Evidence-Based Practice in the Classroom: Evaluating a Procedure for Reducing Perseverative Requesting in an Adolescent with Autism and Severe Intellectual Disability

Jeff Sigafoos*\(^a\), Jennifer Ganz\(^b\), Mark O’Reilly\(^c\) and Giulio Lancioni\(^d\)

\(^a\)Victoria University, Wellington, New Zealand; \(^b\)University of Texas, San Antonio, USA; \(^c\)University of Texas, Austin, USA; \(^d\)University of Bari, Italy

Management of inappropriate behaviour is a major priority in special education. Evidence-based practice dictates that interventions to reduce inappropriate behaviour should be evaluated at the individual level to demonstrate their efficacy in the classroom. This study illustrates the evaluation of an evidence-based procedure (response interruption) for reducing perseverative requesting in an adolescent boy with autism and severe intellectual disability. The boy used a speech-generating device to request snacks during baseline and response interruption conditions. During both conditions, the boy had to wait 30 seconds while the snack was being prepared. Requests that occurred during this wait interval were defined as perseverative. Intervention involved blocking perseverative requests and prompting the child to wait. An ABAB design was used to evaluate the effects of the response interruption procedure. The results demonstrated that response interruption effectively reduced perseverative requesting, while maintaining appropriate requesting at other times. The study illustrates how special educators might evaluate evidence-based practice in the classroom.

Management of inappropriate behaviour is a major priority in special education. Mastropieri (2001) reported that behaviour management was in fact the number one challenge for first-year special education teachers. The growing movement towards a more evidence-based approach in special education dictates that teachers should make use of proven interventions to reduce inappropriate classroom behaviour (Smith, 2003). That is, educators should implement procedures that are research-based and which have demonstrated efficacy for classroom application. Fortunately, a number of

*Corresponding author. College of Education, Victoria University of Wellington, PO Box 17–310, Karori, Wellington, New Zealand. Email: jeff.sigafoos@vuw.ac.nz

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effective interventions, based on the principles of applied behaviour analysis, have been developed and validated for improving learning and reducing inappropriate classroom behaviour (Smith, McAdam, & Napolitano, 2007; Wheldall & Carter, 1996).

However, while a range of empirically validated procedures exists for managing inappropriate classroom behaviour, evidence-based practice requires more than simply identifying an effective intervention and then implementing the associated procedures with a high degree of fidelity. As noted by Linscheid (1999), educators must also be able to modify the procedures to suite the unique characteristics of the individual and context. Along these lines, Sigafoos, Drasgow, and Schlosser (2003) argued that evidence-based practice requires educators to collect data on the learner’s response to intervention. This data is necessary to determine whether or not the intervention is working when applied to specific students in specific classroom contexts. An important consideration in undertaking such evaluations is to ensure that the evaluation process enables the teacher to rule out the influence of potentially confounding or extraneous variables. This requires an evaluation design that controls for maturation, history, and practice effects, etc. (Kennedy, 2005). An evaluation involving a proper single-case experimental design, such as the design used in the present study, is one way that teachers can evaluate the effects of intervention at the level of the individual student. Such evaluations can provide convincing evidence that the intervention was in fact responsible for any changes in the student’s behaviour.

The present study illustrates the use of a single-case experimental design for evaluating the effects of an evidence-based behaviour management procedure in the classroom setting. In the remainder of this article, we will illustrate a process for identifying and evaluating a procedure for reducing inappropriate requesting behaviour in an adolescent with autism and severe intellectual disability. The process begins by reviewing background literature that assists in identifying a relevant procedure for evaluation. Following this, we provide details on the context of the evaluation and how the procedure was implemented and evaluated. This is followed by presentation and discussion of the results.

Review of Background Literature

Many individuals with autism and severe intellectual disabilities fail to develop functional speech and are therefore candidates for augmentative and alternative communication (Beukelman & Mirenda, 2005). Emerging evidence suggests that the use of speech-generating devices (SGDs) may represent a viable mode of communication for such individuals (Schlosser & Bilschak, 2001). SGDs produce digitized or synthetic speech output when the individual presses a panel or switch to operate the device. SGDs offer several potential advantages over manual signs or picture-board communication systems, including (a) a built-in attention-gaining component, (b) availability of natural speech output, and (c) the ability to generate lengthy and precise messages from a single and often simple panel pressing response (Schepis, Reid, & Behrman, 1996).
Individuals with autism and severe intellectual disabilities who lack spoken language have been successfully taught to use SGDs for achieving functional outcomes, such as requesting access to preferred objects (Sigafoos, Didden, & O’Reilly, 2003; Sigafoos & Drasgow, 2001). Successful interventions include: (a) creating motivation by offering preferred objects, (b) prompting correct responses, (c) gradually withdrawing or fading the use of these prompts, and (d) reinforcing correct responses by providing access to the requested item. Sigafoos, O’Reilly, Seely-York, and Edrisinha (2004) applied these procedures in teaching three adolescents with developmental disabilities to request preferred items using a SGD. During a single 20-minute teaching session, each child was offered preferred items, prompted to touch the correct panel on the SGD using the least amount of physical guidance necessary, and then reinforced with the preferred item. Implementation of these procedures was associated with rapid acquisition of requesting response in all three participants.

While Sigafoos et al. (2004) demonstrated rapid acquisition of functional communication using the procedures described above, several problems can emerge following acquisition of an initial requesting repertoire. One problem is the failure to initiate communication when the SGD is not readily accessible. This problem has been solved by teaching individuals to search for and locate their SGD when it is not readily at hand (Sigafoos et al., 2004). Another problem involves using the newly acquired communication response even when no such response is required (Reichle & Johnston, 1999; Reichle & McComas, 2004). For example, the child might use the SGD even when the preferred item is within easy reach and therefore no request is needed to access it. Implementing additional procedures to teach conditional use of requesting is one way that this problem has been solved. Sigafoos (1998), for example, taught conditional use of requesting to a 6-year-old boy with autism. Conditional use was defined as using his augmentative communication system only when preferred items were out of reach and thus not readily accessible. This conditional discrimination was taught by reinforcing requests only when items were out of reach.

A third problem, for which there does not yet appear to be any empirically-supported solutions, arises when the child engages in perseverative requesting. Perseverative requesting, in the present context, refers to making repeated requests even after being informed to wait for the requested item. While perseverative requesting might arise from a history of intermittent reinforcement (Ferster & Skinner, 1957), it can represent a problematic response pattern that is disruptive to the classroom environment, socially unacceptable, and potentially stigmatizing. For example, it would be inappropriate for the individual to make repeated requests for a preferred food item as the snack is being prepared. It would be more appropriate for the individual to make a single request when it was clear the snack was ready for consumption.

An important applied question is whether perseverative requesting can be reduced while at the same time maintaining appropriately timed requests. One potential solution might be to interrupt perseverative requesting, but continue to differentially reinforce the first request that occurs after an appropriate window of opportunity has
been signalled (e.g., after being informed that the snack is now ready for consumption). While response interruption has been used to reduce behaviours that occur at inappropriately high rates (Lennox, Miltenberger, & Donnelly, 1987), its use for reducing perseverative requesting remains untested. That is, the procedure is research-based, but it has not yet been evaluated for reducing perseverative requesting. The purpose of the present study was to illustrate how a procedure such as response interruption could be modified for a specific purpose and evaluated to determine its effectiveness for an individual student in a typical classroom setting.

**Evaluation Context and Methodology**

**Participant**

Ryan was a 12-year-old boy diagnosed with autism who appeared to function in the severe range of intellectual disability, although IQ scores were not available. His limitations in adaptive behaviour functioning, based on results from the Vineland Adaptive Behavior Scales—Interview Edition (Sparrow, Balla, & Cicchetti, 1984), were consistent with a need for extensive to pervasive supports (Luckasson et al., 2002). He also scored in the severely autistic range on the Childhood Autism Rating Scale (Schopler, Reichler, & Rennner, 1988). He did not speak any words, but could vocalize a few speech-like sounds. Vision, hearing, and motor skills were unimpaired. Ryan usually responded appropriately to simple spoken and gestured commands from adults such as *Come here*, *Wash your hands*, and *Sit down*. He could feed, dress, and toilet himself, but required assistance with most other self-care tasks (e.g., tying his shoes, bathing, brushing his teeth).

Prior to his involvement in our communication intervention program that included teaching him to use a SGD, Ryan communicated mainly by pointing to objects that he wanted. He also used a few manual signs (e.g., WANT, MORE) that appeared to function as requests, but these were considered less functional than a SGD because few people in his home, school, and community knew sign language. After learning to use a SGD to make requests, as reported elsewhere (Sigafoos et al., 2004), he was referred for this intervention because he engaged in perseverative requesting of food items that were currently not available or were in the process of being prepared for consumption. When adults responded to his initial request by informing him that he had to wait, he simply continued to make requests. His frequent requesting was disruptive to the classroom routine and therefore had to be reduced, while maintaining appropriate use of the SGD.

**Setting**

Ryan attended a private school for children with autism. Four other students with similar diagnoses, a teacher, and two teaching assistants were typically present in the classroom during sessions. Sessions were conducted in his classroom during a
morning snack time. During each session, the trainer, a reliability observer, and Ryan sat at the snack table. A SGD that Ryan had previously been taught to use to request preferred items was placed on the table directly in front of him throughout each session.

**Speech Generating Device**

Ryan used a BIGmack® switch (AbleNet, Inc.) that was programmed with a single pre-recorded voice message: ‘I want a snack.’ The message was activated each time Ryan touched the switch. A black and white line drawing representing WANT (Mayer-Johnson Co., 1994) was affixed to the surface of the BIGmack switch.

**Preference Assessment**

A preference assessment was conducted across six potential snack items to identify one highly preferred snack item and one less preferred snack item. Each item was individually offered to Ryan on 12 occasions. An offer consisted of placing the item on a tray, moving the tray within reach, and allowing Ryan 10 seconds to make a selection. Because crackers were selected on all 12 occasions that they were offered, this snack was designated as the high-preference item. Juice was designated as the low-preference item because it was selected on only 3 of the 12 opportunities.

**Data Collection and Experimental Design**

Data were collected during sessions lasting about 10 minutes. A session consisted of 10 opportunities to request access to the preferred items. The high-preference item was presented on even-numbered opportunities (i.e., 2, 4, 6, 8, & 10), whereas the low-preference item was presented on odd-numbered opportunities (1, 3, 5, 7, & 9). Sessions were conducted under two conditions: Baseline (or No Interruption) and Response Interruption. These two phases of the study alternated in an ABAB experimental design to evaluate the effects of response interruption on perseverative requesting while controlling for the influence of extraneous variables (Kennedy, 2005).

**Baseline (No Interruption)**

Each baseline opportunity was initiated when the trainer presented one of the two snack items (i.e., either juice or a cracker) and said to Ryan, ‘It’s not ready yet. You have to wait.’ The trainer then began to prepare the snack for consumption (e.g., pouring the juice into the cup, placing the cracker on a plate). This preparation period was timed to last 30 seconds. The trainer and reliability observer counted the number of times Ryan pressed the switch during this 30-second preparation interval. Switch activations that occurred during this 30-second interval were defined as
perseverative requests, but were ignored. At the end of this 30-second interval, the trainer said: ‘OK, it's ready now.’ At this point, Ryan had a 5-second window of opportunity in which to request the prepared snack using the SGD. Any switch press that occurred during this 5-second window was defined as a correct request and reinforced by giving Ryan access to the snack item. After he had consumed the requested snack item, the next opportunity was initiated. If he did not make a correct request during the 5-second window of opportunity, the snack item was removed from the table and the next opportunity was initiated approximately 10 seconds later.

Response Interruption

The procedures in effect during this condition were identical to baseline, except that (a) the response interruption procedure was implemented contingent upon each attempt by Ryan to produce a perseverative request and (b) the definition of a perseverative request was expanded to include any attempts by Ryan to operate the SGD. An attempt was defined as Ryan moving his hand towards the switch as if he was about to press it. Each attempt was counted as a perseverative request to equate data collection across the two conditions of the study. Specifically, each time Ryan attempted to activate the SGD during the 30-second preparation period, the trainer interrupted his attempted request. To interrupt his request, the trainer moved Ryan’s hand away from the SGD, held his hand away from the switch for 5 seconds, and repeated the phrase ‘It’s not ready yet. You have to wait.’

Inter-Observer Agreement and Treatment Integrity

The trainer and one of several reliability observers independently collected data on perseverative and correct requesting during every opportunity. Agreement between the trainer and observer on the number of perseverative requests per opportunity was calculated using the formula: Smaller number/larger number x 100%. Agreement across opportunities ranged from 72 to 100% with a mean of 97%.

Independent observers also assessed treatment integrity on every opportunity by noting whether or not the trainer implemented the procedures as specified on a prepared data sheet. There was only one opportunity during which the trainer failed to implement all of the procedures correctly. This occurred during the final response interruption phase when the trainer mistakenly pointed to the SGD to prompt Ryan to produce a correct request during the 5-second window of opportunity.

Results

Figure 1 shows the number of perseverative requests across successive opportunities (upper panel) and the mean percentage of correct requests for each phase of the study (lower panel). The number of perseverative requests for the low-preference item (juice) during the initial baseline (No Interruption) phase ranged from 15 to 24
per opportunity with a mean rate of 18.2. The corresponding range for the high-preference item (cracker) was 18 to 22 with a mean of 19.6. The data from this first baseline phase therefore demonstrated that Ryan engaged in relatively high and stable rates of perseverative requesting with little difference between the high- and low-preference items.

When the response interruption procedure was first implemented, the number of perseverative requests decreased to a mean of 4.8 (range = 1-10) for the low-preference item and to 13.4 (range = 4-15) for the high-preference item. The data from this first treatment phase revealed greater reductions and less variability in rates of perseverative requests for the low-preference item when compared to the high-preference item.

With the return to the baseline (No Interruption) conditions, perseverative requesting increased to means of 14 and 13.4 for the low- and high-preference item, respectively. The level of perseverative requesting was not as high as during the first baseline phase and there was also greater variability in the data during this second baseline phase, as indicated by response rates that ranged from 6 to 20 and 7 to 22 for the low- and high-preference item, respectively.

In the final phase, during which response interruption was reinstated, perseverative requesting decreased to a low and stable level (mean = 2.1 responses per
opportunity) for both the low- and high-preference item. The level of responding showed a large change from the previous baseline (No Interruption) phase and continued to show a steady decrease to zero during this final phase of the study.

In contrast to the changes observed in perseverative requesting, correct requesting was maintained at a consistently high percentage throughout the study. The one exception was the relatively low percentage of correct requests for the high-preference item during the initial baseline (No Interruption) condition (40%). In all subsequent phases of the study, both items were correctly requested on 80% or more of the opportunities.

**Discussion**

By comparing the rate of perseverative requesting across the two conditions using the ABAB design, we were able to provide a convincing demonstration that response interruption effectively reduced Ryan’s perseverative requesting. Such demonstrations are an important component of evidence-based practice because they allow teachers to determine whether or not their use of a given research-based procedure is effective for any given student under typical classroom conditions. While the evaluation demonstrated that response interruption effectively reduced perseverative requesting, it was also important to show that correct requests continued to occur at an acceptable level during the 5-second window of opportunity. These findings suggest that response interruption worked selectively on perseverative requesting and that Ryan learned to use the SGD conditionally, based on information about the status of the snack. That is, he learned to refrain from requesting when the snack item was still in preparation, but would quickly and reliably make a request when informed that the snack item was now ready for consumption.

Demonstrating that a procedure is effective when applied under typical classroom conditions is an important part of evidence-based practice. To achieve this, educators will need to evaluate the effects of their interventions using proper experimental designs, such as the ABAB design that was used in the present study (Kennedy, 2005). However, while demonstrating the efficacy of an intervention is important, advances in evidence-based practice will also depend on gaining a better understanding of the basic operant and respondent learning principles that underlie effective procedures. This understanding may enable teachers to more effectively modify research-based procedures to suit the unique characteristics of the individual and context (Linscheid, 1999). Along these lines, the results of this study support a number of tentative conclusions that may enable a better understanding of why this particular procedure (response interruption) was effective.

First, the data from baseline suggest that extinction (ignoring) alone may be insufficient to reduce perseverative requesting in some cases. The fact that extinction, which was part of the baseline procedures, was ineffective in reducing perseverative requesting could indicate that SGD use had a prior history of very intermittent reinforcement (Ferster & Skinner, 1957). Alternatively, the high rate of
perseverative requesting during baseline could indicate that the baseline phases were not long enough for any extinction effects to accrue. In terms of understanding this particular procedure better, this interpretation suggests that response interruption may be more effective than extinction for behaviours that have a history of intermittent reinforcement. In any event, the data from Ryan indicated that response interruption produced rapid therapeutic effects, which are clearly desirable in applied settings.

Second, the maintenance of correct requesting suggests that Ryan acquired a complex conditional discrimination during the course of treatment. Specifically, by the final phase of the study, Ryan appeared to have learned to refrain from making requests until the trainer verbally indicated that the item was ready. This would seem to be an important type of conditional discrimination to learn, given that it is likely to be required in a number of contexts (e.g., ordering a meal in a restaurant, purchasing items from a store, requesting assistance with a task).

Third, the results extend the generality of response interruption as a response reduction procedure by demonstrating its applicability to perseverative requesting. Prior to this study, response interruption had been used to reduce problem behaviours such as rapid eating (Lennox et al., 1987), hand mouthing (McEntee, Parker, Brown, & Poulson, 1996), and eye gouging (Slifer, Iwata, & Dorsey, 1984). Results of the present study suggest that this procedure is also effective for reducing perseverative use of a SGD. Because of this extended generality, teachers can now have more confidence in the use of response interruption, provided they use this procedure when it is indicated and can modify it appropriately to suit the individual and context.

Another part of evidence-based practice that is rarely considered is the ability to determine the limits of a procedure. That is, a teacher must be able to gauge the extent to which any given procedure is a good choice for any given student or context. Research evidence and the conclusions that researchers draw from their studies are tentative and must be considered in light of the study’s limitations. The conclusions we reached about response interruption, based on our results with Ryan, need to be considered in light of several limitations. First, the study involved only one individual. Systematic replication with other individuals who engage in inappropriate perseverations is necessary to assess the external validity of our findings. Second, the response interruption procedure included response blocking and verbal instruction (e.g., ‘It’s not ready yet. You have to wait.’) It is possible that the verbal instruction alone may have been sufficient to reduce perseverative requesting, although this is unlikely given that this instruction was also given at the start of baseline sessions, with no apparent impact. We included the verbal instruction because it reflects a fairly natural response from communicative partners that Ryan would be likely to encounter in the future. Still, future research should investigate the role of verbal instruction and response blocking in the overall efficacy of response interruption. A third limitation is the lack of follow-up data, which would be necessary to assess the durability of these treatment gains and determine whether
it would be possible to eliminate the need for continuing with the response interruption procedure. On this latter point, it should be noted that response interruption includes a built-in fading mechanism. That is, once low rates of responding are produced, there will be little need to implement the procedure.

In summary, the results of the present study showed that response interruption effectively reduced perseverative requesting in an adolescent with autism and severe intellectual disability. The effects were rapid and did not undermine his existing fluency with respect to correct requesting. This dual outcome suggests that the procedure operated by way of teaching a conditional discrimination as opposed to mere suppression of behaviour. The study illustrated how teachers can go about evaluating evidence-based practice in the classroom.

References


