THE ASSOCIATION OF UNCERTAINTY TOLERANCE AND TASK APPRAISAL ON LAW ENFORCEMENT STUDENT STRESS AND PERFORMANCE

A Thesis

Submitted In Partial Fulfilment of the Requirements

For the Degree of

Bachelor of Arts (Honours) in Psychology

University of Regina

by

Caeleigh Landry

Regina, Saskatchewan

March 31, 2019
Acknowledgements

I would like to start by extending my sincerest thanks to my supervisors; Katherine Arbuthnott, Greg Krätzig, and Tansi Summerfield. Their dedication to helping me pick a project that was of interest to me and that would contribute to the cadet training program has allowed me to present this thesis, of which I am incredibly proud. Their guidance and support have been necessary to any successes I have had throughout this project.

I would also like to thank my father, Sgt. Blaine Landry, for his professional support in helping me better understand the training program, the terminology associated with the policing world and to understand how my research can inform the training program. Thank you to my mother, Trish Landry, who has been so important in lending me her ear, her patience and, and her support throughout this process. I would also like to thank Zack for being so understanding as I changed plans regularly to accommodate this thesis.

Thank you to Cst. Laura Carroll and all the staff in the simulator training unit, without whom my project would not have gone so seamlessly. The unit graciously gave me their time and thoughts during the data collection stage of this project. I always knew that if I needed help regarding the sessions, I had someone to go to.

I would also like to extend my thanks to Billea Ahlgrim and Chet Hembroff who helped me extensively when running participants and without whom I would not have been able to complete my project.
Abstract

The present study investigated how trait intolerance of uncertainty (IU) and individual task appraisal relate to the stress and performance of law enforcement students. Participants were recruited from Royal Canadian Mounted Police (RCMP) Depot Division training academy. The participants completed a series of questionnaires measuring IU and task appraisal and performed a simulated emergency driving and use-of-force scenario. Arousal was measured through heart rate (HR) that was recorded using a wearable biometrics device, the Hexoskin® Smart Shirt. IU and task appraisal were highly correlated but had no association with either arousal or performance on either aspect of the task.

Keywords: Stress, arousal, performance, law enforcement students, intolerance of uncertainty, task appraisal
# Table of Contents

Title Page................................................................. i
Acknowledgements ...................................................... ii
Abstract ............................................................... iii
Table of Contents ..................................................... iv
List of Tables .......................................................... vi
List of Appendices .................................................... vii

Introduction ......................................................... 1

Task Appraisal ....................................................... 2

Intolerance of Uncertainty .......................................... 4

Purposes ................................................................. 4
Hypotheses ............................................................. 5

Methods ................................................................. 5

Participants ............................................................ 5

Materials and Procedure ........................................... 5

Driving simulator .................................................... 5
Use-of-force judgement simulation ................................ 7
Judgement simulator scenario assessment form .............. 8
Demographic questionnaire ........................................ 8
Challenge versus threat assessment ................................ 8
Subjective stress question ......................................... 9
Intolerance of uncertainty scale (IUS-12) ...................... 9
Experience .............................................................. 9
List of Tables

Table 1. Demographic characteristics of sample .............................................................. 5
Table 2. Performance Measures .................................................................................... 12
Table 3. Stress Measures ............................................................................................... 13
Table 4. IU and Task Appraisal ..................................................................................... 15
List of Appendices

Appendix A. Scenario Grading Form ................................................................. 25
Appendix B. Challenge Versus Threat Appraisal Question .............................. 27
Appendix C. Subjective Stress Question .......................................................... 28
Appendix D. Intolerance of Uncertainty Scale – Short Form .............................. 29
The Association of Uncertainty Tolerance and Task Appraisal on Law Enforcement Students

Stress and Performance

Stress and performance are widely researched areas, yet there is still much to learn about these areas in a law enforcement context. Law enforcement officers and other public safety personnel are repeatedly exposed to stressful situations such as assaults and motor vehicle accidents that may test their skills and abilities as a police officer. Recently, many public safety personnel are beginning to report symptoms of mental illness, including Post-Traumatic Stress Disorder (PTSD), thanks to the increased public and professional awareness of mental health. Thus, it is important that researchers investigate what individual limits exist and what factors influence such high levels of stress within the public safety personnel population.

There are many negative side effects associated with stress, including emotional, social, cognitive, and physiological consequences that can result from extreme stress (Salas, Driskell, & Hughes, 2009). However, stress can also be adaptive and aid people to find alternative solutions to problems. As stress levels increase, however, this ability to find new solutions narrows and the individual may find themselves at a loss for a workable solution to their problem (Salas et al., 2009). Thus, stress is a complicated concept as it can both hinder and improve human performance depending on how intensely it is felt and how the individual perceives that stress. In simple tasks, stress is expected to have an inverted U-shape in which there is an optimal level of arousal for a given task – less than that and the individual does not exert themselves enough and more than that and the individual does not perform the task properly (Anderson, 1976).

Acute stress (i.e., stress that is caused in a given instant due to salient stimuli and does not last over time) may cause slower reaction times, distraction, narrowing of attention, tunnel vision, decreased search activity, and many other negative effects on cognitive abilities that are
imperative to preserving safety in a dynamic, ever evolving and sometime unpredictable law enforcement environment (Salas et al., 2009). Stress can be initiated by a multitude of factors, including noise, time pressure, task load, group pressure, and threat (Salas et al., 2009). Each of these aspects is common in a law enforcement environment. Time pressure, for example, is often heightened as law enforcement officers know they have a limited amount of time in which to calm or dissuade an assailant or risk injury to themselves or others. In addition, they must pay attention to a broad array of factors – they must maintain communication with the dispatcher as well as other officers who have responded to the call. They also must be aware of any bystanders, and effectively handle both the complainant and the subject of the call. Group pressure, as explained in stress research, is the added stress and pressure felt by an individual when they are aware that they are being watched or evaluated. In the context of this research, the threat aspect is particularly important; individuals are generally expected to experience stress if they believe that the situation is likely to be a threat to themselves or others surrounding them.

**Task Appraisal**

Task appraisal is the process of taking the entirety of a situation into account and categorizing the situation with respect to its significance for wellbeing (Tomaka, Blascovich, Kelsey, & Leitten, 1993). There are two individual levels of task appraisal. At the primary level, the individual identifies the type and severity of risk they are encountering (Tomaka et al., 1993; Lazarus & Folkman, 1984). The secondary appraisal is when the individual develops their perception of the risk as well as an idea of what skills the situation requires and whether or not they possess the required skills (Tomaka et al., 1993; Lazarus & Folkman, 1984). These appraisals then lead to the individual’s judgment of whether they have the requisite skills and resources to meet the situational demands (Tomaka et al., 1993; Lazarus & Folkman, 1984). In
addition to the two levels, there are two types of appraisals – one that occurs after an event and one that occurs before an event.

The current research project will focus on a priori assessment of challenge versus threat. In this, participants will be asked to judge whether they believe they can meet the demands of a given situation before the given situation occurs. If an individual develops a threat appraisal, this indicates that they believe they do not have enough resources to cope with the stressor (i.e., the secondary appraisal). Past research has indicated that individuals with a high threat assessment perceive higher subjective stress, experience more negative emotions, and do not perform as well as those with a challenge appraisal (Tomaka et al., 1993). Despite their appraisal, they may still be able to overcome the situation, however this type of appraisal is linked to poorer performance. Challenge appraisals, on the other hand, are when an individual perceives the danger, yet believes they have the resources and abilities to overcome that stressor. Prior research has demonstrated that those with a challenge assessment are more likely to experience a higher heart rate (HR) and reduced cardiovascular resistance (Tomaka et al., 1993). Furthermore, challenge and threat are not mutually exclusive, and someone may interpret a situation as both a challenge and a threat (Lazarus & Folkman, 1984). This appraisal is a fluid process as the individual will constantly develop and re-develop their assessment as the situation progresses. For this reason, it is important that the challenge versus threat assessment is asked for a priori, because when this is asked post hoc, individuals may base their judgement on their level of physiological arousal or their performance outcome and not their cognitive processes (Tomaka, Blascovich, Kibler, & Ernst, 1997).
Intolerance of Uncertainty

Uncertainty Tolerance, commonly referred to as Intolerance of Uncertainty (IU), is the tendency to find uncertainty uncomfortable and to try to avoid it as much as possible. It is a person’s ability to endure the potential discomfort that results from missing information and the feeling of uncertainty regarding that missing information (Carleton, Desgagné, Krakauer, & Hong, 2018). IU is related to appraisal wherein the individual makes a judgement about the potential gains or losses from the situation (i.e., primary appraisal) as well as whether they have the resources to manage the situation (i.e. secondary appraisal; Tomaka et al., 1993). IU is a cognitive individual difference and has both state and trait characteristics.

When faced with fear-inducing stimuli, a fearful feeling is maintained by the uncertainty that the individual associates with the situation (Carleton, 2016). People may respond in multiple different ways to uncertainty including rumination, avoidance, or other potentially unhealthy coping mechanisms. IU may also cause an individual to be incapable of acting in a situation – this is a concern in a law enforcement context as the officers must be ready to respond and must respond in a timely manner (Dugas et al., 2005). As an individual’s uncertainty about a situation grows, they may lose confidence in their ability to later succeed in the situation they are facing. In this way, IU is predicted to be related to challenge versus threat assessment (i.e., task appraisal) wherein the higher levels of IU experienced by the individual, the more likely they are to find ambiguous situations threatening (Dugas et al., 2005). Therefore, it is possible that high levels of IU are positively correlated with a high likelihood of people making threat assessments.

Purpose

To date, there has been no research on uncertainty tolerance in a law enforcement setting. Therefore, the purpose of the study is to examine the relationships among performance,
physiological arousal, uncertainty tolerance and challenge versus threat assessment (i.e. task appraisal) in Royal Canadian Mounted Police law enforcement students.

**Hypotheses**

Given previous research in non-law enforcement settings, I hypothesize there will be significant correlations between the dependent variables of IU, task appraisal, stress, and performance.

**Methods**

**Participants**

Forty-one participants were recruited for this study from the RCMP Depot Training Academy in their 17th week of their 26-week training program. This week was selected because the following week is where the participants are assessed on their emergency vehicle driving, a task in which they report makes them feel nervous and is physiologically arousing. The mean age of participants was 28.47 (SD = 6.13; Table 1).

<table>
<thead>
<tr>
<th>Table 1: Demographic characteristics of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex:</strong> n (%)</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td><strong>Age:</strong> M (SD)</td>
</tr>
<tr>
<td><strong>Previous Experience:</strong> n (%)</td>
</tr>
<tr>
<td><strong>Height (cm): M (SD)</strong></td>
</tr>
<tr>
<td><strong>Weight (kg): M (SD)</strong></td>
</tr>
</tbody>
</table>

**Materials and Procedure**

**Driving simulator.** The driving simulators are a part of the regular law enforcement student training program and are used to refine their driving skills as well as teach competence in
emergency vehicle procedures (i.e., lights, sirens, and increased speeds). The instructors have the capability of manipulating different aspects of driving including visibility and weather and road conditions (e.g., the amount of ice). The interior of the driving simulator is a replication of a regular police vehicle. The driving simulator includes much of the equipment that standard police vehicles have (e.g., radio, lights, sirens) and realistic standard vehicle equipment (e.g., speedometer, car set, steering wheel). However, it is missing the computer that would normally be present in a police vehicle.

This study was conducted in an operational training setting. Each training session within the program introduces new skills that build on previously learned information and prepares the law enforcement student for the upcoming sessions. As a result, the following sessions occurred in a consistent order to keep training consistent between all law enforcement students. The first training session consists of ten drives that increase in difficulty. The seventh and tenth drives in this series were examined in this research. In an effort to simplify exposition, they will henceforth be referred to as drives one and two, respectively. The second training session contains only one drive and this will be referred to as drive three.

All three drives required the participants to navigate four intersections in an urban environment while their lights and sirens were operating. Drive one was done with no dispatch, drive two included dispatch, and drive three included dispatch and was an evaluation. Drive three also required the participants to respond to an emergency call involving an ‘officer down’; these calls indicate that a fellow officer is hurt and that there is an armed suspect in the area. Thus, the scenario is emotionally charged and cognitively demanding for the law enforcement student. This session also included a use-of-force judgement. This second part is administered only if the participant completed the drive (i.e., is not involved in a collision). Once the simulated drive is
successfully completed, the participant exited their driving simulator and entered the adjacent judgement simulation room. At the end of the simulation, the computer generates a score on the participant’s performance.

At the end of each of the drives, the computer generated a score assessing the participants’ driving performance including their speed, lane position, and their adherence to RCMP driving policy. This objective measure was used to assess the participants’ performance in each drive. Additionally, drive three was also assessed by the facilitators to examine the participant’s technique of which the system is unaware, such as how well the participant is holding the steering wheel.

Use-of-force judgement simulation. The use-of-force judgement simulators are used to allow law enforcement students to experience scenarios they may encounter in the field in a safe and risk-free environment. The enforcement tools used in the simulator are identical to the intervention tools regularly carried by law enforcement officers (i.e., firearm, Oleoresin-Capsicum [OC]-Spray, Conducted Energy Weapon [CEW]). The only difference is that they are rendered inert and are outfitted with lasers that interact with the video images projected on the screen.

Once in the judgment simulator the participant encounters a law enforcement officer treating an officer who has been shot. The unwounded officer gives a vague description of the suspect, which is made more difficult as this occurs in a dark alley. As the participant continues to make their way through the simulation, they encounter a person who does not match the description of the suspect; however, within two seconds the subject raises a pistol and begins to shoot in the direction of the participant. Once the suspect appears, the participant has to make a series of decisions (e.g., matching the description given to what is encountered, determine if the
person presents a threat, locate adequate cover to stand behind if this person is a threat, decide whether they should aim their pistol (which should already be drawn in this scenario), and whether they should shoot.

This is designed to be a stress inoculation task, meaning that the task was designed to introduce the law enforcement students to stressors to allow them to develop the necessary skills to reduce the amount of stress they feel when encountering similar situations (Meichenbaum, 2017). Once they have developed these skills within the simulations, it is believed that they will be able to translate these skills into real emergency calls.

**Judgment simulator scenario assessment form.** In order to measure performance, the standard rubric the instructors use to assess law enforcement students was used (Appendix A). This rubric assesses whether the students were able to properly utilize their skills and tools while maintaining a professional police presence. The instructors complete this assessment form as part of the regular training program of the law enforcement student and a completed, anonymized copy of this assessment was provided to the researcher.

**Demographic questionnaire.** The participants were given a demographics questionnaire that included questions about biological sex, age, and previous experience in relevant fields (i.e., military, law enforcement, security, emergency medical service, or other first responder.) The participants were also asked when the last time they participated in rigorous physical activity was and how much caffeine they have consumed that day, as both of these can influence physiological measurements. Due to this, they were given the demographics form before both of the driving sessions.

**Challenge versus threat assessment.** The participants received the challenge versus threat assessment before the second driving scenario (Appendix B). Using a Visual Analogue
Scale (VAS), the participants were asked to what degree they agree with the statement: “Do you think the second driving scenario will be more of a challenge to overcome or a threat to respond to? That is to say, do you believe that you have the necessary skills and abilities to be successful (challenge) or do you feel inadequately prepared (threat)?”

**Subjective stress question.** The participants were also asked to rate their subjective levels of perceived stress for the second session including both the drive and the judgement scenario (Appendix C). This question was asked after they completed the required tasks. These questions helped to inform the physiological readings captured by the Hexoskin® Smart Shirt. Using a VAS, ranging from “no stress” to “extremely high stress,” the participants were asked: “now that you have completed the simulation, how stressful did you experience it to be?” This question is important as physiological arousal, such as in the case of a challenge appraisal, may not be associated with a negative stress assessment and thus the individual may not have felt subjective stress despite the increased arousal.

**Intolerance of uncertainty scale (IUS-12).** This 12-item scale was published by Carleton, Norton, and Asmundson (2007; Appendix D). Items include “unforeseen events upset me greatly” and “uncertainty keeps me from living a full life.” Cronbach’s alpha indicated high internal consistency, $c = .94$ and the shortened scale correlated highly with the original 27-item scale, $r = .96$ (Carleton, Norton, & Asmundson, 2007). The participants were asked to complete this form upon arrival at their drive three. The scale assessed the level to which they find uncertainty uncomfortable and how hard they work to avoid uncertainty in their lives.

**Experience.** The participants were also asked to indicate how much previous first responder experience that they had in order to see if this led to a difference in their performance or their arousal.
**Hexoskin® Smart Shirt.** The Hexoskin® Smart Shirt fits like a regular t-shirt and continually collects biometric data, such as HR and breathing rate. This Smart Shirt was worn by the participant during the entire data collection period (both simulations) and the biometrics data collected was used to measure the physiological arousal experienced by the participant during both driving sessions and the judgement simulation.

**Timing and Summary of Procedure**

One week before drives one and two, I met with the law enforcement students without any of their program instructors present. At that time, I explained the project and the students were given a consent form to read and sign. It was emphasized that the law enforcement students’ decision to participate and the data collected would have no impact on their performance in the training program nor on their job prospects upon the completion of the program.

A week after receiving consent, the participants attended drives one and two and, upon verbal renewal of consent the participants were outfitted with a Hexoskin® Smart Shirt. Participants sat still for five minutes before beginning the questionnaires to collect baseline data of their HR in a resting state. This allows for the comparison between resting HR and their HR when engaged in an activity to see if the target activity increases arousal rates. HR data was collected from the participant while they completed the demographics questionnaire and later as they completed the first drive. Upon completion of drives one and two, the participants were asked to sit still and relax for another five minutes while wearing the smart shirt to collect recovery baseline measurements (i.e. how long it takes for their HR to return to the resting state collected at the beginning of the session).
Drive three occurred one and a half weeks later. Upon verbal renewal of consent, participants were again outfitted with the Hexoskin® Smart Shirt. Once outfitted, there was a five-minute period where the participants were again asked to sit still and relax in order to collect resting baseline measurements. Once five minutes lapsed, the participants completed a shortened demographics form (i.e., questions regarding their physical activity and caffeine intake on that day), the appraisal questionnaire, and the intolerance of uncertainty questionnaire.

Once they completed the questionnaires the participants began drive three. The participants were asked to “prepare for duty” by obtaining their intervention tools and ensuring they are operational (i.e., pistol, OC-spray, flashlight, baton). This is standard practice in all judgment simulation sessions within this law enforcement training academy.

Once equipped, the participant began the simulated drive and completed the Emergency Vehicle Response Intersection Clearing (EVRIC; i.e., lights and sirens) manoeuvres while responding to an “officer down” call. They were asked to properly communicate with a dispatcher. The dispatcher was a program instructor who asked the participant questions and provided information regarding the call at predetermined points during the simulated drive. If the drive was successfully completed, the participant immediately proceeded to the judgement simulator.

Instructors evaluated the participants’ performance based on the rubric used for this training session. After the completion of the scenario, the participants were asked to answer the subjective stress question, and before exiting the judgement room the participants were seated and instructed to sit still and relax for five minutes to collect baseline recovery measurements.
Results

Performance Scores

The mean computer and instructor scores for the three drives and the judgment scenario are shown in Table 2. A repeated measures Analysis of Variance (ANOVA) of performance with a Greenhouse-Geisser correction showed a difference between the computer driving scores depending on the demands of the driving session, $F(1, 30) = 31.06, p < 0.001, \eta^2_p = 0.51$. Post hoc tests using the Bonferroni correction revealed that there was no statistically significant difference between the scores for drive one and drive two ($M = 88.93, SD = 6.59$ vs $M = 85.21, SD = 18.16$), $p > .05$, nor was there a difference between drive two and three scores ($M = 85.2, SD = 18.16$ vs. $M = 81.24, SD = 6.23$). However, there was a statistically significant difference between drive one and drive three scores ($M = 88.9, SD = 6.59$ vs. $M = 81.24, SD = 6.23$), $p > .001$.

<table>
<thead>
<tr>
<th></th>
<th>Drive One</th>
<th>Drive Two</th>
<th>Drive Three</th>
<th>Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>99.93</td>
<td>85.21</td>
<td>81.24</td>
<td>72.91</td>
</tr>
<tr>
<td>sd</td>
<td>1.18</td>
<td>3.26</td>
<td>1.12</td>
<td>19.51</td>
</tr>
</tbody>
</table>

Physiological Arousal

The heart rate measures and subjective stress ratings are shown in Table 3.
Table 3: Stress Measures

<table>
<thead>
<tr>
<th></th>
<th>Drives One and Two</th>
<th>Drive Three</th>
<th>Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>sd</td>
<td>M</td>
</tr>
<tr>
<td>HR Baseline</td>
<td>86.70</td>
<td>15.59</td>
<td>81.31</td>
</tr>
<tr>
<td>HR Minimum</td>
<td>65.93</td>
<td>13.14</td>
<td>85.90</td>
</tr>
<tr>
<td>HR Average</td>
<td>86.11</td>
<td>11.58</td>
<td>99.76</td>
</tr>
<tr>
<td>HR Maximum</td>
<td>128.00</td>
<td>22.15</td>
<td>118.27</td>
</tr>
<tr>
<td>HR Recovery</td>
<td>83.71</td>
<td>20.01</td>
<td>85.75</td>
</tr>
<tr>
<td>Stress Rating</td>
<td>---</td>
<td>---</td>
<td>6.31</td>
</tr>
</tbody>
</table>

**Drives one and two.** A repeated measures Analysis of Variance (ANOVA) of HR, measured in beats per minute (BPM), determined that mean HR differed significantly among resting baseline, maximum HR, and HR recovery for the first session (i.e., drives one and two), $F(2, 78) = 76.55, p < 0.001, \eta^2_p = 0.78$. Post hoc tests using the Bonferroni correction revealed that there was no statistically significant difference in BPM between the resting HR and HR recovery ($M = 86.92, SD = 15.73$ vs. $M = 83.71, SD = 20.01$), $p > .05$. However, there was a significant difference in BPM between resting heart and maximum HR ($M = 86.92, SD = 15.73$ vs. $M = 128.00, SD = 22.15$), $p > .001$, as well as between maximum HR and HR recovery ($M = 128.00, SD = 22.15$ vs. $M = 83.71 \pm 20.01$), $p > .001$.

**Drive three.** A repeated measures ANOVA of HR measures was also run on drive three and determined that mean HR differed significantly among resting baseline, maximum HR, and HR recovery for this drive, $F(2, 80) = 104.62, p < 0.001, \eta^2_p = 0.84$. Post hoc tests using the Bonferroni correction revealed that there was no statistically significant difference between the
resting HR and HR recovery (M = 81.31, SD = 16.01 vs. M = 85.75, SD = 16.31), p > .05. However, there was a significant difference in BPM between resting heart and maximum HR (M = 81.31, SD = 16.01 vs M = 118.27, SD = 16.03), p > .001, as well as between maximum HR and HR recovery (M = 118.27, SD = 16.03 vs. M = 85.75, SD = 16.31), p > .001.

Judgement scenario. A repeated measures ANOVA of HR measures during drive three and the judgment scenario with a Greenhouse-Geisser correction determined that there were statistically significant differences among resting HR, maximum HR, and HR recovery for the judgement scenario specifically, $F (2.30, 84.97) = 115.25, p < 0.001, \eta^2_p = .83$. Post hoc tests using the Bonferroni correction revealed that there was no significant difference in BPM between the resting HR and HR recovery (M = 81.37, SD = 16.34 vs. M = 85.04, SD = 16.33), p > .05. However, there was a significant difference between resting heart and maximum HR in the driving portion (M = 81.34, SD = 16.34 vs. M = 118.55, SD = 16.35), p > .001, as well as between the resting HR and maximum HR for the judgement scenario (M = 81.37, SD = 16.34 vs. M = 131.74, SD = 19.96), p > .001. Furthermore, there were also differences in BPM between the maximum HR in the driving portion and the judgement scenario (M = 118.55, SD = 16.35 vs M = 131.74, SD = 19.96), p > .001. The maximum HR for the driving session, as discussed previously, was significantly different from the baseline recovery. The maximum HR for the judgement scenario was also significantly higher than the HR recovery (M = 131.74, SD = 19.96 vs. M = 85.04, SD = 16.33), p > .05.

Arousal and driving performance. Arousal, as indicated by increased HR, was not significantly correlated with the drive three system drive score, $r (36) = -.101, p > .05, d = -.20$, the facilitator score, $r (38) = -.06, p > .05, d = -.12$, nor with the combined driving score (i.e., the system drive score and the facilitator score), $r (35) = -.098, p > .05, d = -.20$. Maximum HR was
also not significantly correlated with scores in the judgement scenario, \( r (38) = .100, p > .05, d = .20 \), nor with the overall score of the driving and judgement session score, \( r (35) = -.05, p > .05, d = -.09 \).

**Dispatch differences between sessions.** There was no relationship between HR in non-d dispatch drives, \( r (28) = .09, p > .05, d = .18 \), nor was there a statistically significant association between the dispatch drive score and the maximum HR, \( r (33) = -.03, p > .05, d = -.07 \).

**Subjective stress.** Subjective stress ratings were not significantly correlated with the driving score, \( r (36) = .13, p > .05, d = .27 \), the facilitator score, \( r (38) = -.07, p > .05, d = -.13 \), nor the combined drive score, \( r (35) = -.12, p > .05, d = -.24 \). Subjective stress ratings were not significantly related to scores in the judgement scenario, \( r (38) = .16, p > .05, d = .31 \), nor the overall driving and judgement session, \( r (35) = -.03, p > .05, d = .06 \).

Subjective stress was not statistically significantly related to maximum HR in the driving portion of the second session, \( r (41) = -.04, p > .05, d = -.08 \), nor was it statistically significantly related to maximum HR in the judgement scenario, \( r (38) = -.14, p > .05, d = -.2 \).

**Uncertainty tolerance and task appraisal**

Mean scores for ratings of IU and task appraisal are shown in Table 4.

<table>
<thead>
<tr>
<th>Table 4: IU and Task Appraisal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Three and Judgement</td>
</tr>
<tr>
<td>M</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>IU</td>
</tr>
<tr>
<td>Task Appraisal</td>
</tr>
</tbody>
</table>
Uncertainty tolerance. IU was examined for the second session, which included drive three and the judgement scenario. IU scores were not significantly related to either the computer-generated driving score, \( r (35) = -0.23, p > 0.05, d = -0.62 \), nor the facilitator’s score, \( r (37) = -0.24, p > 0.05, d = -0.49 \). However, the correlation between IU scores and the combined drive score was statistically significant, \( r (34) = -0.37, p < 0.033, d = 0.79 \). The participants’ scores in their judgement scenario was not significantly related to IU, \( r (37) = -0.10, p > 0.05, d = -0.20 \), nor was their overall session score (i.e. drive three and the judgement scenario), \( r (34) = -0.23, p > 0.05, d = -0.47 \).

Uncertainty tolerance was not found to be statistically significantly related to maximum HR in drive three, \( r (40) = -0.26, p > 0.05, d = -0.54 \), nor was it related to maximum HR in the judgement scenario, \( r (37) = 0.01, p > 0.05, d = 0.02 \). There was not a statistically significant relationship between IU and subjective stress either, \( r (40) = 0.114, p > 0.05, d = 0.23 \). However, there was a statistically significant relationship between IU and task appraisal, \( r (40) = 0.49, p < 0.002, d = 1.11 \).

Task appraisal. Task appraisal was not significantly correlated with the computer-generated score of performance, \( r (36) = -0.12, p > 0.05, d = -0.25 \), the facilitator score, \( r (38) = -0.05, p > 0.05, d = -0.10 \), nor the combined driving score, \( r (35) = 0.091, p > 0.05, d = 0.18 \). Task appraisal scores were also not significantly related to the scores in the judgement scenario, \( r (38) = 0.08, p > 0.05, d = 0.16 \), nor the overall score of the drive and the judgement scenario, \( r (35) = 0.08, p > 0.05, d = 0.16 \).

Task appraisal was not significantly related to subjective stress, \( r (41) = -0.20, p > 0.05, d = -0.44 \). There was also no statistically significant association between task appraisal and maximum HR in the driving portion of the second session, \( r (41) = -0.28, p > 0.05, d = -0.50 \), nor was there a
statistically significant relationship between task appraisal and maximum HR in the judgement scenario, $r (38) = -.14, p > .05, d = -.29.$

**Experience and driving performance.** Months of experience as a public safety personnel, in some capacity was negatively correlated with the score given by the system for the second session drive, $r (28) = -.42, p < .027, d = .92.$ This indicates, counterintuitively, that greater previous experience was associated with worse driving scores. A one-way ANOVA was conducted on field of experience and the driving score for the second session to better understand the results. The one-way ANOVA indicated there were statistically significant differences, $F (4, 31) = 6.99, p < .001, \eta^2 = .47.$ More specifically, it indicated that those without any experience performed better than those with experience.

**Discussion**

Consistent with hypotheses in previous literature, there was a statistically significant relationship between uncertainty tolerance scores and task appraisal scores. This would indicate that those with lower uncertainty tolerance are more likely to perceive an ambiguous situation as threatening. This, however, did not translate into significant differences in scores on either of the constructs for the sessions discussed. These results suggest that task appraisal and IU are not significant contributors to the performance of law enforcement students, which may occur during the training program. Unfortunately, this does not support previous findings in the field and may be related to social desirability. The participants are in a difficult program and they have to work hard to ensure their place in this program. For that reason, they may be less willing to report their difficulties in order to project confidence.

Despite the proposed relationship between IU and performance, the current study only showed an association in one facet of performance: the combined system and instructor score for
drive three. The combined score examined both the objective driving ability of the participants as well as the subjective ability of the participant to efficiently and effectively communicate while driving. IU scores, therefore, may relate more to the performance of more complex tasks rather than singular tasks in law enforcement students. This may be why IU scores were not significantly related to only one score or the other and why IU was not found to be a significant factor in the judgement scenario. Furthermore, IU was also not related to arousal in drive three, indicating that high IU scores were not significantly related to increased stress.

Task appraisal was also hypothesized to be related to performance, as would be consistent with previous literature, but the current study found no relationship among task appraisal and performance variables (Tomaka et al., 1993). The scale was designed so that low scores would indicate a challenge assessment and high scores would indicate a threat assessment. Firstly, the question as posed may have lacked criterion validity in that the participants often use the terms “challenge” and “threat” for other aspects of their training program, thus potentially confounding the results. Their instructors often refer to tests within their training program as a “challenge” to indicate the difficulty associated with the task and a “threat” often times refers to a suspect who is thought to be dangerous. In Tomaka’s studies (Tomaka et al., 1993; Tomaka et al., 1997) he was using a primarily university student population and thus the results may indicate that students and law enforcement officers may have a different understanding of what a threat and a challenge are. In the future, I would change the terminology used by asking if they feel prepared for the scenario and how confident they are in their abilities to do well in the scenario, omitting the words “challenge” and “threat” entirely from the question. Furthermore, as it was a self-report questionnaire, there is the risk of social desirability bias. The participants are in a difficult
program and they have to work hard to ensure their place in this program. For that reason, they may be less willing to report their discomfort in order to project confidence.

There was also no relationship between task appraisal and subjective stress nor to physiological arousal. This was inconsistent with Tomaka et al.’s (1993) findings where those with a challenge assessment were more likely to experience a higher heart rate as they were more likely to put in more physical effort if they believed they could do well. The present study may not have found this difference as the participants might have all exerted the same amount of effort in order to do well in their evaluation. Furthermore, the participants may have more expertise in completing these types of complex tasks than did the university students in Tomaka’s studies.

There were significant differences between performance scores as well as physiological arousal for drives one and three show that there is a difficulty increase when dispatch and the concern of an evaluation are added. Given that the drive three and the judgment scenario were designed to be complicated and to be used as a stress inoculation test, this is a positive result. Additionally, this is consistent with studies involving distracted driving, whereby the increased complexity of a task leads to increased collisions (Klauer et al, 2018). Additionally, the present study found no significant differences among scores in drives one and two or drives two and three, indicating the participants were able to handle the incremental differences better than had both the evaluation and dispatch been added at the same time. In contrast to the present results, Kratzig (2012) found significant differences among all three of the drives tested in this study. Later, Hembroff, Arbuthnott and Kratzig (2018) also found significant differences among all three of the same drives as used in this study. However, when these prior studies were done, the three drives were spaced over three different sessions. For the current study, these drives were
completed over two different sessions because the curriculum was modified to accommodate this lesson plan. As drives one and two occurred within the same session, it may be speculated that the small differences in performance observed in the present study may be due to practice effects within the session. Practice effects may also explain why there was no difference in arousal regarding whether or not there was dispatch within the drive.

Furthermore, the present study found no differences in physiological arousal for drives one and two. This is consistent with the lack of change in performance scores. However, there was an increase in arousal from the resting HR to the maximum HR as well as from maximum HR to resting HR for drives one and two. Similar differences were found among HR variables in drive three and the judgement scenario, with no differences between resting HR and baseline, but significant differences between resting HR and maximum HR as well as maximum HR and recovery HR. These results indicate that the participants were experiencing increased arousal during the session but that it is not so severe that they are unable to return to their resting rate once the scenario was complete. As the sessions are interactive, it is good that the participants are experiencing increased arousal. The participants’ ability to return to their resting heart rate also suggests that the participants are healthy and thus they are able to recover from the session.

Additionally, there was a significant difference between maximum HR for drive three and maximum HR for the judgement scenario. These results are especially important as it shows that the participants do experience increased arousal rates while in the judgement scenario than the drive and indicate that the law enforcement students may find the use-of-force judgement more stressful than driving. This makes sense as in the scenario they are aware they are interacting with a film in which an officer has been shot, that they do not have back up, and that there is
someone who is armed and dangerous. This increased level of stress indicate that the judgement simulation procedures are working as intended.

Subjective stress was not found to vary significantly with the performance variables either. Since their instructors were present, though unable to see their answers to the questionnaires, there is increased risk of the social desirability bias and ratings on this scale appeared to have little variance across participants. These scores also were not related to actual physiological arousal, which may indicate their physiological arousal was caused by activity and not “stress”. While physiological arousal has long been associated with stress in the literature, newer studies acknowledge that there is a difference in perceived stress based on whether it is thought to be positive or negative (Salas et al., 2009). Therefore, while someone may experience physiological arousal that can be perceived as stress, they do not interpret it this way. These findings may also support that the training program itself has allowed the participants to experience less stress, consistent with their stress inoculation training. There was not a significant relationship between stress scores and performance scores. This may be due to the fact that participants do not experience higher arousal rates between dispatch and non-dispatch drives.

Interestingly, there was a significant difference regarding performance in the second session driving score based on experience. The analyses demonstrated that those with more experience in public safety personnel fields performed worse than those with no experience. It can be speculated that this is a result of bad habits obtained in previous employment as a first responder as not all emergency vehicle driver training courses are as robust as that of the RCMP.

In conclusion, this study verified that there are arousal differences among these sessions within the law enforcement student training program and that there is evidence to show that
increased difficulty and the stress of an evaluation does lead to poorer performance. This means that the participants may be feeling the increased stress and arousal as the training program intends. These findings can help encourage stress inoculation tests in program to better prepare law enforcement students for the field. It also demonstrated that there is a relationship among task appraisal and uncertainty tolerance as has been previously hypothesized. However, the factors of IU and task assessment do not appear to be relevant to either stress, arousal, or performance with a law enforcement population. More research with a larger and more heterogeneous sample is needed to verify the accuracy of this conclusion, but the possibility that these factors do not significantly influence security workers is encouraging.
References


https://doi.org/10.1016/j.janxdis.2016.02.007


https://doi.org/10.1007/s10608-005-1648-9


## Appendix A. Scenario Grading Form

### Emergency Response Officer Down – Performance Assessment

<table>
<thead>
<tr>
<th>Cadet</th>
<th>Troop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Facilitator:**

<table>
<thead>
<tr>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Conditions for Feedback:**

- [ ] Accident/ Collision
- [ ] Fails to take action at scene
- [ ] Critical error that will place the public & police officer in jeopardy

### Part 1: Driving - Emergency Response

<table>
<thead>
<tr>
<th>Drive</th>
<th>Yes</th>
<th>No</th>
<th>Late</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Activates emergency lights and siren.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Consistently drove with Mic using push/pull steering technique.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Consistently straddles the center line and changes the siren pitch between 120 to 60 metres before intersection.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Consistently chooses the proper lane at 60 metres before intersection based on risk assessment.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Consistently conducts lane change sequence before moving into oncoming lane #2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Consistently centers up in the #1 lane before exiting the intersection.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Communicates, clear, concise &amp; appropriately.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

---

Version 8 STU/PDU Sessions 59 & 60  
Appendix 57.1  
2019-01-08
### Part 2: J-SIM – Officer Down

<table>
<thead>
<tr>
<th>J-SIM Officer Down</th>
<th>Yes</th>
<th>No</th>
<th>Late</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Fashlight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Use of Cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Firearm drawn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 ID/Police</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Arrest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Shot Suspect</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Time of first shot:** __________  **Effective shot #:** __________  **Rounds fired:** __________  **Number of hits:** __________

**4C's**

- [ ] Employed when prompted
- [ ] Employed, no prompting required

**Comments:**

---

**Facilitator Signature:** ____________________________  **Cadet Signature:** ____________________________

---

**Version 8 STU/PDU Sessions 59 & 60**
**Appendix 59.2**  2  **2019-01-08**
Appendix B. Challenge Versus Threat Appraisal Question

**Challenge Versus Threat Appraisal Question**

Participant Number: __________________________

The following questions are to be answered using a Visual Analogue Scale. In order to show your answer, you must mark a vertical line that represents your perception on the horizontal line.

**For example:**

Question: How tired are you today?

Not at all tired  [ ]  Extremely Tired

**Question:**

Do you perceive the DSIM 6 scenario to be more of a challenge to overcome or as a threat to respond to?

That is to say, do you believe that you have the necessary skills and abilities to be successful (challenge) or do you feel inadequately prepared (threat)?

Challenge  [ ]  Threat

Why did you select this rating?

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________
Appendix C. Subjective Stress Question

**Subjective Stress Question**

Participant Number: ____________________________

The following questions are to be answered using a Visual Analogue Scale. In order to show your answer, you must mark a vertical line that represents your perception on the horizontal line.

**For example:**

Question: How tired are you today?

[Visual Analogue Scale]

Not at all tired                                      Extremely Tired

**Question:**

Now that you have completed the simulation, how stressful did you experience it to be?

[Visual Analogue Scale]

No Stress                                            Extremely High Stress

Why did you select this rating?

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
Appendix D. Intolerance of Uncertainty Scale – Short Form

ASDP IUS-12 1 of 1

Initials/ID #:__________________
Date:___________________

Intolerance of Uncertainty Scale - Short Form

*(Carleton, Norton, & Asmundson, 2007)*

Please circle the number that best corresponds to how much you agree with each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all characteristic of me</th>
<th>A little characteristic of me</th>
<th>Somewhat characteristic of me</th>
<th>Very characteristic of me</th>
<th>Entirely characteristic of me</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unforeseen events upset me greatly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. It frustrates me not having all the information I need.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Uncertainty keeps me from living a full life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. One should always look ahead so as to avoid surprises.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. A small unforeseen event can spoil everything, even with the best of planning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. When it’s time to act, uncertainty paralyses me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. When I am uncertain I can’t function very well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I always want to know what the future has in store for me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I can’t stand being taken by surprise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. The smallest doubt can stop me from acting.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. I should be able to organize everything in advance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. I must get away from all uncertain situations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Score:_______