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The Effect of Safety Coaching on The Accuracy of Safety Observations and Feedback

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by

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We the undersigned committee hereby approve the attached thesis, "The Effect of Safety Coaching on The Accuracy of Safety Observations and Feedback," by Nicholas Matey.

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Abstract

The Effect of Safety Coaching on The Accuracy of Observations and Feedback
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Behavior-based safety (BBS) is an effective approach to decreasing workplace incidents and injuries. BBS typically consists of a peer observation and data collection process, and a feedback process. Accurate observations are required to provide accurate feedback, and accurate feedback is essential for acquisition and performance improvement. This study alternated observation only and required feedback phases during peer observations to examine whether requiring observers to provide immediate feedback following an observation affects the accuracy of the observation itself. Four participants were included in the study and the conditions were evaluated using a counterbalanced ABAB design. Results suggested that requiring observers to provide immediate feedback may result in a decrease in observation accuracy. Implications of these findings are discussed.

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Dedication

I would like to dedicate this work to my parents Stephen, and Linda Matey. Thank you for your immeasurable contributions toward both my academic and personal development. You will never understand how much I appreciate all that you have given me.

Introduction

Occupational safety is an ongoing concern in today's workplaces. In 2014, there were nearly 3 million nonfatal workplace injuries and illnesses; a rate of 3.2 cases per 100 full-time workers (United States Department of Labor, 2015). Of these cases, over 50% involved loss of time, job transfer, or restriction. Additionally, there were 4,821 recorded fatal work injuries, at a rate of 3.3 fatal injuries per 100,000 full-time equivalent workers. Overall, injuries have declined over the last 40 years but still occur, and fatalities have remained unchanged, indicating substantial room for improvement.

Occupational injuries are costly to both the employee and the organization. Occupational injuries result in an individual missing time or render individuals unable to work in the future. Individuals who are injured at work often experience long-term health issues, financial responsibilities the company does not cover, and an overall decrease in quality of life (Occupational Health and Safety Administration, 2012). Beyond personal costs, injuries carry substantial costs for organizations directly (e.g., paying healthcare bills and fixing equipment) and indirectly (e.g., downtime due to injury, retraining, increased insurance costs, fines). It is estimated that businesses collectively spend $170 billion annually in the United States on costs associated with workplace injuries and illnesses (Occupational Safety and Health Administration, 2012). According to The Occupational Safety and Health Administration (OSHA), lost productivity from injuries and illnesses costs companies $60 billion each year. Specifically, the National Safety Council (2015) reported that the possible savings from avoiding one medically consulted injury ranges from $39,000 to $1.42 million.

Considering the enormity of personal and financial costs associated with workplace injuries and illnesses, many organizations focus on safety and prevention. Since the OSHA safety and health act of 1970, organizations have allocated more resources to safety (Occupational Health and Safety Administration, 2012). There are varying approaches to workplace safety including engineering and process modifications, improved training, and protective equipment.

While these approaches have significantly improved safety, more work is needed to reduce injuries. McSween (2003) analyzed injuries at hundreds of organizations over a decade and reported that unsafe behavior contributed to 96% of all injuries. Therefore, interventions targeting human behavior could prove to be an effective approach for reducing injuries and illnesses as well as subsequent costs.

Behavior-Based Safety

One approach that targets behavior to decrease at-risk behaviors and subsequently, workplace injury rates, is Behavior-Based Safety (BBS) (e.g., Sulzer-Azaroff & Austin, 2000; Tuncel, Lotlikar, Salem & Daraiseh, 2006). BBS is a proactive approach to improving safety within organizations using the principles of behavior analysis (Grindle, Dickinson & Boettcher, 2000). In many settings, BBS is one aspect of a total safety process (Sulzer-Azaroff & Austin, 2000). Each BBS process is unique; however, most share common features. Typically, BBS consists of some combination of components including: (1) the identification of targets, (2) the development of a measurement system, (3) a feedback and reinforcement process, and (4) a commitment to continuous improvement of the process (Austin, 2006; Sulzer-Azaroff & Austin, 2000). BBS follows an Antecedent-Behavior-Consequence (ABC) model, where training (antecedent), is combined with observations and positive feedback (consequences) in an effort to improve safety performance (behavior) (Tuncel et al., 2006). Feedback is defined in this approach as information about performance that allows an individual to improve their performance (Alvero, Bucklin, & Austin, 2001).

BBS has a history of empirically supported success decreasing workplace injuries and incidents (Sulzer-Azaroff & Austin, 2000; Tuncel et al., 2006). Sulzer-Azaroff and Austin (2000) conducted a review in which they analyzed 83 examples of behavioral safety processes that intended to encourage safety performance. Of the 33 cases that met the review's inclusion criteria of reporting data on changes in incident rate, 32 showed a decrease in injuries. Another review by Tuncel et al. (2006), initially reviewed 449 total articles. Thirteen of these articles met the inclusion criteria of involving a BBS intervention in an occupational setting with accident and injury data. The review excluded interventions that included data concerning general work behavior (e.g., absenteeism), were performed in controlled settings, studied off-the-job safety or personal wellness, consisted of only training, or did not report the required data. The researchers found that a decrease in accidents and injuries was present in 12 of 13 studies and eight of these 12 exhibited a statistically significant decrease (Tuncel et al., 2006). The conclusions support the use of BBS to improve safety performance and decrease workplace injuries and accidents.

Although reviews of BBS research identified several successful BBS processes, these reviews also include examples of BBS processes that were not successful at reducing injuries (Sulzer-Azaroff & Austin, 2000; Tuncel et al., 2006). Further, some examples of BBS processes that were not effective would likely not be submitted or accepted for publication or presentation because unsuccessful examples of research are less likely to be published (Fanelli, 2010). Many factors contribute to successful or unsuccessful outcomes of BBS models, factors worthy of additional consideration. These factors may be organizational (e.g., leader support) or related to process implementation (e.g., low participation) (e.g., Sulzer-Azaroff, & Austin, 2000).

Identifying factors that lead to successful applications of BBS is critical. Successful BBS processes reduce injuries and help save lives (Sulzer-Azaroff & Austin, 2000; Tuncel et al., 2006). Conversely, unsuccessful implementations of BBS may result in lost credibility in a workplace, making it difficult to successfully reintroduce the process a second time (Grindle, 2016). Even with the empirical support of BBS as an effective intervention, resistance to the process exists (e.g., United Steel Workers, 2010). The United Steel Workers Union (USW) opposes BBS practices and claims they blame accidents on the worker (United Steel Workers, 2010). Mathis (2009) states that poorly executed BBS processes with less than optimal results may result in resistance if attempts are made to improve the process. Initially successful BBS processes are less likely to be resisted (Grindle, 2016). Therefore, it is important to identify the components of the BBS process that improve execution and increase the likelihood of improving safety performance and reducing injuries.

Identification of what makes BBS processes successful should start with examining the core components of the process. It is within these core components that variation can occur and impact the outcome of BBS processes. Specifically, the areas where variation is most likely to occur are in the measurement process and the feedback process (Sulzer-Azaroff & Austin, 2000). However, reviews on BBS provide little information indicating which approach is most effective. Further investigation of the impact of measurement and feedback variations could lead to more successful outcomes and less resistance to BBS processes.

Peer Observations

Typically, the method used to gather behavioral measures in BBS is peer observations (Alvero & Austin, 2004). Peer observations are typically conducted by employees who observe their coworkers and record data on their safety performance (McSween, 2003). The data are recorded on a form called a behavioral checklist. Checklists can contain different safety behaviors of interest and include areas to record them as either safe or at-risk (Alvero & Austin, 2004). They may also include items to evaluate conditions and barriers to safety (McSween, 2003). A peer observation involves an employee using a checklist to observe another employee performing a work task and record safe and at-risk behaviors and conditions. Following the observation, the observer may approach the observed and provide feedback on whether the observed behaviors and conditions were safe or at-risk (Geller, Perdue & French, 2004). However, in some BBS processes, the observed person is never provided individual feedback (Sulzer-Azaroff & Austin, 2000). The data recorded on the checklist are added to a central database for the site, and often, group feedback is provided (McSween, 2003).

Many experts in BBS suggest creating observation processes that are specific to each organization (Grindle, 2016; Sulzer-Azaroff & Austin, 2000). This suggestion leads to a great deal of variation from process to process (Sulzer-Azaroff & Austin, 2000). Variations can include frequency of observations, who conducts the observations, and if/how feedback is delivered after the observation occurs. Nevertheless, peer observations have been evaluated in several research studies, demonstrating their potential for improving safe practices (e.g., Alvero & Austin, 2004; Alvero, Rost & Austin, 2008; Sasson & Austin, 2005, Williams & Geller, 2000).

Peer observations ultimately allow for the measurement and communication of safety performance. In addition to measurement, behavioral observations aim to improve safety performance by: providing aggregate feedback to a group, providing immediate peer-to-peer feedback from the observer to the person being observed, and capitalizing on the effects of conducting an observation through the Observer Effect. The Observer Effect posits that observing others can change the observer's own performance of those same behaviors (Alvero & Austin, 2004; Alvero & Austin, 2008; Sasson & Austin, 2005).

Observer Effect

Austin (2006) stated that the most successful BBS processes incorporate employee and manager participation into the measurement process. Alvero and

Austin (2004) conducted a study in an analog setting to evaluate the use of peer observations for improving postural safety behaviors. The investigators measured safety performance in baseline, an information phase, and an observation phase and employed a multiple baseline design. In the information phase, participants were told that the purpose of the study was to observe individual safety behaviors. The participants were then given a handout containing definitions for performing the target behaviors safely. In the observation phase, the students were asked to use a checklist to collect data on the safety behavior of a confederate in a 5-minute videotape. Immediately after scoring the video, participants were asked to perform the same tasks observed in the video. Results of the study suggested that the safety performance of the participants improved due to observing and evaluating the behaviors of the confederates. Other studies have obtained similar results regarding the Observer Effect (Alvero & Austin, 2008; Sasson & Austin, 2005).

Sasson and Austin (2005) evaluated the impact of the Observer Effect on safety performance in an applied setting. The results resembled those found by Alvero and Austin (2004), suggesting that participating in behavioral observations results in improved safety performance of the observer (Sasson & Austin, 2005). Sasson and Austin (2005) also investigated the impact of observer accuracy in relation to improved safety performance. The results suggest that overall, there was a positive correlation between observer accuracy and increases in safety performance. A limitation mentioned in this study was that it did not experimentally control accuracy and therefore, future investigation into the importance of accuracy in observations is warranted (Sasson & Austin, 2005).

Behavior-Based Safety Feedback

Feedback delivered based on peer observations also varies greatly from process to process. Some variations of feedback delivery in BBS processes are: (a) commenting on only positive or only negative actions, (b) immediate peer feedback or delayed supervisory feedback, (c) delivering feedback every time or on a schedule, and (d) immediate peer feedback and graphed aggregate feedback, or just graphed aggregate feedback (Sulzer-Azaroff & Austin, 2000). Regardless of the way feedback is delivered, it is a key piece in BBS processes. Tuncel et al. (2006) reviewed 12 successful BBS variations. Of these variations, only one example did not incorporate a feedback process (Tuncel et al., 2006).

Individual feedback. One form of safety feedback that has been demonstrated to be effective is individualized feedback. Alavosius and Sulzer-Azaroff (1986) found that individualized feedback delivered to direct service providers increased safety performance on patient transfer tasks. Six direct care staff participated in the study. In the year leading up to the intervention, 55% of injuries at the facility occurred while transferring patients. Checklists were used that delineated client transfer techniques into 18 sequential steps. The experimenter and his/her assistants conducted the employee observations and interobserver agreement assessments to ensure the accuracy of the observations, which averaged 88%. Feedback was provided privately and in written and verbal form, to each participant by a manager or researcher. Utilizing a multiple baseline design, the researchers demonstrated clear increases in all participant performance, up to 55%, in the percentage of transfers performed safely following the implementation of individual feedback. In this study, researchers ensured the accuracy of observations and feedback was given by managers or researchers. This suggests the feedback was likely accurate, which may have been a reason for the large improvements in performance.

Moon and Oah (2013) also demonstrated the effectiveness of individual feedback on safety performance. In this study, the researchers found that immediate feedback substantially improved the safety posture of three individuals. The researchers focused on safe postures while performing an office task on the computer. To ensure accuracy, the posture of the participants was measured using seven sensors installed on cushions which were attached to the participant's chairs. During the intervention, when a sensor detected at-risk posture, a general feedback statement immediately popped up on the computer screen. An example of a statement used is, "Back and Leg, At-risk." The results showed that upon introduction of the feedback phase, all categories of safe postures improved significantly. The accuracy and immediacy of the feedback provided may have contributed to the large performance improvement.

In BBS, individual feedback is typically in the form of behavior-based safety coaching. Behavior-based safety coaching is an interpersonal process of one-on-one observation and feedback, in which one person observes the behavior of another and provides feedback on their safety behavior (Geller, Perdue & French, 2004). Austin (2006) suggests feedback and reinforcement manifest as a two-way conversation between the observer and the observed. We know feedback has contributed to improvements in performance (e.g., Alvero, Bucklin & Austin, 2001; Lee, Shon & Oah, 2014; Williams & Geller, 2000), and because of this, many BBS systems use behavior-based coaching as a medium for feedback, to influence future safety performance. However, accuracy is not always considered.

Aggregate feedback. Aggregate feedback in BBS is often presented in a line or bar graph weekly or monthly (McSween, 2003). Williams and Geller (2000) demonstrated the effectiveness of graphed, aggregate feedback on safety behaviors in a soft-drink bottling company. The target safety behaviors were chosen because they were associated with recurring incidents and injuries on site. Employees were assigned to one of four groups. The four groups were global feedback with social comparison, specific feedback with social comparison, global feedback without social comparison, and specific feedback without social comparison. Global feedback consisted of a single mean percentage safe score for all behaviors for the week; the specific feedback consisted of graphed feedback for each individual safety behavior. Two of these groups received social comparison feedback that included their group's performance *and* the performance of a similar group. The other two groups only received feedback on their own group's performance. Specific feedback with social comparison and global feedback with social comparison resulted in the highest mean safe scores of .78, and .77 respectively; however, all conditions resulted in an increase of percentage safe scores from baseline. Global feedback without social comparison led to a minimal increase from baseline to treatment, but fell to levels below baseline, upon withdrawal. Because it requires less effort, the researchers concluded that global feedback with social comparisons may be the best way to optimize behavioral feedback.

Lee, Shon and Oah (2014) also demonstrated the effectiveness of feedback from aggregate data on safety performance. This study took place at a construction site in South Korea. The investigators looked at the impact of global and specific feedback on safety performance of the target and non-target safety behaviors in 21 members of a construction crew. The target safety behaviors were chosen because of their contribution to injuries in the three years prior to the study. Examples of the target behaviors included having a flagman for construction zone traffic, appropriate housekeeping, and wearing personal protective equipment. Data were collected through behavioral observations conducted by two supervisors. The results showed increases from baseline after the introduction of both types of feedback. Inconsistent with the findings of Williams and Geller (2000), specific feedback produced slightly higher percent safe scores compared to global feedback.

However, the authors stated that global feedback was more effective for generalizing improvements in safety behavior to non-target safety items. This study sought to ensure the accuracy of observations through interobserver agreement data collection. A research assistant independently observed the same person as the observer performing the checklist and inconsistencies were recorded. Interobserver agreement was obtained for just over 25% of the total observations. The mean percentage of agreement was 88% for safe items, and 92% for at-risk items. The accuracy of the observations could have contributed to the effectiveness of the feedback interventions. It could also explain the discrepancy in findings between this study and Williams and Geller (2000), who did not evaluate the accuracy of observations.

Because feedback from aggregate data is effective for improving performance of safety behaviors, it is considered an important component of BBS. Some organizations, like the examples above (Lee, Shon & Oah, 2014; Williams & Geller, 2000) create behavior change interventions that target specific issues on site. These specific issues are likely identified through collected aggregate data and may use the same data collection method to measure the results. Inaccurate data may not correctly identify the behaviors most in need of improvement (Hinz, Mcgee, Huitema, Dickinson, & Van Enk et al., 2014) and the targeted intervention may be ineffective, wasting time and resources.

Accuracy

Because BBS is so reliant on feedback provided both individually and aggregately, the accuracy of observation data and feedback may be of significant importance. It allows an organization or site to identify behaviors in need of improvement and provide feedback on errors. Mihalic and Ludwig (2009) provide a case study of a measurement and feedback system in a furniture company. The authors show how a flawed measurement system that did not accurately record employee errors resulted in a failure to provide employees with accurate feedback. This is important because feedback errors likely contribute to the ineffectiveness of behavioral interventions (Hirst, & Digennaro Reed, 2015).

Johnson, Rocheleau, and Tilka (2015) found that accurate feedback was more effective at improving performance than inaccurate feedback. This study used undergraduate students as part of a group design. There were four groups, consisting of two main categories: feedback contingent on performance (accurate) and feedback independent of performance (inaccurate). These two groups were then further separated into supportive and critical feedback conditions. Participants worked on a simulated check processing software and completed two sessions of this task. After the first session, depending on their assigned group, participants were provided feedback on their performance. Upon completion of the second session, results from the two sessions were compared. Accurate feedback outperformed inaccurate feedback in both the supportive and critical conditions.

The accurate feedback conditions improved an average of 21%, whereas the inaccurate conditions improved an average of only 11%.

Palmer, Johnson, and Johnson (2014) conducted two experiments. In the first, they exposed performers to accurate and inaccurate feedback. There was no noticeable difference in performance between the two conditions which suggested feedback may not need to be accurate to improve performance. The researchers then conducted a second experiment that examined performance feedback on three levels: accurate, high (triple) and low (1/3) inaccurate. The feedback was delivered to performers who completed a check processing task in an experimental setting. The 2X2 factorial design included four groups: control (no feedback), accurate, high (triple), and low (1/3). All groups initially performed one session without feedback, followed by an accurate feedback phase for all groups but the control. Next, the groups received their designated feedback accuracy levels. Results suggest that both accurate and high (triple) inaccurate feedback were superior to low (1/3) inaccurate and no feedback. These findings suggest that exaggerated feedback can improve performance similarly to accurate feedback. However, limitations include that all experimental groups received accurate feedback in session two, before high (triple) and low (1/3) feedback was introduced. Further, participants reported afterwards that they could not tell the feedback was inaccurate. It is not clear whether the exposure to accurate feedback initially affected each group's performance. It is also not clear whether inflated feedback alone would improve performance, however the findings suggest that accurate feedback increases performance. In addition, inflated feedback may be effective for a task that is primarily focused on productivity, but may not generalize to safety performances that require a specific response form.

Hirst, Digennaro Reed, and Reed (2013) analyzed the effect of feedback accuracy on task acquisition and performance. In this study, the investigators tested varying levels of inaccurate and accurate feedback on nonsense task acquisition and performance. They found that performance on the task was directly related to the respective level of feedback accuracy. Participants that were exposed to accurate feedback performed better than those who were exposed to inaccurate feedback (Hirst, Digennaro Reed & Reed, 2013). However, this study went one step further. The results also showed that the mal-effects of exposure to inaccurate feedback persisted when the same participants received accurate feedback on the same task after (Hirst, Digennaro Reed & Reed, 2013). This suggests that not only is accurate feedback important in relation to performance, but that it may be critical to ensure accurate feedback occurs early on and throughout the acquisition process. BBS processes require workers to acquire skills to work safely. If any feedback is inaccurate, it could negatively impact the safety behaviors of participants in a BBS process immediately and in the future. Delivering accurate feedback in a BBS process appears important to its long-term success. Therefore, taking steps to ensure both observation and feedback accuracy is necessary.

Observations and feedback both have positive effects on safety performance (e.g., Alvero & Austin, 2004; Sulzer-Azaroff & Austin, 2000). Observation data in a BBS process are important because, as described earlier, the data are then used to evaluate the effectiveness of the process and provide feedback to workers. Additionally, accurate observation data may enhance the observer effect (Sasson & Austin, 2005). Accurate feedback enhances performance and acquisition more than inaccurate feedback (Hirst et al., 2013; Johnson et al., 2015). Therefore, it is critical to ensure the accuracy of observations and subsequent feedback in a BBS process.

Factors That May Affect Accuracy

Response effort may be one variable that affects the accuracy of observations and feedback. Hinz et al. (2014) suggest that accuracy of observation decreases as the effort of the observation increases. Safety observers were nurses and students in a hospital setting. Hinz et al. (2014) used an ABAB design, where in baseline (A), documenting a compliant behavior required less response effort than documenting a noncompliant behavior, and in intervention (B) the response effort for documenting both compliant and noncompliant behaviors was equal. The results of this study showed that participants recorded more behaviors as non-compliant when the response effort was equal. When response effort was greater for recording non-compliance, less non-compliance was recorded, suggesting that the observation scores may not have been accurate in the greater effort condition.

Requiring observers to give immediate feedback also increases the amount of effort required to complete an observation. Noting at-risk behaviors may further increase the response effort. For example, an all-safe observation allows for a simple feedback statement like, “Good job being safe.” An observation with at-risk behaviors may require more information to be provided to the observed worker. For example, “I noticed that your feet were only in the safe position 20% of the time. To improve safety, you can use the foot rest or keep your feet flat on the floor.” The increase in response effort might be especially large if the observer recorded several at-risk behaviors. This increase in effort could lead to less accurate results because observers may check safe to avoid delivering feedback on at-risk behaviors. Therefore, observations that do not require immediate feedback may yield more accurate results.

Moreover, Geller, Perdue, and French (2004) explain that the behavior-based coaching process can seem awkward and confrontational. It may be perceived that a worker does not wish to be observed and/or they do not appreciate constructive feedback. A study conducted by Rohn (2004) found that people prefer working without being observed. In this study, participants completed an assembly task. In one condition, participants were observed for a fixed amount of time. In another (termination phase), participants were observed for what could be the same amount of time as the observed phase, however, if they met a specific safety and performance goal, they could terminate the observation halfway through the session. Later, participants were exposed to a choice condition in which they could choose whether the observer was present. Result showed that participants in the termination condition worked to terminate observer presence. In the choice phase, 92% of participants indicated they preferred working with no observer present. This suggests that observations may be aversive, but there is little information on how the aversive nature of observations could impact the BBS process.

There is also evidence that giving feedback following an observation may be aversive. DePasquale and Geller (1999) found that when comparing voluntary and mandatory observation and feedback processes, there was no significant increase in the frequency of observations made per employee, per month between the two processes. However, there was a significant increase in the frequency of both giving and receiving positive behavior-based feedback when feedback was mandatory. This may suggest that when feedback is not required, people are less likely to deliver feedback to others. Although there was a significant increase in giving and receiving positive feedback from voluntary to mandatory processes, there was not a significant increase in giving and receiving negative feedback. This may suggest that giving negative behavior-based feedback may be more aversive than giving positive behavior-based feedback. These data were self-report measures and should be interpreted prudently. However, the findings suggest that when people are required to give feedback, they are more likely to give positive feedback, which may not be accurate feedback.

Purpose of Current Investigation

BBS processes commonly use behavioral observations to collect data (Alvero & Austin, 2004). There is evidence to show that participating in observations and collecting accurate data may result in better safety performance (e.g., Sasson & Austin, 2005). Following an observation, the observer is typically encouraged to provide feedback to the observed individual regarding their safety behavior; this process is called behavior-based coaching (Geller et al., 2004). The observation data collected are then typically compiled in an aggregate manner and can be used to give group feedback to the workers (e.g., Lee et al., 2014; Williams & Geller, 2000). The accuracy of the feedback provided may be important for influencing safety performance (Johnson, Rocheleau, & Tilka, 2015).

There is evidence to suggest that observations and immediate feedback may be awkward, seemingly confrontational, and aversive (Geller et al., 2004; Rohn, 2004). Further, the response effort required to give immediate feedback may decrease the accuracy of the observations (Hinz et al., 2014). Lastly, the aversive nature of this process may affect the accuracy of observations and the delivery of feedback.

A literature review found no data on how the behavior-based coaching process affects the accuracy of safety observations and the accuracy of feedback delivered. The current study aimed to address the above concerns. In this study, the impact of providing verbal feedback to the worker was observed to determine if it impacts (1) accuracy of the observation, (2) the accuracy of the feedback provided.

Method

Participants

Four college students from a southeastern university participated in this study. All participants were at least 18 years of age. Participants were excluded from the study if they indicated they were actively involved in other studies requiring peer observations or if they were familiar with any confederates involved in the study. None of the participants who registered for the study were excluded based on these criteria. Participants were recruited using word of mouth and the university's online subject pool system (SONA). SONA is a computer software program that allows students to volunteer for research studies online. This study was approved by Florida Institute of Technology's Institutional Review Board.

Setting and Materials

This study took place in two on-campus offices used for training participants on the study's procedures and running the experimental sessions. The offices contained a desk, computer, and two chairs. A discrete video and audio recording device was present in the experimental room during all sessions. This recording device was used to capture audio of the participants and video of the confederates' posture behaviors. In addition, participants were given a clipboard and pen with a safety checklist (Appendix A) that they used to score confederate postures. The safety checklist had five opportunities to score two different postures, for a total of five observations per session.

Dependent Variables

Accuracy of recorded observations on the checklist was the primary dependent variable in this study. Accuracy of verbal feedback delivered was used as a secondary measure. Each is described in more detail below.

Accuracy of observations on checklist. At two-minute intervals, a beep sounded prompting the participant to score the safety performance of the confederate on an observation checklist. Confederate performance was also scored by the principal investigator who watched a video, obtained discreetly, of the confederate during the session. For this study, the principal investigator's scoring was considered 100 percent accurate. Therefore, accuracy of observations was defined as the extent to which the participant's checklist agreed with the observations of the researcher. The final calculation yielded a percent accurate score, obtained by dividing the number of items agreed upon by the total number of opportunities.

Required feedback condition. At the end of observation sessions during the required feedback condition, participants were asked to give the confederate feedback on their safety performance. Accuracy of feedback *provided* was defined as the extent to which the participants' verbal feedback to the confederate agreed with their observation checklist. Participants were instructed how to deliver feedback using a checklist (Appendix B). The principal investigator compared the audio recording of the participants providing feedback to their completed checklist.

Following a session in which over 50% of postures were scored as "at-risk", participants were required to provide a blanket statement, name the postures, and state the safe definition of those postures. Following a session in which at least 50% of postures were scored as "safe", participants were required to provide a blanket statement, name the postures, and state the safe definition of those postures. The omission of a required blanket statement, any "at-risk" postures, or the safe posture definition during the feedback provided were considered incorrect. Accuracy of feedback provided was calculated by dividing total correct feedback statements by the total opportunities to present correct feedback.

Data Collection

One session lasted for a total of five minutes and the participants recorded data on two confederate' posture behaviors once at the end of every one-minute interval, using momentary time sampling, totaling five recording intervals per session. These intervals were combined into a single data point, representing one session.

Checklists were stapled together in order and labeled by session number so that the investigator knew which session and checklist corresponded. When more than one session block was run in succession, the participants were required to obtain the corresponding checklists immediately before each session block. After each block of sessions, participants put all five completed checklists into a drop box outside of the office. After participants left, checklists were collected and marked with the participants' name and session number.

Procedure

Informed consent and inclusion criteria. Informed consent was explained verbally (Appendix C) and in writing (Appendix D). Participants were given the option to either consent to the study or refuse participation. Participants agreed to participate by signing the written consent form prior to the study and were reminded that they may terminate their participation at any time without penalty. All participants agreed to participate after reading the informed consent.

After informed consent was obtained, each participant was introduced to a confederate worker. Participants were asked if they were familiar with the confederates. If the participants indicated that they were familiar with the confederate, they could not participate in the study.

Group assignment. Participants were randomly assigned, using a random number generator, to either Group A or Group B. Group A began the study in the observation-only phase and Group B began the study in the required feedback phase. This counterbalanced design was in place to control for possible sequence effects.

Training. All participants were told that they were randomly assigned to be an observer, and that others (confederates) were assigned to be performers. The participants were told their role was to record observations of the performer's (confederate/s) posture while they completed a computer work task. Participants were told that the performers (confederates) were aware they would be observed during the study. Participants were trained to accurately identify postures as "safe" or "at-risk", to record an observation on a checklist (Appendix A), and to conduct a session (Steps in Appendix E and F).

Then, participants were trained on two posture behaviors:

1. *Back Position- To be scored as safe, the worker's back must be in contact with the entire back rest of the chair. There must be a 90 degree or greater angle between legs and back.*
2. *Feet Position- The worker's feet are both firmly on the ground or footrest, and the entire sole of each shoe is in contact with the ground. When only one foot or part of the entire shoe is in contact with the ground, it is not safe feet position.*

Participants were taught how to correctly identify these behaviors as either "safe" or "at-risk". This was done by providing the written definitions above and giving examples of "safe" postures and examples of "at-risk" postures. Before participants could begin the study, they were required to correctly score 10 consecutive examples of the postures.

Next, participants were taught how to conduct a session block. They were provided instructions (Appendix E) and were required to correctly complete two minutes of a session through role play with the investigator acting as the performer. Finally, participants were told not to put their name on their completed checklists, to make data collection appear anonymous. Checklists were stapled together in order and labeled by session number so that the investigator knew which session each checklist corresponds to. If more than one session block was run in succession, the participants were required to obtain the corresponding checklists immediately before each session block.

Confederate behavior. Confederates were taught to conduct session blocks and correctly identify "safe" and "at-risk" postures in the same way participants were trained. Then, confederates were asked to perform each posture safely and at-risk in random order until five consecutive correct demonstrations were achieved.

Before each session block in the study, confederates were told to attempt to demonstrate at-risk postures for 70 percent of the time in each session. Confederates had a timer on their computer to help them to estimate participant observation intervals. The participants were positioned to the right side of the confederate worker.

Observation-only phase. In this phase, participants used a checklist to record observations of back position and feet position as either “safe” or “at-risk” immediately after an audible beep, using momentary time sampling, every minute. At the end of each session, participants were instructed to say nothing to the performers, and began the next session when they were ready. At the end of the session block, participants were instructed to say nothing to the performers and to place their completed checklists into a drop box outside of the office.

Required feedback. Immediately prior to beginning this phase, participants were trained on how to provide feedback, in line with a script (Appendix C), and were required to give mock feedback at 100 percent accuracy before beginning. Participants were provided two examples of feedback, positive and constructive, and the criteria for delivering each type. In this phase, each participant completed each session in a similar fashion as the observation-only phase, however, they also were required to give immediate verbal feedback, in line with the script (Appendix C), to the confederate on their posture following each 5-minute session. The confederate reacted to this feedback in a neutral manner (e.g., by saying, “Okay,” or, “Alright.”).

Experimental Design

The study used a counterbalanced ABAB reversal design. Phase A was the observation-only phase, during which each participant conducted observations of confederate posture behaviors and recorded data on a checklist. Phase B was the required feedback phase, during which participants conducted observations and recorded the same data as in the observation-only phase, but were also required to give immediate verbal feedback to confederates at the end of each observation. Two participants (Group A) began the study in the observation-only phase (ABAB), and two participants (Group B) began the study in the required feedback phase (BABA).

Interobserver Agreement

Interobserver agreement (IOA) was calculated on confederate posture for 100% percent of the total sessions. A minimum criteria of 80 percent IOA across all sessions measured was required. To calculate IOA, an independent observer completed the posture checklist for the video recordings of confederate posture in a session, and these were compared to the principal investigator's posture checklist for the same video. Total items in agreement were divided by total items and yielded a percent agreement. Overall IOA was the mean percentage of IOA across all sessions measured.

IOA was also calculated for scoring of verbal feedback for 100% of the total sessions. This was calculated in the same way as the IOA for confederate posture, using the audio recordings of participants.

Results

Figure 1 depicts the results for participant 1. Participant 1's mean accuracy of observations in the first observation only condition was 100% across five sessions, followed by 88% (range, 80% to 100%) in the first required feedback condition across five sessions. In the second observation only condition, mean performance was 100% across five sessions and in the second required feedback condition mean performance was 94.3% (range, 80% to 100%) across five sessions. Participant 1's accuracy of feedback provided was 100% during both required feedback conditions.

Figure 2 depicts the results for participant 2. Participant 2's mean accuracy of observations in the first required feedback condition was 92% (range, 80% to 100%) across five sessions, followed by 95% (range, 80% to 100%) in the first observation only condition across five sessions. In the second required feedback condition mean performance was 90% (range, 80% to 100%) across six sessions and in the second observation only condition mean performance was 100% across four sessions. Participant 2's accuracy of feedback provided was 100% during both required feedback conditions.

Figure 3 depicts the results for participant 3. Participant 3's mean accuracy of observations in the first observation only condition was 100% across three sessions, followed by 92.9% (range, 80% to 100%) in the first required feedback condition across seven sessions. In the second observation only condition mean performance was 98% (range, 90% to 100%) across five sessions and in the second required feedback condition mean performance was 94% (range, 80% to 100%) across five sessions. Participant 3's accuracy of feedback provided was 100% during both required feedback conditions.

Figure 4 depicts the results for participant 4. Participant 4's mean accuracy of observations in the first required feedback condition was 74% (range, 50% to 100%) across five sessions, followed by 92% (range, 70% to 100%) in the first observation only condition across five sessions. In the second required feedback condition mean performance was 78% (range, 50% to 100%) across five sessions and in the second observation only condition mean performance was 92% (range, 80% to 100%) across five sessions. Participant 4's accuracy of feedback provided was 100% during both required feedback conditions.

Interobserver Agreement

IOA was obtained for both accuracy of observation and accuracy of feedback provided. An independent observer viewed screenshots of the confederate postures and scored these on the safety checklist. These checklists were then compared to the researcher's observations of the same postures. IOA for accuracy of observation was collected for 100% of sessions and agreement was 94.4%. IOA for accuracy of feedback delivered verbally was collected for 60% of sessions and agreement was 100%.

Discussion

The current research suggests that requiring observers to deliver immediate feedback may affect the accuracy of observations. All participants' observations were more accurate in the observation only condition than in the required feedback condition and this was replicated within participants using a reversal design. The smallest increase in average observation accuracy from required feedback conditions to observation only conditions was 5.4% (participant 3), and the largest increase was 18% (participant 4). Moreover, although accuracy of observations did change between phases, accuracy of the verbal feedback provided was 100% throughout the entire study; meaning the feedback provided by the participant matched the data on their observation checklist.

Accuracy of observations in individual sessions ranged from 50% to 100% in the 45 required feedback sessions, and were between 80% and 100% in 41 of the 45 total sessions. This small range was expected based on the protocol for confederate behavior (~30% safe per session) and the criteria required to provide positive feedback (at least 50% safe in a session) to the confederate. It was assumed that giving constructive feedback to others may be aversive and so observation accuracy may at times reach 80% and meet the criteria to provide positive feedback as opposed to constructive feedback.

Positive feedback was provided in five of 44 required feedback sessions scored by the investigator as “at-risk”. While this number may seem small, it meant that 11.4% of the time confederates received inaccurate positive feedback on their posture even though they were behaving “at-risk”. Compared to the observation only conditions where participants never (0 of 34 sessions) scored an “at-risk” observation as “safe”. Further, in the required feedback phases, on average all but one participant (participant 3) scored more confederate postures as “safe” than the principal investigator.

These small changes in observation accuracy can have a large impact on a BBS process. BBS processes rely on data collected through peer observations to deliver feedback to employees both immediately after the observation and aggregately to the group. The group level data is also used to make safety related decisions like removing items from the observation checklist or developing additional interventions. Previous studies have highlighted the importance of accurate feedback in performance improvement (e.g., Johnson et al., 2015). Hirst et al. (2013), demonstrated how varying the level of feedback accuracy can affect acquisition proportional to the level of feedback accuracy. In the current study, participants provided inaccurate feedback 11.4% of the time, and three of four participants were more likely to score confederate posture as “safe” when compared to the principal investigator, in the required feedback condition. On a larger scale, where just one accident must occur to produce a fatality, 11.4% of workers receiving inaccurate positive feedback may be a significant issue. Observers could potentially reinforce at-risk behavior that may have serious consequences.

The negative impact of inaccurate observations is not limited to individuals during the immediate feedback. Organizations make safety decisions based on aggregate safety data collected from observations. For example, they may choose to spend more time on a behavior that is scored consistently at-risk or remove a checklist item that is scored consistently safe. In the current study's required feedback conditions, three of four participants (all but participant 3) scored more postures as "safe" on average than the principal investigator. Although these were sometimes one or two postures out of a total of ten, if aggregated on a large scale, these subtle differences could influence significant decisions.

An interesting pattern to note is that accuracy of observation was always higher in the first half of each required feedback condition than in the last half. This was seen across all four participants. This may suggest that confederate reaction (or lack thereof) to the participant's feedback may have resulted in less accurate observations over time. Across all sessions, confederate posture was "safe" on average 26% (2.6 behaviors out of 10) of each individual session. After participants provided feedback, the confederate's posture never improved. Participants may have expected to see an improvement after providing feedback and a lack of change may have had a punishing effect on recording accurate observations. This may explain the decline in accuracy as the required feedback phases progressed. And, it suggests that the response to feedback may impact accuracy over time.

In addition, these results may suggest that giving constructive feedback to others following peer safety observations is aversive, especially when no change occurs based on the feedback. This is consistent with Geller et al. (2004), who stated that safety coaching can seem awkward, and even confrontational. The aversive nature of constructive feedback may impact the accuracy of data which is used to make decisions in BBS processes.

These findings certainly do not make a case for eliminating peer observation feedback in BBS interventions, but rather, highlight the importance of designing an observation and feedback process that ensures the accuracy of the data collected as well as the feedback provided. The current results suggest that observers will provide feedback based on what they record. Therefore, the aim for organizations should be to obtain accurate recording by observers.

Processes that encourage employees to give immediate feedback following observations should consider the current results, as this variable may affect the accuracy of the data used to provide feedback to employees. Organizations should look to do what they can to ensure feedback is provided as accurately as possible. One antecedent intervention possibility would be to train employees on the purpose of observations and feedback within a BBS process, so that they recognize the importance of accurate data collection. Observers who are only trained on how to conduct an observation, and the goals of BBS processes, may not understand how the different components contribute to improved safety performance. Training observers on the importance of accurate observations and feedback, and how this contributes to safety improvements, may create a rule that is strong enough to influence the behavior of taking accurate observations.

Providing reinforcing consequences for taking accurate observations and providing accurate feedback is another way to combat inaccurate observations. One approach may be to have safety professionals conduct observations with other employees, and provide feedback on the accuracy of the workers' observation and delivery of feedback to the performers. Comparing observations should encourage more accurate observations and feedback, and receiving praise following the delivery of that feedback could make the feedback process less aversive.

Another possibility would be to target the response of the person receiving the feedback. It is possible that in the current study the lack of behavior change following feedback played a role in the decreased accuracy of observations. This effect might be nullified by training employees how to react to safety feedback. It is possible that in place of the neutral reactions used in the current study, if the performer receiving the feedback reacts in a positive manner, observation accuracy may maintain. Further, the performer receiving feedback should also attempt to immediately improve their own behavior based on the feedback provided.

It should also be considered that if constructive feedback is aversive, employees may simply opt-out of providing feedback following an observation in a different setting. However, results of the current study suggest that the observations will change, not the feedback provided. Because of the Observer Effect's positive effect on the safety behavior of the observer (e.g., Alvero & Austin, 2004), and evidence suggesting accurate feedback results in performance improvement (e.g., Johnson, Rocheleau, & Tilka, 2015), BBS processes should aim to have employees complete many observations consistently. The aversiveness of providing constructive feedback may make this goal difficult for organizations to achieve. Focusing on the current findings may help to not only improve the accuracy of observations, but also increase the frequency of observations completed.

Limitations

The current study is not without limitations. First, the postures in this study were distinctly either "safe" or "at-risk". Sometimes, posture and other safety behaviors can be more difficult to discern as safe or at-risk. The current results may have been stronger if the "at-risk" behaviors were more difficult to discern, because observers may have felt more comfortable scoring a behavior that just barely met the definition as "at-risk" as "safe", compared to a behavior that was decidedly "at-risk". In the current study, confederates were instructed to make their at-risk behaviors obvious. If the confederates would have been more subtle in their distinctions between “safe” and “at-risk” postures, observers may have marked more of the “at-risk” postures as “safe”.

Second, this study was conducted in an analogue setting. Participants may not have been motivated to perform quality observations on par with what would be expected of an employee in an applied work setting. This possible lack of motivation could be enhanced by postural behaviors being viewed as less serious than common applied issues (e.g., working from heights without fall protection). Further, employees in an applied setting may have a stronger relationship with the people they observe than the observers in this study, who had no prior relationship with the confederates. This could result in more accurate observations, as a positive relationship may decrease the aversiveness of providing constructive feedback. Although, we should consider the fact that BBS processes are often implemented in large organizations where employees may not necessarily be familiar with each other or may have strained relationships. In addition, the participants received no training or background on BBS processes, and therefore may not have understood the implied importance of their data. Because of these limitations, the results may differ in an applied setting.

Third, the researcher did not mention to participants that feedback was an attempt to improve the posture of the confederates. While the participants were asked to observe, and give feedback on “safe” and “at-risk” posture, the participants may not have felt like they were making an impact on the safety of the confederate. This is different from an applied setting, where employees would be told the BBS observations aim to contribute to the safety of employees. However, one participant mentioned he thought the purpose of the study was to improve confederate posture. Further, two other participants mentioned in the debriefing that they did not think they had improved the posture of the confederate. This suggests that the components of the study were enough to suggest the purpose of the feedback was to improve the posture of the confederates.

As mentioned previously, another limitation might be that regardless of the feedback provided, the confederates did not change their posture. There were required feedback phases in which the accuracy of observations initially measured 100%, however after two or three sessions, accuracy decreased. This may be a result of a punishing effect when an individual delivers feedback and does not see any noticeable changes, or does not feel the recipient values the feedback.

Lastly, one confederate (matched with participant 2), reported that as time went on it became harder to sit in a “safe”, or close to a “safe” position. Therefore, the at-risk postures may have become more noticeable toward the end of the session blocks. The implications of this would be more accurate observations towards the end of a session block (10-15 sessions). The data for participant 2 (Group B) may reflect this possible effect, however the same trend was not seen as strongly in participant 4 (Group B), and was not seen at all in Group A.

Suggestions for Future Research

Future research in this area should look to replicate these findings and consider how different variables beyond simply requiring feedback impact the accuracy of data collection. Ultimately, an applied investigation, with more complex behaviors should be studied to determine if results would be similar. There are many additional variables (e.g., BBS training, more risk involved, etc.) present in applied settings that may produce different results and that warrant investigation.

For example, examination of the confederate response to feedback and how the response effects accuracy would further understanding on this topic. In the current study, regardless of the feedback provided, confederate percentage of safe posture per session did not change (~30%) and the confederates gave a neutral response to the feedback. It is possible that if safe posture either increased or decreased following participant feedback, observation accuracy may have been affected. Investigating and learning about this possible interaction would be beneficial. Future work may also consider the confederate's verbal reaction to the feedback. It is possible that responses that are both positive and negative, as opposed to neutral, could impact the participant's future observation and feedback accuracy.

Lastly, future research should look to investigate a choice scenario, in which observers can choose to either provide feedback or not. It may be the case that if observers find constructive feedback aversive, they may be less likely to give feedback when a performer is working unsafely. Additionally, performer response (e.g., increased safe behavior, positive/negative verbal response, etc.) following feedback may affect the observer's choice to provide feedback as well. These variables should be investigated to contribute to best practices in BBS.

Conclusion

In conclusion, the current study highlights the possibility of decreased observation accuracy when requiring observers to give immediate feedback. Results may also suggest that providing constructive feedback to others can be aversive to some participants. This study was certainly not conclusive and future research should look to further understand the possible effects. However, these data do provide an initial step towards a better understanding of the impact of required feedback on observation accuracy, which may enhance our current knowledge of BBS best practices.

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Appendix A
Safety Checklist

Performer:	Date:	Time of Observation Period:

Observation	Back Position		Feet Position	
1 (1:00)	Safe	At-risk	Safe	At-risk
2 (2:00)	Safe	At-risk	Safe	At-risk
3 (3:00)	Safe	At-risk	Safe	At-risk
4 (4:00)	Safe	At-risk	Safe	At-risk
5 (5:00)	Safe	At-risk	Safe	At-risk

Appendix B
Feedback Script and Scoresheet

If at least 50% of postures were scored as **SAFE**	
1	"You were working safely the last 5 minutes"
2	"Your back...
3	...and your feet were in a safe position"
4	"Great job!, Nice work!, other"
5	"Do you have any questions?"

If more than 50% of postures were recorded as **AT-RISK**	
1	"You were not working safely the last 5 minutes"
2	"Most of the time, your back was not in contact with the back rest...
3	...and your feet were not in a safe position"
4	"To be safe, your back should be completely in contact with the back rest and your feet should be firmly planted on the floor"
5	"Do you have any questions?"

Appendix C
Informed Consent Script to be Read Aloud

Please hand the participant the informed consent form, and read the following aloud:

Please read this consent form, and let me if you have any questions. After reading the form, if you decide to participate you must sign the form. You will not be penalized in any way if you decide not to participate.

Take as much time as you need to ensure you understand the form. If you choose to participate, please sign the form. You will be given a copy for your records.

Appendix D
Informed Consent Form

Informed Consent

Please read the following document carefully, and ensure that you understand all language presented before you decide to participate in this study. Any questions or concerns you bring up will be addressed before you sign the form.

Study: Postural Safety Observations

Purpose of the Study: You are invited to participate in a research study designed to increase safe work behaviors.

Procedures: You will be asked to participate a total of 2-3 times over the course of the study. These sessions will last for roughly 70 minutes each. The scheduling will be based heavily on your preference.

Potential Risks: There are no perceived risks of participating in this study beyond what you would normally encounter in your daily activities. Completion of the study will require approximately 2.5 hours of participation which may cause some minor fatigue. You are welcome to take breaks when needed, and may terminate your participation at any time with no penalty.

Potential Benefits: You will not receive any direct benefits from participation in this study but may learn about behavioral safety initiatives and observations.

Compensation: You may receive class credit or extra credit if offered by any of your professors.

Confidentiality: All information shared and collected for this project will be kept fully confidential. All information will be filed and stored in a protected electronic file for a minimum of 3 years.

Participation: Your participation in this study is entirely voluntary. You may withdraw from the study at any time without penalty. Upon completion of the study, Nicholas Matey will answer any questions you may have concerning the study.

Right to Withdraw from the Study: You have the right to withdraw from the study at any time without penalty.

For Questions Please Contact: If you have any questions please contact Nicholas Matey, at NMatey2015@my.fit.edu or (607)239-7281.

For more information about your rights as a research participant:

Dr. Lisa Steelman, IRB Chairperson
150 West University Blvd.
Melbourne, FL 32901
Email: Lsteelma@fit.edu (321)674-8104

I have read and understand the above procedures. I agree to participate in the above procedure.

Participant: Date:

Principal Investigator: Date:

Appendix E
Instructions for Conducting a Session Group A

1. You are in a safety/posture observation study.
2. There are two groups
    a. Observers
    b. And performers
        i. You are a performer
3. Your Job is to observe the performers as they work on their computers
    a. The performers know they might be observed but do not know what for
4. You are observing two postures to be scored as:
    a. Safe
    b. Or at-risk
5. These postures are (allow them to read handout):
    a. Back position
    b. And Feet position
6. You will score these on a checklist (Hand them first packet)
    a. Each separate block is a 5-min period
    b. With one observation at the end of each minute
    c. Please do not put any identifying info (your name, initials, etc.) as we do not want to know who took the observation, keeping them anonymous
7. Practice with photos to mastery
8. There will be a lap top on the desk with iTunes open
    a. There is a 5-min track to play that corresponds with one block of the checklist observations
    b. You will hear 2 beeps at the end of each minute
        i. These will be fairly loud, please keep volume up as the performer hearing the beep is part of our protocol to see if it has any added effect
    c. At the time of the first beep record the performer's posture as safe, or at-risk
    d. This track will continue for 5 minutes (record once at end of every minute signaled by the 2 beeps)
    e. When the track is complete you will hear 4-5 beeps
        i. Complete your final observation
        ii. Restart the track, and repeat 5 times

9. Please do not talk to the participant, when you finish with the final (5^{th}) observation set, simply drop the packet in the box on the desk, and find me outside of the room
10. I will offer you a 10-minute break so feel free to use the restroom, go on your phone, etc.,

Appendix F
Instructions for Conducting a Session Group B

1. You are in a safety/posture observation study.
2. There are two groups
    a. Observers
    b. And performers
        i. You are a performer
3. Your Job is to observe the performers as they work on their computers, **and to provide feedback after each session**
    a. The performers know they might be observed but do not know what for
4. You are observing two postures to be scored as:
    a. Safe
    b. Or at-risk
5. These postures are (allow them to read handout):
    a. Back position
    b. And Feet position
6. You will score these on a checklist (Hand them first packet)
    a. Each separate block is a 5-min period
    b. With one observation at the end of each minute
    c. Please do not put any identifying info (your name, initials, etc.) as we do not want to know who took the observation, keeping them anonymous
7. Practice with photos
8. There will be a lap top on the desk with iTunes open
    a. There is a 5-min track to play that corresponds with one block of the checklist observations
    b. You will hear 2 beeps at the end of each minute
        i. These will be fairly loud, please keep volume up as the performer hearing the beep is part of our protocol to see if it has any added effect
    c. At the time of the first beep record the performer's posture as safe, or at-risk
    d. This track will continue for 5 minutes (record once at end of every minute signaled by the 2 beeps)
    e. When the track is complete you will hear 4-5 beeps
        i. Complete your final observation

ii. **PROVIDE FEEDBACK**
iii. Restart the track, and repeat 5 times

9. Practice with feedback rubric

10. When you finish with the final (5th) observation set, simply drop the packet in the box on the desk, and find me outside of the room
11. I will offer you a 10-minute break so feel free to use the restroom, go on your phone, etc.

Figure 1
Participant 1 Results

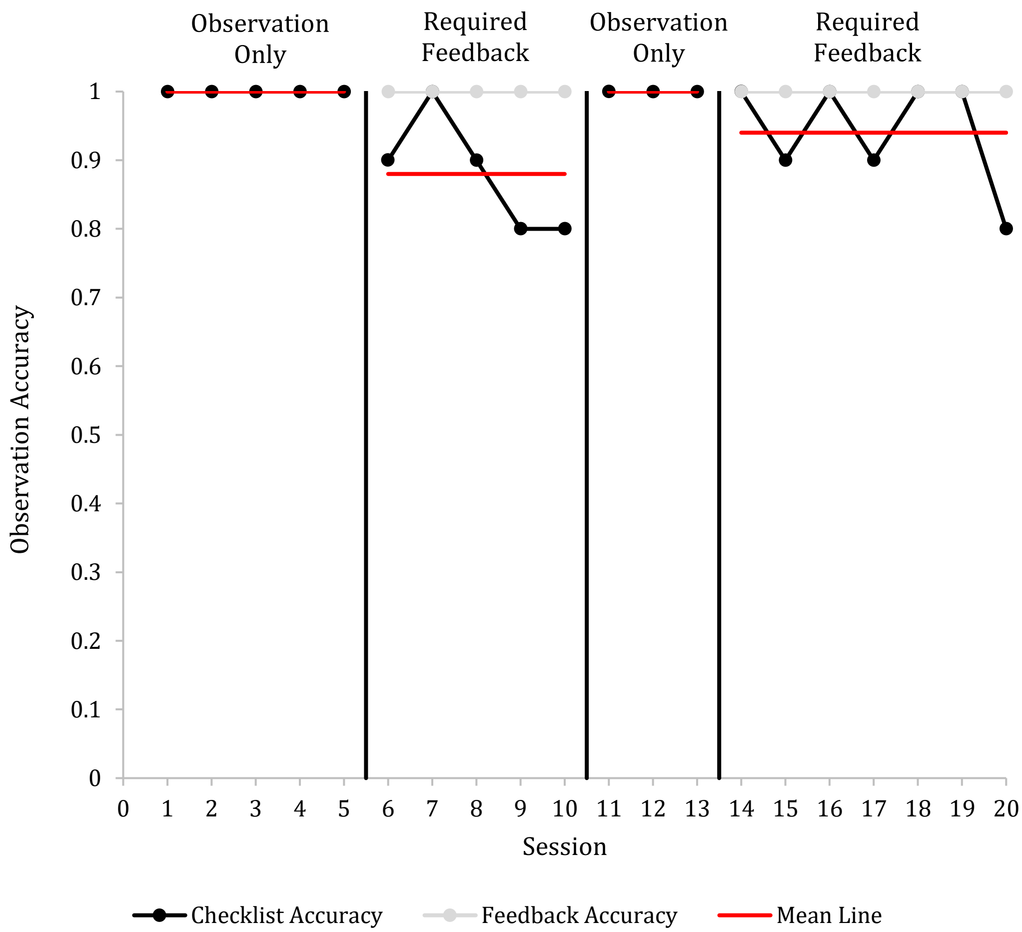

Figure 1. Shows results throughout the study for participant 1 (Group A). Feedback accuracy represents the percent agreement between the participant's completed checklist compared with their verbal feedback based on the rubric provided. Red mean lines for accuracy of observation are provided within each individual phase.

Figure 2
Participant 2 Results

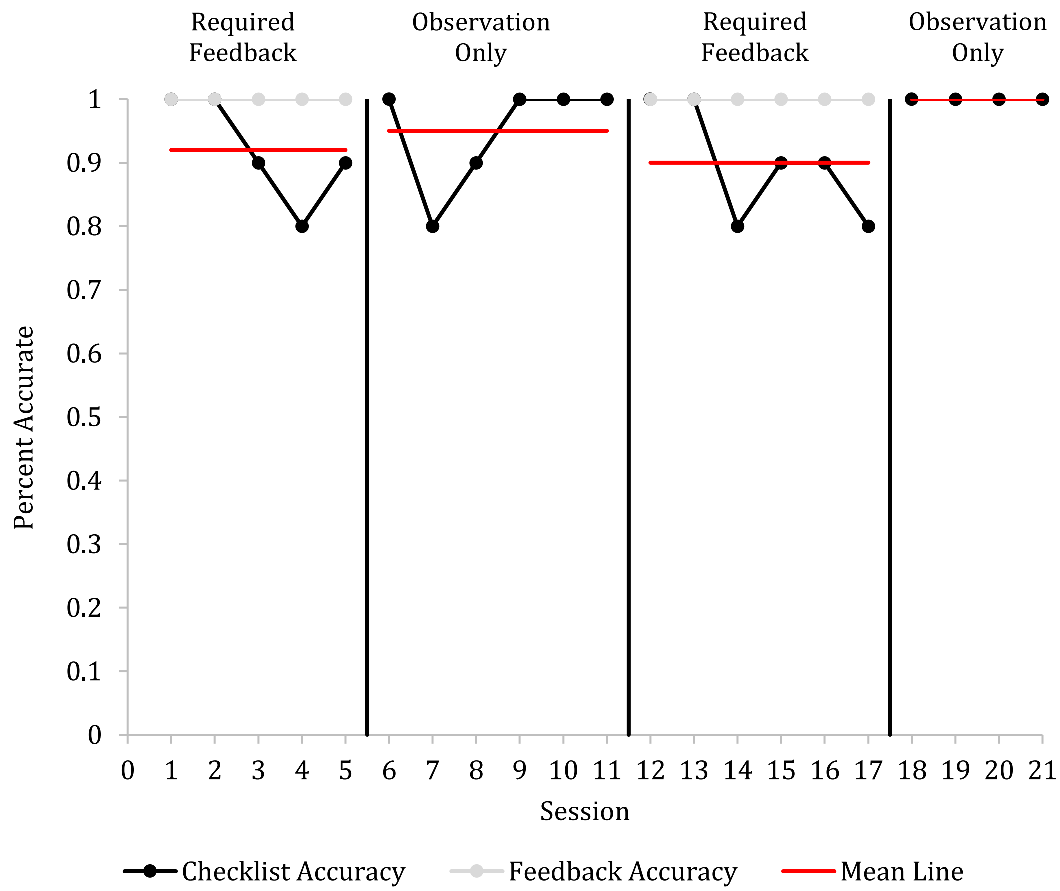

Figure 2. Shows results throughout the study for participant 2 (Group B). Feedback accuracy represents the percent agreement between the participant's completed checklist compared with their verbal feedback based on the rubric provided. Red mean lines for accuracy of observation are provided within each individual phase.

Figure 3
Participant 3 Results

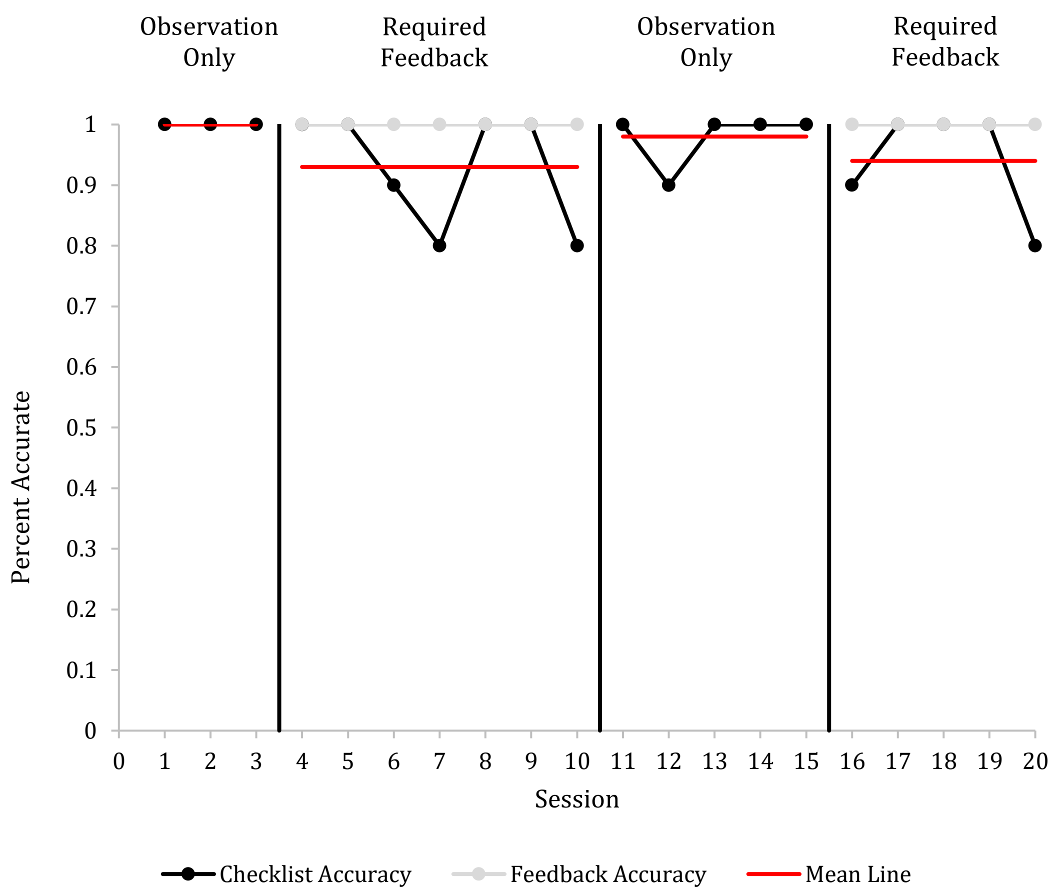

Figure 3. Shows results throughout the study for participant 3 (Group A). Feedback accuracy represents the percent agreement between the participant's completed checklist compared with their verbal feedback based on the rubric provided. Red mean lines for accuracy of observation are provided within each individual phase.

Figure 4
Participant 4 Results

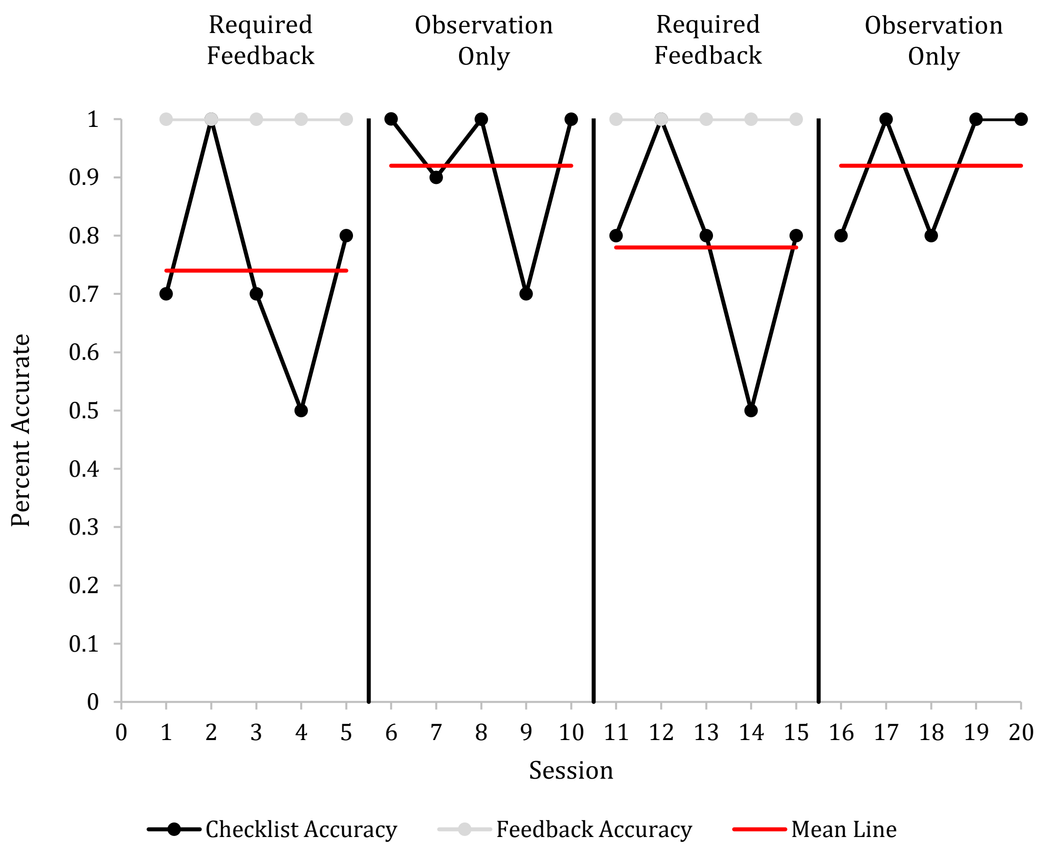

Figure 4. Shows results throughout the study for participant 4 (Group B). Feedback accuracy represents the percent agreement between the participant's completed checklist compared with their verbal feedback based on the rubric provided. Red mean lines for accuracy of observation are provided within each individual phase.