Using Sport Psychology In Simulator Testing

Tracy Primeau[1], and Dr. Krista Chandler.[2]
[1] Bruce Power, Ontario, Canada
[2] Sport and Exercise Psychology Consulting, Windsor, Ontario, Canada

Abstract

The paper will cover the methods of simulator testing at Bruce Power and the recent trial of using a sport psychology consultant to help candidates deal with the mental, physiological and emotional responses to simulator examinations.

Previous research has shown that mental skills training can enhance the performance of both cognitive and physical skills. As such, it was hypothesized that a structured mental skills program would assist candidates in achieving optimal performance during simulator testing.

The paper will be written as a descriptive piece.

The paper will offer insight into the benefits of using mental skills training in preparation for simulator testing and the drawbacks as experienced by the Authorized Nuclear Operator (ANO).

1. Introduction

In the winter of 2005, the Authorized Nuclear Operator in Training (ANOIT) class at Bruce Power attempted their first try at simulator testing. Despite their extensive knowledge and capabilities in the simulator, some were not successful on test day. One of the factors thought to negatively affect these candidates was stress. When testing was to recommence the following spring/summer, the Operations Support Manager tasked one of the simulator instructors with finding outside assistance to help the CNSC candidates in the simulator test environment. As such, a sport psychology consultant, Dr. Chandler, was hired to work with the ANOIT class.

2. Mental Strategies for Successful Testing (Chandler, 2005)

Sport psychology consultants help amateur and professional athletes achieve peak performance. Given the evaluative component of many sports (e.g., figure skating) as well as the immense pressure in the competitive environment, athletes many times turn to sport psychology consultants. The athletic arena is not unlike the simulator environment. The sheer magnitude of situations that arise in simulation training coupled with the additional observers and a small margin for error certainly lends itself to an environment in which stress can be high. Moreover, because the testing environment is an uncontrollable factor (i.e., it cannot be modified) and must remain constant, the candidate must adapt to the situation either by becoming more competent with the procedures and job requirements or by enhancing their individual mental skills to deal with situations as they arise. Dr. Chandler's objective was to introduce the candidates to various mental skills that research demonstrates can assist in reducing stress and ultimately lead to the candidates' success. These mental skills included: goal setting, arousal regulation, concentration, confidence building, and positivity. A workbook designed to address these five integral areas was provided to all candidates.

2.1 Goal Setting

Goal setting was the first mental skill addressed in the workbook. Candidates completed the Performance Profile (Butler & Hardy, 1992), which is a tool that allows for the identification of an individual's performance-related strengths and weaknesses. The exercise involved listing the qualities/attributes of a successful candidate. Candidates were then asked to rate their current level on each of the attributes (1= not at all like me and 10= completely true of me). They then found their discrepancy score by subtracting their current rating from 10 (ideal rating). Having identified those attributes with the highest discrepancy score and thus those in need of immediate attention, individuals can now implement strategies (set goals) to improve those characteristics.

The second exercise included in the goal setting was the Performance Review List (Bull, Albinson, & Shambrooke, 1996). Candidates were asked to list their personal positive points by reflecting on past simulator tests and compiling a list of all things they did well. Candidates were also to reflect upon their weaknesses and to make a list of the things they wanted to achieve in their next test.

Goal setting is one of the most commonly used performance enhancement strategies. According to Locke and Latham (1985), goals direct attention, mobilize effort, foster persistence and promote the development of new learning strategies. For candidates to improve upon their performance in the simulator, weaknesses must be identified and corrected. To overcome these limitations, goals must be set.

2.1.1 Candidate's Workbook

With respect to Performance Profile, as a group we brainstormed on the qualities that make a successful ANO. We all had an opportunity to offer our own opinions. Many qualities were brought forth however; the candidate chose the following as she deemed them most appropriate for herself: confidence, multitasking, experience, team player, knowledge, self-critical, rules, sense of humour and ability to relax away from work. Based on her current rating of those attributes, the candidate felt weakest in confidence, experience, and knowledge, and strongest in multitasking, team player and ability to relax away from work. She acknowledged that confidence was the quality in need of immediate attention. Additionally, she viewed experience and knowledge as qualities that could be improved upon.

The Performance Review List for the candidate included the following list of personal positive points from her most recent simulation test: 1) appearing calm 2) being methodical 3) consistency 4) procedural knowledge 5) multitasking and 6) speed. The three areas in which the candidate wanted to achieve in the next test included: 1) success 2) confidence and 3) better diagnostic skills.

The information generated from these exercises allowed the candidate to identify her strengths and weaknesses in the simulator. With this information, the candidate was able to develop specific strategies for improved performance in the simulator thus increasing her level of confidence.

2.2 Arousal Control

Arousal control was the second mental skill addressed by Dr. Chandler. Three exercises were included to tap into this skill. The first exercise was a questionnaire which assessed the candidate's state anxiety "Cognitive Somatic Anxiety Index" (CSAI-2: Martens, Vealey, & Burton, 1990). State anxiety is the moment to moment anxiety that one experiences. The questionnaire included 27 items used to describe ones anxiety and confidence prior to a performance. This questionnaire is to be completed within 2 hours of performance (e.g., simulator test) for the most accurate results. The candidates were asked to read each statement and then circle the appropriate number to indicate how they felt at that moment. The items were rated on a 4-point Likert scale with 1-Not at all, 2-Somewhat, 3-Moderately so and 4-Very much so true of me. The questionnaire is composed of three subscales: cognitive anxiety (mental anxiety), somatic anxiety (physical anxiety) and confidence. An example of a cognitive anxiety item is "I am concerned about this test". While an example of a somatic anxiety item is "I feel tense in my stomach". Finally an example of a confidence question includes "I'm confident of coming through under pressure". Lower scores in both anxiety subscales suggest a lower anxiety level, while higher scores in the confidence subscale indicate a higher confidence level.

The next exercise included the "Sport Competitive Anxiety Test" SCAT (Martens, Vealey, & Burton, 1990) which was modified from its original sport purpose for test taking. This questionnaire measures the candidate's trait anxiety, which is ones general anxiety level. It consisted of 10 statements about how one generally feels when one performs. It is rated on a 3-point Likert scale with 1-Hardly ever, 2-Sometimes and 3-Often. Some of the statements included, "Before I take a test I feel uneasy" and "I get nervous wanting to begin the test". A higher score indicates greater trait anxiety.

The final exercise for arousal control was a relaxation exercise. Many people will be familiar with both the breathing exercise (belly breathing) and the Progressive Muscle Relaxation Exercise (Jacobson, 1938), which includes tensing and then relaxing each part of the body. Candidates were asked to take note of the tension in their shoulder and neck as this was a primary area for muscle tension. Proper deep breathing and muscle relaxation are two ways in which the candidate can reduce the anxiety prior to a test.

With respect to arousal control, it is important for each candidate to recognize his/her optimal level of functioning. As such, the aforementioned exercises are a means of helping the candidates find their level and then implement strategies to get to that level prior to testing (i.e., psyching up or calming down).

2.2.1 Candidate's Workbook

In completing the CSAI-2, the candidate scored highest in somatic anxiety indicating her stress is manifested most physically rather than mentally. More specifically she discovered that her nervousness manifested itself in a queasy stomach and clammy hands. Although her cognitive anxiety score was not as high as her somatic anxiety, she did realize that her cognitive anxiety (apprehension and self-doubt) was often affected by her body's reactions to the stress affecting her lack of confidence.

The candidate's SCAT score was mid-range, suggesting she was neither too high nor too low in her trait anxiety. The candidate did, however, set a goal of lowering her score before the CNSC testing.

Although the relaxation exercises were not new to the candidate, she did learn to focus on the areas of her body that held the most tension (i.e., neck, shoulders and arms). With practice, the candidate was able to take one deep relaxing breath as a way to reduce the tension prior to stepping into the simulator for testing.

2.3 Concentration

The concentration section of the workbook included two exercises to be completed by the candidate. The first exercise allowed the individual to develop a pre-test routine by describing the events that occur on test day from the time you wake up until testing. A pre-test routine is one way in which individuals can increase consistency in the simulator. Routines are the use of a set sequence of thoughts and actions before the performance of key skills. Routines can ensure that all positive influences on performance are supported and all negative influences are kept at bay. Through the use of routines, individuals are encouraged to focus on task relevant information.

The second exercise included a Concentration Grid (Schmidt, Peper, & Wilson, 2001), which allows the candidate to enhance his/her attentional skills. The grid was comprised of 100 randomized numbers. Candidates were instructed to locate a specific number (chosen arbitrarily) and to then to locate as many numbers, decreasing in sequence, as possible in a one-minute time frame. This was to be completed in a distracting environment.

Concentration is fundamental to optimal simulator testing. Candidates often will attribute performing poorly to a loss of concentration or becoming distracted. As such, exercises that can improve one's focus and attention (concentration) will allow for successful performances when faced with critical events.

2.3.1 Candidate's Workbook

The candidate's pre-test routine included getting up, having a shower and eating a breakfast consisting of eggs. On her way to work, the candidate would listen to an inspiring song in order to get into the right frame of mind. The candidate would ensure she had water to bring into the simulator as well as her favourite pen. She would also spend time reviewing her cue cards before each test. This routine helped the candidate realize that she had consistency to her day and had control over some aspects of the testing environment. The routine also provided a calming effect for the candidate.

The grid exercise was helpful for the candidate in that she felt she had the ability to block out any distracting noise while completing the task. This skill is beneficial while in the simulator as many times the various distractions (e.g., other talking, negative self-talk) can cause a candidate to lose focus.

2.4 Confidence

Confidence was another mental skill discussed by Dr. Chandler. She outlined, using Bandura's Social Cognitive Theory (1986), the strongest determinants of confidence. These included: 1) previous accomplishments, 2) vicarious learning 3) verbal persuasion and 4) physiological states. She then discussed with the class ways in which they could increase their efficacy expectancy (confidence) and ultimately influence their outcome. Previous accomplishments included earlier simulator events in which the candidates had a successful performance. Vicarious learning included learning from the observation of others. Verbal persuasion included the feedback provided by others as well as the feedback from oneself. Finally, physiological states included how one felt while in the simulator. Dr. Chandler also asked all the candidates and instructors to write down on a cue card something they admired about each of the other candidates. She then collected the cue cards. This was to be used by each candidate as verbal persuasion as a way to increase confidence.

2.4.1 Candidate's Workbook

Although there was not much to complete in this section of the workbook, the opportunity to write down a positive trait about each of his or her peers was welcomed by everyone. The candidate was able to provide a strength for each candidate. Interestingly, what she saw as other's strengths was often something she found she was lacking herself.

2. 5 Positive Thinking

The final part of the workbook included an exercise on positivity. The candidate was to imagine he/she had just finished testing. They then had to answer the question "What do you want the Examination Team to say about you?" The purpose of this exercise was to allow the candidate to focus on the positive aspects of testing and to express their thoughts on the feedback they would like to hear from the examination committee

2.5.1 Candidate's Workbook

The candidate felt that it was important the examination team express she would be a great ANO in the station. The candidate also felt it important that the team express the she had both the confidence and the skills to be successful at her job. This last exercise allowed the candidate to think beyond the test day to what was really important, and that was being prepared for a job with a large responsibility.

3. The One-on-One

Dr. Chandler met with each candidate for a one-on-one session lasting approximately 30 minutes. These sessions dealt with the individual's personal stresses, strategies and strengths. She began each session by sharing with the candidate the cue cards written by their peers. She then went over the workbook with each candidate and attempted to tailor the mental strategies to the individual's need.

3.1 Candidate's One-on-One

The candidate's individual session was very helpful. The sharing of her peer and instructor's positive feedback was invaluable. The fact that she was viewed to be more confident than she felt and that others admired her methodical approach to an upset boosted her confidence in the strategies she was already using. A discussion about her somatic anxiety and how she could better control it was also very helpful. A review with Dr. Chandler of the candidate's pre-test routine reinforced her consistency but also reminded her that routines are not fixed, they can be modified.

4. Refresher Training

Shortly after becoming certified, the candidate again had the opportunity to attend a workshop led by Dr. Chandler with long time-certified operators. Although similar to the initial workshop, it served as a refresher for the candidate in that it reinforced the strategies that worked for her. The workshop also offered the opportunity to discuss different strategies other operators used for testing. This workshop, which followed soon after the initial workshop, was the key to the candidate's continued practice and implementation of the mental skills learned.

5. Conclusion

The use of sport psychology (mental training) in simulator testing was found to be very useful in particular for initial candidates. Although it is difficult to measure if improved Canadian Nuclear Safety Commission (CNSC) pass rates are a result of solely mental skills training, the workshop was very effective for the candidate. It allowed her the opportunity to express her own fears and stressors with respect to testing, as well as to hear the fears of others, and develop strategies geared towards reducing that stress. The individual sessions allowed the candidates to openly discuss, in confidence, their thoughts with respect to testing with someone not involved with Bruce Power.

Although the drawbacks are few, it is possible that bringing to light one's anxieties could potentially increase one's anxiety levels and ultimately affect the candidates' performance in a negative manner. Any amount of time taken away from the simulator could also be considered a drawback simply because that time in the simulator is invaluable.

6. Recommendation

It is recommended that this program continue at Bruce Power. For initial candidates like the candidate, the workshop allowed her to effectively deal with the stress and anxiety of simulator testing. Although many ANOITs at Bruce Power have had the opportunity to attend Dr. Chandler's workshop, few have had refresher or follow up workshops. As such, greater benefit could be realized if Dr. Chandler was able to work with the candidates on a more regular basis. Moreover, it is possible this program developed by Dr. Chandler would prove beneficial with other industry personnel.

7. References

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