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The Use of Demand Assessments: A Brief Review and Practical Guide

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Abstract

It is important for practitioners to first conduct an indirect demand assessment to identify appropriate stimuli to include during the direct demand assessment. Information obtained from an indirect demand assessment is useful not only for identifying which demands to evaluate during the direct assessment but also for selecting stimuli associated with each demand. Conducting an indirect demand assessment with caregivers provides practitioners the opportunity to identify whether specific demand stimuli are associated with more challenging behavior (e.g., writing with a pen vs. a pencil) and whether demand presentation may be an establishing operation for challenging behavior (e.g., presenting one math problem at a time vs. presenting an entire math worksheet). The purpose of this article is to review the current literature on demand assessment procedures and to provide practitioners with a practical guide for conducting demand assessments in clinical settings. We provide a summary of our findings along with a brief description of the procedures used for implementing the indirect and direct demand assessments. Further, we created a decision-making guide to help practitioners select which type of demand assessment to conduct with their clients.

Keywords demand assessment · decision-making guide · negatively reinforced · challenging behavior

Typically, children diagnosed with developmental disabilities engage in higher rates of challenging behavior as compared to their typically developing peers (Antonacci et al., 2008; Crocker et al., 2006; McClintock et al., 2003; Oliver et al., 2012; Poppes et al., 2010). Effective treatment of challenging behavior depends, in part, on the identification of the maintaining variables (i.e., function) of challenging behavior (Smith et al., 2012). Practitioners conduct functional assessment procedures to identify environmental variables that influence challenging behavior, such as antecedent variables that evoke challenging behavior and consequences that reinforce or maintain challenging behavior (Neef & Peterson, 2007; Smith et al., 2012). Identifying the function of challenging behavior prior to implementing an intervention results in a greater reduction in challenging behavior (Campbell, 2003; Heyvaert et al., 2014). One method for identifying the environmental events that maintain challenging behavior is to conduct a functional analysis (FA; Beavers et al., 2013; Hanley et al., 2003; Iwata et al., 1994; Smith et al., 2012).

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Practitioners conduct FAs to identify a functional relationship between the environment and the challenging behavior (Asmus et al., 2002; Beavers et al., 2013; Hanley et al., 2003; Iwata et al., 1994; Smith et al., 2012). However, it is common for practitioners to conduct descriptive assessments to infer those relations through observed correlations between environmental events and challenging behavior (i.e., direct assessments) or through indirect assessments (e.g., caregiver reports; Asmus et al., 2002; Smith et al., 2012).

Indirect assessments may involve the use of caregiver interviews to determine possible sources of reinforcement that maintain challenging behavior and to identify appropriate stimuli to include in the control and test conditions (Beavers et al., 2013; Hanley et al., 2003; Smith et al., 2012). For example, practitioners may conduct a structured caregiver interview, such as the Reinforcer Assessment for Individuals With Severe Disabilities (RAISD; Fisher et al., 1996) to identify preferred toys and activities prior to conducting a direct assessment. Following indirect assessments, practitioners often conduct direct assessments in the form of a preference assessment (e.g., paired-choice preference assessment; Fisher et al., 1992) to evaluate the relative preference of the toys and activities. However, prior to conducting the social-negative test condition (i.e., escape), it is less common for practitioners to first conduct a direct assessment to evaluate

the relative aversiveness of the stimuli. Practitioners often determine which stimuli to include in the social-negative test condition based on indirect methods alone (e.g., caregiver interview; Zangrillo et al., 2020). It is imperative that sufficiently evocative demands are included within escape sessions to reduce the likelihood of a false negative outcome (i.e., failing to determine that the challenging behavior is maintained by escape from demands when in fact it is maintained by escape from demands; Call et al., 2009, 2016; Roscoe et al., 2009; Zangrillo et al., 2020). Demand assessments are behavior assessments used to identify demands that are associated with challenging behavior (Call et al., 2009, 2016; Roscoe et al., 2009; Zangrillo et al., 2020; Zarcone et al., 1999). There are two types of demand assessments: indirect demand assessments and direct demand assessments. Indirect demand assessments are interview-informed assessments, whereas direct demand assessments are experimental analyses (Call et al., 2009, 2016; Roscoe et al., 2009; Zangrillo et al., 2020; Zarcone et al., 1999).

Practitioners may use the results of demand assessments to identify both low-aversive and high-aversive demands. Low-aversive demands are demands associated with little or no challenging behavior, and high-aversive demands are demands associated with higher amounts of challenging behavior (Call et al., 2009, 2016). Practitioners often include high-aversive demands in subsequent assessments and treatments of challenging behavior. Within the few studies that have assessed the utility of a demand assessment to inform the escape condition of an FA, the results indicated that practitioners will accurately identify negatively reinforced challenging behavior when demands that are associated with higher rates of challenging behavior are included in the escape condition (Call et al., 2009, 2016; Roscoe et al., 2009; Schmidt et al., 2014; Wiggins & Roscoe, 2020; Zangrillo et al., 2020). The purpose of this article is to review the current literature on demand assessment procedures and to provide practitioners with a practical guide for conducting demand assessments in clinical settings. We provide a summary of our findings along with a brief description of the procedures used for implementing the indirect and direct demand assessments (see Table 1). Further, we created a decision-making guide to help practitioners select which type of demand assessment to conduct with their clients (see Figure 1).

We conducted an electronic database search of the literature for relevant articles published in peer-reviewed journals. The databases included in our search were ERIC, Academic Search Complete, Education Research Complete, PsyArticles, PsycInfo, and Psychology and Behavioral Sciences Collection from EBSCO. Synonyms of FA ("behavior assessment," function, OR analysis), demand assessment ("demand evaluation" OR "demand assess*"), and escape from demands (escape, "negative reinforcement," OR "negatively reinforced") were used to identify articles for inclusion. Studies were included if researchers described the use of an observational data-based assessment to compare challenging behavior and compliance under different demand conditions (i.e., a demand assessment) for participants who engaged in hypothesized escape-maintained challenging behavior. Additionally, we only included studies that contained published demand assessment data.

Data related to participant characteristics were extracted from each of the studies: age, sex, diagnosis, and topography of challenging behavior. Data were also extracted related to demand assessment characteristics: method for selecting demands, primary dependent variable, demand assessment procedures, type of demand assessment, number of demands included, demand assessment duration, and consequence for challenging behavior. A second rater independently coded 100% of the included studies, with an average interrater reliability of 97%. All disagreements were resolved through discussion.

The search resulted in the identification of six studies that met the inclusion criteria. Across those six studies, 32 demand assessments were conducted (Call et al., 2009, 2016; Roscoe et al., 2009; Wiggins & Roscoe, 2020; Zangrillo et al., 2020; Zarcone et al., 1999). It is important to note that the utility of these demand assessment procedures had only been evaluated with 32 participants. However, we hypothesized that the demand assessment procedures used across the six studies would be useful for all clients whose challenging behavior is maintained by access to negative reinforcement. Among these participants, 65% were male ($n = 21$) and 34% were female ($n = 11$; see Table 1). The mean age was 11 years. The participants' ages ranged from 4 to 22 years. Thirty-one percent of participants had more than one diagnosis ($n = 10$). More than half of the participants were diagnosed with autism spectrum disorder (56%, $n = 22$). Seventy-one percent of participants engaged in multiple topographies of challenging behavior ($n = 23$), and the most common topography was aggression (75%, $n = 24$).

Indirect Demand Assessments

It is important for practitioners to first conduct an indirect demand assessment to identify appropriate stimuli to include during the direct demand assessment. Information obtained from an indirect demand assessment is useful not only for identifying which demands to evaluate during the direct assessment but also for selecting stimuli associated with each demand. Conducting an indirect demand assessment with caregivers provides practitioners the opportunity to identify whether specific demand stimuli are associated with more challenging behavior (e.g., writing with a pen vs. a pencil) and whether demand presentation may be an establishing operation (EO) for challenging

Table 1 Participant Characteristics

Study	Age	Gender	Diagnosis	Topography of challenging behavior
Call et al. (2009)	6	M	ASD	AGG, SIB, DIS
	14	F	Cerebral palsy, mental retardation	AGG, SIB, DIS
Call et al. (2016)	6	M	ASD	AGG, DIS, SIB
	8	M	ASD	AGG, DIS, SIB
	8	M	ASD	AGG, DIS, SIB
	9	M	ASD	AGG, DIS, SIB
	9	F	ASD	AGG, DIS
	10	M	ASD	AGG, DIS
	10	M	ASD	AGG, DIS
	11	M	ADHD, disruptive behavior disorder	AGG, DIS
	15	M	Global developmental delay	SIB, AGG
	15	F	PDD	AGG, DIS
	18	M	ASD	SIB, AGG
	21	F	ASD	AGG, DIS
Roscoe et al. (2009)	10	F	Smith-Magenis syndrome	SIB
	10	F	ASD	AGG
	14	M	ASD	AGG
	22	M	Mental retardation	AGG
Wiggins & Roscoe (2020)	4	M	ASD	DIS
	5	F	ASD	DIS
	13	M	ASD	AGG
	14	M	ASD	AGG
	21	F	ASD	DIS
Zangrillo et al. (2020)	4	M	ASD	AGG, SIB
	7	M	ASD, ADHD	SIB, AGG
	11	M	ASD, ADHD, OCD, intellectual disability	AGG, SIB
	14	F	ASD, intellectual disability	AGG
Zarcone et al. (1999)	4	M	Mental retardation	AGG, SIB, DIS
	8	F	Down syndrome	AGG, DIS
	10	M	PDD, mental retardation	AGG, DIS
	14	M	ASD, mental retardation	SIB, AGG, DIS
	14	F	PDD, ADHD, ODD, seizure disorder, mental retardation	AGG, SIB, DIS

Note. M = male; F = female; ASD = autism spectrum disorder; ADHD = attention-deficit/hyperactivity disorder; PDD = pervasive developmental disorder; OCD = obsessive-compulsive disorder; AGG = aggression; SIB = self-injurious behavior; DIS = disruptive behavior; ODD = oppositional defiant disorder.
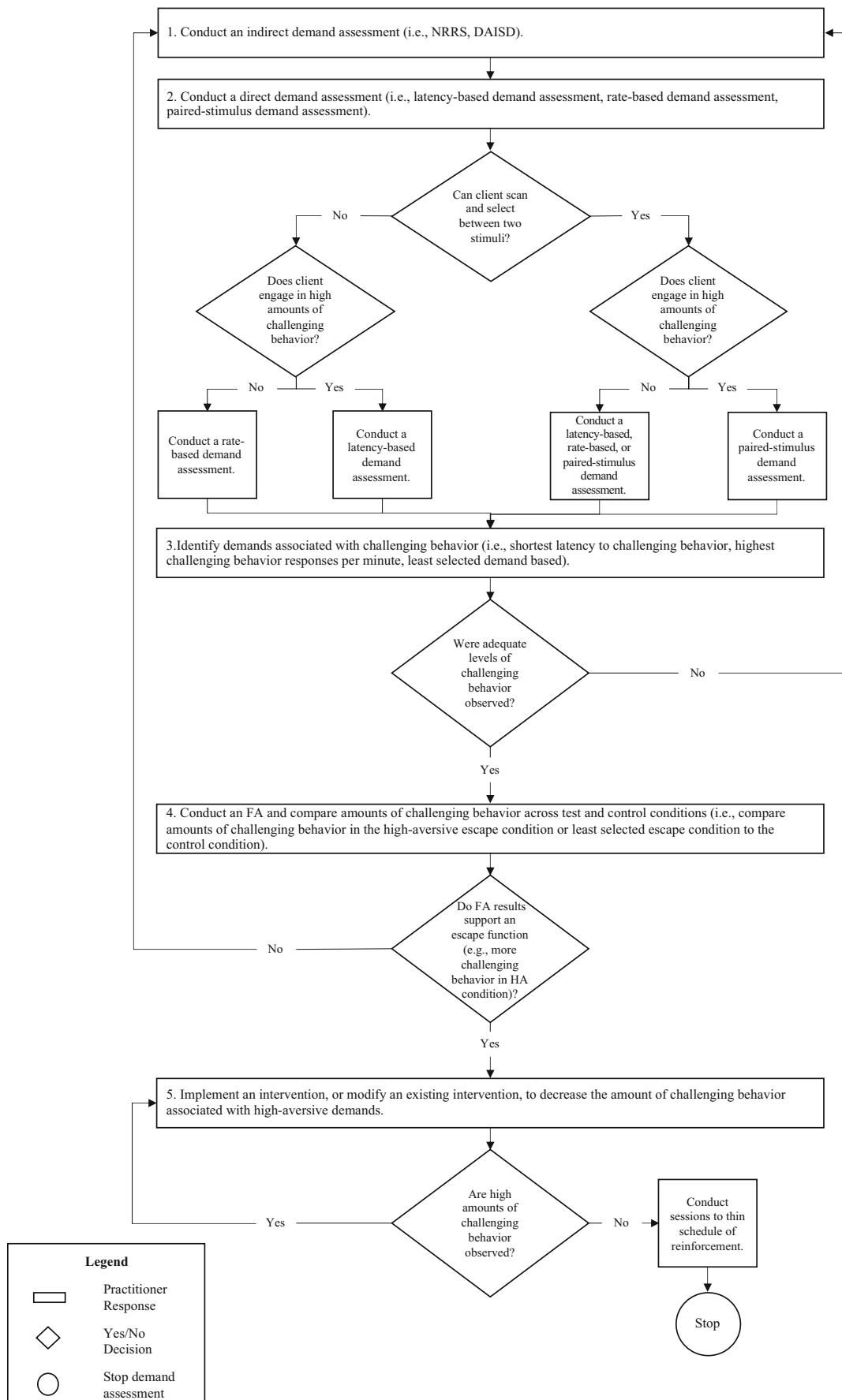
behavior (e.g., presenting one math problem at a time vs. presenting an entire math worksheet).

Researchers across five of the studies first conducted an indirect assessment with the participants' caregivers before conducting an experimental, or direct, demand assessment (Call et al., 2009, 2016; Roscoe et al., 2009; Wiggins & Roscoe, 2020; Zangrillo et al., 2020; Zarcone et al., 1999). The most common indirect assessment used was a structured caregiver interview (e.g., Negative Reinforcement Rating Scale [NRRS], Demand Assessment for Individuals With Severe Disabilities [DAISD]; Call et al., 2009, 2016; Wiggins & Roscoe, 2020; Zangrillo et al., 2020; Zarcone et al., 1999). The researchers in the remaining study reviewed

the participants' permanent school records (Roscoe et al., 2009) as a means to determine appropriate demands (see Table 2).

Negative Reinforcement Rating Scale

The most common indirect assessment employed across the studies was the NRRS (Call et al., 2009, 2016; Wiggins & Roscoe, 2020; Zarcone et al., 1999). Although the NRRS was not developed specifically for the purpose of identifying demands to include in the FA escape condition, three studies have since used the NRRS for that purpose (Call et al., 2009, 2016; Wiggins &

1. Conduct an indirect demand assessment (i.e., NRRS, DAISD).

2. Conduct a direct demand assessment (i.e., latency-based demand assessment, rate-based demand assessment, paired-stimulus demand assessment).

Can client scan and select between two stimuli?

No / Yes

Does client engage in high amounts of challenging behavior?

No / Yes

Does client engage in high amounts of challenging behavior?

No / Yes

Conduct a rate-based demand assessment.

Conduct a latency-based demand assessment.

Conduct a latency-based, rate-based, or paired-stimulus demand assessment.

Conduct a paired-stimulus demand assessment.

3. Identify demands associated with challenging behavior (i.e., shortest latency to challenging behavior, highest challenging behavior responses per minute, least selected demand based).

Were adequate levels of challenging behavior observed?

No

Yes

4. Conduct an FA and compare amounts of challenging behavior across test and control conditions (i.e., compare amounts of challenging behavior in the high-aversive escape condition or least selected escape condition to the control condition).

Do FA results support an escape function (e.g., more challenging behavior in HA condition)?

No

Yes

5. Implement an intervention, or modify an existing intervention, to decrease the amount of challenging behavior associated with high-aversive demands.

Are high amounts of challenging behavior observed?

Yes

No

Conduct sessions to thin schedule of reinforcement.

Stop

Legend

Practitioner Response

Yes/No Decision

Stop demand assessment

◄ **Figure 1** Demand Assessment Decision-Making Guide. *Note.* Demand assessment decision guide for conducting either a latency-based demand assessment, rate-based demand assessment, or paired-stimulus demand assessment. NRRS = Negative Reinforcement Rating Scale; DAISD = Demand Assessment for Individuals With Severe Disabilities; HA = high aversive; FA = functional analysis.

Roscoe, 2020). The NRRS includes 14 questions designed to identify different demand categories (e.g., academic tasks, self-care tasks, household chores) that may function as motivating operations for escape-maintained challenging behavior (Call et al., 2009, 2016; Wiggins & Roscoe, 2020). When completing the NRRS, practitioners prompt caregivers to provide specific examples of demands that likely evoke challenging behavior within each category. For example, under the category of household chores, caregivers might report that challenging behavior often occurs when they ask their child to put the dishes in the sink. Following the identification of demands, caregivers rate each demand using a 4-point Likert-type scale (Likert, 1932), in which a rating of 1 is *does not bother participant at all* and 4 is *always bothers participant*. Demands that are rated 3 or 4 are hypothesized to be highly aversive, and demands that are rated 1 or 2 are hypothesized to be less aversive.

One study has evaluated the convergent validity of the NRRS with direct demand assessment outcomes (Wiggins & Roscoe, 2020). Across the five participants, demands that ranked as high aversive on the NRRS corresponded with demands identified as high aversive in the demand assessment for four participants (Wiggins & Roscoe, 2020). Similarly, across the five participants, demands that ranked as low aversive on the NRRS corresponded with demands identified as low aversive in the demand assessment for two participants (Wiggins & Roscoe, 2020). A limitation of the NRRS is the possibility for inconsistent demands to be identified across caregivers. That is, when reporting on one child, two caregivers may list different examples of demands likely to evoke challenging behavior within each category. For example, both caregivers may rank the category of academic tasks as high aversive but might provide different examples of specific academic tasks. One caregiver may provide the example of sorting colors, whereas the other caregiver may provide the example of tracing letters. To mitigate this limitation, practitioners should consider asking caregivers to list multiple examples within each category. A strength of the NRRS is its emphasis on identifying demand categories and asking caregivers to identify specific demands. This may help practitioners identify specific demands associated with challenging behavior within each demand category. A version of the NRRS can be found on the publisher's website (see Wiggins & Roscoe, 2020).

Table 2 Demand Assessment Characteristics

Study	Method for identifying demands	Type of demand assessment	Number of demands evaluated	Number of times each demand was evaluated	Primary dependent variable	Demand assessment duration — Rate based	Latency based	PSDA	Consequence for challenging behavior
Call et al. (2009)	NRRS	Latency based	10	3	Mean latency to first occurrence of challenging behavior		M = 218 min 35 s		Current session ended; subsequent session began immediately.
Call et al. (2016)	NRRS	Latency based	10	3	Mean latency to first occurrence of challenging behavior		M = 149 min 32 s		Current session ended; subsequent session began immediately.
Roscoe et al. (2009)	School records	Rate based	12	2	Response per minute of challenging behavior	120 min			Demand materials were removed and a 30-s break was provided.
Wiggins & Roscoe (2020)	NRRS	Rate based	6	2	Response per minute of challenging behavior	120 min			Demand materials were removed and a 30-s break was provided.
Zangrillo et al. (2020)	DAISD	PSDA	Range 5–8	Range 2–3	Percentage of trials demand was selected			M = 35 min 3 s	Demand materials were removed and a 20-s break was provided.
Zarcone et al. (1999)	NRRS	Rate based	6	1	Mean latency to first occurrence of challenging behavior	60 min			Demand materials were removed and a 30-s break was provided.

Note. NRRS = Negative Reinforcement Rating Scale; DAISD = Demand Assessment for Individuals With Severe Disabilities; PSDA = paired-stimulus demand assessment.

Demand Assessment for Individuals With Severe Disabilities

The other structured interview used within these studies was the DAISD (Zangrillo et al., 2020). The DAISD was developed by Zangrillo et al. (2020) to identify evocative demands with the specific purpose of including these demands in an FA. The DAISD includes 10 questions designed to identify demands within specific categories (e.g., academic, self-care, household chores, transitions) that may be associated with challenging behavior (Zangrillo et al., 2020). Similar to the RAISD, the DAISD includes prompts to help caregivers generate a list of potential negative reinforcers (Fisher et al., 1992; Green et al., 1988; Pace et al., 1985). When administering the DAISD, practitioners ask caregivers additional questions to gather information on the stimulus conditions in which the object or activity is most aversive. For example, if caregivers identified puzzles as an academic demand that their child has difficulty with, then practitioners may ask questions like "What types of puzzles is your child completing?" "How many pieces are in each puzzle?" and "Is someone else with your child when they are completing the puzzle?"

A limitation of the DAISD is that the convergent validity between what caregivers report as high-aversive and low-aversive demands during the DAISD and the demands identified as high aversive and low aversive during the direct demand assessment has not been evaluated. A strength of the DAISD is its emphasis on differentiating between demands that are and are not in the individual's repertoire. Demands that are in the participant's repertoire may suggest the need for a different intervention than demands that are not in the participant's repertoire. For example, it may be appropriate to teach a child to request help with demand completion for demands that are not currently in their repertoire. However, for demands already in their repertoire, it may be less appropriate to teach a child to request help. A copy of the DAISD can be found on the publisher's website (see Zangrillo et al., 2020).

Direct Demand Assessments

To increase the likelihood of identifying relevant EOs for escape-maintained challenging behavior, practitioners should conduct an empirical test, such as a direct demand assessment (Wiggins & Roscoe, 2020). Researchers used the information gathered from these indirect assessments to conduct the direct demand assessments. The purpose of a demand assessment is to help practitioners and researchers systematically identify a hierarchy of demands that may be associated with varying amounts of challenging behavior. Procedures for implementing the direct assessments differed across the studies. We discuss the three primary variations of demand

assessments: a rate-based demand assessment, a latency-based demand assessment, and a paired-stimulus demand assessment (PSDA). Across the six studies, researchers conducted a rate-based demand assessment in three studies (Roscoe et al., 2009; Wiggins & Roscoe, 2020; Zarcone et al., 1999), a latency-based demand assessment in two studies (Call et al., 2009, 2016), and a PSDA in one study (Zangrillo et al., 2020).

Rate-Based Demand Assessment

The most frequently conducted demand assessment was the rate-based demand assessment (50%, $n = 3$). During this demand assessment, researchers presented one type of demand (e.g., match to sample) per session (Roscoe et al., 2009; Wiggins et al., 2020; Zarcone et al., 1999). For two studies, researchers reported the average challenging behavior responses per minute by presenting each demand across two sessions and recording the frequency of challenging behavior each time (Roscoe et al., 2009; Wiggins & Roscoe, 2020; Zarcone et al., 1999). For one study, contingent on a target escape response (i.e., clapping hands), demand materials were removed and participants were provided with a 30-s break from demand completion (Zarcone et al., 1999). Across the studies, the average number of different demands evaluated was eight demands (range 6–12 demands; Roscoe et al., 2009; Wiggins & Roscoe, 2020; Zarcone et al., 1999). Contingent on the occurrence of challenging behavior, demand materials were removed, and participants were provided with a 30-s break from demands (Roscoe et al., 2009; Wiggins & Roscoe, 2020; Zarcone et al., 1999). If no challenging behavior occurred, the researchers continued to present demands, employing a least-to-most prompting procedure with a 5-s time delay, until the session ended. Across these studies, the rate-based demand assessment took 100 min to conduct on average (range 60–20 min). In addition, the researchers identified both high-aversive (i.e., low-probability) and low-aversive (i.e., high-probability) demands. Within these studies, high-aversive demands were demands associated with the most target responses per minute or lowest percentage of compliance. Further, low-aversive demands were demands associated with the fewest target responses per minute or with the highest percentage of compliance.

A limitation of the rate-based demand assessment is that a hierarchy of demand aversiveness may not be identified due to similar rates of challenging behavior across all demands (Zangrillo et al., 2020). Moreover, during rate-based demand assessments, participants contact the contingencies surrounding challenging behavior more often compared to the latency-based demand assessment and PSDA. Repeated demand presentation may increase the aversive properties and the EO for escape (Smith et al., 1995; Zangrillo et al., 2020). A strength of the rate-based demand assessment is that the procedures are similar to those of a traditional FA (Iwata et al., 1994). This

increases the probability that practitioners will implement a rate-based demand assessment with fidelity (DiGennaro-Reed et al., 2005, 2007, 2010; McIntyre et al., 2007; Wilder et al., 2006). Prior research has demonstrated that implementation fidelity is positively correlated with treatment outcomes (McIntyre et al., 2007). As compared to a latency-based demand assessment, a rate-based demand assessment is more likely to result in the accurate identification of evocative demands after only one series. This is true because when conducting a rate-based demand assessment, practitioners will observe multiple opportunities for demand completion and challenging behavior during each series. This is important for practitioners who have limited time to conduct demand assessment sessions.

Latency-Based Demand Assessment

The next most frequently conducted demand assessment methodology was the latency-based demand assessment (33%, $n = 2$). Similar to the rate-based demand assessment, researchers presented one type of demand (e.g., match to sample) per session and recorded the latency to the first instance of challenging behavior (Call et al., 2009, 2016). Latency was defined as the amount of time between the presentation of the initial demand (i.e., the start of the session) and the first instance of challenging behavior. Researchers reported an average latency to challenging behavior by presenting each demand three separate times and recording the latency each time (Call et al., 2009, 2016). Across the studies, 10 demands were evaluated during the direct demand assessment (Call et al., 2009, 2016). Contingent on the occurrence of challenging behavior, demand materials were removed, and the session ended (Call et al., 2009, 2016). If no challenging behavior occurred, researchers continued to present demands throughout the 10-min session (Call et al., 2009, 2016). The average amount of time researchers spent conducting the latency-based demand assessment was 184 min 4 s (range 68 min 0 s to 300 min 1 s). The use of a demand assessment resulted in the researchers identifying both high-aversive demands (i.e., demands with the shortest mean latency to challenging behavior) and low-aversive demands (i.e., demands with the longest mean latency to challenging behavior; Call et al., 2009, 2016).

A limitation of latency-based demand assessments is the amount of time they take to conduct. Compared to the rate-based demand assessment and PSDA, researchers spent the most time conducting a latency-based demand assessment (Zangrillo et al., 2020). A second limitation of latency-based demand assessments is that a hierarchy of demand aversiveness may not be identified due to the absence, or immediate onset, of challenging behavior across all demand presentations (Zangrillo et al., 2020). A strength of latency-based demand assessments is that participants contact the contingencies

surrounding challenging behavior less often than during a rate-based demand assessment. Further, when conducting latency-based demand assessments, practitioners are less reliant on multiple occurrences of challenging behavior. This is true of the latency-based demand assessment because the session ends after the first instance of challenging behavior. Researchers suggest conducting a latency-based demand assessment with participants who engage in frequent or severe challenging behavior (Zangrillo et al., 2020).

Paired-Stimulus Demand Assessment

We identified one study that conducted a PSDA (16%, $n = 1$; Zangrillo et al., 2020). Similar to a paired-stimulus preference assessment, in a PSDA, researchers presented demands in randomized pairs and recorded which demand was selected (Piazza et al., 1996; Zangrillo et al., 2020). Researchers reported the percentage of trials in which each demand was selected. Researchers completed one series of the PSDA when each demand had been paired with every other demand. The number of series completed varied across participants, and researchers continued conducting series until the standard deviation for each participant was no more than 50.0% of the mean, or until three series were conducted (i.e., three pairings of each demand presented with every other demand). Within the study, the average number of demands evaluated across participants was 6 demands (range 5–8 demands; Zangrillo et al., 2020). Contingent on demand selection, researchers removed the other demand and conducted one trial of the selected demand. The researchers used a three-step least-to-most prompting hierarchy for promoting demand completion. Contingent on challenging behavior, demand materials were removed, and participants received a 20-s break from the PSDA. The average amount of time researchers spent conducting the PSDA was 35 min 3 s (range 22 min 21 s to 62 min 12 s). The use of a PSDA resulted in the identification of a demand hierarchy based on participant selection. The use of the PSDA resulted in the researchers identifying both high-aversive demands (i.e., demands selected less frequently) and low-aversive demands (i.e., demands selected more frequently; Zangrillo et al., 2020). The less preferred demands were hypothesized to be more aversive because the individual consistently avoided contacting the demand.

A limitation of the PSDA is that participants must be able to scan and select between two stimuli. Therefore, the PSDA is not an appropriate demand assessment procedure for all participants. Practitioners must first determine whether their client has the necessary prerequisite skills before conducting a PSDA. A strength of the PSDA is that participants do not have to engage in challenging behavior for practitioners to identify a hierarchy of demands that may be associated with varying amounts of challenging behavior. Moreover, a PSDA may decrease exposure to the repeated presentation of demands,

increasing the likelihood of true positive findings in an FA (Zangrillo et al., 2020). These findings support the use of a PSDA for determining demand preference, which further suggests that these procedures may be an effective way to systematically determine demand aversiveness relative to other demands.

Demand Assessment Decision-Making Guide

The following decision-making guide outlines considerations practitioners may make when determining which type of demand assessment best meets the needs of their client (see Figure 1). The guide is based on our review of the demand assessment literature and specific suggestions provided by the authors of these studies. The purpose of this decision-making guide is to serve as a visual prompt for practitioners to use when determining which demand assessment methodology to implement.

When using this decision-making guide, at least four assumptions should be made. First, consent should be obtained from caregivers prior to conducting any assessments with the client. Second, practitioners should have anecdotal data suggesting the need for an FA. Third, practitioners should have evidence suggesting an escape function for challenging behavior. This is an important consideration because "the behavior analyst has a responsibility to operate in the best interest of the client" (Behavior Analyst Certification Board [BACB], 2014, Section 2.0). Last, an adequately trained behavior analyst should be present during the FA. If the practitioner is not adequately trained, they should seek supervision or make an appropriate referral. This is important because behavior analysts only accept clients "whose requested services are commensurate with the behavior analysts' education, training, experience, available resources, and organizational policies" (BACB, 2014, Section 2.01).

Similar to the guide create by Danforth (2016), the legend in the lower left corner of the flowchart describes the roles of each geometric figure. Rectangles indicate practitioner responses, and diamonds indicate a yes/no decision. A question mark follows the phrase in each diamond, from which two lines emerge. One line indicates that, yes, the condition described in the diamond was met, and the second line indicates that, no, the condition was not met. Circles indicate that the demand assessment is complete.

Conduct an Indirect Demand Assessment

The first step in this decision-making guide is the identification of which type of indirect demand assessment to conduct. Within the demand assessment literature, an indirect demand assessment can be generally defined as a structured caregiver interview. Both the NRRS and the DAISD are examples of structured caregiver interviews that are used to identify demand categories that caregivers report as being effective negative reinforcers (Zangrillo et al., 2020; Zarcone et al., 1999). Four studies have assessed the utility of the NRRS to inform practitioners as to which demands to evaluate during a direct demand assessment (Call et al., 2009, 2016; Wiggins & Roscoe, 2020; Zarcone et al., 1999). Results from these studies demonstrated that behavior analysts accurately identified negatively reinforced challenging behavior when demands that were associated with higher rates of challenging behavior were included in the escape condition of an FA (Call et al., 2009, 2016; Roscoe et al., 2009; Wiggins & Roscoe, 2020; Zangrillo et al., 2020). The DAISD is unique because practitioners are prompted to ask additional follow-up questions to obtain more specific information about each demand (e.g., "Is academic work more problematic when your child is alone or with another person?"). Following the indirect demand assessment, practitioners should have identified potential evocative demands to evaluate during the direct demand assessment.

Conduct a Direct Demand Assessment

Following the indirect demand assessment, practitioners should consider which of the three direct demand assessment variations to implement with their client (i.e., rate-based demand assessment, latency-based demand assessment, or PSDA). What follows are a few considerations practitioners may find useful when determining which direct demand assessment to conduct. The first consideration practitioners should make is whether their client can scan and select between stimuli. This is important because scanning and selecting between stimuli are prerequisite skills for the PSDA. If practitioners are providing services to a client who is not able to scan and select between stimuli, then we recommend practitioners conduct either a latency-based demand assessment or a rate-based demand assessment. However, if practitioners determine that their client can scan and select between two stimuli, then it is recommended that practitioners consider whether the amount of challenging behavior during the demand assessment is a concern. If practitioners are providing services to a client who does not engage in high rates of challenging behavior and is able to scan and select between stimuli, then we recommend that practitioners consider conducting any one of the three demand assessment variations (i.e., latency-based demand assessment, rate-based demand assessment, or PSDA). However, if clients do engage in high rates of or high-intensity challenging behavior, we recommend that practitioners conduct either a latency-based demand assessment or a PSDA.

Identify Demands Associated With Challenging Behavior

After conducting a direct demand assessment, it is important for practitioners to graph and visually analyze data obtained during the demand assessment to compare amounts of challenging behavior across demands. When conducting the latency-based demand assessment or the rate-based demand assessment, practitioners should identify whether demands were associated with low latencies to challenging behavior (e.g., less than 150 s) or frequent challenging behavior responses per minute. If demands were not associated with high rates of challenging behavior, then we recommend that practitioners conduct another indirect demand assessment to identify different demands. However, if practitioners did identify demands that are associated with high rates of challenging behavior, we recommend that practitioners select the high-aversive demand(s) to include in the FA. The high-aversive demand is either the demand associated with the shortest latency to challenging behavior (latency based), the most challenging behavior responses per minute (rate based), or the least selected demand (PSDA).

Conduct an FA and Compare Amounts of Challenging Behavior Across Test and Control Conditions

Given that the BACB Code requires practitioners to use assessment results when developing a behavior-reduction program, the next step in the decision-making guide is for practitioners to conduct an FA. It is important for practitioners to conduct an FA to demonstrate that their client engages in escape-maintained challenging behavior and to validate the demand assessment results. During the FA, practitioners should include the high-aversive demand(s) identified during the demand assessment within the escape condition. This will allow practitioners to compare amounts of challenging behavior across the high-aversive demand condition and the control condition to determine whether the amount of challenging behavior observed suggests the need for an intervention. Prior research has demonstrated that structured demand presentation (e.g., least-to-most prompting hierarchy procedure) and reinforcement may be effective at decreasing challenging behavior. If practitioners observe low amounts of challenging behavior within both the test and control conditions, practitioners should decide whether the level, trend, and variability of challenging behavior still suggest the need for an intervention. If practitioners determine that the amount of challenging behavior does not suggest the need for an intervention, we recommend that practitioners stop using the described decision-making guide and target other socially significant goals with their client. However, if practitioners observe socially significant amounts of challenging behavior during the high-aversive demand condition compared to the control condition, we recommend that practitioners implement a function-based intervention that targets the reduction of escape-maintained challenging behavior associated with high-aversive demands (Campbell, 2003; Heyvaert et al., 2014).

Implement an Intervention, or Modify an Existing Intervention, to Decrease the Amount of Challenging Behavior Associated With High-Aversive Demands

The completion of an FA will provide an opportunity for practitioners to appropriately implement a function-based intervention (e.g., functional communication training; Campbell, 2003; Heyvaert et al., 2014). Using the information obtained from the FA, practitioners will be in a position to adequately assess whether the intervention is effective for reducing challenging behavior associated with high-aversive demands. Practitioners are ethically obligated to establish an objective criterion for the discontinuation of behavior change programs (BACB, 2014, Section 4.11). Therefore, it is important for practitioners to engage in frequent visual analyses of the graphed data in order to make data-based decisions regarding their clients' treatment. By conducting visual analyses, practitioners are able to make modifications to an existing intervention or are able to determine when a goal has been mastered.

Discussion

The purpose of the current article was to review the current literature on demand assessment procedures and to provide practitioners with a practical guide for conducting demand assessments in the clinical setting. The brief literature review resulted in the identification of six studies that described the use of an observational data-based assessment for comparing challenging behavior and compliance under different demand conditions (i.e., a demand assessment). Among those six studies, 32 demand assessments were conducted (Call et al., 2009, 2016; Roscoe et al., 2009; Wiggins et al., 2020; Zangrillo et al., 2020; Zarcone et al., 1999). The results of this review demonstrated that the use of demand assessments has been evaluated with participants who are between the ages of 4 and 22 years. To our knowledge, prior demand assessment research has not evaluated the use of an indirect FA to identify possible demands for inclusion in FA test conditions. Across the six studies identified in our literature review, the two types of indirect assessments used to identify demands for inclusion in the direct demand assessment were the NRRS and the DAISD. However, it may be possible for practitioners to use similar indirect assessments to gather data to inform the design of FA conditions, such as the Functional Analysis Interview (O'Neill et al., 1997) or the Interview-Informed

Synthesized Contingency Analysis (Hanley et al., 2014). Future research should evaluate whether a separate indirect assessment is needed to identify demands for inclusion in direct demand assessments and FA test conditions. Although the utility of the reviewed demand assessment procedures has only been evaluated across six studies, we created this guide in the hope that it will inspire future research in the area of demand assessments.

The aforementioned decision-making guide represents one interpretation of decisions that practitioners make when conducting demand assessments to inform the subsequent assessment and treatment of challenging behavior. The decision-making guide provides an antecedent strategy to increase the likelihood that practitioners will observe differentiation across FA conditions (Brodhead, 2015). Practitioners may find this guide useful for conducting demand assessments to increase the likelihood of accurate FA results for clients who engage in escape-maintained challenging behavior.

Some considerations practitioners should make prior to conducting a demand assessment are worth noting. Though this decision-making guide provides practitioners with a systematic framework for conducting demand assessments, it is not meant to be used with every client who engages in challenging behavior. That is, practitioners should have anecdotal evidence suggesting an escape function for challenging behavior prior to conducting a demand assessment. Furthermore, the use of this decision-making guide has not been systematically evaluated across practitioners; therefore, it is unclear whether the use of this guide will improve the efficacy of treatment. Deciding whether to conduct a demand assessment is one decision practitioners will make when developing a behavior-reduction program. Consequently, it is not clear whether the use of this decision-making guide will have a noticeably positive impact on client outcomes. Future research should evaluate the potential effectiveness of this demand assessment decision-making guide.

Given the limited number of studies that have evaluated the efficacy of demand assessments to inform FA test conditions, future demand assessment research is warranted. Conducting indirect and direct demand assessments may enhance the identification of relevant EOs, facilitating the identification of an escape function in a subsequent FA (Call et al., 2009, 2016; Roscoe et al., 2009; Wiggins et al., 2020; Zangrillo et al., 2020). Future research should continue to evaluate the reliability and validity of indirect demand assessment methods (i.e., NRRS, DAISD) to inform direct demand assessments (i.e., rate-based demand assessment, latency-based demand assessment, PSDA). Future research may also consider evaluating the number of demands included in the direct demand assessment. Our results indicate that the average number of demands evaluated during direct demand assessments were 8 demands (range 5–12 demands). It is important to evaluate whether indirect demand assessments (i.e., NRRS, DAISD) yield a

sufficient number of demands across caregivers to adequately inform direct assessment measures (Zangrillo et al., 2020). Moreover, the PSDA seems like a promising method for conducting direct demand assessments; however, only one study has evaluated the use of these procedures. Future research should continue to evaluate the use of the PSDA to identify both high-aversive and low-aversive demands for inclusion in FA test conditions. To our knowledge, researchers have not attempted to compare indirect and direct demand assessment procedures. It may be of interest for future research to attempt to directly compare the NRRS to the DAISD. Further, future research may consider directly comparing the PSDA to rate-based and latency-based demand assessments.

The purpose of this article was to review the current literature on demand assessment procedures and to provide practitioners with a practical guide for conducting demand assessments in clinical settings. In practice, this decision-making guide could be adapted to meet the needs of the individual practitioner, a group of practitioners, or an agency. This guide could be useful for practitioners who do not currently conduct demand assessments prior to FAs. It is our hope that this guide will help narrow the research-to-practice gap and offer a framework that emphasizes the importance of conducting either latency-based demand assessments, rate-based demand assessments, or PSDAs to inform the escape condition of an FA and treatment evaluation.

Availability of data and material Not applicable.

Declarations

Conflicts of interest The authors declare that they have no conflicts of interest.

Ethical approval This manuscript does not contain any studies with human participants performed by the authors.

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