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# USING ANALOG ASSESSMENT PROCEDURES FOR DETERMINING THE EFFECTS OF A GLUTEN-FREE AND CASEIN-FREE DIET ON RATE OF PROBLEM BEHAVIORS FOR AN ADOLESCENT WITH AUTISM

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The behavioral effects of a gluten/casein-free diet were evaluated for an adolescent with autism who displayed several forms of aberrant behavior. An analog assessment was used to measure behavioral response rates within four conditions with type of diet controlled using a BABA design. Results suggested that a gluten/casein-free diet did not serve as an abolishing operation for assessed problem behaviors. Both the limitations and generality of this finding are discussed. Copyright © 2006 John Wiley & Sons, Ltd.

## INTRODUCTION

Dietary interventions for the treatment of autism are promoted by some as being effective in reducing the symptoms of autism to include reductions in aberrant behaviors for select individuals (Knivsberg, Reichelt, Hoien, & Nodland, 2002). One popular form of dietary intervention is the avoidance of foods containing gluten (a protein found in wheat, oats, barley, and rye) and casein (a milk-based protein). Evidence for the potential benefit of this diet is largely based on biological measures that demonstrate differences in the level of specific peptides and amino acids for some individuals consuming the diet (Shaw, 2002; Shattock & Whiteley, 2000). Irrespective of this evidence, there have been no well-controlled studies conducted that demonstrate behavioral effects occasioned by a gluten/casein-free diet. The current study presents a method, similar in design to that used by O'Reilly (1997)

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who demonstrated the effects of recurrent otitis media on behavior using an analog assessment protocol to measure the behavioral effects of a gluten/casein-free diet with an adolescent with autism who displayed several topographies of high-frequency problematic behaviors.

## METHOD

### Participant and Setting

The participant was a 12-year-old boy (Aleck) who was first diagnosed with autism and mental retardation at age of 3 by an agency specializing in the assessment of children suspected of having learning and/or developmental disabilities. Subsequent evaluations performed various professionals with expertise in developmental disabilities confirmed these diagnoses. Due to uncontrollable behavior problems Aleck moved, at age of 11, from his parents home to a 24-hour residential treatment facility designed to serve children and youth with autism and extreme behavioral challenges. A physical examination performed at the time of admission revealed Aleck to be in good physical health with no history of chronic medical problems to include no evidence of chronic gastrointestinal problems.

Aleck displayed several forms of problematic behavior including self-injury, physical aggression, and property destruction. Aleck also displayed self-restraint, most often in the form of wrapping his arms into his shirt. Self-restraint occurred at very high levels and frequently interfered with Aleck's ability to perform common activities of daily living.

### Response Measurement and Data Collection

Aleck's behavior problems most often occurred in combination and were therefore measured and treated as a single entity. Topographies of behaviors measured included (a) self-injurious behavior, defined as hitting head or other body surfaces with hand(s); (b) property destruction, defined as hitting, kicking, and/or throwing objects or pushing objects off tables; and (c) aggression, defined as hitting, kicking, biting, slapping, scratching, head butting, and/or pulling the hair of others. All assessment sessions were conducted in a room located in Aleck's treatment setting that was specifically designed for assessment purposes. The assessment room was equipped with a ceiling mounted video camera, a table, two chairs, and a variety of tabletop activities. Sessions were videotaped and later viewed by a trained observer who otherwise had no involvement with this study. The observer counted the frequency of target behaviors within all assessment phases/conditions. A second observer

 

collected data during 32% of sessions. Interobserver agreement for each condition was calculated by dividing the lowest frequency by the highest frequency and multiplying by 100. Interobserver agreement for the occurrence of a target behavior across conditions ranged from 96% to 100%.

A registered dietician developed nutritionally balanced menus and lists of snack food items compatible with that required for each treatment phase and provided oversight of kitchen staff responsible for preparing Aleck's meals. Staff working with Aleck during meals were provided a written copy of Aleck's menu and were instructed to assure that all meals sent from the kitchen were compatible with the items on the menu. Staff were further instructed to block Aleck from consuming any non-approved item that he may contact and attempt to consume. Staff working with Aleck during meals documented if each offered food item was consumed or refused. A second staff person made periodic checks of the compatibility between food items offered during meals and those recommended by the registered dietician. Those data reflected 100% compliance with Aleck's prescribed diet.

Following meals, staff working with Aleck estimated the total volume of food Aleck consumed using a 5-point scale ranging from none to all in one-quarter increments. Meal consumption data reflected marked increases in meal refusals within the gluten/casein-free diet phases (i.e., 42% and 58% of meals refused during the of initial [final two weeks] and second gluten/casein-free diet phases, respectively) relative to regular diet phases (i.e. 6% and 0% of meals during the initial and second regular diet phases, respectively).

## Procedure and Design

An analog assessment consisting of attention, demand, play, and self-restraint interruption conditions was conducted within two diet phases: gluten/casein-free and regular diet. The same therapist, who did not work with Aleck outside of these sessions but who was aware of the treatment phase, conducted all sessions. The attention, demand, and play conditions were conducted in a manner consistent with that used by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994). Self-restraint occurring within these conditions was uninterrupted unless it interfered with requirements of the analog condition (e.g., prompting of task performance within the demand condition). The self-restraint interruption condition was conducted in a manner identical to the play condition except that all attempts to self-restrain were blocked. Each condition was run for 5 min one time per session with no more than one session conducted per day. Each phase included a minimum of 4 sessions with up to 6 sessions run during select phases to ensure stability of behavioral trend. The initial phase, a gluten/casein-free diet, had been in effect for slightly more than 1 year before initiation of analog assessment procedures. All analog sessions within the

 

initial gluten/casein-free diet phase were conducted across the final 5-day period of that phase. The initial regular diet phase was in effect for 12 days with the first analog session completed during the third day of that phase and the final analog session completed on the twelfth day. The second gluten/casein-free diet phase was in effect for 10 days with the first analog sessions completed on the fifth day and the final session completed on the tenth day. Analog sessions performed in the final regular diet phase began on the fourth day of that phase with the final session performed 21 days later. A follow-up analog session was conducted 30 months following completion of the original study over which time Aleck had received a regular diet consistent with the final phase of the study.

## RESULTS AND DISCUSSION

Figure 1 shows self-restraint interruption to be the primary factor associated with the occurrence of Aleck's problem behaviors and that the gluten/casein-free diet had no decelerative effect on the frequency of Aleck's behavior problems as measured within any of the analog conditions conducted. These results suggest an absence of behavioral benefit derived from the consumption of a gluten/casein-free diet as provided for Aleck in the manner formerly described.

The current study represents the first to demonstrate the effects of a gluten/casein-free diet on levels of problem behaviors displayed by an individual having autism using analog assessment procedures. The use of analog assessment procedures provided a method for accurately measuring rates of behavior problems under a variety of controlled conditions allowing for better isolation of the potential behavioral effects associated with consumption of a gluten/casein-free diet than would otherwise be possible. Although results of the current study are relevant only to the single participant evaluated, the methodology employed could be replicated for the evaluation of other individuals receiving specialized diets as well as for other forms of biomedical treatment interventions intended to effect behavioral change. While use of this methodology is less rigorous than that afforded by a double blind placebo-controlled experimental protocol, it nonetheless provides a practical method for more objectively determining the effects of diet and/or like interventions than would otherwise be possible within an applied treatment environment.

A further limitation of the current study is the relatively brief duration of the second gluten/casein-free diet phase. Although this phase was originally planned to be of a longer duration, Aleck's significant increase in meal refusal from that witnessed in the initial regular diet phase prevented further assessment. The significance of this limitation is difficult to determine based on currently available empirical information regarding the amount of time required for the benefits of a

 

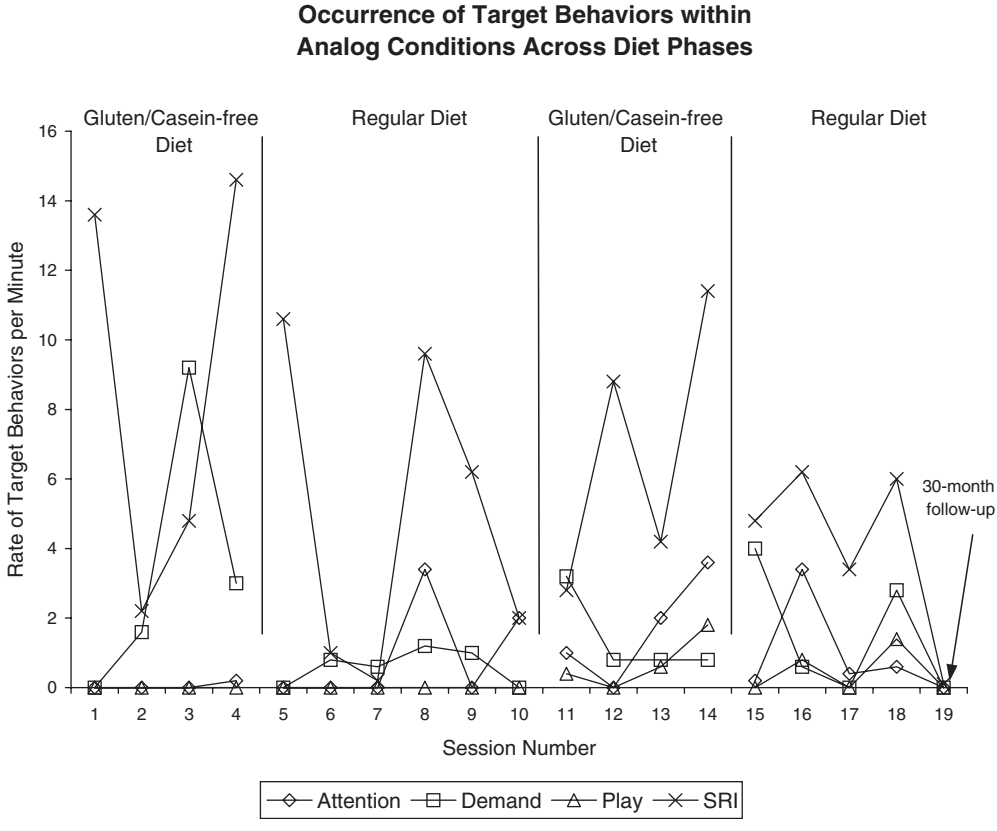


Figure 1. Rates of target behaviors displayed within sessions within each diet phase. SRI = Self-restrain interruption.

gluten/casein-free diet to be witnessed. Shattock and Whiteley (2000), authors of a treatment protocol for assessing biomedical interventions, suggests that positive effects can be witnessed within days of introducing a gluten/casein-free diet but that trials of up to 6 months may be needed.

Lastly, it was assumed within the current study that potential negative effects associated with re-introduction of a diet containing gluten and casein would be evidenced within a relatively brief period of time and, as such, assessment of the effect of a diet containing these substances was completed within the initial two weeks of the diet's introduction. It may be that more time is required before the negative effects of a diet containing gluten and casein are evidenced. Follow-up data, obtained after 30 months of consuming a regular diet, reflect no acceleration in problematic behavior as measured within the context of the analog conditions sampled.

 

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