

*BRIEF FUNCTIONAL ANALYSIS AND  
TREATMENT OF A VOCAL TIC*

T. STEUART WATSON AND HEATHER E. STERLING

MISSISSIPPI STATE UNIVERSITY

This study sought to extend functional methodology to the assessment and treatment of habits. After a descriptive assessment indicated that coughing occurred while eating, a brief functional analysis suggested that social attention was the maintaining variable. Results demonstrated that treatment, derived from the assessment and analysis data, rapidly eliminated the cough. We discuss the appropriateness of using functional analysis procedures for deriving treatments for habits in a clinical setting.

DESCRIPTORS: vocal tic, descriptive assessment, functional analysis, habits, clinic-based functional analysis

Recurrent coughing with no physiological cause is regarded as a vocal tic. Treatment of vocal tics has typically involved procedures such as differential reinforcement (Wagaman, Miltenberger, & Williams, 1995; Watson & Heindl, 1996). Although usually defined topographically, habit behaviors have begun to be identified functionally (Carr, Taylor, Wallander, & Reiss, 1996; Woods & Miltenberger, 1996). Woods and Miltenberger suggested further research investigating the relationships among habits, antecedents, and consequences using single-subject methodology with referred clients to extend the clinical significance of functional analysis for habits. Thus, this study sought to extend previous research on functional analysis of habit behaviors, specifically a vocal tic, by analyzing both antecedents and consequences and then implementing treatment based on the results of the analysis.

## METHOD

Vivian was a 4-year-old girl of estimated normal development with a 4-month history of repeated coughing. Prior to developing

the cough, she had experienced a respiratory infection that had subsequently subsided. Her pediatrician found no identifiable medical cause for her coughing (e.g., allergic reactions, asthma, postnasal drip, gastroesophageal reflux, sinusitis). Her parents reported that the behavior was “annoying” and “intrusive” in their conversations. All assessment, analysis, and intervention sessions were conducted in Vivian’s home. Coughing was defined as any loud barking or metallic sound coming from the mouth.

An interview with Vivian’s parents suggested that Vivian coughed only during meal times. We then had the parents collect data on coughing during four meals (breakfast, snack, lunch, and dinner) and three noneating activities (watching TV, lying in bed, and drawing at the table) across 3 consecutive days. We asked them to note what happened immediately after each instance of coughing. Social attention and tangible reinforcers were selected for evaluation in the functional analysis primarily because Vivian’s parents noted that either they made comments or she took a bite of food immediately after coughing. The analysis was carried out during regular mealtimes, with one of her parents implementing the functional analysis procedure and one recording data. Sessions usually lasted from 15 to 25 min, depending

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Correspondence concerning this article should be addressed to T. Steuart Watson, School Psychology Program, P.O. Box 9727, Mississippi State, Mississippi 39762 (E-mail: tsw2@ra.msstate.edu).

on the duration of the meal. In the social attention condition, one of the parents made brief comments within 2 to 5 s after Vivian coughed while the other parent recorded the number of coughs. In the tangible reinforcer condition, one of the parents immediately presented Vivian with one small Sweet Tart candy (a preferred item, according to the parents) but made no comment contingent upon coughing while the other parent recorded the number of coughs. Each condition (social and tangible) occurred once during each meal across 2 consecutive days. For example, if the social condition was implemented at breakfast on Day 1, then the tangible condition was implemented at breakfast on Day 2.

The results of the functional analysis suggested that social attention was maintaining the cough. Thus, treatment involved withholding attention when Vivian coughed (extinction) combined with providing attention in the form of verbal statements contingent upon no coughing (differential reinforcement of other behavior; DRO). The beginning DRO interval was 15 s and increased by 10 s after delivery of three consecutive reinforcers. Parents kept track of the intervals by observing the number of seconds elapsed on a large digital stopwatch that was conspicuously placed on the table. The stopwatch ran continuously until the interval changed, at which point the watch was reset. The terminal DRO interval was 300 s. Intervention was conducted at each of the four meals for 6 days. During the treatment phase, either one or both of the parents collected data. Reliability of the parents' recording was assessed by an experimenter during 33% of the sessions across all phases of the study. Interrater agreement was calculated by dividing the smaller number of coughs recorded by the larger number of coughs recorded and multiplying by 100%. Average agreement was 94% (range, 89% to 100%). Integrity of the functional analysis

procedures was calculated by computing the percentage of coughs that were followed by social statements or tangible reinforcers. In the social statement condition, 96% of the coughs were followed within 2 to 5 s by verbal statements. In the tangible reinforcer condition, 98% of the coughs were followed by candy. Integrity of treatment implementation was calculated during 25% of intervention sessions by an experimenter counting the number of times verbal attention was withheld contingent upon coughing (extinction) divided by the number of coughs emitted and the number of times attention was provided at the correct time (i.e., termination of the interval) contingent upon no coughing (differential reinforcement) divided by the number of intervals that elapsed with no coughing. Integrity for the extinction component averaged 98% (range, 94% to 100%) and 94% for the differential reinforcement component (range, 86% to 100%).

## RESULTS AND DISCUSSION

Data from the descriptive phase indicated that Vivian coughed primarily while eating (see top panel of Figure 1). During the functional analysis, the average rate of coughing across all meals was 2.69 for the attention condition and 1.01 for the tangible condition. After 4 days of intervention, the rate of coughing decreased to zero. Three follow-up observations during one randomly selected meal indicated maintenance of results with a zero rate of coughing. One limitation of the current study is the A-B design to evaluate treatment, particularly when there was a declining trend in the attention condition during baseline. Another potential limitation is that there may have been reactivity to the conspicuous data-collection procedure. A final limitation is the somewhat contrived nature of the tangible condition in which candy was provided contingent upon

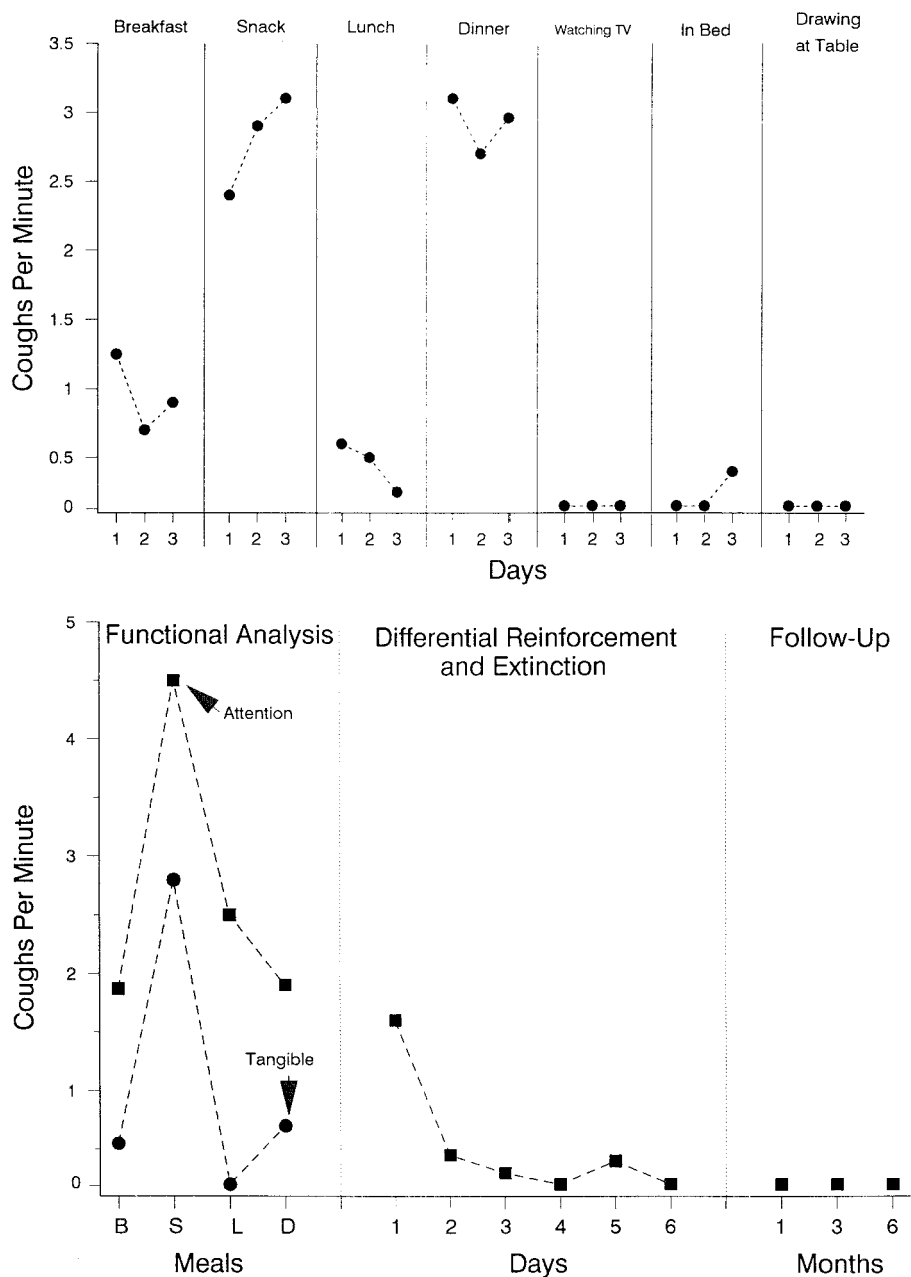


Figure 1. Data from the descriptive assessment are depicted in the top panel. Data from the functional analysis (lower panel) represent the rate of coughing at breakfast, snack, lunch, and dinner during tangible and social attention conditions. Rate of coughing during treatment is an average across four meals each day. Follow-up observations occurred at 1, 3, and 6 months posttreatment.

coughing. Because of the artificial nature of this condition, the results may not accurately reflect maintenance of the cough by tangible reinforcers.

Previous studies have hypothesized that attention may maintain repeated coughing (Watson & Heindl, 1996). This study, using both descriptive assessment and a modified

functional analysis, indicated that social attention was the primary maintaining variable. In addition, an antecedent was identified (eating) that evoked coughing and that allowed us to specifically apply the treatment during those times when coughing was most likely to occur. Although the parents' close proximity may have been a discriminative stimulus for coughing, they were situated close to Vivian at other times in which coughing did not occur. The data suggest potential clinical advantages of combining descriptive and functional analysis methodologies for identifying the function of habit behaviors. The procedures were neither time consuming nor overly complex, thus allowing the parents to participate throughout the process. Future research might address the applicability of functional analysis to other habit behaviors and compare the efficiency and outcome of selecting treatment based on the results of such an analysis with other effective treatments, like habit reversal. This study also extends the work of others who have noted the importance of establishing functional relationships between social con-

sequences and habits (Woods & Miltenberger, 1996) and suggests that there may be some clinical treatment utility in identifying functions of habits, perhaps especially in cases in which empirically derived treatment protocols are ineffective.

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