

# Functional Analysis of Challenging Behaviours in People with Severe Intellectual Disabilities Using The Observer XT 10.0 Software

C. Delgado<sup>1</sup>, R. García<sup>1,2</sup>, J.I. Navarro<sup>1</sup>, E. Hinojo<sup>2</sup>

<sup>1</sup>*Department of Psychology, University of Cadiz, Spain.* <sup>2</sup>*AFANAS-JEREZ, Centro Vistahermosa, Spain.*

<sup>1</sup>*candida.delgado@uca.es*

## Abstract

Challenging behaviours (self-injuries, physical or verbal aggression, and material destruction) are particularly prevalent in adults with intellectual disabilities and are one of the main challenges for researchers. Several studies show that such people are 3-to-5 times more at risk of behaviour problems than the general population. The development of functional analysis to assess behaviour has provided clinicians with effective methodology for the empirical assessment of the functions of a particular behaviour. Therefore, in order to undertake effective intervention, we should carry out a prior functional assessment of behaviour. The aim of this is to gather and synthesize information in order to define the behaviour, determine its motivation, and describe the environment associated with high and low rates of this behaviour. This paper presents a new system of assessment and the behavioural analysis of a person with a severe intellectual disability and challenging behaviour. This system uses a triangular design analysing the participant, environment and interaction. Assessment was carried out using recordings and *The Observer XT 10.0*. This software has several advantages over previous behavioural methods. The statistical analysis module allowed us to filter data, select information and visualize the context in which challenging behaviours occur, in order to discover functions, antecedents and consequences of those behaviours, as well as frequency, duration and intensity.

## Introduction

There is a consensus that behaviour problem interventions are more effective when based on the results of a functional evaluation identifying the variables underlying the individual's challenging behaviour [7]. Therefore, in order to undertake effective intervention, we should carry out a prior functional assessment of the behaviour. The aim of this is to gather and synthesize information to define the behaviour, determine what underlies it, and describe the environmental context associated with high and low rates of this behaviour [6]. Then we can implement an intervention that changes the environment to increase appropriate behaviour and reduce challenging behaviour, teaches new skills, and guarantees the safety of all those involved [3, 4]. Epidemiological studies of self-injury and other challenging behaviours [1] have shown that the function of those behaviours can be identified in most cases. However, a study by Thompson *et al.* [8] which evaluated aggressive behaviour in a child with severe intellectual disabilities showed that the conclusions obtained by a functional analysis were inconclusive in those cases in which the self-injury, aggressive or destructive behaviour was supported by automatic reinforcement. This suggests that when challenging behaviour is supported by social responses, treatment usually involves breaking the reinforcement, extinction and positive reinforcement of adapted behaviours. However, when the reinforcement responsible for maintaining the challenging behaviour is automatic, it is more difficult to design an intervention because the specific reinforcer that is responsible for maintaining the behaviour is unknown or impossible to manipulate.

In this study we present a system of objective evaluation and the consequent behavioural analysis of a person with a severe intellectual disability. This system uses a triangular design which analyses the participant, environment and interaction [5]. Assessment was carried out using recordings and *The Observer XT version 10.0*. The aim of this process was to design an individual programme to reduce or eliminate the individual's challenging behaviour, replacing it with pro-social behaviour.

## Methodology

*Participant.* A 40-year-old male who has been diagnosed with profound intellectual disability, autism and extremely challenging behaviour participated in this study. His behaviour, defined as violent and sometimes dangerous, includes: (1) *self-injury*, defined as behaviour in which he injures himself; (2) *physical aggression*: behaviour causing physical pain to others; (3) *repetitive or stereotyped behaviours*: unusual or bizarre behaviours; (4) *socially-offensive behaviours*: behaviours that offend others; (5) *disruptive behaviours*: those that interfere with the work of others. These behaviours have been present since childhood. The user has twice undergone a neurosurgical intervention (bilateral cryohypothalamotomy) to reduce problem behaviour and has been prescribed psychotropic drugs permanently. Following neurosurgical intervention, aberrant behaviours decreased slightly, although they continue to be present in his repertoire. We used various methods of behaviour modification to reduce or eliminate aberrant behaviour, including negative reinforcement, extinction, negative punishment, positive punishment, and time-out. However, even though his behaviour changed, challenging behaviours still remained in his repertoire, harming both himself and those around him.

*Materials and procedure.* First we gathered information about the participant through the review of his medical records, collecting data concerning his diagnosis, etiology, behavioural problems, medication, physical health and mental health, intervention undertaken so far and his personal history. We conducted an interview with his care staff and family, in order to understand why these challenging behaviours appear, whether there has been any variation in these behaviours, and what is currently being done to correct them. We also administered different evaluation tests *Diagnostic Assessment for the Severely Handicapped*, *Autism Diagnostic Interview-R* and *Inventory for Client and Agency Planning*). Finally, we performed behaviour observation by recording him in his natural environment in different contexts at the Day-Stay Unit. The family was informed and agreed to this study.

The participant's operative challenging behaviours were defined as follows: (1) *self-injury*: banging his head, belly, chest, leg, hand or arm, (2) *physical aggression*: kicking, head banging, hitting or punching, (3) *repetitive or stereotyped behaviours*: wandering or swinging, (4) *socially-offensive behaviours*: urinating in the work room, being naked in public, (5) *disruptive behaviours*: escaping from the room during working hours or throwing or destroying the material. Repetitive or stereotyped behaviours were defined by duration, in order to know the time involved in such behaviour. Self-injurious, physical aggression, socially-offensive and disruptive behaviours were defined as discrete behaviours and the frequency and intensity with which they occurred were recorded. We also defined *antecedents* (stimuli that explain the presence of challenging behaviours) and *consequences* (social response of the environment when challenging behaviours happen) individually, after the information provided by care staff and family. So, antecedents were classified as: (1) Not paying attention, defined as those situations in which no attention had been paid to the subject before the onset of challenging behaviour, (2) Interruption, defined as those situations in which someone interacted with the subject and prevented him from doing something he liked, (3) Transitions, understood as those times when a change was made from one activity to another, (4) A difficult task, defined as those circumstances in which the subject was asked to do an activity, (5) Receiving an order, conceptualized as the time when the subject was asked to collaborate and (6) Attempted communication, understood as those situations where the subject attempted to deliver a message to the staff member. Consequences were classified as: (1) Obtain self-stimulation: situations where the subject was involved in episodes of challenging behaviour without getting any social result, (2) Get attention: situations in which the subject was involved in challenging behaviours and immediately received attention from the direct care staff, (3) Get an object or an activity: situations where the subject was involved in episodes of challenging behaviours and immediately received an object or performed a desired activity, (4) Avoid orders: situations in which, following an order by the direct care staff, the subject was involved in challenging behaviours and avoided obeying the order, (5) Avoid activity: situations where, after a request for an activity to be done, the subject was involved in challenging behaviours and managed to avoid doing it (6) Avoid people: situations in which the subject was involved in challenging behaviours in response to social interaction with someone.

We selected a continuous observation method because of the low frequency of some behavioural problems. Recordings each lasted two hours and covered the entire period in which the user was working at the Day-Stay

Unit. Data collection was carried out for 15 non-consecutive days, over a total period of a month and a half, for a total of 30 hours. Recordings were made in different contexts (classroom, dining and on entertainment trips). Finally, these materials were recorded manually and later analysed with The Observer XT 10.0, a tool for observing and analysing all types of behaviour.

## Results and Discussion

Data obtained by The Observer XT provided extensive information about the frequency or duration of behaviours, and this allowed us to design a person-centred intervention, aimed at reducing or eliminating challenging behaviours and increasing the occurrence of appropriate behaviour. Figure 1 shows challenging behaviour frequency. The most predominant behaviour in the behavioural repertoire was self-injury (N=391). The most prevalent behaviours were: hitting his leg ( =13.67), head banging ( = 6.80) and hitting his hand ( =3.00). In terms of physical aggression (N=83), the most frequent was hitting others ( =4.07) (Table 1).

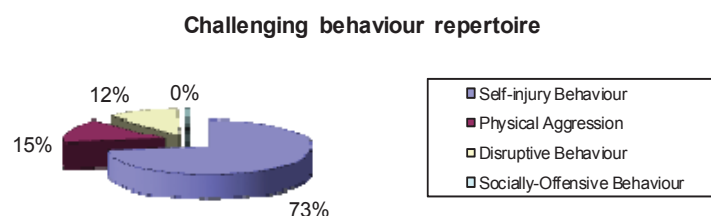


Figure 1. Frequency of challenging behaviours observed in 15 days.

|                                       | N          | Min. | Max. | Mean  | SD    | Rate/min |
|---------------------------------------|------------|------|------|-------|-------|----------|
| <b>Self-injury behaviours</b>         | <b>391</b> |      |      |       |       |          |
| Hitting his leg                       | 205        | 0    | 53   | 13.67 | 18.02 | 0.17     |
| Banging his head                      | 102        | 0    | 22   | 6.80  | 9.03  | 0.09     |
| Hitting his hand                      | 45         | 0    | 19   | 3.00  | 6.00  | 0.05     |
| Hitting his arm                       | 20         | 0    | 15   | 1.33  | 3.89  | 0.02     |
| Hitting his belly                     | 9          | 0    | 4    | 0.60  | 1.18  | 0.008    |
| Hitting his face                      | 6          | 0    | 3    | 0.40  | 1.06  | 0.005    |
| Hitting his chest                     | 4          | 0    | 3    | 0.27  | 0.80  | 0.003    |
| <b>Physical Aggression behaviours</b> | <b>83</b>  |      |      |       |       |          |
| Hitting                               | 61         | 0    | 20   | 4.07  | 5.81  | 0.05     |
| Kicking                               | 13         | 0    | 4    | 0.87  | 1.51  | 0.01     |
| Head banging                          | 5          | 0    | 3    | 0.33  | 0.90  | 0.004    |
| Punching                              | 4          | 0    | 1    | 0.07  | 0.26  | 0.002    |
| <b>Socially-Offensive behaviours</b>  | <b>2</b>   |      |      |       |       |          |
| Being naked in public                 | 1          | 0    | 1    | 0.07  | 0.26  | 0        |
| Urinating in classroom                | 1          | 0    | 1    | 0.07  | 0.26  | 0        |
| <b>Disruptive behaviours</b>          | <b>62</b>  |      |      |       |       |          |
| Escaping the work room                | 35         | 0    | 9    | 2.33  | 2.72  | 0.03     |
| Throwing material                     | 27         | 0    | 6    | 1.80  | 2.43  | 0.02     |

Table 1. Results obtained after analysis of the challenging behaviours observed.

The Observer XT allowed us to make a more precise behavioural analysis by considering the frequency of *antecedents* and *consequences*, thus identifying functionality for the observed behaviours. Most problem behaviours occur when the subject is not receiving any attention (F=50), he is interrupted (F=19), after receiving an instruction (F=7), he is doing a difficult activity (F=6), he becomes frustrated because of his inability to communicate (F=1), or he changes activity (F=1) (Table 2). Therefore, challenging behaviours functions were: achieve self-stimulation (F=33), seek attention (F=18), obtain a desired object, undertake a desired activity

(F=9), avoid other people (F=9), avoid carrying out instructions (F=8), or avoid carrying out tasks (F=6). Figure 2 represents the frequency and duration of all challenging behaviours observed in the subject after The Observer XT. Each colour represents a different behaviour (e.g. "banging his head" is shown in blue), the frequency of each behaviour is represented by a vertical line, while the duration is represented by a bar whose length is determined by the time of the behaviour.

Table 2. Relationship between antecedents and consequences of the challenging behaviours observed.

|                        | Self-injury     |                  |                  |                 |                 |                   |                   | Physical aggression |          |         | Disruptive | Total             |    |
|------------------------|-----------------|------------------|------------------|-----------------|-----------------|-------------------|-------------------|---------------------|----------|---------|------------|-------------------|----|
|                        | Hitting his leg | Banging his head | Hitting his hand | Hitting his arm | Hitting his arm | Hitting his belly | Hitting his chest | Hitting             | Punching | Kicking | Escaping   | Throwing material |    |
| <i>Antecedents</i>     |                 |                  |                  |                 |                 |                   |                   |                     |          |         |            |                   |    |
| Not paying attention   | 9               | 6                | 13               | 3               | 2               | 2                 | 2                 | 2                   | 2        | 1       | 7          | 1                 | 50 |
| Interruption           | 1               | 1                | 5                | -               | -               | -                 | -                 | 7                   | 1        | 2       | 1          | 1                 | 19 |
| Transition             | -               | -                | -                | -               | -               | -                 | -                 | -                   | -        | -       | 1          | -                 | 1  |
| Difficult task         | 1               | 2                | -                | -               | -               | 1                 | -                 | 2                   | -        | -       | -          | -                 | 6  |
| Receive an instruction | 1               | 1                | 1                | -               | -               | 2                 | -                 | -                   | -        | -       | 1          | 1                 | 7  |
| Communication attempt  | -               | -                | -                | -               | -               | -                 | -                 | 1                   | -        | -       | -          | -                 | 1  |
| <i>Consequences</i>    |                 |                  |                  |                 |                 |                   |                   |                     |          |         |            |                   |    |
| Get self-stimulation   | 7               | 6                | 12               | 3               | 2               | 2                 | -                 | 1                   | -        | -       | -          | -                 | 33 |
| Get object/activity    | 1               | 1                | 3                | -               | -               | -                 | -                 | 2                   | -        | -       | 2          | -                 | 9  |
| Gain attention         | 1               | -                | 1                | -               | -               | 1                 | 1                 | 2                   | 2        | 1       | 8          | 1                 | 18 |
| Avoid instruction      | 1               | -                | 2                | -               | -               | 2                 | -                 | 2                   | -        | -       | -          | 1                 | 8  |
| Avoid activity         | 1               | 2                | -                | -               | -               | 1                 | -                 | 1                   | 1        | -       | -          | 1                 | 6  |
| Avoid people           | 1               | 1                | 1                | -               | -               | -                 | -                 | 3                   | 1        | 2       | -          | -                 | 9  |

This software allowed us to describe challenging behaviours accurately, quantify human behaviour, and generate results through a rigorous statistical analysis letting us select each variable analysed. In summary, The Observer XT offers the possibility of visualizing the context in which challenging behaviours occur many times, in order to discover functionality of those behaviours, the antecedents and consequences that determine them, as well as their frequency, duration and intensity. At the same time, the statistical analysis module allows us filter data and select relevant information in order to discover the factors that may be involved in maintaining the participant's

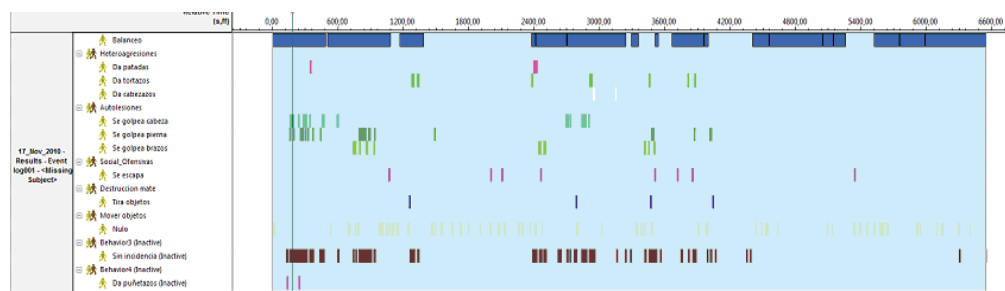


Figure 2. Frequency and duration of challenging behaviours observed in the subject in a day of observation.

challenging behaviours. This is very different from the other behaviour recording systems (e.g. *O'Neill's details of systematic observation*, *Aberrant Behaviour Checklist Scale*) used to perform a functional or topographical assessment. They do not offer the possibility of repeating the episode in which challenging behaviour occurred in order to perform a precise analysis of the antecedents and consequences explaining occurrence of the behaviour. This may cause confusion in the observer when defining the function of that behaviour. This may also affect the reliability and validity of the study, misrepresenting elements involved in such behaviour. In practice, the antecedent and consequent periods involved in narrative ABC records are rarely defined in a sufficiently precise way that either conditional or unconditional probabilities can be determined with any degree of confidence [2]. As a result, the information provided by narrative ABC charts can only have a very general value in determining basic response dimensions (e.g. the rate of occurrence of challenging behaviours) and the relationship between challenging behaviour and general setting variables (e.g. time, location). Thus, while the narrative descriptions of antecedent and consequent events may generate some tentative hypotheses for further investigation, they are far from providing a "convincing demonstration" of underlying behavioural processes. Although the software used clearly has advantages over previous methods of behavioural observation, we would like make some comments about our experience. The Observer XT had some limitations in terms of cost and time on data collection. Secondly, there are limitations in the supported video formats, which do not include HD-quality video. This makes the data entry process very slow, with more time being spent on converting video than on data entry.

## References

1. Derby, K. M., Wacker, D. P., Sasso, G., Steege, M., Northup, J., Cigrand, K., & Asmus, J. (1992). Brief functional assessment techniques to evaluate aberrant behaviour in an outpatient clinic: A summary of 79 cases. *Journal of Applied Behavior Analysis* **25**, 713–721.
2. Emerson, E. (1995). *Challenging behaviour: Analysis and intervention in people with learning difficulties*. Britain: Cambridge.
3. Horner, R. & Carr, E. G. (1997). Behavioral supports of students with severe disabilities: Functional assessment and comprehensive intervention. *Journal of Special Education* **31** (1), 84-104.
4. Horner, R., Dunlap, G., Beasley, J., Fox, L., Lambara, L., Brown, F. & cols. (2005): Positive support for behavioural, mental health, communication and crisis needs. In K. Lakin & A. Turnbull (Eds.), *National goals and research for people with intellectual and developmental disabilities* (pp. 93-208). Washington, DC: American Association on Mental Retardation.
5. Pascual-Leone, J. (2007). Comments to the Practice Guidelines for diagnostic, treatment and related support services for persons with intellectual disabilities and problem behaviour.
6. Repp, A. C. & Horner, R. H. (1999). *Functional analysis of problem behaviour: From effective assessment to effective support*. Belmont, CA: Wadsworth.
7. Sigafos, J., Arthur, M., & O'Reilly, M. (2003). *Challenging behaviour and developmental disability*. London: Whurr Publishers.
8. Thompson, R. H., Fischer, W. W., Piazza, C. C., & Kuhn, D. E. (1998). The evaluation and treatment of aggression maintained by attention and automatic reinforcement. *Journal of applied behaviour analyses* **31**, 103-116.