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Teaching Self-Care and Domestic Living Skills using Least-to-Most Prompting Procedure in a Semi-Residential Setting

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ABSTRACT

Background: This study evaluates the effectiveness of a Least-to-Most (LTM) prompting system, combined with total task chaining, to teach self-care and domestic living skills during two experiments. The participants were five adolescents with Intellectual Developmental Disorders (IDD).
Methods: Treatment effects were evaluated in Experiment 1 with a delayed multiple baseline across behaviors and participants with two follow-ups phases and a delayed multiple baseline across behaviors design with follow-up phase for Experiment 2.
Results: The analysis show that all students learned the target behaviors using LTM prompting procedure, but performance levels slightly decreased during follow-up for both experiments.
Conclusions: The LTM prompting procedure proved helpful in teaching the target skills in a semi-residential context. Implications for practice are discussed.

Keywords: *Domestic Living Skills*; *IDD*; *LTM*; *Self-care Skills*; *Total Task Chaining*.

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Introduction

Intellectual developmental disorders (IDD) are characterized by learning disabilities and adaptive functioning impairments (Carulla et al., 2011; American Psychiatric Association, 2013). People with IDD often need assistance in daily living activities (Braun et al., 2009). Many adults with IDD live at home with their families or are located in facilities that can provide them with supervision and care (Aronow, & Hahn, 2005; Taylor & Hodapp, 2012). However, individuals with IDDs may learn adaptive behaviors and essential life skills if provided with the right supports during the learning process. These new behaviors may increase their independence within their respective communities, mainly if the skills targeted are "life skills". Cronin (1996) defined life skills as "those skills or tasks that contribute to the successful, independent functioning of an individual in adulthood" (p. 54). The author categorized these skills into five broad clusters: self-care and domestic living, recreation and leisure, communication and social skills, vocational skills, and other skills essential for community participation.

Applied behavioral analysis (ABA) (Baer et al., 1968) proposes several intervention strategies to teach these skills. Skinner (1986) noted that completing daily living tasks increases life satisfaction and self-determination, as people feel reinforced by success in doing what the community expects from them. Thus, when individuals with IDDs require support to complete daily living skills, they do not experience this potential reinforcement source. Skinner (1975) also noted that clinicians' goal is to teach people how to do things, rather than do things for them, such that they can access reinforcers without relying on others' support. The real challenge for those involved in assisting people with IDDs to develop new skills is to help them display new, independent, and functional responses (Lovaas, 2003).

Many skills needed for independent functioning involve response chains, such as cooking, mending, cleaning cloths for the domestic area, janitorial skills, apparatus assembly, and dishwashing in the vocational area. Research has shown that an effective way to help people with autism and IDDs learn new skills is to provide them with prompts that are eventually faded (Cengher et al., 2018). Prompts are additional stimuli used to evoke correct responses. The clinician uses response prompts to facilitate the correct response while the person is emitting the behavior. Response-prompting procedures are: most-to-least prompting, graduated guidance, no-no prompting, progressive/gradual time delay, constant time delay, simultaneous prompting, and least-to-most prompting (Cooper et al., 2014).

The system of least-to-most prompting (LTM), or the increasing assistance procedure, is a prompting strategy used for teaching various types of curricula (Doyle et al., 1988; Wolery et al.,

1992; Collins, 2012; DiCarlo et al., 2017; Finke et al., 2017; Gil et al., 2019; Westling & Fox, 2019; Halbur et al., 2020).

This strategy is based on a prompt hierarchy defined by starting from the least amount of assistance required, moving to the most intrusive amount of assistance required until the student can perform behavior independently (Ault & Griffen, 2013). A standard LTM prompting system includes verbal prompts, gestures, modeling, and manual cues. An advantage of increasing assistance with LTM is that each trial provides an opportunity for the student to make an unprompted response to relevant environmental stimuli (Cooper et al., 2014). Increasing assistance procedures share the common feature of "self-fading". Therefore, they are easy to implement for providing an educational experience for students with IDDs, in contexts where the employed staff (e.g., peers or social assistance operators) do not have extensive preparation in systematic instructional procedures (West & Billingsley, 2005).

Practitioners can easily apply LTM procedures because they do not require an evaluation to establish the controlling prompt, such as time-delay, simultaneous prompting, or Most to least strategies. LTM procedures do not require frequent verification of student performance data to make educational decisions. Furthermore, they do not employ probe sessions outside the instructional setting (West & Billingsley, 2005).

When implementing an LTM procedure, it is crucial to select the appropriate prompts for the individual in performing a specific task. The clinician must consider that each person can complete the same activity with different assistance levels based on each individual's abilities (Meadan et al., 2013; West & Billingsley, 2005). LTM prompting procedures have been widely described in the literature to teach individuals with different disabilities and ages (Barton & Wolery, 2010; Cihak et al., 2010; Manley et al., 2008; Mechling et al., 2008; Snell & Brown, 2011; Yanarda et al., 2011). Implementing LTM procedures could benefit the participants in achieving new skills useful in everyday life, thus reducing the need for caregivers' supervision and increasing opportunities to access the most inclusive environments (Cannella-Malone et al., 2006). Moreover, LTM procedures can support individuals with IDDs to increase their independent functioning and, therefore, their participation in living environments (Dollar et al., 2012).

Rationale

Few studies in the literature are reported in community settings for teaching life skills (Burckley et al., 2015; DiCarlo et al., 2017; Gil et al., 2019). Given the importance of acquiring daily living skills for people with IDD, Burckley et al. (2015) emphasized the need for further research to evaluate the use of teaching strategies in community settings. Therefore, this study is meant to

contribute to exploring this area of focus. The authors wanted to evaluate the LTM prompting procedure's effectiveness in teaching Self-Care and Domestic Living skills in a semi-residential setting for five adolescents with Intellectual Developmental Disorders (IDD). The authors also wanted to verify the participants' performance levels one month and six months after the intervention to assess the newly acquired skills' level of maintenance.

Method

Participants

The participants in this study were five adolescents with IDD enrolled in a project to teach independent living skills. Upon admission to the project, users' adaptive behavior skills were measured using The Assessment of Functional Living Skills (Partington & Mueller 2012). The results showed low scores in the areas of self-care skills for all participants. For each participant, we selected the skills with the lowest results.

Frank was a seventeen-year-old boy diagnosed with a moderate developmental disability with IQ = 45 (Roid & Miller 1997). He could not use a knife to peel fruit such as apples and peaches and wash his dishes after lunch.

Luke was a seventeen-year-old boy diagnosed with autism spectrum disorder and moderate intellectual disability with IQ = 48 (Wechsler, 2014). He could not peel fruit, such as apples and peaches.

Brian was a fourteen-year-old boy diagnosed with moderate disability and dyspraxia, with IQ = 48 (Roid & Miller 1997). He needed assistance in washing his dishes.

Greg was an eighteen-year-old boy diagnosed with autism spectrum disorder and moderate intellectual disability with IQ = 42 (Wechsler, 2014). He needed assistance in washing his dishes.

Robert was a fifteen-year-old boy with autism spectrum disorder and moderate intellectual disability with IQ = 46 (Wechsler, 2014). He could not perform a personal hygiene routine that included preparing his toothbrush, brushing his teeth, washing his face, and combing his hair.

Procedure and Materials

As a result, this study's participation could have improved the participants' quality of life. The authors obtained written informed consent from participants' parents for participation in this study.

All sessions were conducted in an apartment consisting of five rooms: dining room, kitchen, bathroom, bedroom, and study. Participants attended from 9:00 a.m. to 4:00 p.m. five days a week. The staff consisted of a psychologist and three practitioners, who directly implemented the procedures described. The practitioners were university master's program students in applied

behavior analysis. We arranged the environment as similar to the natural settings in which participants would perform the targeted skills (e.g., the home environment).

The materials used in the study included forks, knives with rounded tips, fruits of various kinds, a kitchen washbasin, plastic dishes, plastic glasses, sponges, dishwashing detergent, a bathroom washbasin, toothbrush, toothpaste, liquid soap, a hairbrush, and towels. For data recording, the experimenter used the task analyses and a pencil. Training sessions were conducted by clinicians who were attending the learning center for at least four months. They were trained in the use of the LTM training procedure before the implementation of the study.

Experimental Design and Dependent Variables

In this study, two experiments were conducted to measure the Least to Most Prompting procedure's effectiveness. Table 1 summarize Experimental designs, Dependent Variables, and participants assigned to each experiment.

Experimental Design	Delayed multiple baseline across behaviors and participants design with two follow-up phases.				Delayed multiple baseline across behaviors experimental design with follow-up phase.			
Dependent Variables	Peeling fruit		Washing dishes		Brushing teeth-preparation	Brushing teeth	Washing face	Combing hair
Participants	Luke	Frank	Brian	Greg	Robert			

Table 1. Experimental Designs, Dependent Variables, and Participants

For Experiment 1, the first follow-up phase was conducted one month after the training; the second follow-up phase was conducted six months after the first follow-up phase. The dependent variables were specific Self-Care and Domestic Living Skills.

For Experiment 2, the follow-up phase was conducted one month after the end of the training. The dependent variables were Hygiene Skills.

The independent variable was an LTM prompting procedure for completing the assigned activities following the steps that comprised the behavioral chain taught using a total-task chaining procedure. We used a prompt-fading procedure with total-task chaining for teaching self-care and domestic living skills, following each behavioral chain's steps. The response-prompting procedure used was LTM. Using LTM, the experimenters provided increasing assistance with a sequence of prompts that began with minimal assistance and progressed to more assistance following a 4-step hierarchy, as shown in Table 2. The procedure was used to teach all the dependent variables according to the experimental design.

LTM Prompt Hierarchy
Verbal
5-sec delay, modeling
5-sec delay, partial physical guidance
5-sec delay, full physical guidance

Table 2. Prompt levels associated with LTM prompting procedures

Pre-Experimental training - Before implementing the study, the staff was trained on the LTM procedure's knowledge and the acquisition of skills to implement the procedure itself through role-playing sessions conducted by the experimenter. During these sessions, the experimenter monitored the procedure's correct implementation through the same checklist used for the study and provided explanatory feedbacks. The training lasted one week, with daily sessions of 1 hour each.

Least to Most Prompting Procedure. Staff training and Treatment Integrity checklist
The teacher creates the proper motivational operations before submitting the request to the student.
The teacher provides an educational prompt following the hierarchy of prompts.
If the student does not respond within the given time or starts emitting a different behavior, then the teacher presents the following prompt in the hierarchy.
If the student emits the desired behavior, the teacher reinforces the correct behavior by providing social praise.

Table 3. The checklist used to collect correct trials, errors, and percentage of correct trials

Baseline **-** Baseline probe sessions were conducted in the different rooms of the apartment to measure the steps in each behavioral chain completed correctly. To assess the performance levels of each task analysis, the authors used a multiple opportunity method. After obtaining participants' attention (i.e., eye contact), the experimenter provided a general instruction (i.e., "Frank, come on, peel your apple."; "Greg, it is time to wash the dishes."). The experimenter then waited up to 5 seconds for the participant to begin to perform the task sequence. Following the multiple opportunity method, the experimenter waited for the participant to begin performing the task sequence. Any consequences did not follow correct responses. If the response was incorrect, different from the specified response, or if the participant did not begin to issue the response within the specified time, then the experimenter would intervene to complete the task. He would then guide the participant to take the appropriate position to perform the next step in the chain. The experimenter would provide general feedback at the end of the completed sequence (e.g., "Okay, Frank, you have peeled your apple"). We recorded all correct and incorrect responses.

Treatment **-** Probe sessions were also conducted daily during the treatment phase. Probes were performed before implementing the training sessions using the same procedures as the baseline probe sessions. The mastery criterion was set at 100% of steps performed correctly for each behavior chain for three consecutive sessions. All probe sessions were also videotaped to calculate procedural fidelity and IOA.

We implemented a total-task chaining procedure and positive reinforcement during the treatment phase: participants performed the same task analyses used for the probe sessions. The clinician provided vocal instructions for each step in the chain (e.g., "Frank, pick the fruit with your left hand using your thumb and index finger"). He waited up to 5 seconds for the participant to produce the required response. If the participant responded correctly, the clinician provided positive reinforcement in the form of verbal praise (e.g., "Well done, Frank!"), or physical contact (e.g., a pat on the back or a high five). If the participant did not start to perform the correct behavior after 5 s or if he started to produce a different behavior, the clinician provided increasing assistance with a sequence of prompts that begins with minimal assistance (modeling). Modeling involves showing the participant the action to be performed, such as showing the correct movement required to be imitated. If the participant performed the correct behavior after the prompt's presentation, then the clinician provided positive reinforcement as described above. If the participant did not produce the correct behavior or started to produce a different behavior, he would progress to more assistance using a more intrusive prompt (partial physical guidance and finally full physical guidance). Physical guidance involves physically guiding the participant to perform the behavior, such as placing the clinician's hand on top of the participant's and guiding him to perform the behavior. When the participant performed the correct behavior, the clinician provided positive reinforcement and moved on to the next step, providing the corresponding vocal instruction and repeating the procedure for the next step of the behavioral chain until its completion.

Upon completion of the entire sequence, the clinician provided positive reinforcement in the form of verbal praise (e.g., "Good job Frank, you're done!").

Follow-up 1 **-** Follow-up sessions were conducted one month after the training using a multiple-opportunity method (Cooper et al., 2014). The sessions were conducted as described during baseline sessions.

Follow-up 2 - Follow-up sessions were also conducted six months after the end of Follow-Up 1 sessions, for Experiment 1 only.

Results

The experimenter collected data on completing the assigned activities. Each behavior was observed or taught following the steps that comprised the behavioral chain; the definitions of target behaviors specifically described topography and were specified in detail as shown in tables 4 and 5.

Washing dishes	*Peeling fruit*
1. Turns on the water to correct temperature.	1. Place paper on the workstation
2. Closes drain.	2. Have the student take the fruit with the left hand using thumb and index (and middle)
3. Puts detergent in water.	3. Have the student take the knife with his right hand
4. Have the student place all dishes in the sink.	4. Have the student hold the knife vertically
5. Fills up the sink and moves the faucet to the second sink.	5. Have the student hold in front of itself fruit and knife with thumbs facing the face
6. Washes knife and fork.	6. Have student place knife on the fruit and near the thumbs
7. Rinses knife and fork.	7. Have student push lightly with the knife to make an incision
8. Washes glass.	8. Have the student move the knife to the left, removing the peel
9. Rinses glass.	9. Have student rotate the fruit to the left
10. Washes plate.	
11. Rinses plate.	
12. Turns off the water.	
13. Opens drain.	

Table 4. Task Analyses used during all phases of Experiment 1.

Brushing teeth-preparation	*Brushing teeth*
1. Turns on cold water.	1. Brushes outer surfaces of lower teeth.
2. Removes cap from a toothpaste tube.	2. Brushes outer surfaces of upper teeth.
3. Wets brush.	3. Brushes chewing surfaces of lower teeth.
4. Puts toothpaste on the brush.	4. Brushes chewing surfaces of upper teeth.
5. Replace the cap on the toothpaste tube.	5. Brushes inside surfaces of lower teeth.
	6. Brushes inside surfaces of upper teeth.
	7.Rinses and cleans up materials.
Washing face	*Combing hair*
1. Turns on water.	1. Picks up the comb.
2. Wets hands with water.	2. Forms part in the hair.
3. Washes forehead.	3. Combs preferred side.
4. Washes right side of the face.	4. Transfers comb.
5. Washes left side of the face.	5. Combs not preferred side.
6. Washes mouth.	6. Transfers comb.
7. Washes chin.	7. Combs back of the head.
	8. Replaces comb.

Table 5. Task Analyses used during all phases of Experiment 2.

Inter-observer Agreement (IOA) and Treatment Integrity: Cut-off criteria selected for the Inter-observer Agreement (IOA) and Treatment Integrity have been set at 90% of agreements for at least 40% of the sessions (Cooper et al., 2014).

Trial-by-trial inter-observer agreement (IOA) data were collected for 92% of pre-experimental training sessions by a second observer. Observers measured staff members' performance during role-playing sessions. Agreements were divided by agreements plus disagreements then multiplied by 100. The average IOA result for staff members was 94.8% (range, 91.2% to 98.7%).

For the experiment 1, Inter-observer agreement (IOA) data were collected for 98% of probe sessions (baseline, treatment, and Follow Up phases) by a second observer. Both the experimenter and the second observer watched the participants' steps in completing the assigned tasks. Trial-by-trial IOA was scored for 82% of treatment sessions.

The mean agreement across participants was 92.58% (range, 90.25 to 97.3%) for probe sessions. The mean agreement across participants was 93.48% (range, 90.33 to 98.3%) for treatment sessions. Treatment integrity data for correct implementation of the teaching procedure were collected for 45% of all sessions, with a mean value of 97% (range, 91% to 100%; see Table 4).

Figure 1 shows the percentage of steps completed independently relative to the skills in question for Experiment 1.

During Experiment 2, we collected IOA data for 87% of probe sessions Trial-by-trial IOA was scored for 74% of treatment sessions. During probe sessions, the mean agreement coefficient was 95.1% (range, 86% to 97%), and during treatment was 94.8% (range, 89.7% to 98.2%). Treatment integrity data were collected for 52% of all sessions, with a mean value of 94% (range, 89% to 100%). Figure 2 shows the percentage of independently completed passages for Experiment 2.

The two experiments' results were investigated using visual analysis of graphical displays (Cooper et al., 2014; Horner et al., 2005; Lane & Gast, 2014). We analyzed to identify the trend (progress over time), level (magnitude), and stability (bounce) of the data by performing within-condition and between-condition measurements.

The trend was assessed using the split-middle technique for both within-condition and between-condition measurements. We assessed the absolute level change by comparing the first and last data value of a single experimental phase for within-condition measurements; for between-condition measurements, we compared the last value of one experimental phase with the first value of the following experimental phase. The stability criterion was 80% of data points above and below 0.25 from the median.

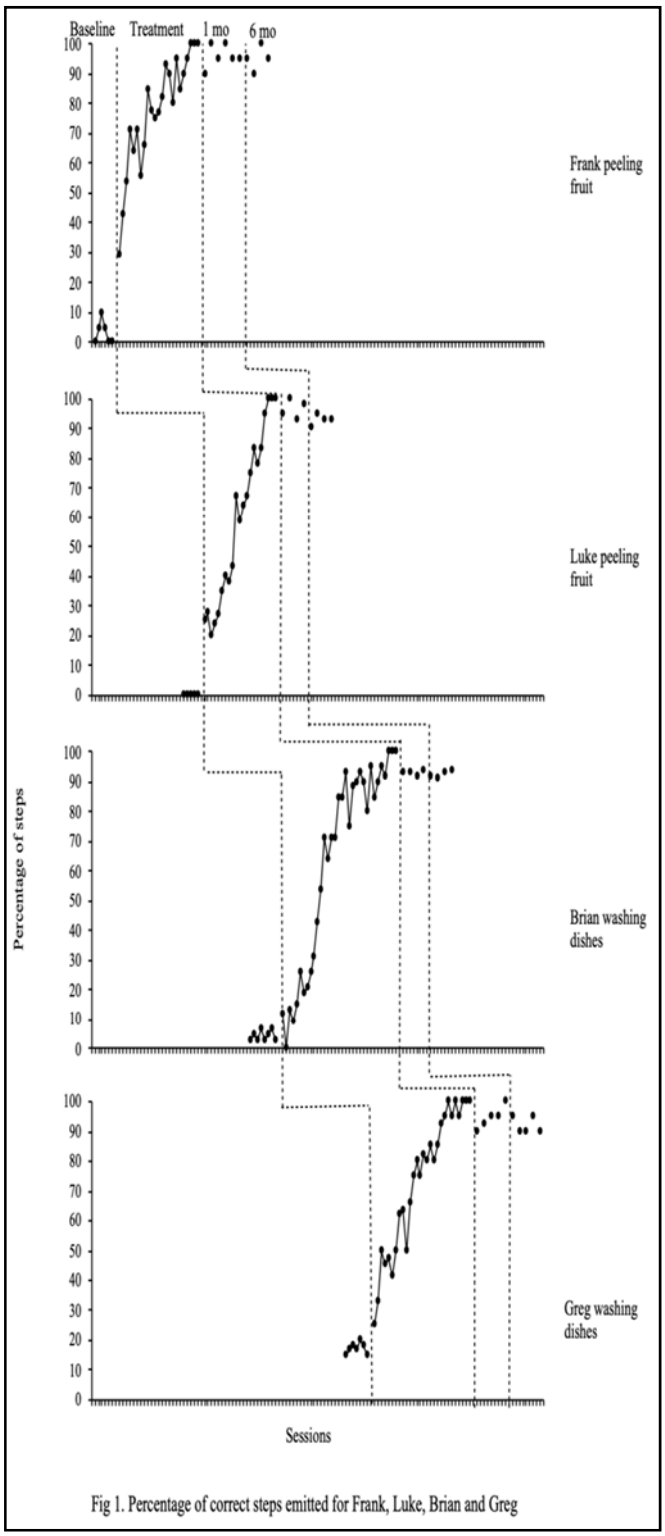

Fig 1. Percentage of correct steps emitted for Frank, Luke, Brian and Greg

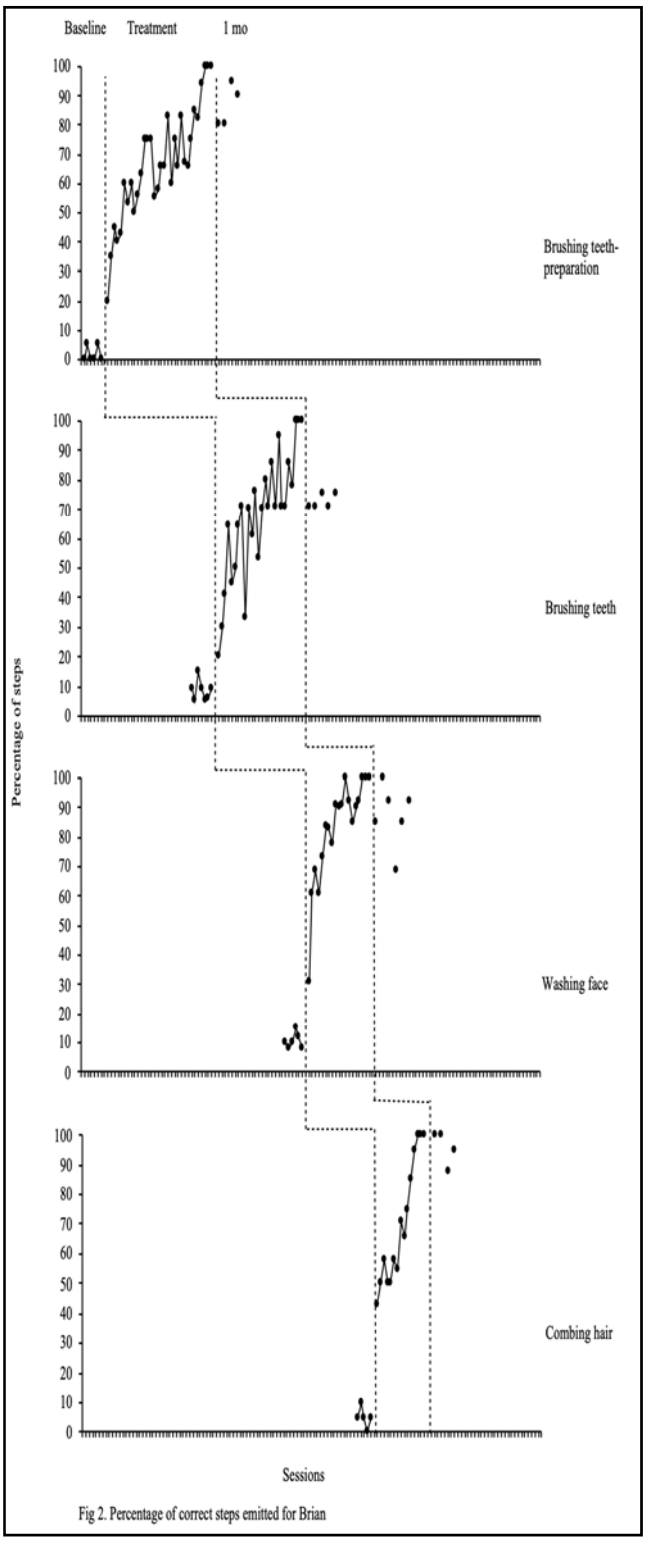

Fig 2. Percentage of correct steps emitted for Brian

Finally, the percent of non-overlapping points (Scruggs et al., 1987) was evaluated to determine the treatment's relative effectiveness. Table 6 reports the results of the analyses for experiment 1.

	Baseline	Treatment	Follow Up 1	Follow Up 2
Luke - Peeling Fruit	Within-Condition Analysis			
Absolute Level Change	No Change	Improving	Improving	Improving
Stability	Stable	Variable	Variable	Variable
Trend	Zero Celerating	Accelerating	Accelerating	Accelerating
	Between- Condition Analysis			
Level		Improving	Deteriorating	Deteriorating
PND		100%	100%	100%
Frank - Peeling Fruit	Within-Condition Analysis			
Absolute Level Change	No Change	Improving	Improving	No change
Stability	Variable	Variable	Variable	Variable
Trend	Decelerating	Accelerating	Zero Celerating	Accelerating
	Between- Condition Analysis			
Level		Improving	Deteriorating	Stable
PND		100%	100%	100%
Brian - Washing Dishes	Within-Condition Analysis			
Absolute Level Change	No Change	Improving	Improving	Improving
Stability	Variable	Variable	Stable	Stable
Trend	Zero Celerating	Accelerating	Zero Celerating	Accelerating
	Between- Condition Analysis			
Absolute Level Change		Improving	Deteriorating	Stable
PND		97%	100%	100%
Greg - Washing Dishes	Within-Condition Analysis			
Absolute Level Change	No Change	Improving	Improving	Deteriorating
Stability	Stable	Variable	Variable	Variable
Trend	Zero Celerating	Accelerating	Accelerating	Zero Celerating
	Between- Condition Analysis			
Absolute Level Change		Improving	Deteriorating	Deteriorating
PND		100%	100%	100%

Table 6. Results for experiment 1

Table 7 reports the results for experiment 2.

	Baseline	Treatment	Follow Up 1
Robert - Brushing teeth-preparation	Within-Condition Analysis		
Absolute Level Change	No Change	Improving	Improving
Stability	Stable	Variable	Variable
Trend	Zero Celerating	Accelerating	Accelerating
	Between- Condition Analysis		
Level		Improving	Deteriorating
PND		100%	100% (baseline/F-Up)
Robert - Brushing teeth	Within-Condition Analysis		
Absolute Level Change	No Change	Improving	Improving
Stability	Variable	Variable	Variable
Trend	Decelerating	Accelerating	Accelerating
	Between- Condition Analysis		
Level		Improving	Deteriorating
PND		100%	100% (baseline/F-Up)
Robert - Washing face	Within-Condition Analysis		
Absolute Level Change	Deteriorating	Improving	Improving
Stability	Variable	Variable	Variable
Trend	Decelerating	Accelerating	Decelerating
	Between- Condition Analysis		
Absolute Level Change		Improving	Deteriorating
PND		100%	100% (baseline/F-Up)
Robert - Combing Hair	Within-Condition Analysis		
Absolute Level Change	Deteriorating	Improving	Deteriorating
Stability	Stable	Variable	Variable
Trend	Zero Celerating	Accelerating	Decelerating
	Between- Condition Analysis		
Absolute Level Change		Improving	Stable
PND		100%	100% (baseline/F-Up)

Table 7. Results for Experiment 2

Discussion

This study's first objective was to evaluate the LTM prompting procedure's effectiveness in teaching

Self-Care and Domestic Living skills in a semi-residential setting for five adolescents with Intellectual Developmental Disorders (IDD). The first graph in Figure 1 shows a stable trend with zero acceleration and no absolute level changes for baseline measurements. Following the treatment's introduction, a change in the direction of the trend can be observed, which accelerates and varies in the therapeutic direction. These results are replicated across participants and behaviors to observe a functional relationship between response trends and the independent variable's introduction. Similarly, the first graph in Figure 2 shows a variable trend with zero acceleration and no absolute level change in baseline measurements, which changes to being accelerating but variable in the therapeutic direction during the intervention phase. The results are replicated between behaviors, demonstrating the existence of a functional relationship. Both studies, therefore, demonstrate experimental control by the logic of the baseline for single-subject studies with multiple baselines (Cooper et al., 2014). PND also confirms the efficacy of the treatment. Their values are attested at percentages equal to 100% concerning comparing the baseline and intervention phases for seven measurements out of eight (average value 99.63%) (Scruggs et al., 1987).

This study's second objective was to assess the maintenance of newly acquired skills after the end of the intervention.

In Experiment 1, during the first phase of Follow Up, the absolute level change is improving for all behaviors and participants. Response trends vary from zero celerating to accelerating and are variable, except for and measurements related to Brian-Washing Dishes, where they are stable. For the second phase of Follow Up, results are mixed. The analysis of absolute level change between the intervention phase and Follow Up phase 1 for Experiment 1 show a deterioration in performance. This result is replicated across participants and behaviors.

In contrast, for the second Follow Up phase, the results show a partial stabilization of absolute level change. Comparison across conditions shows a deterioration in absolute level change between the intervention measurements and those for the first Follow Up phase. Comparing the two phases of Follow Up, the level tends to stabilize for the measurements related to Frank - Peeling Fruit and Brian - Washing Dishes.

In experiment 2, the absolute level change is improving for the first three behaviors while deteriorating for the last behavior. The comparison between- conditions shows a deterioration of the absolute change in level between the intervention measurements and those related to the first phase of Follow Up for the first three behaviors. At the same time, it is stable for the fourth behavior. In general, it can be said that in the Follow Up phases for both experiments, there is a decrease in the level of response concerning the last data point of the intervention phase, which represents the

criterion of skill acquisition (100% correct responses). The PND shows a non-overlapping point percentage of 100% between the baseline and Follow Up conditions for both experiments. Thus, this result demonstrates a measure of treatment effects in a therapeutic direction (Scruggs et al., 1987).

According to Burckley et al. (2015), we wanted to evaluate the use of the LTM prompting procedure in community settings to teach daily living skills. The setting in which this study was conducted was structured to be similar to the participants' home settings. Thus, we presented opportunities to train the skills in question in a highly naturalistic context.

All the participants learned the target behaviors using LTM teaching procedures. Frank and Luke learned to peel fruit independently, Brian and Greg learned to wash dishes (Experiment 1), and Robert learned to complete the Personal Hygiene routine (Experiment 2). These results, therefore, seem to demonstrate the effectiveness and efficiency of the teaching procedure used (Cengher et al., 2018; Cengher et al.,2020).

According to Ault and Griffen (2013), the LTM procedure appears to be a practical, economical and non-intrusive method for teaching self-care and domestic skills replicated by the current experiments.

According to Cannella-Malone et al. (2006), these behavioral chains' acquisition will allow participants to complete essential tasks accurately and independently in various meaningful contexts.

Participants will also have access to new reinforcement contingencies, such as those resulting from independently completing the behavioral chains or those resulting from other people's praise present in the same context.

Limit of the research and future prospective

The fading of the prompts provided by the experimenter was rapid during the training phases. Nevertheless, it remains to be investigated how to ensure that participants maintain the newly acquired skills over time. It is also unclear whether, during the follow-up phases, the experimenter's help may have overestimated the level of mastery achieved by the participants for each skill taught. It was not measured whether, in the absence of such help, the participants would still have been able to carry out the task independently. These represent the limitations of the current study. However, it should be noted that the level of supervision provided to the participants for carrying out these activities in the context of the daily routine at the learning center significantly decreased after the end of the training. Future research should investigate the use of training booster sessions to maintain the newly acquired skills and the conduct of single opportunity probes to have a more

accurate estimate of the participants' level of supervision (Cooper et al., 2014). A further limitation is that the prompted responses were not measured. Future studies could graphically report the percentage of prompted responses to evaluate the type of prompts used (Ault & Griffen, 2013).

Concerning the psychological implications, we should detect the limit not having collected indicators of happiness or even secondary data through the caregivers' report. Therefore, future research could include these measurements conducted at the end of the study (Bobzien, 2014).

Overall, these findings are preliminary and cannot be generalized. The experimental design used in this study was limited as it included few participants. Replications are therefore needed to establish the effectiveness of procedures and the generalization of results.

Conclusions

This study deals with a topic that may have some implications for clinical practice. As stated by West and Billingsley (2005), these findings seem to corroborate the feature of "self-fading" of the LTM procedure, which proved to be helpful in a context where staff did not have extensive preparation in systematic instruction procedures. The role-playing sessions served to increase the staff's training level and correct the procedures. Therefore, the study's internal validity is supported by the high level of integrity of the treatment, demonstrating the integrity and consistency of the independent variable introduced (Cengher et al., 2020).

Practitioners could implement this procedure in daycare centers or residential facilities. With brief staff training, it could be used to promote the acquisition of new daily living skills or increase mastery in the execution of skills already in the resident's repertoire. To ensure successful implementation, supervisors in these facilities could conduct role-playing sessions with staff at a rate compatible with the organization of activities and shift rotations.

Regarding the rehabilitation implications, the results of this study corroborate the effectiveness of the procedure used for teaching life skills (Doyle et al., 1988; Wolery et al., 1992; Collins, 2012; DiCarlo et al., 2017; Finke et al., 2017; Gil et al., 2019; Halbur et al., 2020). The behaviors taught in the two experiments reported here are age-appropriate for the participants and could increase their access to other situations and environments: they may have the opportunity to be included in group and more complex routines. The acquisition of these new behaviors could also facilitate access to additional social and educational opportunities (Meadan et al., 2013). The newly acquired skills could also increase the perception of self-efficacy and participants and their caregivers' overall well-being.

According to Burckley et al. (2015), we wanted to evaluate the use of the LTM prompting

procedure in community settings to teach daily living skills. We structured the environment in which this study was conducted to be similar to the participants' home contexts. We presented the opportunity to train these skills in a highly naturalistic setting through a behavioral intervention that involved behavioral strategies in typical daily routines. This study contributes to the line of research related to life skills acquisition in naturalistic settings. The procedures described could be helpful for operators working in settings similar to the one described. The use of the LTM prompting procedure could provide several practical implications for future replications.

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Authors' contribution: All authors contributed to and have approved the final manuscript.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the institutional and/or national research committee's ethical standards and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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