COMPONENT ANALYSIS OF BEHAVIORAL SKILLS TRAINING

by

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A dissertation submitted to the Graduate Faculty in Psychology
in partial fulfillment of the requirements for the degree of Doctor of Philosophy,
The City University of New York

2011

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction with the dissertation requirement of Doctor of Philosophy.

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Abstract

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Few studies have conducted a component analysis of behavioral skills training (BST) and none have evaluated the independent effects of all components of BST. Therefore, the purpose of this experiment was to conduct a component analysis of behavioral skills training (BST) in the context of training teachers to conduct functional analyses. An alternating-treatments design was used to evaluate the components of BST. Prior to baseline, teachers reviewed written instructions of the functional analysis conditions. Following baseline, modeling, rehearsal, and feedback training occurred independently during the first training phase and in combination during subsequent phases. Rehearsal was ineffective at improving teachers' performance. Feedback was effective at improving the performance of all teachers. Modeling was less effective than feedback, such that improvements only occurred for some teachers and some functional analysis responses. Thus, feedback and to a lesser extent modeling are the effective and perhaps necessary components of BST.

Dedication

This work is dedicated to my parents, Claude and Chris Ward-Horner, who have taught me innumerable life lessons and who have been and continue to be amazing parents and advisers. This work also is dedicated to my family, Mary-Rose and Patrick O'Neill, Gina and Jim Patraitis, Michael Ward-Horner, Simon Ward-Horner, and Hedy Brezinski, for their never-ending support.

Acknowledgements

I would like to thank my adviser, Dr. Peter Sturmey, who has been an excellent mentor. His encouragement, insightful feedback, and guidance were invaluable, and I would not have made it through the program without your sage advice and supervision. I also would like to thank my committee members, Dr. Robert Lanson and Dr. Alica Alvero, for their guidance and support. Further, I would like to thank Dr. Jenifer Zarcone and Dr. Linda Cooper-Brown for their service as outside readers for my dissertation defense and for their thoughtful comments and feedback. I am grateful to Dr. Ronald Lee and the QSAC day school for sponsoring my dissertation research and to my research assistants, Gracie Bolic, Alan Zurita, Kim Seiler, Diana Arevalo, Julia Carmody, for their help with collecting and analyzing data. I also would like to thank my friends: To Matt Taylor and Laura Seiverling, you have been great friends and colleagues, and I very much admire your dedication to behavior analysis and am appreciative of your help when I needed it the most; to my friend and teacher John Reuter, thank you for guidance and support and for encouraging me to pursue graduate studies; to Fred Berard, Dan Burke, Mike Marroquin, and Tom Myers, thank you for your friendship and for helping me not to take things too seriously. Last, but not least, I would like to thank my partner and biggest supporter, Amanda Mentzer, who I am fortunate to have in my life.

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Introduction

A component analysis is an assessment of the independent variables (components) of which a treatment package is composed (Baer, Wolf, & Risley, 1968; Cooper, Heron, & Heward 2007; Ward-Horner & Sturmey, 2010). The purpose of a component analysis is to identify the necessity and sufficiency of the components of a treatment package. Component analyses are important for several reasons. First, they are important for the analytic goal of applied behavior analysis (Baer et al., 1968) such that researchers should demonstrate functional relations between the components of a treatment and outcome measures. Second, they may be important for enhancing the social validity (Wolf, 1978) of treatments by making treatment packages more efficient through the identification and removal of unnecessary and perhaps aversive components. Finally, the Behavior Analysis Certification Board (Behavior Analyst Task List, 2005) requires that behavior analysts conduct component analyses to identify the effective components of a treatment. Therefore, research should strive to improve multi-component treatments through the identification and removal of the unnecessary and perhaps effortful components.

Behavioral skills training is a training package that consists of instructions, modeling, rehearsal, and feedback which is highly effective for teaching parents and staff a variety of skills ranging from discrete-trial teaching (Sarokoff & Sturmey, 2004, 2008; Lafasakis & Sturmey, 2007; Ward-Horner & Sturmey, 2008) and paired-stimulus preference assessments (Lavie & Sturmey, 2002) to teaching functional analysis skills (Iwata et al., 2000; Moore et al., 2002; Phillips & Mudford, 2008; Wallace et al., 2004). Although researchers have demonstrated its effectiveness and generality, few studies have attempted to conduct a component analysis of behavioral skills training.

Ward-Horner and Sturmey (2010) conducted a review of the literature that included 30 component analyses using single-subject experimental designs; only two performed a component analysis of behavioral skills training. In one study, Feldman et al. (1989) evaluated the effectiveness of instructions alone versus instructions, modeling, rehearsal, and feedback for teaching parents with developmental disabilities to be more responsive to their children. The authors used a multiple-baseline design across responses and participants for the component analysis. The experimental phases consisted of baseline without instructions, verbal instructions only, and behavioral skills training. Verbal instructions had a slight impact on parental responsiveness, but substantial increases in parental responsiveness only occurred after the introduction of behavioral skills training. The authors concluded that verbal instructions were not sufficient and that modeling, rehearsal, and feedback were necessary.

Although Feldman et al. (1989) demonstrated that the training package was necessary, Ward-Horner and Sturmey (2010) suggested that the component analysis was incomplete because they did not independently evaluate modeling, rehearsal, and feedback. Thus, Feldman et al. did not demonstrate the necessity and sufficiency of modeling, rehearsal, and feedback independently of one another. Further, the extent to which written instructions were a necessary component of the treatment package is unknown because written instructions were included with the evaluation of the other components.

Krumhus and Malott (1980) also used a single-subject experimental design to conduct a component analysis of behavioral skills training. These researchers evaluated the components of behavioral skills training for teaching university students to provide social reinforcement during tutoring session. The component analysis consisted of sequentially presenting instructions, modeling, and feedback, respectively. Further, the authors used two groups of participants to

evaluate the effects of the immediacy of modeling and feedback (e.g., presenting modeling and feedback before or after the next tutoring session). Instructions were ineffective whereas modeling substantially improved the tutors' social reinforcement. Feedback was also effective at increasing the tutors' social reinforcement, but the high levels of responding produced by modeling made it difficult to draw definitive conclusions about the effects of feedback. Finally, the authors noted that post-session modeling increased performance over pre-session modeling, whereas there were inconsistent effects of the timing of feedback.

As noted by Krumhus and Malott (1980), there are two concerns when evaluating their component analysis. First, modeling preceded feedback, so it was impossible to rule out sequence/order effects when evaluating the effectiveness of feedback. Thus, it was possible that the effectiveness of feedback was dependent on previous modeling. Second, even if sequence/order effects were not a concern, due to ceiling effects, the dependent measure was insensitive to evaluate the full effects of feedback. Therefore, Krumhus and Malott's component analysis also was incomplete, as the authors did not determine the independent contributions of feedback.

Only one other study was identified that conducted a functional analysis of behavioral skills training, which employed a group design. Hudson (1982) performed a component analysis that compared the effectiveness of verbal instructions, verbal instructions with a general description of behavioral procedures, and behavioral skills training (instructions, rehearsal modeling, and feedback) to examine the relative effectiveness of each training procedure for teaching parents to work with his/her child with developmental disabilities. Hudson randomly assigned 10 participants to each of three treatment groups and to a waitlist-control group. Hudson measured participants' knowledge of behavioral principles and their generalization of

skills through the use of multiple choice and easy tests, respectively. The author also measured participants' performance while teaching their children, the number of programs the children mastered, and the children's rate of development. Participant performance while teaching their children and the number of programs mastered by the children were significantly greater for the behavioral skills training group than the other treatment groups. The author concluded that modeling, feedback, and rehearsal were necessary components of the training.

There are a number of concerns with Hudson's (1982) study. First, Hudson independently evaluated the effectiveness of verbal instructions, so the sufficiency and necessity of modeling, rehearsal, and feedback independent of one another was unknown. Therefore, Hudson's component analysis was incomplete. Second, the author used a group design and did not report data for individual participants, so it was unclear whether all participants responded favorably to the various training procedures. Finally, Hudson measured the accuracy of the participants' teaching using rating scales instead of direct measures of performance (e.g., reporting the percentage of correct teaching steps). Given these limitations, it is difficult to draw firm conclusions about the effectiveness of any of the components.

Although researchers have not conducted a complete component analysis of behavioral skills training, there is some evidence to suggest that modeling and feedback may be the most effective training procedures (Alvero, Bucklin, & Austin, 2001; Leblanc et al., 2005; Roscoe et al. 2006). For instance, Leblanc et al. (2005) evaluated the effectiveness of feedback alone for teaching three paraprofessionals to conduct discrete-trial teaching with children with autism. Leblanc et al. used a multiple-baseline-across-participants design and measured the percent correct of discrete-trial teaching during a no-instruction baseline and a feedback condition. During baseline, staff members' percent correct discrete-trial teaching remained below 50%.

During performance feedback, the staff members' percent correct discrete-trial teaching increased above the 90% criterion, and performance maintained above 90% through an 11-week follow-up. These data indicated that feedback was sufficient to improve discrete-trial teaching performance.

Roscoe et al. (2006) used a multiple-baseline-across-participants design with an embedded alternating-treatments design to evaluate the effects of feedback (discriminative component) and contingent money (reinforcing component) on the trainees' acquisition of multiple-stimulus-preference assessment without replacement (MSWO) and paired-stimulus preference assessment. The experimental phases included a no-instruction baseline, instruction baseline, and two training phases. During the first training phase, the authors provided feedback or contingent money while the participants conducted either the MSWO or paired-stimulus preference assessments. During the second training phase, they presented feedback and contingent money together for both types of preference assessments. Written instructions had an inconsistent effect on participant performance, and that only feedback resulted in increases in participants' performance above the 90% criterion during the first training phase. Thus, the authors demonstrated that written instructions were not sufficient, and that feedback was necessary for teaching participants stimulus preference assessments.

The findings of Leblanc et al. (2005) and Roscoe et al. (2006) suggest that feedback is effective, and possibly sufficient, for training staff; however, other researchers have demonstrated that video modeling may be as effective as feedback for training individuals in behavioral procedures. For instance, Moore and Fisher (2007) evaluated the effects of lecture, partial-video modeling, and complete-video modeling on participants' acquisition of functional analysis skills. The authors used a multiple-baseline experimental design with embedded

alternating treatments that consisted of a written-instructions baseline and three training phases. During the first training phase, they conducted lecture training, partial-video modeling, and complete-video modeling, such that each type of training was conducted for different functional analysis conditions (attention, demand, and play). During the second training phase, the functional-analysis condition that had lecture training in phase one received complete video-modeling, and the condition that had partial-video modeling in phase one continued to receive partial video-modeling. During the final training phase, the functional-analysis condition that received partial-video modeling during the previous two phases received complete-video modeling. Both lecture and partial-video modeling produced some improvements in correct performance; however, only complete-video modeling increased participants' performance above the 80% criterion. They concluded that complete-video modeling was an effective method for training staff to implement the functional-analysis conditions.

In summary, the component analyses of behavioral skills training using single-subject experimental designs and group designs are incomplete (Feldman et al., 1989; Hudson, 1982; Krumhus & Malott, 1989). They indicate that (a) instructions are not sufficient, (b) feedback is effective, and (c) modeling may be effective, but it is unclear as to whether modeling and feedback are necessary and/or sufficient components of behavioral skills training. Other experiments evaluating the efficacy of feedback and modeling alone have indicated that both types of training are effective (Leblanc et al., 2005; Moore and Fisher, 2007; Roscoe et al., 2006). Taken together, feedback and modeling may be the effective components of behavioral skills training; however, the relative contributions of feedback, modeling, and rehearsal within the context of behavioral skills training are unknown. Therefore, the purpose of the present

investigation was to conduct a component analysis of behavioral skills training for teaching staff members to perform the attention, demand, and play functional-analysis conditions.

Method

Participants, Setting, and Materials

Three direct-care staff members participated. The staff members were selected on the basis that they had no prior experience conducting functional analyses and scored less than 50% correct when implementing the attention, demand, and play functional analysis conditions during baseline. (A fourth staff member was dropped because of high performance during baseline in the attention condition; See Appendix A). All staff members signed informed consent forms. At the start of the study, Carol, Sandy, and Debby had been employed at the school for 7 months, 1 year 4 months, and 1 week, respectively.

Two students with a diagnosis of Autistic Disorder also participated. Isaac and James were 9 and 10 years old, respectively, at the beginning of the study. They were selected on the basis that they exhibited aggressive behavior that interfered with classroom instructions, and both children were students at the day school where the study took place. Prior to the start of the study, the parents' of the students signed an informed consent allowing their children to participate in the study. Isaac's target response consisted of hitting, and James' target responses consisted of hitting and kicking. *Hitting* consisted of the student forcefully slapping or punching any part of the staff member's body with either an open or closed fist. Hitting did not include tapping or pulling the staff member's arm to get attention. *Kicking* included James forcefully kicking his foot at any part of the staff member's body. Isaac's non-target challenging response, chin tapping, consisted of Isaac tapping or pressing any part of his hand or fingers into his chin. Chin tapping did not include Isaac resting his head in his hand with his elbow on the table or scratching his chin. James' non-target challenging responses included hand tapping and spitting. The definition for hand tapping included James repeatedly banging a wall, desk or an object with

either an open or closed fist. The definition of spitting included the expulsion of saliva regardless of whether spitting was directed toward or away from the staff member.

Each staff member was paired with one student for the purpose of collecting generalization data. Carol and Debby conducted functional analyses with Isaac during the generalization-assessment sessions, and Sandy conducted functional analyses with James during the generalization-assessment sessions. The experimenter conveniently paired staff members with students based on the staff members and student's classroom schedules.

The study took place in a functional analysis room at the students' school, which contained a table, two chairs, a video camera, and materials necessary for the staff member to conduct the functional analysis conditions. The size of the room was approximately 3.5m x 2.5m. The table was situated in a corner of the room and the chairs were positioned next to each other at the table. The video camera was situated on a tripod stand that was located on the other side of the room. The orientation of the video camera in relation to the table and chairs allowed for a side view of the staff member and student when viewed on videotape. The materials for the functional analysis conditions included a stopwatch, leisure items, and academic materials.

Functional Analysis Conditions

During each experimental phase, the experimenter instructed each staff member to conduct the attention, play, and demand functional analysis conditions (Iwata et al., 1994; Iwata et al., 2000). The attention condition provided a test of whether the target response was maintained by social positive reinforcement and required that the staff member provide attention each time the target response occurred and to withhold attention for all other responses. The demand condition provided a test whether the target response was maintained by escape or avoidance from instructional demands and required the staff member to remove task demands

when the target response occurred. The play condition functioned as a control condition, such that the protocol required that the staff member ignore the target response and to provide attention when the student engaged in appropriate bids for social interactions. All staff members performed the functional analysis conditions with simulated students and with real students.

Simulated-Assessment Sessions. In the simulated function analysis sessions, an experimenter (the author) simulated scripted child behavior as described by Iwata et al. (2000). Table 1 displays the student responses that the experimenter simulated during simulated-assessment sessions. The simulated responses included the target response, non-target challenging behavior, compliance with instructions, appropriate social initiations, and appropriate play. In each functional analysis condition, there were eight instances of the target behavior. For non-target behavior, there were four simulations during the attention and play conditions, and there were 6 simulations during demand condition. There were six instances of compliance that occur in the demand condition only. There were four instances of appropriate play and four instances of social interactions for the attention and play conditions only. Thus, each simulated-functional analysis condition consisted of the same number of target responses, but they differed in the number and type of other student behavior. The experimenter did not simulate appropriate play and social interactions during the demand condition because it was believed that the duration of instructional trials would not provide students with many opportunities to engage in such responses. Similarly, the experimenter did not simulate student compliance during the play and attention conditions because these conditions do not require staff members to present instructional demands.

Table 1. The type and number of simulated-student behavior for the attention, demand, and play functional analysis conditions.

Simulated-student Behavior	Functional analysis conditions		
	Attention	Demand	Play
1. Target response	8	8	8
2. Non-target challenging behavior	4	6	4
3. Compliance		6	
4. Appropriate play	4		4
5. Appropriate social interactions	4		4

For each of the three functional analysis conditions, the experimenter created four scripts to simulate student behavior, with each script containing 20 simulations of student behavior by block randomization to determine the sequence and timing of simulated-student behavior. That is, the experimenter randomly assigned half of each type of student behavior to be simulated during the first and last half of the script, with the restriction that there was a minimum of 5-s between instances of simulated-student behavior.

The scripts for each functional-analysis condition contained the same proportion of student-simulated behavior (e.g., 8 target responses, 6 non-target responses, and 6 compliance responses for the demand condition); however, the scripts differed in terms of the sequence and timing of student-simulated behavior. For instance, one script for the attention condition called for the experimenter to simulate a social interaction followed by an instance of appropriate play 7-s and 17-s into the session, respectively, whereas another script called for the experimenter to simulate the target response followed by social interaction 17-s and 30-s into the session, respectively (see Table 2). Four scripts were used to reduce the likelihood that staff members

would simply learn a single sequence of responses for each condition, which could reduce the probability that they would generalize their skills to working with real students.

Generalization-Assessment Sessions. During each generalization-assessment session, staff members conducted a functional analysis condition with actual students.

Dependent Measures

The dependent variable was the percentage of correct responses during the attention, play, and demand functional analysis conditions (Moore & Fisher, 2007). Table 3 displays the responses that observers scored for the attention, play, and demand conditions. There were five responses scored for each functional analysis condition.

Table 2. Sample script displaying the type and temporal distribution of the 20 simulated-student responses for the attention condition.

Session Time	Simulated-student Responses
0:07	Appropriate social interaction
0:17	Appropriate play
0:25	Non-target challenging behavior
0:32	Non-target challenging behavior
0:51	Target response
1:09	Appropriate play
1:34	Target response
2:49	Appropriate social interaction
2:03	Target response
2:14	Target response
2:24	Target response
2:38	Target response
2:46	Target response
3:20	Non-target challenging behavior
3:27	Appropriate social interaction
3:45	Appropriate play
4:09	Appropriate play
4:17	Appropriate social interaction
4:39	Target response
4:48	Non-target challenging behavior

Table 3. Staff responses measured during the attention, demand, and play functional analysis conditions.

Condition	Staff Responses
Attention	1. Prompt student to play with leisure items 2. Remove attention after prompting student to play with leisure items 3. Present statements of disapproval for target response 4. Withhold attention with each occurrence of appropriate behavior 5. Withhold attention when non-target challenging behavior occurs
Demand	1. Present instructional trial every 30-s 2. Re-present instruction and provide gestural prompt if the student does not comply to initial instruction 3. Re-present instruction and provide physical prompt if the student does not comply to verbal instruction and gestural prompt 4. Terminate trial when target response occurs 5. Provide praise if student responds correctly to the original instruction or to a verbal instruction and gestural prompt
Play	1. Provide leisure items and praise every 30-s 2. Interact with student when student initiates appropriately 3. Ignore target responses 4. Withhold praise if the target response occurs when praise is scheduled 5. Ignore all other non-target challenging behavior

Data Collection

Each functional analysis condition lasted 5-min and was videotaped. Undergraduate research assistants scored staff members' behavior during all conditions for the simulated- and generalization-assessment sessions. Research assistants scored the occurrence and non-occurrence of each staff members' behavior as correct or incorrect based on simulated or actual student behavior and the timing of staff members' instructions and attention according to protocol. For instance, in the attention condition, research assistants scored the delivery of a staff member's attention (occurrence) as correct if the student engaged in the target response and

incorrect if the staff member provided attention for a non-target challenging behavior. Similarly, research assistants scored the non-occurrence of a staff member's behavior in the attention condition as correct when the staff member withheld attention in the presence of non-target challenging behavior. The non-occurrence of attention was scored as incorrect when the staff member withheld attention in the presence of the target response. Thus, the percentage of correct responses was determined by dividing the number of correct responses by the total number of correct and incorrect behavior, multiplied by 100%.

Independent Variables

Instructions. The experimenter provided the staff members with instructions that described the purpose and procedure of each functional analysis condition. The instructions were identical to those published in Appendix A of Iwata et al. (2000), with the exception that the descriptions of the target and non-target responses were specific to the children included in this study (See Appendix B for instructions).

Video Modeling. Videotapes displayed examples of the correct implementation of each response needed to perform the functional analysis condition correctly. Videotapes contained simulated examples of correct staff member performance, such that one experimenter played the role of the student while another experimenter illustrated the correct response (Iwata et al., 2000). There were three videotapes, one for each functional analysis condition. The video for each functional analysis condition was 5-min in length. The student-simulated behavior in each video was based on a script that was similar to the scripts described above; however, the sequence and timing of student simulated-behavior was arranged so that the range of correct functional analysis responses could be modeled. For instance, during the demand video model, the experimenter simulated a target response between instructional trials and at various points

during instructional trials. Therefore, the video model consisted of the experimenter modeling escape contingently on the target response, regardless of whether the target response occurred immediately after a verbal instruction or during a trial that included a physical or gestural prompt. The rationale for systematically programming student behavior during video modeling was to ensure that each video displayed the range of stimulus and response variations to which the staff would need to respond.

Rehearsal. The staff member practiced conducting an additional 5-min session with the experimenter simulating student behavior. The rehearsal sessions were exactly the same as the simulated-assessment session, such that the experimenter simulated 20 student responses. Rehearsal training immediately preceded a simulated-assessment session, which was videotaped and scored later. The staff member did not receive any instructions or feedback of any kind during the rehearsal sessions.

Feedback. The experimenter provided verbal and written feedback to the staff member for each response for a given functional analysis condition (See Appendix C for sample feedback sheet). Feedback sessions began with verbal feedback regarding staff member's performance on the previous simulated-assessment session. The experimenter provided praise statements for the responses that were performed with 90% accuracy or greater, and the experimenter provided corrective feedback for the responses that were performed with less than 90% accuracy. Following verbal feedback, the staff member was given a typed sheet containing a summary of the verbal feedback that the experimenter provided.

Experimental Design

The experimental design was an alternating treatments design, such that each functional analysis condition was trained using a different training procedure (modeling, rehearsal, or

feedback training) or a different combination of training procedures (e.g., modeling + feedback). The instructions (baseline) phase was followed by two to three training phases depending on the participants' performance. The first training phase assessed the independent effects of each component of behavioral skills training, whereas the second training phase assessed a combination of two components. The third training phase included the combination of modeling, rehearsal, and feedback. There was a mastery criterion of 90% for two consecutive sessions during all training phases. Those functional analysis skills meeting mastery criterion during a given training phase were not targeted for training during the subsequent training phases. For example, during the first training phase, Sandy reached the mastery criterion for the demand and play conditions; therefore, the experimenter did not collect data for these responses during the second training phase. The type of assessment session (simulated versus generalization) and the type of functional analysis condition performed during the assessment session was block randomized, with the exception that generalization probes occurred a maximum of two time for each functional analysis condition during each experimental phase.

Procedure

Baseline. Prior to the first baseline session, the experimenter gave each staff member written instructions regarding the implementation of each functional analysis condition. Each staff member also completed a quiz to ensure that they read the procedure for each condition. If a staff member did not score 90% or above on the quiz, the experimenter reviewed the incorrect answers and provided an explanation as to why the answer was incorrect. Further, the experimenter then asked the staff member to re-take another version of the quiz. This procedure continued until the staff member scored at least 90% correct for each functional analysis quiz.

During each assessment session, the experimenter instructed the staff member to perform a functional analysis condition (e.g., attention, demand, or play condition) as accurately as possible based on the instructions. The experimenter did not provide any feedback to the participants, nor did the experimenter answer any questions regarding the instructions.

Training Phase 1. The top panel of Table 4 displays the assignment of training that the experimenter conducted for each functional analysis condition for the three staff members. The experimenter randomly assigned modeling, rehearsal, or feedback to each functional analysis condition for Carol. The experimenter used random assignment and counterbalancing to assign modeling, rehearsal, and feedback to Sandy and Debby. For instance, the experimenter randomly assigned modeling to the attention condition for Carol during training phase 1, and the experimenter randomly assigned modeling to the demand and play conditions for Sandy and Debby, respectively. In this way, the presentation of individual components was counterbalanced across participants and functional analysis conditions. Further, each training session immediately preceded a simulated-assessment session, where the staff member's performance for the functional analysis condition that previously received training was measured, and all training session were 5-min in duration. The experimenter set a mastery criterion of 90% or better for two consecutive training sessions.

During video modeling, the staff member watched a video model of a functional analysis condition. The staff member watched the video model immediately prior to conducting a simulated-assessment session for the functional analysis condition that was modeled. Following the video, the experimenter instructed the staff member to implement the functional analysis condition based on the instructions received during baseline and the responses modeled in the video.

Table 4. The type of training assigned to the three staff for the attention, demand, and play conditions during Training phases 1 and 2.

Training Phase 1	Carol	Sandy	Debby
Modeling	Attention	Play	Demand
Rehearsal	Demand	Attention	Play
Feedback	Play	Demand	Attention
Training Phase 2	**Carol**	**Sandy**	**Debby**
Modeling + Feedback	Attention*	Play*	Demand
Rehearsal + Modeling	Demand	Attention	Play
Feedback + Modeling	Play*	Demand*	Attention*

* Indicates the functional analysis conditions that were not included during the second training phase because the staff met the mastery criterion during the first training phase.

For the functional analysis condition designated to receive feedback, the experimenter provided the staff member with verbal and written feedback based on the staff member's performance from the previous assessment session. First, the experimenter read a description of the staff member's performance that included praise statements for correct responses and corrective feedback for incorrect responses. Next, the experimenter provided the staff member with a written summary of the verbal feedback. Feedback training occurred immediately prior to conducting a simulated-assessment session. Following feedback training, the experimenter instructed the staff member to conduct the functional analysis condition based on the instructions from baseline and the feedback from the previous session.

For the functional analysis condition designated to receive rehearsal training, the experimenter provided the staff member with a 5-min rehearsal session immediately prior to a simulated-assessment session. The experimenter did not provide the staff member with any additional instructions, modeling, or feedback during rehearsal training. Following rehearsal

training, the experimenter instructed the staff member to perform the functional analysis condition based on the instructions during baseline and what he/she may have learned by practicing an extra functional analysis condition.

Training Phase 2. This phase was similar to the first training phase with the exception that the experimenter conducted two types of training for each functional analysis condition. For instances, if the protocol called for a staff member to receive modeling and feedback, the experimenter conducted two 5-min training sessions immediately prior to the simulated-assessment session. Thus, there was a total of 10-min of training that preceded each simulated-assessment session, with 5-min devoted to each type of training. To control for the order of training, the experimenter randomly determined the training session that was conducted first. The lower panel of Table 4 indicates the type of training combinations that the staff members received before each assessment session. As with training phase 1, immediately following training, the staff member conducted the functional analysis condition that was previously trained during a simulated-assessment session.

Training Phase 3. This phase was similar to the second training phase. Any functional analysis condition that the staff member performed with less than 90% accuracy received training using the combination of modeling, rehearsal, and feedback. The experimenter randomly determined the order of training sessions.

Inter-Observer Agreement. Two observers randomly selected 50%, 61%, and 52% of Carol, Sandy, and Debby's sessions across experimental phases to evaluate Inter-Observer Agreement (IOA). The observers selected the same proportion of each functional analysis condition to evaluate IOA and independently scored staff members' percent correct functional analysis response for those randomly selected sessions. An agreement was recorded when both

observers scored the same staff behavior at approximately the same time (+/- 2-s). IOA was calculated by dividing the total number agreements by the total number of agreements plus disagreements, multiplied by 100%. The overall mean IOA for each participant averaged over experimental phases was 95%, 92%, and 91% for Carol, Sandy, and Debby, respectively. Table 5 provides details of the mean percent and range of IOA for each participant during each experimental phase.

Procedural Integrity. Observers collected procedural integrity data on the experimenter's simulation of student responses during simulated-assessment sessions across all experimental phases. Observers collected procedural integrity data for 40% of Carol's sessions and for 42% of Sandy and Debby's sessions. Observers collected procedural integrity data by measuring the frequency and proportion of simulated-student behavior. Observers scored procedural integrity data by summing the total correct number of simulations and dividing by 20 and then multiplied by 100%. In the cases where the experimenter was not able to simulate student behavior because the staff member's behavior set the occasion for the simulation (e.g., a staff member provided only 4 instructions during a demand condition, yet the experimenter was required to simulate 6 correct responses to staff member's instructions), observers calculated integrity data by totaling the number of correct simulations and dividing by the total number of simulations. The mean percentage of correctly simulated student behavior averaged across staff members and experimental phases was 99% (range 95–100% correct simulations).

Treatment Integrity. Observers also collected treatment integrity data for a minimum of 30% of the training sessions when the experimenter provided modeling, rehearsal and feedback training. For rehearsal training, observers collected data on the experimenter's correct simulation of student behavior (same as described for procedural integrity).

Table 5. The mean percentage and range of inter-observer agreement for each staff during each phase of the experiment.

Participant	Baseline	Training Phase 1	Training Phase 2	Training Phase 3
Carol	93% (87%-93%)	96% (89%-100%)	97% (92%-98%)	94% (91-97%)
Sandy	90% (57%-100%)	95% (83%-100%)	90% (NA)	(NA) (NA)
Debby	91% (83%-100%)	93% (83%-100%)	92% (85%-100%)	90% (82%-100%)

For the feedback training, research assistants collect data on the accuracy of the experimenter's comments regarding each staff member's response (e.g., the correct delivery of praise and corrective feedback in the absence of modeling and extra practice), the order in which the experimenter provided feedback (verbal followed by written), and the duration of training. For modeling training, observers collected data on the presentation of the correct video model. The overall mean percentage of correctly implemented modeling, rehearsal, and feedback training was 100%, 99% (range 95% - 100%), and 96% (range 89% - 100%), respectively. In addition, each video model was scored to ensure 100% accurate functional analysis responses and that the experimenter simulated the correct number and proportion of student behavior.

Social Validity Measure. Following the completion of the study, each staff member was asked to rate how much they liked each type of training and the effectiveness of each training (Table 7 displays the questions and staff members' responses to each question). The first series of questions required staff members to rate the effectiveness and their liking of each training separately by circling one of the following: poor, fair, good, very good, or excellent. The last two

questions required staff members to select the training that they liked the most and the one that they believed to be most effective.

Results

Figure 1, 2, and 3 display percent correct functional analysis responses as a function of the baseline and the three training phases for the Carol, Sandy, and Debby, respectively. During the written instructions phase, the three staff members' percent correct responses for the simulated assessment sessions were generally stable across staff members with an average of 21%, 20%, and 22% for Carol, Sandy, and Debby, respectively. In addition, staff members' performance during the generalization sessions was similar to the simulated-assessment sessions, with the exception that Carol and Debby's performance during the demand and attention generalization-assessment sessions, respectively, was greater than 50%.

During the first training phase, feedback training was highly effective at improving staff members' performance, whereas rehearsal was not effective. Each staff member reached the mastery criterion for the functional analysis responses trained with feedback, and the average percent correct responding with feedback training was 82%, 85%, and 95% for Carol, Sandy, and Debby, respectively. In contrast, rehearsal training did not have any appreciable effect on the staff members' performance. Carol, Sandy, and Debby's average percent correct responding with rehearsal training was 38%, 19%, and 32%, respectively. Finally, with the exception of Sandy's generalization session for the attention condition, which was substantially greater than the simulation sessions, the generalization sessions for the conditions receiving feedback and rehearsal training closely resembled the staff members' performance during simulation sessions.

Figure 1. Carol's percentage of correct functional analysis responses during baseline and during the three training phases.

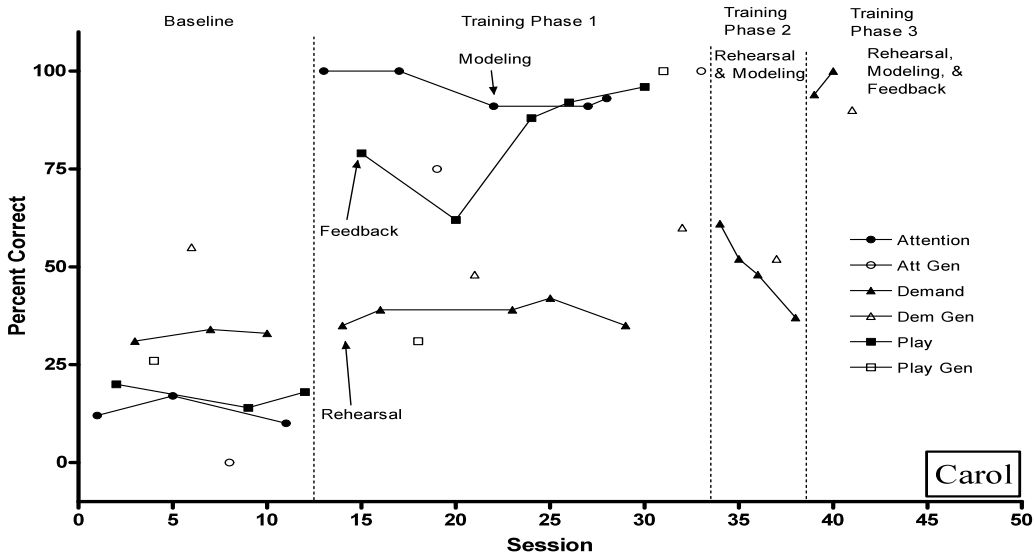


Figure 2. Sandy's percentage of correct functional analysis responses during baseline and during the three training phases.

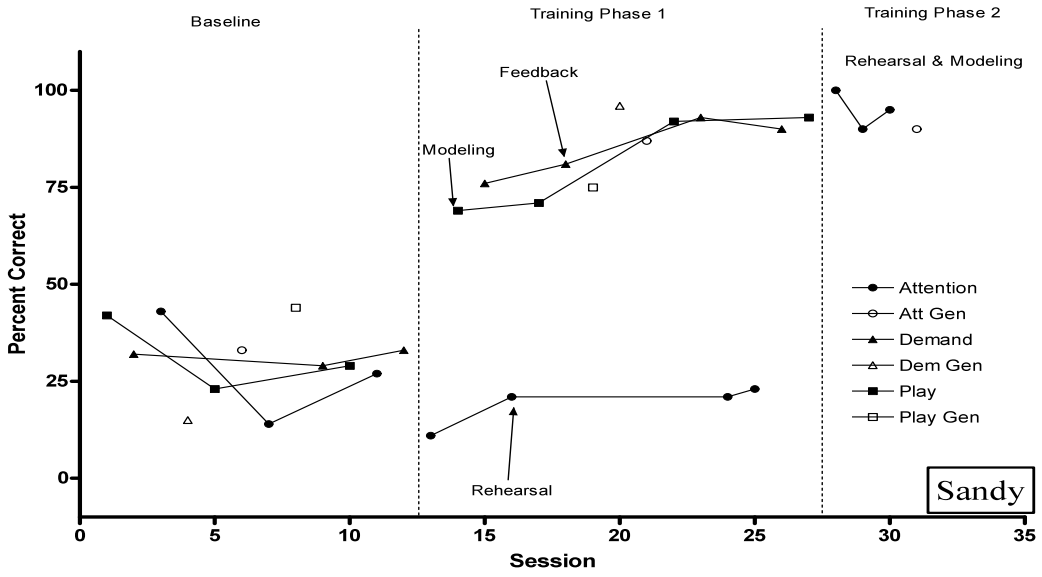
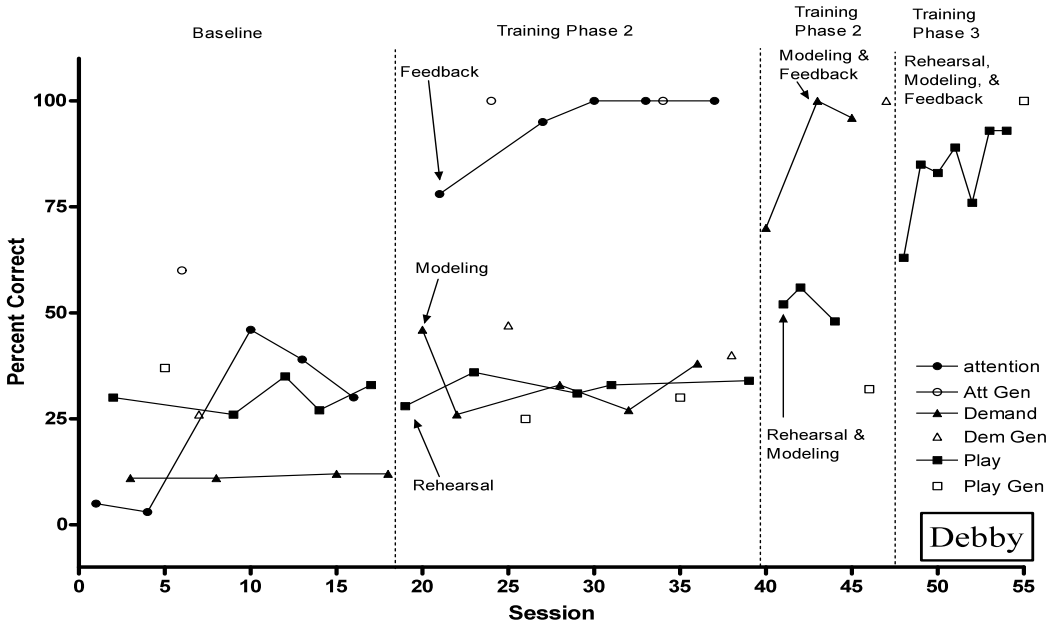


Figure 3. Debby's percentage of correct functional analysis responses during baseline and during the three training phases.



The effects of modeling during the first training phase were less consistent than feedback. Modeling training produced substantial increases in performance for Carol and Sandy during the attention and play conditions, respectively, and both reached the mastery criterion with modeling training. With modeling training, Carol and Sandy's average percent correct responding was 95% and 81%, respectively. Modeling training for Debby during the demand condition only had a marginal effect on her performance, and her average percent correct was 44%. Finally, with the exception of Sandy's performance during the attention generalization session, the generalization sessions for the conditions receiving modeling were consistent with staff members' performance during simulation sessions.

During the second training phase, the combination of modeling and rehearsal training occurred for the demand, attention, and play conditions for Carol, Sandy, and Debby, respectively. For each participant, modeling training was added to the condition that received rehearsal training during the first training phase. The combination of modeling and rehearsal training produced an immediate increase in performance to an average percent correct of 95% during the attention condition for Sandy. For Carol and Debby, the combination of modeling and rehearsal had marginal effects on performance and their average percent correct was 50% and 52%, respectively. Further, because modeling did not improve Debby's performance for the demand condition during the first training phase, the experimenter added feedback to modeling during the second training phase. The combination of modeling and feedback training for Debby was effective at improving performance to criterion with an average percent correct of 89%. Finally, the staff members' performance during all generalization probes was similar to all simulated sessions.

Because the combination of rehearsal and modeling training was ineffective at improving Carol and Debby's performance during the demand and play conditions, respectively, the experimenter used a combination of modeling, rehearsal, and feedback training to teach these responses during the third training phase. With this combination of training, Carol's performance during the demand condition increased after the first training session to criterion, and she reached mastery criterion within two training sessions. Carol's average percent correct was 97%. Improvements in Debby's performance were much more gradual, as it took 6 training session before she reached mastery criterion. Debby's average percent correct was 82%. Finally, the generalization sessions for both staff members were similar to their performance during simulated sessions.

Table 6 provides a summary of the overall effectiveness of each type of training averaged over participants and experimental phases. The two measures of effectiveness presented in the table include (a) the number of times a particular training was effective out of the total number of times the training was used, and (b) the percentage of change from the previous experimental phase to the phase when the training was first introduced. Feedback training was effective at improving staff members' performance to mastery criterion every time it was implemented and modeling training was effective only 50% of the time. Rehearsal training was never effective at improving performance.

Table 6. The effectiveness of each type of training for each functional analysis condition averaged over staff and experimental phases. For each type of training, the first column displays the total number of times the training was effective by the total number of times it was presented. The second column for each training indicates the average percent change from the previous phase to the phase in which the training was first introduced.

	Modeling		Rehearsal		Feedback	
FA Condition	Effective?	% Change	Effective?	% Change	Effective?	% Change
Attention	2/2	79%	0/1	5%	1/1	70%
Demand	0/2	16%	0/1	-9%	3/3	53%
Play	1/2	37%	0/1	2%	2/2	53%
Total	3/6	50%	0/3	0%	6/6	55%

Table 7 displays the staff members' ratings of the effectiveness and liking of each type of training. Carol reported that she liked written instructions and feedback more than rehearsal and modeling. When asked to choose the component she liked the most, Carol indicated that she liked feedback more than the other types of training. Sandy reported that she liked modeling and feedback training more than written instructions and rehearsal training. When asked to choose

the training she liked the most, Sandy indicated that she liked modeling more than the other types of training. Both Carol and Sandy's ratings of effectiveness and liking of specific trainings showed a high degree of correspondence, such that they tended to rate the components that they believed to most effective as the ones they liked the most. Further, both Carol and Sandy's ratings of the most effective components were consistent with the trainings that were most effective at teaching them to conduct a functional analysis. Finally, Debby rated her liking and the effectiveness of all the components as very good or excellent, with the exception of rating the effectiveness of written instructions as good. When asked to select the most effective training and the one she liked the most, Debby selected feedback for both questions. Although Debby tended to like all trainings and to rate all trainings as effective, when forced to choose the most effective training and the training she liked the most, Debby selected feedback for both questions. Debby's selection of feedback as the most effective training is consistent with the training that was most effective at teaching Debby to conduct a functional analysis.

Table 7. Outcome of social validity questionnaire completed by staff.

1 = Poor 2 = Fair 3 = Good 4 = Very good 5 = Excellent

Questions	Participants' Responses Carol	Sandy	Debby
1. Rate how much you liked			
a. Modeling training?	2	4	4
b. Rehearsal training?	1	2	4
c. Feedback training?	3	4	5
d. Written instructions training?	3	2	*
2. Rate the effectiveness of			
a. Modeling training?	2	4	4
b. Rehearsal training?	1	1	4
c. Feedback training?	4	4	5
d. Written instructions training?	5	2	3
3. Which training was most effective to learn how to conduct a functional analysis (Circle one: Instructions, modeling, rehearsal, feedback)?	Feedback	Modeling	Feedback
4. Which training did you like the most (Circle one: Instructions, modeling, rehearsal, feedback)?	Feedback	Modeling	Feedback

* Indicate that Debby did not provide a response to this question.

Discussion

The present study indicates that feedback, and to a lesser extent modeling, are the most effective components of BST. With the implementation of feedback training during the first training phase, there was a systematic increase in staff members' performance to mastery criterion across, regardless of the functional analysis skill targeted for feedback training. The inclusion of feedback for those responses not meeting criterion in the first and second training phases also always improved performance to mastery criterion. With the implementation of video modeling training during the first training phase, there was a systematic increase in performance for two out of the three staff members. Further, the addition of modeling during subsequent training phases was effective at improving performance for only one out of the three times it was presented. Finally, staff members' low performance during baseline and lack of improvement with the introduction of rehearsal training indicates that written instructions and rehearsal training were ineffective. Given the consistent effects of feedback training, the less consistent effects of modeling, and that written instructions and rehearsal training were ineffective, in this study one may conclude that written instructions and rehearsal training are not sufficient and that feedback and modeling are the active components of BST.

Before providing a more thorough discussion of the present data, it is important to emphasize that the conclusions about the components of behavioral skills training are specific to this study. For instance, although instructions and rehearsal were ineffective at improving staff members' performance in this study, it is possible that these components might be effective if implemented in a different manner or for a different behavior. Thus, rehearsal might be effective if staff members practiced for longer periods of time, and instructions might be effective if presented in a different format. Similarly, it is possible that alternative methods for conducting

modeling and feedback training may produce very different outcomes than what has been reported in this study. Therefore, researchers should be careful not to draw broad conclusions about the active components of behavioral skills training based on this study alone.

As noted earlier, the goal of conducting a component analysis is to evaluate the necessity and sufficiency of the active components of a treatment package (Baer, Wolf, & Risley, 1968; Cooper, Heron, & Heward 2007; Ward-Horner & Sturmey, 2010); however, using the term necessity to describe the effects of feedback and modeling in this study is challenging. Indeed, it is tempting to label feedback as the necessary component of BST because it was the most effective. Nevertheless, because modeling was sometimes effective independent of feedback, the sweeping statement that feedback is the necessary component is inaccurate. To reconcile this issue with labeling components as necessary when the effects of a component are mixed, it seems most accurate to reserve the terms necessity and sufficiency for describing the effectiveness of components for individual participants and specific responses. For instance, Debby's data suggest that feedback was necessary because modeling and rehearsal training were not effective. Nevertheless, a different challenge arises when evaluating the individual data of this study to draw conclusions about the necessity of components. For instance, it could be argued that the use of the term necessary in regards to Debby's data is inappropriate given the experimental design. Because the author used counterbalancing to control for different responses receiving different treatments across participants, one could argue that the use of such an inter-subject control procedure would require replication of an effect across participants to warrant the use of the term necessity. On the other hand, one could argue that the replication of the effectiveness of feedback across responses and experimental phases (e.g., Debby's data)

sufficiently mitigates confounding of component and response interactions, although sequence effects remain a concern.

Because of the absolute nature of the terms necessity and sufficiency, it is perhaps best to be conservative in their use. Therefore, given the type of experimental control procedures used in this study, it is most appropriate to describe the components as effective or ineffective when evaluating individual data. For instance, modeling and feedback were both effective for teaching Sandy; modeling and feedback were both effective for teaching Carol, but the effectiveness of modeling was dependent on the response; feedback was the only effective component for teaching Debby. In characterizing the study as a whole, the active components are feedback and modeling, and it is accurate to characterize written instructions and rehearsal as not sufficient because the effects (or lack thereof) were replicated across participants.

Although definitive conclusions regarding the necessity of components are not warranted, this study extends previous studies by providing a direct comparison of the independent and combined effects of modeling, rehearsal, and feedback. Previous attempts at a component analysis of behavioral skills training using single-subject designs either did not adequately separate components (Feldman et al., 1989) or were unable to adequately evaluate individual components due to sequence effects (Krumus & Malott, 1980). For instance, Feldman et al. compared the effects of written instructions to the combination of rehearsal, modeling, and feedback; thereby making it impossible to evaluate whether the combination of components was required to improve behavior or whether a single components was responsible for behavior change. As for the experimental design of Krumus and Malott's study, the sequential add-in nature of the design did not permit the independent evaluation of feedback prior to the combination of components. Therefore, the present study extends these previous component

analyses by independently evaluating all components prior to the evaluation of component combination.

This study is consistent with other studies that have demonstrated that feedback and modeling are independently effective training procedures (Leblanc et al., 2005; Moore & Fisher, 2007; Roscoe et al. 2006). For instance, Moore and Fisher (2007) demonstrated that complete video modeling was effective at improving two out the three participants' performance at conducting functional analyses, and that the inclusion of feedback was needed to improve one participant's performance to criterion levels. The present study is consistent with Moore and Fisher's study because in both cases modeling was effective for training some participants and some functional analysis responses, although modeling was consistently more effective in Moore and Fisher's study than in the present study. Further, Leblanc et al. and Roscoe et al. both demonstrated the effectiveness of feedback for teaching participants to conduct discrete-trial teaching and stimulus preference assessments, respectively, which echoes the findings of the present study that showed feedback to be independently effective.

Beyond the analysis of treatment components, the present study has important clinical implication. As Krumus and Malott (1980) discussed, video modeling is an effective and cost efficient procedure for teaching new skills. Video models are relatively inexpensive and easy to create, and video-model training does not require one-to-one training, as is the case with rehearsal and feedback. Because modeling can be effective for training some staff members to perform some responses, one approach to training new staff members might be to (a) train all staff members using video modeling and (b) to use feedback to improve the performance of those staff members that were unable to learn from the video models. Even if video-modeling training is effective for only 50% of new staff members, such a training model might cut in half

the time required to train a group of new employees. Further, given the high degree of correspondence between the most effective training and the staff members' rating of the component they liked the most, the elimination of the written instructions and rehearsal may not influence the social acceptability of the training.

Although it is tempting to eliminate rehearsal and written instructions because they were ineffective and generally liked the least, it is important to first evaluate the necessity of each of these forms of training. Indeed, one important limitation of this study is that the findings do not allow conclusions regarding the necessity of instructions (or the sufficiency of feedback and modeling). Because the experimenter provided instructions prior to the training phases, it is unknown as to whether feedback and modeling would have been as effective without prior instructions. Therefore, it is possible that written instructions and rehearsal training are ineffective when separated from other types of training, but the effectiveness of modeling and feedback may hinge on the inclusion of one or both trainings.

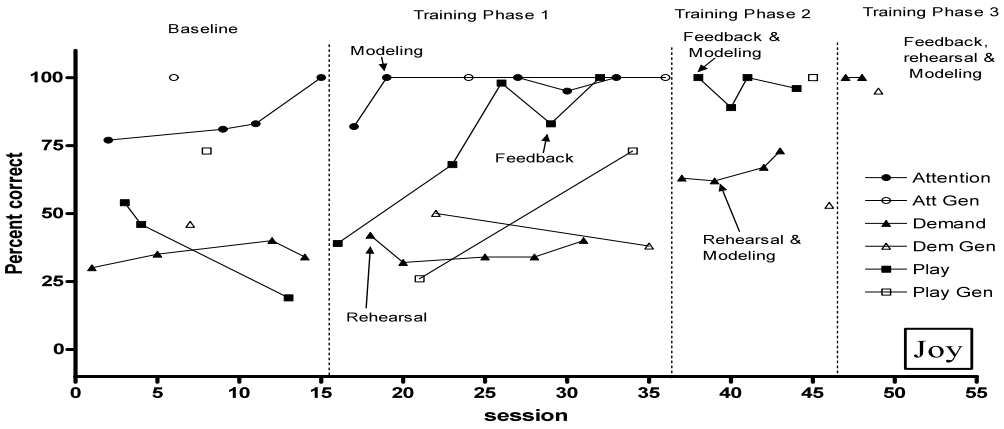
There are two other important limitations to this study. First, the generalization probes might not accurately reflect staff members' performance. Isaac and James were selected to participate based on supervisors' reports and informal observations of the students engaging in aggressive responses during classroom instruction. Nevertheless, throughout the study neither Isaac nor James emitted a single aggressive response. In fact, both students primarily engaged in play behavior when toys were present or emitted non-target responses. Therefore, the staff members needed to respond to only a subset of potential student responses that may occur during a functional analysis. One explanation as to why the students did not engage in the target responses was that their behavior was maintained and occasioned by stimuli not present in the attention, play, and demand functional analysis conditions. Through ABC observations during

classroom instructions, it appeared as though both students' aggression was maintained by access to tangibles. Because only the play, demand, and attention conditions were included in the present study, staff members' performance at responding to the target behavior was never assessed during generalization probes. Thus, it is possible that the generalization-assessment sessions overestimate the staff members' ability to conduct a functional analysis with actual students. Second, because the counterbalanced assignment of components to functional analysis responses was not maintained during the second and third training phases, it is challenging to draw conclusions regarding the effects of component combinations. In addition, for both Carol and Sandy, there was no comparison condition during the component combination phases. Without comparison conditions and without counterbalancing component combinations across functional analysis responses, it is challenging to compare the effectiveness of one combination of components with a different combination of components.

In summary, this study provides the most complete analysis of the components of behavioral skills training. Future researchers should continue to evaluate the effectiveness of modeling and feedback for teaching other skills to evaluate the robustness of the present findings. Further, researchers should attempt to evaluate the necessity of instructions to assess the sufficiency of modeling and feedback training by independently evaluating the effects of each type of training (instructions, modeling, and feedback) and systematically evaluating training combinations.

Appendix A

Figure Displaying Joy's Data



Appendix B

Written Instructions From Iwata et al. (2002)

Attention Condition

Purpose

This condition is designed to determine whether the target behavior is maintained by contingent attention delivered by a therapist. The condition involves remaining in a room with a student and ignoring all student behavior, except for the target behavior, which is followed by attention.

Target Behavior

The target behavior being assessed is *hitting*. *Hitting* consists of the student forcefully slapping or punching any part of the teacher's body with either an open or closed fist. Hitting does not include tapping or pulling the teacher's arm to get attention.

Other Inappropriate behavior

Aside from the target behavior, the primary inappropriate behavior that the student displays is chin tapping. Chin tapping consists of the student pressing any part of his had or fingers into his chin, which does not include scratching. The student may also engage in the following inappropriate, non-target behaviors: kicking a wall, throwing toys, knocking over furniture, yelling, screaming, spitting, running around the room, dropping to the floor, kicking the teacher, or head butting.

How to Conduct a Session

1. Begin a session by directing the student toward the leisure materials that are present in the room. Tell the student that he or she should play with the toys while you do some work.
2. After issuing the initial instruction, turn away from the student and pretend to do some work or read. You should move away from the student within approximately 10 seconds of telling the student to play with the toys. Thus, once the student is in close proximity of the leisure items, remove attention by moving away from the student, sit in another chair, read or do some paperwork (or pretend to do so), and completely ignore all behaviors exhibited by the student except as noted below.
3. If the target behavior does not occur during the session, you will ignore the student for the entire session. Someone will inform you when the session is over.
4. If any behaviors other than the target behavior occur, ignore these also. Examples include *appropriate behaviors* (e.g., playing with the toys, smiling at you, or any attempts to talk to you or to interact with you in an appropriate manner) and *inappropriate behaviors* other than target behavior (e.g., chin tapping, screaming, throwing materials, running around the room, etc.).
5. The only time you will attend to the student is when he or she engages in hitting. If the student exhibits the target behavior of hitting at any time during the session, do the following within 5 seconds of the target response: (a) Go over to the student and

verbally express concern and disapproval. For example, you could say something like, "Stop that, you're going to hurt me," "[Name], that's not nice; play with your toys," "[Name], I don't want you to do that; put your hands down," or something similar. (b) While you express concern, briefly touch the student's arm, place your hand on the student's shoulder, or physically block the target behavior, but do not physically hold (restrain) the student. The general idea is to express concern, briefly interrupt the behavior, and calm the student. Do not shout at the student and do not handle the student roughly.

6. After a target behavior occurs and you have responded as indicated above (Step 5), resume ignoring the student until another target behavior occurs or until the session is over.

Demand (Escape) Condition

Purpose

This condition is designed to determine whether the target behavior is maintained by escape from task demands. The condition involves presenting a series of instructional trials to the student. Compliance produces praise, noncompliance produces a series of prompts, and the occurrence of the target behavior immediately terminates the trial.

Target Behavior

The target behavior being assessed is *hitting*. *Hitting* consists of the student forcefully slapping or punching any part of the teacher's body with either an open or closed fist. Hitting does not include tapping or pulling the teacher's arm to get attention.

Other Inappropriate behavior

Aside from the target behavior, the primary inappropriate behavior that the student displays is chin tapping. Chin tapping consists of the student pressing any part of his had or fingers into his chin, which does not include scratching. The student may also engage in the following inappropriate, non-target behaviors: kicking a wall, throwing toys, knocking over furniture, yelling, screaming, spitting, running around the room, dropping to the floor, kicking the teacher, or head butting.

How to conduct a session

1. Begin a session with you and the student seated at a table. Using the materials that are available, you will implement a series of trials to teach the student to perform a task. The task selected for this condition is putting a block under a bowl from the student's preposition program. To conduct the program, place a bowl upside down on the table, and instruct the student to "put the block under the bowl".
2. Activate a stopwatch at the beginning of the session (when the experimenter says "Now"). At the beginning of every 30-s interval (starting at 0), you will initiate an instructional trial. Thus, there will be approximately 10 trials during a 5-min session. Begin each instructional trial with the bowl and block on the table in front of the student. The sequence to be used during each instructional trial is as follows: (a) first deliver a clear instruction to the student, such as "[Name], put the block under the

bowl." If the student performs the response within 5-s (count to 5 slowly to determine this), or at least begins to initiate the response during that time, deliver praise (e.g., say "nice job," "that's great," "good," etc.) when the student has finished. (b) If the student does not perform the response within 5-s, repeat the instruction and gesture (point to or motion to initiate the correct response) to help the student make the correct response. If the student performs the response within 5-s following the instruction and gesture, deliver praise as noted above. (c) If the student does not perform the response within 5-s of your instruction and gesture, repeat the instruction again and simultaneously provide physical assistance. That is, use your hands to help the student pick up the block and put it under the bowl. Do not deliver praise if you used physical assistance. (d) If, at any time during this sequence, the student emits the target behavior (hitting), terminate the trial within 3-s of the target behavior. Remove the materials from the table, turn away from the student, and ignore the student until it is time to begin a new trial. (e) If the student emits other inappropriate behaviors (chin tapping, screaming, throwing things, etc.), continue with the sequence, do not terminate the trial when these responses occur.

3. Repeat the above sequence at each 30-s interval (e.g. 0-s, 30-s, 60-s, etc.). However, if one instructional trial does not end before you are scheduled to begin the next instructional trial (instructional trial last more than 30-s, perhaps due to difficult student behavior), wait until the next available 30-s interval to begin a new instructional sequence. Continue this sequence of trial presentations until the session is over.

Play Condition

Purpose

This condition is designed to be a general control condition, in which no demands are placed on the student, continuous access to leisure materials is available, and attention is delivered frequently independent of the student's behavior.

Target Behavior

The target behavior being assessed is *hitting*. *Hitting* consists of the student forcefully slapping or punching any part of the teacher's body with either an open or closed fist. Hitting does not include tapping or pulling the teacher's arm to get attention.

Other Inappropriate behavior

Aside from the target behavior, the primary inappropriate behavior that the student displays is chin tapping. Chin tapping consists of the student pressing any part of his had or fingers into his chin, which does not include scratching. The student may also engage in the following inappropriate, non-target behaviors: kicking a wall, throwing toys, knocking over furniture, yelling, screaming, spitting, running around the room, dropping to the floor, kicking the teacher, or head butting.

How to Conduct a Session

1. Begin a session by activating a stopwatch and directing the student toward the leisure items and instructing the student to play with the leisure items that are present in the room. You may say something like, “Here are some nice toys; why don’t you play with them for a while?” or “Would you like to play with these toys?” (as you hand the student a toy), or anything similar.
2. At least once every 30-s, deliver some for of attention to the student. For example, you can tell the student that he or she is playing nicely, ask if he or she is having fun, and so forth. You can also hand the student another toy, pat the student briefly on the shoulder, or smile at the student while commenting on the student’s behavior. The general idea is to provide some type of friendly, non-demanding interaction (lasting about 5-s) at each 30-s interval.
3. If the student attempts to interact with you appropriately (e.g., asks for something, hands you a toy, etc.), reciprocate and provide attention.
4. If the student emits any form of inappropriate behavior (e.g., chin tapping, throwing toys, knocking over furniture), including the target behavior, do not deliver attention.
5. If the target behavior or an inappropriate non-target behavior (chin tapping, kicking, spitting, throwing toys) occurs precisely at the end of a 30-s interval (just as you are about to deliver attention), do not deliver attention. Instead, wait until the problem behavior has stopped for a minimum 5-s, and then deliver attention.

Appendix C

Example Feedback Sheet

Attention Feedback

- Overall Percentage: 78%
- Prompt to leisure items:
    - Percent correct = 100%
    - You did an excellent job of prompting the student to the leisure items by walking the student to the leisure items, handing the student an item, and by telling the student to play with the toys.
- Remove attention after prompting to leisure items:
    - Percent correct = 100%
    - You did an excellent job of instructing the student to play with the items while you did some work.
    - You did an awesome job of removing attention by moving and turning away from the student and pretending to do some work (reading/looking at notes).
- Provide a disapproving statement follow a target behavior:
    - Percent correct = 50%
    - When the student engaged in the target behavior, you often told the student to play with toys. On one occasion, you did not provide any attention when the target behavior occurred (In other words, you kept on pretending to do work without bring attention to the target behavior).
    - Remember, the instructions for the attention condition specify that you should provide statements of disapproval when the target behavior occurs. Thus, when the student hits you, present a disapproving statement ("don't do that, it really hurts" or "Stop that, do you really want to hurt me"). Also, remember to disrupt the student's hitting by providing physical attention (block the student from hitting you by intercepting the students hand with your hand).
- Withhold attention for appropriate behavior:
    - Percent correct: 89%
    - One time during the session you told the student to continue playing with a toy. Remember to ignore (continue to pretend to do work by reading/looking at notes) the student's appropriate behavior (sitting quietly or playing with toys) and bids for social interactions.
- Ignore all non-target behavior:
    - Percent correct: 100%
    - You did an excellent job of ignoring the student's non-target behavior of chin tapping. When the student engaged in the non-target behavior, you correctly continued to pretend to do work/look at notes.

Attention Feedback

- Overall Percentage: 30%
- Prompt to leisure items:
    - Percent correct = 0%
    - Instead of allowing the student to wander the room, you should begin each session by prompting the student to play with leisure items. Prompting the student to the leisure item consists of two parts:
        - (a) Direct the student to the leisure items by walking/directing the student to the leisure items and or handing the student an item;
        - (b) Instructing the student to play with the items while you do some work.
- Remove attention after prompting to leisure items:
    - Percent Correct = 0%
    - Instead of playing with the student once the session begins, you should remove attention. You should remove attention by orienting (turning) away from the student and by pretending to do some work (reading/looking at note book).
- Provide a disapproving statement follow a target behavior
    - Percent correct = 0%
    - When the student engaged in the target behavior (hitting), you often said "nice hands" and offered the student a toy. To present a disapproving statement you must tell the client to stop hitting and physically block the hit (but don't restrain the student).
    - Remember, the instructions for the attention condition specify that you should provide statements of disapproval when the target behavior occurs. Thus, when the student hits you, present a disapproving statement ("don't do that, it really hurts" or "Stop that, do you really want to hurt me"). Also, remember to disrupt the student's hitting by providing physical attention (block the student from hitting you by intercepting the students hand with your hand).
- Withhold attention for appropriate behavior
    - Percent correct: 54%
    - When the student interacted with you by asking you to play, you sometimes reciprocated. In addition, When the student was independently playing with toys, you sometimes provided attention by commenting on the student's play or by providing the student another toy.
        - During this condition, you should ignore the student's bids for social interactions and independent play by continuing to pretend to do work. Thus, continue to present to read a book or a sheet of paper when the student taps your should and asks you to play with a toy. Remember, the goal of the attention condition is to only provide attention when the student engages in the target behavior (hitting).
- Ignore all non-target behavior
    - Percent correct: 25%
    - When the student engaged in non-target behavior (chin tapping), you often said nice hands and prompted the students hands down.
    - When the student engages in non-target behavior (e.g. chin tapping), ignore the behavior by continuing to pretend to do work.

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