The Effects on Performance After Combining Driving and Judgment Simulation

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ABSTRACT

The use of simulators in training is well established in a number of professional fields (e.g. military, aviation, and medicine); however, in the face of a rapidly evolving policing environment and increasing financial pressures, law enforcement agencies are slowly beginning to adopt simulation technology as a way to address training gaps while being fiscally responsible. The Royal Canadian Mounted Police (RCMP) has adopted driving simulators (Krätzig, Bell, Groff, & Ford, 2010; Krätzig, & Hudy, 2011) as a training tool for their Cadet Training Program (CTP). Although the successful use of driving simulators (Krätzig, et al, 2010; Krätzig & Hudy, 2011) and the video-based use-of-force simulators is well established, the RCMP envisioned combining the driving simulations and use-of-force simulations to create a more dynamic and high-arousal training environment. Currently when cadets train in the driving or use-of-force synthetic environments, they are standalone training sessions with a focus on task-specific learning objectives, and as such cadet performance is very good. An experiment using 214 RCMP cadets was conducted, and the performance data from combining these two synthetic environments into one complex scenario, was analyzed. These results revealed performance decrease in both driving and judgment in previously demonstrated areas of proficiency. This paper discusses methods, measures, and results along with the future research directions.

ABOUT THE AUTHORS

Gregory P. Krätzig
Mr. Krätzig is responsible for investigating the efficacy of simulator technology in a law-enforcement training environment. He has lead many research projects investigating skills acquisition during simulator exercises (e.g., driving, course-of-fire, and use-of-force), measured against real world tests. He was awarded a 3-year Doctoral Scholarship from the Natural Sciences and Engineering Research Council (NSERC), as well as numerous other scholarships and awards, and was recently awarded $450,000.00 from the DRDC/CSSP program to further his work investigating training police officers using synthetic environments. Mr. Krätzig has several publications in this area including a book chapter discussing the use of synthetic environments as a law enforcement training tool. He has been invited to speak at the Federal Law Enforcement Training Centre, the Canadian Military Council, the Justice Institute of British Columbia, Corrections Services Canada, the University of Regina, the FBI, and has presented his findings at I/ITSEC 2010, 2011, and the Canadian Psychological Association. He received his Masters Degree in Experimental and Applied Psychology, and is nearing completion of his PhD in the same area. His dissertation topic in Experimental and Applied Psychology is an investigation of pistol skill acquisition in a synthetic training environment and the effects of skill retention between live and synthetic-fire trained cadets.

Rae Groff
Cpl. Rae Groff joined the Royal Canadian Mounted Police (RCMP) in 1990, and had eight years of operational policing in British Columbia which included General Duty, General Investigation Section, Municipal Traffic and Highway Patrol, before being transferred to the Immigration and Passport Section in Ontario. In 2006 she joined the RCMP Training Academy as an instructor in the Police Driving Unit before moving to the Simulator Training Unit in 2009. She was responsible for conducting research, developing programs and was instrumental integrating the driving simulators into the Cadet Training Program. Cpl. Groff has completed three years of a four year degree program in Psychology from the University of Regina and has recently accepted a posting with Customs and Excise in Kingston Ontario.

Fred Foerster
Cpl. Fred Foerster joined the Royal Canadian Mounted Police (RCMP) in 1990, and has 17 years of operational general duty policing in Saskatchewan and Alberta. In 2002 he completed a 9 month UN mission in East Timor and was an investigator for the Serious Crimes Unit investigating Crimes Against Humanity for the World Court. Upon his return, he was promoted to Corporal in 2003 where he commanded his own detachment for 4 years. In 2007 he transferred to the RCMP Training Academy where he taught Police Defensive Tactics and Applied Police Sciences before moving to his current position in the Simulator Training Unit in 2010. Cpl. Foerster is part of the research team that is investigating ways simulation training technology can be integrated into the current training program. He is a PPCT Defensive Tactics and Spontaneous Knife Defense Instructor, a certified A.C.E Knife Defense Instructor, and Winning Mind Ground Fighting Instructor. He also holds a 2nd Degree Black Belt in Tae Kwon Do, a Blue belt (3 stripe) in Brazilian Jiu Jitsu and is a Basic Firearms Instructor. Cpl. Foerster has a B.A. in Justice Law Enforcement and is currently finishing off a certificate in Mediation and a diploma in Human Resource Management.

Catherine Ford joined the Royal Canadian Mounted Police (RCMP) as a Regular Member in 1993. Before coming to the RCMP Training Academy she spent 12 years in British Columbia working as a general duty police officer in various mid-sized detachments. In 2005, she transferred to the RCMP Training Academy in Regina, Saskatchewan where she spent 4 years in the Police Driving Unit as a Facilitator/Instructor, before becoming a Police Driving potential Instructor (train the trainer). In 2009, she transferred to the Simulator Training Unit, as part of the research team investigating cadets' performance during emergency vehicle intersection clearing responses. She is also helped develop the new training program for the Police Driving Unit, with a focus on the integration of the driving simulators into the Cadet Driving Program. She recently received a promotion and has taken her skills to the Training Program support and Evaluation Unit. Her education includes a certificate from the University of Regina in Adult Education

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INTRODUCTION

In order to obtain greater efficiency in our demanding home and work lives, our ability to effectively multitask is becoming an increasingly essential skill for most of us (Bühner, König, Pick, & Krumm, 2006). Multitasking is described as attention shifting while performing two or more tasks over short periods of time (Oswald, Hambrick, & Jones, 2007). However, this definition alone does not describe task demands and accuracy with performance of multiple tasks with either novel or well-learned skills (Oberlander, Oswald, Hambrick, & Jones, 2007), an important consideration when investigating multitasking. Consider for a moment driving a car through an obstacle course while talking on your mobile phone. Although the act of driving a car, driving a car through an obstacle course, or talking on the phone, may be singularly performed with relative ease; put these tasks together and add time constraints and this task may become very difficult to successfully complete. As a result, the requirement to complete all of these tasks in concert with each other could lead to performance errors, which in some cases could have disastrous consequences (Mills, 2005).

The preceding example is a real world illustration of what occurs far too often in the real world. The National Highway Traffic Safety Association (NHTSA) reported that in 2010 over 3,000 people were killed in distracted driver related collisions. It with this in mind that police training includes teaching recruits/cadets how to drive in emergency response situations, while successfully managing multiple tasks that need to be completed under sometimes extremely emotionally charged and/or hazardous conditions (e.g., navigating traffic while communicating with a police dispatcher while driving to a life-threatening situation).

Without training it would not be unexpected to find that a student would commit any number of errors in the preceding scenario. When these errors do arise, the focus should not be on the fact that these errors occurred, but instead both the teacher and student need to be made aware of these errors as soon as possible (Mills, 2005; Oberlander, et al 2007), and then be allowed to correct them in subsequent scenario training instead of “hoping for the best” the next time.

While emotionally charged circumstances have been linked to increased driver error in cell phone related studies (Briggs, Hole, & Land, 2008) it is also argued that multitasking (Ishizaka, Marshall, & Conte, 2001; Köinig, Bühner, & Mürling, 2005), and personality type (e.g., Type A; competitiveness, striving to be the best, impatience, and feelings of being under time pressure, Type B: lack or decrease of Type A traits; Ishizaka, et al., 2001; Mathews & Brunson, 1979) should also be considered when investigating this area. Mills (2005); however, suggests that regardless of these potential variables that these differences relate to inexperience, and that with experience, comes greater task proficiency.

Support for Using Synthetic Environments in a Police Driver Training Setting

Police training programs are as diverse and varied as the communities police officers are sworn to protect, with each agency providing instruction tailored to meet their respective community needs. However, missing in most law enforcement officer (LEO) training environments are emergency response lights and sirens (EVO) learning exposures (Krätzig, Groff, & Ford, 2010; Krätzig & Hudy, 2011). Although EVO training in situ is difficult to do, agencies that have access to a closed driving track are able to develop scenarios that will provide their students with some EVO exposure; however, most police agencies do not have this type of access. Regardless of having track access or not, the first time a police officer drives with their lights and sirens activated, they most likely will do so outside of their respect training environment, and conceivably they may do this without the benefit of a field trainer at their side (Krätzig & Hudy, 2011). In 2010 the North American law enforcement community lost 50 police officers who died while driving a police vehicle. The majority of these tragic losses were a result of the LEO pursuing a suspect, or responding to a complaint (Officer Down Memorial Page, 2012). It is with this in mind that some law enforcement agencies are turning to synthetic environments to better prepare their officers for the field.

Over the past several years the Royal Canadian Mounted Police (RCMP) has conducted a series of experiments designed to 1) measure the efficacy of police driver training in a synthetic environment and 2) determine whether those skills are transferable in situ. Krätzig, et al, 2010 argue that training in a synthetic environment does transfer to a real world setting (Figure 1), and that the use of this technology can address a gap in training that was not previously made available to police students. Additionally, an interesting by-product of the research was a significant savings in training time through fewer training iterations.

RCMP cadets are required to successfully complete a rigorous 24-week training program. This program includes training in areas such as Police Defensive Tactics, Firearms, Academics, etc. Proficiency in the advanced driving course (ADC) is one such program that the cadet must pass before leaving the academy. During this scenario the cadet is dispatched to a complaint, and using this information, the cadet must locate the suspect and if necessary make an arrest. These scenarios often involve the cadet "pulling over" a suspect’s vehicle, and most end without incident. While the majority of these scenarios do not involve a pursuit, if a pursuit is justified, the cadet will invariably have to navigate the intersection on the track.

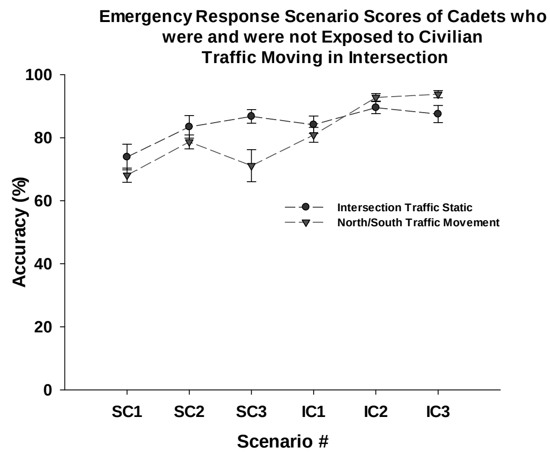

Figure 1. *Note*: SC1 = Simulator scenario straight through on green light, SC2 = Simulator scenario turn left on red light, SC3 = Simulator scenario straight through on red light, IC1 = Track scenario straight through on green light, IC2 = Track scenario turn left on red light, IC3 = Track scenario straight through on red light (Krätzig et al, 2010).

Previously our cadets acquired these skills through classroom sessions and videos which were followed by hands-on coaching with an instructor. However, the RCMP now uses driving simulators to provide more learning opportunities that were not previously possible (Krätzig, et al., 2010). Although the performance expectation of our cadets is high, the ADC occurs near the end of their training program, and speed restrictions on base do not always produce the extreme emotional responses that are evidenced when driving at elevated speeds through city streets accompanied by all the unpredictable hazards that police officers invariably encounter (e.g., pedestrians, cyclists, moving vehicles, etc). In order to increase the arousal level of cadets, we combined the driving simulators with the video-based use-of-force simulators to create a more dynamic and emotionally charged training environment.

METHOD

Participants

Four troops of RCMP cadets (N = 214; 43 Female), mean age 28.47, SD = 7.31 were used for this study.

Materials

The RCMP Cadet Training Program consists of 24 weeks of intense training. Each cadet must successfully complete a number of tests that are scheduled throughout their program. These tests are designed to evaluate each cadet's progress in all areas of policing including academics, police driving, police defensive tactics, etc. The synthetic environment tests that each cadet completes occur at three different points in training (i.e., EVO week 18, Radio-dispatch week 19, Code-3 week 21; these tests will be explained shortly). Cadet performance was evaluated using EVOC-101 software (AST, 2001) loaded onto L-3 Communications driving simulators. The use-of-force portion of the experiment was conducted using hardware and software from Advanced Interactive Systems (AIS, 2010). These data were analyzed using SPSS 19.0 (IBM, 2011) statistical software, and the results are considered significant at $p < .05$.

Part of normal police work, sees the officer patrolling a specific area of a community, and over the course of a single shift an officer may travel the same stretch of road several times. This "familiarity" is one of our rationales for using the same scenario for each of the following tests (i.e., EVO, Radio-Dispatch, and Code-3). Additionally using the same scenario allows for direct comparisons between each test.

The first two sessions (i.e., EVO and Radio-Dispatch) require the cadet to complete multiple scenarios before being tested. It is only the Code-3 scenario that is a single exposure test.

EVO. This session is made up of seven scenarios that increase in both complexity and the amount of time needed to compete them (25 s to 180 s). Each scenario requires the cadet to successfully negotiate between one and five urban intersections, while traveling with lights and sirens activated, to a complaint. The first scenario acquaints the cadet with the functionality of the simulators, and requires the cadet to clear one green light intersection. The seventh scenario (i.e., EVO test) takes approximately 180 s to complete, and is comprised of five intersections with varying numbers of vehicles, pedestrians and cyclists. These "hazards" occur both in and between each of the intersections. Scoring is made up of 54 testing points (e.g., activating lights and sirens, stopping for cross-traffic, etc), and are dichotomously scored (i.e., pass/fail). A minimum score of 80% is required to pass this test.

Radio-Dispatch. This session is made up of four scenarios that increase in both complexity and time between the first and fourth scenario. As evidenced during the EVO session, each cadet needs to successfully negotiate between one and five urban intersections while traveling with lights and sirens activated to a complaint. However, we have added the additional variable of communicating with a dispatcher (unlike the EVO scenarios). The cadet now is required to interact with a dispatcher, and those interactions occur for each cadet at predetermined points within the scenario (e.g., radio-dispatcher calls as the cadet is 10 m from intersection #1. The fourth scenario takes approximately 180 s to complete, and a minimum score of 80% is needed to pass this test.

Code-3. This session occurs near the end of the 24-week training program. This scenario builds on the two previous examples; however, the radio-dispatch now begins with a plea from an officer who has just been shot, and the active shooter is still at large. Immediately following the officers plea for help, a dispatcher begins communicating with all units to attend Code-3 (officer down). We also manipulated one additional environmental component, and that is to set the scenario for half the cadets to occur during a simulated night-time setting and the other half of the cadets to complete this call during a simulated day-time setting. In order to enhance the training experience, we added a video-based use-of-force simulation in which the cadet must interact with one police officer (who gives a description of the suspect) while attending to the wounded officer.

The cadet must first complete the driving simulation while interacting with a dispatcher on the radio. Once they have arrived at their destination they must inform the dispatcher, exit the simulator, and enter a video-based use-of-force simulation. During this simulation the cadet must interact with the video of a police officer who is administering first-aid to a second police officer who has just been shot in the abdomen. After the officer who is administering first-aid gives a brief description of the suspect to the cadet, the video continues until the possible suspect appears from around a corner, at which time the cadet must respond with the appropriate use-of-force option (e.g., pistol, OC-Spray, etc).

Performance measurement for the driving scenario is as described in the two preceding tests (i.e., EVO and Radio-Dispatch). For the video-based use-of-force scenario, the articulation (i.e., verbal narrative of the event from initial dispatch to the end of the use-of-force scenario), communication skills (e.g., ability to communicate with dispatcher, with officer administering first-aid, with suspect), risk assessment (e.g., intersection clearing, suspect location unknown) radio communications (e.g., with dispatcher, handling radio while driving), identify self as police (e.g., to suspect; "stop police"), and arrest procedures are evaluated and scored.

Use-of-Force. Once cadet has completed the driving scenario, they exit the driving simulator and enter the video-based use-of-force simulation (AIS, 2010). During this session the cadet interacts with the video-based actors (e.g., officer who has been shot, officer administering first-aid and the suspect). This portion of the test is evaluated by an instructor (who also acts as dispatch).

During this time the cadets are evaluated in eight domains.

1. Situational awareness (Scanning environment, cover, position of threat)
2. Communication with dispatch (Officer safety)
3. Identify as Police (Law and Policy)
4. Arrest (Reason for arrest, Prior to intervention, Law and Policy)
5. Application (Application of the Use-of-force model; Law and Policy)
6. Intervention (Application of the proper use-of-force option)
7. Officer Behaviour (Professionalism)
8. Articulation (Accuracy and detail of recounting the event as it occurred)

Cadets are evaluated in each of these areas using an 8-point Likert Scale, and good inter-rater reliability was established.

RESULTS

Performance

Performance data for cadets who completed all three test drives (i.e., EVO, Radio-Dispatch, Code-3) were analyzed using a 3 (Test; EVO vs. Radio-dispatch vs. Code-3) X 2 (Time of Day; Day vs. Night) repeated measures ANOVA with Time of Day as the between subjects factor. There was an effect of Test-type with performance decreasing between EVO and Code-3 (EVO = 85.23% vs. Radio-dispatch= 77.35% vs. Code-3 = 69.93%), $F(1,51) = 145.26$, $MSE = 41.99$, $p < .001$. There was no Time of Day interaction $F(1,51) = 2.10$, $MSE = 41.99$, $p = .15$ (Table 1).

Table 1. Mean Percentage Score by Test and Time of Day

Test	Mean	SE
EVO	85.23	1.10
Radio-Dispatch	80.51	0.99
Code-3 Day Completed	71.52	1.76
Code-3 Night Completed	68.34	1.54
Code-3 Day Collisions	51.40	6.00
Code-3 Night Collisions	41.84	4.85

Note. All Cadets completed the EVO and Radio-dispatch tests during daylight hours. Only the Code-3 test had day-time or night-time testing.

The data were also analyzed using dependent *t*-tests and effects sizes were calculated (Field, 2009)[1]. Cadets' test performance was better with the EVO test ($M = 82.37$, $SE = .66$) than it was with the Radio-dispatch test ($M = 79.46$, $SE = .62$), $t(176) = 4.69$, $p < .001$, $r = .29$. Cadets' test performance was better with the EVO test ($M = 83.83$, $SE = 1.01$) than it was with the Code-3

[1] Effect size $r = .20$ considered small; $r > .50$ considered large (Field, 2009)

Test (*M* = 70.81, *SE* = .98), *t*(83) = 11.79, *p* < .001, *r* = .79. Test performance was better with the Radio-dispatch test (*M* = 80.66, *SE* = .80) than it was with the Code-3 Test (*M* = 70.25, *SE* = .93), *t*(91) = 10.18, *p* < .001, *r* = .73 (Figure 2).

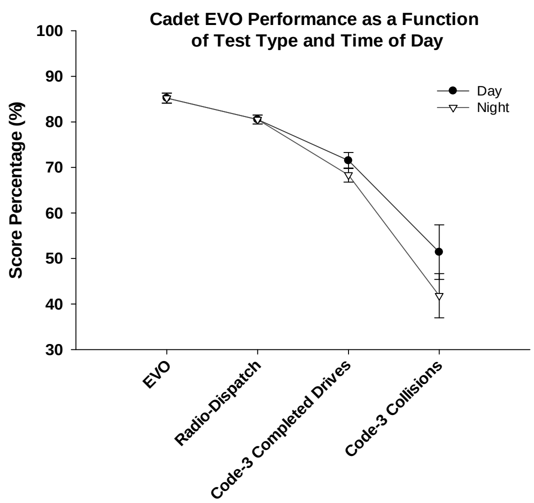

Figure 2. Note: EVO-Test = Emergency Vehicle Operations Simulation Test, Radio-dispatch Test = Emergency Vehicle Operations Simulation Test interacting with Dispatcher, Code-3 = Emergency Vehicle Operations Simulation and Judgment Simulation Integration Test

A one-way ANOVA were also conducted to determine if there were performance differences between cadets being tested during a day-time or night-time Code-3 Scenario; however, no differences were found *F*(1,57) = .913, *p* = .343. Additionally, cadets who were involved in a collision were assigned zero for a score but were not included in the preceding analysis. While it is intuitively appealing to include all cadets, a score of zero negatively biased the results and it was decided to look only at those cadets who completed the driving scenarios. Mean scores for cadets who were involved in a collision were also included in Table 1 and Figure 2 for illustration purposes only. However, collision data will be discussed later.

Time

Time to complete all three test drives (EVO, Radio-Dispatch, Code-3), were analyzed using a 3 (Test; EVO vs. Radio-dispatch vs. Code-3) X 2 (Time of Day; Day vs. Night) repeated measures ANOVA with Time of Day as the between subjects factor. Data from only those cadets who completed the drive were used as those cadets who were involved in a collision were assigned a time of 0. There was an effect of test with the time to complete the test decreasing between EVO and Code-3 (EVO = 177.26 s vs. Radio-dispatch = 167.17 s vs. Code-3 = 123.73 s), *F*(1,51) = 131.19, *MSE* = 568.78, *p* < .001. There was no Test X Time of Day interaction *F*(1,51) = .84, *MSE* = 568.78, *p* = .36 , with all cadets time decreasing between tests regardless of the Time of Day. There was no main effect of Time of Day *F*(1,51) = .02, *MSE* = 603.15, *p* = .90 (Table 2).

Table 2. Mean Time in Seconds Needed to Complete Scenario by Test and Time of Day

Test	Mean	SE
EVO	177.26	3.38
Radio-Dispatch	167.17	2.39
Code-3 Day Completed	127.88	4.87
Code-3 Night Completed	119.57	4.27
Code-3 Day Collisions	111.79	5.48
Code-3 Night Collisions	105.38	3.57

Note. All cadets completed the EVO and Radio-dispatch tests during daylight hours. Only the Code-3 Test had day or night testing.

Time to complete the scenario (RT) for each of the three test drives (EVO, Radio-Dispatch, Code-3), were analyzed using dependent *t*-tests. Cadets completed the Radio-dispatch test faster (*M* = 172.34, *SE* = 1.70) than the EVO Test (*M* = 180.79, *SE* = 2.00), *t*(176) = 4.31, *p* < .001, *r* = .31. Cadets completed the Code-3 Test faster (*M* = 129.43, *SE* = 2.97) than the EVO Test (*M* = 179.00, *SE* = 2.82), *t*(82) = 12.51, *p* < .001, *r* = .81. Cadets completed the Code-3 Test (*M* = 130.19, *SE* = 2.75) faster than the Radio-dispatch test (*M* = 170.74, *SE* = 2.12), *t*(90) = 12.57, *p* < .001, *r* = .79 (Figure 3). Means for time of day were calculated (Day vs. Night) with a one-way ANOVA, there was no effect on the length of time to complete the Code-3 Scenario *F*(1,57) = 1.05, *p* = .310 regardless of the time of day.

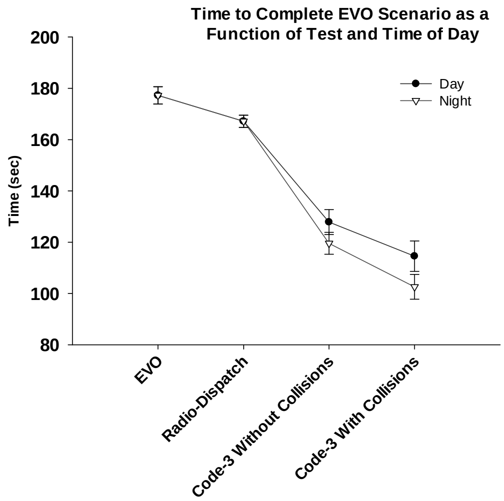

Figure 3. Note. EVO-Test = Emergency Vehicle Operations Simulation Test, Radio-Test = Emergency Vehicle Operations Simulation Test interacting with Radio Dispatch, Code-3 = Emergency Vehicle Operations Simulation and Judgment Simulation Integration Test.

Collisions

There were significantly more collisions during the Code-3 test than the EVO and Radio-dispatch test, X^2= 76.35, Ø =.36, p < .001 (Figure 4).

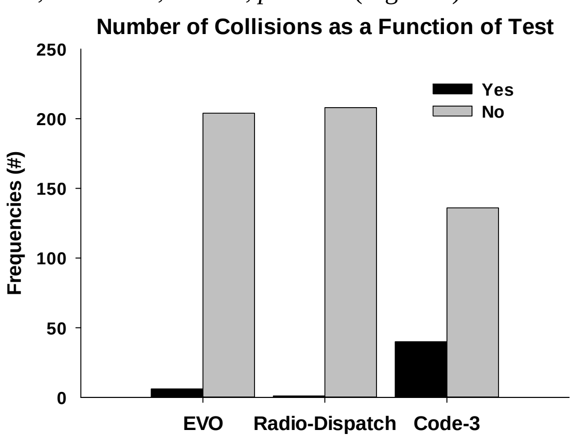

Figure 4. Note: Yes = Cadet involved in a collisions, No = Cadet successfully completed the driving scenario; EVO-Test = Emergency Vehicle Operations Simulation Test, Radio-Test = Emergency Vehicle Operations Simulation Test interacting with Radio Dispatch, Code-3 = Emergency Vehicle Operations Simulation and Judgment Simulation Integration Test.

Use-of-force

Cadet performance was evaluated in eight areas using an eight-point Likert-scale (1 fail - 8 Superior). Data for cadets who completed the driving simulation were used for this analysis (N = 56). Data were analyzed using a one-way ANOVA with time of day as the between subjects factor. Time of day was significant only for articulation $F(1,54) = 7.65$, $p = .008$, with performance better during the night than the day (night = 4.79 vs. day = 4.06), all other analysis $p > .05$ (Figure 5).

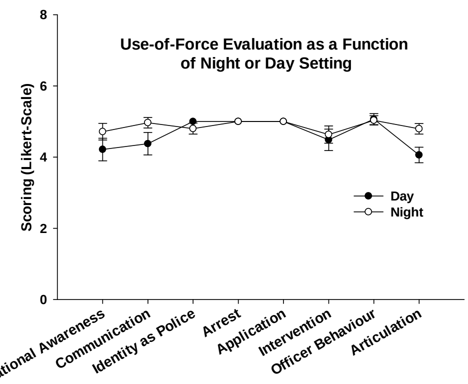

Figure 5. Video-based Use-of-Force Performance.

DISCUSSION

The literature discusses the need for more realistic training for first responder professionals. This argument is made in part using evidence from the military, airline, and medical professions. Airline pilots often practice “ditching” a plane into the ocean, and the military rehearses complex military operations in advance of doing the same exercise in theatre. While police training programs are both extensive and intensive, there are still components of training that cannot occur in an academy environment due to safety and logistical concerns. The results of the following experiment begin to provide some evidence of the effects of high arousal exposure and the impact that this has on performance in a policing environment.

The results of the EVO test are encouraging as they continue to demonstrate that cadets can obtain the necessary decision making skills to successfully complete this session (Krätzig et al., 2010: Krätzig & Hudy, 2011). However, the data from the Radio-dispatch test clearly demonstrate that even with scenario familiarity, there is a decrease in driving performance. This decrease is congruent with researchers who suggest that driving performance for civilians is negatively impacted when they are operating their mobile-device while driving a motor vehicle (McEvoy, Stevenson, McCartt, et al., 2005; Svenson, & Patten, 2005). This performance degradation continues to be observed with the Code-3 exercise. Overall we observed performance decrease approximately 15 percentage points (i.e., 85% - 70%) if they completed all three drives.

Another stark observation was that collisions jumped from six in the EVO exercise and one in the Radio-Dispatch, to 40 in the Code-3 test. Although it was assumed that the increase in collisions was a result of increased vehicle speed, after analyzing the data it became clear that this was not the case. When data from cadets who completed the scenario were compared with cadets who were involved in a collision it was discovered that all cadets increased their speed by about 30%.

At the beginning of the Code-3 scenario the cadet responded to an officer who had been shot by an unknown assailant. The cadet is originally told that only the wounded officer is on the scene and that other units are en route, with the closest cruiser being about 2 min away. The cadets' drive is scored by the computer, and the use-of-force simulation is evaluated by an instructor (who also acts as dispatch). The instructor radios the cadet at predetermined points of the drive. The rationale for this is to evaluate if each cadet is responding back to the dispatcher only when safe to do so, and to provide consistency so that group performance can be compared.

The results of the Code-3 test demonstrate that driving performance decreases during this session. While this intuitively makes sense, what was unexpected was that time-of-day (night vs. day-time driving) did not impact overall driving performance, nor were there time-of-day differences in the number of collisions that occurred. While the speed by which cadets are responding to this call is a major contributing factor to the overall decrease in performance (e.g., not slowing down at intersections, no siren pitch change before intersections, etc), it was not directly related to the increase in the number of collisions. We also found performance decreases during the use-of-force portion of the experiment, performance that is lower than when the use-of-force simulation is presented as a stand-alone test.

There was; however, one time-of-day difference during this portion of the experiment. Cadets who completed the scenario during the simulated night-time setting, performed significantly better with their articulation than their day-time tested peers. Although this difference was not entirely unexpected what this does illustrate is that further emphasis should be placed in this important area as it relates to day-time interactions with their environment (Briem & Hedman, 1995; Strayer, Drews, & Crouch, 2006).

FUTURE DIRECTIONS

These results provide evidence of the effects of realistic training on performance. While cadets perform quite well during the EVO and Radio-dispatch tests, when extreme emotional conditions are introduced the resulting performance decrease suggests that the cadets are focused on getting to the officer in need, instead of being focused on the task at hand and all of the potential hazards they encounter en route. While this explanation is intuitively appealing, it does not fully explain why some cadets can successfully drive at high speeds to their destination, while others driving at the same rate of speed end up in a collision. Future work in this domain will focus on two areas: 1) gradually exposing cadets to this type of high arousal situation, building on their decision making skills, as well as improving their environmental assessment, 2) determining what individual differences exist between cadets who are involved in a collision with those who are not.

We have also begun to collect physiological data (e.g., Galvanic Skin Response; GSR). While our current N is small, preliminary results find significant increases in GSR readings between the EVO and Code-3 scenario and that driving performance is negatively correlated with increased GSR readings.

A review of the literature also suggest that cognitive performance, as determined by objective measures (e.g., Alpha Numeric Sequencing, Grigsby, Kaye, & Busenbark, 1994; N-Back Test; Lezak, Howieson, Bigler, & Tranel 2012; Trail Making Test, Lezak, et al, 2012), may help predict performance differences from which to design potential strategies to mitigate performance decrements. Another possible explanation for these differences may be found in the emotional intelligence literature (EI; Lyons & Schneider, 2005). Lyons and Schneider (2005) argue that EI may influence task performance in stressful situations, and that investigating this area may provide clues in which to mitigate errors in stressful environments.

This study provided valuable information for our Cadet Training Program as it revealed areas that needed to be reinforced and presented opportunities for enhanced training. For example we noticed that some cadets, who entered the alley-way where the officer had been shot, demonstrated poor flashlight with pistol handling skills. Following this observation, we went back into the training program and developed additional exposures that reinforced the use of this skill. Preliminary results suggest that this strategy is working.

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