

Effectiveness of Constant Time Delay Procedure in Teaching Daily Living Skills to Children with Intellectual Disability and Associated Conditions

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Abstract

The present study is an attempt to study the effectiveness of constant time delay procedures in teaching daily living skills to children with intellectual disabilities. Two activities of daily living such as folding of trouser/ jeans and washing hands with soap were selected for training after assessing current level functioning of the participants to children. A 5 seconds delay was inserted between the presentation of target stimulus and providing the controlling prompt. The study included two participants having moderate intellectual disabilities aged between 14 to 18 years.

Single-subject research design was used to closely examine the effects of intervention. All experimental sessions were carried out in a classroom of special school based at Lucknow. The dependent variable of the study was teaching folding trouser/jeans and independent variable was constant time delay. Training was evaluated with a multiple probe design across behaviours. Results indicated subjects reach criterion to fold trouser/jeans. The skill maintained with 100% accuracy over one and half month period.

Introduction

The ultimate goal of education is to teach students, to reach the fullest potential for successful and independent functioning in the community and it is true with special education too. Persons with intellectual disabilities can be trained in practical skills which are to be used in the community. This means students with intellectual disabilities must learn to perform act daily living skills such as taking bath, combing hair, getting dressed, shopping at a mall, washing clothes, folding clothes etc.

Research in the last two decades have shown that persons with moderate to severe intellectual disabilities can learn to perform variety of tasks related to daily living and community activities. There is substantial body of research inrelation to effective teaching such as prompting, shaping, modelling, differential reinforcement etc. Onemethod is errorless teaching (Schuster & Griffen, 1990, Schuster et. al 1998). This is a response prompting procedures in which teacher initially provides the student with assistance following a stimulus and continues until the learner emit a target response (Morse& Schuster, 2004). The prompts are then faded or removed in subsequent presentations of the stimulus as instruction progresses. Presentation of the prompts before the student respond reduces errors and provides more opportunities for reinforcement.

Time delay is one of the errorless teaching methods used for training severe disabilities. There are two types of time delay: progressive time delay, in which the delay interval is gradually increased over trials or sessions and constant time delay, in which a fixed number of seconds (4 seconds/5 seconds) is inserted between the target stimulus and the prompt.

Research has shown that constant time delay is an effective instructional procedure in teaching students with various disabilities including autism, (Ault, Wolery, Gast, Doyle & Eizanstant, 1988) moderate and severe intellectual disabilities (Browder, Morris & Snell 1981). This procedure is also effective for teaching discrete behaviours, (Gast, Doyle, Wolery & Baklarz, 1991) as well as chained behaviours (Browder, Snell & Wildonger 1998).

Aykut, C (2012) compared the effectiveness and efficiency of Constant Time Delay and Most-to-Least Prompt procedure in teaching daily living skills to children with Intellectual Disability. The study was aimed to investigate whether Constant Time Delay and Most-to-Least Prompting procedure effective in teaching daily living skills (sewing skills, cooking readymade soup), which procedure was more effective in terms of instructional trials, instructional time and number of instructional errors through criteria and was both procedure result in maintenance and generalization of acquired skills

Cooking readymade soup and sewing skills of the subjects were dependent variable and Most- to- Least Prompt procedure and Constant Time Delay were independent variable of the study. The design of the study was alternate treatment model of the single subject experimental design.

The four students were the subjects and study was conducted in a room determined by the rehabilitation centre. During the training, trainer and the subjects sat side by side, turning their back to the wall, so that the trainer was to the side of the subject while he did his work. The data related to baseline were collected in three different sessions on three different days for each subject.

A most to least prompting strategy and the time delay training were the two intervention strategies used with each child. Maintenance sessions were conducted 1, 2 and 4 weeks after the end of intervention and generalization sessions were conducted at different location. No instructional procedure was used during maintenance and generalization sessions.

Results of the study indicated that two of the subjects at the end of the instruction for each procedure, managed to achieve both living skills at the level of 100%. The collated efficiency data were examined to see whether one procedure differed from another in terms of efficiency and it was found that most to least prompt were more efficient than constant time delay in terms of instructional time to criteria, number of instructional errors to criterion and number of instructional trial until the criterion were met. Both strategies were found to be effective in maintenance and generalization.

Miller, C.,U. & Test, D.,W.(1989) investigated the effectiveness of and efficiency of constant time delay and a most- to-least prompting strategy in teaching operating a washing machine and dryer to four students with moderate mental retardation. Three females and one male, all 18 years old, served as subject of the study.

The setting selected for the training was a room within school furnished with washing machine, dryers, sink, trashcan, and a shelf. The trainer was special education graduate student who had four years of experience in working with severe handicaps. Task analyses were developed for both the washing machine and dryers. Probes were conducted at the beginning of every other day of instruction. Students were probed on both the washing machine and dryers during each probe session.

The study employed a multi-element, alternating treatment within subject design. Trainer provided time delay and most-to-least prompting on both task analyses for two students per day.

After intervention instructional session data were collected to determine the average number of instructional sessions to criteria, instructional time and instructional errors for each prompting strategy. The most- to – least prompting strategy resulted in fewer average instructional trials to criteria than time delay on washing machine but on dryers it was same for both. However in terms of instructional time and errors the time delay procedure was superior to the most- to – least prompting strategy.

Rai (2008) investigated the effectiveness of treatment package that included video technology with constant time procedure to teach three activities of daily living (eg. Cleaning sunglasses, putting on wrist watch and zipping a jacket) to three elementary school students with intellectual disability in a small group setting. Using a constant time delay procedure, investigator measured the percentage of steps of task analyses performed correctly before and after a video model prompt. A multiple probe design across behaviour demonstrated experimental control. The results indicated that an instructional package that includes video technology can be an effective method for teaching activities of daily living to students with intellectual disabilities. There are many studies that have been reported to be effective for teaching activities of daily living through constant time delay procedure but there is paucity of research conducted in India with Indian children and settings. The purpose of the current study was to find out the effect of constant time delay procedure with forward chaining on teaching folding own trouser/jeans and washing both hands using soap to adolescent with moderate intellectual disability

Method

Participants

Two adolescents with moderate intellectual disabilities met the inclusion criteria which were as follows: (a) the child follows verbal instructions, (b)the child uses both hands in cooperation, (c) the child has ability to imitate prompts, (d) the child has ability to attend to the task for 20 minutes and (e) the child has ability to wait for 5 seconds. A total of 15 students were scanned, four of whom met the inclusion criteria and became participants. All students were enrolled in special school based at Aliganj, Lucknow serving persons with intellectual disability.

Case One Shyam (name changed) was 17 years 9 month old female with moderate intellectual disability with cerebral palsy with left leg affected.

Case two Arbaj (name changed) was 14 years and 3 month old male child with ADHD. He is moderately retarded and currently studying in secondary class.

The current level functioning of both the subjects were assessed using Behavioural Assessment scale for Indian children with Mental Retardation. The behavioural profile of each subject is presented below in the table 1.

Table-1: Subject Characteristics

Subje ct. NO	Name of Partici pant	Age	Motor	ADL	Langua ge	Reading / Writing	Number / Time	Domestic / Social	Pre- Voc/ Money
Case 1	Shyam	17 y 9M	106	146	162	75	96	88	75
Case 2	Arbaz	14 Y 3M	147	116	134	72	72	86	71

Behavioural profile of all participants on BASIC-MR Part-A

Setting

In order to provide training in washing hands with soap, trainingprogramme was provided within one of school'sroom, fitted with sink. The sink used had a manual water tap and was the perfect height for the participants. The area around the sink was about 20 square feet, which provides enough space for the trainer to help the children with training. The room had one table in the corner with four chairs. These space and materials were used for training in folding jeans/ trousers. The study was conducted between 8.15 to 11.30 AM where the four participants attended the programme. All sessions were conducted in a one to one basis.

Materials

The investigator used following materials/tools for the study -

- (a) Task analyses for both selected skills were developed and were validated by concerned experts.
- (b) Laminated picture flash cards were developed for selected two skills. Picture flash cards consisted of the pictures depicting the steps in the task analysis along with written instructions. Picture flash cards were given for validation to experts and necessary modifications were done accordingly.

(c) Investigator used Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC-MR) for assessing the current level functioning of the subjects in the selected skills.

For all the training sessions two sets of materials were required. One set was used by the student and another set for the trainer. In probe sessions only one set of materials were used. For giving training in folding jeans/trouser, a cloth basket with jeans/trouser was placed in front of the child on the table each day by the trainer. Similarly to train participants in washing both hands with soap, they were taken nearby to sink each day. Sink was fitted with soap tray and soap was placed on it.

Dependent Variable

Hand washing with soap and folding of jeans/trouser were the dependent variable. The both activities of daily living were further analysed in to simpler steps. The task analysis for washing hands with soap included 6 steps (turning on the water tap, wetting of the hands, taking soap,, rubbing the soap, rinsing soap out and turning of water tap) and 5 steps for folding of jeans/trousers (get jeans, lay out jeans flat, fold in half, fold in half again and make pile)

Independent Variable

The independent variable for the study was to examine the effect of constant time delay procedure in achieving the goals selected.

Design

The design of the study was single-subject research design. A multiple probe design across two tasks and four participants were used to ascertain the effectiveness of 5 seconds constant time delay procedure in teaching the chained skills of folding jeans/trouser and washing both hands with soap.

Procedure

Instructional sessions took place over five days of week. A total of 25 sessions were carried out for each subject. Each session was of 30 to 35 minute duration. Three instructional probe sessions was conducted prior to the training of each session. Instructional sessions consisted of two types of trials: 0- and 5 seconds trials. During first two training sessions for each skill a 0 second delay was used. During all subsequent training sessions a 5 seconds delay was used. Initially the trainer gave general attentional cue (e.g., "are you ready to fold jeans?)

once affirmative response was obtained, the trainer hand over flash card to the student and was provided the task request " fold----". Trainer then waited for 5 seconds for student to initiate the response. If the student did not initiate the desired response within 5 seconds or performed the response incorrectly or completing a step out of sequence in the task analysis, trainer provided the pre-determined prompt. Students were praised following successful completion of each step. This procedure was continued until each student completed the task analysis for each skill with 100% correct anticipation.

Maintenance sessions were conducted after 2 weeks after each student reach criterion on each skill. Programming for generalization was built into the study by training sufficient examples (Stokes & Baer, 1977). Specifically, different colour jeans/trouser was used. Similarly for washing hands with soap, different colour/brands of soap were used. In order to change the settings, performance was assessed in each student's home after all maintenance sessions had been completed. These sessions were identical to maintenance session.

Reliability

Reliability observers included one of the class room special educators and a faculty member of special education (Intellectual Disability). Inter-observer agreement was gathered on student performance during 20% of probe sessions across all tasks and phases. The observers were trained to criterion on all definitions prior to observing in the school. Interobserver agreement was calculated for the percentage of steps correctly completed in proper sequence. An agreement was recorded for a sequence of errors only if both the trainer and observer recorded the student's performance as correct or incorrect on each of the task analysis steps. An agreement was recorded for a sequence of errors only if both trainer and observer recorded the same error sequence. Inter-observer agreement was calculated by dividing the number of agreements by the number of disagreements then multiplying by 100.

Inter-observer agreement for task analyses steps across all four subjects during probes was 100% across both skills. Inter-observer agreement during instruction for both skills was 100%. Inter- observer agreement on errors across all subjects during probe sessions ranged from 95% to 100% in the skill of folding jeans and for washing both hands with soap it was from 94% to 100% with mean of 98%. Similarly inter-observer agreement of errors during instruction ranged from 70% to 100%, with a mean of 93%.

Procedural reliability was also collected on 20% of all training sessions. During training sessions, the congruence of the trainer's prompts specified procedure was recorded. The trainer's prompts were considered correct if a prompt was, delivered within designated time limits. Procedural reliability was calculated for each training session by dividing the number of correct prompts provided by the trainer by the number of correct plus incorrect prompts and multiplying by 100. Procedural reliability ranged from 90% to 100%, with a mean of 94%.

Result

Case one - During the probe session (two trials per session each day), case one could not perform any sub-tasks independently. The mean of baseline score was 0. The case learnt the first sub- task in the sixth session, first through second sub-task in 9th session, first through third sub-task of task analysis in the 13th session, first through fourth sub-task in in 18thsessions first through fifth sub-tasks in 22nd session and first to sixth sub-task in 27th session with 100% accuracy. Case one criterion was set at 100% which he obtained in 27th session.When the mean of baseline score and post intervention was compared subject gained score of 100%. Total instructional time for washing hands was 121 minutes (2 hours and 1 minute). He made 2 non-wait error (both topographical) and 3 wait error (2 topographical and 1 sequential)

Maintenance data shows that subject maintained the skill at 100% accuracy. The generalization sessions were carried out one week after maintenance session. It was conducted in bathrooms located in their homes. Data of generalization probe revealed that the subject learnt the task of washing hand with soap in 8th session.

Similarly, he performed the task of folding trouser/jeans at a mean 0% accuracy during probe sessions. He learnt the first sub-task in 6th session and first through second sub-task in 10th session. Similarly he learnt first through third sub-task in 14th session, first through last sub-task in 18th session. Case one criterion was fixed at 100% which he obtained in 18th session. The total instructional time for folding trouser/jeans was 85 minutes. He made 3 wait errors (all topographical). He maintained the skills at 100% accuracy.

The generalization sessions were conducted in their home. The data of generalization revealed that the subject learnt the task in 6th session

Case two:- During the probe session, case two could not perform any of the sub-task of washing hands with soap. He was functioning at 0% during probe sessions. The case two

learnt the first sub-task in the 6th session, first through second sub-task in in 10th session, first through third sub-task in the 14th session and first through fourth sub-task in 18th sessions . He learnt first through fifth sub-tasks in 22nd session and finally all sub-tasks in 26th sessions. The total instructional time for washing hands with soap was 109 minutes. He made a total of 1 error of non- wait nature and two errors were wait errors (both topographical in nature). When the data from the maintenance sessions was examined it was seen that he had 100% correct responses. The generalization sessions were conducted at the subject's home and the subject learnt the task in the 9th sessions

Similarly, his performance on folding of trouser/jeans during probe session was at a mean of 0% accuracy.. His performance at the end of 19th session's ofintervention was at 100%. He learnt the first sub-task in 6th session and first through second sub-task in 9th session. Similarly he learnt first through third sub-task in 14th session, first through last sub-task in 19th session. Case two criterion was fixed at 100% which he obtained in 19th session. The total instructional time for folding jeans was 91 minutes. He made 2 wait errors (all topographical) and one non-wait error. He maintained the skills at 100% accuracy

The generalization sessions were conducted in their home. The data of generalization revealed that the subject learnt the task in 9th session.

Discussion and Conclusion

The purpose of this study was to evaluate the effectiveness of using a constant time delay procedure to teach activities of daily living to children with moderate intellectual disability. Results of the study indicate that the constant time delay procedure was effective in teaching folding of trouser/jeans and washing both hands to all four children. These findings support previous research conducted using constant time delay procedure with children with intellectual disabilities (Aykut, 2012, Mcdonnell and Ferguson, 1989).

Intervention using constant time delay procedure is relatively new in special education in India, further researches are required in order to support and generalize the results across environments.

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