar with the method used in the study,

collected the application reliability data of the study. The application reliability data was 100%.

DISCUSSION

The findings of the present study suggested that teaching choice-making among the photographs with constant time-delay procedure was effective, that the participants retained the choice-making skill after 1, 3, and 4 weeks after the end of the teaching, and that they generalized the skill they learned to their primary caregivers.

Although the findings as regards the third aim of the study were generally positive, it is required to discuss certain situations observed during the conduct of the study. It was seen that the subjects' percentage of accuracy of the choice-making skills was improved in the sessions with constant time-delay procedures. It was seen upon a review of the accuracy percentages of choice making skills that Esin's performance rapidly improved, yet became stationary during the 4, 5, and 6th sessions. It was suggested that the stationary performance could be attributed to the upper respiratory infection that affected Esin. Esin's performance increased to 100% upon recovery from disease, providing her with audio and visual computer game as reinforcement at the end of the teaching sessions, allowing her to consume the stimulus that she preferred, using the same stimulus pairs, and increased number of sessions with constant time-delay procedure. Esin retained choice-making skill at 100% 1, 3, and 4 weeks after the end of the teaching.

Eray's percentage of accuracy as regards choice-making among photographs rapidly increased, yet became stationary during the 4th session. The reason of the stationary performance during the 4th session might be the fact that he was combative and reluctant to work due to a problem experienced with his teacher at school. Eray's performance during the 5th session rapidly increased yet he underperformed during the 6th session. The fact that the session was held on his birthday, when he had lower concentration, might be the underlying factor. Eray's performance reached 100% during the 8th session, and he retained choice making skill at 100% 1, 3 and 4 weeks after the end of the teaching. Eray's success in learning the choice-making skill fast was evident with his performance increased to 100% upon the use of his favorite computer game with a dozer and truck as reinforcement, allowing him to consume the stimulus that he preferred, using the same stimulus pairs, and increased number of sessions with constant time-delay procedure. Eray retained choice-making skill at 100% 1, 3, and 4 weeks after the end of the teaching.

Kaan's percentage of accuracy as regards choice-

making among photographs showed a marked increase, yet it declined during the 4th session. The reason for the decline was attributed to the intestinal infection that affected Kaan. A review of Kaan's performance during the 5, 6, and 7th sessions suggested that his performance was sustained at 87%. He experienced difficulties in making choices between the curd cheese and halva. This was because of the fact that the distractor has against the preferred stimulus, that is, the curd cheese, was placed in a black plate, or that the distractor was very powerful.

Kaan's success in learning the choice-making skill increased fast to 87% upon playing his favorite plays based on throwing and catching (balls, buckles) as a reinforce, allowing him to consume the stimulus that he preferred, using the same stimulus pairs, and increased number of sessions with constant time-delay procedure. Kaan retained choice-making skill at 100% 1, 3, and 4 weeks after the end of the teaching.

The findings of the present study were consistent with that of Stafford (1999), who investigated the effectiveness of constant time-delay procedure in teaching the three levels of choice-making (preferred-non-preferred, preferred-neutral, and among two preferred stimuli). He suggested that constant time-delay procedure was effective in teaching the three levels of choice-making. Nevertheless, the present study found that constant time-delay procedure was effective also on different subjects in teaching to make choices between the photographs of preferred and non-preferred stimuli, only one and the first of the levels suggested by Stafford (1999). The present study had a limitation of not addressing the other levels of choice-making as suggested by Stafford's study.

The findings of the present study were similar to and different from that of Clark (2006) in some aspects. Clark (2006) investigated whether it was effective to use the intervention package, which included the constant time-delay procedure as well, in teaching the choice-making skills to preschoolers, and concluded that it was effective. Despite the similar findings, there are differences between the present study and Clark's (2006) study in three aspects. The first is that Clark (2006) studied preschoolers with visual and multiple disabilities, whereas the present study enrolled schooled individuals with SMD. The other difference is that Clark (2006) used a teaching package that additionally included the constant time-delay procedure among others, whereas the present study only employed the constant time-delay procedure. Finally, Clark's (2006) study was based on multiple baseline model, whereas the present study employed the multiple probe model. In that respect, the present study is different from that of Clark (2006).

It was found as a result of the study that the individuals with SMD acquired the skill of choice-making among the

photographs. The findings of the present study are consistent with that of the study by Parsons et al. (1997), in which two out of seven subjects learned to make choices among the photographs. Parsons et al. (1997) employed two methods (objects and pictures) in teaching to make choices to 7 individuals aging between 49 and 67 with severe mental disabilities and additional disabilities. As a result of the study, five participants demonstrated the skill of choice-making based on objects, and two participants based on pictures. It was suggested the fact that only two participants learned how to make choices on the basis of photographs was attributable to age factor and individual characteristics.

As a result of the first phase of the present study, a highly positive relationship was found between the predictions of the primary care givers of the individuals with SMD about the consumable preferences and the single-, paired-, and multiple-stimulus direct preference assessments for individuals with SMD. These findings suggested the fact that the views of the primary caregivers might reflect the truth as regards the preferences of children with SMD. Furthermore, there was a highly positive relationship between the single-, paired-, and multiple-stimulus preference assessment as conducted within the scope of the study. These findings are important for the fact that the individuals may make consistent choices even when the number of stimuli changes.

The second phase of the study found that teaching to make choices among photographs based on the constant time-delay procedure was effective, that the participants retained the choice-making skill 1, 3, and 4 weeks after the completion of the teaching, and generalized the same to their primary caregivers. It was concluded that these findings were important since they were the prerequisites for teaching the skill of making choices among the photographs, an upper level of real stimuli. In addition, it was considered a transition stage towards the stimuli with photographs and illustrated communication systems to be used in the next educational stages. Furthermore, the results of the present study suggested that the individuals with SMD may acquire the choice-making skill since they can live independently and take on the responsibility of life.

A review of the studies on teaching the choice-making skills (Sigafoos and Dempsey, 1992; Kennedy and Haring, 1993; Stephenson and Linfoot, 1995; Parsons et al., 1997; Koepfel, 1998; Stafford, 1999; Barry and Burlew, 2004; Dutt, 2010; Clark, 2006; Hoch, 2006; Duke, 2008) provides that preferences are assessed before teaching the choice-making behavior. In the light of the research data, one can conclude that preference assessment is necessary for teaching to make choices. Teaching to make choices upon data obtained as a result of the preference assessment

leads to a more effective acquisition of the said skill and also helps the individuals to become more liberated and independent.

Conflict of Interests

The authors have not declared any conflicts of interest.

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