Teaching Applied Behavior Analysis Knowledge Competencies to Direct-Care Service Providers: Outcome Assessment and Social Validation of a Training Program

James K. Luiselli[1], Jennifer D. Bass[2], and Sara A. Whitcomb[3]

Abstract

Staff training is a critical performance improvement objective within behavioral health care organizations. This study evaluated a systematic training program for teaching applied behavior analysis knowledge competencies to newly hired direct-care employees at a day and residential habilitation services agency for adults with intellectual and developmental disabilities. Three content areas—measurement, behavior support, and skill acquisition—were trained in a group format using *Powerpoint*® presentations that featured didactic instruction, practice exercises, and video demonstrations. The employees

[1]May Institute, Randolph, MA
[2]Cincinnati Children's Hospital Medical Center, Cincinnati, OH
[3]University of Massachusetts, Amherst, MA

Corresponding Author:
James K. Luiselli, EdD, ABPP, BCBA-D, May Institute, 41 Pacella Park Drive,
Randolph, MA 02368
Email: jluiselli@mayinstitute.org

completed an assessment of knowledge test before and after training in each content area. Across five training groups, the average correct posttraining test scores were consistently higher than pretraining test scores. A social validity assessment revealed that the employees judged the training program favorably along several dimensions. Issues pertaining to staff training and performance improvement initiatives are discussed.

Keywords

staff training, performance improvement, applied behavior analysis

Many habilitation services organizations for people who have intellectual and developmental disabilities (ID/DD) adopt an applied behavior analysis (ABA) orientation. As defined initially by Baer, Wolf, and Risley (1968), *applied* concerns a focus on socially important areas, *behavior* involves objective and accurate measurement of what people do, and *analysis* means scientifically evaluating process and outcome. Importantly, ABA is as much a philosophy for understanding human behavior as it is a methodology for changing it.

ABA staff training programs have included methods such as reading assignments with verbal instructions (Iwata et al., 2000; Moore et al., 2002), performance feedback (Alavosius & Sulzer-Azaroff, 1986; Gilligan, Luiselli, & Pace, 2007; Lavie & Sturmey, 2002), and behavior-specific checklists (LeBlanc, Ricciardi, & Luiselli, 2005). Training programs usually combine more than one method and typically are implemented with multiple staff in a group format.

For organizations specializing in ABA, direct-care staff should understand basic learning principles, terminology, and procedures. It has been recognized, for example, that acquiring ABA *knowledge competencies* should enable direct-care staff to implement care plans more effectively (Luiselli & Amand, 2005; Luiselli, Amand, MaGee, & Sperry, 2008; Reid et al., 2003). Furthermore, Granpeesheh et al. (2010) advised that "conceptual or academic training might be particularly relevant to training in ABA because virtually all of the procedures used are directly derived from and logically linked to basic principles of learning and motivation" (p. 12).

Because of the demands and limited resources of most habilitation services organizations, staff training to acquire knowledge competencies, as well as other objectives, must be practical, time efficient, and integrated "on the job." Also, trainees should judge the training positively—that is, it should

have good social validity (Wolf, 1978). Finally, training content and methods should be reasonably geared to the diverse and sometimes limited educational backgrounds of many direct-care staff. Accordingly, the present study evaluated a multicomponent training program for teaching ABA knowledge competencies to direct-care staff at a community-based habilation services organization for adults with ID/DD. Our purpose was to design and implement a comprehensive training program for educating staff about ABA principles, terminology, and applications necessary for them to function effectively as newly hired employees. We measured training success through assessment of knowledge tests that were administered before and after training. In addition, trainee satisfaction was documented by including social validity assessment of the training program.

Method

Participants and Setting

The participants were 35 newly hired employees at an habilation services organization for adults with ID/DD. On the basis of consecutive hiring periods during a 4-month period, the participants formed five training groups (Group A = 9, Group B = 7, Group C = 7, Group D = 5, and Group E = 7). In total, 53% of the participants were women and 47% of the participants were men, with an average age of 32 years (range = 22-51 years). Table 1 shows other participant demographics, including educational background, average years experience in the field of ID/DD, and average months of employment at the habilation services organization preceding ABA training.

Once hired, the participants worked in a vocational day setting or community-based group home operated by the habilation services organization. Approximately 75 adults with ID/DD were served in these settings. The participants were responsible for conducting activities with the adults such as teaching them adaptive living and self-care skills, implementing behavior support plans, and assisting with care routines. In addition, the participants recorded data, incident reports, and progress notes.

Measurement

Assessment of knowledge (AOK) tests. As described below, the ABA training program had three content areas: (a) measurement, (b) behavior support, and (c) skill acquisition. Each content area had a respective AOK test that was created for the study. The three tests were comprised of 10 multiple-choice

Table 1. Participant Demographic Statistics

Group	M age	Gender F (%)	Gender M (%)	Education (%)	M years experience	M months employment
A (*n* = 9)	31	55	45	High school: 33.3 College (BA): 66.6	5.8	2.1
B (*n* = 7)	31	57	43	High school: 57 College (BA): 43	5.1	1.8
C (*n* = 7)	28	57	43	High school: 57 College (BA): 15 College (MA): 28	1.7	1.8
D (*n* = 5)	35	40	60	High school: 60 College (BA): 40	3.7	2.2
E (*n* = 7)	37	57	43	High school: 28 College (BA): 72	2.4	0.42

questions that asked about information in each content area. The participants were instructed to choose one of four possible answers to each question. Table 2 presents a representative question and the answer options from each of the three content areas.

The AOK tests were presented to the participants immediately before and immediately following training in each content area. The person responsible for training distributed the tests to the participants, informing them to take as much time as needed to answer the 10 questions. On average, the tests were completed in less than 5 min.

The pretraining and posttraining AOK test scores were computed for the three content areas by dividing correct answers by correct plus incorrect answers and multiplying by 100. The dependent measure for the study was the average pretraining and posttraining score (percentage correct) per participant for each of the five training groups.

Social validity questionnaire. We created a social validity questionnaire that was given to the participants when they completed training in each of the three content areas. The questionnaire had six items: (a) I learned something new from the information presented, (b) the information provided is important for me to know, (c) the trainer communicated content clearly, (d) the materials/video were useful, (e) there was enough time to cover the topic presented, and (f) I will use the information provided in my new job. For each

Table 2. Representative Question and Answer Options From Each Content Area

Content area	Question and answer options
Measurement	When you record the amount of time an individual performs a behavior, you are recording the following: (a) frequency (b) duration (c) partial interval recording (d) whole interval recording
Behavior support	Antecedent procedures are designed to _____ challenging behavior: (a) maintain (b) prevent (c) increase (d) provoke
Skill acquisition	The three main parts of a discrete trial are (a) discriminative stimulus, response, consequence (b) discriminative stimulus, task analysis, chain (c) prompt, initiation, elaboration (d) prompt, successive approximation, consequence

questionnaire item, the participants circled one rating on a 5-point Likert-type scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *no opinion*, 4 = *agree*, and 5 = *strongly agree*). The ratings on the questionnaire were averaged for each of the five training groups.

Procedures and Design

The study was a pretraining/posttraining replication design among the five training groups. The participants in each group followed an identical sequence although their training started at different times during the 4-month period: (a) pretest on measurement, training on measurement, posttest on measurement, social validity questionnaire; (b) pretest on behavior support, training on behavior support, posttest on behavior support, social validity questionnaire; and (c) pretest on skill acquisition, training on skill acquisition, posttest on skill acquisition, social validity questionnaire. All training sessions with the groups were implemented over two consecutive days at the work site. One of four management staff served as trainer for each participant group.

Pretest. Before training on each of the three content areas, the trainer distributed the respective AOK test to the participants. On completing the AOK test, the participants returned it to the trainer.

Training. Table 3 shows the topics in each content area that were taught to the participants during training. As described by Luiselli and Amand (2005) and Luiselli et al. (2008), the training curriculum was designed by senior clinical staff at the habilitation services organization with reference to several texts (Catania, 1998; Cooper, Heron, & Heward, 1987) and competency "task lists" promulgated by the Behavior Analyst Certification Board (www.bcba .org). Each of the three content areas were developed as modules and shown to the participants in *Powerpoint*® slide presentations lasting 1.5 to 2 hr per training session. Before each training session, the trainer described briefly the topics that would be covered in the module. The trainer also distributed to the participants a photocopy of the *Powerpoint*® presentation.

Many of the slides comprising the *Powerpoint*® presentations defined terminology and constructs (e.g., "negative reinforcement") with accompanying illustrations (e.g., "taking away something a person doesn't like"). Other slides had the participants' complete simple exercises. For example, in learning about measurement, the participants practiced frequency, duration, and interval recording. Several slides in each module had video clips of one or more adult confederates demonstrating a relevant principle or procedure. Examples included implementing prompting techniques, behavior-contingent procedures, and discrimination instructional methods. Finally, there were slides that illustrated data sheets and recording forms.

Each module had guidelines that the trainers followed during training sessions. We prepared the guidelines to ensure consistency among trainers by giving them easy to follow "scripts." Before the study, all the trainers reviewed the guidelines during demonstration sessions with the second author.

Posttest. Immediately following training on each of the three content areas, the trainer distributed the respective AOK test to the participants. After completing the AOK test and returning it to the trainer, the participants filled out the social validity questionnaire.
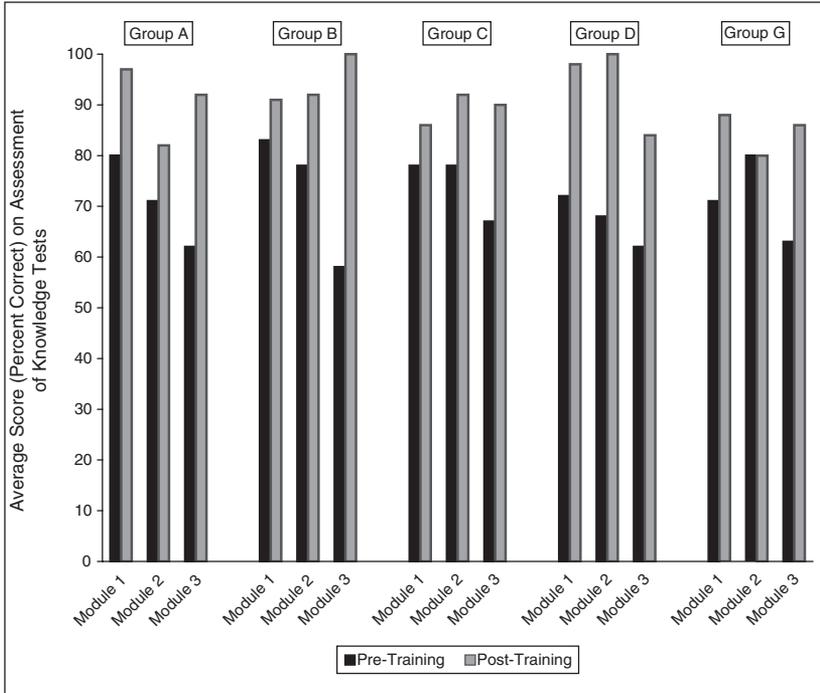
Results

Figure 1 presents the average pretraining and posttraining AOK test scores (percentage correct) achieved by the participants on the three training modules. These data show that, with one exception (Group E: behavior support), the participants uniformly scored higher in posttraining. Across the five

Table 3. Topics Trained in Each Content Area

Content area	Topics
Measurement	Defining what ABA is and is not
	Defining behavior
	Recording methods (frequency, duration, interval)
	Conducting observation and measurement
	ABC model of assessment and intervention
	Functional behavioral assessment (indirect methods)
	Functional behavioral assessment (descriptive methods)
	Functional (experimental) analysis
Behavior support	Principles of contemporary behavior support
	Goals of function-based intervention
	Proactive and reactive methods
	Antecedent (preventive) intervention
	Consequence-based intervention
	Positive reinforcement
	Negative reinforcement
	Implementing positive and negative reinforcement procedures
	Punishment defined functionally
	Implementing punishment procedures
	Assessment-derived intervention planning
	Writing behavior support plans
Skill acquisition	Selecting learning objectives
	Discrete trial teaching
	Prompting procedures
	Prompt hierarchies
	Prompt fading
	Error correction procedures
	Chaining
	Task analysis
	Naturalistic teaching procedures
	Incidental teaching

Note: ABA = applied behavior analysis; ABC = antecedent-behavior-consequence.

training groups, the participants averaged 76.8% correct (range = 71%-83%) at pretraining and 92% correct (range = 86%-98%) at posttraining for Module 1 (measurement). On Module 2 (behavior support), the average

Figure 1. Average pretraining and posttraining AOK test scores (percentage correct) achieved by the participants on the three training modules
Note: AOK = assessment of knowledge.

pretraining test score was 75% correct (range = 68%-80%) and the average posttraining test score was 89.2% correct (range = 80%-100%). The average score for Module 3 (skill acquisition) was 62.4% correct (range = 58%-67%) at pretraining and 90.4% correct (range = 84%-100%) at posttraining.

Concerning social validity assessment, Table 4 shows the average rating per training group on the six questionnaire items. On average, the participants in groups A, B, C, and D "agreed" and "strongly agreed" that the training they received taught them something new, gave them important information, was of value in their new job, and had other positive features (communication of content, time allotted for training, and format). Compared with these groups, the participants in Group E had lower average ratings in the range of "no opinion" to "agree."

Table 4. Social Validity Assessment Results

Questionnaire item	Groups and average rating				
	A	B	C	D	E
Q1: I learned something new from this training	4.4	4.7	4.8	4.6	4
Q2: The information provided in the training is important for me to know	4.8	5	4.8	5	4.7
Q3: The trainer communicated content clearly	5	5	5	4.4	3.8
Q4: The material and media clips were useful	4.4	4.7	4.8	4.4	4
Q5: There was sufficient time to cover the training information	5	5	5	4.4	3.8
Q6: The training will be of value at my new job	4.8	5	4.8	4.6	4.2

Discussion

This study illustrates a performance improvement project within behavioral health care. Specifically, our objective was to design and evaluate a staff training program for new employees that targeted their knowledge of ABA principles, applications, and procedures. To be effective, we reasoned that the training program should have several characteristics. First, training had to be time efficient and easily implemented. In total, training on the three modules required approximately 6 hr spread among three sessions. Trainers were able to follow guidelines and use an audiovisual medium (*Powerpoint*®) to standardize their presentations in each content area. Also, the training program had to be conducted with groups of employees in their work environment. This arrangement meant that training did not have to be "out sourced" to professionals unfamiliar with the behavioral health care organization. Finally, we deemed it critical to evaluate the effects of training on valid outcome measures—this objective was achieved through the knowledge competency and social validity assessments.

There were several consistent findings from the study, one being that pretraining test scores were higher than expected ($M = 58\%$-83%). A possible explanation for these results is that the majority of the participants had several years work experience in ID/DD and postsecondary education in which they may have learned about ABA. Or, it is possible that the AOK tests were basic enough to allow higher average scores before training. Another consistent finding was that in the pretraining phase the participants generally

scored lowest in the content area that was devoted to skill acquisition (Module 3). This training module had the most information among the three and, compared with other content areas, may have featured concepts and methods that were less familiar to the participants. Note, however, that the posttraining test results for skill acquisition were similar to the other content areas.

The social validity assessment found that the participants rated the training program favorably along several dimensions. Trainee satisfaction is a valuable outcome measure because it informs decision making about training format, content, and procedures. Our impression is that direct-care employees such as the participants in this study are likely to have different expectations about training that could influence their satisfaction with it.

By replicating pretraining and posttraining test results across the five participant groups in the study, we demonstrated that the training program successfully increased the targeted knowledge competencies. However, these findings would have been strengthened if we conducted a more formal experimental evaluation. Also, although the trainers followed implementation guidelines, we did not assess procedural integrity by observing and recording their performance during training sessions. Another limitation of the study is that it did not measure whether acquiring ABA knowledge competencies generalized to the participants correctly implementing instructional and behavior support plans. Future training research should conduct such measurement as well as assess whether acquired knowledge and performance competencies by staff improve the skills, adjustment, and quality of life of the people they serve.

References

Alavosius, M. P., & Sulzer-Azaroff, B. (1986). The effects of performance feedback on the safety of client lifting and transfer. *Journal of Applied Behavior Analysis, 19*, 261-267.

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*, 91-94.

Catania, A. C. (1998). *Learning* (4th ed.). Upper Saddle River, NJ: Prentice Hall.

Cooper, J. O., Heron, T. E., & Heward, W. L. (1987). *Applied behavior analysis.* Englewood Cliffs, NJ: Prentice Hall.

Gilligan, K. T., Luiselli, J. K., & Pace, G. M. (2007). Training paraprofessional staff to implement discrete trial instruction: Evaluation of a practical performance feedback intervention. *Behavior Therapist, 30*, 63-66.

Granpeesheh, D., Tarbox, J., Dixon, D. D., Peters, C. A., Thompson, K., & Kenzer, A. (2010). Evaluation of an eLearning tool for training behavioral therapists in academic knowledge of applied behavior analysis. *Research in Autism Spectrum Disorders, 4*, 11-17.

Iwata, B. A., Wallace, M. D., Kahng, S., Lindberg, J. S., Roscoe, E. M., Conners, C., . . . Worsdell, A. S. (2000). Skill acquisition in the implementation of functional analysis methodology. *Journal of Applied Behavior Analysis, 33*, 181-194.

Lavie, T., & Sturmey, P. (2002). Training staff to conduct a paired-stimulus preference assessment. *Journal of Applied Behavior Analysis, 35*, 209-211.

LeBlanc, M. P., Ricciardi, J. N., & Luiselli, J. K. (2005). Improving discrete trial instruction by paraprofessional staff through an abbreviated performance feedback intervention. *Education & Treatment of Children, 28*, 76-82.

Luiselli, J. K., & St. Amand, C. (2005). Staff training in applied behavior analysis: Improving knowledge competencies of service providers for people with developmental disabilities. *Mental Health Aspects of Developmental Disabilities, 8*, 120-125.

Luiselli, J. K., St. Amand, C., MaGee, C., & Sperry, J. M. (2008). Group training of applied behavior analysis (ABA) knowledge competencies to community-based service providers for adults with developmental disabilities. *International Journal of Behavioral Consultation and Therapy, 4*, 41-47.

Moore, J. W., Edwards, R. P., Sterling-Turner, H. E., Riley, J., DuBard, M., & McGeorge, A. (2002). Teacher acquisition of functional analysis methodology. *Journal of Applied Behavior Analysis, 35*, 73-77.

Reid, D. H., Rotholz, D. A., Parsons, M. P., Morris, L., Braswell, B. A., Green, C. W., & Schell, R. M. (2003). Training human service supervisors in aspects of PBS: Evaluation of a statewide, performance-based program. *Journal of Positive Behavioral Interventions, 5*, 35-46.

Wolf, M. M. (1978). Social validity: The case for subjective measurement, or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*, 203-214.

Bios

James K. Luiselli, EdD, ABPP, BCBA-D, is the senior vice president of Applied Research, Clinical training, and Peer Review at May Institute, Randolph, Massachusetts. He is also the director of training for the institute's Predoctoral Internship Program in clinical psychology. His interests include applied behavior analysis, performance enhancement, staff training, and the integration of research and clinical practice.

Jennifer D. Bass, PsyD, BCBA-D, is a clinical psychologist/behavior analyst in the Kelly O'Leary Center for Autism Spectrum Disorders and the Psychology Department of the Division of Developmental and Behavioral Pediatrics at Cincinnati Children's Hospital Medical Center. Her primary interests include applied behavior analysis, assessment and treatment of children with autism spectrum disorders (ASD), behavioral feeding disorders, siblings of children with ASD, and staff training.

Sara A. Whitcomb, PhD, is an assistant professor in the school psychology program at the University of Massachusetts, Amherst. She teaches courses pertaining to behavioral assessment and developmental psychopathology. Her primary interests include staff training, behavioral consultation, social-emotional and behavioral skill acquisition in early childhood, and positive behavior support.