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Comparisons of interventions for rumination maintained by automatic reinforcement

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ABSTRACT

The effectiveness of four antecedent treatments for rumination was compared for two individuals with autism, severe intellectual disabilities and long histories (at least 20 years) of rumination. Comparisons of increased meal size, supplemental feedings, fixed-time provision of peanut butter, and liquid rescheduling found liquid rescheduling to be the most effective intervention for both clients. However, within-session analyses, both during intervention and for 30 min after the meal, showed individualized schedules of fluid provision were needed to increase the effectiveness of the treatment.

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1. Introduction

Rumination is the repetitive regurgitation, chewing or sucking, and re-swallowing of food that has been previously ingested (Rast, Johnston, Drum, & Conrin, 1981). Up to 10% of individuals with developmental disabilities engage in rumination, a behavior that can cause physical harms, e.g., malnutrition, dehydration, esophageal damage, and severe tooth decay (Rast et al., 1981). In addition to health effects, rumination may lead to reduced social attention, restrict community outings, and alter the manner in which people interact with the individual (Dudley, Johnson, & Barnes, 2002; Vollmer & Roane, 1998).

Over the last 20 years there has been an increase in research on treatments that involve antecedent manipulations. Liquid rescheduling involves restricting access to liquids during and after a meal. Heering, Wilder, and Ladd (2003) found liquid rescheduling to reduce rumination both in the hour after a meal and in the hour following the provision of liquid (given 90 min after meal completion). Supplemental feeding, in which the individual is given additional food on a fixed-time schedule for a specified period following the meal, has been found to be effective at reducing rumination during a 20-min treatment period (Lyons, Rue, Luiselli, & DiGennaro, 2007). However, Lyons et al. did not evaluate rumination after each 20-min treatment period, nor did they evaluate rumination during meals other than lunch. Greene et al. (1991) found the supplemental feeding of peanut butter on a fixed-time schedule after meals to be effective for five adults with intellectual disabilities. Kenzer and Wallace (2007) compared larger portion sizes with supplemental feeding, finding that the provision of a larger portion size decreased rumination after a meal, but not as effectively as supplemental feeding.

The current study compared the effectiveness of liquid rescheduling, supplemental post-meal food, supplemental post-meal peanut butter, and increased meal size on the levels of rumination of two adults with intellectual disabilities and autism. The aim was to assess the effectiveness of each intervention both during the treatment period and in the 30 min after treatment, using both session total data and within-session analysis.

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2. Method

2.1. Participants and setting

Martin, a 31-year-old, and Rachel, a 41-year-old, both had diagnoses of autism and severe intellectual disabilities. Both were non-verbal and were reported to have ruminated since they were children. Rachel was underweight and both participants had decaying or lost teeth and were at risk of aspirating food into the airway during rumination. They lived in adjacent houses in a cluster housing residential community. Martin had lived in the house for 10 years; previously he had lived with family and had no history of intervention. Rachel had lived in her house for 15 years; previously she had lived in an institution. Historic records reported unsuccessful interventions, including hot sauce placed in the mouth contingent on rumination.

All sessions were conducted in participants' houses, across all three meal times. Neither participant had free access to liquids. During all phases of the study, a staff member who knew the participants well was present. The researcher (first author) and the staff in each house were First Aid trained, and a registered nurse was available onsite in the event of adverse incidents such as choking or aspiration.

Ethical review of treatment options and consent procedures was undertaken by the employer at the time of the study of the researcher (first author) and clinical supervisor (second author). As required by the university's applied behavior analysis training program, conduct of the study conformed with the New Zealand Psychologists Board Code of Ethics (New Zealand Psychologists Board, 2002) and the Behavior Analyst Certification Board's Guidelines on Responsible Conduct that were current when the study was conducted (Behavior Analyst Certification Board, 2004). Written informed consent for assessment and intervention was obtained from welfare guardians.

2.2. Response measurement and definitions

Rachel's rumination was comprised of a discrete behavior chain of puffing out her cheeks, chewing, and swallowing. This chain of behaviors was one instance of rumination. The frequency of rumination was recorded in 5-min intervals. Martin's topography of rumination was less discrete and involved prolonged swirling or chewing movements of the mouth following the use of the throat muscles to bring previously ingested food or fluid up the esophagus. Therefore, the movement of throat muscles or the movement of his cheeks indicating swirling or chewing were defined as rumination. Martin's rumination was recorded with 10-s partial interval recording.

Interobserver agreement (IOA) data were collected for 20% of sessions for Martin and 7% of sessions for Rachel. For Martin, IOA was calculated by dividing agreements by the total number of intervals and multiplying by 100. For Rachel, IOA was calculated per interval by dividing the smaller frequency by the larger frequency and multiplying by 100. Mean IOA for Martin was 89% (range 78–100%) and for Rachel was 96% (range 94–98%).

2.3. Procedure

2.3.1. Functional analysis

Analogue conditions were attention, control, demand, and alone (as in Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). The task selected for the demand condition was a simple instruction to stand up. Each condition lasted 5 min and each session of four conditions commenced immediately on completion of a meal. Conditions were ordered within a session to utilize establishing operations (alone, attention, control, demand; Iwata, Pace, et al., 1994). Conditions were approximately 5 min apart.

2.3.2. Baseline

Nine 60-min observation sessions were conducted across breakfast, lunch, and dinner. Sessions commenced at the completion of each meal.

2.3.3. Interventions

Supplemental feeding involved splitting the food for that meal in half, providing one half at the mealtime and the other half provided by spoonfuls on a Fixed Time (FT) 1-min schedule for 30 min after the meal, irrespective of the occurrence of rumination. *Peanut butter* intervention involved half a teaspoon of peanut butter being delivered on a FT 1-min schedule for 30 min after the meal, irrespective of the occurrence of rumination. Neither participant was allergic to peanut butter. *Larger portion* involved doubling the usual portion size. *Liquid rescheduling* involved withholding drinks for 60 min after the meal. Interventions were randomly alternated in an alternating treatments design. Observations started upon the completion of the meal and ended 30 min after the intervention had finished. The most effective treatment, liquid rescheduling, was then conducted over all mealtimes and, as part of the hand-over to staff, the impact of delaying liquid availability by 60 min and 90 min was assessed.

2.3.4. Maintenance

Programs were handed over to the house staff. Maintenance probes were conducted after six months and 18 months for Rachel and one month and 18 months for Martin.

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