

Functional Behavior Assessment: Characteristics and Recommendations

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Functional behavior assessment refers to any systematic attempt to identify potential maintaining variables (environmental events) for problem behavior. Functional behavior assessments may involve the use of indirect assessments, descriptive assessments, functional analyses, or some combination thereof. In this paper, we discuss the characteristics of each type of assessment and provide recommendations for the use of functional behavior assessment procedures by practitioners.

Descriptors: Functional behavior assessment, indirect assessment, descriptive assessment, functional analysis

In the first issue of the *Journal of Applied Behavior Analysis*, Baer, Wolf, and Risley (1968) provided guidelines for the emerging field of applied behavior analysis. Baer et al. described seven dimensions of applied behavior analysis, one of which was *analytic*. "The analysis of behavior...requires a believable demonstration of the events that can be responsible for the occurrence or nonoccurrence of that behavior. An experimenter has achieved an analysis of behavior when he can exercise control over it" (pp. 93-94). The term *functional analysis* has generally been used in reference to the demonstration of functional (cause-effect) relations between environmental events and behavior (Skinner, 1953). In the context of the assessment of problem behavior, a functional analysis

involves the use of an experimental model to identify maintaining contingencies for problem behavior (e.g., Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). This term should be viewed in contrast to the term *functional behavior assessment*, which refers to any systematic attempt to identify the sources of reinforcement maintaining problem behavior. To stay true to the guiding principles of our field, functional behavior assessments are only referred to here as *analyses* if they involve an experimental demonstration. As Baer et al. noted, "a non-experimental analysis is a contradiction in terms" (p. 92).

Types of Functional Behavior Assessment

Functional behavior assessments include a variety of procedures that fall into three

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categories: indirect (anecdotal) assessments, descriptive (naturalistic) assessments, and functional (experimental) analyses.

Indirect Assessments

Many indirect assessment (IA) procedures have been developed, all with the same general characteristics: IAs (a) focus on the circumstances under which behavior occurs, (b) are based on informant recall, and (c) use verbal report (e.g., interviews, checklists, rating scales) as the primary data. IAs may be appealing to practitioners for several reasons. First, IAs pose no risk to either the individual or the practitioner as problem behavior need not be observed to complete the assessment. Second, IAs require little skill on part of the practitioner to complete. Third, IAs can be completed in a short amount of time (in most cases, 10-30 min). Despite the popularity of IAs, research has repeatedly shown that anecdotal assessments developed thus far have poor reliability and questionable validity (see Iwata, DeLeon, & Roscoe, 2013, for a recent discussion of limitations as well as potential applications of IAs). Further, IAs do not involve any direct measurement of the behavior of interest, in opposition to another defining dimension of our field (*behavioral*, Baer et al., 1968).

Descriptive Assessments

In contrast to IAs, descriptive assessments (DAs) involve the direct observation of behavior under the natural conditions in which it occurs. Although the seminal publication by Bijou, Peterson, and Ault (1968) often has been cited as the basis for a variety of DA procedures subsequently developed, the description of the quantitative observation of behavior under naturally occurring conditions by Bijou et al. represents only one of several commonly used procedures (e.g., scatter-plots, narrative recordings, etc.). Although DAs may be considered an improvement over IAs as DAs allow for observation and quantification of behavior and environmental events, research has repeatedly shown

that DAs frequently fail to correctly identify the reinforcer(s) maintaining problem behavior (see the special section on DAs in Volume 42, Issue 2, of the *Journal of Applied Behavior Analysis* for recent examples), most likely because DAs can only demonstrate correlations between the environment and behavior, not functional relations.

Functional Analyses

The only type of functional behavior assessment that allows for identification of functional relations is the functional analysis (FA). The defining characteristic of an FA is the use of experimental methods to determine cause-effect relations between the environment and behavior. The generality of experimental approaches to assessment has been established in hundreds of studies, whose results have shown that FA methodology is extremely flexible (i.e., can incorporate a variety of response topographies, antecedent events, reinforcement contingencies, and experimental designs) and more precise and efficient than DAs (Beavers, Iwata, & Lerman, 2013). Nevertheless, certain characteristics of problem behavior or conditions under which it is observed may pose challenges to assessment.

Challenges to assessment.

Time constraints. An FA typically requires several hours and, because sessions are not run continuously, may take more than a day to complete. When assessment time is limited, abbreviated FAs may be useful, such as the brief FA (BFA), which consists of a single exposure to test and control conditions, each of which lasts only five min (Northup et al., 1991). Due to its drastic reduction in both number and duration of sessions, however, the BFA yields interpretable results in about half to two thirds of cases (Derby et al., 1992; Kahng & Iwata, 1999). An alternative to the BFA is the single-function test (see Hanley, Iwata, & Thompson, 2001, for examples), in which results of only one test condition

(selected based on the problem behavior's suspected function) are compared to those of a control condition. A variation of the single-function test might be considered when problem behavior is suspected to be maintained by automatic reinforcement. For example, Vollmer, Marcus, Ringdahl, and Roane (1995) observed problem behavior during only one test condition—repeated “alone” sessions and no control, to verify that problem behavior would continue to occur in the absence of all social contingencies. More recently, Querim et al. (2013) found that brief, five-min “alone” probes were highly effective as a screening procedure to identify the function of stereotypy.

Severe problem behavior. Extreme self-injurious behavior (SIB) or aggression may pose significant risks, in which case the rate of response rather than the time required for assessment is problematic. When feasible, protective devices can be worn by clients to reduce risk, although this strategy occasionally may obscure assessment results (Le & Smith, 2002). Another possibility involves terminating a session following the first occurrence of problem behavior and using latency, rather than rate or duration, as the index of responding. Thomason-Sassi, Iwata, Neidert, and Roscoe (2011) showed that response latency and rate often are inversely correlated and that the use of latency greatly reduced occurrences of problem behavior during the course of FAs. A similar procedure involves using discrete trials that are terminated when problem behavior occurs and measuring the proportion of test vs. control trials containing problem behavior (Bloom, Iwata, Fritz, Roscoe, & Carreau, 2011; LaRue et al., 2010). Finally, if severe problem behavior often is preceded by another (precursor) response, and if both responses are members of the same functional class, an FA of the precursor may reveal the function of the more severe problem behavior while minimizing occurrences of the latter (Fritz, Iwata, Hammond, & Bloom, 2013; Smith & Churchill, 2002).

Low-rate problem behavior. When exposed to a relevant establishing operation (EO) and contingency, responding should occur at moderate if not high rates. Within the context of an FA, problem behavior may occur rarely for one of several reasons. First, EOs such as deprivation from attention or the presence of task demands do not always occasion behavior immediately, but only after they have been present for some period of time. For example, Derby et al. (1992) summarized the results of 79 BFAs and reported that problem behavior never occurred in over a third of the cases, most likely due to the brevity of sessions (five min). Davis, Kahng, Schmidt, Bowman, and Boetler (2012) examined session duration empirically by showing that problem behavior absent from brief sessions showed clear patterns of responding when session length was increased. Second, when multiple problem behaviors are members of the same response class and are aggregated during an FA, severe (more effortful) problem behavior may not occur if milder (less effortful) problem behaviors occur first (Richman, Wacker, Asmus, Casey, & Andelman, 1999). A third possibility is that problem behavior may be occasioned only by a highly idiosyncratic EO (e.g., being ignored while, at the same time, someone else receives attention) or maintained by an unusual form of reinforcement (e.g., stern reprimands rather than statements of concern). Schlichenmeyer, Roscoe, Rooker, Wheeler, and Dube (2013) summarized a number of variations in antecedent and consequent events that have influenced problem behavior in FA research.

Setting or therapist influences. The fact that most published FA data have been gathered in well controlled settings during sessions conducted by novel therapists rather than teachers or parents raises the question of whether functions identified in FA research are representative of what is seen in the natural environments where problem behavior typically occurs. Questions of setting or therapist generality, however, are

not limited to FA studies but also apply to any assessment or intervention conducted in a research setting, regardless of whether the focus is on behavioral acquisition or reduction. Results from hundreds of studies (Beavers et al., 2013) have shown that problem behavior often clearly differentiates across FA conditions and, more important, reliably decreases when interventions based on FA results are implemented. Nevertheless, distinctive characteristics of settings or persons occasionally may influence behavior. For example, Kurtz, Fodstad, Huete, and Hagopian (2013) found that when FAs conducted by unfamiliar therapists yielded inconclusive results, FAs conducted by parents produced clearer outcomes. It must be noted, however, that the unclear therapist-conducted FAs represented only 10% of all FAs from which their sample was drawn. Moreover, it has been shown that the inclusion of a familiar setting or caregiver can actually obscure a function rather than facilitate its identification (Thomason-Sassi, Iwata, & Fritz, 2013).

Summary and Recommendations

All approaches to behavioral assessment yield useful information but differ based on method and purpose. The IA relies on subjective measures such as opinions and attempts to recall past events, whereas the DA and FA emphasize objective, direct observation. The main distinction between the DA and FA is that the former answers questions about structural features of behavior and environment, whereas the latter answers questions about functional (cause-effect) relations. This point was emphasized clearly by Bijou, Peterson, and Ault (1968): “. . . descriptive studies provide information only on events and their occurrence. They do not provide information on the functional properties of the events or the functional relationships among the events. Experimental studies provide that kind of information” (pp. 176-177). Despite this almost 50-year old

caveat, some behavior analysts continue to argue the merits of indirect and descriptive methods in answering questions about function. A complete account of problem behavior, however, requires identification of its determinants, which is best achieved through experimental analysis. Thus, we present the following recommendations for practitioners: First, conduct a brief IA (interview) to develop an operational definition of problem behavior and identify contexts for use in the FA. Second, conduct an FA (any of the variations described above). If the results of the FA are unclear, *then* conduct a DA to identify unusual environmental events, whose effects would be verified by incorporating them into a revised FA.

More research may always be needed to expand and refine FA methodology for use with novel populations, settings, and response topographies. We close by noting that anyone can say something that has yet to be done *cannot* be done, but a quick review of the technological innovations developed in the past hundred years shows the folly of that sentiment. It is our hope that this paper will inspire similar innovations for the assessment of problem behavior.

References

- Baer, D. M., Wolf, M. W., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*, 91-97. doi:10.1901/jaba.1968.1-91.
- Beavers, G. A., Iwata, B. A., & Lerman, D. C. (2013). Thirty years of research on the functional analysis of problem behavior. *Journal of Applied Behavior Analysis, 46*, 1-21. doi:10.1901/jaba.2013.46-1
- Bijou, S. W., Peterson, R. F., & Ault, M. H. (1968). A method to integrate descriptive and experimental field studies at the level of data and empirical concepts. *Journal of Applied Behavior Analysis, 1*, 175-191. doi:10.1901/jaba/1968.1-175
- Bloom, S. E., Iwata, B. A., Fritz, J. N.,

- Roscoe, E. M., & Carreau, A. B. (2011). Classroom application of a trial-based functional analysis. *Journal of Applied Behavior Analysis, 44*, 19-31. doi:10.1901/jaba/2011.44-19
- Davis, B. J., Kahng, S., Schmidt, J., Bowman, L. G., & Boetler, E. W. (2012). Alterations to functional analysis methodology to clarify the functions of low rate, high intensity problem behavior. *Behavior Analysis in Practice, 5*, 27-39. PMID: PMC3546641
- Derby, K. M., Wacker, D. P., Sasso, G., Steege, M., Northup, J., Cigrand, K., & Asmus, J. (1992). Brief functional assessment techniques to evaluate aberrant behavior in an outpatient setting: A summary of 79 cases. *Journal of Applied Behavior Analysis, 25*, 713-721. doi:10.1901/jaba.1992.25-713
- Fritz, J. N., Iwata, B. A., Hammond, J. L., & Bloom, S. E. (2013). Experimental analysis of precursors to severe problem behavior. *Journal of Applied Behavior Analysis, 46*, 101-129. doi:10.1901/jaba.2013.46-101
- Hanley, G. P., Iwata, B. A., & Thompson, R. H. (2001). Reinforcement schedule thinning following treatment with functional communication training. *Journal of Applied Behavior Analysis, 34*, 17-38. doi:10.1901/jaba.2001.34-17
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27*, 197-209. (Reprinted from *Analysis and Intervention in Developmental Disabilities, 2*, 3-20, 1982) doi:10.1901/jaba.1994.27-197
- Iwata, B. A., DeLeon, I. G., & Roscoe, E. M. (2013). Reliability and validity of the functional analysis screening tool. *Journal of Applied Behavior Analysis, 46*, 271-284. doi:10.1901/jaba.2013.46-271
- Kahng, S., & Iwata, B. A. (1999). Correspondence between outcomes of brief and extended functional analyses. *Journal of Applied Behavior Analysis, 32*, 149-159. doi:10.1901/jaba.1999.32-149
- Kurtz, P. F., Fodstad, J. C., Huete, J. M., & Hagopian, L. P. (2013). Caregiver- and staff-conducted functional analysis outcomes: A summary of 52 cases. *Journal of Applied Behavior Analysis, 46*, 738-749. doi:10.1901/jaba.2013.46-738
- LaRue, R. H., Lenard, K., Weiss, M. J., Bamond, M., Palmieri, M., & Kelley, M. E. (2010). Comparison of traditional and trial-based methodologies for conducting functional analyses. *Research in Developmental Disabilities, 31*, 480-487. doi:10.1016/j.ridd.2009.10.020
- Le, D. D., & Smith, R. G. (2002). Functional analysis of self-injury with and without protective equipment. *Journal of Developmental and Physical Disabilities, 14*, 277-290. doi:10.1023/A:1016028522569
- Northup, J., Wacker, D., Sasso, G., Steege, M., Cigrand, K., Cook, J., & DeRaad, A. (1991). A brief functional analysis of aggressive and alternative behavior in an outclinic setting. *Journal of Applied Behavior Analysis, 24*, 509-522. doi:10.1901/jaba.1991.24-509
- Querim, A. C., Iwata, B. A., Roscoe, E. M., Schlichenmeyer, K. J., Ortega, J. V., & Hurl, K. E. (2013). Functional analysis screening for problem behavior maintained by automatic reinforcement. *Journal of Applied Behavior Analysis, 46*, 47-60. doi:10.1901/jaba.2013.46-47
- Richman, D. M., Wacker, D. P., Asmus, J. M., Casey, S. D., & Andelman, M. (1999). Further analysis of problem behavior in response class hierarchies. *Journal of Applied Behavior Analysis, 32*, 269-283. doi:10.1901/jaba.1999.32-269
- Schlichenmeyer, K. J., Roscoe, E. M., Rooker, G. W., Wheeler, E. E., & Dube, W. V. (2013). Idiosyncratic variables that affect functional analysis outcomes: A review (2001-2010). *Journal of Applied Behavior Analysis, 46*, 339-348. doi:10.1901/jaba.2013.46-339

- Skinner, B. F. (1953). *Science and Human Behavior*. New York: Macmillan.
- Smith, R. G., & Churchill, R. M. (2002). Identification of environmental determinants of behavior disorders through functional analysis of precursor behaviors. *Journal of Applied Behavior Analysis, 35*, 125-136. doi:10.1901/jaba.2002.35-125
- Thomason-Sassi, J. L., Iwata, B. A., Neidert, P. L., & Roscoe, E. M. (2011). Response latency as an index of response strength during functional analyses of problem behavior. *Journal of Applied Behavior Analysis, 44*, 51-67. doi:10.1901/jaba.2011.44-51
- Thomason-Sassi, J. L., Iwata, B. A., & Fritz, J. N. (2013). Therapist and setting influences on functional analysis outcomes. *Journal of Applied Behavior Analysis, 46*, 79-87. doi:10.1901/jaba.2013.46-79
- Vollmer, T. R., Marcus, B. A., Ringdahl, J. E., & Roane, H. S. (1995). Progressing from brief assessments to extended experimental analyses in the evaluation of aberrant behavior. *Journal of Applied Behavior Analysis, 28*, 561-576. doi:10.1901/jaba.1995.28-561
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