Functional Assessment: Old Wine in New Bottles

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Abstract. This manuscript traces functional assessment (FA) in school settings to early contributions by B. F. Skinner that are evident in Science and Human Behavior (1953). The logic and methods of functional assessment are evident in Skinner’s writings, and many early researchers and practitioners influenced by his ideas employed FA in designing interventions in schools and other settings. FA has continued to play an important role in behavior analysis, and the value of this approach in dealing with behavior problems in many settings, including schools, has long been evident. Although interest in FA in school settings has only recently become widespread, FA in education has a long and impressive history.

A number of recent articles written for school psychologists have included discussions of functional behavioral assessment (e.g., Kratochwill, Sheridan, Carlson, & Lasecki, 1999; Martens, Witt, Daly, & Vollmer, 1999). Although “functional behavioral assessment” and the related terms “functional assessment” and “functional analysis” are commonly used in the literature, there is no consensus regarding how these terms should be defined and the specific procedures that constitute a functional approach to assessment (Cone, 1997; Haynes & O’Brien, 1990).

Confusion regarding what functional behavioral assessment comprises is worsened by the fact that “functional,” “function,” and related terms have been used for a long time and in a number of ways in psychology. For example, “functionalism” is commonly used to refer to a general approach to psychology popularized by William James that was concerned with how the various elements of the mind work (i.e., function) to produce consciousness and to allow people to adapt to their environment (Schultz, 1975). Psychologists and educators often refer to the “function” of behavior with respect to whether such actions are adaptive or useful, as in “functional skills training.” They also sometimes refer to the psychodynamic “function” of a behavior (e.g., Jan acts out “to vent anger”). The “function” of a behavior may also refer to the consequences that it produces, as in “functional communication training,” where individuals are taught to emit communicative responses as an alternative to troublesome behaviors that produce similar outcomes (Carr et al., 1994).

The last usage is relevant to functional assessment (FA) as we use the term. As defined here, FA involves relating external conditions to specific behaviors so as to allow those behaviors to be predicted and controlled. FA reveals antecedent variables and consequences that control the behavior of interest, and this information is used to develop interventions that change the behavior in a desired way.

Historical Foundations of FA

Behavior analysts laid the conceptual and empirical foundations of FA many years...
Among them was B. F. Skinner, who wrote at considerable length about FA in *Science of Human Behavior* (1953). He wrote therein:

The external variables of which behavior is a function provide for what may be called a causal or functional analysis. We undertake to predict and control the behavior of the individual organism. This is our "dependent variable"—the effect for which we are to find the cause. Our "independent variables"—the causes of behavior—are the external conditions of which behavior is a function. Relations between the two—the "cause-and-effect relationships" in behavior—are the laws of a science. A synthesis of these laws expressed in quantitative terms yields a comprehensive picture of the organism as a behaving system. (1953, p. 35)

In *Science and Human Behavior*, Skinner (1953) categorized classes of variables that generally affect behavior and in so doing introduced fundamental principles of behavior such as reinforcement, punishment, extinction, and stimulus control. These principles specify the behavioral function of certain kinds of environmental events. Positive reinforcement, for instance, occurs when the presentation of a stimulus following the occurrence of some behavior increases the future likelihood of occurrence of (or otherwise strengthens) such behavior.

In an early article that influenced subsequent school-based applications of FA (Repp, 1994), Carr (1977) reviewed the research on self-injurious behavior and hypothesized that positive reinforcement, negative reinforcement, or self-stimulation (a special form of positive reinforcement) often maintain self-injury. That is, Carr proposed that there was a functional relation between self-injury and its consequences in certain settings, and that this relation constituted reinforcement, which was responsible for the recurrence of the behavior under similar settings.

Carr did not test his proposed functional analysis in his 1977 article, but he did provide data relevant to this proposal in subsequent studies (e.g., Carr & Newsom, 1985; Carr, Newsom, & Binkoff, 1980). Moreover, Carr's (1977) theoretical analysis of self-injury provided a basis for the seminal experimental analysis of self-injury conducted by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994) discussed later. Clearly, Skinner (e.g., 1953) contributed to FA by providing a general model of operant behavior, and by delineating specific principles that govern such behavior. This work was done many years ago, although Skinner continued to refine his analyses until his long life ended in 1990 (e.g., Skinner, 1957, 1969, 1987).

Skinner (1953) also described methods for experimentally isolating functional relations between behavior and environmental events in individual organisms. These single-case methods, which were elaborated by Sidman in *Tactics of Scientific Research* (1960), are characteristic of the experimental analysis of behavior and applied behavior analysis. They were used by Iwata et al. (1982/1994) in a study that has had a pervasive influence on research and practice regarding FA for school-based problems (Repp, 1994). In this study, Iwata et al. conducted a comprehensive experimental analysis of the variables that controlled self-injurious behavior exhibited by nine individuals with developmental disabilities. Results indicated that different sources of reinforcement maintained the behavior in different individuals. This has obvious treatment implications. From Iwata et al.'s (1982/1994) seminal study to the present time, the methods of mainstream FA have been primarily behavior analytic. These methods were developed and popularized by B. F. Skinner and others over 40 years ago.

Finally, Skinner suggested that human behavior could be dramatically improved through the scientific application of behavioral principles. As Michael (1993) notes:

There are undoubtedly many antecedents to the applied branch of behavior analysis, but Skinner's *Science and Human Behavior* (1953) is probably the most relevant. There, for the first time, respondent and operant functional relations were used to interpret many aspects of human individual and social behavior. . . . Mastery of this text prepared the behaviorist to approach almost any human problem with some chance of success, and further, to have a behavioral interest in almost any aspect of human behavior.
Seminal Applications of FA in Applied and Basic Research

The *Journal of Applied Behavior Analysis* was founded in 1968 to provide an outlet for studies describing clinical applications of behavior analytic concepts and procedures. A study published by Sailor, Guess, Rutherford, and Baer (1968) in that journal in its first year provides a good illustration of an attempt to assess the variables that control a troublesome behavior in an educational setting. The participant in this study was a 9.5-year-old girl with mental retardation. She regularly had tantrums during educational sessions intended to develop her verbal skills. By observing the participant, Sailor et al. (1968) came to the conclusion that her tantrums "seemed to produce the effect of terminating contact with other individuals who usually were making some demand of her" (p. 238).

In subsequent experimental manipulations, Sailor and his colleagues demonstrated that tantrums during verbal training sessions were maintained at a high level when they reduced the difficulty of the task that she was required to perform, but occurred much less frequently during sessions when they increased task difficulty. The participant's verbal performance was consistently better during sessions in which tantrums were relatively infrequent and resulted in increased task difficulty.

Observing naturally occurring events and determining how they are related to the occurrence of problem behaviors continues to be a popular FA technique in school and other settings (Dunlap & Kern, 1996). Arranging experimental conditions to examine the effects of specific variables also plays an important role in contemporary school-based FA (Repp, 1994).

Most early behavior analysts who worked in applied settings were familiar with laboratory studies of nonhumans indicating that the behavioral functions of a given stimulus were not fixed, but instead varied depending upon current and historical circumstances. For example, by the mid-1960s, researchers had demonstrated in laboratory studies with nonhumans that electric shock could serve as an unconditional stimulus, a conditional stimulus, a positive punisher, a discriminative stimulus, a negative reinforcer, or even a positive reinforcer (e.g., Honig, 1966).

Moreover, these researchers had shown that a given response (e.g., a pigeon's key peck or a rat's lever press) could be controlled by any of a variety of antecedents and/or consequences. This empirical evidence, coupled with Skinner's compelling theoretical analyses of the multiple sources of control of human behavior, convinced most early applied behavior analysts of the importance of carefully analyzing the variables that control troublesome behaviors prior to intervention. For example, extinction (eliminating the reinforcer for a troublesome behavior) was used to reduce troublesome behavior in the classroom in a number of early studies (e.g., Pinkston, Reese, LeBlanc, & Baer, 1973; Thomas, Becker, & Armstrong, 1968). Isolating the reinforcer that maintains troublesome behavior is a prerequisite to using extinction to manage such behavior.

Interventions without Analyses: The Technology Debate

Applied behavior analysts had great success during the 1960s and 1970s (e.g., Michael, 1993). During this period, interventions based on operant (and sometimes respondent) conditioning proved to be effective across a wide variety of behaviors, client populations, and settings. Many successes in educational settings were reported (e.g., Sulzer-Azaroff et al., 1988). Nonetheless, in 1978 Deitz cautioned that over time applied behavior analysts had become increasingly less interested in determining the variables of which socially important behaviors are a function, both prior to and following treatment. At the same time, they had become increasingly more interested in developing generally effective treatments for behavior problems. These treatments primarily involved the use of "package" interventions (e.g., token economies) or especially powerful single-component interventions (e.g., punishment). These general issues also were discussed at about the same time by other behavior analysts (see Warren & Warren, 1977).

Deitz was critical of the shift of emphasis in applied behavior analysis and was sympa-
thetic to the position of Baer, Wolf, and Risley (1968), who contended that, “The differences between applied and basic research [in behavior analysis] are not differences between that which ‘discovers’ and that which merely ‘applies’ what is already known. Both endeavors ask what controls the behavior under study” (p. 91). Put differently, both endeavors are based on FA.

Following the appearance of Deitz’s article, a spate of papers discussing the increasingly “technological” and nonanalytical focus of applied behavior analysis appeared (e.g., Branch & Malagodi, 1980; Epling & Pierce, 1983; Michael, 1980; Poling, Picker, Grossett, Hall-Johnson, & Holbrook, 1981). Most were critical of the change and argued that applied behavior analysis should focus on the current and historical variables of which troublesome behavior is a function, as well as on improving such behavior. But some (e.g., Baer, 1981) did not join in this criticism. Although it is not known whether arguments in favor of an analytic approach to troublesome behaviors influenced the methods that Iwata and his colleagues used in their influential FA of self-injury (Iwata et al., 1982/1994), it is interesting that their article appeared soon after those arguments were published. In any case, their logic and methods were purely analytical, although their ultimate focus was on developing effective interventions for individual clients.

Behavior Analysis, Functional Analysis, and School Psychology

At about the same time that the proper role of FA in applied behavior analysis was generating much controversy (circa 1980), behavior analysis was beginning to have a growing influence on school psychology. As Ervin and Ehrhardt (2000) point out, a fundamental way in which behavior analysis has influenced school psychology is by providing a general model for the discipline. Baer and Bushell (1981) note that from a behavioral perspective the field can be “conceptualized as a system of service provision designed to help remediate school-based problems of children [that is] preventative [and] incorporates explicit efforts to resolve problems before child placement in special education is required” (p. 192). School psychology so construed has much in common with applied behavior analysis (Lentz & Shapiro, 1985).

Behavioral school psychologists assume that a child’s “failure to profit from regular education is relatively common and results to some extent from idiosyncratic, inappropriately arranged environmental events” (Lentz & Shapiro, 1985, p. 199), rather than from some deficit within the child. The proper remedy for behavioral problems, therefore, is to ensure that environmental events are appropriately arranged. Determining the kinds of arrangements that are “appropriate” requires careful assessment of the child in her or his natural environment. This assessment is functional, in that it ascertains the variables of which the behavior of interest is a function. Determining whether or not an intervention is effective also requires careful assessment of behavior. Behavioral school psychologists are empiricists and, as Lentz and Shapiro (1985) emphasize, they constantly “relate assessment to treatment and evaluation” (p. 200).

The behavioral model of school psychology differs fundamentally from the traditional model, which is “best conceptualized as the pschometric model which views the school psychologist’s primary function to be that of diagnostician” (Lentz & Shapiro, 1985, p. 192). Many school psychologists are not behavior analytic, although it is probably the case that most of them have some knowledge of behavioral interventions (e.g., extinction, timeout, token economies) and may recommend their use. Applying interventions without understanding the variables that contribute to their effectiveness, and the variables that control the target behavior prior to the onset of intervention, may produce desired changes in behavior. However, recent studies have shown that even when procedures are carefully designed and consistently implemented, they are likely to have no effect or to worsen target behaviors unless they are based on adequate knowledge of the variables that control those behaviors (Broussard & Northup, 1995; Taylor & Miller, 1997).

For example, if a student calls out in math class because doing so results in escape from task demands, timeout is unlikely to re-
duce this behavior no matter how consistently it is implemented. The same procedure probably would be effective in reducing calling out if the behavior were maintained by teacher attention. Those who argue for FA in school psychology understand that the effectiveness of a given intervention depends not so much on the form of the behavior being treated as on the historical and current variables that control that behavior and the extent to which the intervention counters the effects of those variables.

There is substantial evidence that basing behavior-change interventions on FA is more likely to produce beneficial outcomes than basing interventions on traditional educational or psychiatric diagnostic categories (Barnett, Bauer, Ehrhardt, Lentz, & Stollard, 1996; Kratochwill & McGivern, 1996). In fact, according to Lentz, Allen, and Ehrhardt (1996), one of the characteristics of strong school-based interventions is that they “result from a structured problem solving sequence that allows accurate hypotheses about problem maintenance and the type of intervention matches those hypotheses” (p. 121).

It is noteworthy—and heartening—that Congress recognized the value of FA in their 1997 amendments to the Individuals with Disabilities Education Act (IDEA, 1999). Section 1414(k)(1)(B) specifies that, before certain disciplinary actions (e.g., suspension) are imposed on a student with a disability: “[I]f the [local educational agency] did not conduct a functional behavioral assessment and implement a behavioral intervention plan for such child before the behavior that resulted [in the discipline], the agency shall convene an IEP meeting to develop an assessment plan to address that behavior.” As Turnbull, Wilcox, Stowe, Raper, and Hedges (2000) point out, the amendments do not specify how this assessment is to be conducted, which may be problematic for school psychologists. Given that leading scholars do not agree as to what constitutes an adequate FA (e.g., Cone, 1997; Haynes & O'Brien, 1990; Turnbull et al., 2000), practical guidelines that are generally accepted probably will be difficult to establish. Be that as it may, FA is rapidly becoming an integral part of the practice of school psychology.

Conclusion

Put differently, strong interventions use FA. Behavior analysts have recognized this for over 50 years, and the fact that school psychologists and educators are beginning to do so is heartening for anyone interested in the well-being of children. FA is consistent with a science of behavior that seeks to understand why students behave as they do, to develop interventions that foster appropriate academic and non-academic behaviors, and to provide rational explanations of why those interventions are effective. Although accurate FA requires expertise and is usually somewhat difficult to accomplish in everyday school settings, a wealth of data collected over the past 5 decades provide abundant proof of its value. FA has a long and illustrious history and its recent popularity is deserved. Old wine in new bottles retains its quality, and FA was and remains a classic.

References


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