An Evaluation of the Utility of Two Demand Assessments in Identifying Negative Reinforcers

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Abstract

The purposes of this study were to evaluate the utility of an indirect assessment for informing subsequent demand assessments, compare the reliability within and across two demand assessments, and assess their validity during a subsequent functional analysis. Two individuals with an autism spectrum disorder participated. Results obtained during the indirect assessment did not correspond with those obtained during the demand assessments. For one participant, the indirect assessment indicated there were several demands which were correlated with problem behavior; however, no problem behavior was observed in either demand assessment. For the second participant, the indirect assessment indicated clearly high- and low-preference tasks and the demand assessments produced opposite findings. The implication of the results for informing function analysis and treatment of problem behavior will be discussed.
An Evaluation of the Utility of Two Demand Assessments in Identifying Negative Reinforcers

Negative reinforcement, the removal, postponement, or termination of an aversive stimulus or aversive stimulation contingent upon the occurrence of a target behavior, results in a future increase in the probability of the response (Cooper, Heron, & Heward, 2007). Problem behavior exhibited by individuals with intellectual disabilities (ID) is often maintained by negative reinforcement. In a large-scale analysis of 152 individuals exhibiting self-injury, Iwata et al. (1994) found that self-injury was maintained by negative reinforcement in 38.1% of the cases. Hanley, Iwata, and McCord (2003) conducted a review of the functional analysis (FA) literature and found that 32.4% of 536 individuals exhibited problem behavior maintained by social negative reinforcement. In both the Iwata et al. and Hanley et al. studies, negative reinforcement was the most common maintaining variable for several topographies of problem behavior.

Once the results of an FA indicate that a problem behavior is maintained by negative reinforcement, appropriate treatment involving antecedent and consequent event manipulations can be developed. Antecedent event manipulations often involve altering motivating operations. Specifically, by manipulating antecedent variables that may reduce the aversive aspect of the antecedent, the reinforcing potency of escape from that aversive event can be reduced. An example of an antecedent event manipulation that involves altering motivating operations is noncontingent reinforcement (NCR). During NCR, the maintaining reinforcer is delivered on a fixed-time schedule, independent of responding. Ingvarsson, Kahng, and Hausman, (2008) evaluated NCR for a participant’s escape-maintained problem behavior. Specifically, the therapist delivered an edible prior to demand presentation. Edibles were delivered before demand presentations in order to avoid accidentally reinforcing compliance with demands. This
intervention resulted in a decrease in problem behavior and an increase in compliance with requests. In addition, results maintained when the schedule of reinforcement was thinned. These findings indicated that reinforcers other than those maintaining problem behavior can be used during NCR to effectively reduce problem behavior.

Vollmer, Marcus, and Ringdahl (1995) evaluated NCR using escape as the reinforcer as an intervention for treating participants’ escape-maintained problem behavior. As a result of this intervention, decreases in problem behavior and increases in compliance were observed. O’Callaghan, Allen, Powell, and Salama (2006) evaluated NCR escape as an intervention for treating typically developing children’s problem behavior while having dental work performed. The authors found that this intervention was effective in reducing problem behavior. Vollmer et al. and O’Callaghan et al. did not compare the effects of NCR escape to NCR edibles.

In addition to antecedent-based interventions, several consequence-based interventions have been found effective for treating escape-maintained problem behavior. One common consequent-based treatment component is escape extinction, the continued presentation of demands following problem behavior. Several studies have demonstrated the positive effects of using escape extinction (e.g., Iwata, Pace, Cowdery, & Miltenberger, 1994). Although escape extinction has been found effective for reducing problem behavior in a variety of studies (e.g., Zarcone, Iwata, Hughes, & Vollmer, 1993), there are some limitations in using extinction. For individuals who have very severe forms of problem behavior (self injury or aggression), extinction may not be a viable option or may not be able to be implemented with integrity.

An alternative treatment component that has been evaluated is differential reinforcement of an alternative appropriate (DRA) response. DRA, in this case, involves delivering the maintaining reinforcer, or a break from work, contingent upon an appropriate alternative
response, such as requesting a break. Unlike NCR, DRA involves the delivery of the maintaining reinforcer contingent on an appropriate communication request or compliance. Carr, Newsom, and Binkoff (1980) evaluated DRA (edibles) for compliance without extinction for one participant who exhibited escape maintained problem behavior. As a result of this intervention, problem behavior was reduced and compliance increased. One participant was exposed to extinction conditions because the participant would not eat edibles and did not readily engage with leisure items. These results indicated that extinction was an extremely effective treatment for this participant, reducing aggression to zero levels even when stimuli signaling demand presentation were removed. Piazza, Patel, Gulotta, Sevin, and Layer (2003) evaluated differential reinforcement alone for treating food refusal and found that differential reinforcement alone was not sufficient for reducing food refusal. When DRA was combined with extinction, the participants’ food refusal was significantly reduced. These studies indicate that DRA may be a useful treatment for escape maintained problem behavior, however, it may need to be used in conjunction with other treatment components for some individuals.

In addition to positive reinforcers, negative reinforcers can also be used during DRA interventions. For example, Carr and colleagues (1980) demonstrated with their second participant that the termination of demands upon an alternative appropriate response led to a reduction in problem behavior. Steege and colleagues (1990) demonstrated the utility of DRA for appropriate requests using negative reinforcement for individuals with escape- maintained problem behavior. The authors trained individuals with developmental disabilities to manipulate a microswitch during grooming tasks to request termination of the task. Significant reductions in escape maintained behavior were seen in conjunction with increases in compliance and functional responses. The results of these two studies suggest that the maintaining reinforcer for
problem behavior (i.e., escape) can be effectively used during DRA interventions for treating escape-maintained problem behavior. Carr et al. demonstrated the effectiveness of negative reinforcement for appropriate behavior even when problem behavior was not placed on extinction.

Several studies have compared DRA (escape) versus DRA (tangible or edible) for compliance without extinction. For example, Piazza, Fisher, Hanley, Remick, Contrucci and Aitken (1997) evaluated the effects of DRA (escape + tangibles + attention) for compliance with and without extinction on compliance and problem behavior. When extinction was in effect, problem behavior did not result in a break, whereas when extinction was not in effect, problem behavior did result in a break. Similar to the results found by Piazza, Patel, Gulotta, Sevin, and Layer (2003), the results of the current study indicated that DRA was effective in reducing escape-maintained problem behavior. For two of the participants, positive reinforcement for compliance alone was successful in reducing problem behavior and increasing compliance. For a third participant, positive reinforcement in conjunction with an extinction component were necessary to achieve decreases in problem behavior. However, for all participants, positive reinforcement in two forms (tangibles and attention) plus negative reinforcement for compliance plus extinction were most effective once schedule values were thinned.

Lalli, Vollmer, Progar, Wright, Borrero, Daniel, Barthold, Tocco, and May (1999) compared two different DRA conditions with five participants. Results of participants’ functional analyses indicated that their problem behavior was maintained by escape from demands and that their behavior was not maintained by access to edibles. Therefore, edibles did not function as a reinforcer for problem behavior. Throughout the escape baseline condition, high levels of problem behavior occurred, demonstrating that the demands functioned as establishing
operations for problem behavior. During the treatment analysis, experimenters evaluated DRA (positive reinforcement for compliance) versus DRA (negative reinforcement for compliance) when extinction was not in place for problem behavior for three participants. For all three, DRA (positive reinforcement) was found to be a more effective treatment for increasing compliance and decreasing problem behavior. For one participant, experimenters evaluated these DRA conditions as well as noncontingent escape and extinction. For this participant, DRA (positive reinforcement) did not increase compliance to high levels consistently. However, there were significant decreases in problem behavior. These treatment effects were not seen using NCE, extinction, or DRA (negative reinforcement) for this participant. Therefore, for all four participants, DRA (positive reinforcement) was the most effect treatment for escape-maintained problem behavior. Additionally, treatment effects maintained under leaner schedules of reinforcement for two of the participants. These findings indicated that delivering preferred edibles contingent on compliance may compete with the maintaining reinforcer for problem behavior.

Kodak, Lerman, Volkert, and Trosclair (2007) compared the effects of DRA using edibles versus DRA using breaks for increasing compliance and decreasing problem behavior. After conducting an FA that indicated that participants’ problem behavior was maintained by escape, the authors conducted a demand assessment to identify tasks that may function as establishing operations. The demand assessment involved conducting a trial-based paired-task format that required the participant to make a selection response. Demands selected on 70 percent of trials or greater were identified as high-preference and demands selected on 40 percent of trials or fewer were deemed low-preference. A potential concern with this demand assessment method is that demands identified based on low selection may not function as establishing operations for
problem behavior. Therefore, escape from these demands may not function as reinforcers for compliance. Because Kodak et al. did not conduct demand baseline sessions indicating levels of problem behavior and compliance; it is unclear whether the demands identified functioned as aversive events. During treatment, participants were presented with pictures of edible reinforcers and a picture of a break upon completion of the scheduled work requirement. The participant was then granted access to the selected reinforcer. Schedules of reinforcement were thinned until participants selected the break reinforcer. All three participants selected the edible reinforcer until a very thin schedule (FR20 or FR 40) of reinforcement was introduced, at which point participants allocated responding to the break response. These results were replicated in a reversal. Subsequently, participants were exposed to conditions in which the schedule of reinforcement was set at that which the participant allocated responding to the break response in the previous condition. During these phases breaks were enriched with edibles or attention from the therapist. These enriched breaks were then offered as a choice against either high or low-preference edibles, i.e. the participant could complete the task at hand and then choose either the enriched break or a high-preference edible in some conditions. In other conditions, the participant was required to complete the task and then offered either the enriched break or a low-preference edible. Participants continued to select break reinforcers only when low-preference edibles were in place as reinforcers for two of the participants, or when attention was available in place of an edible for one participant.

When conducting a functional analysis, it is important to include stimuli in the demand condition that may function as establishing operations (EOs) for individuals with escape-maintained problem behavior. Although demand assessments have been found useful for informing the FA demand condition, it is unclear if the procedural differences across demand
assessments may affect their utility for identifying demands during a FA. The demand assessment conducted by Kodak et al. (2007) identified low-preference tasks based on low selection, whereas Roscoe et al. (2009) identified low-preference tasks based on low compliance and high levels of problem behavior. Because it is unclear which assessment format is most useful for informing a functional analysis, the purpose of the current study was to evaluate the relative reliability and potential utility of two different demand assessment formats. In addition, we compared the results of an indirect assessment to results obtained during the demand assessments to determine whether they yielded similar outcomes.

Method

Participants and Setting

Participants were three individuals enrolled in a school providing preschool, day and residential services for children with autism. Participants were identified based on reports by caregivers that their problem behavior may be maintained by negative reinforcement. Will was 12-years-old and communicated using a picture exchange system. Chase was a 16 year old who communicated using some modified signs and an electronic communication device.

Sessions were conducted in participants’ classrooms and materials included a table and chairs and the materials necessary to complete the tasks presented to the participants. Session durations varied for demand assessment 1 (DA 1) and were 5 min for demand assessment 2 (DA 2), FA sessions were 5 min in duration, and sessions varied in duration for the negative reinforcer assessment. The therapist and participant were present in the room; occasionally a third party was present to record sessions using a handheld camera.

Response Measurement and Reliability

Sessions were video recorded using either a handheld camera or a camera recording system in the room. Sessions were reviewed by two independent observers who recorded
problem behavior, demand presentation, and compliance. Problem behavior was measured using frequency and was summarized as response per min. Occurrences of compliance were recorded when participants completed the task prior to the physical guidance prompt; these data were summarized as a percentage by dividing the number of compliances by the number of demand presentations.

Agreement between observers was scored for 33 percent of sessions. Agreement was determined on an interval-by-interval basis; if both observers recorded problem behavior, demand presentation, and compliance in the same 10-s interval, agreement was recorded. The agreement percentage was calculated by dividing the number of intervals in agreement by the total number of intervals scored, and multiplying this number by 100.

**Indirect Assessment**

Prior to each demand assessment, staff who had worked with the individuals for at least 6 months were asked to complete a questionnaire for identifying demands which the participant may or may not enjoy engaging with or readily engage with. These indirect assessments were formatted such that they were divided into the following categories: self-help, domestic, academic, and physical tasks. Initially, blank assessments were handed out to staff with the instruction to list and rank tasks in each category based on how much the participant did or did not like or readily engage with the particular task. There was an additional section in which staff could list tasks which did not fall into a previously described category. Tasks were ranked on a Likert scale in which 1 was valued “strongly likes, or readily engages” with and 5 was valued “strongly dislikes and does not readily engage in”.

Following this assessment, the tasks identified and ranked by staff were broken down into tasks which the participant could be manually guided to complete in the even they did not
comply independently. For example, “getting dressed” was broken down into “zip your coat” and “button your shirt”. These tasks were then listed on the indirect assessment under the corresponding category with the blank category still remaining so that staff could continue to list tasks which they felt were not covered by the tasks listed for ranking in previous sections. These new indirect assessments were then passed out to new staff with the same instructions as given before.

Respondents’ rankings for each task were compared to determine exact and partial agreement. Exact agreement was scored if both respondents indicated the exact same rank for a task, whereas partial agreement was scored if one respondent indicated a rank that was no more than one rank below or above the other respondent’s rank (e.g., a ranking of 1 by Respondent A and a Ranking of 2 by Respondent B). A disagreement was scored if respondents had a difference in rankings of greater than one for a task. After calculating agreement across respondents, the questionnaires of the two respondents with the greatest agreement were then used to inform the array of tasks for use during the demand assessment.

**Demand Assessment 1**

Pictures were taken of the participants completing each task prior to the beginning of demand assessment 1. This assessment was similar to that used by Kodak et al. (2007) and the paired stimulus preference assessment procedure developed by Fisher et al. (1992). The eight tasks identified through the indirect assessment were included. During this assessment, the experimenter presented pairs of photos such that every photo was paired with every other photo. Two forced-exposure trials were conducted prior to each trial. In these forced-exposure trials, the therapist presented one of the upcoming photos, manually guided the student to touch the photo, and subsequently prompted the participant to complete the task using a three step prompt.
hierarchy (vocal, model, physical) for 12 s. This same procedure was then repeated with the second photo of the pair to be presented in the upcoming trial. Following these forced-trial exposures the therapist presented the pair of photos simultaneously and instructed the participant to pick one. Upon selection, the participant was prompted (again using a three step prompt hierarchy) to complete the task from the photo for 12 s. If both photos were selected, both were removed and then re-presented. If neither photo was selected within 5 s, the therapist conducted two forced-exposure trials again and re-presented the photos. If neither photo was selected on the second presentation, the photos were removed and the therapist moved on to the forced exposure for the next trial. There were no programmed consequences for problem behavior.

**Demand Assessment 2**

Eight tasks that were identified from the indirect assessment were included, and a single task was presented during each 5-min session. During each session, the therapist presented a single task continuously using a three-step prompting hierarchy (vocal, model, then physical). If the participant complied with the demand prior to physical guidance, the therapist delivered verbal praise and then immediately re-presented the same task. Upon the occurrence of problem behavior, the therapist turned away from the participant and removed all demands for 30 s. After the 30-s break, the therapist re-presented the demand using the three-step prompt hierarchy. Each demand was assessed in two 5-min sessions.

During this assessment, observers recorded frequency of problem behavior, demands, and compliance. Data were summarized as responses per min problem behavior and percentage of trials with compliance. Based upon this assessment, low-preference demands were identified as those associated with the greatest responses per minute of problem behavior and lowest percentage of trials with compliance. These demands were then used in subsequent functional
and treatment analyses. The results of these three assessments were used to identify three demands, a low p task according to both demand assessments, a high p task identified by all three assessments, and a low p task identified by the indirect assessment only.

**Functional Analysis**

Following the demand assessments, a functional analysis was conducted for only Chase using procedures similar to those described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994) to identify the function of his problem behavior. All sessions were 5 or 10 min. Conditions included attention, control, and two demand conditions. One demand condition (Demand Condition 1) included the low-preference demand from both demand assessments, and the other demand condition (Demand Condition 2) included all eight tasks that were included in the demand assessments. The tasks were alternated in random order during the 5-min session.

During the demand conditions, tasks were presented using a three-step hierarchy (vocal, model, physical), and problem behavior resulted in 15-s of escape from the demand. When the 15 s had elapsed, the demand was re-presented. In an attention condition, the therapist stated “you can play with these toys while I do some work” and ignored all behavior exhibited by the participants except the target behavior. Upon the occurrence of the target behavior, the therapist delivered brief physical attention and made a statement such as “Stop that”. During the no interaction condition, the therapist was present; however, the therapist did not interact with the participant and no materials were provided. During the control, or toy play, condition, the therapist delivered vocal and physical attention on a fixed-time 15-s schedule; no consequences were in effect for problem behavior. These conditions were alternated in a multielement design during the FA.
Results

The results of Will’s indirect assessment are depicted in Table 1. The table shows the tasks included in the assessment, the ranks given to each task by each respondent, and the IOA from the pair of respondents with the greatest agreement. The high-preference tasks (based on the ranks given by respondents) are highlighted in red and low-preference tasks are highlighted in blue. The results of Chase’s indirect assessment are depicted in Table 2.

Figure 1 depicts the results for demand assessment 1 (the selection based assessment) on the top graph and the results for demand assessment 2 (the assessment based on compliance and problem behavior) in the bottom graph for Will. For DA1, the eight tasks presented during the assessment were ranked from highest to lowest based on percentage selection. Fisher et al. (1992) considered items selected in 75-80% of opportunities highly preferred. However, Will did not select any one task in over 70% of opportunities. Additionally, Will’s lowest preferred task was selected in only 50% fewer opportunities than his highest preferred task. These results do not yield clearly high and low preferred tasks. Results for DA2 yield similarly unexpected results. Will exhibited no aggression in any of the 5-min sessions and compliance was relatively high with the lowest percentage compliance for throwing items away (72%) and the highest for sorting by color, clapping hands, and wiping the table (100%). These results were replicated when the assessments were run multiple times. However, only one data set is shown.

For Will, there was little consistency across assessments indicating high-preference and low-preference demands. Additionally, based on these assessments, there was no evidence to indicate that Will’s aggression was maintained by negative reinforcement. Therefore, no further assessments for the purpose of this analysis were conducted.
Figure 2 depicts the results for demand assessment 1 (the selection based assessment) on the top graph and the results for demand assessment 2 (the assessment based on compliance and problem behavior) in the bottom graph for Chase. During DA 1, the task most frequently selected was shoe tying (78.6%) and the tasks selected the least were sorting silverware and wiping hands (28.6%). During DA 2, Chase exhibited the lowest compliance for the demand “wipe hands” and the highest compliance for the demand “tie your shoes” (range, 8.3-to-91.7%). However, like Will, Chase exhibited no problem behavior during DA 2. Dissimilar from Will’s results, Chase’s results across DA 1 and DA 2 were much more consistent with regards to identifying high-preference and low-preference demands. Both DA 1 and DA 2 identified “tie shoes” as a high-preference demand and “wipe hands” as an low-preference demand.

During the functional analysis (Figure 3), Chase did not exhibit aggression during 5-min or 10-min sessions. When conducting modifications to the functional analysis, including running the demand conditions in a pairwise analysis and including pictures of the demands before presenting vocal prompts during Demand Condition 2, no problem behavior was observed.

The results produced by demand assessments 1 and 2 were unexpected. Specifically, aggression was only observed in DA 1. In order to further evaluate the data for Chase, data were analyzed for DA 1 session by session and trial by trial. These data are shown in Figure 4 and Figure 5. These data show an initial burst in problem behavior in sessions one and two, towards the beginning of sessions. Thereafter, levels of problem behavior reduced to near zero levels, potentially indicating an extinction effect.

Discussion

For Will, inconsistent outcomes occurred across assessments. For example, according to the indirect assessment, hair brushing was a low-preference task. However, according to the two
direct assessments, hair brushing was a high-preference task. This is not a surprising finding given that previous research has also shown that indirect assessments do not consistently produce reliable results (e.g. Greene et al., 1988). However, the indirect assessment did identify clapping hands as a high-preference task and toe touches as a low-preference task. The results of both subsequent demand assessments corresponded with the indirect assessment. There were also inconsistencies across DA 1 and 2. Demand assessment 1 identified wiping the table and sorting as low-preference tasks, whereas DA 2 indicated that these tasks were high-preference. Again, although there were discrepancies between the two direct assessments for Will, there were also some agreements across assessments. For instance, both demand assessments indicated that toe touches was a low-preference task and clapping hands was a high-preference task.

Because problem behavior was not consistently observed across demand assessments, we did not conduct replications of the demand assessments. However, replicating the assessments would have permitted an evaluation of the stability of assessment outcomes. Additionally, problem behavior occurred primarily when a new demand was presented indicating that aggression may not be maintained by escape from demand but by some idiosyncratic variable, such as interrupting repetitive behaviors in the context of a demand. However, we were not able to capture this via these assessments.

For Chase, discrepancies were observed across all assessments. Specifically, the indirect assessment identified hand wiping as a high-preference task, whereas DA 1 identified this task to be low-preference (i.e., 28.57% percent compliance). The indirect assessment identified shoe typing as a low-preference task, whereas the demand assessments identified it as a high-preference task (i.e., 78.6% selection and 91.67% compliance). In addition, there were
discrepancies in outcomes across demand assessments. For example, folding was a moderately preferred task according to DA 1 and a low-preference task according to demand assessment 2. On the other hand, picking up feet, touching toes, clapping hands, and sorting silverware were all low-preference tasks according to demand assessment 1 but were relatively highly preferred according to DA 2. These results verify that one may procure different results based on the type of assessment used. However, it is important to remember that for both participants no problem behavior was ever exhibited in DA 2 so high- and low-preference tasks are based solely on compliance.

Although we did not observe any instances of aggressive responding in DA 2, the assessment in which the dependent variables were compliance and problem behavior, we did observe problem behavior in DA 1, the selection based assessment. Because we only observed problem behavior during DA 1 (the selection-based assessment), we modified the FA to include similar antecedent events to those in effect during this demand assessment. Specifically, we included a demand condition that included the presentation of all eight tasks in random order. Initially, responding was differentially higher in the alternating demands condition. However, following the first series of sessions, all problem behavior ceased. Subsequently, we made some additional modifications, including increasing the session duration to 10 min and presenting the same pictures used in DA 1 to approximate the context under which we observed problem behavior in the demand assessments. However, this did not result in elevated levels of aggression.

Because Chase frequently exhibits ritualistic behavior, we hypothesized that Chase may have exhibited higher levels of problem behavior in DA 1 relative to DA 2 because of the former assessment involves frequent changes in demand presentation across trials. However,
approximating frequent presentations of different demands did not evoke problem behavior during the functional analysis. Another explanation for why problem behavior occurred only during the first two sessions of DA 1 sessions one and two, no problem behavior was exhibited in session 3, and only two instances of aggression were recorded in the fourth, and final, session. This pattern in responding may indicate an extinction effect as problem behavior was placed on extinction in DA 1. If problem behavior was, in fact, maintained by escape from demands, these data may possibly support escape extinction as an effective treatment for this participant. Further evidence supporting extinction as a treatment may be that in all three sessions in which problem behavior did occur, it occurred at the beginning of the session.

The current study extends previous research in a number of ways. First, we empirically evaluated two demand assessments and compared those results to those of indirect assessments. The results of both direct assessments for both participants produced somewhat similar results. However, there were some significant discrepancies between those demand assessments and the indirect assessments. According to Hagopian, Long, and Rush (2004), the validity of indirect assessments for establishing positive reinforcers has not been established. The current assessment results may indicate that indirect assessments may not be effective methods for identifying negative reinforcers.

There are some limitations to the current study, as well. Some demands used in sessions may have poor ecological validity as we had to modify tasks based upon the assessment setting. For some participants, transition times were identified as aversive. However, it was difficult for us to replicate this demand in an assessment. Second, all assessments were only conducted once. Replications of these assessments may have produced useful information. Future researchers should replicate assessments in order to evaluate if one replication is sufficient in obtaining the
desired information. Lastly, we evaluated aversive tasks as negative reinforcers only. There are forms of escape maintained problem behavior which may be maintained by escape from stimuli other than the presentation of demands by a therapist or teacher. For this reason, it is important that future research evaluate these same assessments while focusing on or exploring a variety of aversive environments or environmental stimuli.
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Table 1. Results of Will’s indirect demand assessment. Highlighted demands indicate those chosen for use in demand assessments.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Resp 1 (LG)</th>
<th>Resp 2 (CM)</th>
<th>Resp 3 (MA)</th>
<th>IOA 1-2</th>
<th>IOA 1-3</th>
<th>IOA 2-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush Hair</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>E</td>
<td>E</td>
<td>NO</td>
</tr>
<tr>
<td>Tie Your Shoes</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Button Your Shirt</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Zip Your Coat</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Sweep the floor</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>P</td>
<td>NO</td>
<td>P</td>
</tr>
<tr>
<td>Wipe the Table</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>P</td>
<td>NO</td>
<td>P</td>
</tr>
<tr>
<td>Wash the Trays</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>E</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Stapling</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>Fold clothes</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>E</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Sorting (differentiation)</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>P</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Match to Sample</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>P</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Toe touches</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>P</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Sit ups</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>P</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Sit on floor-stand up</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>P</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Place kidbooks from shelfing</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>P</td>
<td>E</td>
<td>E</td>
</tr>
</tbody>
</table>

% Agreement E | 0.4 | 0.6 | 0.4667
% Agreement E or P | 1 | 0.8667 | 0.9334
% No Agreement | 0 | 0.1334 | 0.0667
Table 2. Results of Chase’s indirect demand assessment. Highlighted demands indicate those chosen for use in demand assessments.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Resp 1 (MD)</th>
<th>Resp 2 (AHG)</th>
<th>Resp 3 (AL)</th>
<th>IOA 1-2</th>
<th>IOA 1-3</th>
<th>IOA 2-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush Teeth</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>P</td>
<td>P</td>
<td>NO</td>
</tr>
<tr>
<td>Wiping Hands</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>P</td>
<td>NO</td>
<td>P</td>
</tr>
<tr>
<td>Brushing Hair</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>NO</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Tie Your Shoes</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>P</td>
<td>NO</td>
<td>P</td>
</tr>
<tr>
<td>Zip Your Coat</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>P</td>
<td>P</td>
<td>NO</td>
</tr>
<tr>
<td>Putting on Shoes</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>P</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Folding</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>P</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Sorting Silverware</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>P</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Wiping Table</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>P</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Packing Backpack</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Matching Pictures</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>Filing Papers</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Indicate Named Number</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>Clap Hands</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>E</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Toe touches</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>Sit on floor-stand up</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Sit on chair-stand up</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>P</td>
<td>NO</td>
<td>P</td>
</tr>
<tr>
<td>Sit in chair and pick up feet</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>E</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Pass Ball to Teacher</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>P</td>
<td>P</td>
<td>E</td>
</tr>
<tr>
<td>% Agreement E</td>
<td></td>
<td></td>
<td></td>
<td>26.315</td>
<td>36.842</td>
<td>36.842</td>
</tr>
<tr>
<td>% Agreement E or P</td>
<td></td>
<td></td>
<td></td>
<td>68.421</td>
<td>42.105</td>
<td>52.631</td>
</tr>
<tr>
<td>% No Agreement</td>
<td></td>
<td></td>
<td></td>
<td>5.263</td>
<td>15.789</td>
<td>10.526</td>
</tr>
</tbody>
</table>
Figure 1. Results of both demand assessments for Will. Demand Assessment 1 on the top panel and Demand Assessment 2 on the bottom panel.
Figure 2. Results of both demand assessments for Chase. Demand Assessment 1 on the top panel and Demand Assessment 2 on the bottom panel.
Figure 3. Results for Chase’s functional analysis.
Figure 4. Session by session analysis of demand assessment 1 for Chase.

Chase Demand Assessment 1 Agression Frequency by Session

Sessions

Trials 1-14
Trials 15-28
Trials 29-42
Trials 43-56

Aggression (Frequency)
Figure 5. Trial by trial analysis of demand assessment 1 for Chase.

Chase Demand Assessment 1 Aggression- Frequency per Trial

Session 1  Session 2  Session 3  Session 4

Aggression Per Trial (Frequency)

Trials
Appendix A

Indirect Demand Assessment Questionnaire

STUDENT’S NAME: ______________________________ DATE: _____________

NAME OF REPORTER: _________________________

The purpose of this questionnaire is to get information about certain tasks or demands that a student does or does not enjoy or readily engage with, and to rank these demands in terms of the degree to which the student enjoys completing the task and/or readily engages with the task.

There are some self-care tasks/demands that students may or may not enjoy or readily engage with. Examples of self-care tasks/demands include putting on a jacket, tying a shoe, and brushing hair. What are some self-care tasks/demands that __________ comes into contact with? Please rank these on a scale of 1 (enjoys most/readily engages with most) to 5 (strongly dislikes/frequently avoids or fails to engage with).

<table>
<thead>
<tr>
<th>Task/demand</th>
<th>Enjoys most/engages with most</th>
<th>Enjoys somewhat/engages with sometimes</th>
<th>Neutral</th>
<th>Dislikes somewhat/sometimes avoids or fails to engage with</th>
<th>Strongly dislikes/frequently avoids or fails to engage with</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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</tr>
</tbody>
</table>

There are some domestic tasks/demands that students may or may not enjoy or readily engage with. Examples of domestic tasks include folding a shirt, wiping a table, and sorting silverware. What are some domestic tasks/demands that __________ comes into contact with? Please rank these on a scale of 1 (enjoys most/readily engages with most) to 5 (strongly dislikes/frequently avoids or fails to engage with).

<table>
<thead>
<tr>
<th>Task/demand</th>
<th>Enjoys most/engages with most</th>
<th>Enjoys somewhat/engages with sometimes</th>
<th>Neutral</th>
<th>Dislikes somewhat/sometimes avoids or fails to engage with</th>
<th>Strongly dislikes/frequently avoids or fails to engage with</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
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</tbody>
</table>
There are some academic tasks/demands that students may or may not enjoy or readily engage with. Examples of academic tasks include counting, match-to-sample, and doing a worksheet. What are some academic tasks/demands that __________ comes into contact with? Please rank these on a scale of 1 (enjoys most/readily engages with most) to 5 (strongly dislikes/frequently avoids or fails to engage with).

<table>
<thead>
<tr>
<th>Task/demand</th>
<th>Enjoys most/engages with most</th>
<th>Enjoys somewhat/engages with sometimes</th>
<th>Neutral</th>
<th>Dislikes somewhat/sometimes avoids or fails to engage with</th>
<th>Strongly dislikes/frequently avoids or fails to engage with</th>
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</thead>
<tbody>
<tr>
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<td>1</td>
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</tr>
</tbody>
</table>

There are some physical tasks/demands that students may or may not enjoy or readily engage with. Examples of physical tasks include walking across the room, doing sit-ups, and touching toes. What are some physical tasks/demands that __________ comes into contact with? Please rank these on a scale of 1 (enjoys most/readily engages with most) to 5 (strongly dislikes/frequently avoids or fails to engage with).

<table>
<thead>
<tr>
<th>Task/demand</th>
<th>Enjoys most/engages with most</th>
<th>Enjoys somewhat/engages with sometimes</th>
<th>Neutral</th>
<th>Dislikes somewhat/sometimes avoids or fails to engage with</th>
<th>Strongly dislikes/frequently avoids or fails to engage with</th>
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</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

Please list and rank any other tasks/demands that may not have fallen into the previous categories. Include both tasks/demands that __________ enjoys and engages with most and those that __________ dislikes, avoids, or have led to problem behavior in the past.
<table>
<thead>
<tr>
<th>Task/demand</th>
<th>Enjoys most/engages with most</th>
<th>Enjoys somewhat/engages with sometimes</th>
<th>Neutral</th>
<th>Dislikes somewhat/sometimes avoids or fails to engage with</th>
<th>Strongly dislikes/frequently avoids or fails to engage with</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>