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The effects of simultaneous prompting on teaching receptively identifying occupations from picture cards☆

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Abstract

A multiple probe across subjects design was used to examine whether or not the use of simultaneous prompting procedure would result in an increase on the percentage of correct responding of receptively identifying occupations from picture cards. Maintenance and generalization effects of simultaneous prompting were also investigated. Five occupations were taught to each subject. Black and white picture cards were used to explain occupations during full and daily probe, instructional and maintenance probe sessions. Colored picture cards were used during generalization sessions and generalization probe was assessed before and after instruction. Maintenance sessions were conducted 1, 2, and 4 weeks after the instruction. Maintenance and generalization probe sessions were conducted just like full probe sessions. Fifteen trials were used during full and maintenance probe sessions and 10 trials during daily probe, instructional, and generalization probe sessions. Correct responses resulted in reinforcement in all sessions whereas incorrect responses resulted with error correction during instructional sessions and ignorance during daily, full, maintenance, and generalization probe sessions. Simultaneous prompting was effective for teaching receptively identifying occupations form picture cards. Maintenance and generalization effects of simultaneous prompting were also positive. Future research is needed to extend the current literature about simultaneous prompting.

Keywords: simultaneous prompting; developmental disabilities

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Simultaneous prompting procedure is one of the effective near-errorless teaching procedures that researchers and practitioners have shown a closer attention in the last decade. It is a systematic form of antecedent prompt and test instructional procedure. The main similarity between these two procedures is about delivering controlling prompts. Controlling prompt is delivered simultaneously with the task direction in both of these procedures. However, there are two main differences between these two procedures. First, although a controlling prompt is always presented in each trial during instructional sessions in simultaneous prompting procedure, controlling prompts are not necessarily presented in the antecedent prompt and test. Second, examining the transfer of stimulus control is always planned prior to instructional sessions in simultaneous prompting; but, the same testing can be planned in any time for antecedent prompt and test (e.g., prior or immediately after the instruction, following day, etc.) (Wolery, Ault, & Doyle, 1992).

Although there are experimental evidences that simultaneous prompting is an effective procedure on teaching various discrete and chained skills to subjects with various disabilities further research is still needed to refine the findings about the effectiveness and efficiency of simultaneous prompting (Schuster & Griffen, 1993; Schuster, Griffen, & Wolery, 1992; Singleton, Schuster, & Ault, 1995; Tekin & Kircaali-Iftar, in press).

The studies examined the effectiveness of simultaneous prompting procedure on teaching discrete tasks such as object naming (MacFarland-Smith, Schuster, & Stevens, 1993); science vocabulary words (Johnson, Schuster, & Bell, 1996); word identification (Griffen, Schuster, & Morse, 1998); community signs (Singleton et al., 1995); rebus symbols (Wolery, Holcombe, Werts, & Cipolloni, 1993); sight words (Schuster et al., 1992; Gibson & Schuster, 1992); expressively identifying the flags of the nations, verbally stating the sums of addition math facts, expressively identifying unlabelled outlines of the states from the US map, demonstrating the manual signs for communication picture symbols (Fickel, Schuster, & Collins, 1998); receptively identifying animals (Tekin & Kircaali-Iftar, in press); and chained tasks such as making juice from a frozen concentrate (Schuster & Griffen, 1993); dressing skills (Sewell, Collins, Hemmeter, & Schuster, 1998); vocational skills (Fetko, Schuster, Harley, & Collins, 1999); assembling shipping boxes (Maciag, Schuster, Collins, & Cooper, 2000); and hand washing (Parrott, Schuster, Collins, & Gassaway, 2000).

This study is a partial replication of MacFarland-Smith et al. (1993). MacFarland et al. examined the effectiveness of simultaneous prompting procedure on teaching expressive identification of food items to three preschool students with developmental delays. Simultaneous prompting was effective in teaching expressive identification of food items to young students with developmental delays. Also, all students maintained and generalized the food items with a very high accuracy.

In simultaneous prompting, controlling prompt and discriminative stimulus are presented at the same time. That is to say, the teacher presents the target stimulus (e.g., ‘‘which fruit is this?’’) and presents the controlling prompt (e.g., ‘‘this is an apple’’). Since a controlling prompt is always presented during instruction, the

student does not have the opportunity to respond to the task direction independently. Therefore, separate probe sessions are needed to test the establishment and transfer of stimulus control.

The steps for implementing simultaneous prompting can be listed as follows (Tekin & Kircaali-Iftar, 2001): (a) determine the stimulus to be delivered during training, (b) determine the controlling prompt, (c) plan the probe sessions, (d) determine the response interval, (e) determine the behavioral consequences based on the student's responses, (f) select a data collection system, (g) implement and modify the instructional program based on the student performance.

The present study was conducted to extend the current literature on simultaneous prompting procedure. The following research questions were addressed: (a) Will simultaneous prompting be effective on teaching three preschool students with mild to moderate mental retardation to receptively identify occupations presented on picture cards? (b) Will the students maintain the acquired skills overtime? (c) Will the students generalize the acquired skills across materials? (d) What is the mothers' opinion about the social validity of the study?

1. Method

1.1. Participants and settings

1.1.1. Students

Participants included one female and two male preschool students with developmental disabilities. The students were enrolled in a classroom for individuals with developmental disabilities at a university unit. None of the students had a history with systematic instruction for learning any discrete or chained task with any of the response prompting procedures. Adaptive behavior scores for these students were not available. Demographic information of students—the names (pseudonyms), chronological ages, gender, duration of attending the unit, and diagnoses—are presented in Table 1.

The prerequisite skills which students had to have for this study were as follows: (a) ability to pay attention to an activity for 5 min, (b) ability to follow verbal instructions such as answering questions, etc., (c) ability to select cards from three alternatives, (d) ability to select possible reinforcers. All students met

Table 1
Names, chronological ages, gender, the number of months attending to the unit and diagnoses of the subjects

Name	Chronological age	Gender	No. of months attending to the unit	Diagnoses
Orhan	6	Male	3	Mild mental retardation
Gaye	4	Female	8	Moderate mental retardation, cerebral palsy, speech disorders
Enes	6	Male	24	Moderate mental retardation

the prerequisite skills for this study. The students were chosen by their mothers' consent, and the first researcher signed a contract with each mother regarding participating in the study.

Orhan was a 6-year-old male with developmental disabilities. He had mild mental retardation. He was able to initiate and maintain communication. He performed many gross motor and fine motor skills of his age. He was able to perform most self-care skills independently. His weaknesses were in problem solving, acquiring some concepts such as positions, contrast etc.

Gaye was a 4-year-old female with multiple disabilities. She had moderate mental retardation, speech disorder and cerebral palsy. She had been attending the university unit for 8 months when she participated in the study and she did not attend any school before coming to this unit. She was having one to one instruction in the unit during the study. Gaye had difficulty in problem solving, initiating verbal communication and difficulty in some of the gross motor and fine motor skills. She did not perform several self-care skills independently.

Enes was a 6-year-old male with developmental disabilities. He had moderate mental retardation and had limited speech. He was having group instruction in the unit for 2 years. He was also attending a kindergarten with his peers with normal development in an inclusive setting. His strengths were performing some of the gross motor and fine motor skills, having concepts such as position concepts. He had difficulty in problem solving, initiating verbal communication, grooming, and eating skills.

1.1.2. Trainer and observer

The classroom teacher (i.e., the first author) conducted all experimental sessions. He was a graduate student and enrolled in a masters program in special education. He had 10 years of experience in teaching students with mental retardation. The reliability observer was also a graduate student in a masters program in special education. She had experience with systematic instruction with response prompting procedures. A written report was delivered to the reliability observer explaining the following points: (a) purpose of the study, (b) attentional cues delivered in the study and its consequences, (c) target stimulus presentation, (d) controlling prompts delivered in the study during training, (e) the length of the response interval, (f) number of trials during in each experimental session, (g) behavioral consequences delivered during each experimental session, (h) the length of the inter-trial interval, (i) administration of the generalization and maintenance probe session.

1.1.3. Settings and materials

All screening, probe, instructional, maintenance and generalization probe sessions occurred in the one to one instruction classroom of this university unit. The classroom had a table, two chairs, and a coffee table to replace the training set. A handycam camera was set up to record sessions from the corner of the classroom. There were two alternatives (distracters) of each target stimulus. Also, a stopwatch and reinforcers were used during each experimental session.

Two daily probe and two instructional sessions took place in the classroom from 9.30 a.m. to noon. No individual other than the trainer and the student was present during the study hours in the classroom. All sessions occurred in 1:1 instructional arrangement. The trainer and the student sat face by face at the table.

There were 40 picture cards describing the occupations either by presenting persons in special clothes for that occupation or performing the occupation by action. For example, a picture card for a pharmacist had a woman wearing a white uniform and having a medicine box. A picture card for a car repairman had a man who had a broken car and a man wearing a repairman uniform. Twenty-four of these picture cards were scanned from a preschool reading set, and 16 of them were printed out from clipart. All of the pictures were black and white. These pictures were placed on 10 cm × 15 cm cards. Colored picture cards were used during generalization probe sessions. All of the picture cards were laminated.

In each picture card an occupation is described by having a human figure worn by the special clothes to that occupation. Moreover, an occupation is described by having a human figure who has specific materials to that occupation or having the specific situation for that occupation in the picture cards.

1.2. Screening procedures

Screening was conducted to identify unknown occupations for each student. Prior to initial baseline conditions, the authors selected 40 occupations from a preschool reading set. The first author conducted two screening sessions a day. From a pool of 40 occupations, five unknown occupations were determined for each student to teach receptively identifying them from picture cards. The picture cards were divided into two groups. During the first screening session, the first 20 picture cards were presented, and during the second screening session, the next 20 picture cards were presented to specify the possible target behaviors for each student. There were 20 trails at each screening session with a random trial presentation.

Screening trials were conducted as follows: The trainer secured the student's attention and presented a possible target stimulus by asking, ''Show me. Which one is the pharmacist?'' and waited 5 s for a response. Each target stimulus was presented along with two distracters. Distracter occupations were chosen from the second 20 picture card group, and distracters were changed in each trial. All responses (i.e., correct response, incorrect response or no response) were ignored and the trainer presented the next trial. Five unknown occupations were determined for each student.

Twenty unknown occupations were selected from the occupations which were receptively identified with 33% accuracy at the most for three consecutive screening sessions to use during probe, instructional, maintenance, and generalization probe sessions. Off these 20 picture cards, 5 of them were selected as target stimuli and fifteen of them were used as distracters. While selecting the target stimuli following criteria were used: (a) the occupations responded incorrectly for the three screening sessions or at least for two consecutive screening sessions were selected, (b) if there were more than five occupations

Table 2
Target behaviors for each student

Students	Target behaviors
Orhan	Pilot Dyer Tailor Shoe repairman Speaker
Gaye	Pilot Pharmacist Dyer Traffic policeman Secretary
Enes	Pilot Farmer Cook Fruiterer (green grocer) Secretary

that the student responded incorrectly, the occupations selected form the preschool reading set were given a priority to be chosen, and (c) ask the mother's of the students to rank the occupations they wanted their children learn first. Target stimuli for each student are in Table 2. The subjects' cooperation and attentional behaviors were reinforced at the end of each session.

1.3. Experimental procedures

1.3.1. General procedures

All experimental sessions occurred in a 1:1 instructional arrangement. A total of five target stimuli, receptively identifying five occupations, was taught to each student. A full probe condition was conducted before delivering instruction and after the criterion was reached for a minimum of three consecutive daily probe sessions for each student. During training, two daily probe and two training sessions were conducted in each school day. Daily probe sessions were conducted right before the training sessions. A daily probe session did not take place on the first training day. There was a reinforcer pool. The trainer let the students select reinforcers for the correct responses they performed during the sessions at the end of each session. Students' participation to the study and their cooperation also, resulted in social praise at the end of each session.

1.3.2. Full probe conditions

Each full probe condition had a minimum of three consistent full probe sessions. Full probe condition occurred prior to delivering instruction to and after the criterion was met in each student. Full probe conditions were conducted simultaneously for all students in a 1:1 instructional arrangement. There were 15

trials in each full probe session. Each occupation (target stimulus) was asked five times in a random order for a total of 15 trials. The trials were presented in an unpredictable order. The inter-trial interval was 5 s. The full probe session was conducted as follows: The teacher had the materials ready (five picture cards in order to present three times for target behaviors, and 30 distracters) and placed them on the table separately, placed the target stimuli and two distracters on the table in front of the student, delivered the attentional cue to the student, and, after receiving an affirmative response to the question, "..., are you ready to work?" the trainer delivered the task direction "..., show me. Which one is the pharmacist?" and waited the subject's response for 5 s. Correct responses within 5 s, "student showing the pharmacist from three picture cards by pointing or holding the card," resulted in verbal praise and were followed by the next trial. Incorrect responses or no responses within 5 s were ignored and followed by the next trial. Incorrect responses were defined as (a) showing or holding wrong picture card/s (one or more) at a time, (b) not showing any response during the trial. Student's correct responses resulted in continuous social reinforcement (e.g., "good work," "good girl"), and fixed ratio schedule was used to deliver a tangible reinforcer (FR15). Students' attention and cooperation behaviors were reinforced at the end of each session.

1.3.3. Daily probe sessions

Since a controlling prompt is presented in each trial in simultaneous prompting, the subject does not have the opportunity to respond to the task direction independently. Therefore, a daily probe session is conducted prior to each training session in order to test the acquisition level of the target behaviors. There was no daily probe session prior to the first training session. Each picture card was presented twice with a total of 10 trials in each daily probe session. The trials were presented in an unpredictable order. The daily probe sessions were the same as the full probe sessions with one exception. Daily probe sessions were conducted to test the transfer of stimulus control in only student who was currently being taught rather than testing all students at the same time. Continuous reinforcement schedule was used until the criterion was reached. The criterion was 90% correct responding for at least three consecutive daily probe sessions for each student. Correct responses resulted in verbal praise, and fixed ratio schedule (FR10) was used at the end of each session for the student who completed the probe sessions with 100% correct responding. Incorrect responses resulted in ignorance and delivery of the next trial. Subjects' attention and cooperation behaviors were reinforced at the end of the sessions.

1.3.4. Simultaneous prompting training sessions

Simultaneous prompting procedure was delivered to teach receptively identifying occupations from picture cards. After getting a stable data at the first full probe condition, the trainer started to deliver training to the first student. One to one instructional arrangement was used during the training sessions. There were 10 trials in each training session. Each target stimuli was asked twice.

The response interval and inter-trial interval were 5 s in the study. Model plus verbal prompting was used as a controlling prompt for each student. One training session after daily probe session was conducted per day.

Training sessions were conducted as follows: The teacher had the materials ready (five picture cards for target behaviors and 20 distracters) and placed them on the table separately, placed the target stimuli and two distracters on the table in front of the student, delivered the attentional cue to the student, and after receiving an affirmative response by establishing eye-contact or receiving an answer to the question, "..., shall we start to learn occupations from the picture cards?" and delivering reinforcement to this attentional response, the trainer delivered the task direction "..., show me. Which one is the pharmacist?" and the trainer immediately delivered the controlling prompt for this trial "..., look. This is a pharmacist" and waited the subject's response for 5 s. Correct responses within 5 s, "student showing the pharmacist from the three picture cards by pointing or holding the card," resulted in continuous verbal praise and the delivery of the next trial after 5 s. Incorrect responses or no responses within 5 s resulted in error correction. Incorrect responses in the training sessions were defined as in probe sessions. The trainer continued to deliver error correction until a correct response was given by the student. The student was also verbally praised for this correct response. Students' correct responses resulted in continuous social reinforcement (e.g., "good work," "good girl") and fixed ratio schedule was used to deliver a tangible reinforcer (FR10). Students' attention and cooperation behaviors were reinforced at the end of each session. The training sessions were implemented until the students reached at least 90% correct responding in three consecutive daily probe sessions.

1.3.5. Maintenance and generalization probe sessions

Maintenance probe sessions were conducted 7, 21 and 28 days after the final full probe condition. However, due to the health problems of one student (i.e., Orhan) the last maintenance probe session was conducted 26 days after the instruction was over. Maintenance sessions were identical to the full probe sessions. Reinforcements were thinned during maintenance sessions. The following reinforcement schedule was used to thin the reinforcement. Continuous reinforcement schedule (verbal praise) for every correct response and fixed ratio schedule (FR15) (a tangible reinforcement) were used during the first maintenance session, only continuous reinforcement schedule was used during the second maintenance session, and fixed ratio schedule (FR15) was used during the last maintenance session. Incorrect responses resulted in ignorance.

Generalization across materials was examined in the present study via pre- and post-test design. The colored picture cards were used to test the generalization effects of simultaneous prompting. Pre-test generalization probe session was conducted following the last probe session of the first probe condition. Post-test generalization probe session was conducted after the criterion was met at each student. Generalization probe sessions were conducted in the same fashion as full probe sessions with one exception. In generalization probe sessions colored

picture cards were used. The response interval and inter-trial interval were 5 s during generalization probe sessions. Each target stimulus was presented twice and there were 10 trials in each generalization probe session. The behavioral consequences were delivered in the same manner as full probe conditions. Students' attention and cooperation behaviors were reinforced at the end of each generalization and maintenance session.

1.3.6. Experimental design

A multiple probe design across students was used to assess the effectiveness of simultaneous prompting on teaching receptively identifying occupations from picture cards. The dependent variable of the study was the percent of correctly receptively identifying occupations from the picture cards among three cards by either holding the picture cards or pointing the picture cards. The independent variable of the study was simultaneous prompting procedure. The independent variable was introduced to teach receptively identifying the occupations from picture cards to one student at a time. Experimental control was built in when the subject was responding at or near to baseline levels during full probe conditions before the intervention had been introduced and the criterion was reached only after the intervention was introduced (Tawney & Gast, 1984; Tekin & Kircaali-Iftar, 2001; Wolery, Bailey, & Sugai, 1988).

1.3.7. Reliability

Reliability data were collected at least 20% of daily and full probe sessions, and instructional sessions; 50% of maintenance and generalization probe sessions. A point-by-point method was used to assess the dependent variable reliability with a formula of the number of agreements divided by the number of agreements plus disagreements multiplied by 100 (Tawney & Gast, 1984; Tekin & Kircaali-Iftar, 2001). The independent variable reliability (procedural reliability) was calculated by dividing the number of teacher behaviors observed by the number of teacher behaviors planned and multiplied by 100 (Billingsley, White, & Munson, 1980; Tekin & Kircaali-Iftar, 2001). The following teacher behaviors were observed for procedural reliability: (a) having the materials ready, (b) securing the subject's attention, (c) delivering the task direction, (d) delivering the controlling prompts in time, (e) waiting for the response interval, (f) delivering the correct behavioral consequences, (g) waiting for the inter-trial interval, (h) providing praise for attention and cooperation. The same trainer behaviors were assessed for the independent variable reliability during full probe, daily probe, maintenance probe, and generalization probe sessions except delivering controlling prompt behavior.

Reliability data indicated 99% (range = 98–100%) agreement during full probe sessions, 99% (range = 97–100%) agreement during daily probe sessions, 97% (range = 90–100%) agreement during generalization, and 100% agreement during instructional and maintenance probe sessions on the dependent variable. Procedural reliability collected during daily and full probe sessions, respectively, indicated that the trainer implemented the planned steps of the probe sessions with

an overall 98% accuracy across students (range = 76–100%), and that the trainer implemented all behaviors with 100% accuracy across all students. The trainer implemented all of the planned steps of the instructional procedure with an overall 99% accuracy across students. All of the planned steps were implemented with 100% accuracy during instruction except providing the attentional cue (mean = 99%, range = 97–100%) and delivering the controlling prompts (mean = 99%, range = 97–100%). The trainer implemented the planned steps of the maintenance probe sessions with an overall 97% accuracy across students (range = 89–100%), all planned steps in generalization probe sessions with 100% accuracy across subjects.

1.3.8. Social validation

At the end of the study, a questionnaire was given to the mothers of the subjects to determine their opinions about the procedures, goals, and results of the study. Mothers were requested to complete this questionnaire individually. The questionnaire was designed to reveal (a) whether the trainer complied with the ethical rules determined in this study at the contract, (b) whether or not the mothers liked the simultaneous prompting, (c) what, if any, the outcomes of the study were, and (d) whether or not the mothers' opinions changed regarding their children after participating in this study. The questionnaire consisted of 9 yes–no questions and three open-ended questions.

2. Results

2.1. Instructional data

Fig. 1 indicates data collected on the percent of correct responses during full probe, daily probe, instructional, maintenance, and generalization probe sessions. Data indicate that simultaneous prompting was effective on teaching receptively identifying occupations from picture cards to three young students with mild to moderate developmental disabilities.

The instructional data for each subject, the number of training sessions, the number of training trials, the number and percentage of training errors, amount of training and probe time, and the number and percentage of probe errors are in Table 3.

As seen in Table 3, a total of 33 training sessions and 330 training trials were required for the three students to acquire receptively identifying occupations from picture cards. Orhan needed 9 training sessions and 90 training trials, Gaye needed 14 training sessions and 140 training trails, and Enes required 10 training sessions and 100 training trials to reach criterion on receptively identifying five occupations from picture cards. Approximately, 84 min of training time in total was required for the three students to acquire the skills. Orhan required approximately 20 min, Gaye required approximately 39 min, and Enes required approximately 24 min to reach criterion on receptively identifying five occupations from

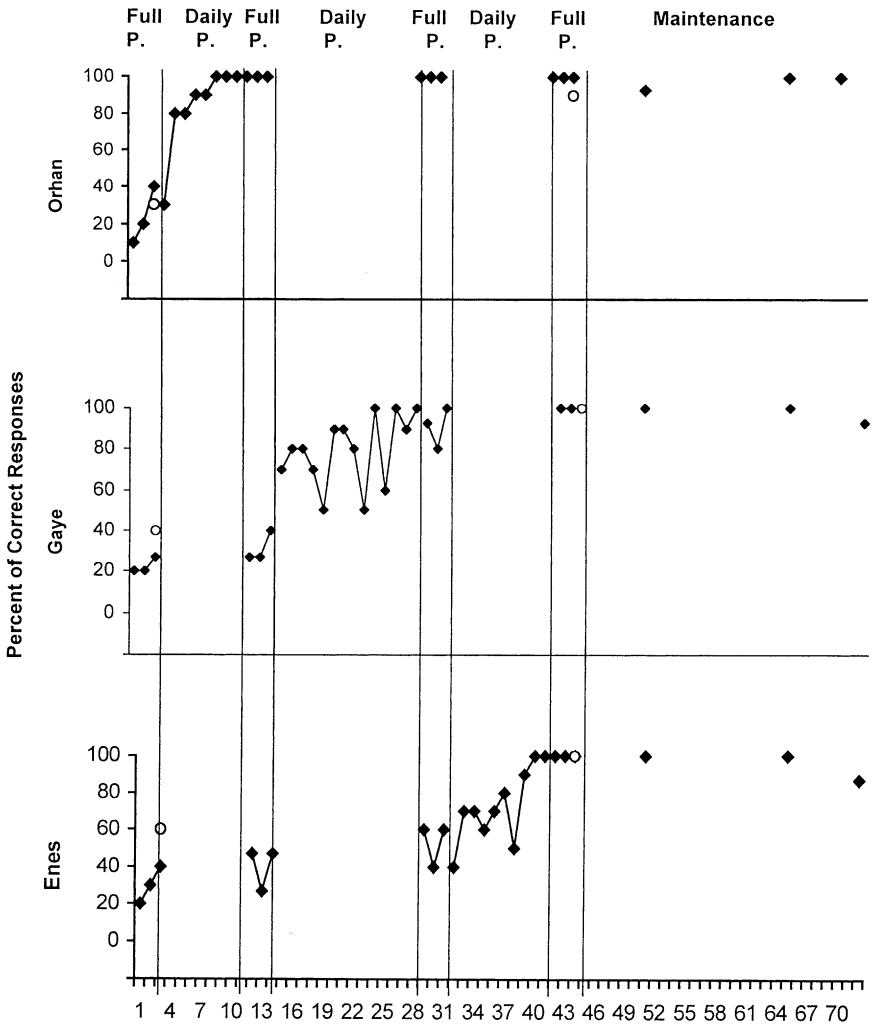

Fig. 1. Percentage correct for Orhan, Gaye, Enes during full, daily, maintenance, and generalization probe sessions. Closed diamonds represent daily probe, full probe, and maintenance probe data and open circles represent generalization probe data.

picture cards. Also, approximately 69 min were spent as a daily probe time to reach criterion. Error percentages during probe sessions to reach criterion were 10, 18, and 27 for Orhan, Gaye and Enes, respectively.

2.2. Maintenance and generalization data

Maintenance probe data indicate that all students maintained the skills they acquired during instruction at the criterion level. The maintenance probe data can

Table 3
Instructional data for each student and training set through criterion

Students	No. of training sessions	No. of training trials	No. of training errors	Percentage of training errors	Training time (min:s)	Daily probe time (min:s)	No. of probe errors	Percentage of probe errors
Orhan	9	90	0	0	20:28	18:29	13	10
Gaye	14	140	4	0.3	39:01	36:10	27	18
Enes	10	100	1	0.09	23:48	24:40	27	27
Grand total	33	330	2	0.13	83:17	69:10	22	18

be summarized for each student across sessions as follows. The data obtained during maintenance probe sessions for Orhan were 90, 100, and 100% across three sessions. Gaye maintained the skill of receptively identifying occupations from picture cards across the three sessions with 100, 100, and 93% accuracy. The data obtained during maintenance probe sessions for Enes were 100, 87, and 80%.

Generalization probe data were collected on the students' performance on receptively identifying occupations across different picture cards before and after training. The same picture cards were used during generalization except the colors. During pre-test, Orhan responded with 30% accuracy, Gaye responded with 40% accuracy, and Enes responded with 60% accuracy. After the instruction, Orhan responded with 90% accuracy, Gaye and Enes responded with 100% accuracy during post-test for generalization probe session.

2.3. Social validity

Social validity results of mothers indicated that (a) trainer complied with all ethical rules determined for this study, (b) all mothers reported their positive opinions about materials and the training setting used in this study except a mother who indicated that a variety of materials should have been used, (c) mothers reported that they will let their children participate in this type of studies in the future, (d) mothers reported that they believe their children will use the skills they learned in this study in novel situations in the community life, a mother stated negative opinions on this topic due to her child's mobility problem, (e) mothers reported that they all liked simultaneous prompting procedure and will learn implementing it to instruct their children at home.

3. Discussion

The purpose of this study was to examine the effectiveness of simultaneous prompting on teaching receptively identifying occupations from picture cards to young students with developmental disabilities. Maintenance and generalization effects were also assessed in the study. In addition to these aims, mothers' opinions about the importance of the target behaviors, the appropriateness of the

instructional procedure and the importance of the findings were examined as social validity parameters of the study. Several conclusions can be drawn from the data analyzed in the study.

First, simultaneous prompting was found to be effective on teaching receptively identify occupations from picture cards to three young students with developmental disabilities. In other words, all of the students participated in the study acquired to receptively identify occupations form picture cards at criterion level. Thirty-three training sessions and 330 training trials, and approximately 84 min training time were required to reach criterion across all three students. This finding is consistent with the findings of the previous studies. All of these studies showed that simultaneous prompting was effective on teaching discrete skills to preschoolers with developmental disabilities (Gibson & Schuster, 1992; MacFarland-Smith et al., 1993; Tekin & Kircaali-Iftar, in press). Majority of these published studies were conducted with young students with various disabilities. Since this study was conducted with preschool students to teach discrete skills, the findings of the study extend the current literature about simultaneous prompting procedure when students' ages are taken into consideration.

Second, the study showed that simultaneous prompting was effective on maintaining and generalizing the skills acquired with a high accuracy rate. The students maintained the skills taught to them 80–100% accuracy over the 4-week period after the training. In addition to the maintenance findings, it was evident that the students generalized the acquired skills to other materials with a high accuracy rate. The subjects generalized the skills to colored picture cards with at least 90% accuracy. These findings are also consistent with the previous studies' findings (Gibson & Schuster, 1992; Johnson et al., 1996; MacFarland-Smith et al., 1993; Tekin & Kircaali-Iftar, in press).

Third, social validity results of the study showed that the mothers were happy with being participated in such a study. Mothers reported that they believed that their children would use the skills they acquired by the study in novel situations. Mothers also reported that acquiring these skills would contribute to their children's independence in the community life.

Fourth, this study showed that the trainer implemented the procedure with a desirable level of procedural reliability (Tekin & Kircaali-Iftar, 2001; Wolery et al., 1988). The teacher implemented simultaneous prompting in the study with 99% accuracy which is almost ideal. When simultaneous prompting literature is review, it is seen that the procedural reliability was higher than 90% in the majority of these studies (Fetko et al., 1999; Fickel et al., 1998; Johnson et al., 1996; MacFarland-Smith et al., 1993; Parrott et al., 2000; Schuster & Griffen, 1993; Singleton et al., 1995; Tekin & Kircaali-Iftar, in press). Of these studies, one was conducted with sibling tutors and sibling tutors delivered simultaneous prompting with an average of 98.9% (range = 98.3–99.7%) compliance with the planned steps of the procedure (Tekin & Kircaali-Iftar, in press). When the findings of the present study and the other studies are taken into consideration together, one can easily say that simultaneous prompting is very teacher friendly and easy to implement.

Fifth, no procedural modifications were required in this study to investigate the effectiveness of simultaneous prompting. In some response prompting procedures such as constant time delay and progressive time delay, teaching the student to wait the prompt and delivering differential reinforcement for the correct response before and after the prompt are required to reach criterion during teaching. In other words, wait training and a shift in trainer's behavior for consequent events can be necessary to implement. On the other hand, since controlling prompt is delivered immediately after target stimulus (i.e., here is no need to wait training) and there is only one type of trainer behavior for correct responses in simultaneous prompting, no procedural modifications were needed while delivering instruction. This feature can be interpreted as an indicator of efficiency and practicality of simultaneous prompting.

Sixth, inappropriate behaviors were very minimal during training with simultaneous prompting. The trainer reported that the students rarely exhibited inappropriate behaviors during experimental conditions.

In addition to the above mentioned strengths of the study, the data should be interpreted cautiously due to some limitations explained below.

First, this study included only three students with developmental disabilities and five discrete behaviors. More students with various disabilities and more behaviors should be planned to teach while investigating the effectiveness of simultaneous prompting.

Second, there is a high rate of correct responding during baseline and full probe sessions before introducing the intervention (i.e., a mean of 23% correct responding on Orhan; a mean of 22, and 31% correct responding on Gaye through baseline and first full probe session, respectively; a mean of 30, 40, and 53% correct responding on Enes through baseline to second full probe session, respectively). Although experimental control is built in the study, the results should be interpreted cautiously. This is the major limitation of the study. It can be claimed that delivering reinforcement during full probe sessions may have caused the increase in correct responding before training. In order to examine the effects of simultaneous prompting procedure, not the reinforcement delivered during probe sessions, correct responses were resulted in reinforcement on both probe and training sessions.

Third, the error rate during daily probe sessions was high as it was in other studies with simultaneous prompting (Gibson & Schuster, 1992; Griffen et al., 1998; Schuster et al., 1992; Tekin & Kircaali-Iftar, in press). On the other hand, error rate during training was minimal, almost errorless, across all students. No training error occurred during training with Orhan whereas 10% error occurred during daily probe sessions with Orhan. There was 4% training error during training with Gaye, and 18% error rate occurred during daily probe sessions with Gaye. There was 1% training error during training with Enes whereas 27% error rate occurred during daily probe sessions with Enes. In sum, a total mean of 2% training error rate occurred during training, and 18% error rate occurred during daily probe sessions across all three students. These findings are consistent with the findings of the previous studies such as no training error occurred, and 49% daily probe error occurred in Singleton et al. study's; 1.30% training error

occurred and 32.7% daily probe error occurred during daily probe sessions in Gibson and Schuster's (1992) study.

Fourth, a pool-out 1:1 teaching approach was used to find out the effectiveness of simultaneous prompting on teaching discrete behaviors to young students with developmental disabilities. A pool-out 1:1 teaching arrangement is not a desirable one. Naturalistic settings and group arrangement can be used in the future study.

Fifth, since controlling prompt is always presented during training, daily probe sessions are needed to test the transfer of stimulus control. Daily probe time may be a disadvantage when adding to training time. The total training time to reach criterion in the study was approximately 84 min and probe time was approximately 69 min across three students. Approximately, a total of 153 min needed to meet the criteria across three students.

The above limitations in this study should be addressed in the future research by (a) including more students with various disabilities and more behaviors to teach while investigating the effectiveness of simultaneous prompting, (b) replicating the same study with students who have lower correct responding during baseline and full probe sessions before instruction, (c) delivering corrective feedback and conducting intermittent probe sessions (instead of daily probe sessions) to decrease the error rate during daily probe sessions, (d) using pull-in teaching approach in inclusive or more natural settings. Besides these recommendation, based upon the limitations of this study, the following can be recommended to the future researchers in general. In the future research, comparison studies can be conducted to compare the occurrence of inappropriate behaviors while delivering instruction with simultaneous prompting and with traditional direct instruction procedures such as concept teaching, and to compare the student characteristics (e.g., learning experience, level of disability, type of disability and etc.) in terms of error rate during probe sessions. Also, when procedural reliability data and easiness of the procedure are taken into consideration together, delivering instruction with simultaneous prompting can be taught to peer tutors, sibling tutors, and other care-givers such as parents, and grandparents in the future research and the effects of the instruction can be examined. Last but not the least, peer delivered and teacher delivered simultaneous prompting instructions can be compared in teaching both discrete and chained behaviors to children with various disabilities.

In sum, the results of this study showed that simultaneous prompting was effective on teaching discrete behaviors to young students with developmental disability. Also, maintenance and generalization effects of the procedure were positive.

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