International Electronic Journal of Elementary Education, December 2016, 9(2), 337-348.

Establishing a Common Vocabulary of Key Concepts for the Effective Implementation of Applied Behavior Analysis

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Received: August, 2016/ Revised: October, 2016 / Accepted: November, 2016

Abstract

The technical language of behavior analysis is arguably necessary to share ideas and research with precision among each other. However, it can hinder effective implementation of behavior analytic techniques when it prevents clear communication between the supervising behavior analyst and behavior technicians. The present paper provides a case example of the development of a shared vocabulary, using plain English when possible, among supervisors and supervisees at a large public school district in which behavior analytic services were provided for children diagnosed with autism spectrum disorders. A list of terms and definitions are provided as well as suggestions on how to develop shared vocabularies within the readers' own service provision context.

Keywords: Autism spectrum disorder, Behavior analysis, Jargon, Verbal behavior

Introduction

For several years we have observed an increase in the prevalence/incidence of autism spectrum disorders (ASDs) worldwide. Even though there are many types of interventions, therapies, and services that are available to individuals with ASDs and their families, behavior analysis as applied to autism intervention remains one of the only empirically supported treatments (Smith, 2012; Smith & Iadarola, 2015). As the incidence of ASDs increased so did the demand for behavior analytic practitioners (Smith, 2007). However, behavior analysis has been and continues to be a relatively small discipline. Recently, several authors have commented on the need for more and better quality training for behavior analysts (e.g., Hughes & Shook, 2007; Leaf et al., 2016; Leaf,

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** Authors' note: Guy Michael Bedient (1956-2007) was instrumental in the development of the list of the key terms/concepts and definitions included in this manuscript.

ISSN:1307-9298

www.iejee.com

McEachin, & Taubman, 2008; McGee, & Morrier, 2005). However, we have a shortage of behavior analysts at the doctoral level, creating challenges to prepare a sufficient number of behavior analysts at the master's and bachelor's levels which results in a further shortage of well prepared and sufficiently supervised behavior technicians.

To illustrate the magnitude of the training, supervision, and practice needs let us look at some numbers in the state of Texas. In 2014, it is estimated that there were 399,915 individuals diagnosed with ASDs and 130,316 were children below the age of 22 (Texas Council on Autism and Pervasive Developmental Disorders, 2014). Currently, there are only two, Association for Behavior Analysis International (ABAI) accredited masters training programs (no accredited doctoral training programs and no ABAI accredited bachelors training programs; Association for Behavior Analysis International, n.d.) in Texas. There are 11 Behavior Analysis Certification Board (BACB) approved course sequences (BACB, n.d.) in Texas. These university-based training programs, ABAI accredited degree programs or approved course sequences in Texas, employ approximately 30 doctoral level behavior analysts (note that not all of these academics focus on training students in behavior analysis and autism treatment, many focus their work on basic principles with nonhumans, education more broadly, organizational behavior management, or behavior and social issues).

Estimating a caseload of 10 children diagnosed with ASDs for each master's level behavior analyst, in order to meet the current need for each child under the age of 22 diagnosed with an ASD, the state of Texas alone would need over 13,000 full-time, supervising behavior analysts dedicated to service delivery. There are currently 1207 Board Certified Behavior Analysts (BCBAs; BACB, n.d.) residing in the state of Texas. To produce the number of full-time, supervising behavior analysts needed in Texas for service delivery alone, each of the 30 faculty members (including those with other specialization areas) would need to train and graduate nearly 400 students (roughly 13 students per faculty member) who chose to focus on autism intervention this year. The challenge to prepare a sufficient number of behavior analytic practitioners, supervisors, and faculty members is even greater outside of the United States (Keenan et al., 2015).

Given the insufficient number of behavior analysts to meet the current service delivery needs for individuals diagnosed with an ASD, practicing behavior analysts are often hindered by high caseloads. For example, in one public school system, the master level behavior analysts have upwards of 70 children diagnosed with an ASD on their caseload. To put this in perspective, Lovaas (1996) suggested 1-2 hours per week of supervision for each case on the supervisor's caseload (with 70 cases, that requires 70-140 hours of supervision each week). More recently, the BACB (2014) recommends that BCBAs, supervising comprehensive intervention programs, not carry caseloads of more than 6 to 12 individuals with an ASD (without the support of an assistant behavior analyst) or 12 to 16 individuals with an ASD (with the support of an assistant behavior analyst). Nonetheless, the contingencies supporting higher caseloads (including both the supervisees and individuals with an ASD) are often demanded by agencies (e.g., public school systems who cannot control enrollment but do not have sufficient funding for personnel), funding sources (e.g., insurance companies reimburse only a certain number of service hours so clinic owners/managers increase caseloads to meet overhead costs), etc. In spite of this, many service providers still cannot meet the demand for services and we need more, well-trained behavior analysts to increase the availability of empirically supported treatment globally.

The confluence of the shortages of behavior analysts and the increasing need of quality persons to deliver behavior analytic services to individuals diagnosed with ASDs are also confounded by the "uniqueness" of the behavior analytic worldview and terminology

(Hineline, 1980; Jarmolowicz et al., 2008; Kazdin & Cole, 1981; Michael, 1975; Rolider & Axelrod, 2005; Rolider, Axelrod, & Van Houten, 2009). Supervising behavior analysts are often tasked with teams of sometimes upwards of 50 behavior technicians at a time to implement behavior analytic principles and procedures with individuals diagnosed with ASDs (c.f., Sellers, Alai-Rosales, & MacDonald, 2016 for a discussion of supervisory volume considerations). Often, these supervising behavior analysts find themselves directing behavior technicians to do the "opposite" of what comes naturally. For example, the supervising behavior analyst might ask the behavior technician to implement planned ignoring with a child who is saying provocative things. Supervising behavior analysts also frequently have to ask behavior technicians to engage in very complex sets of behaviors in the context of interlocking behavioral contingences (IBCs) (Glenn, 1988) that go beyond the simple instruction of, "if the child does this, do this." It requires an advanced, skilled set of analytic skills to teach a child to say a word when his or her current repertoire consists of pulling an adult toward the desired item. To a doctoral or even masters and/or bachelors level behavior analyst, the statement – "you need to shape the vocalization" can be sufficient. But, to a behavior technician with little to no formal training in behavior analysis, that instruction will unlikely evoke skillful behavior that will lead to the child emitting a vocalization when they want something.

The Need for Plain English

Technical jargon is arguably necessary for many disciplines to communicate among themselves but can present a problem when communicating to the layperson. To overcome this challenge, some have suggested that we translate our technical jargon into plain English (e.g., Lindsley, 1991). When the discipline expert must communicate something that requires action or doing something in response to a layperson, this barrier to effective communication can become particularly problematic. Moreover, being able to hear an instruction and then implement the associated behavior(s) is frequently the repertoire that is necessary in behavior analytic interventions. The behavior analyst must communicate to someone without the same history and training how to do something that requires a particular level of precision and fidelity of implementation. This person, who must behave as the behavior analyst instructs, is responsible for thousands upon thousands of interactions with a child diagnosed with an ASD. The quality of those interactions determines what the child will learn and how quickly the child will learn. However, behavior analysts talk funny. The ability of the behavior technician to implement, with integrity, what the behavior analyst is asking depends on whether or not the two persons have a shared understanding of the terms used.

Consider what a behavior technician's response might be hearing the following on their first day of work:

> *Supervisor: "Ok, I can't stay long but I just want you to play. Be sure to follow the student's lead. If you see any challenging behaviors, you are doing something wrong. You want him to be running to you and not away from you. Don't worry about data collection today; just hang out with him; comment on what he does. See if you can get him to run to you, rather than away from you. The goal is for you to keep him wanting more. Once you can do that, I will try to get out here to show you some of his programs. Ok?"*

Creating a common language between behavior analysts and supervisees – verbal communities (Skinner, 1957) – can make staff training "easier." To do this we can provide a definition for each concept, process, procedure, etc. The definitions will be composed of critical features (cf., Tiemann & Markle, 1983). Once critical features are provided in a definition, examples and non-examples can be made explicit. This helps ensure a complete understanding of the concepts and the corresponding behavioral repertoires they describe.

Consider, for example, how the term "behavior" is employed across a variety of educational environments. For many, the term behavior equates to undesirable behavior. Many times you hear someone say something like, "he had a lot of behaviors today" – the implications are that the he engaged in many instances of challenging behaviors. However, in behavior analysis, the definition of behavior also includes desirable behaviors. We can make the definition of *behavior* commonly employed in behavior analysis with three critical features:

Behavior: anything an (1) *organism* (2) *does* that can (3) *be counted.*

We will be able to provide examples that allow for a common understanding and language.

Example: John stands up.

In examining this example, we find that all three critical features are present. John is an organism (critical feature - 1); he stood up (satisfying the action component of critical feature - 2); and we can count the number of times John stands up (satisfying the third and final critical feature). On the other hand, if we exclude one of the critical features as in the following example, we find we can adhere to the critical features method for allowing us to maintain a common language.

Non-example: John feels melancholy.

In this non-example we find John (presumably an organism), qualifying the first critical feature, but then we begin to run into trouble. Can "feels" be clearly conveyed as an action (does not satisfy the criteria for critical feature 2); and further, is it possible to quantify "melancholy" (does not qualify critical feature 3)?

A simple rearrangement of the example allows for a critical features-based example to meet the requirements of a common language. Consider for example the following statement.

Example: John makes depressive statements.

Or, John saying, "I can't do anything right" or, "No one likes me" or, "I've got the blues so bad I just want to stay in bed all day." These three statements lend themselves to a common language because we can agree upon the statements due to the establishment of the critical features. Each one of these three contains the following: they were all emitted by an organism (John), they all contain action (he *said* these statements), and we can count what a person says.

Behavior technician training can be made more efficient through the creation of a set of key terms, concepts, and principles with corresponding definitions that detail the critical features of each term, concept, and principle that behavior technicians need to know to be effective service providers. Frequently, these terms are quickly established in the verbal community of the school district, clinic, or in-home service providing agency and can make communication among employees and supervisors much more efficient.

Toward a Common Vocabulary

The authors of this manuscript developed a list of 50 key terms and definitions that were used during staff training in a large public school district in the Midwest region of the United States. The complete list of key terms and definitions can be found in Table 1. The key terms that were selected for inclusion were created by considering what particular behaviors the behavior technicians could learn quickly, what behaviors they could learn with little initial training, and what behaviors would create the biggest, positive impact on their initial interactions with their students.

Table 1. *Key Terms and Definitions for Effective Implementation of Applied Behavior Analysis with Children with Autism*

Behavior	Anything an organism does that can be counted
Interspersal	Mixing easy and hard instructions
Meaningless Attending	No learning is taking place
Function on the Fly	Moment to moment analysis of problem behavior
Instruct with Meaning	Therapist knows focus of outcome
*Parsimony	Always use the simplest, accurate explanation
Terminal Reinforcer	Chosen reinforcer provided contingent upon set completion
Pace	Moving fast enough to keep a student on task
Complete Set Overkill	Therapist fails to read the student and makes them do the whole set
Wanting More	Leaving a student in a state of deprivation
Teacher Directed Therapy	Lack of shared control, joint attending, and student choice
Prompt Monitoring	Continually monitoring minimal prompt effectiveness
Contingency	If-then relation
Contingent Access	Procedure in which reinforcers are delivered upon minimal response effort
Operants	Class of responses that are functionally distinct
Actively Engaged	Student is working toward a meaningful end
Response Effort	Amount of effort required to perform a task
Nag	Repeating the S^D
Explanatory Fiction	Real event explained by an unobservable cause
Commenting	Teacher vocal based on event noticed
Rule Governed Behavior	Responding based on statement of contingencies
Establishing Operation	Motivating condition
Slide in/Slide out	Watch/do technique provided by a senior therapist
Quit While You're Ahead	Stopping when student is performing best
Outside of the Box	It's okay to play at the desk
Joint Attending	Focus of task is shared by therapist and student
Silly Slides	Interspersing unexpected, fun instructions
Multiple Exemplars	Using varied stimuli to teach one concept
One Step Ahead	Ability of the therapist to prepare future activities while the student is presently engaged
Direct Instruction	Explicit teaching with examples and non-examples.
Shared Control	Control of effort and reinforcement is shared by both student and therapist
Keep 'em Surprised	Student doesn't know what is coming next
Prompt Fading	Systematically decreasing the prompt level required
Stereotypy	Repetitive behavior maintained by automatic reinforcement
Following the Student's Lead	Base tasks on student's interests
Spontaneous Behavior	Behavior that occurs without instructor provided cues
Circular Reasoning	Using the event to explain the event
Short Sets	Keep sets brief and positive
What should you hear?	Student talking/teacher quiet
On-task	Actively engaged in a meaningful task
Behavioral Momentum	Presenting easy tasks right before a more difficult one
Fluency	Accuracy + speed
Variable Effort Programming	Using highly randomized, gradual increase of effort, motivation and reinforcement
Anticipation	Knowing what's going to happen before it happens
Non-compliance	Failure of an instruction to evoke a response
Instruction Pairing (Slide)	Pairing an instruction with the behavior about to occur
Empirical	Observable or measurable in some way
Diminishing Field	Removing stimuli based on correct responses
Precision Teaching	Teaching that incorporates fluency and Standard Celeration Charts
Learning Channels	Modes of acquisition skill input and output

(*)Definitions modified after the third author was deceased

We focused on creating a set key terms that might serve as a sort of set of behavioral cusps (Rosales-Ruiz & Baer, 1997) for behavior technicians, supporting the development of the skills and behaviors that could produce the most impact in their practice until more rigorous training could be conducted. Then, the authors considered what vocabulary they used most frequently when training. We asked ourselves, "what technical jargon could be replaced with more plain English terms?" that could be highlighted when we saw areas in need of improvement or teaching interactions that were desirable. For the purposes of this manuscript, only a few key terms and definitions will be explained in detail in an effort to provide a general idea of how terms and definitions were selected and created to fit the context in which we were working. More information regarding any of the concepts can be obtained by contacting the first author, but readers are encouraged consider the context in which they are providing services and supervising behavior analysts and behavior technicians in the creation of their own key terms and definitions[†].

Let us look at the key terms that were included in the example of the supervising behavior analyst helping the behavior technician get set up on their first day. It is important to note that in the environment in which the authors were working at the time it was not unusual for the masters level behavior analysts to be tasked with more than half of their caseload of children diagnosed with ASDs (often between 50 and 70) starting school in several different locations (upwards of 12). Further, several different brand new staff members (40 or more) holding only a high school diploma or the equivalent were starting work for the first time with only 2 to 6 bachelors level behavior analysts available to help with staff training. Nonetheless, the children were at school and the behavior technicians were going to be interacting with the children, supervisor present, training exhaustive, or not. In this example, the supervisor said several things that the behavior technician likely had no prior association with or at least not in a behavior analytic service delivery context: *Behavior, follow his lead, commenting, wanting more.* These instructions likely had little impact on the behavior technician's behavior.

The concept of following the student's lead has two critical features:

Following the Student's Lead: (1) Base tasks on (2) student's interests

The supervising behavior analyst wanted the behavior technician to take the student's interest into account when arranging teaching opportunities. An example and non-example can clarify what it was the supervising behavior analyst did and did not want the behavior technician's behavior to look like.

Example: A child walks to a shelf in the classroom, takes down a Star Wars™ puzzle, and the therapist does the puzzle with the student, asking the student to count the pieces, to differentiate between piles of pieces that have more or less than the other, and to count how many pieces are needed to finish the puzzle at different points of completion.

Non-example: A child walks to the shelf in the classroom, takes down a Star Wars™ puzzle, and the therapist either says, "No we are not doing that right now, it's time for math" and puts the puzzle back on the shelf.

In this non-example, we see that only one critical feature of *following the student's lead* is present, critical feature 1 - base tasks. Assuming this student is not interested in math but is interested in Star Wars™ or puzzles, the teacher violated the second critical feature of following the students' lead – on student's interests. The supervising behavior analyst wanted the behavior technician to understand that in order to work on math concepts the

[†] Readers are encouraged to work through Tiemann and Markle (1990) to learn how to identify critical and variable features of their own staff training concepts.

student did not need to do math worksheets sitting at a table, or only answer math related questions based on the behavior technician's perspective as to how math should be taught. Instead, the supervising behavior analyst wanted the behavior technician to embed instruction (critical feature 1 – base tasks) within activities that the student imitated or found interesting (critical feature 2 – student's interest).

Consider the critical features for commenting

Commenting. A (1) *teacher vocal* (2) based on a *stimulus event* (3) to which *the student is responding.*

Example: The student points to Yoda™ on the puzzle box. The teacher says, "Yoda." The student points (3 - the student is responding) to Yoda (2 - a stimulus event) on a puzzle box. The teacher says, "Yoda" (1 - a teacher vocal).

The example can be easily contrasted with a non-example:

Non-example: The teacher and the student are walking in the hallway. The student is running his hand along the wall and the teacher says, "The floor is dirty."

In this non-example, we find only one critical feature of the definition of commenting – a teacher vocal (1 – "The floor is dirty"). With close examination of this non-example, one may notice the presence of what may seem to be a stimulus event (2 – dirty floor). Upon closer examination, however, it becomes clear that the second critical feature is not met due to the lack of critical feature 3 – to which *the student is responding*. In this non-example, the stimulus event to which the student is responding is not the same stimulus event for which the teacher is providing the vocal. The student is attending to the sensation he is receiving from running his hand along the wall and the teacher is commenting on the cleanliness of the floor.

In this case, the supervising behavior analyst was trying to communicate to the behavior technician to comment only when the student was also attending to the stimulus. The supervising behavior analyst did not want the behavior technician talking or asking the student to respond when the student was not emitting an observing response (violation of critical feature 3 – the student is responding).

Wanting More. (1) *Leaving* a *student* in a (2) *state of deprivation*

Example: After the student puts the border or some pieces of the Star Wars™ puzzle together, the behavior technician asks the student to go to the math center, has the student complete one easy problem and then takes the student back to the finish the puzzle or to another preferred activity.

Non-example: After the student grabs and starts to complete the Star Wars™ puzzle, the behavior technician lets the student do the entire puzzle and then takes him to the math center.

In this situation, the supervising behavior analyst wanted the behavior technician to arrange his/her session in a way that prevented the student from becoming quickly satiated in regard to preferred items/activities and to arrange quick teaching opportunities with which the student would be more likely to be successful. In the non-example, the behavior technician fails to capitalize on naturally occurring motivating operations (MO; Michael, 1988) within the activity (i.e., an uncompleted puzzle). The uncompleted puzzle in this example, exemplifies the critical features of leaving the student *wanting* more in the sense that the student would want to get back to the puzzle. The supervising behavior analyst did not want the behavior technician to lose opportunities to reinforce responding due to satiation, there is nothing "to want" if the puzzle is finished.

Creating a Common Vocabulary

Over the course of 3 years, over 200 behavior technicians, parents, supervisors, teachers, and related service providers were coached regarding their teaching interactions with children diagnosed with ASDs of many ages and functioning levels with this common vocabulary. In a setting in which the masters level behavior analyst (third author) carried a caseload of over 70 children diagnosed with ASDs and supervised at least 6 bachelors level behavior analysts (first author) who carried a caseload of 15-25 children with ASDs who each supervised upwards of 40 behavior technicians (second author) who worked with 1-6 children with ASDs each academic year, a common vocabulary that led to effective implementation and efficient staff training was critical. The first step was to teach the behavior technicians to relate the term with the definition.

Behavior technicians can be taught the terms and definitions that begin the process of developing a shared vocabulary through supervisors saying the term and giving the definition, examples, and non-examples or by using a behavior analytic teaching strategy derived from Precision Teaching (PT; Lindsey, 1971) using SAFMEDS (Say All Fast, Minute Every Day, Shuffled) (Eshleman, 1985). We used both; in essence, we followed the behavior technician's lead. If a behavior technician showed an interest in learning more about PT, SAFMEDS, competing with oneself, graphing data, making data-based decisions, presenting at a Standard Celeration Society Chart Share, or doing extra work outside his/her teaching sessions, the first and third authors helped the behavior technicians to learn the terms and definitions using SAFMEDS and/or PT. For behavior technicians who did not, the supervising behavior analysts used a combination of stating the term and definition, describing what it was they wanted to the behavior technician to do, noting the critical features of the concept, and contrasting the description with a non-example in which one or more of the critical features were absent and then restating the term.

Each term/definition related to a tangible set of examples and non-examples to bridge the gap between paired associate learning and concept learning (cf., Tiemann & Markle, 1990) for the behavior technicians. A critical feature analysis was used as the foundation for generating a set of examples and close in and far out non-examples (Tiemann & Markle) for each concept. These examples and non-examples were then taught across a variety of input and output modes.

A learning channel matrix (cf., Binder, 1996; Kubina & Yurich, 2012) can be used to help supervising behavior analysts to determine the modes of input and output a skilled behavior technician needs to be able to perform. For example, the behavior technician needs to not only be able to hear the term and say (or think) the definition, s/he must also be able to hear the term and engage in the desired behavior, see the supervising behavior analyst engage in an example of the behavior and say (think) the term and then engage in the behavior. In essence, saying, saying and doing, and hearing and doing are different repertoires and each of these repertoires may need to be established separately (Greer, 1991).

Therefore, supervisors must move staff training beyond simply establishing a common vocabulary. It is critical not to leave the behavior technician with only a repertoire of new verbal behavior (stating terms and definitions and examples and non-examples) but also to teach them to engage in behaviors related to the concept. We used a Model-Lead-Test-Retest, Direct Instruction strategy (cf., Adams & Engelmann, 1996). In practice, this method of instruction involves modeling the desired behavior, assisting the behavior technician in engaging in the desired behavior, providing an opportunity for the behavior technician to engage in the desired behavior, and having the behavior technician engage in the desired behavior several more times, receiving frequent feedback on his/her

performance. This method is similar to those staff training methods described in other empirically evaluated staff training paradigms (e.g., Weinkauf, Zeug, Anderson, & Ala'i-Rosales, 2010) in which the supervisor provides the exemplar and provides opportunities for the supervisee to practice the skill. Even though this method was successful in our experiences, other training methods may also result in the desired outcomes. Regardless of the training method selected, it is critical that shared vocabularies lead to shared responses to the developed vocabulary.

Conclusions

Behavior analysts have an uncommon technical vocabulary. This technical vocabulary can hinder effective implementation of behavior analytic techniques by supervisees. However, developing a common vocabulary, using plain English where possible (Lindsley, 1991), can assist in the effective implementation of behavioral interventions for individuals diagnosed with ASDs. This common vocabulary should include the critical features that should come to control the behavior of the listener, or, in this case, the behavior technician.

Doing a careful analysis of each concept and its critical features has several benefits for the supervising behavior analyst. First, it creates an opportunity for the supervisor to have a quick checklist to examine if the behavior technician is behaving in the desired manner. For example, when the supervisor asks the behavior technician to follow the student's lead, s/he can quickly check if the behavior technician is engaging in the appropriate response based on the critical features of the concept. Second, and similar to the first example, instructions and feedback can be more readily applied by both those who are giving and receiving the information. Moreover, when the critical features of each concept are shared by the supervisor and supervisee, instructions and feedback are more likely to have the desired effect on the listener (i.e., the supervisee). Lastly, creating a shared vocabulary utilizing plain English (similar to Table 1) creates a more welcoming environment for new staff and parents. Walking into a place where everyone is speaking differently (e.g., with technical jargon) can be very overwhelming and even off-putting. Using "softer" language, without losing the critical features and desired outcomes on the listener, can create a more welcoming, natural environment.

Despite the rationale for developing a common vocabulary among staff, it is imperative that it translates into action. Simply agreeing on or providing the same definition of a word and teaching paired associates is insufficient. The shared vocabulary should also occasion shared topographies of behavior. For example, when a supervisor requests that a behavior technician "follow the student's lead," it should occasion a series of responses that are contextually appropriate and responsive to the student's needs, not just an agreed upon definition. Taking shared vocabularies into action allows the supervisor to conduct more efficient trainings and assessments of student and supervisee progress. Ultimately, shared vocabularies that result in shared topographies of responding lead to more effective implementation of behavior analytic techniques and should be a goal of any successful treatment program.

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