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# Training Teamwork in Medical Teams: An Active Approach with Role Play and Feedback

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Training Teamwork in Medical Teams: An Active Approach with Role Play and  
Feedback

by

Matthew S. Prewett

A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
Department of Psychology  
College of Arts and Sciences  
University of South Florida

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## Dedication

This doctoral dissertation is dedicated to my family, friends, and colleagues, especially my parents, Patricia and Mike Prewett, who gave me all that I needed to succeed.

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ABSTRACT

Recent reports in the field of medicine have recommended the use of teamwork training to reduce the number of injuries and fatalities from human error. Teamwork training in the field of medicine appears promising, but few empirical evaluations of such programs have confirmed their effectiveness. Existing teamwork training studies have tended to use a traditional, lecture approach to training, with positive but modest results upon teamwork attitudes and behaviors. The current study developed and evaluated a more active teamwork training protocol for trauma resuscitation teams. The training protocol supplemented several medical and non-medical role plays with a lecture and guided discussion for feedback. Forty-one residents participated in the training on one of two days (groups) and completed evaluation measures prior to and immediately following the training program. The training was evaluated with measures of trainee reactions, attitudes towards teamwork, and responses to a situational judgment test (SJT). Analyses compared item and scale scores between pre-training scores and post-training scores. T-tests generally found higher means for post-training behavioral responses than pre-training responses. However, mean comparisons with teamwork attitudes and

learning goal orientation did not yield significant differences. An item analysis of the SJT responses (using chi-square) indicated significant response shifts in many items that correspond to the teamwork training content. In summary, results indicated that teamwork training on behavioral choices, but little effect on the self-reported attitudes of trainees.

## Chapter One

### Introduction

The use of work teams frequently provides a competitive advantage for organizations (Guzzo & Dickinson, 1996), but this advantage is often contingent upon the team members working well together. Frequent and effective teamwork behaviors are valuable because they improve team effectiveness and contribute to team member satisfaction (LePine, Piccolo, Jackson, Mathieu, & Saul, 2008). Such behaviors are also targeted by organizations in order to guide staffing, training, and performance management decisions (Brannick & Prince, 1997). As a result, researchers and practitioners have taken interest in the use of training techniques to improve teamwork behaviors and team-oriented knowledge, skills, abilities, or other task requirements (KSAs; Stevens & Campion, 1994).

One approach to teamwork training, which was developed in the aviation industry, is usually referred to as Crew Resource Management (CRM; Wiener, Kanki, & Helmreich, 1993). CRM aims to train airline crews to effectively manage all available resources through behaviors including effective team communication and coordination (Salas, Burke, Bowers, & Wilson, 2007). Through the years, CRM has become a model for teamwork training (Salas et al., 2007), and it is now being applied in other domains such as medicine, naval commerce, and energy production. Training may be a big business (Goldstein, 1993), and it is easy to show that training is being conducted in

many contexts, but teamwork training evaluations outside of aviation are rather few and far between. A review by Salas et al. (2001) suggests that CRM is generally beneficial in aviation, but little is known about the benefits of teamwork training outside of this context.

Health organizations may particularly benefit from teamwork training programs because of the high cost associated with human errors (e.g., loss of life), errors which may be prevented through more effective team functioning. In 1999, the Institute of Medicine (IOM) reported that nearly 100,000 lives and approximately 25 billion dollars are lost each year due to medical errors. The IOM concluded that much of these errors could be reduced through changes in the health care system, including the implementation of team training programs. As a result, there is a great need for a valid and reliable training program targeted towards teamwork in medical tasks.

Despite the great potential that teamwork training has to positively impact medical teams, few studies have validated a teamwork training program for medical teams. Much of the existing work has focused on traditional, lecture-based methods with modest results. Thomas and his colleagues (2007), for example, found more frequent teamwork behaviors in teams that received lecture and short, low fidelity role play training than control groups. Small et al. (2007) used a traditional, didactic approach using a high-fidelity simulator with teams that had already received a simple lecture. Teams that received instructional training within the context of the simulator demonstrated more teamwork behaviors later on than did teams that simply received lecture-based training without use of a simulator. Shapiro and colleagues (2004) attempted to improve teamwork behaviors through task simulations in addition to

traditional lecture-based methods, but the training protocol did not yield a significant difference in behavioral comparisons. Morey et al. (2002) performed a quasi-experimental study that compared hospitals that had a teamwork training program against hospitals without such a program. Although this comparison yielded significant differences in teamwork effectiveness, it did not indicate the effect of training on the individual trainees, and the design was not a true experiment with random assignment to groups. Finally, many training programs have been developed for applications in health care organizations (e.g., TEAMSTEPS; ACRM). Although case reports of these training programs are generally positive (Alonso et al., 2006), empirical evaluations on the effect of such programs have been difficult to find in the literature. Thus, much remains to be learned about the optimal training design, delivery, and evaluation approaches to teamwork training in medicine.

The current study applies a teamwork training program in a medical environment in order to assess subsequent effects on trainee reactions, attitudes, and behavioral intentions. Specifically, the training protocol integrates behavioral role modeling in realistic task simulations and error management techniques to increase teamwork behaviors during trauma resuscitation. The study is designed to provide an initial basis for documenting an effect of training and to specify which team processes are most principally affected by the training. What follows is a review of training approaches and their relevance to the teamwork training program applied by this study.

### *A Review of Teamwork Training*

Effective training programs are designed around four basic principles: 1) the training presents the relevant knowledge, skills, and abilities (KSAs) to be learned, 2) the

training demonstrates the KSAs of interest, 3) the training provides opportunities to practice the KSAs, and 4) the practice of these KSAs is supplemented by informational feedback (Salas & Canon-Bowers, 2001). Traditional approaches primarily focus on the first two principles, information presentation and, in some cases, demonstration. Such approaches typically use a lecture or another form of proceduralized instruction, which have a major advantage in terms of efficiency and cost-effectiveness. One trainer can present the material to a large number of trainees at a relatively low cost. Furthermore, traditional methods can encourage participants to “overlearn” the material through structured tasks and routine presentation of the same material (Ford & Kraiger, 1995). This approach has been beneficial for many training areas (Arthur, Bennett, Edens, & Bell, 2003; Driskell, Willis, & Cooper, 1992), primarily because it promotes automatic behavioral responses to specific problems. Lecture-based training is also an efficient way to convey information.

However, traditional or lecture-based methods suffer from several problems that limit their effectiveness. The first issue is that traditional training methods promote *analogical transfer*, but not *adaptive transfer* (Ivancic & Heskith, 2000). Analogical transfer describes familiar or analogous problem solutions that were previously provided to the trainee, whereas adaptive transfer uses existing knowledge and skills to find a solution to a novel problem. In traditional approaches, trainees are frequently provided with the correct solution to an example problem, but do not explore other types of solutions or other types of task problems (Keith & Frese, 2005). The routine expertise developed through this procedure is beneficial because it promotes analogical transfer. It interferes with adaptive transfer, however, by neglecting to instruct trainees how to

develop solutions to novel or dynamic problems (Devine & Kozlowski, 1995). Given the dynamic environments of many team types (Devine, 2002), adaptation to novel stimuli is a needed skill in teams, yet one that is not developed by traditional training methods.

Traditional methods may also inhibit transfer by having low fidelity to the task. Ideally, trainees would apply every element of the training program towards their real-world job. Such a high level of transfer may be difficult to achieve, however, unless the conditions of the training realistically mimic the conditions of the job. That is, the training program should feature identical elements to the task demands (Baldwin & Ford, 1988). Lecture-based and similar forms of training, however, generally make no attempt to capture task elements save through the presentation of hypothetical problems (Beard, Salas, & Prince, 1995). Although participants are informed of potential problems, they are unable to view the conditions of the problem and actively solve it. Thus, lecture-based training has a greater discrepancy between training and job task elements than other forms of training, such as a role play in a task simulation.

Another criticism of traditional methods is that they do not explicitly target a trainee's intrinsic motivation. Specifically, traditional methods place the responsibility of learning upon the instructor or trainer and limit the control and responsibility placed upon the individual (Ford & Kraiger, 1995). Although instructor control makes for an easier transmission of information, it limits independent action or thought by the trainee. By providing a restrictive, structured training protocol, participants are not encouraged to explore the material or learn the concepts beyond what is given to them (Keith & Frese, 2005). As result, trainee motivation to learn and apply the content tends to derive from

extrinsic sources (e.g., to satisfy the organization) rather than intrinsic sources (e.g., to become a more effective team member; Iran-Nejad, 1990).

The use of traditional methods (e.g., a lecture or presentation) has frequently improved trainee performance, but the use of more active training methods in addition to a lecture tends to yield a more effective training program (Arthur et al., 2003). These active training methods include self-guided instruction, role play (usually with simulator), or guided group discussions. Based on these empirical findings, as well as the discussed limitations above, a strong design for teamwork training could make use of active learning techniques to deliver the training, supplemented by a lecture for trainee orientation. What follows is a discussion of the active learning methods used for this teamwork training.

#### *Active Approaches to Training*

Active learning approaches, in contrast to traditional methods, give trainees control over their own learning by granting them greater autonomy and responsibilities (Salas & Canon-Bowers, 2001). Rather than simply giving information to participants, active training asks participants to practice the training skills and provides subsequent feedback. Through the addition of practice and feedback, active training techniques capture the four basic principles of training (traditional methods only capture two principles, as discussed above). Whereas the training process is regulated externally by a trainer in traditional methods, learning is self-regulated by the trainee in active approaches (Bell & Kozlowski, 2008). Active training methods simply use formal training design elements to promote the motivational processes that underlie this self-regulated learning (Mayer, 2004). Theoretically, this design not only encourages trainees



to continue learning beyond the training module, but also prepares trainees to resolve novel problems by encouraging adaptive transfer (Ivancic & Hesketh, 2000). Active methods tend to use new advances in technology, such as auto-instruction software or sophisticated simulation programs, in order to immerse the participant in the training content. Researchers have designed several training approaches reflective of active learning approaches, including exploration (enactive and guided), errors-based training, and mastery training (Bell & Kozlowski, 2008). These different training methods for active learning are next explored and discussed in relation to teamwork skills.

*Guided Exploration: Role Play and Feedback.* Whereas some active training techniques give trainees full autonomy over their learning progress (e.g., experiential learning), guided exploration proceeds in a pre-planned manner, with consistent feedback provided by a trainer (DeBowski, Wood, & Bandura, 2001). Through the addition of structured tasks and feedback, trainees are provided with more detailed knowledge on their learning progress, but the trainee is still able to explore the task beyond these constraints. In CRM, guided exploration techniques usually involve the use of role play with guided self-correction or trainer feedback (Salas et al., 2001)

In role play, participants are given a description of a scenario and then told to act out the scenario in their assigned roles. Ideally, participants would then use this simulation to practice the behaviors targeted in the training. Although role plays may vary in their level of structure (Decker & Nathan, 1985) they generally have more structure than experiential methods. This added level of structure allows the trainer to give guidance and feedback based on the role play behaviors exhibited. Role playing has

been positively associated with training effectiveness in a variety of situations (e.g., Skarlicki & Latham, 1996).

Role playing may also vary by the fidelity of the scenario or simulation used. Low fidelity simulations do not capture as many task elements as high fidelity simulations, but they still allow for trainees to practice solving some example problems. The primary benefit of low fidelity simulations is their economy and flexibility, making them accessible for a variety of environments and samples. High-fidelity simulations capture many of the task elements, such that participants can practice behaviors on a realistic simulation of task problems, but they are also more costly and inefficient to administer. Research has indicated that training may be effective with low-fidelity simulators despite their lower fidelity to the task (e.g., Brannick, Prince, & Salas, 2005). Because low fidelity simulations effectively simplify the task, however, they limit both the scenario possibilities as well as the range of behaviors required to perform the task (Prince, Ellis, Brannick, & Salas, 2007). Still, low fidelity simulators have their use if they can provide psychological fidelity. That is, if the simulation can capture the important features of the task in order to preserve the need for the trained skills and behaviors, then the simulation should still be effective.

Guided exploration and role play depend upon reflection and feedback of the training scenario in order to be successful. This feedback uses the principle of cognitive modeling by demonstrating the cognitive or behavioral steps required to solve a problem (Bandura, 1997). Furthermore, trainer feedback has a significant impact on training effectiveness, making it one of the basic principles for effective training (Brannick & Prince, 1997). Another form of training feedback resides in guided self-correction

(Smith-Jentsch, Zeisig, Acton, & McPherson, 1998). In this technique, an instructor leads a discussion on the team behaviors performed during a practice task. The team is prompted to explore their past behaviors and assess their positive and negative impact. The goal of the instructor and the team is to identify strengths and weaknesses of the team in order to improve on the next task. This form of training has also been associated with positive results in the area of teamwork training (e.g., Smith- Jentsch et al., 1998).

*Mastery Training.* By addressing the self-regulatory mechanisms in the trainee, training research has quickly learned the importance of goal-setting and the framing of training goals. Based on the goal-setting literature stemming from the work by Locke and Latham (1990), training goals should be specifically elaborated by the trainee and relatively difficult to achieve. Self-regulation is also affected by the type of achievement goals. These achievement goals are: a mastery goal, focused on the development of competence and task mastery; a performance-prove goal, focused on the attainment of favorable judgments of competence; and a performance-avoid goal, focused on avoiding perceptions of failure and incompetence (Elliot & Church, 1997). Research has generally concluded that trainees with a mastery orientation have higher levels of intrinsic motivation, self-efficacy, effort, and persistence (e.g., Rawsthorne & Elliot, 1999; Kozlowski et al., 2001). In short, learning-based goals are more effective because they encourage the participant to learn all features of the content and to continue learning even when his/her performance is poor. With performance-based goals, however, participants are more likely to learn only what they need for effective training performance. Furthermore, performance-based goals are more likely to induce frustration at poor

performance, which can inhibit self-regulation and ultimately lead to the participant to quit trying.

Learning-based goals are derived in part from individual dispositions (e.g., goal orientation as a trait; Kozlowski & Bell, 2003), but they may also be encouraged by situational factors. Mastery training encourages the adoption of learning-based based goals by manipulating the environment and training instructions. Specifically, a mastery orientation is induced in trainees through the framing of errors, and participants are assured that task expertise may be acquired with enough practice (e.g., Martocchio, 1994). Results from this form of training have generally been positive (e.g., Kozlowski & Bell, 2006). In teams, a mastery orientation has been associated with greater transfer of knowledge and skills, as well as a greater performance in novel situations (e.g., Bereby-Meyer, Moran, & Unger-Aviram, 2004). Therefore, the inclusion of mastery training (or “framing”) to traditional role playing should enhance training effectiveness. In validating the use of high fidelity role playing scenarios, the current study makes use of mastery training techniques to enhance training effectiveness.

*Error Management Training.* Error management is similar to mastery training because it also informs trainees about the positive function of errors during training. When errors are framed as a natural, instructive learning tool, individuals are more likely to develop a mastery orientation (Ivancic & Hesketh, 1995). When errors are framed as a punishment for poor performance, trainees are more likely to adopt performance-avoid goals. Whereas traditional forms of training emphasize errors as negative events to be avoided, error management training encourages a positive view of errors because such events provide great learning opportunities. Error management tasks are also difficult

throughout the training, thereby exposing participants to many errors possibilities to stimulate learning (Heimbeck et al., 2003; Hesketh & Ivancic, 2002). It is noted that this feature is different from other forms of active learning, in which training tasks are generally structured to be easy and progress with increasing difficulty.

With regards to teamwork training, error management training represents a new “evolution” from traditional CRM methods (Helmreich et al., 1999). This approach facilitates the learning process from errors by providing teams with management strategies to aid the recognition and removal of future errors. These strategies break down into three basic components: 1) recognizing and avoiding a potential error, 2) recognizing and removing (or “trapping”) an existing error before consequences are felt, and 3) mitigating the damage from errors not avoided or trapped (Helmreich et al., 1999). Because this form of training is relatively new to team training, however, there is limited evidence that it improves the effectiveness of teamwork training. The current study employed error-based training by providing guidance on common teamwork errors during medical role play scenarios. Trainer feedback after the role play focused on avoiding and managing these types of teamwork breakdowns in the trauma room. To examine the cognitive effect of such mastery training, this study measured Learning Goal Orientation (LGO) before and after training. In part, training effectiveness can be judged by the increase in LGO scores over training.

### *Training Evaluations*

As the training literature has developed, greater emphasis has been placed on the criteria used to validate a training program. In short, the training criterion matters. However, teamwork training literature has been largely inconsistent in the types of

criteria used in evaluations. In an effort to systematize the research on training validation, Kirkpatrick (1976) provided a typology of training evaluations that guides much of the training evaluation studies today. This typology consists of trainee reactions, learning, behaviors, and task/organizational outcomes. Subsequent research would further outline these categories (e.g., Kraiger, Ford, & Salas, 1993) to provide a more robust account of the types of evaluations used in research and practice. These evaluations are discussed next.

*Reactions.* Reaction criteria refer to trainee perceptions regarding the training program itself. This type of criterion is usually measured by asking participants the degree to which they enjoyed the training program and believed it to be worthwhile, interesting, well-administered, and useful (Kirkpatrick, 1976). Reaction criteria are important because such reactions may impact trainee motivation and transfer. If trainees see the training as worthless, they are unlikely to attempt to use it on the job.

There are theoretical and empirical reasons to assess reaction criteria as a collection of specific constructs rather than as a global construct. Although measuring trainee enjoyment of the task may provide insight for the trainer, utility reactions are more strongly related to learning and performance criteria (Alliger, Tannenbaum, Bennett, & Traver, 1997). This finding suggests that a trainee's belief that a program was effective is more likely to improve learning and performance than the trainee's mere enjoyment of the protocol. Belief in the efficacy of a training program is also much more likely to affect trainee motivational processes, such as their self-efficacy, goal-setting, effort, and persistence. That is, if trainees believe that a training program can benefit them, they will be more likely to believe that they may improve themselves. This

increased self-efficacy, in turn, should promote higher quality goals and more effort and persistence in the training task (Bandura & Locke, 2003).

Existing evidence indicates that trainees who have participated in CRM have enjoyed it, though this was moderated by the type of training. In general, participants enjoyed role playing much more than lecture-based training (e.g., Baker, Baumen, & Zalesny, 1991; Schiewe, 1995). This finding suggests not only performance benefits from active and interactive approaches to training, but affective benefits as well. Although the affective reactions are valuable pieces of information for a trainer, these criteria do not indicate whether trainees believed the training content was valuable. Research assessing utility criteria is much more limited, but existing findings suggest that trainees see CRM as relevant to their jobs and believe it should be expanded to other teams (e.g., Incalcaterra & Holt, 1999; cf. Salas et al., 2001). However, many studies on CRM utility reactions use qualitative descriptions instead of quantitative data (Salas et al., 2007). The current study provides both quantitative and qualitative indices of utility reactions to determine whether medical residents find this training program useful to their work.

*Learning.* Despite the value of affective reactions as criteria, such criteria are limited because they do not target directly the actual skills and behaviors that were supposed to be acquired during the training. The next level of training outcomes focuses on observable indices of what a person can do, rather than what they say they can do or how they feel about the training. Kirkpatrick (1976) proposed a general learning construct, but distinguishing among specific types of learning outcomes is more useful from both a theoretical and practical perspective (e.g., Kraiger et al., 1993). Specifically, trainees may have cognitive-based, skill-based, or affective-based learning (Kraiger et al.,

1993). Cognitive-based learning describes the amount and type of knowledge learned by the participant. Skill-based learning refers to the development of technical and motor skills. Finally, affective-based learning refers to attitudinal and motivational changes from the training. Measuring these different types of learning outcomes allows one to more precisely determine which processes are being impacted by the training. For example, a diversity training program likely targets affective learning (e.g., changing viewpoints on race) to improve behaviors and outcomes. As a result, evaluations for such training designs would most likely benefit from measures of affective learning.

Teamwork training studies have found that training positively impacts affective-based learning in teams by inducing more positive attitudes towards the teamwork behaviors of interest (e.g., Gregorich, 1993; Irwin, 1991). Interestingly, a few studies also report that participant attitudes were more negative of the teamwork behaviors following the training (a.k.a. “boomerang effect”; Helmreich et al., 1999). Helmreich et al. (1999) suggested that personality and cultural factors impact whether trainees report an increase or decrease in positive attitudes. Affective-based learning outcomes are important to assess in training primarily because more positive attitudes towards the behavioral content should lead to more frequent executions of those behaviors. In other words, team members who look favorably upon teamwork should make greater efforts to perform them during task performance. To ensure that our training program improves attitudes towards teamwork, this study examines affective learning in trainees by measuring attitudes towards teamwork behaviors in a medical context.

It is believed that teamwork training will improve attitudes learning in a medical context by increasing salience and acceptance of critical teamwork behaviors. Because



teamwork concepts have not been formally trained in residents, initial teamwork attitudes should stem from prior experiences or intuitive appeal. Post-training attitudes should instead be based upon training concepts and experiences. As a result, pre-training attitude scores should vary randomly, whereas post-training attitudes should yield high, stable attitude scores.

*Hypothesis 1:* Attitudes towards teamwork will have higher means after the teamwork training than before.

*Behaviors.* Although positive attitudes toward teamwork are important, the primary intention of teamwork training is to change the awareness and execution of the teamwork behaviors. Behavior-based training criteria are important for two reasons. First, they specify the behaviors desired by trainees during the course of the training program. Second, behavioral criteria may determine if the training will actually change the target behaviors in trainees. Because it is the behaviors that are usually being targeted in a training program, behavior-based criteria reflect the most direct evaluation of the trainee's ability to apply the training content. This type of criterion can also indicate trainee readiness and ability to perform on the job (Canon-Bowers et al., 1989).

In teamwork training, behavior-base criteria generally refer to process behaviors such as communication, coordination, monitoring, and others (e.g., Hackman, 1987; Dickinson & McIntyre, 1995). However, the team performance literature has struggled to achieve a common framework for the structure and definitions of teamwork behaviors. A recent review, for example, documented 29 studies with different taxonomies of team behaviors (Rousseau, Aube, & Vincent, 2006). These various frameworks may unfortunately stem from the multitude of team types and tasks studied in the literature.

The use of multiple frameworks for team behaviors has also posed a problem in teamwork training literature. The teamwork training primarily focuses on five teamwork dimensions identified by previous medical teamwork studies (e.g., Amodeo, Baker, & Krokos, 2009). These dimensions are: team structure, leadership, communication, monitoring, and mutual support. Team structure refers to the degree that members orient to team goals instead of individual goals and correctly assume roles within the team. Leadership focuses on effective leadership behaviors for the team, which include considering team member input and making a decision. Communication describes sharing information and suggestions with other team members, particularly leadership. Monitoring refers to maintaining awareness of patient condition and the status of other team members. Finally, mutual support describes team member willingness to request or provide assistance. Specific examples of these behaviors for an emergency room situation are provided later in a discussion of the training context.

Teamwork training studies using team behaviors as the evaluation criteria have witnessed inconsistent results with regards to effectiveness (Salas et al., 2007). The type of behaviors and the method of measuring these behaviors may account for some of this inconsistency. Because team behaviors serve different functions during team performance (e.g., Marks, Mathieu, & Zaccaro, 2001), it is likely that they may be affected differently by training interventions. Indeed, several studies reported that teamwork training affected team behaviors differentially (e.g., Spiker, Nullmeyer, Tourville, & Silverman, 1998), suggesting that some behaviors are simply more easily trained or transferred than others. Team communication, for example, appears to benefit from teamwork training more so

than other types of behaviors (Salas et al., 2001). Studies which yielded poor results in evaluating team behaviors, then, may have simply been targeting the wrong behaviors.

In addition, most studies using self-rated measures of behavior are quite positive (e.g., Gran & Valet, 1997; Incalcaterra & Holt, 1999). Studies with observational measures of team behaviors, however, show more modest results (e.g., Brannick, Prince, Prince, & Salas, 1995; Jentsch, Bowers, & Holmes, 1995). As a result, the effectiveness of teamwork training on improving behaviors is unclear due to methodological reasons. For logistical purposes, observational ratings were not possible to obtain for every trainee on every scenario. This training program instead measured and examined the behavioral intentions of trainees through the use of a Situational Judgment Test (SJT). The SJT items were designed to elicit behavioral responses to scenarios that describe a particular challenge to effective teamwork. Thus, we may consider the teamwork SJT a measure of stated behavioral intentions. This training evaluation assesses these behavioral intentions to examine the behavioral effects of the training program. Because an SJT poses a variety of critical incidents or work situations, this measure may capture effective behaviors for many types of challenges in medical teamwork. Behavioral observations, on the other hand, only survey the behaviors performed in specific situation or role play. However, SJT responses only capture behavioral intentions and not actual behaviors, posing a limitation on the measure.

*Hypothesis 2:* Trainee responses to teamwork incidents in Situational Judgment Test will shift to reflect more effective teamwork behaviors (leadership, communication, monitoring, mutual support).

*Outcomes.* Outcome evaluations describe the ultimate results at the task and organizational level from the training program. Examples of such evaluations include whether the training reduced the total number of accidents or improved the number of sales or the amount of profit. This is an evaluation highly valued by organizations as it provides information on whether the training program is “paying off.” Unfortunately, outcome evaluations are rarely included in teamwork training studies and are often difficult to link clearly to the training program. Accidents and critical incidents that training is designed to prevent typically have a low base rate, which makes it difficult to obtain statistical significance for training interventions. Furthermore, the results from training may take months or even years to surface at the organizational level, a phenomena which can only be captured through longitudinal design. Such longitudinal designs are difficult to employ and are rarely used.

Existing research on organizational outcomes from CRM is positive but far from conclusive. In a rare longitudinal study, Byrnes and Black (1993) found that CRM training improved pilot outcomes in the form of air carrier discrepancy reports. However, this study provided no control group to rule out the influence of environmental factors which affect air travel. The bulk of the remaining evidence with regards to organizational outcomes lies in anecdotal evidence. Generally, anecdotal evidence is positive, but the lack of statistical comparisons presents a problem. Although organizational outcomes are valuable criteria to assess with regards to training, the current study focused on reaction, learning, and behavioral criteria for practical reasons. Because of the inherent time delay between training and organizational outcomes, this study focuses on more immediate criteria. Specifically, the results criterion for this study was of a more short-term nature,

in which trainee performance on scenario tasks was assessed both pre- and post- training. Including simulation outcome measures provides some information on the immediate impact of training on task performance. However, it fails to answer whether trainees successfully transferred the skills to their actual jobs, and whether the training had a long term impact on organizational outcomes.

*Training Context: Trauma Teamwork*

When designing a teamwork training program, it is useful to consider the type of team being targeted, as well as the team's tasks. This is because the specific behaviors to be trained may vary by task and team type. Furthermore, the general effectiveness of a training program may be task-dependent, in which teamwork behaviors easily trained for one team type are not easily trained in another team type. As a result, when designing a training protocol, it is necessary to specify the team and task type that the training is designed to improve. In doing so, the training program can specifically target the relevant behaviors to the team and improve the transfer of team behaviors from the training to the actual job. Towards this end, the current study focuses on the impact of team building in medical teams, specifically emergency room trauma teams.

According to Devine's (2002) taxonomy of team types, medical teams diagnose the physical condition of patients and take appropriate steps to improve their health. They typically operate under severe time constraints, with the health of the patient contingent on appropriate procedures being executed in a particular window of time. Medical team tasks are usually very structured, with the aid of standardized diagnostic protocols and operating procedures and a highly controlled operating environment. They are generally assembled for a particular mission (e.g., a resuscitation) or a defined period of time (i.e.,

a shift); roles tend to be fairly specialized and based on mastery of procedures as they relate to particular instruments, devices, and substances (surgeon, anesthesiologist, nurse, etc.). Within this context, team behaviors typically consist of effective communication, leadership, performance monitoring, helping (or backup), and conflict resolution. Existing qualitative and quantitative research has also verified that teamwork behaviors such as the ones listed are a critical component of error and mishap prevention in a medical environment (e.g., Thomas et al., 2005; 2006).

Consultation with trauma Subject Matter Experts (SME's) and an examination of scenario descriptions yielded specific information on trauma team tasks and performance. The primary goal of trauma teams is to stabilize a patient in order to send him/her to further treatment (e.g., surgery, intensive care, out-patient). Obviously, the proper steps to stabilize the patient will depend upon the medical condition, but trauma teams must always monitor and maintain patient vital functions, including respiration and blood circulation.

The current study was conducted in a teaching hospital that employs medical residents. Although residents have received extensive training in medical procedures for these tasks, there is less time devoted to effective team interactions. Based upon feedback from residents and attending physicians, residents appear unsure how to voice a concern, how to handle a problematic resident or nurse, or how the organization perceives receiving help. Thus, there was a need for training teamwork in the trauma room.

Effective trauma room teamwork consists of many components. First, an effective team structure must be established. The organization in the current study employs six medical professionals for a standard trauma patient, with prescribed locations around the

bed or table and general roles at each position. For example, the person at the head of the table is in charge of maintaining a proper airway in the patient (being closest to the head and mouth). Effective team structure in the trauma room, then, refers to establishing the correct positions around the table, assuming the correct roles, and focusing on team goals.

Second, effective leadership is necessary for successful performance. Leadership is typically assumed by the most senior member in the room, but the communications between leaders and followers should be open and appropriate. Leaders should maintain discipline and make procedural/treatment decisions, but they should also consider input from team members, whether such input consists of diagnostic information or procedural suggestions. Because much of the communications within a trauma team occurs between the leader and team members, effective leadership has some overlap with the third dimension, effective communication. In general, team members should maintain an appropriate tone and wording when voicing a concern or sharing information. Likewise, leaders must be willing to communicate with team members, even if they disagree with their concern (it may be something as simple as: “I’ll explain it afterwards”).

Monitoring the situation is a responsibility of all team members. The main purpose of monitoring is to identify potential issues and errors in order to successfully treat a patient. Team members must alert other team members of new diagnostic information and stay aware of other member performance. Members may observe or inquire about the task progress of others (e.g., intubation), or they may repeat diagnostic information in order to maintain such awareness. If the monitoring process identifies an error, mutual support refers to the team process of preventing or removing this error. For example, a member may repeat a concern until it is acted upon, or they may assist another

team member struggling with a procedure. Most importantly, team members must assist each other constructively to avoid conflict from evaluation apprehension or negative feedback.

### *Study Purpose and Training Design*

Although results from the existing medical literature are positive, very few studies have been completed, so an optimal training method has yet to be determined and validated. This study contributed to the existing body of literature by adapting and validating a team behaviors training program for trauma room resuscitation. The current study examined training effectiveness based on trainee reactions, attitudinal changes towards learning and teamwork, and behavioral intentions through an SJT. It was hypothesized that the medical residents undergoing this training would demonstrate positive utility reactions to the training, exhibit affective-based learning of the targeted teamwork behaviors, and would choose different responses towards managing teamwork incidents. The specific training features included in this study were as follows:

(a) Lecture: to orient students to the training and teamwork concepts, we presented a lecture because it provides the most efficient means of information transfer. Such an introduction was intended to enhance the effectiveness of the medical role plays by providing some initial guidelines.

(b) Role play with Feedback and Guided Discussion: The primary focus of this training program was several role plays to demonstrate teamwork concepts, first in general and then in specific medical scenarios. Effective and ineffective teamwork were demonstrated through introductory role plays, and teamwork in the trauma room was trained using role plays in medical scenarios. Residents practiced managing a breakdown



in teamwork through a role play for a medical emergency. To enhance the transfer of teamwork behaviors from the training to the task, a medical simulator was used to provide diagnostic information on the patient and a fake body for participants to treat. These scenarios provided a medical emergency, but also provided scenarios where a confederate created problems in teamwork. Trainers led a guided discussion afterwards as part of a debriefing process, providing feedback when appropriate during the discussion. Such feedback should reinforce positive behaviors, encourage teams to investigate their deficits, and facilitate more effective behaviors for the next task. Role play with feedback should not only enhance learning, but should also improve affective reactions to the training itself.

(c) Error Management/Mastery Training: The lecture portion of the training emphasized the value of learning from mistakes, and also provided some suggestions for how to deal with a breakdown in teamwork (e.g., “an error”).

Results from this study should benefit research and practice alike by examining the impact of these design features on reactions, attitudes, and behavioral intent. If successful, health organizations would benefit from training teamwork for trauma room resuscitation teams using such an approach. On a theoretical level, the results would increase our knowledge about teamwork training. Can teamwork, the process of moment-to-moment responses of one team member to another, be improved in a realistic, fast paced, life-critical task environment? Results would also benefit researchers by providing guidance for future training designs and evaluations.

## Chapter Two

### Method

#### *Design*

To test the efficacy of teamwork training for emergency room teams, this study implemented a between-groups design with repeated measures of multiple training criteria. Specifically, residents completed study measures before and after the training module for two separate training days. Trainees were assigned to training days as randomly as possible, although in some cases scheduling was based upon a resident's schedule. To summarize, the independent variables for this study were training group (1<sup>st</sup> or 2<sup>nd</sup>) and time of criteria measurement (pre- and post- training). The dependent variables were primarily team reactions, attitudes, as well as SJT test and item scores.

#### *Sample*

Forty-one first-year medical residents from a southeastern medical center were recruited to participate in this training over the course of one day. Five residents did not provide either pre-training or post-training scores due to a late arrival or early departure. The sample sizes for specific analyses were provided in the results to account for this missing data. Participating residents were all in the first year of residency at the hospital and were recruited by attending physicians who contributed to this study. The sample was relatively representative demographically, with 18 females and 9 Asian, African-

American, or Hispanic residents. The majority (N = 36) of the residents had received a M.D., but a few had earned some other advanced degree (e.g., Ph. D., D.O.).

### *Training Content*

The first exercise was a role play designed to serve as an icebreaker and to demonstrate ineffective teamwork. The exercise featured a science fiction scenario in which all trainees received a scripted personality and instructions to work with their team while adopting the scripted personality. The scripted personalities were designed to cause breakdowns in teamwork, thus illustrating the difficulty of problem-solving without effective teamwork. After the role play, participants were debriefed on the personalities being played and the real purpose of the exercise. Then trainers guided participant discussion on the dynamics that led to poor teamwork and poor task performance. A full script of the role play is presented in Appendix A.

The next exercise was a wilderness survival exercise designed to illustrate how groups may outperform individuals (Jones & Pfeffer, 1976). Participants chose the best answer to multiple choice questions about surviving in the wilderness, first individually, and then within groups. As is typical for this exercise, the group score was generally better than individual scores, showing participants the benefit of working in groups. Appendix B presents the wilderness exercise. After the exercise, residents were debriefed on the purpose of the exercise (an illustration of the benefits of teamwork) and led through a discussion of their experiences.

Following these exercises, teamwork concepts were explicitly provided to participants in the form of a brief lecture. The lecture was meant to complement the exercises by giving clear information about the recently demonstrated concepts in the

context of medical teamwork. It was during this time that error framing and error management were incorporated into the training. Specifically, participants received encouragement to learn from any mistakes, but were provided some guidelines for avoiding teamwork breakdowns and managing a problematic team member (“recognizing” and “trapping” errors).

After the lecture, 5-6 participants performed emergency medical tasks within a medical simulation. The scenarios were developed by the researchers and an expert physician in trauma resuscitation who was affiliated with the teaching hospital. Along with the participants was a confederate (recruited from available staff) who was instructed to cause a specific issue in teamwork. For example, one scenario placed the confederate as the team leader, where the confederate was scripted to be a poor leader who gave little direction. The team was instructed to identify this issue and resolve it while successfully completing the medical task. A total of four scenarios were run to allow all trainees to participate in exactly one scenario. These scenarios were also recorded and broadcast live to a viewing room, so that trainees not currently participating in the scenario could watch and learn from the role play. As a result, each trainee participated in one scenario, and observed the other 3 scenarios.

The first medical scenario used a confederate who insisted on sending the patient to surgery before the patient was adequately evaluated. Effective responses discussed in the feedback section included an assertive but polite response to the nurse, maintaining awareness as the patient condition changed, and finishing patient resuscitation and evaluation before taking the actions recommended by the confederate (sending the patient to surgery). The second role play featured a confederate making a common procedural

error (in intubation), which the team must identify and correct in order to successfully treat the patient. Effective behaviors referred to constant monitoring and communication of diagnostic information, and correcting the intubation error. The third scenario featured a timid confederate leader who failed to initiate structure or make decisions regarding treatment. Team members had to recognize a pre-existing error (from “emergency responders”) and correct the issue before sending the patient to surgery, which required another leader to emerge and make team decisions. Finally, the fourth and final role play featured a confederate with hostility towards the patient (a drunk driver in an accident), exhibited by negative and inappropriate comments throughout the session. Team members needed to assertively silence the confederate while treating the patient, who had complications during the resuscitation.

To facilitate feedback and guided discussion, the video was played back to the entire group. Trainers provided comments on specific issues and critical incidents, but they also asked questions of the participants to encourage an interactive discussion. Ineffective behaviors were highlighted, and trainers then asked for suggestions of more effective behaviors (reinforcing the more positive behaviors). For example, if team members hesitated to assume leadership, the trainers suggested directing specific inquiries to the designated leader in order to gauge the need for assuming command.

### *Measures*

*Pre-Training Questionnaire.* Prior to training, participants were asked to provide demographic and occupational information. This questionnaire also asked if the participant had been involved in any prior teamwork training programs (none had). Because trainee interest in training often relates to training success (Mathieu &

Martineau, 1997), the scale also asked participants to indicate their interest in participation for the training. Appendix C presents the items.

*Learning Goal Orientation.* Learning Goal Orientation (LGO) was measured using an eight item, 5-point Likert scale developed by Button, Mathieu and Zajac (1996). This scale is provided in Appendix D.

*Teamwork Attitudes.* Attitudes toward teamwork in medicine were measured using 21 items from the Teamwork Attitudes in Medicine (Amodeo et al., 2009), adapted to fit trauma teamwork specifically. See Appendix E for this scale.

*Teamwork Behaviors.* Behavioral intentions were measured using a Situational Judgment Test (SJT) developed specifically for teamwork issues in medical emergency tasks. Subject Matter Experts (SMEs) constructed items that reflected previous or potential issues in trauma room teamwork. The SJT was developed through consultation with the trauma expert who helped develop the medical role plays. The items asked trainees to choose behavioral responses to critical teamwork incidents in the trauma room. The items reflected situations which were analogous, but not identical, to the medical scenarios used in the role plays, such as an ineffective leader, inappropriate comments by team members, or procedural errors that need correcting.

Trainees and a set of four SMEs chose their most likely and least likely behaviors out of a total of four options. The SMEs included attending physicians; two specialized in general trauma resuscitation, one specialized in neonatal resuscitation, and the last an attending emergency surgeon. A total of 15 situational items were administered, which may be observed in Appendix F. An SJT scale score was computed by giving a point for every response that matched the expert responses. Expert responses were determined by

the modal response among experts. Items 3, 8, 11, 12, and 14 were only partially scored when computing scale totals because experts provided more than 1 mode for either the most or least likely response. For items with partial scoring, the response with one expert mode was scored (e.g., “most likely”), but responses with more than one mode were not scored (e.g., “least likely”).

The internal consistency of the SJT scale was relatively low ( $\alpha = .42$  pretest,  $.44$  posttest), but these types of tests generally do not exhibit strong internal consistencies due to the variety of situations being posed. The reliability of SME scores was estimated by treating different response options as distinct categories and calculating kappa to estimate agreement. Kappa for expert scores was  $.68$ , a reasonably acceptable level of agreement among expert responses. The SJT scale was used for mean comparisons, but chi-squares were also conducted upon each item, even the ones with multiple expert modes.

*Reactions.* Trainee utility reactions were measured using a scale that asked participants about the degree to which they liked the training and the degree to which they believed the training would be useful. Because these questions are training specific, reaction measures were not assessed until after the team had completed the training. The reaction scale measure can be viewed at Appendix G. Responses to this scale helped diagnose particular problems with the training approach from the trainee’s perspective.

### *Procedure*

Two recruited SMEs served as the trainers for this study, an attending M.D. experienced in emergency trauma care, and a Ph.D. experienced in observing and facilitating teamwork. The trainers explained that the purpose of the training was to improve teamwork for trauma room emergencies, and trainees provided consent to have

data used for publication. Participants were trained on either day one or day two, but not both days. First, participants completed the demographics form and pre-test measures of the survey. Then, trainers guided participants through the training protocol as described earlier. The procedure concluded with a second administration of the reaction, attitudes, and SJT scales.

### *Analyses*

Training evaluation focused upon the difference in trainee responses from pre-training to post-training. Given the study design, several paired and independent *t*-tests were conducted to assess mean differences for attitude and SJT total scores. Independent *t*-tests were planned contrasts between pre-training measures for the first group and the post-training measures for the second group, and vice versa. This design used each group's pretest scores to serve as the other group's control. Thus, using this design, training was compared to a no-training control, but not to a placebo training of equivalent duration. Such a design was preferable to single group pre- and post-test comparisons for the same training day. When comparing pre- and post-test measures for the same group, it was more difficult to discount the potential effect of nuisance variables specific to that group, such as specific team performances in the medical role plays. However, because pre-post comparisons may still yield information with regards to training effectiveness, paired *t*-tests examined the mean difference between pre- and post-training outcomes for each group.

In addition to using total SJT scores for group comparisons, this study analyzed each SJT item response using frequency tables and chi-square goodness of fit tests. The goodness of fit test treated the observed frequencies from pre-training SJT item responses



as the expected frequencies for post-training SJT responses. A chi-square then estimated the degree of fit between the observed post-training responses to the expected frequencies for each response option (most and least likely for each item). If training had no effect on trainee response choices, one would expect post-training scores to be the same or very similar to pre-training scores. Thus, a significant chi-square would suggest a significant effect of training on item responses, based on shifts in the frequency tables. Bar charts provided an illustration of some of the more interesting response shifts.

## Chapter Three

### Results

Table 1 presents the means, standard deviations, and inter-correlations of continuous variables in the study. Tables 2 and 3 present the means, standard deviations, and inter-correlations for each training group (day 1 and day 2), respectively. The level of interest in training did not relate to any of the study variables except the reactions measure, so using this variable as a covariate in additional analyses was deemed unnecessary. There were strong positive correlations among the self-report measures, particularly with the reaction score and the learning goal orientation. These correlations suggest a general relationship between learning goal orientation, teamwork attitudes, and training reactions. It should not be surprising that participants who enjoy learning new material would also enjoy the teamwork training and have positive attitudes towards its content. However, these high correlations may also reflect a general response bias in self report measures. In particular, high scale means cause reason for concern of score inflation by respondents, or a general halo effect. The ceiling effects of study self-report variables are illustrated via boxplots in Figure 1.

Surprisingly, SJT scores (both time 1 and time 2) did not relate to LGO or teamwork attitudes, suggesting that having positive attitudes and a learning goal orientation does not mean one will know the right response to a breakdown in teamwork. SJT scores also did not relate to trainee reactions. Finally, the distributions of all

Table 1. *Descriptive Statistics and Inter-correlations for Self-Report Measures*

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
1. Interest in Training	1.90	0.72	--							
2. LGO, Time 1	4.42	0.49	.15	(.90)						
3. LGO, Time 2	4.52	0.51	.13	.71**	(.94)					
4. Attitudes, Time 1	4.43	0.35	.16	.60**	.17	(.85)				
5. Attitudes, Time 2	4.44	0.41	.26	.48**	.60**	.47**	(.91)			
6. SJT Score, Time 1	14.63	3.61	-.06	-.01	-.08	-.17	-.25	(.42)		
7. SJT Score, Time 2	16.89	2.57	-.13	-.05	.06	-.28	.04	.40*	(.44)	
8. Reactions	4.02	0.84	.63**	.56**	.27	.53**	.39*	.01	.17	(.91)

Note. LGO = Learning Goal Orientation. SJT = Situational Judgment Test. N = 34-41. Scale reliabilities (alpha) on diagonal. \*p < .05, \*\*p < .01.

Table 2. *Descriptive Statistics and Intercorrelations for the First Training Group*

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
1. Interest in Training	1.95	0.62	--							
2. LGO, Time 1	4.54	0.42	.25	(.90)						
3. LGO, Time 2	4.48	0.62	.53*	.87**	(.94)					
4. Attitudes, Time 1	4.44	0.23	-.38	.47*	.34	(.85)				
5. Attitudes, Time 2	4.32	0.48	.30	.64**	.81**	.47	(.91)			
6. SJT Score, Time 1	15.63	4.06	.15	-.06	.39	-.37	.48	(.50)		
7. SJT Score, Time 2	17.29	1.99	.02	.12	.27	-.05	.50*	.74**	(.48)	
8. Reactions	4.37	0.62	.62**	.64**	.83**	.29	.84**	.15	.02	(.91)

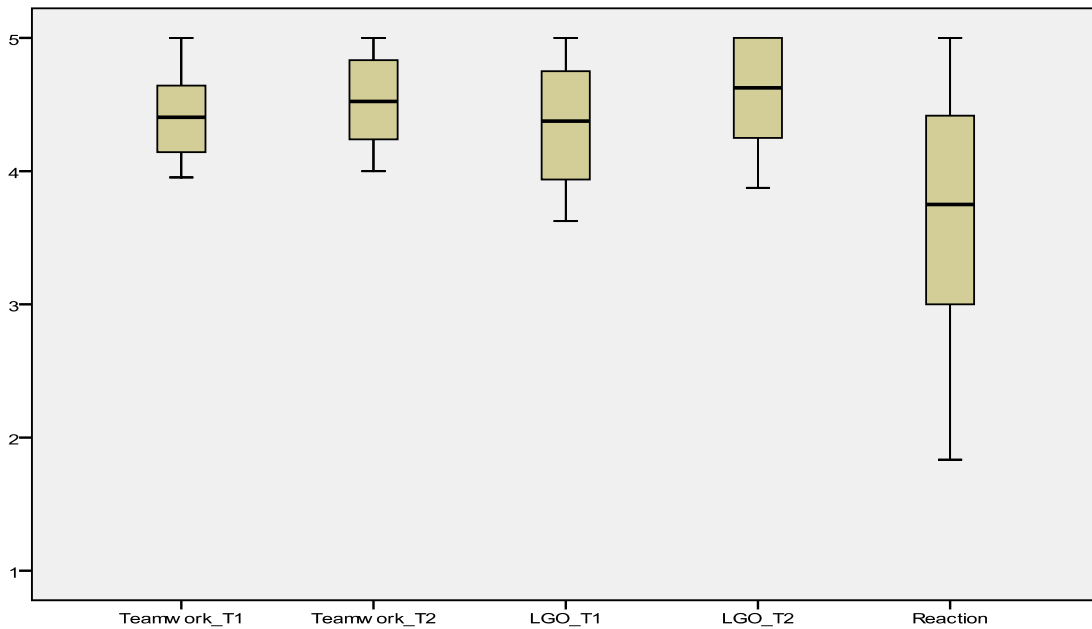
Note. LGO = Learning Goal Orientation. SJT = Situational Judgment Test. N = 34-41. Scale reliabilities (alpha) on diagonal. \*p < .05, \*\*p < .01.

Table 3. *Descriptive Statistics and Intercorrelations for the Second Training Group*

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
1. Interest in Training	1.85	0.83	--							
2. LGO, Time 1	4.31	0.53	.06	(.90)						
3. LGO, Time 2	4.54	0.42	-.19	.61**	(.94)					
4. Attitudes, Time 1	4.41	0.34	.45*	.67**	.06	(.85)				
5. Attitudes, Time 2	4.53	0.33	.29	.51*	.30	.57**	(.91)			
6. SJT Score, Time 1	13.77	4.06	-.33	-.08	-.38	-.06	-.57**	(.50)		
7. SJT Score, Time 2	16.55	1.99	-.20	-.21	-.03	-.39	-.10	.14	(.48)	
8. Reactions	3.73	0.95	.62**	.50*	.05	.50*	.46*	-.25	.11	(.91)

Note. LGO = Learning Goal Orientation. SJT = Situational Judgment Test. N = 34-41. Scale reliabilities (alpha) on diagonal. \*p < .05, \*\*p < .01.

Figure 1. Boxplots of Teamwork, Learning Goal Orientation, and Reactions Scale Scores



continuous variables were relatively normal, suggesting that the data met the assumptions for mean comparisons.

#### *Results for Group Comparisons*

LGO, teamwork attitudes, and SJT score means were first compared for the pre-test measures from day two and the post-test measures from day one. Mean differences were not statistically significant for LGO ( $t(34) = 1.58, p = .12$ ) or teamwork attitudes ( $t(36) = -0.68, p = .50$ ), contrary to expectations. However, group 1's post training scores ( $M = 17.29, SD = 1.99$ ) for the teamwork SJT were significantly higher than group 2's pre-training score ( $M = 13.77, SD = 3.01, t(37) = 4.39, p < .001$ ). This result illustrated a strong effect ( $d = 1.38$ ), which would suggest some benefit from the training.

Next, analyses examined mean differences between pre-training scores for day one and post-training scores for day two. However, this comparison did not yield

statistically significant mean differences between groups for any criterion. With regards to the SJT scores, the post-training mean ( $M = 16.55$ ) for day two was higher than day one's pre-training mean ( $M = 15.63$ ), but the effect size for this difference was small ( $d = 0.26$ ) and not statistically significant ( $t(36) = 0.81, p = .90$ ).

Finally, analyses were conducted comparing the pre-training score to post-training scores within each training day. Table 2 provides the means and standard deviations for the pre- and post-training scores of the first training group. This comparison yielded small mean differences for teamwork attitudes ( $t(15) = 1.07, p = .30$ ) and LGO ( $t(14) = .20, p = .84$ ), but it showed a marginal difference for SJT scores ( $t(16) = 1.95, p < .10$ ) and a modest effect size ( $d = 0.34$ ). Table 3 provides the statistics for the second training day. Again, teamwork attitudes did not improve statistically from pre-to post-training ( $t(19) = 1.60, p = .13$ ), but LGO scores were significantly higher post-training than pre-training ( $t(19) = 2.35, p < .05, d = 0.46$ ). SJT scores exhibited a large mean difference between pre-and post training for the second training group ( $t(19) = 2.78, p < .01$ ). This difference reflected a strong effect size ( $d = 0.82$ )

In summary, training did not affect trainee teamwork attitudes in any comparisons and only affected LGO in the pre- and post-test comparisons for the second training group. Results for the SJT, however, demonstrated an effect in three out of the four comparisons used. To examine if specific items were driving the positive shift in SJT scores, item-level analyses were conducted using the chi-square goodness of fit.

#### *Item Analysis for the Situational Judgment Test*

Tables 4-18 present the pre- and post- training frequencies, as well as the chi-square test results, for the most and least likely responses of the 15 SJT items. To

summarize, the data suggest a significant effect of training on one or both responses for SJT items save for items five and eight. An examination of the frequency tables finds three forms of response shifts, which will be discussed more in depth next. The first type of response shift occurred when trainee post-training responses aligned more closely with expert responses than pre-training responses, which reflects the optimal result from the training. Items 3, 4, 7, 9, 13, and 14 demonstrated such an effect with either the “most likely” or “least likely” responses. The second type of shift describes a pattern where neither pre- nor post-training scores matched expert responses, but a shift was detected nonetheless. Instead, trainees shifted from one distracter option to another, or experts failed to agree on an optimal response. Items 10, 11, and 12 appeared to yield such effects. Finally, the “least likely” responses to items 1, 2, 6, and 15 demonstrated effects where trainee responses matched experts’ more closely prior to training than afterwards

To illustrate the pattern of these response shifts in relation to the SJT questions, figures 2- 8 provide example item questions, item response options, and bar charts of trainee (time 1 and time 2) and SME responses. These figures focus primarily on the effective items, but they provide a couple of examples where item responses shifted, but not necessarily for the better. First, Figure 2 presents the results for the least likely responses to item 3, which presents a situation where the team leader is hesitating to make a time-critical decision. With time being a critical factor, the worst response in this situation is to have a full discussion of team issues. The best treatment decision must be made quickly, preferably by the leader but by another team member if necessary. Thus, the observed response shift represents an improvement in resident scores from pre- to post-training.

Table 4. Pre- and Post-Training Response Frequencies for SJT Item 1.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	0	0	0	0	A	0	0	2	1	3
B	3	27	0	1	31	B	0	0	0	0	0
C	0	4	2	0	6	C	0	0	0	1	1
D	0	0	0	0	0	D	1	0	4	27	32
Total	3	31	2	1	37	Total	1	0	6	29	36
$\chi^2 = 6.92, df = 3, n.s.$					$\chi^2 = 26.62, df = 3, p < .01$						

Note. Shaded response notes modal expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 5. Pre- and Post-Training Response Frequencies for SJT Item 2.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	0	0	0	0	A	23	2	5	0	30
B	0	0	0	2	2	B	0	1	2	0	3
C	0	0	1	3	4	C	2	0	0	0	2
D	0	1	0	29	30	D	0	0	0	0	0
Total	0	1	1	34	36	Total	25	3	7	0	35
$\chi^2 = 2.77, df = 3, n.s.$					$\chi^2 = 13.26, df = 3, p < .01$						

Note. Shaded response notes modal expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 6. Pre- and Post-Training Response Frequencies for SJT Item 3.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	1	0	1	0	2	A	6	0	0	11	17
B	0	6	1	1	8	B	0	1	0	1	1
C	1	6	11	0	18	C	0	0	0	0	0
D	0	2	2	4	4	D	2	0	1	13	16
Total	2	14	15	5	37	Total	8	1	3	25	35
$\chi^2 = 5.55, df = 3, n.s.$					$\chi^2 = 106.31, df = 3, p < .01$						

Notes. Shaded response notes modal expert rating. No shading indicates no modal expert response. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 7. Pre- and Post-Training Response Frequencies for SJT Item 4.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	0	6	0	6	A	2	2	0	1	5
B	0	0	1	1	2	B	3	11	0	2	16
C	0	0	20	0	20	C	1	1	0	0	2
D	0	0	6	2	8	D	5	3	0	4	12
Total	0	0	33	3	36	Total	11	17	0	7	35
$\chi^2 = 18.55, df = 3, p < .01$					$\chi^2 = 14.92, df = 3, p < .01$						

Note. Shaded response notes modal expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 8. Pre- and Post-Training Response Frequencies for SJT Item 5.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	0	1	0	1	A	0	0	0	0	0
B	0	0	0	0	0	B	1	1	0	5	7
C	2	0	33	0	35	C	0	0	0	0	0
D	0	0	0	0	0	D	1	6	0	21	28
Total	2	0	34	0	36	Total	2	7	0	26	35
$\chi^2 = 4.80, df = 3, n.s.$					$\chi^2 = 4.14, df = 2, n.s.$						

Note. Shaded response notes modal expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 9. Pre- and Post-Training Response Frequencies for SJT Item 6.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	12	8	0	1	21	A	0	0	0	0	0
B	0	14	0	0	14	B	0	0	0	0	0
C	0	0	0	0	0	C	0	1	4	1	6
D	1	0	0	0	1	D	0	0	8	21	29
Total	13	22	0	1	36	Total	0	1	12	22	35
$\chi^2 = 4.56, df = 3, n.s.$					$\chi^2 = 104.94, df = 3, p < .01$						

Note. Shaded response notes modal expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.



Table 10. Pre- and Post-Training Response Frequencies for SJT Item 7.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	3	2	0	5	A	2	0	0	0	2
B	0	17	7	0	24	B	0	1	0	0	1
C	0	1	5	0	6	C	0	0	1	2	3
D	0	0	1	0	1	D	1	1	0	27	29
Total	0	21	15	0	36	Total	3	2	1	29	35
$\chi^2 = 17.13, df = 3, p < .01$					$\chi^2 = 4.02, df = 3, n.s.$						

Note. Shaded response notes modal expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 11. Pre- and Post-Training Response Frequencies for SJT Item 8.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	3	2	0	0	6	A	2	1	1	2	6
B	3	11	1	4	2	B	0	0	2	0	2
C	0	2	1	1	20	C	4	0	15	0	19
D	2	2	0	4	8	D	0	1	1	6	8
Total	8	17	2	9	36	Total	6	2	19	8	35
$\chi^2 = 3.93, df = 3, n.s.$					$\chi^2 = .02, df = 3, n.s.$						

Note. Shaded response notes modal expert rating. No shading indicates no modal expert response. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 12. Pre- and Post-Training Response Frequencies for SJT Item 9.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	0	0	0	0	A	0	1	0	5	6
B	0	0	4	0	4	B	1	0	0	3	2
C	0	0	32	0	32	C	0	0	0	0	0
D	0	0	0	0	0	D	0	0	0	25	25
Total	0	0	36	0	36	Total	1	1	0	33	35
$\chi^2 = 3.93, df = 3, n.s.$					$\chi^2 = 8.80, df = 3, p < .05$						

Note. Shaded response notes modal expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 13. Pre- and Post-Training Response Frequencies for SJT Item 10.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	1	1	1	1	4	A	5	0	0	3	8
B	0	16	3	1	20	B	2	0	0	1	3
C	0	1	2	0	3	C	2	0	2	6	10
D	0	3	3	2	8	D	2	1	2	8	13
Total	1	21	9	4	35	Total	11	1	4	18	34
$\chi^2 = 22.45, df = 3, p < .01$					$\chi^2 = 8.86, df = 3, p < .05$						

Note. Shaded response notes modal expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 14. Pre- and Post-Training Response Frequencies for SJT Item 11.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	3	0	1	4	A	1	0	0	2	3
B	0	29	0	0	29	B	0	0	0	0	0
C	0	0	0	0	0	C	5	0	6	2	13
D	0	2	0	0	2	D	3	0	2	13	18
Total	0	34	0	1	35	Total	9	0	8	17	34
$\chi^2 = 4.25, df = 3, n.s.$					$\chi^2 = 20.56, df = 3, p < .01$						

Note. Shaded response notes expert rating. No shading indicates no modal expert response. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 15. Pre- and Post-Training Response Frequencies for SJT Item 12.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	3	1	5	11	20	A	0	2	0	0	2
B	0	1	2	2	5	B	0	6	1	1	8
C	0	0	0	0	0	C	3	8	8	2	21
D	0	0	1	10	11	D	1	0	2	1	4
Total	3	2	8	23	36	Total	4	16	11	4	35
$\chi^2 = 6240, df = 3, p < .01.$					$\chi^2 = 16.56, df = 3, p < .01$						

Note. Shaded response notes expert rating. No shading indicates no modal expert response. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 16. Pre- and Post-Training Response Frequencies for SJT Item 13.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	0	0	0	0	A	1	0	0	7	8
B	0	1	0	0	1	B	0	0	1	2	3
C	0	3	32	0	35	C	0	0	0	0	0
D	0	0	0	0	0	D	1	1	0	22	24
Total	0	4	32	0	36	Total	2	1	1	31	35
$\chi^2 = 10.51, df = 3, p < .05$					$\chi^2 = 101.61, df = 3, p < .01$						

Note. Shaded response notes expert rating. No shading indicates no modal expert response. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 17. Pre- and Post-Training Response Frequencies for SJT Item 14.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	0	6	0	6	A	1	3	0	1	5
B	0	1	6	0	7	B	2	8	0	2	12
C	2	0	17	1	20	C	0	0	0	1	1
D	0	0	2	1	3	D	4	4	0	9	17
Total	2	1	31	2	36	Total	7	15	0	13	35
$\chi^2 = 13.35, df = 3, p < .01$					$\chi^2 = 4.29, df = 3, n.s.$						

Note. Shaded response notes expert rating. No shading indicates no modal expert response. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Table 18. Pre- and Post-Training Response Frequencies for SJT Item 15.

<i>Most Likely Response</i>					<i>Least Likely Response</i>						
Pre-score	Post-training responses				Row Total	Pre-score	Post-training responses				Row Total
	A	B	C	D		A	B	C	D		
A	0	2	0	0	2	A	1	0	0	1	2
B	0	25	1	0	26	B	0	0	0	0	0
C	0	2	5	0	7	C	1	0	0	2	3
D	0	0	1	0	1	D	6	0	3	21	30
Total	0	29	7	0	36	Total	8	0	3	24	35
$\chi^2 = 3.64, df = 3, n.s.$					$\chi^2 = 32.67, df = 3, p < .01$						

Note. Shaded response notes expert rating. Chi square goodness of fit estimated upon post-training responses, using pre-training frequencies as expected values.

Figure 2. Frequencies for Least Likely Responses for Item 3.

Question 3: A patient begins crashing during treatment, and your team leader appears unwilling to make a decision on a controversial treatment. When questioned, he gives multiple reasons for different courses of action, but it is unclear which direction the team should go. What should you do?

- Make the decision for the team.
- Ask the next most senior team member to make the decision.
- Directly request the leader to decide on applying the specific treatment.
- Ask for a team meeting to discuss and decide upon the issue.

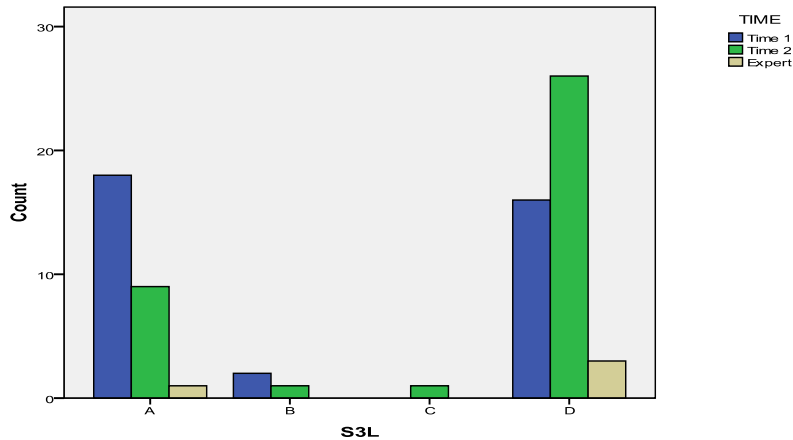


Figure 3 gives the “most likely” response frequencies for item 4, which described a situation where a resident was joking inappropriately. This figure indicates a shift in trainee responses from multiple categories (time 1) to primarily the option endorsed by experts (time 2), or “requesting that the resident focus on work.” This response presents a constructive, but assertive method of managing a problematic team member. Thus, the pattern of response frequencies suggests a positive effect of training for addressing a team member acting inappropriately (as described in item 4).

Figure 4 presents the results for item 7, which asked for responses to a non-physician team member (e.g., nurse or tech) who politely challenges the leader’s decision. This item yielded different responses between trainees and experts both before and after training, with residents preferring to listen to the challenge, and experts voting

Figure 3. Frequencies for Most Likely Response for SJT Item 4

Question 4: While treating a patient with head trauma, another resident makes many unhelpful and inappropriate comments, such as joking about the patient's condition and the body habitus. What should you do?

- Let the team leader deal with it.
- Ask the resident if everything is okay, or if they want to talk about something.
- Request that the resident focus on work until emergency treatment is completed.
- Tell the resident to be quiet.

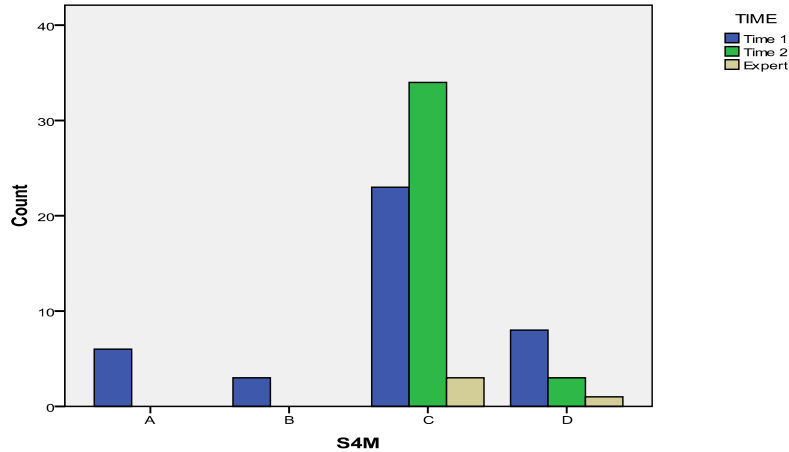
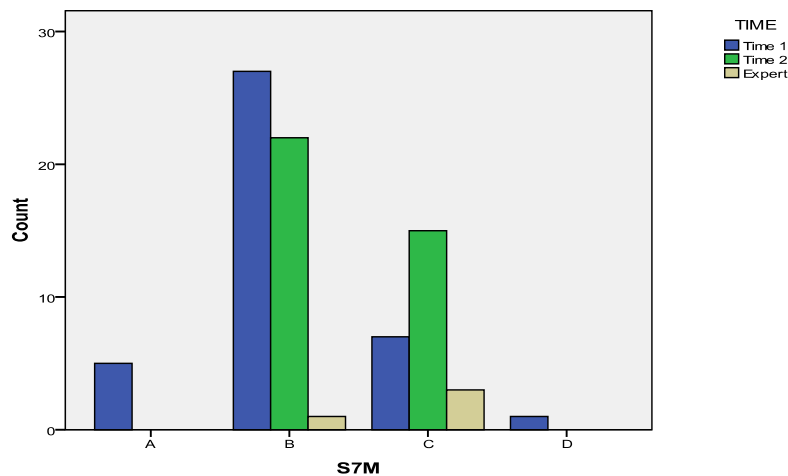


Figure 4. Frequencies for Most Likely Response for SJT Item 7.

Question 7: A senior non physician member of the team politely and appropriately questions the decisions of the team. What should you do?

- Let the team leader deal with it.
- Listen and use those suggestions for the benefit of the patient.
- Tell the team member that you will explain the treatment after the resuscitation.
- Ignore the team member.



to explain the decision to the member after treatment. Thus, this effect may reflect different perceptions based upon one's position in the organizational hierarchy. However, less than a quarter of pre-training responses did not match the modal expert response, whereas nearly half of the post-training responses did match SME responses, so the training did shift participant responses to more closely match expert scores.

Figure 5 provides the least likely response frequencies for item 9, which describes a situation where the resident observes a colleague inserting a tube without a light. As the figures illustrate, both the least likely resident responses matched the expert responses more frequently with post-training measures. Experts unanimously agreed that the worst response in this situation is to let the colleague make an error. Thus, we may infer that the response shift shows an improvement in error management or mutual support.

Figure 6 presents the most likely response choices for item 14, which describes an underperforming team member. Resident responses post-training indicated a much more effective choice than pre-training responses, according to expert scores. In an emergency situation, personal or performance issues in team members must be substantively addressed later, but the team member should still receive encouragement or support, such as being encouraged to focus on the immediate task. Thus, the response shifts observed in item 14 suggest a positive benefit from training.

Finally, Figures 7 and 8 provide two examples where training effects did not move trainee scores closer to expert scores. Figure 7 presents results for item 12, which presented a controversial issue where a team member makes a charged comment about a patient accused of rape and homicide. Although experts disagreed on the best response to this team member, residents overwhelmingly chose "let the leader handle it" before

Figure 5. Frequencies for Least Likely Responses for SJT Item 9.

Question 9: You see a team member attempting to intubate, but the light on the laryngoscope is not working. What should you do?

- Ask the person if he wants you to do it.
- Point out the issue to the team leader.
- Ask the person if they realize that the light is out.
- Wait until the person misses the intubation, then point out the problem and take over.

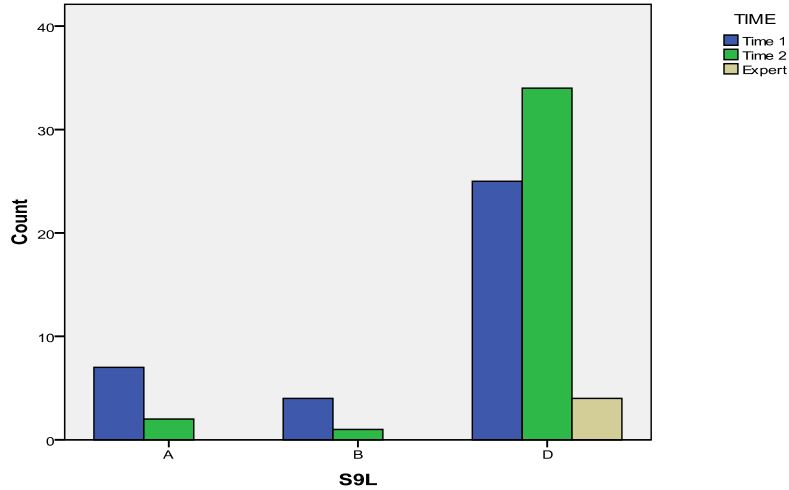


Figure 6. Frequencies for Most Likely Responses for SJT Item 14.

Question 14: You notice that another resident is not doing his part during the resuscitation and seems to need to be prompted to perform his role. What should you do?

- Let the team leader deal with it.
- Ask the person if everything is okay, or if they want to talk about something.
- Request that the person focus on work until emergency treatment is completed.
- Point out that the resident is not “in the game” during the resuscitation.

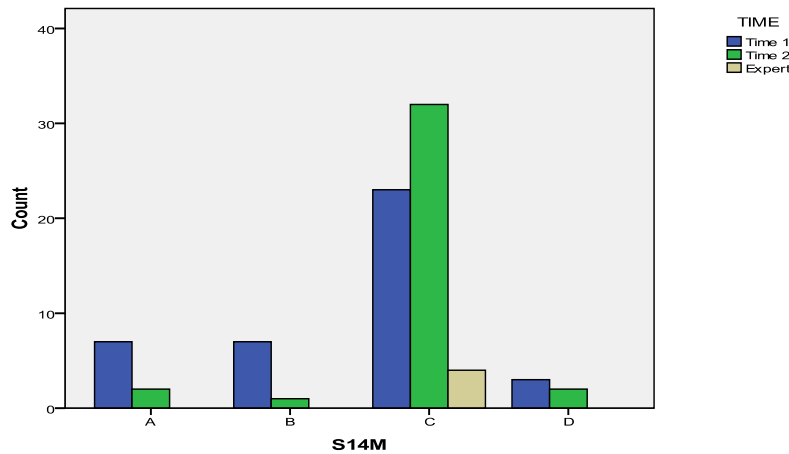


Figure 7. Frequencies for Most Likely Responses for SJT Item 12.

Question 12: Your team is caring for a gunshot wound to the abdomen of an 18 year old male with stable vital signs who was caught by police after a gun battle. The police officer in the trauma room has announced that this patient has just raped and shot a 13 year old girl. The respirator tech says he got what he deserved. What should you do?

- Let the team leader deal with it.
- Ask the person to step out of the trauma room to discuss why he would have said such a thing.
- Call the person unprofessional in public immediately after the remark, in order to set an example.
- Tell the respiratory tech to be quiet.

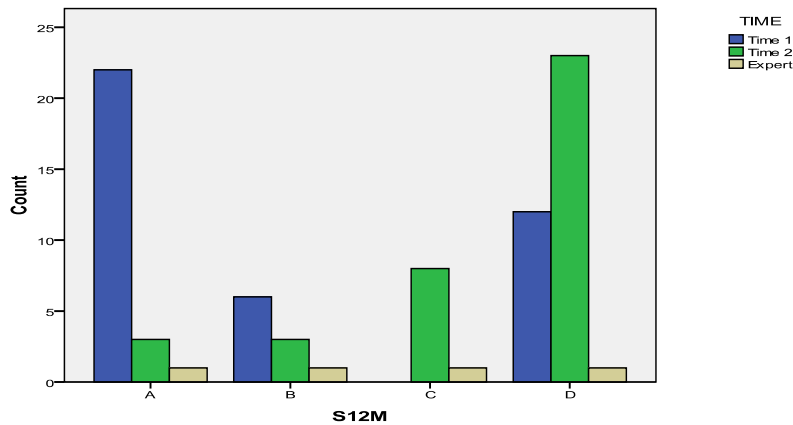
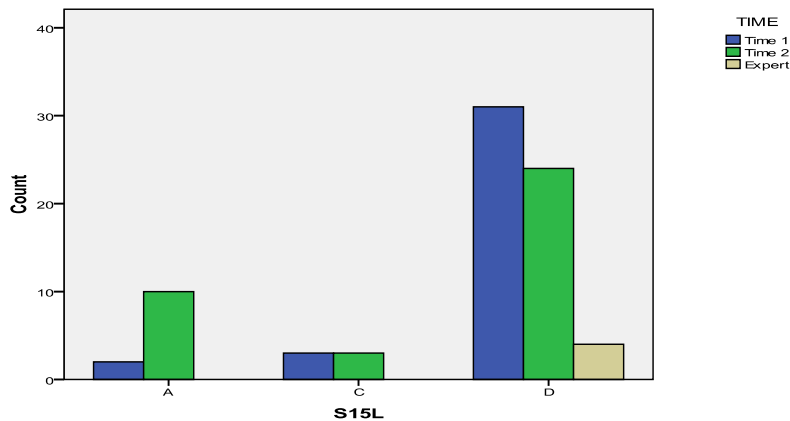


Figure 8. Frequencies for Least Likely Responses for SJT Item 15.

Question 15: A junior resident seems to be very enthusiastic, easily excitable, and raises his voice during the resuscitation when things get difficult. A senior nurse tells him to keep it down, and the resident then withdraws and stops participating in the care of the patient. What should you do?

- Let the team leader deal with it.
- Ask the person to perform a specific task to get him involved again.
- Wait until the resuscitation is over and address the issue with the nurse and resident separately and individually.
- Tell the nurse to be quiet.





training, and overwhelmingly chose “tell the team member to be quiet” after training. This dramatic shift appears to represent more assertiveness by residents after training than before. Figure 8 provides the least likely responses for item 15, in which a resident becomes withdrawn because he was recently told to keep his voice down by a senior nurse. For this item, the least likely response of resident before training more closely matched the least likely response of experts, reflecting an effect opposite from previously discussed items (in which post-training responses matched expert responses). However, there was a small shift in resident responses to choose the most passive response post-training (let the team leader deal with it). This result may also suggest an increase in resident assertiveness from training, as occurred with item 12.

The SJT items responses not illustrated here are described next. Least likely responses for item 13 reveal another positive shift where trainee scores matched expert scores more closely using post-training measures. Specifically, experts identified a negative comment as the worst response to a team member struggling with a procedure. Least likely responses for items 1, 2, and 6 mirrored the responses in item 15. Although post-training responses for these items did not reflect expert ratings as well as pre-training scores, post-training choices identified a passive response (e.g., “let the team leader deal with it”) more often as the least likely response. Thus, these shifts may indicate a commitment to assertiveness on the part of the participants, as they perceive passivity to be the worst mistake.

Most likely responses for item 10 and least likely responses for items 4, 11, and 12 demonstrated significant response shifts that did not drift towards or away from expert responses. The response shifts for items 4, 10, and 11, however, seem to indicate more

assertive responses for post-training scales, similar to the results observed in the most likely responses for item 12. For these items, post-training respondents more frequently identified a passive approach as the least likely choice (or vice versa for most likely). Other responses to items did not produce meaningful patterns or significant results. The implications of the item and scale results with the SJT, as well as the attitude measures, are discussed next.

## Chapter Four

### Discussion

The purpose of the present study was to validate a teamwork training program for medical residents in trauma resuscitation. The author provided a comprehensive training program that complemented an interactive role play with lecture and trainer feedback. Trainee learning and reactions were examined by using self-report measures of learning goal orientation teamwork attitudes, and trainee reactions on training utility. Teamwork behavioral intentions were assessed using a situational judgment test which presented critical incidents in trauma teamwork.

Results generally validated the training program with regards to the situational judgment test responses, but it failed to significantly improve learning goal orientations or teamwork attitudes. It would appear that teamwork training provided some benefit in responding to specific situations, but that it had little effect on participant attitudes towards the training and the content.

The SJT scale score demonstrated an overall scale effect in three of the four group comparisons planned by the study, and more than half of the items showed a significant or marginal effect in responding from the before and after training. In several instances, the post- training resident responses matched the expert responses more closely than pre-training responses (e.g., items 3, 4, 7, 9, 14). Even in cases where response shifts did not

necessarily match expert ratings (e.g., items 12 and 15), one may observe an increase in resident assertiveness on item responses.

The goal of the teamwork training program was to improve resident teamwork behaviors in the trauma room through role plays of critical teamwork incidents. Residents were specifically trained on effective structure, leadership, communication, monitoring, and mutual support behaviors in order to effectively manage critical incidents in trauma room teamwork. The responses on the SJT provide a good index of analogous transfer from the medical role plays and feedback, as the SJT items presented analogous situations to those role plays. Thus, results from this study that participants used the knowledge and experience gained from the role plays to change their responses to analogous situations.

The response shifts on the SJT generally reflected more effective teamwork choices after the training than before. Specifically, some items demonstrated more effective leadership through assertive actions and the consideration of team member input (e.g., items 7, 10, 12). Other items demonstrated more effective mutual support and backup among team members. Examples include catching an existing error (item 9), or helping a team member perform a procedure (item 13), or encouraging another team member (item 14). The training also affected situational awareness in some items, as the patient must remain the focal point of work. As a result, trainee responses did not approve of options that required a break from the resuscitation to deal with a problem team member (e.g., item 3). In summary, the response shifts observed from pre- to post-training SJT scores correspond to the goals of the teamwork training program in this study. Even for items that did not show a closer match with expert scores post-training,

response shifts tended to illustrate an increase in assertiveness which may reflect the training emphasis on assertive actions to correct ineffective behaviors or decisions. Because behaviors are the ultimate target of a teamwork training program, the training effect observed here documents an increasing awareness of team members of effective behaviors and ineffective behaviors. This improvement was especially important given the confusion many residents experience with regards to proper team positions and protocols.

There are many elements of the training which may explain its positive effect on SJT responses. An active training approach, such as role play, should serve as the primary focus for teamwork training. Whereas previous teamwork studies have attempted to train teamwork using only lecture-based methods (Small et al., 2007), this study saw a positive shift from using role plays primarily, with some complementary lecture. Furthermore, the fidelity of the medical role plays to critical teamwork incidents in the trauma room served as another valuable asset in the training. By having task-related scenarios to practice and observe ineffective and effective behaviors, trainees learned the training content effectively. The provision of feedback also should have enhanced transfer by reinforcing positive and negative behaviors through the role play. The feedback provides a mechanism for trainees to reflect upon previous behaviors and adapt accordingly in future situations.

Although error framing should have also improved training efficacy, the evidence in this study provides mixed results for its effectiveness. LGO scores were not consistently higher post-training than pre-training scores. Indeed, few significant effects were detected with regards to the self-report measures, LGO and teamwork attitudes

scale. Mean differences in self-report scales were not generally large, and yielded no significant relationships with SJT scale scores. These non-significant results may stem from low variance in scale responses or low power from a small sample size. Self-report means were relatively high for both pre-and post-training (approximately 4.5 on a 5 point scale), suggesting a ceiling effect that restricted scale variance. Hopefully, these elevated means reflected truly positive attitudes towards teamwork and learning goals, and not careless or biased responding.

Regardless of the reason for high scale means, results of this training highlight concerns with attitude measures of teamwork training evaluation. First, evidence from this training suggests that positive attitudes do not necessarily lead to effective behaviors. Although attitudes remained unchanged from pre- to post-training scores, teamwork training did affect resident behavioral choices within critical incidents. It is easy to agree with an abstractly described idea (e.g., effective communication), but it may be difficult to choose a specific course of action based upon that idea (e.g., how would you communicate in this situation?). Second, self-report measures of teamwork attitudes may be more susceptible to response biases. Self-report attitude items tend to be more transparent with regards to more favorable responses, and trainees may have responded based upon their perceptions of the desired or “correct” response rather than their true opinions. That is, social desirability or impression management may play a role in responses on teamwork attitudes, much like it can on personality measures.

### *Limitations*

This training evaluation has documented some interesting effects, but several limitations should be considered when assessing study results. The study sample

prevented the use of an optimal design with a large sample and a placebo-training control group. To avoid a single group pre-post test, the current evaluation study compared mean differences between pre-and post criterion scores between different training groups. Furthermore, the effects of specific training features were not examined in this study. Rather, the training evaluation reflected the overall effect of training. Future training studies may address this issue by comparing different training approaches to a sample of teams. For example, one study may manipulate the type of role play by providing feedback to one condition and no feedback to another.

In addition, teamwork behaviors and task outcomes represent the primary criteria from an organizational perspective, but neither of these criteria was directly measured in the current study. We measured trainee behaviors by their responses to a situational judgment test that presented critical incidents in trauma teamwork. Although this measured was designed to measure the behavioral choices of trainees in specific situations, it does not necessarily indicate their actual behaviors when the situation does present itself. Trainees instead gave an indication of what they would like to do, or what they should do in a given situation, which is still a valuable measure of their understanding of effective teamwork behaviors.

Task outcomes were not measured in this study for practical reasons. Obtaining adequate outcome data requires tracking participant performance for many months following the training. Furthermore, the base rate for critical incidents and teamwork errors in medicine is relatively low, so it may be difficult to obtain an adequate sample of errors to determine if a reduction in errors was due to a training program. The reader is cautioned, however that the training program is not evaluated relative to task or

organizational outcomes. Future research on this or similar training programs should seek to validate findings on actual teamwork behaviors and organizational performance reviews.

### *Summary*

Results from this study suggest that a comprehensive training approach using role play, lecture, feedback, and framing can positively affect behavioral choices for teamwork in the trauma room. The training program did not affect already positive attitudes towards teamwork, but it did demonstrate more effective responses to teamwork issues after the training than before. Health management organizations should benefit from this training because it provides a positive effect at a relatively low cost in resources.



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## Appendices

## Appendix A: Science Fiction Role Play Exercise

### **The Starship Jollyfatzweehawkin (S.S. JFW)**

This gaming exercise is of an imaginary space mission. All participants are given a position on the ship with defined roles and personality traits that they are to play. There is a saboteur among them and they will have to work together to identify and convince the saboteur to fix the damage that they have caused.

The ship is mostly automated and has a supercomputer on board that knows everything about the mission, capabilities of the ship and crew, and will also direct the game. If you are not sure about something phrase a question to the computer: “ Computer, can I or is there,.....”

The most senior member of the ship can order an underling to do something. The command structure of the ship is:

- Captain
- First Officer
- Flight Engineer
- Medical Officer
- Cargo Engineer
- Crew
- Exobiologist
- ET Security
- Cook
- Press
- NGO Representative
- ET Minister of Health
- Computer

#### **SCENARIO:**

The SS Jollyfatzweehawkin (S.S. JFW) is on its way to the outer reaches of the galaxy carrying a vaccine to the planet Bastardo where without the vaccine all the people will suffer greatly and die. The trip is a long one and the crew must cryo-hibernate (suspended-animation) during the journey as the ships jumps thru hyperspace. The freeze and hyper jump will start 24 hours after takeoff.

It becomes apparent to the First Officer that the ship will not reach their destination because of a dysfunction in the fuel systems. There is a slow leak in the fuel tanks. Currently they are 5 hours away from the point of no return to Earth and before the hyper jump and freeze start. If the ship is not turned around before the problem is fixed the ship will run out of fuel and all on board will die. If the trip to the planet to deliver the vaccine does not happen all on the planet will die. The game starts as the First Officer has called everyone to the galley for a meeting to discuss the problem.

## Appendix A: (Continued)

### **RULES:**

Any necessary equipment and expertise will be available to you within reason by asking the onboard computer. You can say or do anything and can try to convince your fellow crew to do things.

You can ad lib as necessary but please stay in character.

Please respect the chain of command.

### **First officer**

Weak, indecisive, and are looking for someone else to take charge. You will begin the game as you realize there is a leak in the fuel tanks and it is a slow leak. Initial diagnostics determine that the leak is either a small puncture made by a sharp object or an organism but should confer with the computer. As you were not sure what to do so you had called a meeting of all people on board to discuss the problem in the mess hall. When a suggestion is given you waver over it and are noncommittal. Your favorite saying is: "Gee I'm not sure but I suppose...."

### **Captain**

Strong, decisive but ill informed and tend to act before thinking. You are overconfident to the extreme and will not listen to no one and are clearly making wrong decisions. You say and do things that do not clearly make sense. An idea that is remotely reasonable will be promoted by you. You have family on Bastardo. Your favorite saying is: "Yes, that is the answer" Feel free to tell stories of other harrowing situations that you were able to save your ship, never let the truth get in the way of a good story.

### **Flight Engineer**

You seem know what is going on and have all the correct answers but are angry because you were passed over at the promotion board. You have a very large ego. You are a jerk and obstructive in all aspects when trying to find a solution. You are mean and derogatory to everyone and more or less insubordinate. You may be able to reroute the fuel to another holding tank but are not sure. You have family on Bastardo. Your favorite saying is: "I have thought of (or would have) that." You make statements that make you the smartest person on the ship, and that is usually the case everywhere else you go.

### **Cargo Engineer**

You do not want to be on the mission you got married and you miss your spouse. You are helpful and knowledgeable but your head is not in the game. There is a small possibility that the containment area of the vaccine has been breached and that caused the hole. You suggest dumping the cargo to lighten the load to make it with less fuel.

## Appendix A: (Continued)

### **Medical Officer**

You are timid. You are quiet and will only get involved if directly asked. You know the answers and can help and are correct but are too shy to step up and get into the fray. You were an astrophysicist before medical school and could suggest a “biological” plug to the hole. You have family on Bastardo. You will get involved in all conversations but back out: “I think.....ah never mind.”

### **Crew**

You do what you are told and are excited as this is your first mission but are not too bright. You are a comedian and will make a joke out of everything. You suggest making some pizza dough or something to that effect to plug the hole. An Italian or French accent will help. You have family on Bastardo.

### **Cook**

You are the saboteur. Your family was in a space vehicle accident with a bastard (a person from the planet Bastardo) and hold a grudge as this caused your family great financial heartbreak and financial ruin.

You are passive aggressive to the extreme. You offer no help and make suggestions that are clearly misleading. It is not necessary to disguise your distaste of the Bastards you are going to save.

You have placed a microplasmic disruptor implant (MDI) on the fuel tank hull that blew a hole in the fuel tank. Only you have the means to trigger the device to reseal the hole. Your hope is that you scare the crew to return to Earth. You are amendable to reason after a while and only admit your guilt after it becomes obvious that they will figure it out anyway.

### **Press**

You are an antagonistic element and point out the failings of all parties when the opportunity arises. You think you could do it better but will not help. You do not see why some one cannot go outside and fix the hole. You have family on Bastardo. Point out that your significant other could deal with this problem.

### **Exobiologist**

You are loud and antagonistic you try to hide your fear of space travel with inappropriate jokes and sexual innuendos. You are especially uncomfortable with all the ships crew as you do not respond well to authority. You know that your live vaccine can cause problems of this nature.

## Appendix A: (Continued)

### **NGO Representative**

Nice sincere and helpful and will do what is asked to get the mission accomplished. You are gullible and easily led. You think we can stop at a fueling station and voice this. You have family on Bastardo.

### **Extra-terrestrial Security Specialist**

Hard nosed no nonsense professional who man concern is the safety of the passengers, ship, and mission in that order. You know that your live vaccine can cause problems of this nature. You are stuck on this fact and continually point this out. You are paranoid about alien tampering of the residents of the planet Dorko.

### **Extra-terrestrial Minister of Health**

Pompous but knows his stuff and what must be done to keep the crew safe and contain the vaccine and complete the mission. You know that the live vaccine can cause problems of this nature and will not jettison the cargo as that would defeat the purpose of the trip. You think there is a FTF (fuel tank filler, like fix a flat) that will help the problem. You are an ex starship commander and will take control of situation if things are not getting done or focus is lost. Remind the captain that he is in charge. Remind crew that the computer has personnel files and is capable of forensic analysis.

### **COMPUTER**

Will act as the facilitator and knows all the roles. It can be asked a question or voluntarily offer information and advice. It knows about the microplasmic disruptor implant and that the person (COOK) who released it has the code to shut it down. You have access to all personnel files and have clues about who may have set the MDI.

## **Gaming Debrief**

First give disclaimer about personalities and go around room and have crew members describe the roles that they were given. "What's wrong with this character?"

Who was the saboteur?

Did you work together?

Why not?

Personalities

Insecurities

Confidences

Preconceived notions

Prior experiences

Agendas

Who was obstructive? Why?

Who was helpful? Why?

Appendix A: (Continued)

**Self Assessment (to captain, flight engineer, medical officer, cook)**

What went well?

What went wrong?

How did your personality affect the mission?

How well did the team function as a whole?

Did your team members deal with you well?

**Feedback**

Observations

Impressions

What was done well: (Praise)

What could be done better: (Tips)

My concerns: (Issues)

**Exploratory Inquiry**

What did you see, hear, and smell?

What was your mindset?

What guided your decision making process?

What information / data did you use when making your decision?

What were your specific goals? Priorities?

Did you consider other courses of action?



## Appendix B: Wilderness Survival Exercise

**Directions:**

Following are twelve questions concerning personal survival in a wilderness situation. Try to imagine yourself in the situation depicted. Assume you are alone and have a minimum of equipment, except where the question tells you differently. The season is fall. The days are warm and dry, but the nights are cold.

Working alone, select what you believe is the best of the three choices given under each item. After you have completed this task individually, you will again consider each question as a member of your team. Your team will have the task of deciding by consensus, the best answer for each question. Do not change your individual answers, even if you change your mind during the team discussion.

Question	Your Answer	Team Answer
1. You have strayed from your party in trackless timber. You have no special signaling equipment. The best way to attempt to contact your friends is to: a. call for help loudly, but in a low register. b. yell or scream as loudly as you can. c. whistle loudly and shrilly.		
2. You are in snake country. Your best bet to avoid snakes is to: a. make a lot of noises. b. walk softly and quietly. c. travel at night.		
3. You are hungry and lost in wild country. The best rule for determining which plants are safe to eat (those you do not recognize) is to: a. try anything you see the birds eat. b. eat anything except plants with bright red berries. c. put a bit of the plant on your lower lip for five minutes; if it seems all right, try a little.		
4. The day becomes dry and hot. You have a full canteen of water (about one liter) with you. You should: a. ration it -- about a cupful a day. b. not drink until you stop for the night, then drink what you need. c. drink as much as you think you need when you need it.		

Appendix B: (Continued)

Question	Your Answer	Team Answer
<p>5. Your water is gone; you become very thirsty. You finally come to a dried-up watercourse. Your best chance of finding water is to:</p> <ul style="list-style-type: none"> <li>a. dig anywhere in the stream bed.</li> <li>b. dig up plant and tree roots near the bank.</li> <li>c. dig in the stream bed at the outside of a bend.</li> </ul>		
<p>6. You decide to walk out of the wild country by following a series of ravines where a water supply is available. Night is coming on. The best place to make camp is:</p> <ul style="list-style-type: none"> <li>a. next to the water supply in the ravine.</li> <li>b. high on a ridge.</li> <li>c. midway up the slope.</li> </ul>		
<p>7. Your flashlight glows dimly as you are about to make your way back to your campsite after a brief foraging trip. Darkness comes quickly in the woods, and the surroundings seem unfamiliar. You should:</p> <ul style="list-style-type: none"> <li>a. head back at once, keeping the light on, hoping the light will glow enough for you to make out landmarks.</li> <li>b. put the batteries under your armpits to warm them and then replace them in the flashlight.</li> <li>c. shine your light for a few seconds, try to get the scene in mind, move out of the darkness and repeat the process.</li> </ul>		
<p>8. An early snow confines you to your small tent. You doze with your small stove going. There is a danger if the flame is:</p> <ul style="list-style-type: none"> <li>a. yellow.</li> <li>b. blue.</li> <li>c. red</li> </ul>		
<p>9. You must ford a river that has a strong current, large rocks and some white water. After carefully selecting your crossing spot, you should:</p> <ul style="list-style-type: none"> <li>a. leave your boots and pack on.</li> <li>b. take your boots and pack off.</li> <li>c. take your pack off, but leave your boots</li> </ul>		

Appendix B: (Continued)

Question	Your Answer	Team Answer
10. In waist deep water with a strong current, when crossing the stream, you should face: a. upstream. b. across the stream. c. downstream.		
11. You find yourself rimrocked; your only route is up. There is mossy, slippery rock. You should try it: a. barefoot. b. with boots on. c. in stocking feet.		
12. Unarmed and unsuspecting, you surprise a large bear prowling around your campsite. As the bear rears up about ten meters from you, you should: a. run. b. climb the nearest tree. c. freeze, but be ready to back away slowly.		

Here are the recommended courses of action for each of the situations on the Wilderness Survival Work Sheet. These answers come from the comprehensive course on woodland survival taught on the Interpretive Service, Monroe County (New York) Parks Department. These responses are considered to be the best rules of thumb for most situations; specific situations, however, might require other courses of action.

1. (a.) Call help loudly but in a low register. Low tones carry farther, especially in dense woodland. There is a much better chance of being heard if you call loudly but in a low key. "Help" is a good word to use, because it alerts your companions to your plight. Yelling or screaming would not only be less effective, but might be passed off as a bird call by your friends far away.

2. (a.) Make a lot of noise with your feet. Snakes do not like people and will usually do everything they can to get out of your way. Unless you surprise or corner a snake, there is a good chance that you will not even see one, let alone come into contact with it. Some snakes do feed at night, and walking softly may bring you right on top of a snake.

3. (c.) Put a bit of the plant on your lower lip for five minutes; if it seems all right, try a little. The best approach, of course, is to eat only those plants that you recognize as safe. But when you are in doubt and very hungry, you may use the lip test. If the plant is poisonous, you will get a very unpleasant sensation on your lip. Red berries alone do not tell you much about the plant's edibility (unless, of course, you recognize the plant by the berries), and birds just do not have the same digestive systems we do.

## Appendix B: (Continued)

4. (c.) Drink as much as you think you need when you need it. The danger here is dehydration, and once the process starts, your liter of water will not do much to reverse it. Saving or rationing will not help, especially if you are lying unconscious somewhere from sunstroke or dehydration. So use the water as you need it, and be aware of your need to find a water source as soon as possible.

5. (c.) Dig in the stream bed at the outside of a bend. This is the part of the river or stream that flows the fastest, is less silted, deepest, and the last part to go dry.

6. (c.) Midway up the slope. A sudden rain storm might turn the ravine into a raging torrent. This has happened to many campers and hikers before they had a chance to escape. The ridge line, on the other hand, increases your exposure to rain, wind, and lightning, should a storm break. The best location is on the slope.

7. (b.) Put the batteries under your armpits to warm them, and then replace them in the flashlight. Flashlight batteries lose much of their power, and weak batteries run down faster, in the cold. Warming the batteries, especially if they are already weak, will restore them for a while. You would normally avoid night travel, of course, unless you were in open country where you could use the stars for navigation. There are just too many obstacles (logs, branches, uneven ground, and so on) that might injure you—and a broken leg, injured eye, or twisted ankle would not help your plight right now. Once the sun sets, darkness falls quickly in wooded areas; it would usually be best to stay at your campsite.

8. (a.) Yellow. A yellow flame indicates incomplete combustion and a strong possibility of carbon monoxide build-up. Each year many campers are killed by carbon monoxide poisoning as they sleep or doze in tents, cabins, or other enclosed spaces.

9. (a.) Leave your books and pack on. Errors in fording rivers are a major cause of fatal accidents. Sharp rocks or uneven footing demand that you keep your boots on. If your pack is fairly well balanced, wearing it will provide you the most stability in the swift current. A waterproof, zippered backpack will usually float, even when loaded with normal camping gear; if you step off into a hole or deep spot, the pack could become a lifesaver.

10. (b.) Across the stream. Errors in facing the wrong way in fording a stream are the cause of many drownings. Facing upstream is the worst alternative; the current could push you back and your pack would provide the unbalance to pull you over. You have the best stability facing across the stream, keeping your eye on the exit point on the opposite bank.

11. (c.) In stocking feet. Here you can pick your route to some degree, and you can feel where you are stepping. Normal hiking boots become slippery, and going barefooted offers your feet no protection at all.

Appendix B: (Continued)

12. (c.) Freeze, but be ready to back away slowly. Sudden movement will probably startle the bear a lot more than your presence. If the bear is seeking some of your food, do not argue with him; let him forage and be on his way. Otherwise, back very slowly toward some refuge (trees, rock outcrop, etc.).

Appendix C: Pre-training Questionnaire

**Personal Information**

Gender: \_\_\_ Male \_\_\_ Female

Race/Ethnicity:

\_\_\_: American Indian/Alaskan Native

\_\_\_: African-American

\_\_\_: Asian

\_\_\_: Native Hawaiian/Pacific Islander

\_\_\_: Hispanic/Latino

\_\_\_: Non-Hispanic Caucasian

Level of Education (Highest Degree) and Content Area (e.g., Biology): \_\_\_\_\_

Medical School Graduation Year: \_\_\_\_\_

**Past Employment Information**

Previous positions/titles: \_\_\_\_\_

Time spent at most recent position (in months/years): \_\_\_\_\_

Time spent at second most recent position (in months/years): \_\_\_\_\_

How interested are you in the learning the concepts in this training program?

Low Interest

Some Interest

High Interest

Have you participated in this training program or anything like it before? [Y N]

Appendix D: Questionnaire on Learning Goal Orientation

<b>Directions: Please check the box that indicates how much you agree with the questions below.</b>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1) The opportunity to do challenging work is important to me.					
2) When I fail to complete a difficult task, I plan to try harder the next time I work on it.					
3) I prefer to work on tasks that force me to learn new things.					
4) The opportunity to learn new things is important to me.					
5) I do my best when I'm working on a fairly difficult task.					
6) I try hard to improve on my past performance.					
7) The opportunity to extend the range of my abilities is important to me.					
8) When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.					

## Appendix E: Teamwork in Medicine Attitudes Questionnaire

<b>Directions: Please check the box that indicates how much you agree with the questions below.</b>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1) A team's mission is of greater value than the goals of individual team members.					
2) It is important for leaders to share information with team members.					
3) Monitoring patients provides an important contribution to effective team performance.					
4) To be effective, team members should understand the work of their fellow members.					
5) Teams that do not communicate effectively significantly increase their risk of committing errors.					
6) Leaders should create informal opportunities for team members to share information.					
7) Effective team members can anticipate the needs of other team members.					
8) Team members who monitor their emotional and physical status on the job are more effective.					
9) Asking for assistance from another team member is a sign that an individual does not know how to do his/her job.					
10) It is important to have a standardized method for sharing information when handing off patients.					
11) Team leaders should ensure that team members help each other out when necessary.					
12) It is important to monitor the emotional and physical status of other team members.					
13) Personal conflicts between team members do not affect patient safety.					
14) Poor communication is the most common cause of reported errors.					
15) It is a leader's responsibility to model appropriate team behavior.					
16) Individuals can be taught how to scan the environment for important situational cues.					
17) It is appropriate to continue to assert a patient safety concern until you are certain that it has been heard.					
18) I prefer to work with team members who ask questions about information I provide.					
19) Effective leaders view honest mistakes as meaningful learning opportunities					



Appendix E: (Continued)

20) It is appropriate for one team member to offer assistance to another who may be too tired or stressed to perform a task.					
21) Providing assistance to team members is a sign that an individual does not have enough work to do.					
22) It is important for leaders to take time to discuss with their team members plans for each patient.					
23) It is nearly impossible to train individuals how to be better communicators.					

## Appendix F: Situational Judgment Test (SJT) for Teamwork in the Trauma Room

**Directions:** Assume that you are part of the trauma team but are not the leader. Read the following scenarios and choose the actions that you would be MOST and LEAST likely to do, based on what you know both about you and about the work during a medical emergency. Write “M” next to the most likely response, and “L” next to the least likely response for that item.

- 1) In treating a victim of car crash, the team leader has determined CT as an optimal course of action, but an experienced trauma nurse insists that the patient needs to go to the OR. Although your team is confident in its decision, the nurse is also confident and refuses to cooperate with the decision to begin CT. What should you do?
  - a) Ask the nurse to perform another task unrelated to the CT so as to occupy her.
  - b) Explain to the nurse that you respect her opinion, but the team leader has decided to begin CT because of the clinical scenario
  - c) Let the team leader deal with it.
  - d) Tell the nurse to leave the emergency room.
  
- 2) A victim has experienced a traumatic amputation and has severe bleeding. The orthopedic surgeon is a medical resident who wants to begin operating immediately. When your team keeps the patient for some additional tests, he becomes hostile and accuses others of being incompetent. What should you do?
  - a) Defend yourself against the resident by pointing out his mistakes. After all, he’s the one being careless.
  - b) Let the team leader deal with it
  - c) Listen to the resident, and get the patient to surgery as fast as possible.
  - d) Re-assure the resident that the patient will be going to surgery, but assert that the current tests must be completed first.
  
- 3) A patient begins crashing during treatment, and your team leader appears unwilling to make a decision on a controversial treatment. When questioned, he gives multiple reasons for different courses of action, but it is unclear which direction the team should go. What should you do?
  - a) Make the decision for the team.
  - b) Ask the next most senior team member to make the decision.
  - c) Directly request the leader to decide on applying the specific treatment.
  - d) Ask for a team meeting to discuss and decide upon the issue.

Appendix F: (Continued)

- 4) While treating a patient with head trauma, another resident makes many unhelpful and inappropriate comments, such as joking about the patient's condition and the body habitus. What should you do?
  - a) Let the team leader deal with it.
  - b) Ask the resident if everything is okay, or if they want to talk about something.
  - c) Request that the resident focus on work until emergency treatment is completed.
  - d) Tell the resident to be quiet.
  
- 5) The team leader makes, in your opinion, a wrong decision about patient management that might be dangerous. What should you do?
  - a) Openly question the team leader about the decision.
  - b) Ignore the team leader and do what you think is correct.
  - c) Suggest a safer course of action to the team leader.
  - d) Tell the team leader that they do not know what they are doing.
  
- 6) During a resuscitation there is a very deformed open femur fracture. The team leader seems fixed on reducing the open fracture but has not addressed the ABC's. What should you do?
  - a) Ask about or evaluate the ABC's yourself.
  - b) Remind the team leader of the importance of ABC's
  - c) Discuss the issue with the team leader in private after the resuscitation is completed.
  - d) Call the leader out, take control, and become the leader yourself.
  
- 7) A senior non physician member of the team politely and appropriately questions the decisions of the team. What should you do?
  - a) Let the team leader deal with it.
  - b) Listen and use those suggestions for the benefit of the patient.
  - c) Tell the team member that you will explain the treatment after the resuscitation.
  - d) Ignore the team member.

Appendix F: (Continued)

- 8) The team leader has asked for a procedure to be preformed but your co-resident feels uncomfortable doing it, takes his or her time getting ready, and ultimately does not do it. What should you do?
- a) Do it yourself.
  - b) Ask the resident if he or she wants you to do it.
  - c) Point out the issue to the team leader.
  - d) Encourage the person to do it and discuss it with them after the resuscitation.
- 9) You see a team member attempting to intubate, but the light on the laryngoscope is not working. What should you do?
- a) Ask the person if he wants you to do it.
  - b) Point out the issue to the team leader.
  - c) Ask the person if they realize that the light is out.
  - d) Wait until the person misses the intubation, then point out the problem and take over.
- 10) The trauma leader is a female who has just returned from maternity leave, and there is a 38 week pregnant female in extremis from blunt trauma. She has asked for the emergency C-section tray but continues to say “lets give her another chance,” even after the patient has coded 3 times. What should you do?
- a) Let the team leader make the ultimate decision.
  - b) Ask the leader to make a decision on performing a peri-mortem c-section.
  - c) Initiate the steps to perform the peri-mortem c-section yourself.
  - d) Begin the C-section and call for help.
- 11) A member of the team makes comments about the fact that the patient has multiple tattoos including one on the penis. Everyone is laughing, and the patient is heavily intoxicated and seems to be enjoying the attention to his body art. This is clearly distracting and the resuscitation is taking a long time. What should you do?
- a) Let the team leader deal with it.
  - b) Say something to the effect: “let’s keep it professional guys.”
  - c) Announce that this is offensive to you, hoping that this will shut everyone up.
  - d) Tell the residents to shut up.

Appendix F: (Continued)

- 12) Your team is caring for a gunshot wound to the abdomen of an 18 year old male with stable vital signs who was caught by police after a gun battle. The police officer in the trauma room has announced that this patient has just raped and shot a 13 year old girl. The respirator tech says he got what he deserved. What should you do?
- a) Let the team leader deal with it.
  - b) Ask the person to step out of the trauma room to discuss why he would have said such a thing.
  - c) Call the person unprofessional in public immediately after the remark, in order to set an example.
  - d) Tell the respiratory tech to be quiet.
- 13) You are assisting another resident with a chest tube on an obese patient and he is clearly having trouble with it. What should you do?
- a) Let the team leader deal with it.
  - b) Ask the person if he minds you taking over.
  - c) Suggest a way that may help the person complete the thorocostomy.
  - d) Tell him that he should practice more on a simulator.
- 14) You notice that another resident is not doing his part during the resuscitation and seems to need to be prompted to perform his role. What should you do?
- a) Let the team leader deal with it.
  - b) Ask the person if everything is okay, or if they want to talk about something.
  - c) Request that the person focus on work until emergency treatment is completed.
  - d) Point out that the resident is not “in the game” during the resuscitation.
- 15) A junior resident seems to be very enthusiastic, easily excitable, and raises his voice during the resuscitation when things get difficult. A senior nurse tells him to keep it down and the resident then withdraws and stops participating in the care of the patient. What should you do?
- a) Let the team leader deal with it.
  - b) Ask the person to perform a specific task to get him involved again.
  - c) Wait until the resuscitation is over and address the issue with the nurse and resident separately and individually.
  - d) Tell the nurse to be quiet.

Appendix G: Reactions to Training Session

<b>Directions: Consider the training session today (lecture and role play). Please check the box that indicates how much you agree with the statements below.</b>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1) The training will be useful to me in my work.					
2) The training module was well-presented and clearly communicated.					
3) The goals of the training were clear and easy to understand.					
4) The role plays were helpful.					
5) I am more familiar with teamwork concepts now than I was before the training.					
6) The training was worth the time spent.					

What aspects of today's experience were most valuable to you?

What would you change to improve the training?

### About the Author

Matthew S. Prewett received his Master's degree in Industrial/Organizational Psychology at the University of South Florida in 2006, and he is scheduled to receive his Ph. D. in December, 2009. His work focuses on team performance management, including team training, staffing, performance appraisal, and the role of technology in teamwork. His existing research has been published in the journal of *Human Performance*. He is a student affiliate of several professional organizations, including the Society for Industrial and Organizational Psychology, the Academy of Management, and the Human Factors and Ergonomics Society. He has presented over 17 research papers at the annual meetings of these professional organizations.