

A Study to Investigate Whether Differential Reinforcement of Incompatible Behaviour and Extinction Burst Reduces Self Injurious Behaviour

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ABSTRACT: Self-injurious behaviour (SIB) can have lifelong physical damage on individuals and their quality of life. The purpose of this study was to establish whether SIB (head hits) could be replaced with behaviour that is less damaging (hand clapping).

The aim of this study was to investigate whether SIB presented by a six-year-old child with Autism Spectrum Disorder (ASD) was reduced and replaced with an incompatible form of behaviour; hand clapping. The interventions involved differential reinforcement and an extinction procedure. The results show there was a decrease rate of SIB and an increased rate of hand claps. Future suggestions were discussed in this study.

This study involved a six-year-old pupil, in Year 1, following the Early Years Foundation Stage (EYFS) curriculum. His form of communication began as reaching and guiding an adult to reinforcers. He is currently using the Picture Exchange Communication System (PECS) and Makaton to communicate his needs and is beginning to utilise vocal sounds. This pupil displays SIB in the form of head hitting at Level 1 and Level 2. SIB is rhythmic and a repetitive behaviour, which results in physical harm to the individual that displays this behaviour. This behaviour is common in people with ASD (Weiss, 2003). For this pupil, the antecedents of this behaviour are waiting, being told no, being denied access and sensory seeking. The SIB poses a risk to the health and wellbeing of the pupil and reduces opportunities for him to interact and communicate with others. A key consideration is 'determining the function of SIB and selecting treatments based on these functions is paramount for successful treatment' (Mahatmya et al., 2008, p. 107). The aim of this study is to research the effect of redirecting the head hitting to clapping hands through the application of Differential Reinforcement of Incompatible Behaviour (DRI). DRI is the reinforcement of one response class (i.e., clapping hands) and withholding reinforcement for another response class (i.e., head hitting) in order to reduce behaviour that challenges. DRI does not involve extended interruptions of ongoing activities, such as time out, or the presentation of aversive stimuli, such as punishments (Cowdery, Iwata and Pace, 1990). Additionally, an extinction procedure can be utilised as a form of intervention to reduce SIB. This procedure involves the discontinuation of a previously reinforced

behaviour, resulting in the reduction of this behaviour in the future (Cooper, Heron, & Heward, 2007)

Methods

SIB was measured in frequency. Initially, the number of head hits was tallied using pen and paper. A limitation that was experienced by tutors was the difficulty of tallying head hits during an episode of continuous SIB. In order to accurately and efficiently track the frequency of head hits, the tally system was replaced by two clickers from 7th March 2022. These devices were used to measure the frequency of Level 1 and Level 2 SIB. Two tutors who worked with the pupil tracked the occurrence of head hits throughout the day and ensured to hand over clickers to each other.

The ABC data sheet was used for data collection (see Figure 1). The data collection was categorised into level 1 intensity and level 2 intensity head hits. Level 1 head hits involve lower intensity blows to the head, whereas level 2 head hits involved higher intensity blows to the head. Generally, waiting or being told no were antecedents which would lead to level 2 head hits. On the other hand, level 1 head hits typically were the cause of sensory seeking. The target behaviour we aimed to replace with hand clapping was level one (sensory seeking) intensity head hits.

Whenever the pupil began engaging in SIB, the extinction procedure was used by a tutor to block level 1 and level 2 head hits by holding their palms by the side of the pupil's head in order to discontinue the sensory input. If the pupil was engaging in level 1 SIB, the DRI procedure was then applied. This involved prompting the pupil to clap his hands as form of incompatible action to meet his sensory needs.

To prevent occurrence of head hits, positive reinforcement was given in situations where the pupil engaged in the replacement behaviour instead of SIB. Positive reinforcement was given in the form of social praise and physical reinforcers. Whenever he clapped his hands independently social praise was also given by other tutors from his class.

The intervention procedures were handed over and shown to the team during a class meeting, so that they could be followed throughout the day by all the tutors who worked with the pupil.

Results

From 8th March 2022 the head hits were counted as Level 1 which were of low intensity and Level 2 which were of high intensity. The clapping hands trials were also calculated to measure how many times an adult prompted the pupil to clap as a replacement of head hits. Previous to this, no data was collected involving the hand clapping trials. Additionally, the intensity of head hits was not yet categorised into two separate groups.

Graph 2 illustrates that on the 18th March there was a low number of hand clapping trials (5) run and this may be related to sharp increase in Level 1 SIB (61), as seen in Graph 1. In contrast, on the 17th of March a high number of hand clapping trials (18) was used and there was a lower number of Level 1 head hits (18).

As you can see in Graph 1, in the first week there was an increase of level 1 and level 2 SIB; this is in line with the research that when there is intervention, the behaviour tends to increase at first before it decreases. Despite of extinction burst, sensory seeking head hits were not eliminated completely; however, the trend remained noticeably low with few fluctuation points from the 19th March until half term ends.

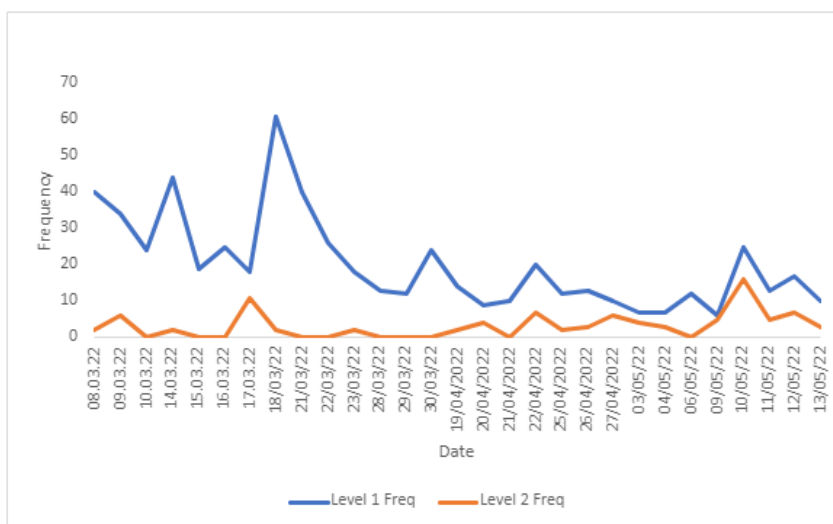
After the school holidays, when the pupil returned on the 19th April 2022, there was a slight increase in level 2 SIB (as shown in the graph 1); intervention might not have been followed consistently at home, or the increase of SIB may have been a result of transitioning back into school.

Discussion and Conclusion

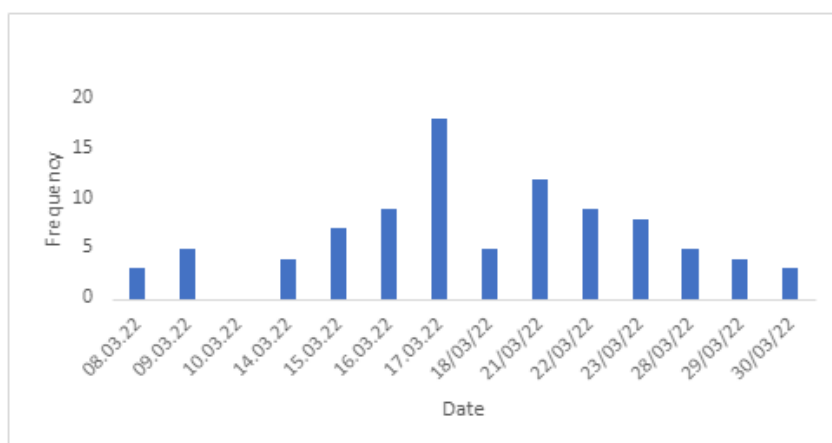
Within this study, we have inferred that the implementation of extinction procedure combined with DRI, by replacing SIB with other forms of incompatible actions, has noticeably reduced the frequency of the SIB. The results of this case study are promising for our future practice. This was accomplished with assessing his sensory needs such as SIB; the hitting on his head replacing it with clapping of his hands to the point where, for example, the pupil would place his toy on the floor momentarily so he can clap his hands and address his sensory need. The data suggest that using DRI combined with extinction procedure to decrease SIB, was the effective reductive method for SIB. Although, there was a slight increase in SIB after an extended time

away from school during the holidays, therefore, in future, the intervention could be introduced at home so that the pupil’s family can work on the same intervention procedures to strengthen and increase the target behaviour. Initially SIB data was collected using paper and pen to tally. This resulted in underestimated frequency of SIB. Therefore, we introduced use of clicker to collect more accurate data. To summarise the study, the sensory seeking self-injurious behaviour can be effectively reduced with extinction combined with reinforcement of the alternative behaviour.

Initially there was an increase in level 2 SIB. In previous research, it has been found that behaviour targeted by an extinction procedure may not decrease at first. This is known as an “extinction burst” and describes a temporary increase in duration and frequency of the target response (Lerman, Iwata, & Wallace, 1999). Nevertheless, the behaviour was not completely eliminated even though an extinction procedure was applied. This may be due to not being able to block every single time. This extinction strategy was made more effective by using it alongside a differential reinforcement plan. In previous studies, it has been discovered that the termination of inappropriate behaviours is more easily done when paired with another form intervention (Alberto & Troutman, 2009). In this case, this alternate form of intervention was DRI.



Graph 1. Level one and level 2 SIB daily frequency from 8th March until 13th May



Graph 2. The clapping hands trails used between 8th March to 20th March

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| | | |
|---|--|---|
| SG ABC Data | Tutor: | Date: |
| | | |
| Function (tally) | Behaviours (tick) | Duration |
| Escape from demand in NET towards reinforcement: _____ | <input type="checkbox"/> Bolting <input type="checkbox"/> Grabbing <input type="checkbox"/> Whining <input type="checkbox"/> Crying <input type="checkbox"/> Hitting others <input type="checkbox"/> Biting others <input type="checkbox"/> Hairpulling others <input type="checkbox"/> Pinching others | |
| Wants attention and seeks access to other reinforcement: _____ | | |
| Waiting for highly valued reinforcer: _____ | | |
| Told no to highly valued reinforcer: _____ | | |
| Wants something can have: _____ | | |
| Use clickers for sensory seeking SIB for below and tally clapping hands trials below: | | |
| Clapping hands trials | | |
| Level 1 SIB | | |
| Level 2 SIB | | |
| Occurrences of grinding (tally): | | Occurrences of inappropriate touching (tally:) |

Figure 1.