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Using video self-monitoring to improve staff performance

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Using Video Self-Monitoring to Improve Staff Performance

A Thesis Presented

By

Amy E. Constantine

The Department of Counseling and Applied Educational Psychology

In Partial fulfillment of the requirements

For the degree of

Master of Science

In the field of

Applied Behavior Analysis

Northeastern University

Boston, MA

August 2010

Running head: VIDEO SELF-MONITORING

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Thesis Title: Using Video Self-Monitoring to Improve Staff Performance

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Abstract

Procedural integrity is very important because it is an analysis of the degree to which the independent variable is implemented as intended. Previous research on this topic has examined the use of more staff and time intensive methods to achieve acceptable levels of procedural integrity. This study examined the effect of video self-monitoring on scores of procedural integrity using a student's clinical behavior program. Three participants were used in this multiple baseline across subjects design. Baseline sessions for all three participants revealed low scores of procedural integrity. Initially staff were provided with written and verbal instructions and data showed that these instructions were ineffective at increasing the scores of procedural integrity. The treatment consisted of fifteen minute videos taken of each participant and each staff participant observed their video before the next observed session. For all three participants the treatment resulted in near 100% procedural integrity. The implications of this research are further discussed.

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Using Video Self-Monitoring to Improve Staff Performance

One of the fundamental principles of Applied Behavior Analysis is that the observed change in behavior is related to a systematic manipulation in the environment. In other words, a change in the dependent variable must be related to a change in the independent variable. This relationship of the independent variable to the independent variable was identified by Baer, Wolf and Risley (1968) in their analytic principle and Skinner in 1953. Applied behavior analysis requires that the independent variable is defined and monitored to ensure accurate implementation.

Procedural integrity is defined as the degree to which the independent variable (IV) is implemented as intended by Cooper, Heron and Heward (2007). Therefore this is a necessary component of a treatment package to measure the accuracy in which the interventions are implemented. Determining this would allow clinicians to determine if the IV is responsible for the change in behavior. A functional relation can only be determined if the IV is implemented as intended. Prior research has also shown that increases in procedural integrity have a positive effect on client behavior (Noell et. al., 2000; Wilder, Atwell & Wine, 2006).

In a recent review of literature from the years 1991 to 2005, a total of 142 articles (152 studies) that met review criteria were included. Nearly all (95%) of these experiments provided an operational definition of the independent variable, but only 30% of the studies provided procedural integrity data (McIntyre, Gresham, DiGenarro, & Reed, 2007) . This was an improvement since the previous review of literature in terms of operational definitions of IVs but there was only a slight improvement in reported integrity. Reporting the studies' procedural integrity may not be seen as important to the

journal articles but this would determine the significance of the independent variable. From what we know currently about the importance of monitoring treatment integrity, this review of literature demonstrated that more research on treatment integrity is needed, as monitoring treatment integrity may be difficult for clinicians. Treating low treatment integrity is another issue for many clinicians because the staff training methods commonly used are either not effective or are time intensive. More research needs to be done to both reiterate the importance of treatment integrity and to develop more suitable staff training methods.

There are several methods commonly used to train staff working with students with special needs. These include: written instruction, verbal instruction and video modeling.

Most studies have combined these common training procedures into a multi-component package. Mueller et al. (2003) conducted two studies comparing four different training options for teaching parents to implement pediatric feeding protocols, which included verbal instructions, written instructions, therapist modeling and rehearsal. The first phase of this study found that, for the three participants, written instructions was insufficient at producing correct treatment implementation. The second phase of this study included a multi-component package and separated this package into three different training components to assess what was necessary and sufficient to achieve high levels of procedural integrity, all three produced increases in procedural integrity. The study used three groups of two parental participants to compare component packages. Two participants' data revealed no increases in procedural integrity with written instructions alone but both produced increases in correct prompting with verbal instructions and

modeling. Two participants' data also revealed no increases in procedural integrity with written instructions alone but both produced increases in correct prompting with verbal instructions and rehearsal. The last group of participants received written instructions only and levels of procedural integrity remained low. Verbal instructions did produce slight increases in correct prompting but the second set of verbal instructions produced near 100% correct prompting. Unfortunately, modeling and rehearsal was paired with verbal instructions and therefore the authors could not determine if verbal instructions were a necessary component. Increases in integrity did maintain for up to three months for the group that was trained with verbal instructions and rehearsal and the group that was trained with two sets of verbal instructions. An important factor of this study was that training packages with fewer components were as effective as training packages containing more components.

Prior research has also examined the influence of written and verbal instructions and compared it to the other common training tools of feedback, modeling and rehearsal. In a study by Moore and colleagues (2002), the authors compared two phases of staff training on teacher acquisition of functional analysis methodology using a multiple baseline across subjects design. The first phase participants received written and verbal instruction, data showed correct responding did not increase significantly as in baseline. The second phase of the study included rehearsal, modeling and performance feedback. Participants in this phase improved the accuracy of correct steps implemented to 95%. The results of this study showed that written and verbal instructions were not a sufficient training tool.

Recently there has been a growing interest in the use of video modeling for staff training (Catania, Almeida, Liu-Constant, DiGennaro, & Reed, 2009). This interest may be because video modeling is relatively easy, potentially inexpensive, and an efficient means of training therapists on a variety of behavior-analytic skills. The effectiveness of video modeling was exemplified in a study conducted by Moore and Fisher (2007). The authors used a multiple baseline across subjects design. Different treatment options, which were partial and complete video modeling, were assessed with a multielement design. The partial video modeling included 50% of the therapist behaviors compared to the complete video modeling which included 100% of the therapist behaviors. The first phase of the study assigned different training techniques to each functional analysis condition. Lecture was one training technique used to train the therapist on a functional analysis condition. It consisted of written and verbal instructions and was found to not be an effective training methodology. This methodology resulted in increases in correct responses but still below the mastery criteria. The functional analysis condition that was trained with the lecture condition was retrained with the complete video modeling in the following two phases. Partial video modeling was another training technique used to train another therapist on a different functional analysis condition. This technique presented a video with only a percentage of the correct staff behaviors displayed in the video. Complete video modeling was the last staff training technique used to train another therapist on a functional analysis condition. This technique presented a video with 100% of the correct staff behaviors displayed in the video. This study found that video modeling was efficient at producing higher rates of correct responses in the implementation of functional analysis conditions but only when multiple exemplars of

correct therapist responses were used. Complete video modeling resulted in mastery performance or 80% of correct responses or greater. The authors noted that future research should study the effectiveness of video modeling to train other assessments and treatment techniques. In summary, video modeling is an effective staff training tool when all responses are modeled and can be an easy method of increasing procedural integrity

Self-monitoring is a procedure that has been shown in prior research to increase levels of procedural integrity. This procedure does not require any additional staff to train individuals and may be a solution to some of the issues of training staff. In a study by Petscher and Bailey (2006) they examined the use of self-monitoring to increase classroom implementation of a token economy. Their independent variable was a treatment package that included a tactile prompt (vibrating pager), a self-monitoring form and accuracy feedback. The staff wore pagers and the observing researcher would activate the pager to prompt the correct teacher response. After an observation session, a self-monitoring form was used. This form asked the teacher to rate with a percentage how best they think they correctly responded to student behavior. After this form was completed feedback was given to the staff on the accuracy with which they completed it. The tactile prompt was faded so that self-monitoring was the only intervention used. The methods section was unclear as to if this study used feedback still paired with self-monitoring for the intervention.

Rose and Ludwig (2009) used self-monitoring to improve procedural integrity of the cleaning behaviors of nine lifeguards at a county swim complex. This study assessed the effects of task clarification, self-monitoring, and performance feedback on three

performance areas: vacuuming, lobby tidying and pool deck maintenance with an ABA reversal design. After a task clarification meeting, self-monitoring was used by the lifeguards to rate the percentage of end of shift tasks completed. Performance feedback was also given daily with the use of line graphs displaying the percentage of correct completed tasks. The graphs were based on both researchers' data and self-reports from the lifeguards. The rates of procedural integrity after intervention improved and the success of the treatment was verified by the removal of the intervention. This meant that the results of the intervention did not maintain over time when the treatment was no longer used. Self-monitoring was effective at producing a change in behavior but only if the intervention was continually used.

Limited previous research has examined using only self-monitoring as a procedure to increase levels of procedural integrity without feedback. One such study that attempted to do this was a study by Richman, Riordan, Reiss, Pyles and Bailey (1988). In this study the authors evaluated the effects of self-monitoring on staff on task behavior and adherence to activities with 10 staff members and used a multiple baseline across subjects design. Self-monitoring was effective at increasing levels of on-task behavior but there was a greater effect when feedback was added. This study provides further evidence that self-monitoring may need additional tools to be of value for a staff training procedure.

Pelletier, McNamara, Braga-Kenyon, & Ahearn (in press) examined the use of video self-monitoring and its effect on procedural integrity with three staff participants using a multiple baseline design across participants. In this study, baseline sessions consisted of videotaping staff in the implementation of a student's behavior management

plan. Staff were trained on how to score their own videos using the self-monitoring form. Following pretraining staff were asked to watch their own baseline video and complete a self-monitoring form. Feedback was also given to staff on the accuracy with which they completed the form. The results of this study showed that video self-monitoring and feedback proved to be effective at increasing procedural integrity. This type of training could be used with little observer reactivity and would be cost and time efficient. Although this study was responsible for increasing procedural integrity scores, it cannot be determined if self-monitoring alone was responsible for the increase in procedural integrity.

The purpose of the current study was to extend the previous research on self-monitoring and video modeling and also to determine which training type would be the most successful in increasing the procedural integrity in the implementation of a student's behavioral plan. The current study compared traditional training techniques and video self-monitoring.

METHOD

Participants

Participants in this study were three teachers who worked at a residential school to children with autism spectrum disorder and other related disabilities. All staff were enrolled in a Master's degree program at the center. In addition, all staff had been trained in the principles of applied behavior analysis. The three staff members included Renee, who was 24 years old, and had been employed at the school the longest of the three participants. Carol was also 24 years old and Brigid was 23 years old. The student, Eli, was 13 years old with a diagnosis of an Autism Spectrum Disorder. His main problem

behavior was stereotypy, both motor and vocal but only motor stereotypy was being targeted through treatment. The treatment consisted of response interruption redirection and competing leisure items.

Setting and Materials

All observation sessions and video modeling sessions were conducted at the school for children with developmental disabilities. The staff were observed with Eli in his classroom which measured 10 m by 13 m. A table and two chairs were the required materials in the classroom for the observations. Video modeling sessions were conducted in a staff office room which measured 10 m by 7 m.

All observation sessions were videotaped using a digital video camera. Observations were scored using a procedural integrity tool (PIT), as shown in Figure 1. This tool had two components which included antecedent and treatment components of the student's clinical program. The antecedent components consisted of: momentary time sampling sheet present, student schedule present, pre-approved leisure items in bin, Eli's PECS book in front of him, and writing instrument present. The treatment components section of the PIT consisted of: session time, stereotypy episode, implement within three seconds, staff hold student hands down, staff establish student eye contact, student complete five simple motor compliances and the competing items component.

Response Measurement and Interobserver Agreement

The PIT was used to measure correctly implemented components of Eli's treatment package. All antecedent components of the PIT was scored with a "+" if the item was present and a "-" if the item was missing. The treatment components of the PIT included the stereotypy episode column. In this section, the time that the motor

stereotypy was first emitted was written in this column. Only the first stereotypy episode in a 30 second interval was scored. An episode was defined as motor stereotypy that lasted for at least five seconds and the episode ended when there was a three second break from stereotypy. All other columns in this section of the PIT was scored with a “+” if the behavior occurred and a “-” if the behavior did not occur. Procedural integrity was defined as the percentage of components that could be scored with a “+” out of the total components. There were a total of nine components in Eli’s treatment and five in the antecedents category for each stereotypy episode. This meant that if the staff member completed six out of nine treatment components, then they would receive a score of 66.67% for that instance of stereotypy. All episodes of stereotypy were averaged together for an average procedural integrity of the treatment components. The antecedents were scored the same as the treatment components except that these components were only scored once for the observation session. Procedural integrity was averaged between the antecedent and treatment components for a final procedural integrity score for the observation session. Interobserver agreement was calculated by dividing the percentage of procedural integrity from the secondary observer by the percentage of procedural integrity from the primary observer and multiplying by 100%. Agreement was scored for a minimum of 33% of sessions across each condition for each participant. Mean total agreement for percent of procedural integrity was 92% for Brigid, 94% for Carol and 93% for Renee.

Experimental Design

A non-concurrent multiple baseline across participants was used in this study to determine the effect that video self-monitoring had on scores of procedural integrity for these staff members.

Procedure

Baseline

The experimenter videotaped the staff members for a 15 minute session once a day on average once every two weeks. No feedback was given to the staff of their performance. The staff were only told that the main therapist was examining new methods of data collection and to run the student's programming as normal. These staff members had previously been trained on the student's programming when they started employment but no other trainings had occurred since the start of their employment. All sessions were scored by the experimenter for procedural integrity according to the procedural integrity tool described in the materials section.

Post Training Meeting/ Written Instructions and Modeling

When all experimenters' rates of procedural integrity were shown to be stable or low in baseline then Eli's program was described in detail at a weekly staff training meeting. This was meant to be a refresher for all staff members. The refresher included a written description of Eli's treatment, including all staff and student steps, and was distributed to the staff members. The steps of the treatment program were also demonstrated in vivo by a supervisor and a colleague. The experimenter continued to videotape the staff members in Eli's classroom according to the schedule described in baseline and these sessions were scored as in baseline.

Video Self-Monitoring

Since the rates of procedural integrity scored in the previous condition were still low or on a decreasing trend, the treatment phase was introduced. The last session of written instructions was used for each participant for the beginning of the self-monitoring phase. The score of this last session was the last data point for the written instruction phase. All following sessions scored were used as data points for the video self-monitoring phase of the assessment. Each participant watched their own last session of baseline video and scored their video according to the procedural integrity tool. Each participant had to be within 90% agreement with the experimenter to continue with this phase of the assessment and all staff members completed this section of the assessment without further training. No feedback was given to staff of their performance or agreement with the experimenter. The experimenter videotaped the participant that afternoon following the scoring and the session was scored for procedural integrity according to the procedural integrity tool. The participant would always score the preceding session videotaped in this phase of the assessment.

Follow Up

Since rates of procedural integrity for all three participants increased to near 100% integrity rates, the video self-monitoring treatment was removed from the procedure and the experimenter videotaped the participant once every two weeks. No feedback was given to the participant. The experimenter continued to score these videos according to the tool used in the preceding phases of assessment.

Results

The percentage of treatment integrity for all three participants is displayed in Figure 1. During baseline, all participants displayed a low average percentage of

procedural integrity. Renee and Brigid's integrity was on an increasing trend but both were lower than 80%. Carol's procedural integrity remained relatively stable at a near 50% integrity rate. After the weekly staff training meeting where written instructions and modeling were presented, the rates of all three participants decreased and remained relatively stable. The video self-monitoring treatment was introduced with Renee at session...and produced a dramatic increase in procedural integrity to near 100%. Since there was no change in procedural integrity for the other two participants, video self-monitoring was introduced to Carol at session 15. Video self-monitoring resulted in an increase in procedural integrity similar to Renee near 100%. There was still no change in procedural integrity for Brigid and Renee's procedural integrity remained high. The introduction of video self-monitoring for Brigid resulted in an increase in procedural integrity similar to the two previous participants. Follow up measures showed that procedural integrity was still high for all three participants when the treatment plan or video self-monitoring was removed. The three participants had three follow up measures which were all near 100%.

Discussion

This study assessed the effectiveness of multiple common staff training programs to increase procedural integrity of a student's behavioral program. Written and verbal instructions, introduced in a staff training meeting, were ineffective at increasing scores of procedural integrity with all three staff participants. These results are also consistent with previous research (Mueller et al., 2003). This phase of the study also included modeling the steps of Eli's response interruption program from a supervisor. The combined package of modeling and instructions actually decreased all three procedural

integrity scores. Video self-monitoring was deemed to be the most effective remediation staff training procedure. This was because there was only a significant increase in procedural integrity with the introduction of this treatment for each participant.

As explained in the method, staff were previously trained on Eli's behavior program before this study began. The initial training was either ineffective at teaching the behavior program or the training did not produce lasting results. The results of baseline showed that a remediation training procedure was needed to increase procedural integrity scores. A remediation training procedure may have different results than an initial training procedure and this may be why written and verbal instructions are not a valuable procedure. Modeling may not have been effective because the staff members do not see their own behavior in the enactment. Also, modeling only displays correct behavior programming. There may be some importance in displaying incorrect staff behavior and these staff members having to interpret their own behavior, as they do in video self-monitoring.

It is impossible to determine which part of the video self-monitoring component was responsible for the change in behavior, but we do know what was not responsible for the change. Since the participants were videotaped during all phases of the treatment, the main therapist videotaping the participants was not responsible for the change in behavior. The phase that followed baseline modeled all correct staff responses and dispensed written and verbal instructions. This phase should have given the staff more information as to what the researcher was assessing. The models were given to all staff members that worked with Eli and this may have been the reason why the participants in this study did not determine or discriminate what the main therapist was assessing. Only

video self-monitoring resulted in the increase of staff behavior responsible for the improvement in procedural integrity. This resulted in a positive change of staff behavior that was maintained over time and a possible permanent change in behavior, since there was no decrease in integrity when the video self-monitoring component was removed.

From the positive results of this study there are many implications for video self-monitoring to be used in the applied field. Video self-monitoring resulted in an increase in procedural integrity in only one session. Since this change in procedural integrity was immediate, it seems that video self-monitoring would be a staff training tool that could be used with minimum time and staff resources. Future research should examine the use of video self-monitoring in other clinical programming.

This study also examined the use of video self-monitoring with individuals. It was successful to improve their procedural integrity but the primary researcher had to video tape each staff member. This process can be time intensive for supervisors who already can be limited with their time. Relative to frequent feedback and training, this process is less time intensive. This is because only one video session is needed to be scored and one individual is needed to operate the video camera, but future research could also examine the use of video self-monitoring in groups or with a shorter time duration that is videotaped. Also, different results may have occurred with a supervisor videotaping the sessions, since the primary therapist in this study was a similar position to the staff participants. Future research could examine the results of a supervisor videotaping the sessions.

Video self-monitoring did result in increases in procedural integrity that were maintained over a six week period. Even when video self-monitoring was removed

procedural integrity did not decrease over the six week period. This possible permanent change in behavior is an important aspect of this treatment procedure. This change in behavior is over a significant period of time but future research should extend the period of follow up to examine whether this change in behavior will maintain for a longer period of time. If it does maintain then it would suggest or affirm a permanent change in behavior.

A limitation of this study was that there was no measure conducted of Eli's rate of motor stereotypy across all sessions. This was impossible to measure since the camera was focused more on the staff rather than the student's behavior. Although 100% procedural integrity seems as though it would decrease his stereotypy, perfect integrity may not be needed. Response interruption redirection may not have to be implemented perfectly to punish Eli's motor stereotypy. A previous assessment conducted with another therapist determined that with 100% procedural integrity Eli's motor stereotypy decreased to clinically low levels but this assessment was conducted three months prior to the start of this assessment. A change in student behavior, for instance a resistance to a reinterruption program, may have occurred in this period of time.

Another limitation of this study was that the staff were only observed when Eli was staffed one staff to one student. Eli is only funded for 20 hours a week of these staffing ratios and so the remainder of the time he is grouped. This means that it was unlikely that the same rates of procedural integrity would have occurred if Eli was paired. Future research could examine the effects of this treatment when Eli is in a more naturalistic grouping.

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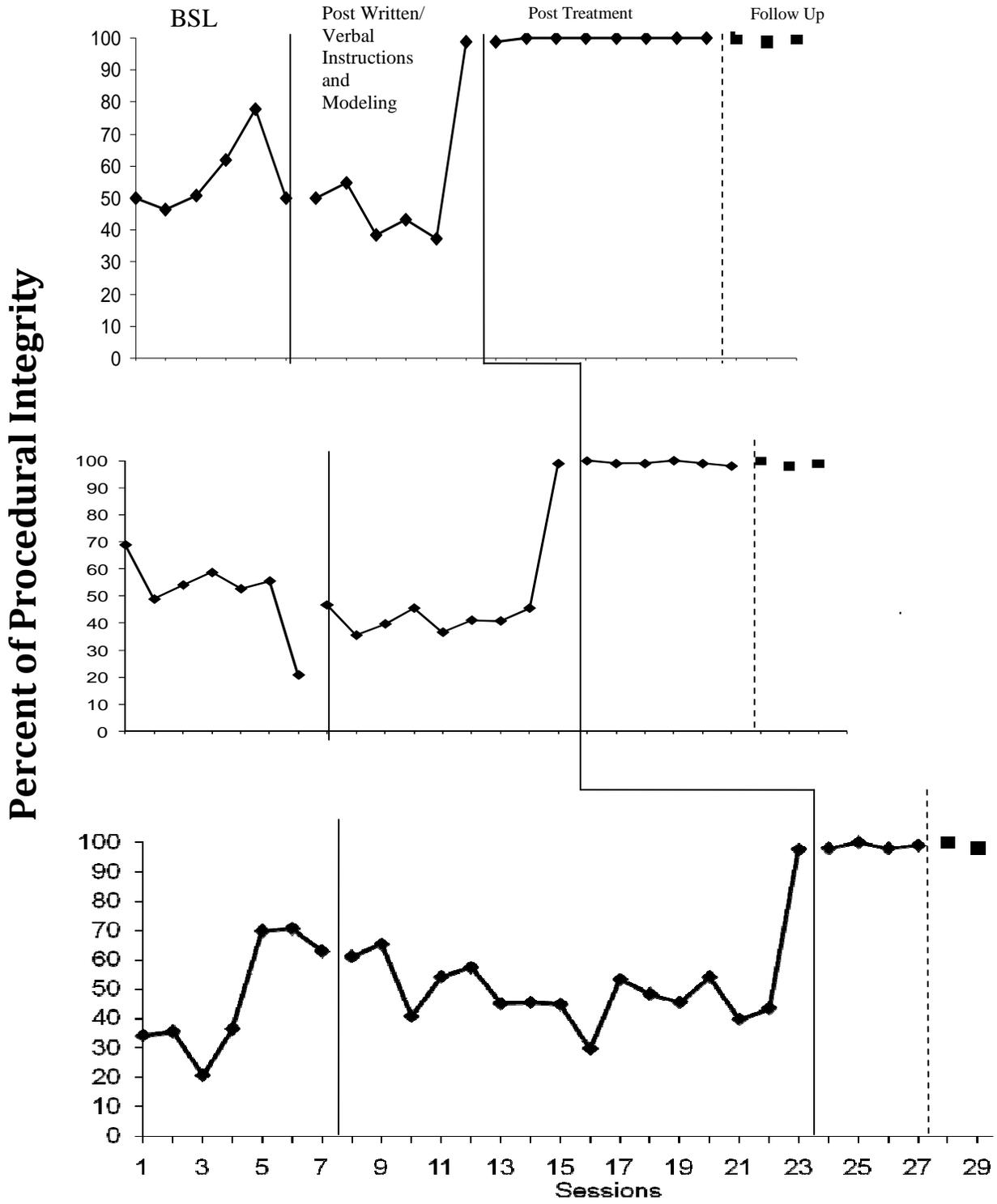
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Figure Captions

Figure 1: Procedural integrity tool (PIT) used to evaluate each staff member

Figure 2: Multiple baseline graph which revealed the effects of each treatment for all three participants



| Stimuli | + or – item present | Comment |
|---------------------------------------------|---------------------|---------|
| Writing instrument | | |
| Prescription sheet present | | |
| MTS Board | | |
| Pre- approved Leisure material in box | | |
| Eamonn’s communication book in front of him | | |

| Time | Stereotypy episode | Implement w/ 3 sec | Hold Hands | Eye Contact | Compliances | | | | | Give back same toy | Comment When was toys switched? |
|------|--------------------|--------------------|------------|-------------|-------------|---|---|---|---|--------------------|---------------------------------|
| | | | | | 1 | 2 | 3 | 4 | 5 | | |
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Motor Stereotypy: Any non-functional movement of torso, hands, arms, or fingers, including but not limited to tapping, waving fingers back and forward in front of him, and/or rotating of the wrists for a duration of more than one second. Includes tapping an object or surface with his fingers or with another object and rocking back and forth standing or sitting with or without movement of the arms or hands for more than one second.