A Preliminary Investigation of Graduated Guidance

DISSERTATION

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By

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Abstract

Graduated guidance is a response prompting and fading procedure that incorporates physical prompts in the transfer of stimulus control. It is a unique procedure in that it does not have specific criteria or guidelines for changing prompt level, instead relying on the student as an indicator of when and how to prompt. Because of its flexibility, it would be beneficial to determine how it is being defined and utilized in the literature, to develop an operational definition and prompting guidelines, and to compare it to other effective prompting procedures. Therefore, the purpose of this study was to operationalize graduated guidance as a prompting procedure, and to compare it to most-to-least prompting with a delay in the acquisition of daily living skills for five individuals with significant disabilities. An adapted alternating treatments design was used across two sets of participants with prompting strategies counterbalanced across tasks. Results demonstrated that both prompting procedures led to improvements for all tasks. However, of the four tasks that reached mastery criterion, three were taught using graduated guidance. In addition, graduated guidance resulted in fewer trials to mastery, fewer errors, fewer intrusive prompts, and fewer overall prompts as compared to most-toleast prompting with a delay. Areas for future research and implications for practice were outlined as well.

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To my family

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Cannella-Malone, H. I., Sabielny, L. M., Jimenez, E. D., & Miller, M. M. (2013). Conducting preference assessments with students with significant intellectual, developmental, and physical disabilities. *Teaching Exceptional Children, 45,* 16–23.

Payne, D., Cannella-Malone, H. I., Tullis, C. A., & Sabielny, L. M. (2012). The effects of self-directed video prompting with two students with intellectual and developmental disabilities. *Journal of Developmental and Physical Disabilities*, 24, 617–634.

Fields of Study

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Chapter 1: Introduction

Prompts are additional stimuli that, when applied in the presence of a discriminative stimulus (S^D), can be used to occasion a correct response (Cooper, Heron, & Heward, 2007). Prompts can vary in delivery (e.g., before or during the targeted behavior) and form (e.g., color, position, verbal, physical). Those that occur before the targeted behavior are called stimulus prompts and those that occur during the targeted behavior are response prompts.

Stimulus prompts include the manipulation of antecedent stimuli and may incorporate movement, position, and/or redundancy (Cooper et al., 2007). When using movement as a stimulus prompt, the practitioner may point to, touch, or look at the targeted item. When using position, the targeted item may be placed closer to the student. When using redundancy as a stimulus prompt, the practitioner may pair one or more stimulus or response dimensions (e.g., color, size, shape) with the targeted item. Whereas stimulus prompts manipulate the task item to cue a correct response, response prompts operate directly on the desired response.

Response prompts are typically delivered as verbal instructions, modeling, or physical guidance, and should only be provided as supplementary stimuli during the acquisition phase of instruction (Cooper et al., 2007). Once the target behavior is reliably occurring with the prompt, it is necessary to transfer stimulus control from the response prompt to the naturally occurring stimulus (e.g., S^D). This is achieved through fading prompts, which not only assists in the transfer of stimulus control from the prompts to the natural stimulus, but also assists in minimizing errors. Wolery and Gast (1984) described four procedures for transferring stimulus control from response prompts to natural stimuli. They are (a) time delay, (b) least-to-most prompts, (c) most-to-least prompts, and (d) graduated guidance.

Time delay procedures involve the manipulation of the time intervals between the presentation of the natural stimulus and the presentation of the response prompt (Wolery & Gast, 1984). Using either constant time delay or progressive time delay procedures, the stimulus control is transferred from the prompt to the natural stimulus by delaying the presentation of the prompt. In a constant time delay procedure, the presentation of the prompt occurs after a 0 s delay, and the trials that follow apply a fixed time delay (e.g., 5 s) between the presentation of the natural stimulus and the presentation of the response prompt. In a progressive time delay procedure, the presentation of the prompt occurs after a 0 s delay, and gradually extends the time delay, often in 1 s intervals. For example, if a teacher applied a progressive time delay for snack preparation, she would prompt immediately following the S^D (i.e., 0 s delay) during the first session. After the student meets criterion at 0 s (e.g., two consecutive sessions successful without a delay), the teacher would then wait 1 s before prompting, then 2 s, and so on, making sure the student meets the criterion at each level before increasing the delay. Time delay procedures may be used in addition to other procedures (e.g., most-to-least prompts,

least-to-most prompts), but do not necessarily occur within a prompt hierarchy. In other words, a consistent physical prompt (e.g., always hand-over-hand) may be given after the time delay instead of hierarchical prompts (e.g., hand-over-hand, forearm, upper arm).

A second method for transferring stimulus control is through least-to-most prompting. In this procedure, the practitioner provides the least restrictive prompt first and fades the physical prompts in as necessary. Least-to-most prompting includes guidelines for when to move up and down the prompting hierarchy (Wolery & Gast, 1984). In other words, if one prompt is not successful, the practitioner should move to the next most restrictive prompt in a specified order. If an error occurs, the practitioner will likely provide the most restrictive prompt (e.g., full physical prompt) to correct the behavior, and may adjust the level of prompting for the following session. Using this prompting hierarchy, the intrusiveness of the prompt is generally faded in across sessions. For example, if a practitioner provides a vocal prompt, the next prompt that could be used might be a gesture or model prompt. If the student makes an error with a vocal prompt, the practitioner may provide a full physical prompt to correct the behavior, and provide a gesture during the following session. To illustrate a specific hand washing example, the practitioner might say, "Turn on the faucet." If the student is not successful with this vocal prompt, the practitioner might provide physical guidance for that step during the session and would gesture to the faucet during the next session.

Using most-to-least prompting, the practitioner begins by providing the most restrictive prompt in the hierarchy to guide the student through the entire target behavior and fades physical prompts across sessions, ending with the least restrictive prompt and,

ultimately, no prompt (Wolery & Gast, 1984). Typically, most-to-least prompting begins with physical guidance, fades to visual prompts, verbal instructions, and finally the natural stimulus. Similar to the least-to-most strategy, most-to-least prompting should incorporate guidelines for when to move up and down the prompting hierarchy (Wolery & Gast, 1984). In other words, a most-to-least prompting hierarchy might state that a student must practice a skill at each step of the hierarchy for two consecutive sessions before moving to the next level of the hierarchy. As in least-to-most prompting, if an error occurs, the practitioner will likely provide the most restrictive prompt (e.g., full physical prompt) to correct the behavior, and may adjust the level of prompting for the following session. For example, a practitioner may provide a hand-over-hand prompt (i.e., most restrictive) for two consecutive sessions, then move to the next least restrictive prompt (e.g., forearm prompt) for two consecutive sessions. If the student makes an error with the forearm prompt, the practitioner may correct the error with a hand-over-hand prompt, and return to providing prompts hand-over-hand for the next session until the student is again successful for two consecutive sessions. To again use the hand washing example, the practitioner might provide a hand-over-hand prompt to turn on the faucet for two consecutive sessions, then prompt the student at the forearm to turn on the faucet for the next two sessions. If the student makes an error with the forearm prompt, the practitioner would immediately provide a hand-over-hand prompt to correct the error, and return to hand-over-hand prompting for the faucet step during the next session.

There have been a small number of comparison studies evaluating the effectiveness of time delay, least-to-most prompts, and most-to-least prompts. In one

comparison study, McDonnell and Ferguson (1989) evaluated the use of a decreasing prompt hierarchy (i.e., most-to-least prompting) and a time delay procedure to teach four students with moderate disabilities to cash checks and use an automatic teller. The authors found that both strategies were effective, but that the decreasing prompt hierarchy (i.e., most-to-least prompting) required fewer trials to mastery and less instructional time, and resulted in fewer errors.

In another comparison study, Day (1987) evaluated the use of a decreasing prompt hierarchy (i.e., most-to-least prompting) and an increasing prompt hierarchy (i.e., least-to-most prompting) to teach six individuals with significant disabilities various tasks (e.g., prepositions, sorting, assembly, receptive identification). The authors found that the most-to-least strategy was more effective in that it produced greater gains and resulted in fewer errors than the least-to-most strategy. It is important to note, however, that several of the participants did not reach or maintain mastery criterion with either strategy.

In a similar comparison, Libby, Weiss, Bancroft, and Ahearn (2008) directly compared the use of most-to-least and least-to-most prompting procedures in the acquisition of solitary play skills for five children with significant disabilities. Least-to-most prompting led to faster acquisition, but most-to-least prompting was associated with fewer errors. A third hierarchy was added in a second experiment that utilized the most-to-least format, but added a 2 s delay before each prompt. The authors found that participants acquired skills almost as quickly with most-to-least prompting with the delay as with least-to-most prompting, but with fewer errors, suggesting that most-to-least prompting with a delay may be the best default prompting procedure of the three.

Overall, most-to-least prompting has been found to be the most effective strategy when compared to other structured physical prompting strategies in the acquisition of skills by individuals with varying disabilities.

The final strategy outlined by Wolery and Gast (1984), graduated guidance, has not received nearly the same amount of research attention as the other three prompting procedures. Wolery and Gast describe graduated guidance as providing physical prompts as needed and fading them immediately (within a session) as the student begins to respond correctly. Fading can include the position of the prompt on the student's body (e.g., hand, forearm, upper arm), and/or the intensity (e.g., pressure, force) of the prompt. The practitioner should shadow the student's movements, allowing for immediate corrections as necessary. The fading is not systematically planned and relies on the student's responding during sessions. This is in contrast to most-to-least and least-to-most prompting, which rely on a specific criterion being met at each prompt level.

Although the first three procedures (i.e., time delay, least-to-most, most-to-least) are generally consistently defined across textbooks and research studies, graduated guidance is not as clearly or consistently defined. What follows is a sample of the definitions for graduated guidance across three popular behavior analytic textbooks. Several similarities as well as several differences become evident. The first two texts (i.e., Cooper et al., 2007; Alberto & Troutman, 2013) were chosen because they are the only two applied behavior analysis textbooks in Amazon's top 100 sellers for special education. The third text (i.e., Miltenberger, 2011) was chosen because its graduated guidance definition is often cited in the literature (see Chapter 2).

Cooper et al. (2007) define graduated guidance in their chapter on stimulus control:

The applied behavior analyst provides physical guidance as needed, but using graduated guidance she will immediately start to fade out the physical prompts to transfer stimulus control. Graduated guidance begins with the applied behavior analyst following the participant's movements closely with her hands, but not touching the participant. The analyst then increases the distance of her hands from the participant by gradually changing the location of the physical prompt. Graduated guidance provides the opportunity for an immediate physical prompt as needed. (p. 404)

According to this definition, graduated guidance is used as a physical fading procedure that is applied immediately, and involves following a participant's movements closely. In addition, it incorporates increasing and decreasing the physical distance as necessary, emphasizing the ability to provide an immediate prompt when necessary.

Alberto and Troutman (2013) define graduated guidance in their chapter on differential reinforcement:

Graduated guidance is used in fading physical prompts. The teacher begins with as much physical assistance as necessary and gradually reduces pressure. The focus of the guidance may be moved from the part of the body concerned (spatial fading), or a shadowing procedure may be substituted in which the teacher's hand does not touch the student but follows his movement throughout the performance of the behavior. (p. 309)

This definition also emphasizes the use of graduated guidance as a physical fading procedure, and it focuses on the use of location to fade the prompts. In addition to this, however, the authors have added the use of pressure in fading prompts. In general, fading is done only as necessary.

Finally, Miltenberger (2011) defines graduated guidance in his chapter on chaining:

With graduated guidance, you use hand-over-hand guidance to lead the learner through the task. Over trials, you gradually provide less and less assistance and shadow the learner's hand as the learner completes the task. Shadowing means keeping your hand close to the learner's hand as the learner engages in the behavior. This allows you to initiate physical guidance immediately if the learner fails to execute one of the component behaviors in the chain. (p. 207)

Similar to the previous two definitions, this definition focuses on graduated guidance as a physical fading procedure. Specifically, it focuses on providing less assistance and shadowing across trials. It also emphasizes using immediate guidance as necessary. However, this definition explicitly states to begin with a most intrusive prompt (i.e., hand-over-hand) and to fade across trials rather than within a trial.

Taken together, the three definitions focus on graduated guidance as a physical fading procedure in which prompts are faded by frequency, intensity, and/or location. All three definitions are consistent in emphasizing gradual fading of the prompts, as well as the purpose being to be able to provide an immediate prompt as necessary. All three definitions mention the use of shadowing. Where the definitions differ, however, is when

and how to fade the prompts. Cooper et al. (2007) emphasize an immediate fade, Alberto and Troutman (2013) recommend fading as necessary, and Miltenberger (2011) recommends fading across trials. Considering that the purpose of a graduated guidance procedure is to transfer stimulus control from the prompt to the naturally occurring stimulus, it would seem problematic for a prompting procedure to not identify the steps or timeline involved in the fading process. In addition, although all three definitions agree that prompts should be faded in multiple ways (e.g., frequency, intensity, location), none of the authors indicated when or how to use which type of fading procedure. Wolery and Gast (1984), on the other hand, emphasize using the student as an indicator of when to prompt, whereas this was not explicitly stated in the other definitions.

Ambiguity in its definition may not be the only difficulty associated with using graduated guidance. Because it is strictly a physical fading procedure, it would seem that its utility may be limited. Whereas time delay, least-to-most, and most-to-least procedures can be implemented with or without physical guidance, graduated guidance cannot. Therefore, the type of skills for which graduated guidance can be used may consist of a small portion of the overall set of skills that a student may need to be taught. Furthermore, with the greater flexibility of the other three prompting procedures, graduated guidance may be a redundant or even unnecessary prompting procedure. It may be that for any skill that could be taught using graduated guidance, time delay, least-to-most, or most-to-least prompting could be equally effective. However, because graduated guidance is a physical-only prompting procedure, it could be seen as the ideal procedure for physical tasks. For example, Thompson, Braham, and Fuqua (1982) taught

three young adults with intellectual disabilities how to complete their laundry. Graduated guidance was an ideal choice in prompting procedures for this task, due to laundry completion being made almost entirely of physical movements.

In addition to the difficulties with the definition and its limited utility, another potential issue with graduated guidance may be that it emphasizes the student's behavior as an indicator of when to prompt and what type of prompt to use. For example, when describing their graduated guidance procedures, Bryan & Gast (2000) explicitly stated that prompts should be based on a moment-to-moment basis, and van der Meer et al. (2012) describe using the least amount of prompt necessary for the student to respond correctly. Each of these can be interpreted as a subjective measure, without clear guidelines. Again, this is in contrast to the other three procedures, which use the previous prompt level as an indicator for the next prompt to use. Determining the prompt level in this manner is a more objective measure, with a clear set of guidelines. However, using the student as a guide for when and how to prompt may be a benefit to this procedure. If a practitioner only prompts when necessary (i.e., when a student needs the prompt to perform correctly), instead of using strict prompting guidelines, it is likely that the student will acquire the skill more rapidly. This would be due to allowing the student the opportunity to respond as independently as possible, versus having to systematically work through a prompting hierarchy. Furthermore, if a practitioner recognizes that a student is about to make an error, graduated guidance would allow the practitioner to prompt immediately, thereby preventing the error from occurring.

More information regarding graduated guidance is necessary. With the differences in definitions across textbooks, it would be beneficial to analyze the procedures and develop a definition based on this analysis. Additionally, because graduated guidance has not been compared to other prompting procedures to evaluate its relative effectiveness, it should be compared to one of the most effective procedures, most-to-least prompting with a delay. As a result, the purpose of this study was to operationalize graduated guidance as a prompting procedure, and to compare it to most-to-least prompting with a delay in the acquisition of daily living skills for five individuals with significant disabilities. Specific research questions included the following:

- 1. How is graduated guidance operationally defined?
- 2. What student behaviors can a practitioner use to cue the appropriate prompts and prompt fading procedures during graduated guidance?
- 3. Is graduated guidance as effective as most-to-least prompting with a delay?
- 4. Which prompting strategy results in faster acquisition as measured by trials to criterion?
- 5. Which prompting strategy results in fewer errors?

Chapter 2: Literature Review

In this chapter, a review of the graduated guidance literature is presented. In the first section, the method of review will be described in terms of the database search, inclusion and exclusion criteria, and coding. The results will then be presented in two categories: using graduated guidance to increase behavior and using graduated guidance to decrease behavior. The final section will outline a discussion of the results, limitations of the review, future research, and implications for practice.

Graduated guidance is a response prompting procedure that includes providing prompts only as necessary, using the student as an indicator for when to prompt (Wolery & Gast, 1984). However, its definition has been inconsistently defined throughout the literature (see Chapter 1). Considering that the purpose of graduated guidance is to transfer stimulus control and fade prompts, it is problematic for this procedure to inconsistently identify the steps or timeline involved in the fading process. A more thorough analysis of the definition and procedures associated with graduated guidance are necessary.

Given that graduated guidance is recognized as a physical-only prompting procedure, this may limit the types of skills for which it can be utilized. Therefore, identifying the types of skills that researchers are identifying for the use of graduated guidance would be beneficial. Furthermore, when this procedure is being used, it is important to determine how effective it is, given that its main indicator for prompt selection at any given moment should be based on the student's behavior, and not on any pre-set guidelines.

As a result, the purpose of this literature review is to provide an overview of studies in which graduated guidance was identified as a prompting procedure and to summarize the results and implications for practice. Specifically, I aimed to (a) determine how graduated guidance was defined, (b) identify the type of skills taught with graduated guidance, and (c) determine if graduated guidance was an effective prompting procedure.

Method

Database Search Procedures

Peer-reviewed studies using graduated guidance as a prompting procedure were identified through electronic searches of CSA, Ebrary, EBSCOhost, Google Scholar, MD Consult, National Library of Medicine, OhioLink, PubMed, and Thomson Reuters. This electronic search returned 40 articles, 28 of which met the inclusion criteria. The keyword used to identify the articles was "graduated guidance," which could be included anywhere within the document. A hand search of the reference sections of the 28 included articles was conducted and did not yield any additional articles

Inclusion and Exclusion Criteria

Studies were included if the term "graduated guidance" was used to describe a prompting procedure in the methodology. No other inclusionary criteria were used. Studies that did not use "graduated guidance" to describe a prompting procedure in the methodology were excluded. Specific examples of exclusion included using the term "graduated guidance" in the introduction (e.g., Griffen, Wolery, & Schuster, 1992; Panyan & Hall, 1978; Rinald & Mirenda, 2012), discussion (e.g., Grow, Carr, Kodak, Jostad, & Kisamore, 2011; Hanley, Heal, Tiger, & Ingvarsson, 2007; Steege, et al., 1990), or results sections (Repp & Barton, 1980) without using it as a procedure in the study. In addition to this, Jones and McCaughey (1992) described graduated guidance in a review of the literature, and Horrocks and Morgan (2011) identified graduated guidance as an available procedure for their teacher training package, but did not end up using it.

Coding of the Data

Studies were divided into two groups according to the use of graduated guidance: the use of graduated guidance to increase behavior and the use of graduated guidance to decrease behavior. For each study, the participant's sex, age, and diagnosis were identified as well as the definition provided for graduated guidance, the skill taught with graduated guidance, if skill data were reported (i.e., data of skills taught with graduated guidance, prompts used during graduated guidance), and outcomes. The outcomes of the study were described as having positive results, negative results, or mixed results. Positive results were defined as those studies that had positive effects for all participants (i.e., improvement in the target behavior). Negative results included those studies that did not have positive effects for all participants (i.e., no improvement). Mixed results were defined as those studies which had a combination of positive and negative results across participants.

Results

The present literature review identified 28 studies that met the criterion for inclusion. These studies were organized into the use of graduated guidance to increase behavior and the use of graduated guidance to decrease behavior and are outlined in Table 1.

Graduated Guidance to Increase Behavior

Of the 28 identified studies, 20 studies implemented graduated guidance to increase a target behavior.

Sample

A total of 68 participants were included in the studies to increase behavior. Of those participants, the majority had a diagnosis of autism (n = 41) or an intellectual disability (n = 19), with the remaining diagnoses including developmental delay (n = 1), blind (n = 1), Cri du Chat (n = 1), Fragile X (n = 1), cerebral palsy (n = 1), traumatic brain injury (n = 1), Kleinfelter syndrome (n = 1), Multi-System Developmental Disorder (n = 1), and Congenital Myotonic Dystrophy (n = 1). A broad range of ages was included (range: 2–37).

Graduated Guidance

Of the 20 studies, 11 did not provide a description or definition of the prompting procedure. Instead, the term "graduated guidance" was the only description of the procedure. In one example, Fyffe, Kahng, Fittro, and Russell (2004) evaluated the use of graduated guidance to teach a boy with traumatic brain injury to request attention through functional communication training (FCT). The authors stated that the participant was

taught using a "graduated guidance prompting procedure" to hand over the attention card (Fyffe et al., 2004, p. 403), which resulted in an increase in card exchanges and a decrease in inappropriate sexual behavior. No further information regarding the prompting procedure was provided. In another example, Krantz, MacDuff, and McClannahan (1993) taught three parents to implement picture activity schedules (PAS) with their sons with autism. Picture activity schedules are binders that contain photographs of various activities. Each page in the binder contains one photograph depicting one activity that the participant is expected to complete. The authors stated that the parents were taught to use "graduated guidance" to teach their children to follow the PAS, but no other procedural information was provided. The parents were effective in implementing the intervention, which resulted in an increase in PAS engagement and a decrease in disruptive behavior for all three participants.

Five of the 11 studies that did not include descriptions of the prompting procedures also did not include acquisition data. For example, Cicero and Pfadt (2002) implemented graduated guidance to teach three children with autism various daily living skills associated with toileting (e.g., dressing). Though toileting data were included, the data for daily living skills (i.e., the skills taught using graduated guidance) were not included.

The remaining nine studies provided definitions for their use of graduated guidance. Of those, seven described how to fade the prompt (e.g., frequency, intensity, location) or what type of prompt to use (e.g., partial physical, full physical). Among the most common descriptions were hand-over-hand or manual guidance and descriptions of Table 1. Studies listed according to categories of use; participant's sex, age, and diagnosis; definition provided for graduated guidance; the skill taught and the context in which it was taught; if skill data were reported; and outcomes.

Category/Article Name	n/Gender	Age	Diagnosis ^a	Graduated Guidance Description	Context ^b	Skill/DV ^c	Data ^d	Findings
~ ~ ·			Z	•				
Graduated Guidance to Incr	rease Behavio	or						
Akmanoglu & Tefkin-Iftar	2M				Skill	Safety:		
(2007)	1F	6–11	Autism	Graduated guidance	acquisition	Strangers	DV	Positive
				Provide physical assistance (e.g., hand-over-hand				
	2M		P1 = DD	manipulation and	Skill		DV &	
Bennett et al. (2011)	1F	3	P2, P3 = Autism	shadowing)	acquisition	PAS	Р	Positive
	5M				Skill		DV &	
Betz et al. (2008)	1F	4–5	Autism	Graduated guidance	acquisition	Joint PAS	Р	Positive
	214			Provide a controlling prompt, then make a moment-to-moment decision about which type				
	3M	7 0	A 15	of prompt to provide; fade	Skill	DAG	DV	р :/:
Bryan & Gast (2000)	11	/—8	Autism	in frequency and intensity	acquisition	PAS	DV	Positive
	2M				Skill	Toileting:		
Cicero & Pfadt (2002)	1F	4–6	Autism	Graduated guidance	acquisition	ADLs	NR	NR
							Co	ontinued

Table 1 continued

Category/Article Name	n/Gender	Age	Diagnosis ^a	Graduated Guidance Description	Context ^b	Skill/DV ^c	Data ^d	Findings
Correa et al. (1984)	3M	2–4	Blind & ID (S to P)	Four levels: No assistance, verbal prompt, partial physical guidance, full physical guidance; graduated prompting	Skill acquisition	Reach- grasp	DV	Positive
Dalrymple & Feldman (1992)	5M 5F	15– 37	P8 = ID (M) P6, P7, P9, P10 = ID (S)	Start with full physical guidance and gradually lighten assistance both within and across trials	Error correction	Sign	P8, P9, P10 = DV	Positive
Denny et al. (2001)	1M	2	Cri du Chat	Hand-over-hand guidance; over time, less and less assistance is provided until a shadow is used; four levels of the prompt with criteria to move to the next level of the prompt	Skill acquisition	Ball rolling Eating	DV & P	Positive
Drasgow et al. (2008)	1M 2F	3	P1, P2 = Autism P3 = Autism & Fragile X	Physical prompts (e.g., full physical prompts, partial physical prompts)	Pre- training	Manding: Sign	Post- training	Mixed
Durand (1999)	4M 1F	3-15	P1, P2 = CP & ID P3 = ID (S) P4, P5 = Autism & ID (S)	Graduated guidance	Skill acquisition	Difficult tasks	NR	NR
							Co	ontinued

Table 1 continued

Category/Article Name	n/Gender	Age	Diagnosis ^a	Graduated Guidance Description	Context ^b	Skill/DV ^c	Data ^d	Findings
					CI '11			
Fyffe et al. (2004)	1M	9	TBI	Graduated guidance	acquisition	FCT	DV	Positive
Ingenmy & Van Houten					Pre-	Motor		
(1991)	1M	10	Autism	Graduated guidance	training	responses	NR	NR
						Demand		
Kahng et al. (2001)	1F	15	ID (P)	Graduated guidance	Assessment	activities	NR	NR
Krantz & McClannahan		<i>.</i>			Skill			
(1993)	3M	6–8	Autism	Graduated guidance	acquisition	PAS	DV	Positive
Krantz & McClannahan	414	0.12	Autism	Graduated guidance	Pasalina	DAS	ND	ND
(1998)	4111	9-12	Autisiii	Reduce manual guidance	Baseline:	FAS	INK	INK
Krantz et al. (1993)	3M	4–5	Autism	from full hand-over-hand prompts to light touches	Skill	PAS	NR	NR
				Fade physical prompts in				
MacDuff et al. (1993)	4M	9–14	Autism	frequency and intensity as rapidly as possible	Skill acquisition	PAS	DV & P	Positive
					-			
Thompson et al. (1982)	3M	12– 24	ID	Graduated guidance	Skill acquisition	Laundry	DV	Positive
							C	1

Continued

Table 1 continued

Category/Article Name	n/Gender	Age	Diagnosis ^a	Graduated Guidance Description	Context ^b	Skill/DV ^c	Data ^d	Findings
van der Meer et al. (2011)	2M 1F	13- 23	P1 = Autism & ID (S) $P2 = KS & ID (S)$ $P3 = ID (S)$	Graduated guidance; physical guidance	Skill acquisition	AAC	Post- training	Mixed
van der Meer et al. (2012)	4M	5–10	P1 = Autism $P2 = MSDD$ $P3 = DS &$ $Autism$ $P4 = CMD$	Use least amount of physical guidance necessary to obtain correct response	Skill acquisition	AAC	DV	Positive
Graduated Guidance to Dec	rease Behavi	or						
Azrin & Wesolowski (1974)	16M 18F	M= 41	ID (S to P)	Guide the individual gently in an instructive manner	OC	Stealing	DV	Positive
Carey & Bucher (1981)	6M 2F	24– 56	ID (S to P)	Graduated guidance	OC	Eating	NR	NR
Duffy Cassella et al. (2011)	2M	4–7	Autism	Gentle manual prompting with graduated guidance	RIRD	Vocal stereotypy	DV	Positive
Grow et al. (2008)	2M	10– 15	Autism	Three step graduated guidance sequence (i.e., verbal, model, and physical prompts)	Assessment	Problem behavior	N	N

Continued

Findings
Positive
N
; Positive
Positive

^a CMD = Congenital Myotonic Dystrophy; CP = cerebral palsy; DD = developmental delay; DS = Down syndrome; ID = intellectual disability, M = moderate, S = severe, P = profound; KS = Klinefelter syndrome; MSDD = Multi-System Developmental Disorder; TBI = traumatic brain injury ^b OC = overcorrection, RIRD = response interruption/redirection

^c AAC = augmentative and alternative communication, FCT = functional communication training, PAS = picture/photographic activity schedule

^d DV = dependent variable, P = prompts

fading in intensity and frequency. van der Meer et al. (2012) successfully taught four children with various disabilities how to request using augmentative and alternative communication (AAC; i.e., sign, speech-generating device). The authors described the graduated guidance procedure as using the least amount of physical guidance necessary to obtain correct responding. In other words, the authors attempted to give a description that provided the type of prompt (i.e., physical guidance, least amount necessary). Although this provides some information, it is far from an operational definition of the procedures. In another example, Bryan and Gast (2000) used graduated guidance to teach four children with autism to manipulate PAS. The authors described graduated guidance by identifying the use of a controlling prompt and fading in frequency and intensity. Although this was one of the more thorough definitions, there were no guidelines for the type of prompt to use beyond the controlling prompt. However, the authors explicitly stated that prompting decisions should be made on a moment-to-moment basis, which is one of the closest definitions to the original definition by Wolery and Gast (1984). The remaining two articles simply described the procedure as providing physical assistance. For example, Drasgow, Halle, and Ostrosky (2008) taught three young children to mand through signing. The authors reported that the use of graduated guidance (i.e., physical assistance) to acquire these skills in pre-training sessions was effective for all three participants, though acquisition data were not reported.

Overall, acquisition data were reported for 14 of the 20 studies. Of those, all but two found positive results. The remaining two resulted in mixed results (i.e., some participants had positive results, some participants did not). Four studies reported data on both the dependent variable and the number or type of prompts delivered. For example, Bennett, Reichow, and Wolery (2011) taught three children to manipulate PAS and recorded not only the participants' on-task and on-schedule behaviors, but the number of prompts that were delivered as well. The authors found that the percentage of intervals with graduated guidance decreased across sessions, and ultimately resulted in zero prompts for all participants, indicating independent use of the PAS and successful use of graduated guidance. In another example, Betz, Higbee, and Reagon (2008) evaluated the effects of PAS on peer engagement. Similar to the study by Bennett et al., the authors found that the percentage of intervals with graduated guidance decreased across sessions, demonstrating the transfer of stimulus control from the prompt to the PAS. *Skills*

The skills targeted for acquisition varied. Seven studies used graduated guidance to teach PAS. MacDuff, Krantz, and McClannahan (1993) taught four adolescents with autism to manipulate PAS. In this study, the activities chosen consisted of leisure items, academic materials, or reinforcers. The authors defined the graduated guidance procedure as reducing manual guidance from full physical prompts to light touches. The results indicated that all participants increased their engagement with the PAS, and the skills generalized to new pictures and a new sequence of pictures.

Five additional studies also targeted daily living/social skills. In one example, Thompson et al. (1982) evaluated the use of graduated guidance to teach laundry skills to three young adults with intellectual disabilities (level not specified). Results demonstrated that all three participants were successful in acquiring laundry skills, a
comparison of their skills to typically-developing peers demonstrated comparable proficiency, and the skills maintained at 10 months.

Of the remaining eight studies, five focused on communication skills. In one example, van der Meer et al. (2011) taught three young adults to use AAC to request preferred snacks or toys. Graduated guidance was used along with time delay and differential reinforcement to teach the target skill. The results were mixed, as one of the three participants did not acquire the skill. The final three studies targeted difficult tasks (Durand, 1999), motor responses (Ingenmy & VanHouten, 1991), and demand activities (Kahng, Abt, & Schonbachler, 2001).

Graduated Guidance to Decrease Behavior

Of the 28 identified studies, eight studies implemented graduated guidance to decrease a target behavior.

Sample

A total of 52 participants were included in the studies to decrease behavior. Of those participants, the majority had a diagnosis of a severe to profound intellectual disability (n = 48), with autism being the only other diagnosis (n = 4). A broad range of ages was included (range: 4–56), however, only five of the 52 participants were children (i.e., under the age of 18). In other words, the majority of the participants included in studies using graduated guidance to decrease behavior were adults.

Graduated Guidance

Of the eight studies, three did not provide a description or definition of the prompting procedure. Instead, the term "graduated guidance" was the only description of

the procedure. For example, Carey and Bucher (1981) used graduated guidance as part of an overcorrection procedure to decrease the inappropriate eating behaviors of eight adults with intellectual disabilities. The authors did not provide a description of the prompting procedure, and no data focusing on the skills associated with graduated guidance were reported. In another example, Northup et al. (1991) used graduated guidance in the context of assessing the aggression of an adult with severe to profound intellectual disability. The authors stated that graduated guidance was used to redirect the participant to the task, but no description of the procedures was provided.

The remaining studies provided definitions for their use of graduated guidance, describing how to fade the prompt (e.g., frequency, intensity, location) or what type of prompt to use (e.g., partial physical, full physical). The majority of the studies described graduated guidance as using gentle prompting and the least amount of prompting necessary. In one example, Lennox, Miltenberger, and Donnelly (1987) used graduated guidance to decrease the rapid eating of three adults with profound intellectual disabilities. The authors described graduated guidance in detail, emphasizing immediate physical guidance followed by the least amount of guidance necessary for the participant to be successful. In addition, the authors faded the prompts by moving further away from the participant. All participants were successful in decreasing their rapid eating through the use of graduated guidance. In a different example, Grow, Kelley, Roane, & Shillingsburg (2008) evaluated the use of graduated guidance for two adolescents with autism in the context of a functional analysis of challenging behavior. The authors described the procedure as a three step sequence, which included verbal, model, and physical prompts. Data were reported on challenging behavior, but not if or when graduated guidance was used.

Overall, data were reported for five of the eight studies. Of those five, all found positive results. None of the studies reported data on both the dependent variable and the number or type of prompts delivered.

Skills

The skills that were targeted to decrease were less varied than those that were targeted for acquisition. Three studies used graduated guidance to decrease issues related to eating. For example, Saloviita (2002) used an intervention package of graduated guidance, blocking, interruption, and punishment to decrease the eating errors (i.e., dropping food outside the plate, spilling the drink, or eating from the plate with her fingers) of a woman with a profound intellectual disability. The training package was successful in decreasing the number of eating errors, and that decrease maintained 3 months later. Four studies targeted the decrease of challenging behavior (i.e., aggression, challenging behavior, stereotypy). In one study, Wacker et al. (1990) used graduated guidance to gain compliance to decrease the aggression of an adolescent with a severe to profound intellectual disability. The graduated guidance procedure was successful in decreasing the aggression of the participant. The remaining study addressed stealing (Azrin & Wesolowski, 1974). In this study, the authors used graduated guidance in the context of overcorrection to decrease the stealing of 34 adults with severe to profound intellectual disabilities. The intervention package was successful for all participants.

Discussion

The purpose of this literature review was to provide an overview of all studies in which graduated guidance was identified as a prompting procedure and to summarize the results and implications for practice. The specific aims included determining how graduated guidance was defined, identifying the type of skills targeted with graduated guidance, and determining if graduated guidance was an effective prompting procedure.

Graduated guidance was not a consistently-defined procedure in the literature reviewed. Of the 28 included studies, only 14 included a definition for the procedure. For those studies that did describe the procedure, there were inconsistencies across them. For example, two studies (Correa, Poulson, & Salzberg, 1984; Grow et al., 2008) included the use of vocal prompts in the graduated guidance description. The one component that most definitions for graduated guidance agreed on is that it is a physical-only fading procedure. Incorporating vocal prompts indicates that the prompting procedure is more likely a most-to-least or least-to-most procedure. Other inconsistencies included when to fade prompts (e.g., immediate, gradual), how to fade prompts (e.g., frequency, intensity, spatially), and what type of prompts to use (e.g., hand-over-hand, least amount necessary). In examining the PAS studies, a wide discrepancy among recommendations becomes evident. Of the seven studies that evaluated the use of graduated guidance in the context of PAS, four provided a definition for the prompting procedure. Of those four, two stated to start with a controlling or most-intrusive prompt (Bryan & Gast, 2000; Krantz et al., 1993), and two did not state what type of prompt to start with (Bennett et al., 2011; MacDuff et al., 1993). Regarding a timeline for fading, MacDuff et al. (1993)

described fading as rapidly as possible, Bryan and Gast (2000) described making a moment-to-moment decision, and the remaining two studies did not identify when the prompts should be faded. Finally, concerning the type of fading procedure, Bryan and Gast and MacDuff et al. described fading in terms of frequency and intensity. Krantz et al. (1993) stated that the prompts should be faded from full physical to light physical (i.e., intensity), and Bennett et al. (2011) did not describe how prompts should be faded. Given that this group of studies used graduated guidance to address the same target skill, one might expect that the procedures would be nearly identical, particularly given that two of the studies were conducted by the same authors. However, this was not the case. This provides further evidence for the inconsistency with which graduated guidance is defined, even within the same skill area.

Among the 14 studies that included definitions, the descriptions seemed to be categorized into two groups: start with the (a) most intrusive prompt (e.g., controlling prompt, hand-over-hand) or (b) the least amount of guidance necessary (e.g., gentle guidance). The first group included five studies (i.e., Bryan & Gast, 2000; Dalrymple & Feldman, 1992; Denny et al., 2001; Krantz et al., 1993; Lennox et al., 1987). These studies all explicitly stated that graduated guidance should start with a most intrusive prompt (e.g., full physical, controlling prompt, hand-over-hand) and then begin to fade the procedures. The second group included four studies (i.e., Azrin & Wesolowski, 1974; Duffy Cassella et al., 2011; Saloviita et al., 2002; van der Meer et al., 2012). These studies stated that graduated guidance should begin with the least intrusive prompt necessary, or described using gentle guidance. The remaining five studies (i.e., Bennett et

al., 2011; Correa et al., 1984; Drasgow et al., 2008; Grow et al., 2008; MacDuff et al., 1993) either provided a hierarchy or did not provide much information beyond a few words (e.g., physical assistance, physical guidance). This could imply that graduated guidance is a prompting procedure that is caught between most-to-least and least-to-most prompting, suggesting that it can be a flexible procedure not necessarily sticking to one approach. Or, it could suggest that it is simply an inconsistently-defined procedure, in need of a standard definition.

The other half of the studies did not provide a definition. Therefore, not only were there inconsistencies with the definition when it was presented, there was also an issue of the lack of a definition. It is possible that the authors did not provide definitions for graduated guidance because of the assumption that it is already a well-known or welldefined procedure. Or perhaps the lack of definition was due to the flexibility of the procedure itself. However, although 14 studies did not provide definitions, a few did provide alternate information, such as a description or definition in the introduction (e.g., Akmanoglu & Tekin-Iftar, 2011) or by citing another study. For example, Betz et al. (2008) cited MacDuff et al. (1993) when they used the term "graduated guidance" to describe the prompting procedure they utilized to teach PAS, but no further description was provided. Although it may seem sufficient to provide this alternate information, it is important to provide as much detail as possible in the procedures section, ensuring that the reader is clear on the implementation of the prompting procedure.

In a demonstration of the flexibility of the graduated guidance procedure, Dalrymple and Feldman (1992) taught five adults with intellectual disabilities expressive sign language. In this study, graduated guidance was used as an error correction procedure. Positive outcomes were only reported for three of the five participants. Regardless, this may imply that graduated guidance is a more flexible procedure than other prompting procedures due to its use as an error correction procedure. In addition to the fact that graduated guidance was used to increase, decrease, and correct behavior, the targeted skills varied across several areas (e.g., daily living/social skills, communication, challenging behavior). The included studies demonstrate that graduated guidance is an effective prompting procedure for a wide variety of skills and applications and is not limited in its utility as one might assume, given its strictly physical prompts. In addition, graduated guidance was effective in isolation (n = 12), as well as in combination with other strategies (n = 16), which may provide further evidence for its flexibility as a procedure. In other words, not only is graduated guidance effective alone, but it can be successful as part of an intervention package.

In regards to the third aim of the review, graduated guidance was generally shown to be an effective prompting procedure. Of the 28 included studies, 20 reported data related to graduated guidance. All but two of those studies demonstrated positive effects. These results suggest that a procedure does not necessarily need to be consistently defined to be effective. However, without a clearly defined procedure, it is unclear exactly what was implemented and how it was executed. Furthermore, it would be unclear if any positive effects were due to the prompting procedure, or due to extraneous variables. Therefore, even though the majority of the studies were successful in their use of graduated guidance without a clear definition of the prompting strategy, it is recommended that procedures be well-defined to decrease the likelihood that positive effects are due to anything other than the outlined procedures.

Based on the summary of the three definitions given in Chapter 1, and the standard definition provided by Wolery and Gast (1984), a few studies called their prompting procedure "graduated guidance," but what was described was more similar to a least-to-most or most-to-least prompting procedure. For example, Denny et al. (2001) taught a young child with Cri du Chat to roll a ball and to eat independently. The prompting procedure that the authors described involved starting with an intrusive prompt (i.e., hand-over-hand) and providing less assistance over time until a shadow was used. In addition to this, the authors added criteria for when to move to the next level of prompt. Although the fading procedure sounds similar to graduated guidance in that it fades prompts to a shadow, it sounds more similar to a most-to-least prompting hierarchy in that it begins with the most intrusive prompt and fades to the least intrusive prompt, while including guidelines for when to use what type of prompt. In another example, Correa et al. (1984) taught reach-grasp behavior to three blind children with severe to profound intellectual disabilities. Graduated guidance was described as having four levels, which included no assistance, verbal prompting, partial physical guidance, and full physical guidance. The authors also called this procedure "graduated prompting." This description sounds more similar to a least-to-most prompting hierarchy than graduated guidance, due to its use of vocal prompts. This, again, points to the inconsistencies in defining the procedure, as well as the overlap between most-to-least, least-to-most, and graduated guidance procedures.

Only one study included in this review compared graduated guidance to any other prompting procedure to determine its relative effectiveness. Dalrymple and Feldman (1992) compared the use of graduated guidance to sequential prompting (i.e., least-tomost prompting) in the acquisition of expressive sign language. Each of these procedures was also compared with the addition of directed rehearsal. The authors stated that four of the participants did not discriminate between the trained signs, so their data were dropped. Of the six participants whose data were reported, the authors found that there were no differences between the two prompting procedures, but that the addition of directed rehearsal did improve the acquisition of signing. However, as mentioned earlier, Dalrymple and Feldman only used the prompting procedures for error correction. In other words, graduated guidance was used to correct an error after it occurred and was not used to prevent an error from occurring. Response prompts should be delivered during the target behavior, in order to transfer stimulus control from the prompt to the naturally occurring stimulus. They should not occur after the behavior has been emitted. Therefore, the extent to which this study can be a measure of the use of graduated guidance is limited.

Limitations

There were a few limitations to the present literature review. The first limitation could be in regards to the search criteria that were used. Only those studies that used the term "graduated guidance" to describe their prompting procedure were included. Therefore, studies which used graduated guidance but did not refer to it as such would have been excluded. For example, Foxx and Azrin (1973) are often cited as an example of the use of graduated guidance and are even cited as the study that originally developed and described the procedure (Wolery & Gast, 1984). However, the authors did not label their procedure. As such, this article did not appear in the electronic search. They did, however, describe the procedure. As previously stated, because of the differences in definitions across textbooks and other publications, it would be difficult to classify a specific procedure as graduated guidance by the description alone. Because of the ambiguity of the various definitions proposed for graduated guidance that were outlined in the introduction, I decided to only include those studies that explicitly stated the prompting procedure as "graduated guidance." It did not seem prudent to develop a new definition strictly for the purposes of this literature review or to further complicate the various definitions that are already in print.

Another limitation is that this literature review investigated the use of a prompting procedure, and the majority of the studies did not report data on prompting, even when acquisition data were included. In other words, the number and type of prompts given were not reported. Therefore, even though graduated guidance was stated as being used, the reader has no way of knowing if it was used for any given participant and to what extent it was used. However, a few studies did include these data (Bennett et al., 2011; Betz et al., 2008; Denny et al., 2001; MacDuff et al., 1993). In general, the authors found that the number of prompts decreased over sessions as the participants acquired the targeted skills, demonstrating the transfer of stimulus control. It would be beneficial for future studies to incorporate this type of data analysis. By evaluating the number and type

of prompts used for each session across participants, a more accurate picture of acquisition under the use of graduated guidance may be achieved.

Future Research

More research, in general, should be conducted in relation to graduated guidance. Specifically, research regarding the type of prompts included within a graduated guidance procedure, and how and when to fade these prompts should be evaluated.

Because graduated guidance is a physical-only fading procedure, it is evident that only physical prompts would be included. However, physical prompts can vary greatly. Traditionally, graduated guidance uses physical prompts that are focused around the hands and arms. For example, graduated guidance could include prompts that are administered hand-over-hand, at the forearm, at the upper arm, and ending at the shoulder or back. Alternative to this could include prompts that are administered at the hand, which then fades into a prompt at the arm, without specific locations being identified. Future research should attempt to determine if providing specific prompt locations (e.g., hand-over-hand, forearm, upper arm, shoulder) is more successful than providing generic prompt locations (e.g., hand, arm, back).

How and when to fade prompts within a graduated guidance procedure is, perhaps, the most important direction for future research, as this is what differentiates it from other prompting procedures. As previously outlined, several of the studies determined that graduated guidance should start with an intrusive prompt and fade, yet others decided to start with the least intrusive prompt necessary. Future research could examine the use of graduated guidance presented in a most-to-least format (i.e., start with the most intrusive prompt) and graduated guidance presented in a least-to-most format (i.e., start with the least intrusive prompt) to determine which is the more effective procedure. Another comparison could include the evaluation of spatial fading of prompts (e.g., hand, forearm, upper arm, shoulder) versus intensity of fading (e.g., full physical versus light physical). Results of these two proposed studies could begin to describe the most effective way to present and fade prompts in a graduated guidance procedure.

As was previously outlined, only one study included in this literature review compared graduated guidance to any other prompting procedure. Future research should attempt to determine the effectiveness of graduated guidance as compared to other prompting procedures, such as most-to-least, least-to-most, and time delay. If graduated guidance is to continue to be utilized, it is necessary that it be demonstrated to be just as effective as, if not more so than, other more evident prompting procedures. In addition to comparing graduated guidance to other in vivo methods, it would be interesting to compare the use of graduated guidance to video prompting, which uses video clips to depict and prompt each step in a behavior chain. Research has demonstrated that videobased instruction can be an effective and efficient way to teach skills to individuals with intellectual and developmental disabilities (Bellini & Akullian, 2007). With the increase in the use of technology to teach skills to students with varying disabilities, a more traditional approach to prompting such as graduated guidance would benefit from being compared to more modern procedures. This comparison may be beneficial not only for acquisition of skills, but for error correction as well. Because video prompting presents some unique benefits (e.g., requires less interaction from the practitioner, less ostracizing in a public setting), graduated guidance might become an outdated procedure. Therefore, comparing its efficacy to these newer procedures may enhance its utility.

An additional line of research might be to evaluate the relative effectiveness of graduated guidance implemented by trained practitioners, and those not trained in its use. Because graduated guidance is so loosely defined, it seems necessary that the practitioner utilizing it be highly skilled in basic behavior principles or other procedures related to acquisition. Perhaps those practitioners with a more comprehensive knowledge of applied behavior analysis (ABA) would be better at implementing graduated guidance than those practitioners with little to no knowledge of ABA, or knowledge of only the prompting procedure. Future research should attempt to determine what level of proficiency a practitioner should have before using graduated guidance as a prompting procedure. On a related note, because graduated guidance seems to emphasize using the student as a guide for when and how to prompt, a practitioner who is familiar with his or her student may be more successful with graduated guidance than someone who is not familiar with the student. Future research could attempt to evaluate this by having practitioners implement graduated guidance with familiar and unfamiliar students to compare the rates of acquisition in the students.

Implications for Practice

Graduated guidance not only requires knowledge of the prompting procedures, but the student as well. Because prompts are faded in and out depending on the student's responses during instruction, the practitioner must be familiar and competent with the prompting hierarchy, as well as recognize when a student is likely to make an error or perform independently. In other words, this procedure seems to require a certain level of proficiency, and may be less effective when implemented with an unskilled practitioner or one who is unfamiliar with the student.

Although graduated guidance may be a loosely-defined procedure, this could actually be its strength. Because practitioners do not need to adhere to prompting rules, they are able to respond when and how the student needs them to, allowing for more efficient teaching (i.e., only prompting when necessary). This should cut down on instructional time, because the student does not have to work systematically through a hierarchy. In addition to this, it decreases the likelihood that a student will become prompt-dependent, because prompts are only implemented when necessary.

In addition to the benefits associated with its flexibility in prompting, graduated guidance has been demonstrated to be effective with a wide variety of skills. Graduated guidance can be used to increase, decrease, and to correct behavior (i.e., error correction). In other words, it is a useful and flexible procedure that is only limited by the physicality of the targeted skill. Although its flexibility might be its strength, it points to the problems that exist in the prompting literature. If a definition is not described with sufficient detail for anyone to implement it consistently, it cannot be a useful procedure. In other words, we cannot expect practitioners to implement the procedures appropriately if they are not accurately and consistently defined. Therefore, practitioners should attempt to develop a consistent definition for graduated guidance, or choose one of the definitions that has already been evaluated, to make sure that the procedure is being

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consistently applied across staff. If it is consistently applied, it is likely that outcomes similar to those outlined in the present review will be demonstrated.

Practitioners should keep graduated guidance in their teaching "toolbox." It has been demonstrated to be an effective procedure, regardless of the ambiguity of its definition. Its flexibility allows it to be used for a wide variety of skills, and its use may allow students to acquire skills at a more efficient pace. If future research evaluates the success of graduated guidance compared to other prompting procedures, and evaluates the type of prompts and prompt fading procedures that are included within it, practitioners will have a more thorough picture of how and when it can be used in their classrooms.

This study will focus on developing a clear, operational definition for graduated guidance and will systematically compare it to most-to-least prompting with a delay to determine its relative effectiveness as a prompting procedure for students with significant disabilities. This will benefit both researchers and practitioners by providing unambiguous guidelines for using graduated guidance procedures.

Chapter 3: Method

In this chapter, the methods used in this study are presented. In the first section, the five students who participated in this study will be described in terms of age, race, sex, disability, communication level, and Vineland age-equivalents. In the second section, the setting will be presented. The following section will describe the materials and task analyses used in the study. In the fourth section, the dependent measures and data collection systems will be presented, followed by the experimental design in the fifth section. Next, the method and scores for interobserver agreement and procedural integrity will be presented. Finally, the procedures used in this study will be described in detail.

Participants

Five participants from a fully segregated county-funded school for students with severe to profound intellectual, physical, and multiple disabilities participated in the present study. Participants were recruited based on age (i.e., the youngest students in the school), and were then chosen based on the order in which consent was received. Younger students were chosen due to a shorter history of ineffective instruction often observed in the chosen school, as well as the ease with which physical prompting procedures could be implemented. In other words, it was easier to physically prompt a younger student. Participant demographics and Vineland age-equivalent scores (Sparrow, Balla, & Cicchetti, 1985) are presented in Tables 2 and 3.

Name	Age	Race	Sex	Diagnosis	Communication	
Rick	12	African- American	М	Developmental delay, autism	Non-vocal, gestures, leading, picture symbols	
Lori	11	Caucasian	F	Intellectual disability, autism, attention deficit hyperactivity disorder, scoliosis	Non-vocal, leading	
Glenn	7	Caucasian	М	DiGeorge syndrome, autism, truncus arteriosus	Non-vocal, gestures	
Daryl	12	African- American	М	Partial Trisomy 13, Arnold-Chiari malformation, atrial septal defect, ventricular septal defect, parent ductus arteriosus, optic nerve damage, epilepsy	Vocal approximations, gestures, leading	
Carl	9	Caucasian	М	CP, optic nerve hypoplasia, nystagmus, strabismus, seizure disorder	Non-vocal, gestures, leading	

Table 2. Participant demographics according to name, age, race, sex, diagnosis, and communication level.

Rick was a 12-year-old African-American male who was diagnosed with a developmental delay and autism. He was non-vocal, and communicated primarily through gestures, leading, and some picture symbols. Rick's Vineland age-equivalent composite score was 1 year and 9 months. Lori was an 11-year-old Caucasian female who was diagnosed with an intellectual disability (level not specified), autism, attention deficit hyperactivity disorder, and scoliosis. She was non-vocal, and communicated through leading. Lori's Vineland age-equivalent composite score was 1 year and 5 months. Glenn was a 7-year-old Caucasian male who was diagnosed with DiGeorge syndrome, autism, and truncus arteriosus. He was non-vocal and communicated primarily through gestures. Glenn's Vineland age-equivalent composite score was 1 year and 5 months. Daryl was a 12-year-old African-American male who was diagnosed with Partial Trisomy 13, Arnold-Chiari malformation, atrial septal defect, ventricular septal defect, patent ductus arteriosus, optic nerve damage, and epilepsy. He communicated primarily through gestures and leading, and attempted to engage in some vocal approximations. Daryl's Vineland age-equivalent composite score was 1 year and 5 months. Carl was a 9year-old Caucasian male who was diagnosed with mild cerebral palsy, optic nerve hypoplasia, nystagmus, strabismus, and a seizure disorder. He was non-vocal and communicated primarily through gestures and leading. Carl's Vineland age-equivalent composite score was 1 year and 3 months.

		Vineland Age-Equivalents (year-month)				
Name	Chronological Age	Communication	Social	Daily	Composite	
Rick	12	1–2	2–7 Below	1-8	1–9	
Lori	11	Below 1–0	1-0	1–7	1–5	
Glenn	7	Below 1–0	1-8	1–7	1–5	
Daryl	12	1–1	1-8	1–6	1–5	
Carl	9	Below 1–0	1–2	1–3	1–3	

Table 3. Vineland age-equivalent scores for all participants.

Setting

The study was conducted in the students' fully segregated county-funded school. Sessions were conducted in an unused classroom, in one of three areas. The first included a long table with two chairs used for setting the table. The second area included a small horseshoe-shaped table with two chairs used for cleaning up an art project. The third included a small table in front of cubicles used for clearing the dishes. An unused classroom was used to decrease distractions during sessions, as well as to conduct sessions in a novel environment (i.e., an environment not paired with instruction from the students' current classrooms).

Materials and Task Analyses

Tasks were chosen based on the students' individualized education programs (IEP) and their current level of performance in regards to age-appropriate daily living tasks. In addition, an informal interview was conducted with each student's classroom staff, asking their opinions on the importance of the identified skills and the extent to which each student had a history with the identified tasks.

Tasks were assessed for equivalency within pairs of participants. This process included informal interviews with support staff (e.g., occupational therapist, physical therapist) and classroom staff. Questions that were asked included (a) Do the tasks contain the same number of steps?, (b) Do the tasks require the same amount of effort?, (c) Do the tasks require the same level of skill?, and (d) Do the tasks seem equivalent? Staff were asked to respond "yes" or "no" for each question. All staff surveyed responded affirmatively to all questions for all tasks.

The first pair of tasks included setting the table (see Appendix A) and clearing the dishes (see Appendix B). Each task was broken down into eight steps. Setting the table included (a) putting the placemat on the table in front of the chair, (b) putting the plate on the left side of the placemat, (c) putting the bowl on the plate, (d) putting the cup on the right side of the placemat, (e) putting the napkin on the right side of the placemat below the cup, (f) putting a piece of silverware on the napkin, (g) putting a piece of silverware on the napkin, and (h) putting a piece of silverware on the napkin. The steps could occur in any order, provided that any required step was completed before it (e.g., silverware must be placed after the napkin). The silverware included a fork, a knife, and a spoon. Clearing the dishes included (a) bringing the tray to the bin, (b) putting the cup in the large section of the bin, (c) putting the bowl in the large section of the bin, (d) putting the plate in the large section of the bin, (e) putting the silverware in the small section of the bin, (f), putting the silverware in the small section of the bin, (g) putting the silverware in the small section of the bin, and (h) placing the tray on the shelf above the bin. The steps could occur in any order, with the exception of the first and last steps. The silverware included a fork, a knife, and a spoon.

All of the dishes were size-appropriate for the age of the participants (i.e., appropriate size for the amount of food that the participants regularly consume during lunch). The plate, bowl, and cup were green and made of a durable plastic, and the fork, spoon, and knife were metal. A green floral plastic placemat was used with a white paper napkin, as well as a red plastic tray from the school's cafeteria. The bin was borrowed from a local café, where patrons are expected to bus their own tables. It was made of brown plastic and was split into a small section for silverware and a large section for plates, bowls, and cups.

The second pair of tasks included clearing the dishes (see Appendix C) and cleaning up after an art project (see Appendix D). Each of these tasks was broken down into six steps. Clearing the dishes for this set was simplified, due to the participants' motor and height restrictions. The steps included (a) putting the cup in the large section of the bin, (b) putting the plate in the large section of the bin, (c) putting the silverware in the small section of the bin, (d), putting the silverware in the small section of the bin, (e) putting the silverware in the small section of the bin, and (f) placing the tray in the cubicle above the bin. These steps could be completed in any order, with the exception of the last step. The silverware included a fork, a knife, and a spoon. Cleaning up after an art project included (a) throwing scrap paper in the garbage, (b) putting the scissors in the bin, (c) putting the glue stick in the bin, (d) putting a marker in the cup, (e) putting a marker in the cup, and (f) putting a marker in the cup. These steps could be completed in any order. The markers included a red, a green, and a blue marker.

The same dishes and bin used for the first pair of tasks were also used for the second pair of tasks. The art materials were collected from the classrooms. The bin was a metal index card holder with a hinged lid. The cup was clear plastic used for mixing paints.

Dependent Measures and Data Collection

Data were collected on the number of steps completed correctly on the task analyses. Percent correct was calculated by dividing the number of steps completed correctly by the total number of steps in the task analysis and multiplying by 100. To be scored as correct, the student had to perform the step as described in the task analysis during the identified latency, without prompting from the experimenter. Data were also collected on the number and type of prompts used. If the experimenter prompted the student, the step was marked as prompted, with the type of prompt used being recorded. In addition, data were collected on the number of errors that occurred. If the student performed the step incorrectly during the identified latency, it was scored as incorrect. Finally, data were collected on the number of trials to criterion. Mastery criterion was 100% independent accuracy (i.e., each step completed correctly during the identified latency) of the entire task analysis across three consecutive sessions. Sample data sheets are included in Appendices A through D.

Experimental Design

An adapted alternating treatments design (Gast, 2010) was used, with the two prompting strategies counterbalanced across equivalent tasks. The study included two conditions: (a) baseline and (b) comparison of interventions. Steady state responding (Johnston & Pennypacker, 2009) was used to determine when intervention should be implemented. In other words, stable baseline data (i.e., not generally increasing or decreasing) was required before beginning intervention. The prompting strategies were counterbalanced across tasks to demonstrate experimental control. Each task was instructed with a different prompting strategy across sets of participants. By counterbalancing in this manner, I can be confident that any change in the target behavior was due to the prompting strategy, rather than the task. Interobserver Agreement and Procedural Integrity

Interobserver agreement (IOA) and procedural integrity were calculated for 30% of baseline and intervention sessions across all participants. I trained a second observer for the purposes of IOA and procedural integrity. I instructed the second observer on the dependent measures, as well as the steps involved in the procedural integrity measures. Following instruction, the second observer received training on data collection of the dependent measures until the mastery criterion was achieved (i.e., 100% agreement across two consecutive sessions). Sample data sheets are included in Appendices E and F.

For IOA, the second trained observer collected data on participant behavior, which included the number of steps completed correctly, as well as the type of prompt necessary for the student to be successful. IOA was calculated by dividing agreements by agreements plus disagreements and multiplying by 100. Mean IOA was calculated to be 96% (range: 75%–100%) across all conditions and participants.

For procedural integrity, the second trained observer collected data on whether or not the procedural steps were completed correctly. Procedural integrity was calculated by dividing the number of procedural steps completed correctly by the total number of procedural steps and multiplying by 100. Mean procedural integrity was calculated to be 99% (range: 95%–100%) for graduated guidance sessions and 96% (range: 79%–100%) for most-to-least sessions across all participants.

Procedures

Sessions were approximately 5 min long and were conducted two times per day (i.e., one session of each condition), three to five times a week.

Operationalization of Graduated Guidance

Due to the ambiguity of graduated guidance definitions outlined in Chapters 1 and 2, prior to beginning the study, training sessions were conducted with the identified participants to establish a clear operational definition of graduated guidance and a decision chart that outlined when and what type of prompts should be delivered.

Skills were identified for each participant that were not taught during intervention. Graduated guidance was used to teach the identified skills, and sessions were videotaped for data collection. Analysis of the sessions focused on when prompts were provided, the type of prompts that were used, the inter-response time (IRT) between prompts, and the participant behavior that cued when and what type of prompt to use (e.g., student error, student reaching toward incorrect item). From this analysis, a decision chart was developed. In other words, by analyzing the student indicators that signaled the experimenter to prompt, guidelines for prompting were developed.

Preference Assessment

A preference assessment was conducted prior to beginning the study to identify potential reinforcers for use during the pre-assessment, as well as for participation in the study.

The Reinforcer Assessment for Individuals with Significant Disabilities (RAISD; Fisher, Piazza, Bowman, & Amari, 1996; see Appendix G) was distributed to each participants' classroom staff and parent. The RAISD is a survey that asks various questions regarding the preferences of an individual. It aims to identify a variety of stimuli (e.g., tactile, visual, olfactory) that the individual may prefer. Based on the results of the RAISD, six items were chosen for further evaluation.

A six-item multiple stimulus without replacement (MSWO) preference assessment (DeLeon & Iwata, 1996) was conducted for all participants. Six items were evaluated across five sessions, which were distributed across at least two days. Items were presented in a horizontal line or arc on a table in front of the participant and the participant was instructed to "choose one." Selection was defined as the participant physically selecting the item from the array. Any attempt to grab more than one item would have been blocked, but none of the participants attempted to do so. Once the participant selected an item, the remaining items were removed and the participant had 30 s to engage with the item. The remaining items were shuffled and represented, and the procedures continued until all items had been chosen. A point value was assigned to each item, based on the order in which it was chosen (Ciccone, Graff, & Ahearn, 2005). The point values ranged from 6 to 1, with 6 indicating the first item chosen and 1 indicating the last item chosen. If no choice was made, the item was assigned a point value of 0. Items identified as highly preferred were used during the pre-assessment and intervention.

Pre-Assessment

A pre-assessment was conducted to determine each student's median IRT between steps in a task. Students were assessed on a mastered task (i.e., a task that could be completed accurately and independently) and a task that was in acquisition at the time of the study. Both mastered and acquisition tasks were used in order to gain a more representative measure of the time it took the student to engage in a task. In other words, IRT may vary across the type of task (i.e., mastered and novel), and collecting data on both types ensured a more accurate measure. Each task was assessed across three sessions of five trials each, with each session consisting of one presentation of the task. A highly motivating environment was arranged using items identified in the preference assessments to establish a context for which engaging in the tasks was likely to occur. If the student did not begin to engage in the task after 1 min had elapsed, or started and stopped the task and did not reengage for 1 min, the trial was terminated and "1 min" was documented as the latency or IRT for that trial. The median IRT was identified for each participant, and this was used to determine the amount of time to wait before delivering prompts (i.e., latency to prompt) during intervention. If the median was greater than 15 s, 5 s was used during intervention. This time was chosen based off of the typical MTLD delay of 2 s (Libby et al., 2008). If the median was over 15 s, the student had clearly demonstrated that a longer delay would be necessary, and the standard 2 s would be inappropriate. Therefore, the student was provided with a slightly longer amount of time to respond before a prompt was delivered (i.e., 5 s).

Baseline

During baseline, the student was placed in front of the materials required to complete the task and given a specific instruction to begin (e.g., "Clear the dishes."). No further instructions or prompting were provided. The student was given two times the latency identified during the pre-assessment or 30 s, whichever was greater, to start the task. This lengthier amount was provided to allow the student a sufficient amount of time to engage in the task. A single-opportunity baseline was conducted. In other words, if the student did not engage with the task materials within the specified amount of time or completed a step incorrectly, the session was terminated.

Graduated Guidance

Graduated guidance was generally defined as providing physical prompts as needed and fading them immediately as the student began to respond correctly (Wolery & Gast, 1984), and it was implemented using the guidelines developed prior to the start of the study. In general, the experimenter shadowed the students' movements, allowing for immediate corrections as necessary. The fading was not systematically planned, and relied on the students' responding during sessions. Graduated guidance consisted of physical prompts at the hand, forearm, upper arm, and shoulder as a light touch. These were general guidelines, and prompts could have been placed between identified prompt locations. The decision chart developed during the operationalization phase was used during all graduated guidance sessions, which provided the researcher with specific instructions on when and how to prompt depending on the students' behavior during the session. This also provided a means for a second observer to collect procedural integrity data.

The student was placed in front of the materials required to complete the task and given a specific instruction to begin (e.g., "Clear the dishes."). The student was given the latency identified during the pre-assessment to start the task. If the student did not engage with the task materials within the specified amount of time, the researcher provided the student with a prompt to begin. If the student paused at any point during the task, the

researcher waited the identified latency before prompting the student to continue. If the student made an error during the task, the researcher provided the student with a more intrusive prompt as an error correction. This does not necessarily indicate the use of the next most intrusive prompt or the most intrusive prompt in the hierarchy, but whatever the student required for a correct response.

If the student attempted to engage in stereotypy before starting to engage in the task, it was blocked. If the student engaged in stereotypy during the task (i.e., after making contact with the task items), he or she was redirected to the task with a full handover-hand prompt (i.e., hands were placed on the task items). Stereotypy was immediately blocked or redirected. In other words, the experimenter did not wait the identified latency before redirecting stereotypy. This was done to prevent stereotypy from competing with task completion.

Most-to-Least Prompting With a Delay

Most-to-least prompting with a delay (MTLD) was defined as a physical prompting procedure that began with the most intrusive prompt (i.e., hand-over-hand) and systematically faded to the least intrusive prompt (i.e., light touch). The prompting strategy included prompts at the hand, forearm, upper arm, and shoulder with a light touch. Set criteria were used to move up and down the hierarchy. In other words, the student was not used as an indicator for when to prompt. Following two consecutive sessions at the prescribed prompt level, the next least restrictive prompt was used (e.g., two sessions at hand-over-hand, then move to a forearm prompt). If the student responded incorrectly during the identified latency, an immediate hand-over-hand prompt was used as an error correction for that step, and prompting continued as prescribed. If the student responded incorrectly on the same step for two consecutive sessions, error correction was provided, and the next most-restrictive prompt was used for that step on the next session. For example, if teaching a student to clear the dishes with prompts being delivered for carrying the tray to the bin, if the student did not lift the tray with a forearm prompt for two consecutive sessions, I provided a hand-over-hand prompt (i.e., next most-restrictive prompt) for carrying the tray during the next session.

Procedures for redirecting stereotypy during the MTLD strategy were identical to those described for the graduated guidance strategy.

Social Validity

Social validity was assessed using an informal interview with the classroom teachers and instructional assistants. A brief questionnaire I developed was delivered following a video example of sessions (see Appendix H). The video demonstrated each prompting procedure being implemented with their student. The questionnaire was designed to assess the social validity of the choice in target behaviors, as well as the acceptability of the prompting procedures utilized, including whether or not the classroom staff believed the procedures could be easily learned and implemented. Each question was evaluated using a 5-point rating scale.

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Chapter 4: Results

In this chapter, the results of each phase of the study will be presented. In the first section, the results of the analysis and operationalization of graduated guidance will be presented. In the next section, the results of the multiple stimulus without replacement preference assessments will be discussed, followed by the results of the latency pre-assessment in the following section. Finally, the results of the comparison of prompting procedures will be presented across pairs of participants, as well as the results of the social validity questionnaire.

Operationalization of Graduated Guidance

General Findings

Figure 1 represents the decision chart created during the operationalization of graduated guidance phase. Based on approximately 40 min of video footage across five students (i.e., 14 sessions of varying lengths), the following depicts the rules associated with current usage of graduated guidance. In general, the type of prompt delivered and the delay to prompting depended on the familiarity with the student, if any challenging behavior occurred, and how many sessions had been conducted. The most consistent practice throughout the videos was to start with the least intrusive prompt necessary (i.e., least intrusive prompt to obtain the correct response) during sessions. Prompts were only

faded in as the student either did not engage with the task items, or indicated that he or she was about to make an error (e.g., reached toward the incorrect item). In addition to this, prompts became more intrusive if the student began to engage in noncompliant behavior (e.g., walking away, falling to the floor).

Another general rule was the amount of time to wait before prompting. By analyzing the videos, it was evident that the delay to prompting depended on several factors. One was the familiarity with the student. The first few sessions resulted in faster prompting, however, as the experimenter became more familiar with the student, the latency to prompt increased, typically around the third session. Another factor was noncompliance. If the student engaged in noncompliant behavior, especially in the form of escape (e.g., walking away, falling to the floor), the latency to prompt decreased, typically to a 0 s or 1 s delay. A third factor in the amount of time to wait before prompting was stereotypy. If the student engaged in stereotypic behavior, this was typically redirected immediately, and a prompt was given to continue the task.

In general, the second session was typically run in a similar fashion to the first session. The third session, however, was slightly more structured. For example, any steps for which the student had previously made an error or attempted to make an error received a more intrusive prompt more quickly than the other steps. The following outlines what type of prompts to use and how long to wait before prompting for novel students, familiar students, and those who engage in challenging behavior. These guidelines are based on the results of the operationalization of graduated guidance phase of the study.

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	Prompts			Delay			Shadow		
	Least	More	Most			Student-			
	Intrusive	Intrusive	Intrusive	0 s	3–5 s	specific	Close	Arc	Down
Novel Student									
1 st Session									
To begin	\checkmark				\checkmark		\checkmark		
Within session	\checkmark				\checkmark		\checkmark		
About to make error		\checkmark		\checkmark			\checkmark		
Error			\checkmark	\checkmark			\checkmark		
3 rd Session									
To begin	\checkmark				\checkmark		\checkmark		
Within session	√				\checkmark			\checkmark	
About to make error			\checkmark	\checkmark			\checkmark		
Error			\checkmark	\checkmark			√		
Familiar Student									
1 st Session									
To begin	√					√	√		
Within session	\checkmark					\checkmark	\checkmark		
About to make error	\checkmark			\checkmark			\checkmark		
Error			\checkmark	\checkmark			\checkmark		
3 rd Session									
To begin	√					√		√	
Within session	√					\checkmark			\checkmark
About to make error		\checkmark		\checkmark			\checkmark		
Error			\checkmark	\checkmark			√		
Challenging									
Behavior									
1 st Session									
To begin			√	~			~		
Within session		√			\checkmark		\checkmark		
About to make error			\checkmark	\checkmark			\checkmark		
Error			\checkmark	\checkmark			\checkmark		
3 rd Session									
To begin		√		\checkmark			\checkmark		
Within session	\checkmark				\checkmark			\checkmark	
About to make error		\checkmark		\checkmark			\checkmark		
Error			\checkmark	\checkmark			\checkmark		
*If this prompting procedure does not successfully interrupt challenging behavior a functional behavior					ehavior as	sessment			
might be warranted.									

Figure 1. Decision chart for using graduated guidance.

Graduated Guidance Guidelines

Throughout the graduated guidance guidelines, prompts are referred to as least intrusive, more intrusive, and most intrusive. Least intrusive prompts are defined as the least amount of pressure or location (i.e., shoulder or back) necessary to obtain a correct response. For example, a least intrusive prompt would include prompting with a light touch at the shoulder to get a student to hang up her backpack. More intrusive prompts are delivered in a more controlling location (i.e., upper arm or forearm) or with a firmer pressure than least intrusive prompts. For example, if the least intrusive prompt described in the previous example was unsuccessful, the practitioner could move to a firmer touch at the elbow. Most intrusive prompts are prompts that are delivered in the most controlling location (i.e., hand-over-hand) or with more pressure than either least or more intrusive prompts. An example of a most intrusive prompt would be using a hand-overhand prompt to get the student to hang up her backpack if she was not successful with the more intrusive prompt. It is important to note that the prompts do not need to occur in order (i.e., least intrusive, followed by more intrusive, followed by most intrusive) like a MTL hierarchy, though it will often be the case.

Shadowing is referred to as a close shadow, an arc shadow, and down. All three types of shadow are provided from behind the student. A close shadow is defined as the practitioner closely following, but not touching, the student's hands with their own hands. An arc shadow is defined as the practitioner increasing the distance between their hands and the student's hands by providing an arc-shaped shadow with their arms. Finally, if a shadow is down, the practitioner's arms and hands are by their side, but the practitioner is still standing close to the student.

When working with novel students (i.e., students new to the practitioner), least intrusive prompts should be delivered after an approximate 3 to 5 s delay. Least intrusive prompts should continue to be provided within the session, unless the student moves to make an error or an error occurs. If the student begins to make an error, an immediate (i.e., 0 s delay) more intrusive prompt should be provided to prevent the error, followed by a return to least intrusive prompts for the following steps. If an error does occur, an immediate most intrusive prompt should be provided to correct the step, followed by a return to least intrusive prompts for the following steps. The second session should run similarly, but the third session should be a little more structured. Prompts will continue to be delivered following a 3 to 5 s delay, and least intrusive prompts will be delivered to start and within the session. However, if the student begins to make an error, especially on a step in which an error has previously occurred, an immediate most intrusive prompt should be provided to core to the student, and should only fade to an arc as sessions progress.

When working with familiar students (i.e., students the practitioner has worked with), least intrusive prompts are delivered after a student-specific delay. An assessment similar to the pre-assessment described in Chapter 3 can be conducted to determine a student's ideal latency to prompt. Least intrusive prompts should continue to be provided within the session, even if the student moves to make an error. If this occurs, an immediate (i.e., 0 s delay) least intrusive prompt should be provided to prevent the error.

A least intrusive prompt should be sufficient to maintain correct responding, as repeated sessions with the student will leave the practitioner familiar with the least amount of prompt necessary to obtain a correct response from the student. If an error occurs, an immediate most intrusive prompt should be provided to correct the step, followed by a return to least intrusive prompts for the following steps. As with novel students, the second session will be run similarly to the first, but the third session should be more structured. Prompts will continue to be delivered following a student-specific delay, and least intrusive prompts will be delivered to start and within the session. However, if the student begins to make an error, especially on a step in which an error has previously occurred, an immediate more intrusive prompt should be provided. In general, shadowing is provided close to the student until familiar with the task (i.e., at least the third session), at which point it should become an arc or down.

With students who engage in challenging behavior, sessions will be more structured. Most intrusive prompts are immediately (i.e., 0 s delay) delivered and will fade to more intrusive prompts after a 3 to 5 s delay within the session. If the student begins to make an error, an immediate (i.e., 0 s delay) most intrusive prompt should be provided to prevent the error, followed by a return to more intrusive prompts for the following steps. If an error occurs, an immediate most intrusive prompt should be provided to correct the step, followed by a return to more intrusive prompts for the following steps. Again, the second session will be run similarly, but the third session will be slightly less intrusive. Prompts will continue to be delivered without a delay, but prompts will be faded to least intrusive following a 3 to 5 s delay within the session. If the student begins to make an error, an immediate more intrusive prompt will be provided. In general, shadowing is provided close to the student and should only fade to an arc as sessions progress. A close shadow is beneficial during sessions where challenging behavior may occur, because the practitioner is able to redirect behavior immediately.

Preference Assessment

Table 3 depicts the rank order from the MSWO for all participants. For Rick, preference was assessed for a book from a local zoo, a hand-held mirror, a basketball, a light-up vibrating toy, a bin filled with water and foam fish, and pop music played on an iPod with headphones. Rick showed a clear preference for the zoo book (30), having chosen it first for every presentation. The mirror (21), basketball (20), and vibrating toy (19) were also closely grouped together, with the water play (10) and music (5) resulting in the least-preferred items. Ron was given a choice between the zoo book, mirror, and basketball during pre-assessment and intervention sessions, and he consistently chose to engage with the basketball. Ron was given multiple choices because he was not engaging with his top one or two items during the first few sessions.

For Lori, a set of animal pictures, a zoo book, large legos, pop music played on an iPod with headphones, a light-up vibrating toy, and a slinky were assessed for preference. The animal pictures (30) were clearly the most preferred out of the six items, as demonstrated by it being chosen first for every presentation. The zoo book (24) was ranked next, with legos (17), music (16), and the vibrating toy (12) following. The slinky (6) was the least-preferred and was chosen last for every presentation. Lori was given
access to the animal pictures and zoo book during pre-assessment and intervention sessions. Lori was given two choices because she was not engaging with her top item during the first few sessions.

Rank	Rick	Lori	Glenn	Daryl	Carl
1	Zoo book	Animal pictures	Basketball	Legos	Slinky
2	Mirror	Zoo book	Number cards	Squishy ball	Beads
3	Basketball	Legos	Letter magnets	Music	Vibrating toy
4	Vibrating toy	Music	Slinky	Magazine	Squishy ball
5	Water play	Vibrating toy	Music	Rain stick	Play-Doh
6	Music	Slinky	Play-Doh	Slinky	Music

Table 4. MSWO preference assessment results for all participants.

Glenn's preference was assessed for a basketball, flashcards with numbers, alphabet magnets, a slinky, pop music played on an iPod with headphones, and assorted containers of Play-Doh. The basketball (30) was clearly ranked in the first position, and was chosen first for each presentation. The number cards (22) and letter magnets (21) were ranked at second and third, with the slinky (11), music (11), and Play-Doh (10) closely ranked toward the bottom. Glenn was given access to the basketball for preassessment and intervention sessions, which consisted of having someone count out the number of bounces he made with the ball.

Daryl's preference was assessed for large legos in a bucket, a squishy light-up ball, pop music played on an iPhone with headphones, a car magazine, a rain stick, and a slinky. Daryl demonstrated relatively equal preference for all of the items, without much differentiation between stimuli. Legos (25) were ranked first, closely followed by the squishy ball (24). The last four items included music (15), magazine (15), rain stick (14), and slinky (12) and were ranked about the same. Daryl was provided a choice between legos and the squishy ball during pre-assessment and intervention. Daryl was given two choices because he was not engaging with his top item during the first few sessions.

For Carl, a slinky, a variety of beaded necklaces, a light-up vibrating toy, a lightup squishy ball, assorted containers of Play-Doh, and pop music played on an iPhone with headphones were assessed for preference. Carl displayed clear preference for the slinky (30), with beads (18) and the vibrating toy (18) tying for second. The squishy ball (14), Play-Doh (13), and music (12) were relatively equal at the bottom of the rank order. Carl was given access to the slinky during pre-assessment and intervention.

Pre-Assessment

Table 4 depicts the IRT and identified latency for all participants during the preassessment. Rick was assessed on color sorting (i.e., mastered task) and spelling his name (i.e., acquisition task). The median IRT for the combination of both tasks was 7 s. This time was used as the latency to prompt during intervention sessions.

Lori was assessed on a put-in task (i.e., mastered task) and color sorting (i.e., acquisition task). The median IRT for the combination of both tasks was 2.5 s. The latency used for prompting during intervention sessions was 3 s.

Glenn was assessed on a put-in task (i.e., mastered task) and spelling his name (i.e., acquisition task). Glenn engaged in noncompliant behavior during sessions in the form of walking away from the table and dropping to the floor. Every trial resulted in a

	Ri	ck	Lo	Lori		lenn	Da	iryl	Са	arl
Trial	М	А	М	А	М	А	М	А	М	А
1	21 s	10 s	1 s	4 s	1 min	1 min	1 min	1 min	15 s	8 s
2	15 s	19 s	10 s	6 s	1 min	1 min	1 min	1 min	12 s	6 s
3	8 s	7 s	6 s	1 s	1 min	1 min	1 min	1 min	14 s	13 s
4	7 s	19 s	1 s	2 s	1 min	1 min	1 min	1 min	22 s	9 s
5	3 s	2 s	5 s	2 s	1 min	1 min	1 min	1 min	8 s	10 s
6	15 s	3 s	2 s	1 s	1 min	1 min	1 min	1 min	12 s	12 s
7	13 s	7 s	2 s	4 s	1 min	1 min	1 min	1 min	10 s	10 s
8	14 s	7 s	2 s	15 s	1 min	1 min	1 min	1 min	8 s	6 s
9	2 s	5 s	5 s	1 s	1 min	1 min	1 min	1 min	8 s	7 s
10	3 s	2 s	3 s	2 s	1 min	1 min	1 min	1 min	13 s	15 s
11	10 s	14 s	2 s	2 s	1 min	1 min	1 min	1 min	18 s	9 s
12	7 s	4 s	5 s	2 s	1 min	1 min	1 min	1 min	17 s	11 s
13	9 s	5 s	3 s	3 s	1 min	1 min	1 min	1 min	18 s	14 s
14	7 s	6 s	15 s	5 s	1 min	1 min	1 min	1 min	14 s	12 s
15	21 s	10 s	5 s	2 s	1 min	1 min	1 min	1 min	15 s	12 s
Median	7	S	2.5	5 s	1	min	1 r	nin	12	2 s
Latency	7	S	3	S		5 s	5	S	12	2 s

prompt at the 1 min mark, therefore the median IRT for the combination of both tasks was 1 min. The latency used for Glenn during intervention sessions was 5 s.

Table 5. IRT and identified latency for all participants during mastered (M) and acquisition (A) tasks.

Daryl was assessed on a put-in task (i.e., mastered task) and color sorting (i.e., acquisition task). Daryl engaged in noncompliant behavior during sessions in the form of walking away from the table and resisting physical guidance. Every trial resulted in a prompt at the 1 min mark, therefore the median IRT for the combination of both tasks was 1 min. The latency used for Daryl during intervention sessions was 5 s.

Carl was assessed on a put-in task (i.e., mastered task) and color sorting (i.e.,

acquisition task). The median IRT for the combination of both tasks was 12 s, and this was the latency used for prompting during intervention sessions.

Comparison of Prompting Strategies

Results of the comparison of prompting strategies will be presented across the counterbalanced sets of participants.

Set One

The first set of participants included Rick and Lori, who were assigned the tasks of setting the table and clearing the dishes.

Rick

The percentage of steps Rick completed correctly across the two tasks is presented in the top panel of Figure 2. During baseline, Rick did not complete any of the steps of either task correctly. With the introduction of graduated guidance for clearing the dishes, Rick's percentage of steps completed correctly had an immediate increase, with a steadily increasing trend (M = 77%, range: 25%–100%). With the introduction of the MTLD prompting strategy for setting the table, Rick's percentage of steps completed correctly was much more variable, though there was a generally increasing trend (M =44%, range: 0%–88%). In other words, as the task associated with the graduated guidance strategy continued to increase in accuracy, the task associated with the MTLD strategy continued in a variable pattern of responding.

The task associated with graduated guidance took 14 sessions to reach mastery criterion, whereas the task associated with MTLD did not reach mastery criterion. By the

end of the school year, MTLD resulted in 30 sessions with 88% being the highest accuracy achieved. Graduated guidance resulted in fewer errors per session (M = 0.5, range: 0–2) and fewer prompts per session (M = 2.7, range: 0–6) as compared to MTLD (M = 2, range: 0–4; M = 4, range: 1–8) as measured across the first and last three sessions of each prompting strategy.

Lori

The percentage of steps Lori completed correctly across the two tasks is presented in the bottom panel of Figure 2. During baseline, Lori did not complete any of the steps of either task correctly. With the introduction of the MTLD prompting procedure for clearing the dishes, there was an immediate increase in the percentage of steps completed correctly, with a variable increasing trend (M = 45%, range: 0%–88%). With the introduction of graduated guidance for setting the table, Lori's percentage of steps completed correctly was slower to increase and just as variable (M = 37%, range: 0%– 88%), though it quickly achieved levels similar to the task associated with the MTLD procedure. In other words, both strategies had a similar impact on the acquisition of the two tasks.

Neither task met mastery criterion. By the end of the school year, both tasks resulted in 38 sessions with 88% being the highest accuracy achieved, regardless of the prompting strategy utilized. Unlike Rick, MTLD resulted in fewer errors per session (M = 2, range: 0–4) and fewer prompts per session (M = 3.3, range: 1–6) as compared to graduated guidance (M = 2.2, range: 0–4; M = 4.8, range: 2–8) for Lori, as measured across the first and last three sessions of each prompting strategy.



Figure 2. Percentage of steps completed correctly across tasks associated with graduated guidance and MTLD for Rick and Lori.

Set Two

The second set of participants included Glenn, Daryl, and Carl who were assigned the tasks of clearing the dishes and cleaning up after an art project.

Glenn

The percentage of steps Glenn completed correctly across the two tasks is presented in the top panel of Figure 3. During baseline, Glenn did not complete any of the steps of either task correctly. With the introduction of graduated guidance for cleaning up the art project, Glenn's percentage of steps completed correctly had an immediate increase, with a steadily increasing trend (M = 43%, range: 17%–50%). However, this quickly leveled out at 50% when Glenn engaged in noncompliance to put the markers in the cup (i.e., the remaining 50% of the task). Glenn's percentage of steps completed correctly with the introduction of the MTLD prompting strategy for clearing the dishes did not have an immediate change in level, but demonstrated a steady increasing trend similar to the trend seen with the graduated guidance procedure, but continued to increase (M = 45%, range: 0%–83%).

Neither task met mastery criterion. By the end of the school year, both tasks resulted in 14 sessions with 50% being the highest accuracy achieved for the task associated with graduated guidance and 83% being the highest accuracy achieved for the task associated with MTLD. Graduated guidance resulted in fewer errors per session (M = 0.67, range: 0–2) than MTLD (M = 1.3, range: 0–3). However, MTLD resulted in fewer prompts per session (M = 3.3, range: 1–6) than graduated guidance (M = 3.8, range: 3–5) as measured across the first and last three sessions of each prompting strategy.



Figure 3. Percentage of steps completed correctly across tasks associated with graduated guidance and MTLD for Glenn, Daryl, and Carl.

Daryl

The percentage of steps Daryl completed correctly across the two tasks is presented in the middle panel of Figure 3. During baseline, Daryl did not complete any of the steps of either task correctly. With the introduction of graduated guidance for clearing the dishes, Daryl's percentage of steps completed correctly had an immediate increase, though the data were variable after this immediate change in level (M = 61%, range: 33%–100%). With the introduction of the MTLD prompting procedure for cleaning up the art project, Daryl's percentage of steps completed correctly did not have an immediate change in level, but demonstrated a sharp increase followed by a variable trend (M = 64%, range: 0%–100%). In other words, both strategies had a similar impact on the acquisition of the two tasks.

Daryl met mastery criterion for both tasks in 13 sessions. Graduated guidance resulted in fewer errors per session (M = 0.2, range: 0–1) and fewer prompts per session (M = 1.8, range: 0–4) as compared to MTLD (M = 0.5, range: 0–1; M = 2.2, range: 3–6) as measured across the first and last three sessions of each prompting strategy.

Carl

The percentage of steps Carl completed correctly across the two tasks is presented in the bottom panel of Figure 3. During baseline, Carl did not complete any of the steps of either task correctly. With the introduction of graduated guidance for cleaning up the art project, there was an immediate increase in the percentage of steps completed correctly with a steady increasing trend to mastery (M = 80%, range: 33%–100%). With the introduction of MTLD for clearing the dishes, there was an immediate change in the second session, though the percent of steps completed correctly quickly leveled out at 50% (M = 47%, range: 0%–67%).

The task associated with graduated guidance took six sessions to reach mastery criterion, whereas the task associated with MTLD did not reach mastery criterion. By the end of the school year, MTLD had resulted in six sessions with 67% being the highest accuracy achieved. Graduated guidance resulted in fewer errors per session (M = 0.2, range: 0–1) and fewer prompts per session (M = 1.1, range: 0–4) as compared to MTLD (M = 1.5, range: 0–2; M = 3.2, range: 2–6) as measured across the first and last three sessions of each prompting strategy.

Social Validity

The results of the social validity questionnaire are presented in Table 6. All three classrooms participated in the questionnaire resulting in three teachers and four instructional assistants. In general, the staff were in agreement that the targeted behaviors were important skills for the students to learn (M = 4.9, range: 4–5). In regards to the prompting procedures, graduated guidance was perceived as the easier strategy (M = 4.9, range: 4–5) as compared to MTLD (M = 4.1, range: 3–5), as well as the strategy that was more likely to be implemented by staff (M = 4.9, range: 4–5; M = 3.4, range: 2–5). In addition, the staff unanimously agreed that graduated guidance would be the preferred prompting strategy over MTLD.

Social Validity Questions	Average Score	Range
How important are the targeted skills for your student?	4.9	4–5
How easy would it be to implement graduated guidance in your classroom?	4.9	4–5
How likely are you to implement graduated guidance in your classroom?	4.9	4–5
How easy would it be to implement MTLD in your classroom?	4.1	3–5
How likely are you to implement MTLD in your classroom?	3.4	2–5
Which prompting procedure are you more likely to implement in your classroom?	Graduated Guidance	Graduated Guidance

Table 6. Results of the social validity questionnaire.

Chapter 5: Discussion

In the first phase of this study, graduated guidance procedures were analyzed and operationalized. The results of this analysis yielded a decision chart that outlines guidelines for when to prompt, what type of prompt to use, and how to reliably use the student as an indicator when using graduated guidance. In general, the guidelines focuses on using the least intrusive prompt necessary to obtain a correct response from the participant while minimizing errors. In addition, they focus on providing increasingly intrusive prompts as the participant begins to make an error, continues to make errors, or does not engage with the task items.

In the second phase, graduated guidance was compared to most-to-least prompting with a delay (MTLD) to determine its relative efficacy. Results demonstrated that graduated guidance was just as effective as, and in some cases more effective than, MTLD. Of the four tasks that reached mastery criterion, three of those tasks were taught using graduated guidance. Furthermore, tasks taught with graduated guidance resulted in fewer trials to criterion (M = 11, range: 6–14) as compared to the 13 trials for the mastered task taught with MTLD. As measured during the first three trials and last three trials of each task, graduated guidance resulted in fewer errors (M = 4.4, range: 1–13) and fewer overall prompts (M = 17.2, range: 7–29) as compared to the tasks taught with MTLD (M = 8.8, range: 3–12; M = 19.6, range: 13–24). In addition, MTLD used more intrusive prompts as measured in an average use of 97% (range: 95%–100%) of prompts being most intrusive as compared to graduated guidance using 76% (range: 63%–91%) of prompts being most intrusive.

This study extends the current literature in several ways. The first of these is by operationalizing graduated guidance, a prompting procedure that has been demonstrated to be poorly and inconsistently defined. As outlined in the literature review, only half of identified graduated guidance studies defined their prompting procedure. Of those, definitions were generally split among (a) starting with the least intrusive prompt and (b) starting with the most intrusive prompt. Considering that these recommendations are in direct contradiction, it was evident that a more standardized definition was necessary. By operationalizing graduated guidance and creating general guidelines, this prompting procedure can now more consistently be applied by both researchers and practitioners.

Gathering data on the median IRT for participants was another way in which this study extends the current prompting literature. By creating participant-specific guidelines for when to prompt (i.e., latency to prompt), this resulted in (a) making the two prompting procedures more equivalent and, (b) allowing the participant an appropriate amount of time to engage with the task. By using a participant-specific latency across both prompting strategies, I could be more confident that any difference in acquisition, errors, or prompts was due to the strategy, and not the latency to prompt. Typically, a MTLD strategy uses a 2 s delay (Libby et al., 2008) and graduated guidance does not specify its delay. By keeping the delay consistent across both strategies, the participant

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has an equal opportunity to respond independently or make an error regardless of the prompting procedure. Additionally, by creating a student-specific latency, it is more likely that the student will have the appropriate amount of time to respond independently before making an error or being prompted. In other words, if a standard 2 s delay was used, it is likely that more prompts would have been used across both strategies, not allowing for independent responding. If a student typically takes longer than 2 s to respond, he or she would not have been given the opportunity to engage independently and would potentially have been prompted unnecessarily. This would likely lead to prompt-dependency.

This study also extends the literature by comparing graduated guidance to MTLD. I was able to identify only one article in which graduated guidance was compared to any other prompting procedure (i.e., Dalrymple & Feldman, 1992), however this was only used as an error correction procedure. As described in Chapter 2, Dalrymple & Feldman (1992) used graduated guidance to teach expressive sign language to 10 students with moderate to severe mental retardation. No response or an incorrect response resulted in graduated guidance being used to mold the students' hands into the correct sign. Response prompting procedures such as graduated guidance aim to transfer stimulus control from the prompt to the naturally occurring stimulus. Once the target behavior reliably occurs with the prompts, it is necessary to fade them to assist in the transfer of control and to minimize errors (Cooper et al., 2007). By using graduated guidance as an error correction method instead of a prompt fading method, the authors were not utilizing the procedures as intended. Therefore, the extent to which the results can be utilized are limited.

There was an unexpected finding that resulted from this study. Two of the participants engaged in challenging behavior in the form of noncompliance during the pre-assessment component of the study, as well as during intervention for one of the two participants. Noncompliance during the pre-assessment prevented an accurate measure of latency, so a default latency of 5 s was used during intervention. For one of the participants, Daryl, this may have contributed to his compliance during intervention. By consistently prompting after 5 s, Daryl did not have the opportunity to engage in noncompliance. In addition, it is interesting to note that Daryl resisted physical guidance during pre-assessment, but not during intervention. This increase in compliance could be due to the steady implementation of prompting, indicating that escape from the task was not going to be reinforced. It may also be due to the fact that the pre-assessment was conducted while my relationship with Daryl was new, whereas by the time intervention was implemented, Daryl had been working with me for several months and clear expectations and a good rapport had been established.

In addition to noncompliance during the pre-assessment, Glenn engaged in similar behavior during intervention. On the same three steps (i.e., placing the three markers in the cup), Glenn consistently attempted to put the markers in the garbage or in the bin. He was also observed to smile when the experimenter blocked him from putting the markers anywhere other than in the cup, but was compliant in allowing the experimenter to prompt him to put them in the correct place. It was reported by Glenn's teachers postintervention that he had a history of throwing items in the garbage can, which was not discussed prior to implementing procedures. Though challenging behavior did occur, I cannot be certain of the function. Anecdotally, Glenn's behavior seemed to be maintained by attention. Depending on the function of challenging behavior, a student may react differently to prompting. For example, a student whose behavior is maintained by attention may enjoy the physical guidance and engage in noncompliance or challenging behavior in order to be prompted. On the other hand, a student whose behavior is maintained by escape may resist physical guidance, resulting in a physical struggle between the practitioner and student.

Although this study extends the prompting literature in several positive ways, there are a few limitations that must be considered. First, though attempts were made to ensure the equivalency of tasks across both sets of participants, it was evident that Rick and Lori's two tasks were not equivalent. Because the three pieces of silverware all went in the small section of the bin and the three remaining dishes went in the large section of the bin, by prompting one of the set, the participants were potentially able to generalize the remaining pieces of silverware or dishes. This was in contrast to the "equivalent" task of setting the table, where each item was to be placed in a unique position, with the exception of the silverware on the napkin. Even though the tasks did not seem to be equivalent, one could still argue that graduated guidance was the more effective procedure. This was demonstrated by Rick quickly acquiring the graduated guidance skill (i.e., the potentially "easier" task) with a clear separation in data, while Lori's two tasks remained extremely close in terms of acquisition. It could be argued that if graduated guidance was not the more effective procedure, Lori would have been significantly behind on the setting the table task. Future research should attempt to more thoroughly assess the equivalency of tasks. Methods for determining equivalency across tasks may include formal and informal assessments conducted by classroom staff or related support staff (i.e., occupational therapist, physical therapist, speech and language therapist), formal and informal surveys of staff and family, as well as a specific recommendation based on this study, choosing tasks without any steps that can generalize within the task.

Mastery criterion of both tasks was not met for four of the five participants. The operationalization of graduated guidance and pre-assessment stages of the study took a significant amount of time, which left just under half of the school year for the intervention phase. In order to acquire and maintain skills, individuals with significant disabilities often require repeated practice opportunities (Downing & Eichinger, 2003), and may take significantly longer to acquire skills than their typically developing peers. In other words, just under half of the school year was likely not a sufficient amount of time for the participants to acquire the assigned skills. Future research should attempt to target skills that can be accomplished within the study timeline so that more representative data can be collected (e.g., trials to mastery).

Another limitation of this study was that MTLD ended up looking almost identical to graduated guidance. Because the pre-assessment determined participantspecific latencies to prompt, what ended up happening looked the same across both hierarchies, with the exception of errors. In other words, with both prompting strategies, if the participant began to initiate the task within the delay, the researcher waited. If the participant then made an error, the researcher corrected it with hand-over-hand prompting for the MTLD strategy. For graduated guidance, the researcher redirected the participant with a light touch if he or she began to make an error. Basically, because the delay to prompt ended up being so accurate, it was an "all or nothing" situation. Either the participant was independent and correct, or he or she made an error (i.e., MTLD), or almost made an error (i.e., graduated guidance). Rarely did the participant actually get prompted during the MTLD hierarchy. If the traditional most-to-least prompting strategy (i.e., no delay) was used instead, there likely would have been a significant difference in the rates of acquisition, due to the lack of a delay before prompting. This is advantageous in that it would cut down on the number of errors the participant engages in, however, it does not give the participant the opportunity to engage independently until the hierarchy has reached the independence stage.

Future Research

There are several areas for future research based on the findings and limitations of this study. Although this study extended the literature by analyzing graduated guidance procedures and developing prompting guidelines, only one practitioner with over 40 min of instructional time was used as a graduated guidance example for the operationalization phase. It is likely that practitioners have been taught prompting procedures differently and have further developed their own guidelines based on various experiences and applications. Future research should analyze additional footage of multiple practitioners over longer periods of time using graduated guidance and attempt to develop more thorough and comprehensive guidelines. Although I didn't examine this experimentally, it appears that identifying individualized latency to responding for each participant had an impact on the efficacy of each prompting system. Developing a student-specific latency to prompt resulted in (a) making the two prompting procedures more equivalent and, (b) allowing the participant an appropriate amount of time to begin to engage with the task. However, it may have also resulted in the prompting strategies being too similar, with the exception of how each strategy handled errors. What resulted was either an independent response or an error/almost error. Future research should attempt to evaluate the effects of a studentspecific latency to prompt versus a standard latency to prompt. This would best be accomplished within the same prompting procedure across tasks. By comparing the two latencies, it will become more evident whether the time allowed to respond independently will affect trials to criterion, number of errors, and the number of prompts used.

Future research should attempt to determine preference of prompting strategies when working with students, particularly those with a history of challenging behavior, as evaluating preference beforehand may decrease challenging behavior observed during sessions. A functional behavior assessment or functional analysis of behavior should be conducted beforehand to determine the function of the student's challenging behavior. Following this, prompting strategies could be compared to determine if one is more effective than the other for addressing the function of the student's behavior. If the strategies are equally effective, then giving the student the opportunity to choose between them would be beneficial considering that choice plays an important role, in that procedures can be demonstrated to be effective and preferred (Hanley, Piazza, Fisher, Contrucci, & Maglieri, 1997) as well as the fact that the opportunity to choose can function as a reinforcer (Tiger, Hanley, & Hernandez, 2008). Studies could attempt to evaluate choice in prompting strategies by running a concurrent operants design where both strategies are simultaneously available. Participants would have the opportunity to allocate their responding to one strategy over another (i.e., choose their prompting strategy; Hanley et al., 1997). However, if the strategies are not equally effective in decreasing challenging behavior while increasing the target behavior, preference of the student may not be the deciding factor in choosing a prompting strategy.

Finally, more studies comparing prompting strategies should be conducted, specifically with graduated guidance. With the addition of graduated guidance guidelines presented in this study, and potentially more comprehensive guidelines developed through future research, studies should continue to specifically investigate the use of graduated guidance and its relative efficacy as compared to other more thoroughly demonstrated procedures (e.g., LTM, MTL, MTLD). By continuing to analyze graduated guidance, there is the potential for it to be the go-to physical prompting procedure for practitioners.

Implications for Practice

Graduated guidance not only requires knowledge of prompting, but of the student as well. The operationalization phase of this study determined that the familiarity with the student affects when and how to prompt. When working with novel students, practitioners should use a standard delay to prompt (i.e., 3-5 s) and should use least intrusive prompts as much as possible. As the practitioner becomes more familiar with the student, the delay can become more student-specific and the prompts should continue to be as least intrusive as possible.

One interesting finding of this study is that students with challenging behavior may react differently to prompting procedures. This is important for practitioners to keep in mind as they choose and implement strategies with their students. It may be advantageous for the practitioner to determine the function of their student's challenging behavior before choosing a procedure, as the function may affect the effectiveness of the procedure.

Practitioners may find it useful to utilize the graduated guidance guidelines and decision chart outlined in this study as they implement graduated guidance with their students. By utilizing these tools, the practitioner can be confident that the procedures they are using have been demonstrated to be effective. In addition, it can help in keeping procedures consistent across staff. It may also be worthwhile for practitioners to videotape themselves implementing graduated guidance in order to evaluate their own use of the strategy.

It is interesting to note that the teachers and instructional assistants surveyed in this study unanimously agreed that graduated guidance is the easier procedure in their opinion, and the procedure that they would prefer to use (over MTLD). When asked to expand, several of the staff mentioned that MTLD seemed difficult to keep track of, and they were not sure that they would be able to use the right prompts at the right times. Practitioners may want to keep feasibility in mind as they are choosing prompting procedures. In addition, practitioners should be aware of the fidelity with which they are implementing various prompting procedures. It could be the case that a procedure is viewed as easy to implement, but it is in fact being poorly or incorrectly implemented.

This study attempted to operationalize graduated guidance, which is historically an inconsistently and poorly-defined prompting strategy. By developing prompting guidelines for graduated guidance and comparing it to MTLD, it was demonstrated that graduated guidance was just as effective as, and in some cases more effective than, MTLD. These findings suggest that graduated guidance is an effective physical prompting procedure which results in rates of acquisition similar to MTLD, but with fewer errors, making it the ideal prompting strategy for individuals with significant disabilities.

References

- Akmanoglu, N., & Tekin-Iftar, E. (2011). Teaching children with autism how to respond to the lures of strangers. *Autism*, 15, 205–222.
- Alberto, P. A., & Troutman, A. C. (2013). Differential reinforcement: Antecedent control and shaping. In A. C. Davis (Ed.), *Applied behavior analysis for teachers (9th* ed.)(p. 309). Upper Saddle, NJ: Pearson.
- Azrin, N. H., & Wesolowski, M. D. (1974). Theft reversal: An overcorrection procedure for eliminating stealing by retarded persons. *Journal of Applied Behavior Analysis*, 7, 577–581.
- Bellini, S., & Akullian, J. (2007). A meta-analysis of video modeling and video selfmodeling interventions for children with adolescents with autism spectrum disorders. *Exceptional Children*, 73, 264–287.
- Bennett, K., Reichow, B., & Wolery, M. (2011). Effects of structured teaching on the behavior of young children with disabilities. *Focus on Autism and Other Developmental Disabilities, 26,* 143–152.
- Betz, A., Higbee, T. S., & Reagon, K. A. (2008). Using joint activity schedules to promote peer engagement in preschoolers with autism. *Journal of Applied Behavior Analysis*, 41, 237–241.
- Bryan, L. C., & Gast, D. L. (2000). Teaching on-task and on-schedule behaviors to high-functioning children with autism via picture activity schedules. *Journal of Autism and Developmental Disorders*, *30*, 553–567.
- Carey, R. G., & Bucher, B. (1981). Identifying the educative and suppressive effects of positive practice and restitutional overcorrection. *Journal of Applied Behavior Analysis*, 14, 71–80.
- Ciccone, F. J., Graff, R. B., & Ahearn, W. H. (2005). An alternate scoring method for the multiple stimulus without replacement preference assessment. *Behavioral Interventions*, 20, 1–17.

- Cicero, F. R., & Pfadt, A. (2002). Investigation of a reinforcement-based toilet training procedure for children with autism. *Research in Developmental Disabilities*, 23, 319–331.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis (2nd ed.)*. Upper Saddle, NJ: Pearson.
- Correa, V. I., Poulson, C. L., & Salzberg, C. L. (1984). Training and generalization of reach-grasp behavior in blind, retarded young children. *Journal of Applied Behavior Analysis*, 17, 57–69.
- Dalrymple, A. J., & Feldman, M. A. (1992). Effects of reinforced directed rehearsal on expressive sign language learning by persons with mental retardation. *Journal of Behavioral Education, 2*, 1–16.
- Day, H. M. (1987). Comparison of two prompting procedures to facilitate skill acquisition among severely mentally retarded adolescents. *American Journal of Mental Deficiency*, 91, 366–372.
- DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis*, 29, 519–533.
- Denny, M., Marchand-Martella, N., Martella, R. C., Reilly, J. R., Reilly, J. F., & Cleanthous, C. C. (2001). Using parent-delivered graduated guidance to teach functional living skills to a child with Cri du Chat syndrome. *Education and Treatment of Children, 23*, 441–454.
- Downing, J. E., & Eichinger, J. (2003). Creating learning opportunities for students with severe disabilities in inclusive classrooms. *Teaching Exceptional Children*, 36, 26–31.
- Drasgow, E., Halle, J. W., & Ostrosky, M. M. (2008). Effects of differential reinforcement on the generalization of a replacement mand in three children with severe language delays. *Journal of Applied Behavior Analysis*, *31*, 357–374.
- Duffy Cassella, M., Sidener, T. M., Sidener, D. W., & Progar, P. R. (2011). Response interruption and redirection for vocal stereotypy in children with autism: A systematic replication. *Journal of Applied Behavior Analysis*, 44, 169–173.
- Durand, V. M. (1999). Functional communication training using assistive devices: Recruiting natural communities of reinforcement. *Journal of Applied Behavior Analysis, 32,* 247–267.

- Fisher, W. W., Piazza, C. C., Bowman, L. G., & Amari, A. (1996). Integrating caregiver report with a systematic choice assessment to enhance reinforcer identification. *American Journal on Mental Retardation*, 101, 15–25.
- Foxx, R. M., & Azrin, N. H. (1973). *Toilet training the retarded: A rapid program for day and nighttime independent toileting*. Champaign, IL: Research Press.
- Fyffe, C. E., Kahng, S., Fittro, E., & Russell, D. (2004). Functional analysis and treatment of inappropriate sexual behavior. *Journal of Applied Behavior Analysis*, 37, 401–404.
- Gast, D. L. (2010). *Single subject research methodology in behavioral sciences*. New York, NY: Routledge.
- Griffen, A. K., Wolery, M., & Schuster, J. W. (1992). Triadic instruction of chained food preparation responses: Acquisition and observational learning. *Journal of Applied Behavior Analysis, 25,* 193–204.
- Grow, L. L., Carr, J. E., Kodak, T. M., Jostad, C. M., & Kisamore, A. N. (2011). A comparison of methods for teaching receptive labeling to children with autism spectrum disorders. *Journal of Applied Behavior Analysis, 44,* 475–498.
- Grow, L. L., Kelley, M. E., Roane, H. S., & Shillingsburg, M. A. (2008). Utility of extinction-induced response variability for the selection of mands. *Journal of Applied Behavior Analysis*, 41, 15–24.
- Hanley, G. P., Heal, N. A., Tiger, J. H., & Ingvarsson, E. T. (2007). Evaluation of a classwide teaching program for developing preschool life skills. *Journal of Applied Behavior Analysis*, 40, 277–300.
- Hanley, G. P., Piazza, C. C., Fisher, W. W., Contrucci, S. A., & Maglieri, K. A. (1997). Evaluation of client preference for function-based treatment packages. *Journal of Applied Behavior Analysis*, 30, 459–473.
- Horrocks, E. L., & Morgan, R. L. (2011). Effects of inservice teacher training on correct implementation of assessment and instructional procedures for teachers of students with profound multiple disabilities. *Teacher Education and Special Education, 34,* 283–319.
- Ingenmy, R., & Van Houten, R. (1991). Using time delay to promote spontaneous speech in an autistic child. *Journal of Applied Behavior Analysis, 24, 591–596*.
- Johnston, J. M., & Pennypacker, H. S. (2009). *Strategies and tactics of behavioral research (3rd ed.)*. New York, NY: Routledge.

- Jones, R. S. P., & McCaughey, R. E. (1992). Gentle teaching and applied behavior analysis: A critical review. *Journal of Applied Behavior Analysis, 25, 853–867.*
- Kahng, S., Abt, K. A., & Schonbachler, H. E. (2001). Assessment and treatment of lowrate high-intensity problem behavior. *Journal of Applied Behavior Analysis*, 34, 225–228.
- Krantz, P. J., & McClannahan, L. E. (1993). Teaching children with autism to initiate to peers: Effects of a script-fading procedure. *Journal of Applied Behavior Analysis*, 26, 121–132.
- Krantz, P. J., & McClannahan, L. E. (1998). Social interaction skills for children with autism: A script-fading procedure for beginning readers. *Journal of Applied Behavior Analysis*, 31, 191–202.
- Krantz, P. J., MacDuff, M. T., & McClannahan, L. E. (1993). Programming participation in family activities for children with autism: Parents' use of photographic activity schedules. *Journal of Applied Behavior Analysis*, 26, 137–138.
- Libby, M. E., Weiss, J. S., Bancroft, S., & Ahearn, W. H. (2008). A comparison of mostto-least and least-to-most prompting on the acquisition of solitary play skills. *Behavior Analysis in Practice*, 1, 37–43.
- Lennox, D. B., Miltenberger, R. G., & Donnelly, D. R. (1987). Response interruption and DRL for the reduction of rapid eating. *Journal of Applied Behavior Analysis*, 20, 279–284.
- MacDuff, G. S., Krantz, P. J., & McClannahan, L. E. (1993). Teaching children with autism to use photographic activity schedules: Maintenance and generalization of complex response chains. *Journal of Applied Behavior Analysis*, 26, 89–97.
- McDonnell, J., & Ferguson, B. (1989). A comparison of time delay and decreasing prompt hierarchy strategies in teaching banking skills to students with moderate handicaps. *Journal of Applied Behavior Analysis*, 22, 85–91.
- Miltenberger, R. G. (2011). Chaining. In T. Matray, P. Hovanessian, & S. DeNola (Eds.), *Behavior modification: Principles and procedures (5th ed.)(p. 207).* Belmont, CA: Wadsworth.
- Northup, J., Wacker, D., Sasso, G., Steege, M., Cigrand, K., Cook, J., & DeRaad, A. (1991). A brief functional analysis of aggressive and alternative behavior in an outclinic setting. *Journal of Applied Behavior Analysis*, 24, 509–522.

- Panyan, M. C., & Hall, V. (1978). Effects of serial versus concurrent task sequencing on acquisition, maintenance, and generalization. *Journal of Applied Behavior Analysis*, 11, 67–74.
- Repp, A. C., & Barton, L. E. (1980). Naturalistic observations of institutionalized retarded persons: A comparison of licensure decisions and behavioral observations. *Journal of Applied Behavior Analaysis*, 13, 333–341.
- Rinald, K., & Mirenda, P. (2012). Effectiveness of a modified rapid toilet training workshop for parents of children with developmental disabilities. *Research in Developmental Disabilities*, 33, 933–943.
- Saloviita, T. (2002). Behavioural treatment of improper eating by an institutionalised woman with profound intellectual disability—description of a successful intervention. *Journal of Intellectual & Developmental Disability*, 27, 15–20.
- Sparrow, S. S., Balla, D. A., & Cicchetti, V. (1985). *Vineland adaptive behavior scales: Classroom edition*. Circle Pines, MN: American Guidance Service.
- Steege, M. W., Wacker, D. P., Cigrand, K. C., Berg, W. K., Novak, C. G., Reimers, T. M., . . . DeRaad, A. (1990). Use of negative reinforcement in the treatment of self-injurious behavior. *Journal of Applied Behavior Analysis*, 23, 459–467.
- Thompson, T. J., Braam, S. J., & Fuqua, R. W. (1982). Training and generalization of laundry skills: A multiple probe evaluation with handicapped persons. *Journal of Applied Behavior Analysis*, 15, 177–182.
- Tiger, J. H., Hanley, G. P., & Hernandez, E. (2006). An evaluation of the value of choice with preschool children. *Journal of Applied Behavior Analysis, 39*, 1–16.
- van der Meer, L., Kagohara, D., Achmadi, D., Green, V. A., Herrington, C., Sigafoos, J., ... Rispoli, M. (2011). Teaching functional use of an iPod-based speechgenerating device to individuals with developmental disabilities. *Journal of Special Education Technology*, 26, 1–11.
- van der Meer, L., Kagohara, D., Achmadi, D., O'Reilly, M. F., Lancioni, G. E., Sutherland, D., & Sigafoos, J. (2012). Speech-generating devices versus manual signing for children with developmental disabilities. *Research in Developmental Disabilities*, 33, 1658–1669.
- Wacker, D. P., Steege, M. W., Northup, J., Sasso, G., Berg, W., Reimers, T., . . . Donn, L. (1990). A component analysis of functional communication training across three topographies of severe behavior problems. *Journal of Applied Behavior Analysis, 23,* 417–429.

Wolery, M., & Gast, D. L. (1984). Effective and efficient procedures for the transfer of stimulus control. *Topics in Early Childhood Special Education*, *4*, 52–77.

Appendix A: Setting the Table Data Sheet

Task: Setting Table

Student: _____

Condition (circle one): Baseline

Graduated Guidance Most-to-Least

Instruction: "Set the table"	Reinfo	Reinforcer: Praise, token, and/or preferred edible								
1. Place mat in front of chair	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*2. Place plate on left side of mat	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
3. Place bowl on plate	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*4. Place cup on right side of mat	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*5. Place napkin on right side, below	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
cup	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
6. Place silverware on napkin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
7. Place silverware on napkin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
8. Place silverware on napkin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
Date										
Initials										
Percent Correct										
Reliability										

*Can be completed in any order

H = hand-over-hand

F = forearm

U = upper arm

L = light touch/shadow

I = independent

Appendix B: Clearing the Dishes Data Sheet

Task: Clear the Dishes

Student: _____

Most-to-Least

Condition (circle one): Baseline

Graduated Guidance

Instruction: "Clear the dishes"	Reinfo	Reinforcer: Praise, token, and/or preferred edible								
1. Move tray to garbage	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*2. Place cup in large section of bin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*3. Place bowl in large section of bin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*4. Place plate in large section of bin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*5. Place silverware in small section	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
of bin	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*6. Place silverware in small section	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
of bin	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*7. Place silverware in small section	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
of bin	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
8. Place tray on shelf	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
Date										
Initials										
Percent Correct										
Reliability										

*Can be completed in any order

H = hand-over-hand

F = forearm

U = upper arm

L = light touch/shadow

I = independent

Appendix C: Clearing the Dishes (Easy) Data Sheet

Task: Clear the Dishes: Easy

Student:_____

Condition (circle one): Baseline

Graduated Guidance Most-to-Least

Instruction: "Clear the dishes"	Reinforcer: Praise, token, and/or preferred edible									
*1. Place cup in large section of	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
bin	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*2. Place plate in large section of	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
bin	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*3. Place silverware in small	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
section of bin	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*4. Place silverware in small	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
section of bin	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*5. Place silverware in small	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
section of bin	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
6. Place tray above bin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
Date										
Initials										
Percent Correct										
Reliability										

*Can be completed in any order

H = hand-over-hand

F = forearm

U = upper arm

L = light touch/shadow

I = independent

Appendix D: Clean Up Art Data Sheet

Task: Clean Up: Art

Student: _____

Condition (circle one): Baseline

Graduated Guidance Most-to-Least

Instruction: "Clean up"	Reinfo	orcer: P	raise, to	oken, ar	nd/or p	referred	d edible	!		
*1. Put scissors in bin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*2. Put glue stick in bin	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*3. Put marker in cup	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*4. Put marker in cup	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*5. Put marker in cup	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
*6. Throw scrap paper in trash	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF	ΗF
	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX	ΙX
Date										
Initials										
Percent Correct										
Reliability										

*Can be completed in any order

H = hand-over-hand

F = forearm

U = upper arm

L = light touch/shadow

I = independent

Appendix E: Sample IOA and TI Data Sheet for Graduated Guidance

Task: Set the Table

Student:

Condition: Graduated Guidance

	Student	Experimenter								
				Provided						
		Waited	Provided	more						
		student-	less	restrictive	Faded		Corrected			
		specific	restrictive	prompt	prompts	Prompted	errors if			
Instruction: "Set		delay to	prompt to	only when	within	to prevent	they	Redirected		
the table"	Data	prompt	start	needed	session	errors	occurred	stereotypy		
1. Place mat in	HFU	Y N	ΥN	ΥN	ΥN	Y N	Y N	Y N		
front of chair	LIX	NA	NA	NA	NA	NA	NA	NA		
*2. Place plate on	HFU		ΥN	ΥN	ΥN	Y N	Y N	Y N		
left side of mat	LIX	Y N	NA	NA	NA	NA	NA	NA		
3. Place bowl on	HFU	Y N	ΥN	ΥN	ΥN	Y N	Y N	Y N		
plate	LIX	NA	NA	NA	NA	NA	NA	NA		
*4. Place cup on	HFU	Y N	ΥN	ΥN	ΥN	Y N	Y N	Y N		
right side of mat	LIX	NA	NA	NA	NA	NA	NA	NA		
*5. Place napkin										
on right side,	HFU	Y N	ΥN	ΥN	ΥN	Y N	Y N	Y N		
below cup	LIX	NA	NA	NA	NA	NA	NA	NA		
6. Place silverware	HFU	Y N	ΥN	ΥN	ΥN	Y N	Y N	ΥN		
on napkin	LIX	NA	NA	NA	NA	NA	NA	NA		
7. Place silverware	HFU	Y N	ΥN	ΥN	ΥN	Y N	Y N	ΥN		
on napkin	LIX	NA	NA	NA	NA	NA	NA	NA		
8. Place silverware	HFU	Y N	ΥN	ΥN	ΥN	Y N	Y N	ΥN		
on napkin	LIX	NA	NA	NA	NA	NA	NA	NA		
Session Date										
Reliability Initials										
Percent Correct										
Reliability										

*Can be completed in any order

H = hand-over-hand

F = forearm

U = upper arm

L = light touch/shadow

I = independent

Appendix F: Sample IOA and TI Data Sheet for Most-to-Least Prompting With a Delay

Task: Set the Table

Student:

Condition: Most-to-Least Delay

	Student	Experimenter								
		Waited student-	Provided							
Instruction: "Set the		specific delay to	prescribed	Corrected errors	Redirected					
table"	Data	prompt	prompt	if they occurred	stereotypy					
1. Place mat in front of	HFU	Y N	Y N	Y N	Y N					
chair	LIX	NA	NA	NA	NA					
*2. Place plate on left side	HFU	Y N	Y N	Y N	Y N					
of mat	LIX	NA	NA	NA	NA					
	HFU	Y N	Y N	Y N	Y N					
3. Place bowl on plate	LIX	NA	NA	NA	NA					
*4. Place cup on right side	HFU	Y N	Y N	Y N	Y N					
of mat	LIX	NA	NA	NA	NA					
*5. Place napkin on right	HFU	ΥN	Y N	Y N	ΥN					
side, below cup	LIX	NA	NA	NA	NA					
6. Place silverware on	HFU	ΥN	Y N	Y N	ΥN					
napkin	LIX	NA	NA	NA	NA					
7. Place silverware on	HFU	Y N	Y N	Y N	Y N					
napkin	LIX	NA	NA	NA	NA					
8. Place silverware on	HFU	Y N	Y N	Y N	Y N					
napkin	LIX	NA	NA	NA	NA					
Session Date										
Reliability Initials										
Percent Correct										
Reliability										

*Can be completed in any order

H = hand-over-hand

F = forearm

U = upper arm

L = light touch/shadow

I = independent

Appendix G: The Reinforcer Assessment for Individuals With Severe Disabilities

(RAISD)

THE REINFORCER ASSESSMENT FOR INDIVIDUALS WITH SEVERE DISABILITIES (RAISD)

Name: _____

Date:

Assessor:

The purpose of this structured interview is to get as much specific information as possible from the parent (or caregiver) as to what they believe would be useful reinforcers for the consumer. Therefore, this survey asks parents questions about categories of stimuli (e.g., visual, auditory, etc.). After the parent has generated a list of preferred stimuli, ask additional probe questions to get more specific information on his/her preferences and the stimulus conditions under which the object or activity is most preferred (e.g., What specific TV shows are his favorites? What does she do when she plays with a mirror? Does she prefer to do this alone or with another person?).

We would like to get some information on _____'s preferences for different item and activities.

1. Some individuals really enjoy looking at things such as a mirror, bright lights, shiny objects, spinning objects, TV, etc. What are the things you think _____ most likes to watch?

RESPONSE TO PROBE QUESTIONS:

Some individuals really enjoy different sounds such as listening to music, car sounds, whistles, beeps, sirens, clapping, people singing, etc. What are the things you think _____ most likes to listen to?

RESPONSE TO PROBE QUESTIONS:

3. Some individuals really enjoy different smells such as perfume, flowers, coffee, pine trees, etc. What are things you think _____ most likes to smell?

RESPONSE TO PROBE QUESTIONS:

4. Some individuals really enjoy certain foods or snacks such as ice cream, pizza, juice, soda, coffee, graham crackers, McDonald's hamburgers, etc. What are the things you think _____ most likes to eat?

RESPONSE TO PROBE QUESTIONS:
5. Some individuals really enjoy physical play or movement such as being tickled, wrestling, running, dancing, swinging, being pulled on a scooter board, etc. What activities like this do you think _____ most enjoys?

RESPONSE TO PROBE QUESTIONS:

6. Some individuals really enjoy touching things of different temperature, cold things like snow or an ice pack, or warm things like a hand warmer or a cup containing hot tea or coffee. What activities like this do you think most enjoys?

RESPONSE TO PROBE QUESTIONS:

7. Some individuals really enjoy feeling different sensations such as splashing water in a sink, a vibrator against the skin, or the feel of air blown on the face from a fan. What activities like this do you think _____ most enjoys?

RESPONSE TO PROBE QUESTIONS:

8. Some individuals really enjoy it when others give them attention such as a hug, a pat on the back, clapping, saying "Good job", etc. What forms of attention do you think _____ most enjoys?

RESPONSE TO PROBE QUESTIONS:

9. Some individuals really enjoy certain toys or objects such as puzzles, toy cars, balloons, comic books, flashlight, bubbles, etc. What are ____'s favorite toys or objects?

RESPONSE TO PROBE QUESTIONS:

10. What are some other items or activities that _____ really enjoys?

RESPONSE TO PROBE QUESTIONS:

After completion of the survey, select all the stimuli which could be presented or withdrawn contingent on target behaviors during a session or classroom activity (e.g., a toy could be presented or withdrawn, a walk in the park could not). Write down all of the specific information about each selected stimulus on a 3" x 5" index card (e.g., "Having a female adult read him the *Three Little Pigs* story."). Then have the parents (or caregiver) select the top 16 stimuli and rank order them using the cards. Then list the ranked stimuli below.



Appendix H: Social Validity Questionnaire

How important are	e the targeted sk	ills for your student?			
1 Not at all	2	3 Neutral	4	5 Very	
How easy would i	t be to implement	nt graduated guidance	in your classroo	om?	
1 Not at all	2	3 Neutral	4	5 Very	
How likely are yo	u to implement	graduated guidance in	your classroom	?	
1 Not at all	2	3 Neutral	4	5 Very	
How easy would	it be to impleme	nt MTLD in your clas	ssroom?		
1 Not at all	2	3 Neutral	4	5 Very	
How likely are yo	u to implement	MTLD in your classro	oom?		
1 Not at all	2	3 Neutral	4	5 Very	
Which prompting	procedure are ye	ou more likely to imp	lement in your c	lassroom?	
Graduated Guidance			MTLD		