Using differential reinforcement of alternative behaviour (DRA) to increase food consumption

Bobbie Hasselby

Executive summary

It is vital that children eat a well-balanced and adequately sized diet for healthy physical and cognitive development. Difficulties around food can develop in children and are more prevalent in children diagnosed with developmental disorders. Therefore, it is very important that procedures to help reduce these difficulties are established. The case study follows the progress of a 7-year-old boy who consumed a limited amount of food daily. A changing criterion design was used to assess whether DRA was effective for increasing food consumption. Data was collected on the number of mouthfuls consumed, a significant increase was observed following the intervention in comparison to baseline levels.

Introduction

Difficulties related to eating are prevalent among children with developmental delays, it is estimated that between 33%-80% of individuals diagnosed with a developmental delay may experience feeding difficulties at some point in their childhood (Bachmeyer, 2009). There are a wide range of difficulties that may be displayed related to feeding, such as total refusal to eat, food selectivity, not eating an adequate amount of food or drink, reliance on supplemental feeding (e.g. tube feeding) or exhibiting strong preferences for how food is cooked and presented (Bachmeyer, 2009; Williams, Gibbons and Shreck, 2005). Children who experience food difficulties are at risk of health, developmental and social issues, including excessive weight loss, growth delay, malnutrition, lethargy and impacts to cognitive functioning (Christopherson & Hall, 1978). A development of strategies to successfully reduce feeding difficulties have significant implications, such as improved health in children, improved quality of life for children and families, decreased mental health problems in families and reduced risk of long-term eating problems (Bachmeyer, 2009).

Within a review of the literature pertaining to food difficulties, conducted by Bachmeyer (2009), 7 out of 12 studies successfully used positive reinforcement to increase healthy food intake. The differential reinforcement of alternative behaviours (DRA) procedure was most commonly used. This procedure involves providing the child with access to preferred stimuli following appropriate alternative behaviours, e.g. accepting a mouthful of food.

The following case study outlines how a DRA procedure was used to increase food intake for a young boy who regularly did not consume an adequate amount of food, within school.

Method

Participants: This case study is about O, a 7-year-old boy who has a diagnosis of autism spectrum disorder (ASD). He attended Park House School in a class of six other pupils aged 4-7 years old. O could use Makaton sign language to make requests. He enjoys being lifted high by an adult, jumping on the trampoline and partaking in arts and crafts activities. However, O found lunchtimes difficult. O arrived at school with a prepared lunch of various foods such as rice or pasta with vegetables. O preferred to eat his food when it was presented in his lunchbox, if it was not in the lunchbox, O would refuse to eat. When the food was presented in his lunchbox, O would eat very few mouthfuls before signing that he was finished. When asked to eat more food O engaged in the following behaviours: pushing the spoon and lunchbox away or placing the lid on the lunchbox, crying, screeching, shouting, hitting his own head, leg or the table and attempting to sit on an adult's lap.

Setting and materials:
The procedures were implemented within the normal lunchtime hours of 12:30-13:00 and O remained in the classroom with his peers. O was seated alongside his 1:1 throughout the lunch period. We used O's prepared lunch from home as the target food, so this could vary each day and the preferred item was a packet of biscuits that were sent in. Bowls and cutlery were provided by the school. A data sheet was designed to collect data on each mouthful.

Design and variables:
A changing criterion design was used. The criterion for access to the preferred item and removal of the food was systematically increased. The dependent variable was the

number of mouthfuls consumed without refusal. The independent variable referred to the schedule of reinforcement used.

Interobserver Agreement:
No IOA data was collected.

Procedure:
Baseline data was collected within a 2-week period prior to implementing the procedure, during baseline O was presented with his lunch prepared in his own lunchbox. No demands were placed for O to eat the food, but it was placed in front of him. Data were collected on the frequency of mouthfuls eaten without refusal. A '+' was recorded when O ate a mouthful without refusal and a '-' was recorded if refusal behaviour was observed. During the school day, it was observed that O engaged in behaviours such as shouting, screeching, hitting his own head, legs or the table when sensory reinforcement was valuable, therefore, if O engaged in the above behaviours but continued to move the food towards his mouth and eat it, a '+' was still recorded.

During the intervention, O was presented with his prepared lunch in a bowl with a spoon or fork. A target number of mouthfuls was established before each lunch time session. When O engaged in eating he was provided with reinforcement in the form of social praise, tickles and being lifted on a variable reinforcement schedule. Once O had consumed the target mouthfuls, he was told "you can finish if you want to". O could continue to eat if he chose to and the schedule of reinforcement continued to be applied. When O used his sign language to communicate that he had finished, this request was honoured, and he independently placed the remaining food in the bin and the bowl in the dishwasher. If O had consumed the target number of mouthfuls with no refusal, he was provided with the biscuit that was provided in his lunchbox. If O requested that he had finished before the target mouthfuls were consumed, he was reminded by his 1:1 that he needed to eat some more, if O accepted this and continued to eat a '+' was still recorded for that mouthful and the schedule of reinforcement continued to be applied. Where required further vocal prompts were used until the target number of mouthfuls had been consumed. If O emitted any refusal behaviours, O was reminded that he needs to eat more. If by the end of the lunch period O had still not eaten the required mouthfuls, O was prompted to clear away his lunch. If any refusal behaviour was observed/the required mouthfuls were not consumed during a lunch session, O did not receive his biscuit. O was still given the opportunity to eat his biscuit within the afternoon snack session aft 14:30. See Appendix 1. For a flowchart summarising the steps above.

Mastery criterion was set at target mouthfuls consumed across 3 consecutive lunchtime sessions, with 0 refusals. Once mastery criterion was achieved the target number of mouthfuls were increased depending on the average number consumed in the previous 3 sessions and the variable schedule of reinforcement was thinned. If O achieved the target number of mouthfuls in the first session, this was recorded as known and the target was increased the following day.

Results

Figure 1. displays the results of the DRA procedure on the frequency of mouthfuls consumed by O without refusal.

During baseline, O consumed an average of 3.9 mouthfuls daily with a range of 0 to 12 mouthfuls. Within the last 10 days of the intervention O was consuming on average 30 mouthfuls daily, with a range of 18 to 40 mouthfuls. This is a significant improvement in the number of mouthfuls consumed and was a much more adequate amount of food to be consuming daily. 9 criterion changes were made of varying magnitudes from 2 to 7. There is a high level of variation around the criterion levels, so experimental control cannot be strongly demonstrated.

Some observations were made by O's tutor during lunchtimes. O tolerated eating his food from a novel bowl and developed independence with preparing his food. He was able to get a bowl and cutlery, place the lunch in the bowl and subsequently the microwave (monitored by his 1:1). During lunchtimes, O was observed to occasionally ask for more food. O began to eat more foods in his natural environment, such as fruit during food tech.

Discussion

Before introducing this procedure, O found lunchtimes difficult, he preferred to eat his food from his own lunchbox and would only eat a small portion of his lunch. It is important that children consume adequate amounts of food and a variety of foods for healthy growth and development (Christopherson & Hall, 1978). Therefore, this was considered an important behaviour to change. There was a high level of variability around the changing criterion, therefore we were unable to establish

We were successfully able to thin the schedule of reinforcement throughout the meal time from a schedule of VR3 with access to tickles or being lifted, to a schedule of VR5 with social praise only. Therefore, the meal time resembled a more natural setting. Biscuits were selected as a terminal reinforcer because O demonstrated that he had a strong preference for them and children often have a sweet food following their main meal. Following on from this procedure, we will continue to monitor O's food consumption and ensure that progress is maintained and work to reduce the social praise even further so that the 1:1 can be faded out and O can eat more independently.

The procedure should be replicated with other individuals that eat an inadequate amount of foods, to assess whether the procedure is effective. By fading to social praise, this replicates a more natural setting in which a child would be praised for eating their food and would therefore be easier to implement in other settings, i.e. at home.

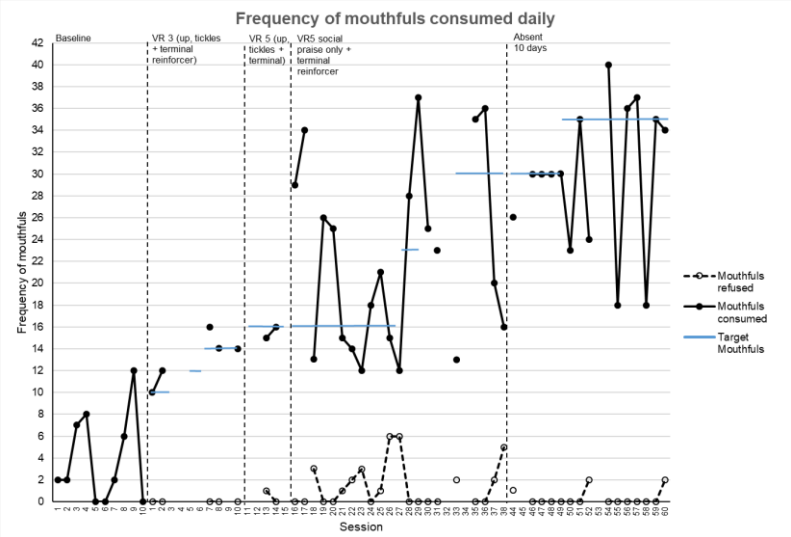
References:

Bachmeyer, M. H. (2009). Treatment of selective and inadequate food intake in children: A review and practical guide. Behavior Analysis in Practice, 2(1), 43-50.

Christopherson, E. R., & Hall, C. L. (1978). Eating patterns and associated problems encountered in normal children. Issues in Comprehensive Pediatric Nursing, 3, 1 – 16.

Williams, K. E., Gibbons, B. G., & Schreck, K. A. (2005). Comparing selective eaters with and without developmental disabilities. Journal of Developmental and Physical Disabilities, 17(3), 299-309.

Figure 1. A graph to show the frequency of mouthfuls consumed each session, the target number of mouthfuls and the relevant schedule of reinforcement.



Appendix 1. A flowchart demonstrating the steps used during meal times with O.