

## Linking Brief Functional Analysis to Intervention Design in General Education Settings

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**Abstract:** This study focused on the utility and applicability of brief functional analysis in general education settings. The purpose of the study was to first identify the environmental variables maintaining noncompliance through a brief functional analysis, and then to design and implement a functionally equivalent intervention. The participant exhibited noncompliance in his preschool program. The brief functional analysis included the conditions as follows: ignore-no attention, attention, play, and escape. In this case, the brief functional analysis accurately identified the variables maintaining noncompliance. Once the environmental variable had been identified, an intervention was implemented that differentially reinforced other behavior. An ABA reversal design was used to evaluate the effectiveness of the plan for 14 days. The results of this study demonstrated brief functional analysis as a practical assessment tool in general education settings as well as the marketability of their use by behavior analysts working in the least restrictive environments.

**Keywords :** brief functional analysis, preschool children, general education settings

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Functional analysis has been shown to be an effective assessment tool for identifying the environmental variables maintaining a wide range of problematic behavior in various settings (Derby et al. 1992; Mace & Lalli, 1991; Northup et al., 1991; Sasso et al., 1992; Wacker et al., 1994; Wilder, Chen, Atwell, Pritchard, & Weinstein, 2006; Wilder, Harris, Reagan, & Rasey, 2007). Despite numerous studies in the literature that supply evidence for the utility of functional analyses, this assessment tool has not been readily adopted in general education settings. The rationale for the lack of integration are cited as being due to time constraints, the general complexity of the analysis, as well as the impractical nature of this method for use in many public school districts (Axelrod, 1987; Tincani, Castrogiovanni, & Axelrod, 1999). Similar reasoning could also be given for the lack of adoption by behavior analysts to fully market this method of assessment when consulting in general education settings. As a result, teachers, behavior analysts, and other professionals may instead choose to use less reliable assessment methods in order to obtain similar conclusions for the relationships between behavior and the environment (Northup et al., 1991).

Still the evidence is definitively clear that functional analysis is the most effective method for identifying the relationship between the environment and behavior (Derby et al., 1992; Wacker et al., 1994). The link between the identification of the contingencies maintaining problematic behavior and the intervention designed and chosen to produce a targeted behavior change has significant implications. Past studies have shown that the accurate identification of behavioral function is crucial to designing an intervention which focuses on replacing the socially inappropriate behavior with an appropriate alternative that will serve the same function (Carr & Durand, 1985; Derby et al., 1992; Mace & Lalli, 1991; Northup et al., 1991; Sasso et al., 1992; Tincani, et al., 1999; Wilder et al., 2007).

Brief functional analyses are less time consuming than traditional or extended functional analyses and offer an effective alternative approach in settings in which time, resources, and staffing limitations cannot be made more accommodating (Derby et al., Tincani et al., 1999; Wacker et al., 1994; Wilder et al., 2006; Wilder et al., 2007). Although functional assessments are traditionally performed in least restrictive environments, brief functional analyses may produce more accurate and clear results as well as take less time to conduct. For this reason, general education settings could more readily use this assessment tool in situations in which the maintaining variables may be confounded by simultaneously occurring consequences in the natural environment (e.g. attention and escape). The importance of accurately assessing the function of problematic behavior to determine a functionally equivalent intervention remains an indisputable fact within behavior analysis studies in any setting.

The purpose of this research study was to first conduct a brief functional analysis to determine the function maintaining noncompliant behavior and then to determine a function-based intervention centered on analysis results in a general education setting. A short-term evaluation documented the effectiveness of the proposed function-based intervention. This brief study extends the research to general education settings and provides further basis for the utility of brief functional analyses in the least restrictive environments.

## METHOD

### *Participant*

The participant in this study was a student who attended a regular education preschool program. Michael was a four-year old boy who attended a regular education preschool program. He had not received a diagnosis at the time of this study. The behavior of concern was non-compliance which Michael exhibited by remaining stationary when given a direction, throwing objects, and/or vocally stating “no.” Interviews with the teachers stated that previous interventions focused on verbal reprimands, redirections to the task, or loss of a determined amount of playtime at the end of the day.

### *Setting*

The brief functional analysis and the function-based intervention took place within the student’s regular classroom setting. An area, separated by a divider, at the back of the classroom was the site in which the brief functional analyses took place. In the classroom there was a small area with a table and chairs, separated by a divider, which was regularly used for small group activities.

*Response Definition and Measurement*

The brief functional analysis was measured using a continuous 10 –s partial interval recording procedure and occurred within a time period of one school day. Interobserver reliability was calculated for 100 % of sessions by having a second observer, a classroom aide, collect data simultaneously. The total number of agreements were added then divided by the total number of both agreements and disagreements and multiplying by 100. Agreement for the brief functional analysis ranged from 96% to 100%.

The intervention phase of the study took place after the function of the behavior had been determined. During this phase, data were recorded using a five-minute-interval recording data sheet. This sheet recorded the occurrence and non-occurrence of the targeted behavior. The researcher was primarily responsible for taking the data, although a classroom aide conducted reliability checks 40 % of the time by simultaneously taking data during the course of a school day. The time intervals began 12:15 and ended at 2:15. The daily percentage of non-compliance was calculated by adding the number of occurrences, dividing that number by the total number of intervals recorded, and then multiplying the result by 100. Response definitions were typed at the bottom of all data sheets to ensure consistency with respect to scoring instances of the target behavior. Interobserver agreement was calculated at the end of each day and ranged from 90% to 100%.

*Design*

According to initial interviews with the participants' teachers, access to attention or escape were the primary consequences associated with episodes of noncompliance. Therefore, the brief functional analysis began with an ignore-no attention condition in which the researcher remained consistently engaged with other activities such as preparing materials for the other conditions. Any instance of either appropriate or inappropriate behavior was ignored. During both the attention and escape conditions, the presentation of a consequence was always contingent upon the occurrence of previously defined noncompliant behavior. During the attention condition, verbal reprimands (e.g., "We don't throw in preschool"), typically used by the classroom teacher constituted what served as attention. For the escape condition, a task was selected based upon the actual activity in which the targeted behavior occurred during a typical school day (e.g. coloring sheet). Upon occurrence of the behavior, the task was moved away for 15 seconds or until the participant no longer engaged in the targeted behavior. A play condition was used for control purposes between both attention and escape conditions. During this condition, access to games or other preferred activities were available for each participant to choose from and periodic praise was the only access to attention given.

In the brief functional analyses, a multielement design consisting of the four sessions were presented in the following order: ignore – no attention, attention, play, and escape, each lasting 5 minutes. To ensure that the results were indicative of the function, a fifth session was repeated with the condition

that generated the highest number of responses to verify that responding again increased. For example, in Michael’s analysis the target behavior was shown to occur in the highest number of intervals during the attention session. Therefore an attention session was repeated as the fifth session to solidify the results that attention was maintaining the target behavior.

An ABA reversal design was used to evaluate the effectiveness of each plan. The contingency reversal phase of the study lasted for approximately 14 school days.

*Experimental Phases*

Once a hypothesis concerning the function had been determined, an intervention was designed to differentially reinforce other responses, which then provided access to the same reinforcer as the target behavior. The intervention designed for Michael consisted of a continuous 2-minute DRO schedule of reinforcement that provided attention from the teacher or classroom aide for other behavior aside from the targeted noncompliant behavior. For consistency purposes, a timer was used to help the teachers visually keep track of the schedule. In addition, an ignore/no attention component was implemented simultaneously contingent upon the presentation of noncompliant behavior.

RESULTS

The results of the brief functional analysis and the experimental phases are displayed in Figures 1 and 2. In this participant’s case, one condition yielded a higher percentage of noncompliance than the other conditions presented.

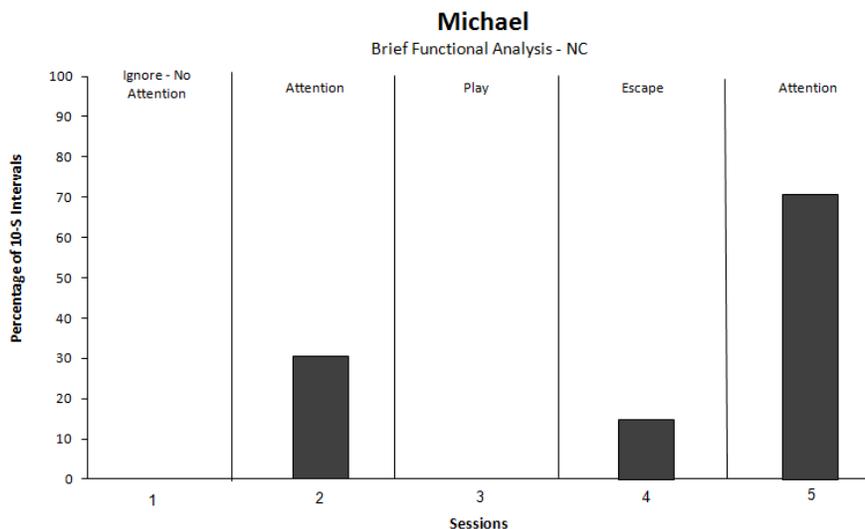


Figure 1. Brief functional analysis results for Michael

Michael displayed noncompliance in both the attention and escape conditions, with attention generating the highest percentage of responses. The first presentation of the attention condition displayed a 30% increase with respect to the target behavior, and the second presentation showed a 70% increase (See Figure 1.). During the ignore – no attention condition, Michael sat passively in a chair, turned around to look at the computer stations, and occasionally watched what the researcher was doing. In the escape condition, Michael displayed noncompliance during 14% of the intervals recorded.

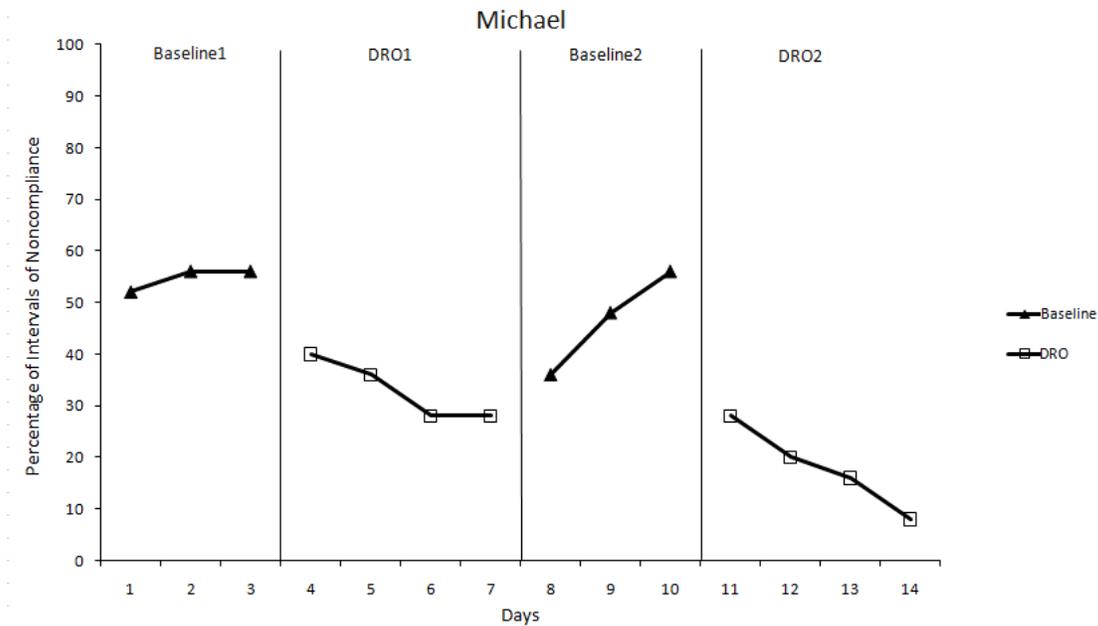


Figure 2. Closed triangles signify baseline conditions during which no reinforcement procedure was in effect. Open squares signify treatment conditions during which a reinforcement procedure was in effect.

The implementation of a function-based intervention yielded a significant decrease of noncompliance for the participant. A reversal design was used to verify the validity of the results. Noncompliance exhibited by Michael during Baseline1, ranged from 52% to 56% (See Figure 3.). Following the implementation of the DRO1, noncompliance decreased from 40% to 28% by the end of this phase. Baseline2 lasted for 3 days and noncompliance again increased with each passing day. Upon the presentation of DRO2, the noncompliance exhibited by Michael again dropped from 28% to 8% by the end of the phase.

The participant showed a decrease in noncompliance percentages from day one to day fourteen of the reversal design portion of the study. Michael had a substantial drop in percentage points with 56% being the highest percentage of intervals that displayed noncompliance and 8% being the lowest.

## DISCUSSION

The results of this study extend the existing research on both the use of brief functional analysis as a means to identifying the maintaining contingencies of problematic behavior, and the importance of using analysis results in the design of functionally equivalent interventions (Carr & Durand, 1985; Derby et al., 1992; Mace & Lalli, 1991; Northup et al., 1991; Sasso et al., 1992; Tincani, et al., 1999; Wilder et al., 2007). Carr and Durand (1985) were among the first researchers to hypothesize and advance the notion that maladaptive behaviors may be learned as effective communicative requests by children, and therefore the steps to design interventions based on functional equivalence should be taken with each individual. Other studies since have further established and provided the validity of this significant contribution (Derby et al., 1992; Mace & Lalli, 1991; Northup et al., 1991; Sasso et al., 1992; Tincani, et al., 1999; Wilder et al., 2007). In addition, this study shows the practicality of using brief functional analysis as an assessment tool in general education settings. The relative short duration of time it took to complete each brief functional analysis (approximately 25 minutes in one school day) may make this mode of analysis perceived by general education teachers as a welcomed alternative when other indirect methods prove inconclusive in the least restrictive environments. An important side note to mention along with duration is that each brief functional analysis may need to be longer or shorter depending on the target behaviors to be assessed, the individual students' behavioral setbacks, as well as how clear the results of the analysis prove to be.

A key aspect of this study would be the reversal design used to evaluate the effectiveness of the proposed intervention that continued 14 days after the brief functional analysis concluded. The reversal of contingencies helped to rule out other confounding variables that could have been present along with the proposed intervention. However if time had permitted each phase could have been lengthened to produce more significant results.

There are a few points that should be noted. The first point is that though the proposed intervention decreased noncompliance for a short period of time, the intervention implemented should be consistently evaluated for effectiveness and adjusted as necessary. For instance, Michael had a relatively dense schedule of reinforcement implemented, and over time this could be expanded as his behavior allows. The second point is that due to the small number of participants in this study, it would be presumptuous to generalize the findings to other individual students. A third point to be made is that while the brief functional analysis was an effective method for identifying contingencies maintaining noncompliance, it should not replace other methods such as functional assessments in general education settings that may reveal the same conclusions. Fourth, because the researcher was present during the entire duration of the study, it is possible that without the consistent oversight which encouraged treatment integrity, the outcome of the study may have had different findings. Finally, while generalization to other students should not be assumed, this study does encourage further use of brief functional analysis technology as well as the marketability of this tool for behavior analysts working in general education settings.

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