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Comparing descriptive, experimental and informant-based assessments of problem behaviors

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Abstract

In this study, the outcomes of descriptive, experimental and informant-based methods of functional assessment were compared in four individuals with developmental disabilities who showed problem behaviors. Results indicated that the descriptive and experimental assessments were concordant in only one of the four cases whilst informant-based and experimental assessments were concordant in three of the four cases. The descriptive assessment identified thin schedules of attention in all cases. These results appear to question the usefulness of employing descriptive assessments for problem behaviors either as an adjunct or replacement for experimental assessments, particularly given their time-consuming nature.

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Keywords: Descriptive assessment; Experimental assessment; Thin schedules

Many researchers now routinely employ functional assessments to examine the influence of environmental variables on the occurrence of behavior problems shown by people with developmental disabilities (Durand & Carr, 1991; Iwata et al., 1994). Studies have shown that problem behaviors such as self-injury, aggression and pica can be maintained both by social environmental variables (e.g., attention, escape, tangibles) and/or by non-social factors (e.g., sensory stimulation) (Durand & Crimmins, 1988; Iwata, Dorsey, Slifer, Bauman, & Richman, 1982). In a summary of 152 cases of SIB, for example, Iwata et al. (1994) showed that SIB was maintained by escape in 38.1% of

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cases, by attention or tangibles in 26.3% of cases, and by self-stimulation in 25.7% of cases.

Most functional assessments are carried out in an “analogue” of the target individual’s naturalistic setting so that an experimenter can systematically manipulate potential antecedents and consequences for problem behaviors (Iwata, Vollmer, & Zarcone, 1990). Whilst the control afforded by experimental assessments is appealing to many investigators, there are several disadvantages to conducting functional assessments in this way. Firstly, by systematically manipulating environmental events under artificial conditions, the ecological validity of the assessment is seriously compromised. Secondly, by presenting events contingent on the occurrence of problem behavior, there is a risk that a new behavioral function may be established during the assessment process itself. Thirdly, the behavior may be maintained by idiosyncratic events that may not be manipulated in the experimental assessment. Finally experimental assessments are considered highly complex and difficult to implement in clinical settings.

Because of these difficulties, some researchers have considered using descriptive assessments and/or informant-based methods of functional assessment, either as an adjunct to or as a replacement for an experimental analysis (Hall & Oliver, 1992, 2000; Lerman & Iwata, 1993). Descriptive assessments involve the direct observation of behavior under naturalistic conditions and are thus more ecologically valid, allowing the investigator to determine which environmental events are most likely to occur before and after the target behavior. However, because the environmental events are not controlled, the data are correlational in nature.

To examine the concordance between descriptive and experimental assessments, Lerman and Iwata (1993), compared the results of these assessments conducted on six adults with developmental disabilities who showed SIB. In the descriptive assessments, individuals were observed for 6–12 h in discrete 15 min sessions that were conducted over several weeks. Support-staff behaviors recorded included “attention delivery”, “instruction delivery”, “attention removal”, “instruction removal”, and the presence of materials, staff and ambient stimuli. In the experimental assessment, environmental events were systematically manipulated under artificial conditions using the methodology of Iwata et al. (1982). Results indicated that the results were concordant in only one of the six cases. For the remaining five cases, the descriptive analysis yielded data that were difficult to interpret, suggesting that the validity of the descriptive assessments was limited.

Because both experimental and descriptive methods of functional assessment are time-consuming and complex to conduct, some researchers have also administered questionnaires or interviews to the parents, support-staff or teachers of the target individual (Durand & Crimmins, 1988; Paclawskyj, Matson, Rush, Smalls, & Vollmer, 2001). An advantage to this approach is that questionnaires can be easily administered and are therefore less costly in terms of assessment time. A disadvantage to this approach is that the psychometric properties of these questionnaires are sometimes poor (Newton & Sturmey, 1991; Zarcone, Rodgers, Iwata, Rourke, & Dorsey, 1991). In a study conducted by Paclawskyj et al. (2001), the Questions About Behavioral Function (QABF) scale was administered to 13 individuals with developmental disabilities who showed either self-injury, aggression, tantrums or stereotypy. Results indicated that for 10 of the participants, the problem behavior appeared to be motivated either by escape or sensory consequences and in only one case did the motivation

appear to be to obtain attention. When the results of the QABF were compared to the results of experimental analogue assessments, the QABF and analogue assessments agreed on the primary motivating variable in 56.3% of cases. Clearly, more research needs to be done to ascertain why methods of functional assessment are not always concordant.

Few studies have directly compared the outcomes of functional assessments using experimental, informant-based and descriptive methods. Crawford, Brockel & Schauss (1992) compared the outcomes of these assessments conducted on four individuals who showed high rates of stereotypic behavior. For the descriptive assessment, two support-staff observed each individual in four 15-min periods using a 1-min time sampling procedure, recording antecedent, concurrent and consequent events in the order in which they occurred at the end of each 1-min interval. Each episode of stereotypic behavior was classified as either “attention”, “escape/avoidance”, “tangible”, or “sensory” according to whether or not social interaction or tangibles preceded or followed the behavior. Results indicated that “sensory stimulation” was the primary maintaining variable (i.e. the vast majority of episodes were preceded and followed by no interaction). The individuals were then exposed to two sets of four experimental conditions, similar to those conducted by Iwata et al. (1982). Results showed an undifferentiated pattern for three individuals with the remaining individual showing high rates of stereotypic behavior in the “sensory” and “control” conditions. For the informant-based assessment, the Motivation Assessment Scale (Durand & Crimmins, 1988) was completed for each individual by eight support-staff, with the results indicating that the primary maintaining variable for each individual was “sensory reinforcement” (although there was some degree of variability across informants). These data indicate that in comparison to the Lerman and Iwata (1993) and Paclawskyj et al. (2001) studies, there was good agreement between the experimental, descriptive and informant-based assessments.

Given the paucity of data concerning the concordance between different methods of functional assessment, in the present study, descriptive, experimental and informant-based methods of functional assessment were compared in four individuals with developmental disabilities who showed problem behaviors. To enhance the concordance between methods, standardized and psychometrically sound measures in all three areas of assessment were conducted. In the descriptive assessment, real-time observations were conducted in the participant’s natural environment and the data were subjected to a time-based lag sequential analysis (Sackett, 1987). In the experimental assessment, the methodology of Iwata et al. (1994) was employed in the individual’s natural environment using support staff to administer the assessments. In the informant-based assessment the Questions about Behavioral Function questionnaire (Matson & Vollmer, 2000) was administered to all support-staff involved with the individual concerned.

1. Method

1.1. Participants

Four individuals with severe/profound developmental disabilities participated in the study. These individuals were recruited following screening visits to day and/or residential

services for adults with developmental disabilities within a particular geographical region. All participants were identified by support-staff as showing problem behaviors (self-injury, aggression, disruption) at least once per hour. Informed consent to participate in the research was obtained from the parents and/or support-staff of each individual concerned.

Claire was 29 years old at the time of the assessment, and lived in a large residential service for adults with developmental disabilities. She attended a training unit during the day that was adjacent to the residential unit. She appeared to have no verbal language skills but could use a few rudimentary signs to indicate what she wanted (e.g., “toilet”) and she could follow simple requests if they included gestural prompts. Her primary target behavior was pica (the ingestion of toilet tissue, pages of magazines, plaster, threads, pegs and stones). In particular, Claire would ingest large amounts of toilet tissue during visits to the toilet or would pick loose threads from furniture or from the floor. She had also been seen to ingest leaves, plaster and wallpaper from the walls (on one occasion immediately after a meal). During the night, she would also ingest pieces of the foam filling in her duvet. As a result of this behavior, Claire suffered from frequent bouts of constipation and this needed to be treated regularly with laxatives. Claire’s daily medication regimen included Carbamazepine (an anticonvulsant), Thioridazine (an antipsychotic), Doxycycline (an antibiotic) and Bisacodyl (a laxative).

Tom was 51 years old at the time of the assessment and lived in a group home with four other adults with developmental disabilities. Tom was diagnosed with cerebral palsy and although Tom could walk unaided, he was very slow on his feet and used a metal walking frame to get about the house. He had very limited verbal language skills but could use idiosyncratic signs to indicate what he wanted (e.g., “TV”). His primary target behavior was self-injurious behavior that consisted of head-banging, throat-pulling, arm-pulling, face-scratching and hair-pulling. This behavior frequently caused cuts, bruising and bleeding to his face, throat and arms. Tom would often get down onto the floor, place his head near to a wall or a door, self-injure and then engage in loud moaning and crying that appeared indicative of severe distress. On occasions, Tom would go to his room, lock the door, bang his head, and cry out through the air-vent that was positioned at the bottom of the door. This behavior could be heard throughout the house. Tom also appeared to engage in a form of “self-restraint” which consisted of placing his hands up his jumper. This behavior was most likely to occur when he was watching television. Tom’s daily medication regimen included Carbamazepine (an anticonvulsant), Omeprazole (for gastroesophageal reflux) and Lorazepam (an anxiolytic).

John was 31 years old at the time of the assessment and lived in a group home with five other adults with developmental disabilities. John appeared to have limited verbal language skills but could use single words to indicate what he wanted (e.g., “tea”, “walk”, “chocolate”). Some members of support-staff appeared to understand John’s requests more than others. John was fully mobile and could move quickly about the house, often spending long periods of time on his own in his bedroom. His primary target behavior was aggression that consisted of hitting and grabbing support-staff and pulling at their hair. These behaviors could, on occasion, result in severe injury to female support-staff (cuts, bruises and abrasions). Indeed following an injury to a female member of staff, John’s opportunities to go outside were now severely limited. John’s daily medication regimen included Chlorpromazine (an antipsychotic), Propranolol (an anxiolytic) and Fluoxetine (an antidepressant).

Paul was 31 years old at the time of the assessment and lived in a residential unit for people with developmental disabilities. He attended a day centre that was attached to the residential unit. He appeared to have limited verbal skills and few signs, but could say “no” to indicate if he did not want to do something. Although he could walk unaided, Paul spent most of his time in a wheelchair either holding onto or seeking out his preferred items (magazines). He also spent periods of the time following a female service-user around the day center. His primary target behavior was aggression that consisted of hitting or kicking support-staff or pulling at their hair. Paul’s daily medication regimen included Diazepam (an anxiolytic).

1.2. Procedure

1.2.1. Descriptive assessment

Each participant was observed in his/her natural setting over a period of 4 weeks. Observations were conducted using a computerized data-collection program on a Jornada palmtop PC that allowed the occurrence and duration of the participant’s problem behaviors to be recorded in real-time. For Claire, *pica* was defined as any chewing and ingestion of tissue paper, pegs, stones, threads and magazines. For Tom, *self-injurious behavior* was defined as any forceful contact between the head and a hard surface, any contact with the fingernails against the skin, any closure of the fingers around the hair coupled with a tugging motion, any pulling of the skin on the throat using the thumb and index finger. For John and Paul, *aggression* was defined as any actual or attempted forceful contact of the foot and another person, any actual or attempted grabbing of another person’s throat using the thumb and index finger, and any forceful contact of the hands against another’s body. In addition to the participant behaviors, three environmental events were also recorded. *Attention* was defined as any physical or verbal interaction from support-staff that included general comments and statements to the participant such as “you’re looking well” or “it’s a nice day today”, physical blocking of the participant behavior, verbal denials, offers and reprimands. *Demands* were defined as any physical or verbal interaction from support-staff in which the participant was required to do something (e.g., “put your shoes on, please”). *Tangibles* were defined as the participant holding any preferred food or activity.

Observations were conducted between 10 a.m. and 3 p.m. throughout various locations either in the participant’s home (John and Tom) or training center (Claire and Paul). The observer remained as inconspicuous as possible throughout the observations and out of the participant’s line of sight. Support-staff were instructed to interact with the participant as normal. A variety of activities were sampled throughout the day including leisure time, structured activities and mealtimes. The privacy of each participant was respected at all times and observations were terminated if the participant entered private areas. Total observation times were 13.5, 14.6, 7.2 and 7.4 h for Claire, Tom, John and Paul, respectively. Observations sessions lasted between 2 and 4 h and were conducted on the same day each week over the 4-week period.

For 17% of the observations, a second observer simultaneously but independently recorded occurrences of the participant and support-staff behaviors. Agreement on the occurrence of problem behaviors and support-staff behaviors was assessed on a 10-s

interval-by-interval basis using Cohen's Kappa statistic. Mean agreement on participant problem behaviors was 0.86 (range 0.54–0.90). Mean agreement on support-staff behaviors was 0.76 (range 0.63–0.85).

1.2.2. Experimental assessment

For each participant, all experimental sessions were conducted in a quiet room on the premises in which the descriptive analysis was conducted. For one participant (Tom), four test conditions and one control condition was employed. For the remaining participants, three test conditions and one control condition was employed. During the presentation of each condition, an observer recorded the occurrence and duration of the participant and support-staff behaviors (see definitions above) using the computerized data-collection program described above.

During the *Attention* condition, a member of support-staff was present in the room and sat with his/her back to the participant. The participant had access to preferred items and activities (chocolate for Tom and John, magazines for Paul, and toilet tissue for Claire). Occurrences of problem behavior resulted in the observer cueing the member of support-staff to turn around and deliver a brief reprimand (e.g., "don't do that") followed by statements of concern. The attention condition was designed to test whether problem behavior was maintained by support-staff attention.

During the *Demand* condition, the member of support-staff asked the participant to do a task (matching socks and folding clothes for Tom and Claire, mopping the floor for John, and completing a puzzle for Paul) and sat beside the participant giving physical and verbal prompts. Occurrences of problem behavior resulted in the removal of the task for 30 s. Each participant had continuous access to preferred items and activities (chocolate for Tom and John, magazines for Paul, and toilet tissue for Claire). The Demands condition was designed to test whether problem behavior was maintained by escape from tasks.

During the *Tangible* condition (Tom, John and Paul only), the member of support-staff removed the previously available preferred item or activity (chocolate for Tom and John, magazines for Paul) and sat beside the participant, interacting with the participant every 30 s. Occurrences of problem behavior resulted in access to the preferred item or activity for 30 s. The tangible condition was designed to test whether problem behavior was reinforced by access to preferred items or activities.

During the *Alone* condition (Tom and Claire only), the member of support-staff left the room and did not return at any time during the condition. Occurrences of problem behavior were ignored. For Claire, pieces of toilet tissue were left scattered on a table. The Alone condition was designed to test whether problem behavior would persist in the absence of social contingencies.

During the *Play* condition, the member of support-staff sat beside the participant, allowed the participant to have access to preferred items and activities (chocolate for Tom and John, magazines for Paul, and toilet tissue for Claire) and interacted with the participant every 30 s. No demands were made of the participant and occurrences of problem behavior were ignored. If problem behavior had just occurred and attention was scheduled to be delivered, attention was withheld for an additional 10 s.

A multi-element design was employed (i.e., conditions were presented in randomized order both within and across participants). Each condition lasted 10 min and a break of

approximately 2 min was instituted before the next condition was conducted. Three to four blocks of the four to five conditions were conducted for each participant over a 3-week period. Participants were therefore exposed to each condition three or four times.

For 30% of the observations, a second observer simultaneously but independently recorded occurrences of the participant and support-staff behaviors. Agreement on the occurrence of problem behaviors and support-staff behaviors was assessed on a 10-s interval-by-interval basis using Cohen Kappa statistic. Mean agreement on participant problem behaviors was 0.92 (range 0.63–1.00). Mean agreement on support-staff behaviors was 0.87 (range 0.65–1.00).

1.2.3. Informant-based assessment

All support-staff who worked in close contact with each participant were asked to complete the Questions About Behavioral Function (QABF) scale (Matson & Vollmer, 2000) after the experimental analysis had been completed. The QABF is a 25-item scale concerning five possible functions of problem behavior (*attention, escape, non-social, physical and tangible*) with five items relating to each possible function. Each item is rated on a 4-point likert scale from 0: “never” to 3: “always”. Thus, the maximum possible score for a particular function is 15. Inter-rater reliability for each subscale ranges from 0.79 to 0.99 (Matson & Vollmer, 2000). Claire’s pica was rated by 10 support-staff, Tom’s SIB by 6, John’s aggression by 5, and Paul’s aggression by 7 support-staff. Support-staff were not allowed to compare answers during the administration.

2. Results

2.1. Descriptive assessment

Table 1 shows the frequency per hour of the target problem behavior and the percentage duration of each environmental event observed for each participant. Tom showed the most frequent problem behavior (13.29 occurrences per hour) whilst Claire showed the least frequent problem behavior (4.67 occurrences per hour). The most frequent environmental event was tangibles for Tom (19.67%), attention for Claire (5.90%), and tangibles for John and Paul (41.25 and 76.11%, respectively).

To identify antecedents and consequences for each participant’s problem behavior, periods of time prior to and following occurrences of problem behavior were examined.

Table 1

Frequency of problem behavior and percentage duration of attention, demands and tangibles observed in the descriptive assessment

Participant	Problem behavior (frequency per hour)	Attention (% duration)	Demands (% duration)	Tangibles (% duration)
Claire	4.67	5.90	5.68	1.79
Tom	13.29	14.2	1.35	19.67
John	12.08	6.85	2.61	41.25
Paul	8.38	6.31	0.70	76.11

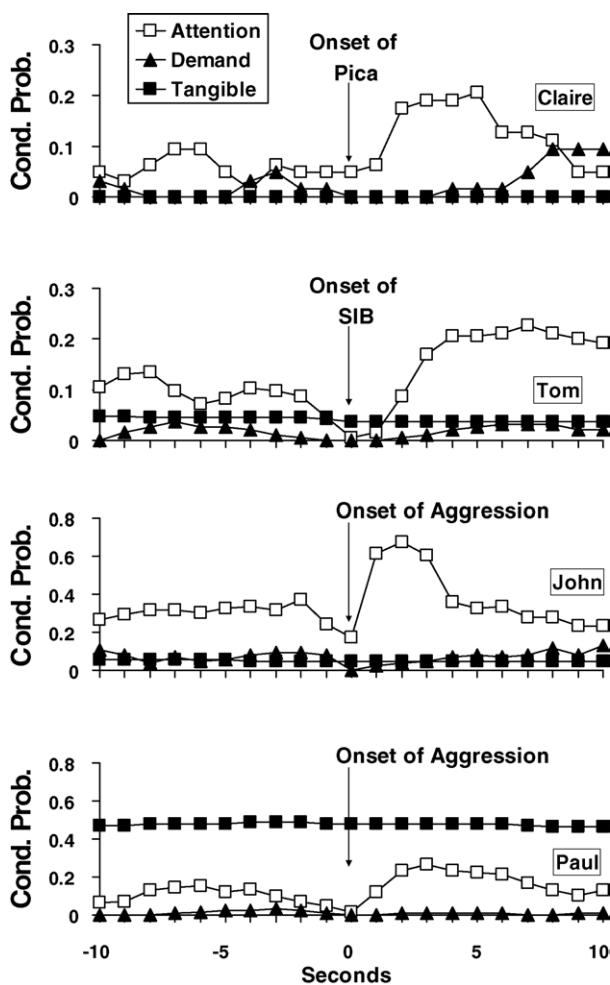


Fig. 1. Results of the descriptive assessment for each participant. Each graph shows the probability of attention, demands and tangibles occurring at each second in the 10-s period preceding and following the onset of problem behavior.

Fig. 1 shows the results of the descriptive assessment for each participant. Each graph in the figure shows the probability of support-staff behavior (*attention*, *demands*, and *tangibles*) occurring at each second in the 10-s period antecedent to and consequent to problem behavior.

The figure shows that for all participants, problem behaviors were most likely to be followed by support-staff attention. For Claire, Tom and Paul, the schedule of attention was relatively thin ($p = 0.2$) whilst for John, the schedule of attention was relatively rich ($p = 0.6$). For all individuals, the probability that attention occurred preceding the onset of the problem behavior was low (i.e., near zero). For Paul, the probability of tangibles preceding and following his aggression was high ($p = 0.5$). This reflected the fact that Paul

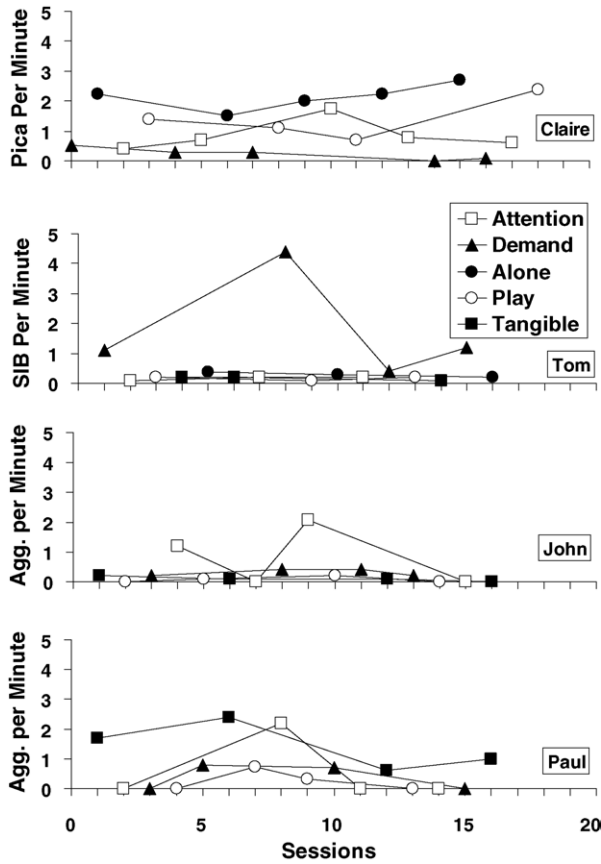


Fig. 2. Results of the experimental assessment for each participant.

would often hold on to magazines (his preferred activity) for long periods of time. However, because the probability of tangibles was high preceding the onset of his aggression, it appeared that tangibles was not a relevant functional variable.

2.2. Experimental assessment

Fig. 2 shows the results of the experimental assessment for each participant. The figure shows the frequency per minute of problem behavior occurring in each session.

The results of Claire’s experimental assessment showed that the highest levels of pica¹ occurred in the *alone* condition ($M = 1.9$ responses per minute), followed by *control* ($M = 1.40$), *attention* ($M = 0.85$), and *demand* ($M = 0.24$). Given that her pica persisted in the absence of social contingencies, and occurred at their lowest levels under conditions in

¹ Note that for Claire, the room was “baited” with pica items, i.e., small pieces of toilet tissue that were placed on the table in front of her.

which stimulation levels were relatively high (i.e., demand) these data were consistent with the hypothesis that her pica was maintained, at least in part, by non-social factors.

The results of Tom's experimental assessment showed that the highest levels of SIB occurred in the *demand* condition ($M = 1.78$) whilst low rates of SIB were observed in the other conditions (*attention*, $M = 0.17$; *control*, $M = 0.17$; *alone*, $M = 0.30$; *tangible*, $M = 0.17$). These results suggested that Tom engaged in SIB primarily to escape from tasks.

The results of John's experimental assessment showed that the highest levels of aggression occurred in the *attention* condition ($M = 0.85$) followed by *demand* ($M = 0.3$), *tangible* ($M = 0.10$) and *control* ($M = 0.08$). These results suggested that John engaged in aggression primarily to gain attention. The results of Paul's experimental assessment showed that the highest levels of aggression occurred in the *tangible* condition ($M = 0.55$) followed by *attention* ($M = 0.3$), *demand* ($M = 0.10$) and *control* ($M = 0.08$). These results suggested that Paul engaged in aggression primarily to gain tangible items (e.g., magazines).

2.3. Informant-based assessment

Fig. 3 shows the results of the informant-based assessment for each participant. The figure shows the percentage of care-staff that rated each subscale with the highest score.

Informants rated *Non-social* as the most likely function for Claire's pica (mean score = 12.1), *Attention* as the most likely function for Tom's SIB (mean score = 13.67),

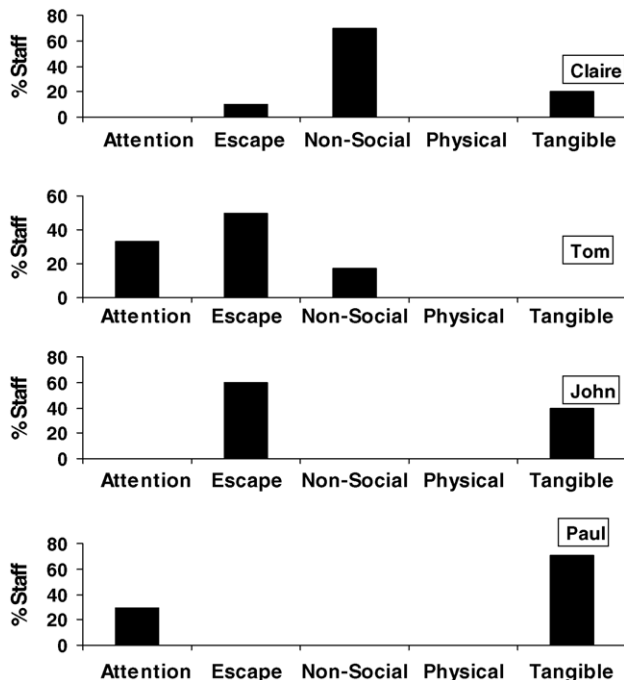


Fig. 3. Results of the informant-based assessment for each participant.

Table 2
Summary of assessment results

Participant	Function of behavior		
	Descriptive	Experimental	Informant-based
Claire	Attention	Non-social	Non-social
Tom	Attention	Escape	Escape
John	Attention	Attention	Escape
Paul	Attention	Tangible	Tangible

Escape as the most likely function of John's aggression (mean score = 11.8) and *Tangible* as the most likely function for Paul's aggression (mean score = 11.17).

2.4. Summary of assessment results

Table 2 shows a summary of the results from the three assessments for each participant.

The table shows that for three of the participants, the functions that were identified from each method of assessment were not always concordant. Claire's pica, for example, was identified as being "non-social" by the experimental and informant-based methods whilst the descriptive assessment identified her pica as being maintained by attention. Tom's SIB was identified as being maintained by escape in the informant-based and experimental assessments, whilst the descriptive assessment identified his SIB as being maintained by attention. John's aggression was identified as being maintained by attention in both the descriptive and experimental methods whilst the informant-based method identified his aggression as being maintained by escape. For Paul, the experimental and informant-based assessments identified his aggression as being maintained by tangibles whilst the descriptive assessment identified his aggression as being maintained by attention.

3. Discussion

In this study, the problem behaviors of four individuals with developmental disabilities were subjected to three methods of functional assessment: descriptive, experimental and informant-based. Comparison of the results of these assessments showed that the informant-based and experimental assessments were concordant in three out of the four cases (for Claire, Tom and Paul) whilst in one case (John), the descriptive and experimental methods were concordant. For Tom, the experimental and informant-based assessment identified an escape function for his SIB whilst the descriptive assessment identified attention. For Claire, the experimental and informant-based assessments identified a non-social function for her pica whilst the descriptive assessment identified attention. For Paul, the experimental and informant-based assessments identified a tangible function for his aggression whilst the descriptive assessment identified attention. Finally, for John, the descriptive and experimental assessments identified attention as a function for his aggression whereas the informant-based assessment identified escape. The concordance between descriptive and experimental assessments was therefore 25% whilst the concordance between informant-based and experimental assessments was 75%. From

these data, it appears that employing descriptive methods of functional assessment, in isolation to experimental assessments, would have failed to identify functions of problem behavior, or worse, would have identified functions of problem behavior (e.g., attention) when they were, in fact, inoperative.

In the study conducted by Lerman and Iwata (1993), the concordance between descriptive and experimental assessments was only 16.7%. These authors suggested two possibilities that may have accounted for the poor concordance. Firstly, they pointed out that in their descriptive assessment, it was possible that a relevant variable presented on a thin schedule of reinforcement (e.g., attention) may not have been detected in their conditional probability analysis. In order to try to overcome this problem in this study, the descriptive data was subjected to a time-based lag sequential analysis (Sackett, 1987). In this type of analysis, the probability of each environmental event was calculated at each second preceding and following the onset of the problem behavior. Using this method, in three of the four cases, the schedule of attention identified in the descriptive assessment was relatively thin ($p = 0.2$). That is, attention was presented contingent on the occurrence of the problem behavior, on average, only once every fifth time. Secondly, Lerman and Iwata (1993) pointed out that in their analysis, a relevant variable (e.g., escape) may have been masked by the occurrence of a high frequency irrelevant variable (e.g., attention). This scenario can be seen in the descriptive data for Paul where it was observed that he would hold on to his magazines for long periods of time. Not surprisingly, in the sequential analysis, the most likely consequence following Paul's aggressive behavior was tangibles (i.e., he was holding his magazines). However, the analysis also revealed that the most likely antecedent to Paul's aggressive behavior was also tangibles, suggesting that tangibles was an irrelevant variable in this case. These data suggest that adopting the method of sequential analysis employed in this paper may be useful in future descriptive analyses of problem behaviors.

Given the poor concordance between descriptive and experimental assessments found in this study and in the Lerman and Iwata (1993) study, it would appear that the validity of descriptive assessments can be questioned. Approximately 10 h of descriptive assessment data were collected for each participant in this study, requiring three to four visits to the clients' day center or home plus a large amount of time for data analysis. By comparison, only 2 h of experimental assessment data were required for each participant and the informant-based method required approximately 15 min for support-staff to complete. Given the time-consuming nature of descriptive assessments, and the questionable validity of the descriptive assessment itself, it would appear that information from descriptive assessments may not be a useful adjunct to experimental assessment. It is hoped that future studies will continue to improve the ecological validity of experimental assessments by conducting the assessment in naturalistic environments and training teachers and parents to administer the assessments.

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