

## BRIEF PROBES: A METHOD FOR ANALYSING THE FUNCTION OF DISRUPTIVE BEHAVIOUR IN THE NATURAL ENVIRONMENT

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**Abstract.** The present study illustrates the use of brief functional analysis probe conditions to verify the results of a descriptive assessment. An initial descriptive assessment of the disruptive behaviour of an 8-year-old student with severe developmental disabilities showed that levels of disruptive behaviour (screaming and throwing equipment) were higher in some lessons than others and suggested that the behaviour might be maintained by escape from task demands. An intervention in which work demands were alternated with 5-minute periods of free activity reduced levels of screaming to under 50%, and of throwing to under 25%, of baseline levels. Brief experimental variations of demand level in some lessons confirmed that levels of disruption were generally higher under high demand conditions. We conclude that brief probes provide a method by which experimental analyses can be conducted in the client's natural environment, reducing the problem of non-occurrence of the target behaviour that can pose problems for analogue assessments and facilitating ongoing assessment during initial intervention. We note also, however, that the consequent reduction in control over establishing operations may reduce the precision of the analysis and that ethical considerations limit the range of behaviours for which the method is appropriate.

*Keywords:* Functional analysis, severe developmental disabilities, disruptive behaviour, natural environment.

### Introduction

In recent years researchers have attempted to adapt functional analysis methodologies to the time and resource constraints typical of clinical settings. Wacker and his colleagues (Wacker et al., 1994) have developed brief functional analysis procedures typically comprising a single session using the methods of Iwata, Dorsey, Slifer, Bauman and Richman (1982) followed by a brief evaluation of hypotheses derived from that analysis in a mini-reversal

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or multi-element design. Results from such methods correspond with those from extended functional analyses in over 60% of cases (Kahng & Iwata, 1999), but these brief analyses fail to identify the functions of challenging behaviours in over 30% of cases, most commonly because the client shows no challenging behaviour during the assessment (Derby et al., 1992). Experimental analyses conducted in settings and by personnel other than those of the client's everyday environment may yield undifferentiated results because specific establishing operations, discriminative stimuli, and reinforcers occasioning or maintaining the problem behaviour in the natural environment are not replicated in the analogue environment (see e.g. Carr, Yarbrough, & Langdon, 1997; Richman & Hagopian, 1999; Ringdahl & Sellers, 2000). Carr et al. (1997) and Vollmer and Smith (1996) have recommended the use of descriptive analyses to identify relevant stimuli for incorporation into experimental analyses. An alternative strategy is to implement an experimental analysis in the client's natural environment. Sigafos and Sagers (1995) described a brief "discrete-trial" approach to functional analysis of the problem behaviours of two children with autism that was implemented in the children's regular classroom by their teacher. More recently, Anderson and colleagues (Anderson & Long, 2002; Freeman, Anderson, & Scotti, 2001) have described the use of a structured descriptive assessment method in which carers are asked to systematically and repeatedly implement in the client's natural environment antecedent conditions similar to those typically used in experimental analyses (e.g. task demands, reduced attention levels, or withdrawal of preferred objects), but without systematic control of consequences following challenging behaviour. In this paper we illustrate the use of an approach that is conceptually related, but so far as we are aware procedurally novel, namely brief functional analysis probe conditions implemented by the client's regular carers in the course of an intervention.

## Method

### *Participant*

The participant was Beth, an 8-year-old female with severe developmental disabilities attending a residential school for children with challenging behaviour associated with autism and/or severe learning disabilities. Her challenging behaviours included frequent episodes of screaming and throwing equipment in the classroom.

### *Recording and assessment methods*

Baseline measures of screaming and throwing were recorded by Beth's classroom teacher for 10 whole school days, using a 15-minute partial interval recording system. The lesson or activity in which Beth was involved during each 15-minute interval was also recorded. The results of this descriptive assessment showed higher levels of disruptive behaviour (screaming and throwing equipment) in lessons such as English and Maths. Screaming and throwing occurred respectively in 50% and 37% of 15-minute intervals during English, for example, but both occurred in only 12% of intervals during careers lessons. We hypothesized that lessons associated with higher rates of problem behaviour involved higher levels of academic task demand and that Beth's disruptive behaviour might be maintained by

escape from such demands. Further details of assessment and recording methods are given in an extended report available from the third author.

### *Intervention*

Based on the above assessment, an intervention was implemented in which the teacher alternated 5-minute periods of academic demands on Beth with 5-minute periods of free activity during those lessons which in baseline were associated with higher levels of disruptive behaviour. It was hypothesized that this reduction in the intensity of task demands would reduce escape-maintained disruptive behaviour. The impact of the intervention on Beth's behaviour was evaluated for a further 10 whole school days.

### *Experimental functional analysis*

In order to verify the results of the descriptive analysis, two sessions of experimental analysis were incorporated within the intervention phase. Each session was one hour long and was conducted between 9.30 and 10.30 a.m. during Maths and English (i.e. two lessons previously associated with high rates of disruption). In these sessions intervention conditions and continuous presentation of task demands were each implemented for 30 minutes, in counter-balanced order.

### *Follow-up*

Following the above monitoring, intervention continued, and 12 weeks after the end of the previous recording Beth's behaviour was again observed for five full school days.

### *Inter-observer reliability*

Inter-observer agreement was assessed by having a second observer record Beth's behaviour during eight one-hour sessions (four during baseline, two during the initial intervention, and two at follow-up), all on separate days. Inter-observer agreement was calculated by dividing the number of 15-minute periods in which the teacher and second observer agreed on the occurrence or nonoccurrence of a behaviour by the number of such agreements plus disagreements and expressing this figure as a percentage. Mean inter-observer agreement for screaming was 84% (range 75–100%) and mean inter-observer agreement for throwing was 72% (range 50–100%). Cohen's Kappa (calculated across all observations for each behaviour) was 0.64 for screaming and 0.4 for throwing.

## **Results**

As shown by Figure 1, alternation of work demands with 5-minute periods of free activity reduced screaming from a mean level of 22% of intervals during baseline to a mean level of 10% of intervals during intervention; throwing decreased from a mean level of 13% of intervals during baseline to a mean of 3% of intervals during intervention. These reductions were maintained at follow-up 12 weeks later. The brief probes confirmed that levels of disruptive behaviour returned to baseline levels under high demand conditions in three out

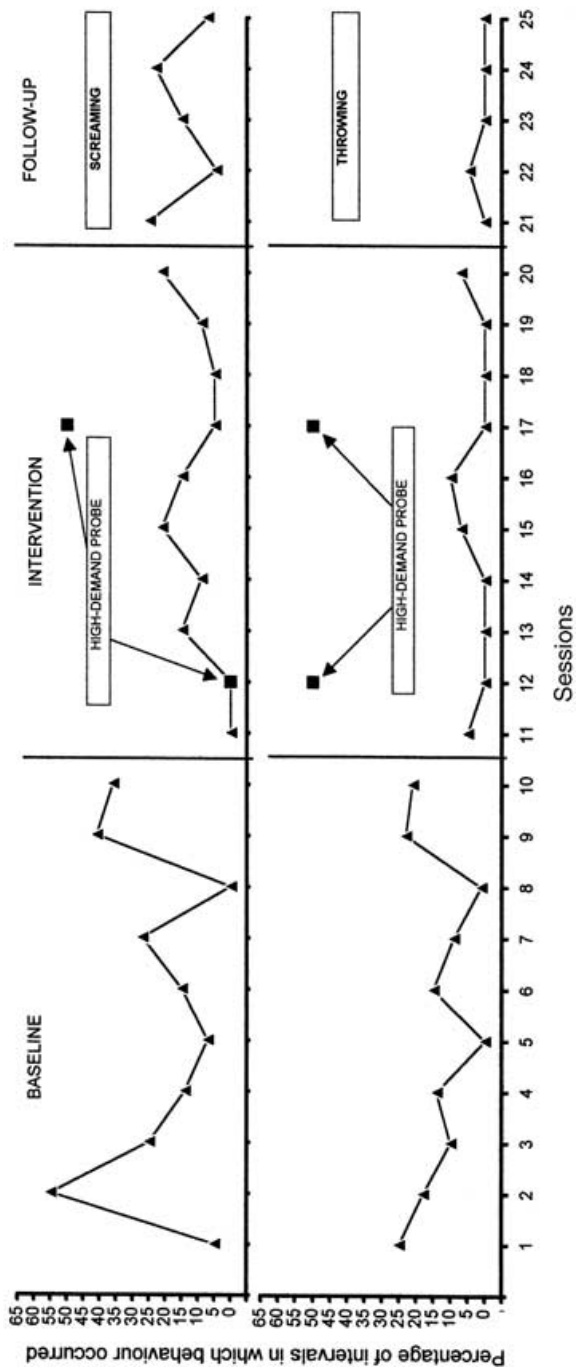


Figure 1. Levels of screaming and throwing during baseline, reduced-demand intervention (and high-demand probe periods) and follow-up

of four cases; in the fourth (screaming in the first probe session) no screaming occurred in either high or low demand conditions.

### **Discussion**

The functional relationship between the intervention and the improvement in the student's behaviour during the intervention phase was demonstrated by the functional analysis probes in which levels of disruptive behaviour were reduced during low demand conditions but generally returned to baseline levels during the high demand condition. The study therefore illustrates a further method for incorporating experimental analyses into interventions conducted within the client's natural environment so as to confirm that treatment effects are functionally related to the intervention procedure.

Nonoccurrence of the behaviour to be assessed is a substantial problem for single-session functional assessments conducted in analogue settings (Derby et al., 1992). In this study too, in one probe session, one behaviour (screaming) was seen in neither high nor low demand conditions, so this difficulty may not be entirely eliminated by implementing the functional analysis within the client's natural environment. Research directly comparing outcomes from analyses conducted in the natural environment and in analogue settings will be necessary to determine which strategy is more frequently successful in demonstrating differentiated patterns of responding across conditions. Embedding brief functional analysis probes within daily routines could also lead to other problems that may be better addressed by analogue environment procedures. Firstly, control over potential establishing operations for reinforcers may be reduced. Secondly, challenging behaviour may be sensitive to brief probes within extended treatment conditions only when the procedure involves manipulation of antecedent variables. Where consequence manipulations are involved use of brief probe conditions may allow insufficient opportunity for the client's behaviour to contact and respond to the change in contingencies. Finally, the use of experimental analyses in relatively uncontrolled conditions would only be appropriate (as in the present case) with relatively low-risk behaviours. For a behaviour such as self-injury or serious physical aggression, an experimental analysis could be justified only under appropriately controlled conditions.

Despite these limitations, conducting functional analyses in the natural environment, and especially embedded within the treatment phase, may have the advantage of allowing analyses to be continued without repeatedly removing the client from his/her natural setting or delaying the initiation of treatment, and hence may enable more extended and detailed analyses to be conducted (cf. Horner, 1994). The analysis in the present case could, for example, be extended to determine exactly what it is about demands (e.g. task difficulty or subject matter) that is aversive. The use of brief functional analysis probes within interventions in the natural environment may therefore enable more detailed assessment and hence more individualized interventions in everyday clinical practice.

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