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Effects of Antecedent Prompt and Test Procedure on Teaching Simulated Menstrual Care Skills to Females with Developmental Disabilities

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Abstract: Although menstrual care is among the most important skill areas for females with mild to moderate developmental disabilities to facilitate their independence, there is limited research examining this issue. The present study was designed to analyze the acquisition and maintenance effects of antecedent prompt and test procedure on teaching changing sanitary napkins on a doll to three young females with mild to moderate developmental disabilities. Generalization through multiple exemplar approach and social validity were also examined. A multiple probe design across participants was used in the study which consisted of baseline, intervention, probe, maintenance, and generalization sessions. All participants were able to acquire and maintain the skills taught to them, and generalize the acquired skills to various examples. Furthermore, the parents of the participants were very pleased with the study in general. The results are discussed and recommendations regarding future research and practice are raised in the article.

Many individuals with developmental disabilities have unique learning needs which differentiate them from individuals with other types of disabilities. Self-care skills which are listed under the category of practical adaptive skills as ‘activities of daily living’ in the classification of American Association on Mental Retardation (2002) and are among the primary curricular areas for individuals with developmental disabilities when their unique learning needs are considered. Therefore, extensive research has been conducted on teaching self-care skills such as toileting and related skills (Hobbs & Peck, 1985; Luiselli, 1996; Marshall, 1996), eating (Collins, Gast, Wolery, Holcombe, & Leatherby, 1991; Denny et al., 2001;

Luiselli, 1998; Matson, Taras, Sevin, Love, & Fridley, 1990), dressing (Alberto, Jobes, Sizemore, & Doran, 1980; Matson et al., Reese & Snell, 1991; Young, West, Howard, & Whitney, 1986) and other daily living skills and cognitive skills (Cohen et al., 2006; Ellis, Ala'i-Rosales, Glenn, Rosales-Ruiz, & Greenspan, 2006; Matson et al.; Wolery, Ault, Gast, Doyle, & Griffen, 1991) to individuals with developmental disabilities. Acquisition of self-care skills (i.e., feeding, dressing, and maintaining personal hygiene) contributes to health, independence, self-determination, social acceptance, and quality of life of persons (Carothers & Taylor, 2004; Collins, 2007; Culatta, Tompkins, & Werts, 2003; Hardman, Drew, & Egan, 2005; McCarthy, Cuskelly, van Kraayenoord, & Cohen, 2006; Sheppard, 2006; Smith, 2004; Snell & Brown, 2000; Turnbull, Turnbull, Shank, & Smith, 2004).

Teaching menstrual care skills to females with disabilities has received relatively little attention from researchers and practitioners although menstrual management is often raised as a concern by either parents or caregivers of the females with developmental dis-

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abilities. The majority of the existing literature on menstrual care and developmental disabilities show that menstruation is problematic for both females with developmental disabilities and their parents or caregivers. Findings of two recent survey studies indicated that females with developmental disabilities experience similar as well as different menstrual problems when compared to other females and have limited opportunities to learn to deal with their own menstrual care. As a result, caregivers usually presume a major role in assisting females with developmental disabilities in menstrual care (Rodgers & Lipscombe, 2005; Rodgers, Lipscombe, & Santer, 2006).

Although menstrual care is among the most critical personal hygiene maintenance skills for females, menstrual care instruction is one of the most difficult personal hygiene instructions to be delivered since it may interfere with individuals' right to privacy. However, in order for females with developmental disabilities to live as independently as possible, menstrual care should be taught to them as in any other self care skills. Unfortunately, as shown in a recent study (Rodgers & Lipscombe, 2005), there are serious problems related to teaching menstrual care skills to females with developmental disabilities as well as providing appropriate assistance during menstruation period.

To address the problems on menstrual care needs of females with developmental disabilities, medical procedures such as hysterectomy rather than educational procedures have often been suggested. However, various concerns such as dysfunctions of the ovaries or cardiovascular systems as well as legal and ethical concerns are often raised regarding such procedures (Carlson, 2002; Carlson & Wilson, 1994; Rodgers & Lipscombe, 2005; Rodgers et al., 2006). Elkins, Gafford, Wilks, Muram, and Golden (1986) conducted a study with females who were referred for menstruation termination through hysterectomy. The women were able to avoid the suggested operation and successfully cope with their periods through a menstrual training program consisted of hormonal medication and home-based behavior modification.

Acceptability of the type and content of instructional procedures for teaching men-

strual care is another issue of concern. Epps, Prescott, and Horner (1990) compared the acceptability of two different training methods for teaching menstrual care skills to females with developmental disabilities. Findings of this study showed that the acceptability ratings of professional (e.g., special education) and nonprofessional females differed: professional females preferred self-training whereas nonprofessionals preferred training using a doll.

Limited research exists examining the effects of menstrual care instruction provided to females with developmental disabilities. In an earlier study, Richman, Reiss, Bauman, and Bailey (1984) analyzed the effects of a training package consisting of forward chaining and prompting on teaching specific menstrual care skills (changing stained underwear and sanitary napkins) to five females with mild to severe developmental disabilities. Results of this multiple-baseline across participants study revealed that the participants were able to acquire, maintain, and generalize those skills. The simulation training using a doll was found to be effective for teaching independent menstrual care skills to four females with moderate to profound developmental disabilities (Richman, Ponticas, Page, & Epps, 1986). Epps, Stern, and Horner (1990) compared the effects of two different simulation procedures, on self and using a doll. Treatment was implemented according to general case instruction in which a range of relevant stimulus and response variations were used for teaching generalized menstrual care skills to four females with severe developmental disabilities through a split multiple-baseline study across participants. The results indicated that limited generalization occurred after training using a doll whereas high levels of generalization occurred after on-self training.

Errorless training consists of various effective and efficient response prompting and fading procedures utilized for teaching a variety of skills to individuals with moderate to severe developmental disabilities. Antecedent prompt and test procedure (APTP) has been proven to be among the successful errorless training procedures for teaching chained tasks such as self-care skills to individuals with developmental disabilities (e.g., Crist, Walls, & Haught, 1984; Welch, Nietupsky, & Hamre-Nietupsky, 1985). This procedure includes (a)

prompt trials conducted with zero second delays between the delivery of the task direction and the prompt and (b) probe (i.e., unprompted test) trials conducted before or after the prompt trials to assess whether the student responds correctly to the task direction delivered without the prompt (Tekin-Iftar & Kircaali-Iftar, 2004; Wolery, Ault, & Doyle, 1992; Wolery, Bailey, & Sugai, 1988). Matson et al. (1990) used physical and verbal prompts to teach a variety of self-care skills to three participants with autism and mental retardation; and assessed the attainment of those skills during the probe trials conducted at the end of each session. The findings revealed that all three participants were able to acquire the skills taught to them while two of the participants maintained those skills over 7 to 12 months.

APTP can be delivered with some variations. Variations regarding the prompt trials are conducting the prompt trial with or without requiring the student to make a response. Some of the variations regarding the probe trials are: (a) delivering the probe trial immediately or a few seconds after the prompt trials, (b) delivering the probe trial before the prompt trials, and (c) delivering the probe trial independent of the time and/or place of the prompt trials (Wolery et al., 1992).

Errorless training is usually utilized to examine the effects of various instructional procedures on skill acquisition. However, generalization is another parameter of paramount importance for assessing effectiveness, especially when individuals with developmental disabilities are considered. Hence, there are various approaches for facilitating the generalization of the acquired skills, one of which is known as 'multiple exemplar approach' (Browder & Snell, 1983). Training with multiple examples of a stimulus or response class is used to facilitate generalization by multiple exemplar approach. Browder and Snell reported the stages of multiple exemplar approach as follow: (a) define the stimulus and response class, (b) define the sample, (c) test all examples prior to training, (d) start training with the first example of the target behavior, (e) when the criterion is reached on the first example, probe the rest of the examples, (f) if generalization is reached in all examples, stop training, (g) if generalization is not

reached in all examples, repeat step (d) and (e) for the second example, (h) follow the above steps until the generalization criteria are reached in all examples. The multiple exemplar approach has been used successfully to obtain or at least facilitate the generalization of the taught discrete as well as chained skills (Collins et al., 1991; Gardil & Browder, 1995; Hughes & Rusch, 1989; Hughes, Schuster, & Nelson, 1993; Schuster & Griffen, 1993; Sandkop, Schuster, Wolery, & Cross, 1992; Smith & Schloss, 1986; Solnick & Baer, 1984; Taylor, Collins, Schuster, & Kleinert, 2002). However, none of these studies utilized the multiple exemplar approach systematically as explained above.

Based on the related literature, it seems to be worth examining effects of APTP on teaching menstrual care skills. Hence, the purpose of the present study was to analyze (a) acquisition and maintenance effects of APTP on teaching changing sanitary napkins on a doll to three young females with mild developmental disabilities, (b) effects of the multiple exemplar method on the generalization of the acquired task to various examples, and (c) opinions of the parents of the participants about the instruction provided to their daughters.

Method

Participants

Participants were three female youths with mild to moderate developmental disabilities. One of them (Esra) had Down syndrome. Two subjects (Esra and Aynur) attended a special class at a public elementary school, and one (Filiz) was mainstreamed at a regular class in the same school. Filiz was 12, Esra was 13, and Aynur was 14 years old. Esra menstruated for the first time during the third full probe condition. The remainder of the participants did not experience menstruation while the study was in progress.

The purpose of the study was explained to parents of the participants. Their consents were obtained for including their daughters in the study. The prerequisite skills which the girls possessed for beginning the study were: (a) sticking an adhesive material on a surface and pulling out the same material off the

TABLE 1
Training and Generalization Sets

<i>Training Sets</i>	<i>First Generalization Set</i>	<i>Second Generalization Set</i>
Anatomic doll in 43 cm length with hair	Anatomic doll in 38 cm length without hair	Half anatomic doll in 55 cm length with hair
Daily sanitary napkins	Regular sanitary napkins	Winged sanitary napkins
Lace underwear	White underwear	Colored underwear

surface, (b) having dressing-undressing skills, (c) having hand washing skill, (d) following verbal instructions, (e) folding and rolling a paper, (f) identifying the materials used in the study such as sanitary napkins, plastic bags etc., and (g) agreeing to participate in a systematic teaching process. The first author tested whether participants had these skills. It was found out that all three girls had the prerequisite skills with two exceptions. Esra and Aynur needed training on identifying the materials and their functions. None of the participants had prior experience with APTP.

Staff. The first author of the study conducted all experimental sessions. She was the school counselor at the children's school. A special education teacher collected the reliability data since he was familiar with the instructional procedure used in the study.

Settings

All sessions were conducted in the bathroom of the subjects' houses. In order to standardize the bathrooms, some arrangements were made by the researchers. Each bathroom had a chair placed in front of the sink for putting the doll. Also, a trashcan was available at the left side of the chair. Toilet paper was put on the sink; towels were hung either on the door handle or on the back of the door. A handy cam camera on a tripod was placed to tape-record the sessions near the door. Sessions were conducted after school during weekdays and at times considered as convenient by the parents during weekends.

Materials

Sanitary napkins, plastic bags, dolls, underwear, trashcan, toilet paper, reinforcers (e.g., stationary items, music cassettes, etc.,) cam-

era, data collection forms, and a stopwatch were used in the study. Since a multiple exemplar approach was used to facilitate generalization, except the materials (training sets) used during intervention, two different sets for testing the generalization were used (Table 1). These two sets had sanitary napkins in two different brands and sizes, two panties in different colors, and two different dolls.

Sanitary napkins were adapted for the sizes of the dolls by the researchers. This adaptation was made by cutting the daily sanitary napkins (thin ones) into two and normal sanitary napkins into four equal pieces. The winged sanitary napkins were cut from two ends.

Tangible and verbal reinforcers were used throughout the study. Participants selected the possible reinforcers from a menu. The reinforcer selection menu included stationary items such as pens, pencils, and crayons; accessory items such as buckles and rings; and music cassettes. Both the girls (teacher read the menu and signed their preferences on the menu) and their parents filled out the reinforcer selection menu. The teacher selected the items preferred by both children and their parents. The teacher put the possible reinforcers in a bag and showed the inside of the bag to the participants when letting them pick their reinforcers.

Target Behavior

The target behavior of changing sanitary napkins on a doll was comprised of placing the sanitary napkin on the underwear and pulling it off the underwear. Since a multiple exemplar approach was used in the study, task analysis for the generalization sets were developed as well. The task analysis developed for the training sets was composed of 18 steps (Table 2). The task analyses developed for the first

TABLE 2**Task Analysis of Changing Sanitary Napkins on a Doll**

1. Takes the sanitary napkin and plastic bag.
2. Walks into the bathroom with the doll.
3. Places the doll on the chair.
4. Lowers the pants of the doll.
5. Lowers the underwear of the doll.
6. Pulls out the sanitary napkin from the underwear.
7. Wraps the sanitary napkin.
8. Puts the wrapped sanitary napkin in a plastic bag.
9. Throws the plastic bag in the trashcan.
10. Wipes out the doll with a toilet paper.
11. Takes the clean sanitary napkin.
12. Pulls out the paper from the sticky surface of the sanitary napkin.
13. Puts the paper in the trashcan.
14. Places the sticky face of the sanitary napkin on the underwear of the doll.
15. Puts on the underwear of the doll.
16. Puts on the pants of the doll.
17. Washes the hands of the doll.
18. Dries the hands of the doll with the cotton towel.

and second generalization sets were composed of 18 and 20 steps respectively.

General Procedure

Changing sanitary napkins on a doll was taught to three subjects in the study. All experimental sessions were conducted in 1:1 teaching arrangement. All sessions were tape-recorded. Daily probe sessions were conducted to test acquisition whereas full probe sessions were conducted to establish experimental control. Also, maintenance probe sessions were conducted after the training (5, 11, and 20 days later) and generalization probe sessions were conducted following every full probe condition in the study. A trial was defined as providing an opportunity to the subject for performing all steps of the task analysis. Response intervals were 5 s during all sessions and inter-trial intervals was also 5 s during intervention sessions. Performing a trial correctly resulted in a fixed ratio schedule of reinforcement with a 1/18 ratio (FR18) during full and daily probe sessions. That is,

the subject was reinforced with a tangible reinforcer upon correct completion of all 18 steps. Reinforcements were thinned during maintenance sessions and participants were reinforced with FR18 schedule with verbal reinforcement only. FR18 and FR20 schedules were used during generalization probe sessions. The first author conducted all sessions. She delivered reinforcement for the subjects' performances as well as attending and cooperation behaviors at the end of every session.

Baseline/Full Probe Sessions

Full probe sessions were conducted before introducing the intervention to the first subject and after criterion was met for each participant. The first full probe sessions were conducted to collect baseline. Full probe sessions were conducted until stable data were recorded for at least three consecutive sessions. A trial was conducted in each full probe. Single opportunity method was used during probe sessions (Brown & Snell, 2000). The teacher presented the task direction and recorded the participant's responses to the steps of task analysis. If the participant initiated an incorrect response, the teacher interrupted her response and recorded the response as incorrect. The following steps in the task analysis were recorded as incorrect as well. There were two types of responses during full probe sessions: (a) correct responses were defined as initiating a correct step of the task analysis within 5 s and completing it, (b) incorrect responses were defined as initiating an incorrect step of task analysis, completing the step incorrectly or not initiating the step. Correct responses were verbally reinforced whereas incorrect responses were ignored during full probe conditions. Full probe sessions were conducted as follows: The teacher had the training materials ready, secured the subject's attention (e.g., "Are you ready?"), and after receiving an affirmative response, delivered the task direction (e.g., "Esra, please change the sanitary napkin on your doll."), and waited 5 s for the subject to initiate her response.

Daily Probe Sessions

Since a controlling prompt was delivered on every training trial when providing instruction

with APTP, participants did not have an opportunity to respond to the task direction independently. Therefore, daily probe sessions were conducted to assess the transfer of stimulus control. Daily probe sessions were conducted immediately after the training sessions. Correct responses during intermittent probe sessions were counted toward criterion. Criterion was 90% correct responding to the steps of the task analysis during daily probe sessions for at least three consecutive sessions for all participants. Daily probe sessions were conducted just like the full probe sessions with the exception that in daily probe sessions, only the subject who was currently being taught was assessed. Correct responses resulted in a verbal praise whereas incorrect responses resulted in ignorance.

Antecedent Prompt and Testing Sessions

Changing sanitary napkins on a doll was taught by using APTP within a total task presentation format (Brown & Snell, 2000). That is to say, subjects were required to perform all steps of the task analysis in a trial. Subjects were not required to respond during the intervention trials. Two intervention trials were conducted in each intervention session. Then the teacher conducted the daily probe sessions to test the acquisition. The teacher delivered the task direction and then immediately delivered the controlling prompt. Controlling prompt consisted of modeling and verbal prompting for all subjects. The intervention sessions were conducted as follows: Prior to intervention sessions, the teacher turned her back to the subject and placed the sanitary napkin on the underwear of the doll. The teacher secured the subject's attention by saying "Esra, watch me. I am going to change the sanitary napkin on the doll. I'll be asking you to do the same soon." The teacher delivered the task direction, "Esra, please change the sanitary napkin on the doll", and then immediately delivered the controlling prompt as verbal prompt plus modeling. That is, the teacher provided verbal prompt "Esra, take your doll to the bathroom" while taking the doll to the bathroom without waiting a response from the subject. The subsequent steps were performed in the same format.

Maintenance and Generalization Probe Sessions

Maintenance probe sessions were conducted 5, 11 and 20 days after training. The response definitions in maintenance sessions were the same as in the full probe sessions. The same behavioral consequences were provided in maintenance probe sessions as well.

Multiple exemplar approach was used to facilitate the generalization of the acquired skills in the study. Therefore, generalization probe sessions were conducted after every full probe condition. In these sessions, the two generalization sets were probed. That is to say, in these sessions generalization was assessed in the first and second generalization sets which were not used during intervention. The following rule was followed. When participants met the generalization criteria for the first generalization set, the second generalization set was probed. However, if the participant did not meet the criteria on the first generalization set, training with this set was initiated. Generalization criteria were 80% correct responding the generalization sets for all participants. Training was needed on the second generalization set for all three children.

Response definitions in generalization probe sessions were the same as in the full probe sessions. The same behavioral consequences were provided in generalization probe sessions as well.

Experimental Design

A multiple probe design across participants was used to assess the effectiveness of APTP on teaching to change sanitary napkins on a doll to three females with mild developmental disabilities. The dependent variable was percent of correct responding on changing sanitary napkins on a doll and the independent variable of the study was APTP. The independent variable of the study was introduced to each subject consecutively. Experimental control was built in when the subject was performing at or near to baseline levels during full probe conditions before the intervention was introduced and the criterion was reached only after the intervention was introduced (Tekin-Iftar & Kircaali-Iftar, 2004; Wolery et al., 1988).

Reliability was collected at least 20% of all experimental sessions. Dependent variable reliability data for Esra and Aynur indicated 100% agreement during all probe sessions (full and daily), intervention, and maintenance and generalization probe sessions. Dependent variable reliability data for Filiz indicated 93% agreement (range = 86%–100%) during all full probe sessions, 67% agreement (range = 33%–100%) during daily probe sessions, and 100% agreement during intervention, and maintenance and generalization probe sessions.

Procedural (independent variable) reliability data were collected to estimate whether the teacher delivered intervention and other experimental sessions (e.g., full and intermittent probe sessions, generalization sessions, etc.) as they were planned in the study. The planned teacher behaviors were determined for reliability analyses. The planned steps that the teacher was expected to demonstrate for APTP were (a) presenting the task direction, (b) performing the steps of the task analysis in a correct (suggested) order, and (c) providing the controlling prompt. The teacher delivered the intervention with 100% compliance with the planned steps of the intervention sessions across three subjects. The planned steps that the teacher was expected to demonstrate during full probe sessions were (a) securing the student's attention, (b) presenting the task direction, (c) delivering appropriate consequences, (d) testing the generalization on the generalization sets, (e) providing intervention with the sets which the criteria for generalization was not met. The last two steps were not taken into consideration during daily and maintenance probe sessions.

The teacher delivered the intervention with 100% compliance with the planned steps of the APTP sessions across three subjects. The teacher provided full and maintenance and generalization probe sessions with 100% accuracy with Esra. She provided daily probe sessions with 100% accuracy except securing the participant's attention. She did not provide this step to Esra.

The teacher provided full probe sessions with 100% accuracy except the step of securing the participant's attention with Filiz. She

delivered this step with 33% accuracy. The teacher delivered the maintenance and generalization probe sessions with 100% accuracy. The teacher delivered the daily probe sessions with 100% accuracy except the steps of delivering appropriate consequences (67% accuracy) and securing the participant's attention (0%).

The teacher delivered full probe sessions with 100% accuracy except the step of securing the subject's attention with Aynur as well. She delivered securing the participant's attention with 67% accuracy. The teacher delivered the maintenance and generalization and daily probe sessions with 100% accuracy, except for securing attention (0%).

Social Validation

At the end of the study, parents were asked to respond to a questionnaire aimed at obtaining their opinions about the goals of the study, intervention procedure used to teach their daughters, and on outcome. To collect the social validation data a "Social Validity Form" was developed. The Form consisted of six Yes/No questions three of each had one open ended sub-question. Social Validity Form was administered to the parents following treatment.

Results

Instructional Data

Figure 1 displays the full probe and daily probe sessions data for Esra, Filiz, and Aynur. As seen at Figure 1 all of the subjects met the criteria after the introduction of APTP. Data indicated that APTP was effective on teaching changing sanitary napkins on a doll to female youths with mild to moderate developmental disabilities. No procedural modifications were needed during the experimental sessions in the study.

Esra performed the behavior with 13% (range = 11%–16%) accuracy during baseline sessions. As soon as the APTP was introduced, her performance increased to 100% accuracy for the last three days in the intervention session. Esra performed the behavior with 100% accuracy during the second and third full probe sessions, and 78% accuracy (range =

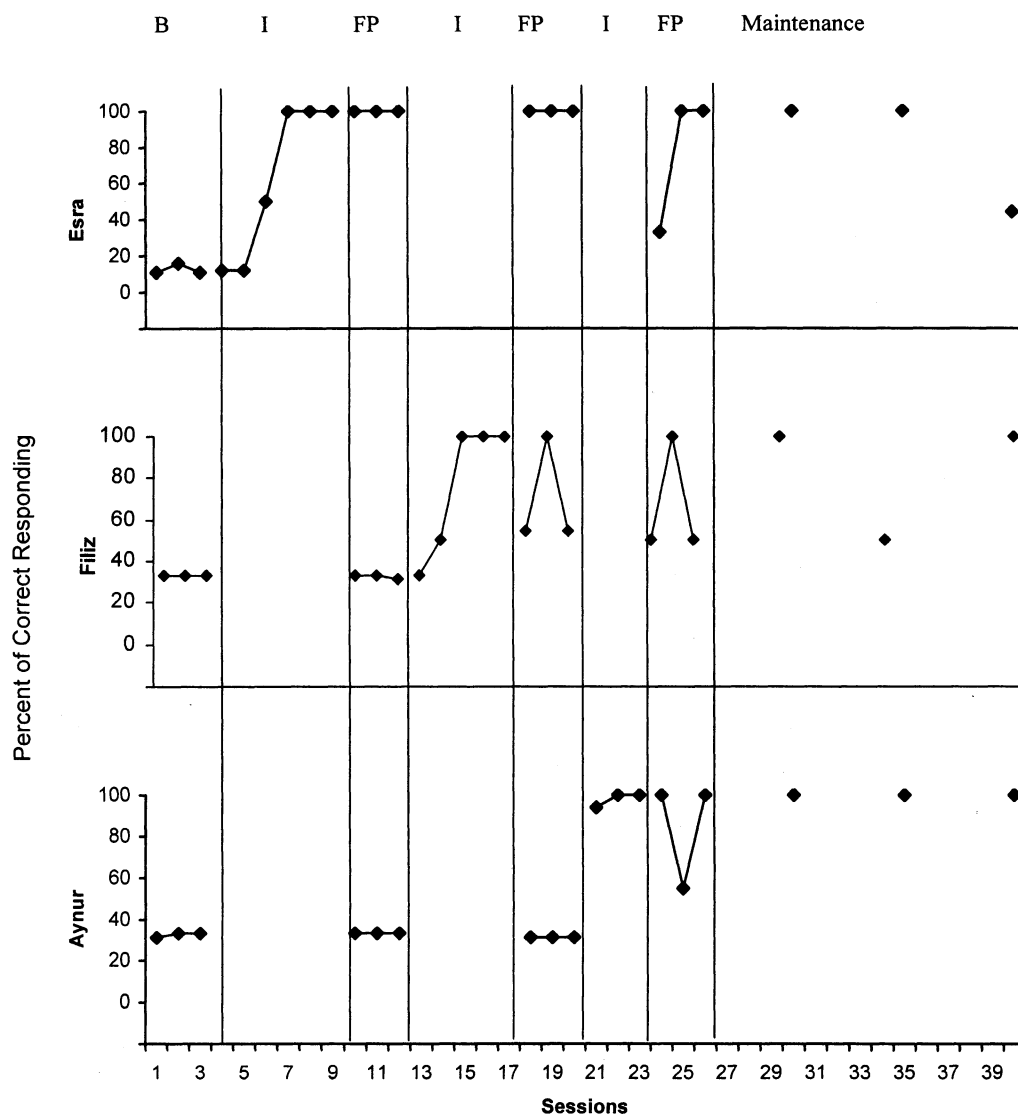


Figure 1. Percent of correct responding for Esra, Filiz, and Aynur during the baseline (B), intervention (I), and full probe (FP) sessions. Daily probes data are plotted during intervention.

33%–100%) during the fourth full probe session. Filiz performed the behavior with 33% accuracy (range = 33%) during the baseline sessions and 32% accuracy (range = 31%–33%) during the second full probe session. After introducing the APTP, her performance increased to 100% accuracy for the last three days in the intervention sessions. Filiz performed the behavior with 70% accuracy (range = 55%–100%) during the third full

probe session, and 67% accuracy (range = 50%–100%) during the final full probe session. Aynur performed the behavior with 32% accuracy (range = 31%–33%) during the baseline sessions, 33% accuracy (range = 33%) during the second full probe session, and 31% accuracy (range = 31%) during the third full probe sessions. After introducing the APTP, her performance increased to 100% accuracy for the last two days in the interven-

tion sessions. Aynur performed the behavior with 85% accuracy (range = 55%–100%) during the final full probe session.

Data also indicated that subjects maintained the acquired behavior of changing sanitary napkins on a doll (range = 44%–100%). Esra maintained the acquired behavior with a mean of 81% accuracy (range = 44%–100%) across the three maintenance probe sessions. Filiz maintained the acquired behavior with a mean of 83% accuracy (range = 50%–100%) across the three maintenance probe sessions, and Aynur maintained the acquired behavior with 100% accuracy across all three maintenance probe sessions.

Instructional data were summarized as the number of training sessions and trials, training and probe time, number and percent of probe errors. Data indicated that Esra needed three training sessions with 6 trials to criterion, Filiz needed two training sessions with 4 trials to criterion, and Aynur needed one training session with 2 trials to criterion.

A total of 14 min, 7 s training time was needed to criterion across three subjects. Esra needed 7 min training time to criterion, Filiz needed 4 min, 51 s training time to criterion, and Aynur needed 2 min, 16 s training time to criterion. Three min, 44 s daily probe time was needed to criterion across three participants. Esra needed 1 min, 39 s daily probe time to criterion, Filiz needed 1 min, 23 s daily probe time to criterion, and Aynur needed 42 s daily probe time to criterion.

A total of 55 errors occurred during probe sessions with an average of 42% across students. The probe session error rate ranged from 6% to 67%.

Generalization Data

Generalization across multiple exemplar data showed that participants generalized the acquired skills at criterion level. All subjects generalized the acquired skills on the first generalization set at criterion level. On the first generalization set Esra performed with 22% accuracy during the baseline, 100% accuracy during the second full probe session, and 100%, 80%, and 61% accuracy for the subsequent full probe sessions with the first generalization set. On the first generalization set Filiz performed with 33% accuracy during the

baseline, and 1% accuracy during the second full probe session, and 83% and 100% accuracy for the subsequent full probe sessions with the first generalization set. On the first generalization set Aynur performed with 31% to 33% accuracy during the baseline, and second and third full probe sessions, and 83% and 100% accuracy for the subsequent full probe sessions with the first generalization set. The data revealed that, Esra, Filiz, and Aynur generalized the skills as soon as they acquired them during the intervention with the training set.

As mentioned earlier, none of the subjects generalized the acquired skill at criterion level at the second generalization set. Therefore training sessions with the second generalization set were delivered to each subject.

On the second generalization set Esra performed with 20% accuracy during the baseline and second full probe session. Following the training with this generalization set she performed with 100%, 30%, and 65% accuracy for the subsequent full probe sessions with the second generalization set. Filiz performed with 33% and 1% accuracy during the baseline and second full probe session on the second generalization set. Following the training with this generalization set she performed with 100%, 73%, and 75% accuracy for the subsequent full probe sessions with the second generalization set. On the second generalization set Aynur performed with 20% accuracy during the baseline, second and third full probe sessions. Following the training with this generalization set she performed with 100% accuracy for the subsequent full probe sessions with the second generalization set.

Social Validity Data

Social validity data showed that parents' opinions were very positive in overall. The first question investigated whether the teacher was loyal to her responsibilities as indicated in the contract signed prior to the study. All parents reported that the teacher conformed to her responsibilities during the study. The second question examined the appropriateness of the materials, rules of the study (e.g., attending the study regularly, etc.) and settings. All parents reported their positive opinions regarding the appropriateness of the materials,

rules, and settings of the study. The importance of the purposes of this study was investigated in the third question. All parents reported that teaching changing sanitary napkins on a doll to their daughters was important for themselves and their lives. The fourth question investigated whether the researcher paid attention to their as well as their daughters' personal concerns such as privacy. Parents' opinions were positive on this item. The appropriateness of the intervention on teaching changing sanitary napkins on a doll to their daughters was asked in the fifth question. Parents reported their positive opinions on this item as well. The last question revealed the implications and contributions of teaching to change sanitary napkins on a doll to their daughters. They reported positive opinions on this item. When the possible contributions were asked, one parent reported that they will be free of charge from this responsibility as a parent, and two of them reported that their daughters will be functioning more independently in their lives following this intervention.

Discussion

The purpose of the present study was to examine the acquisition and maintenance effects of APTP on teaching menstrual care skills to three females with mild to moderate developmental disabilities. Furthermore, generalization effects via multiple exemplar approach were also investigated in the study. Based on the findings of the study, the following conclusions were drawn.

First, APTP was found to be effective on the acquisition and maintenance of the target skills by all three subjects. These results are consistent with the results of the previous studies inquiring the acquisition and/or maintenance of similar menstrual care skills instructed either on self or on a doll (Epps, Stern, et al., 1990; Richman et al., 1986, 1984). However, all subjects of the present study reached criterion rather fast (in one-to-three instructional sessions) compared to the subjects of the above mentioned studies. Moreover, the acquisition trend was not consistent across the subjects of those studies; i.e., some subjects showed immediate improvement on their performances whereas others did not

show the same consistent improvement (Epps, Stern et al.; Richman et al., 1986). This difference between the findings of the present and the previous studies may be due to, in part, the differences between the functioning levels of the subjects. That is, all of the subjects of the present study had mild to moderate developmental disabilities whereas the subjects of the previous studies had moderate to severe developmental disabilities.

Second, subjects were able to generalize the acquired skills via multiple exemplar approach. For instance, when the full probe sessions immediately following the intervention are considered, the subjects generalized the acquired skills with at least 73% accuracy. These results are also consistent with the findings of the previous studies which used similar generalization approaches (Collins et al., 1991; Gardill & Browder, 1995; Hughes & Rusch, 1989; Hughes et al., 1993; Sandkop et al., 1992; Schuster & Griffen, 1993; Smith & Schloss, 1986; Solnick & Baer, 1984; Taylor et al., 2002).

Third, social validity findings of the study indicated that parents of the subjects were very pleased with the aim of, procedure used in and results of the study in general. Parents especially highlighted their opinions as to the expected contributions of the study to the independence of their daughters.

Although findings of the study are very positive in general, the following points are worth discussion. The procedural reliability percentage of the step regarding 'securing the subject's attention' was consistently low throughout the study. This may be due to the fact that all of the subjects were ready for the instruction during the experimental sessions. Therefore, the teacher might have tended to omit this step and give the task direction right away most of the time.

The generalization level for the second generalization set was below the criterion across all subjects. The reason for this finding might be related with the nature and the length of the task analysis of this set. Therefore, training with this set was delivered to all subjects to reach the criterion.

The present study was planned to teach menstrual care skills on a doll without including any in vivo components. The main reason for this decision was due to the sensitivity of

the authors about the privacy of the subjects and their families. This sensitivity limited the study in terms of generalization of the acquired skills to real life. However, an informal telephone interview with the parents of the subjects showed that all subjects had already experienced their menstruation and two of them were able to deal with their menstruation successfully. Filiz's mother reported that Filiz needed extra practice after the onset of menstruation. Hence, this follow-up information suggests that the skills the participants had acquired via simulations might have contributed to their actual menstrual care performances.

Based on the above discussion, several suggestions can be raised for future research. First of all, the number of studies utilizing APTP on teaching discrete or chained tasks is limited. Therefore, studies examining the effects of APTP on various skills with different levels of developmental disabilities are needed.

Furthermore, effects of simulated training on a doll and/or on self and in vivo training can be conducted via APTP on teaching menstrual care skills to individuals with developmental disabilities. Video modeling could be added as a training component.

Social validity is a very crucial aspect in such studies interfering with the private lives of the subjects. Therefore, extended social validity data can be collected inquiring the acceptability of interventions in the future studies. For example, acceptability of various interventions (e.g., on a doll, on self, etc.) can be assessed by detailed narratives before designing instruction.

Another future research suggestion might be related to the analyses of such interventions delivered by parents, sisters or primary caregivers. Future research might be recommended to be designed to establish consciousness and awareness regarding menstrual experiences and to teach routines to initiate periodic menstrual care management to females with developmental disabilities.

The error rate during daily probe sessions was rather high, with a range of 50% to 67% in the present study. Hence, intermittent probe sessions rather than daily probe sessions and error correction can be tried in the future studies. Not only the effectiveness but also the

efficiency of an instruction is important. Therefore, efficiency variables related to APTP should be examined in the future research. For instance, the acquisition of observational learning stimuli or the appropriateness of APTP for group instruction might be investigated.

Recommendations regarding practice can be summarized as follows. Practitioners working with individuals with developmental disabilities can be recommended (a) to utilize errorless training procedures such as the one used in this study (APTP) for teaching discrete and chained skills effectively, (b) to include the instruction of critical personal care skills such as menstrual care skills in the educational programs, and (c) to use and/or adapt the instruction package consisting of APTP and multiple exemplar approach suggested in the present study in their own environments.

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