An evidence-based approach to critical incident scenario development

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Abstract

Purpose – There has been an increasing emphasis on developing officers who can effectively make decisions in dynamic and stressful environments to manage volatile situations. The aim of this paper is to guide those seeking to optimize the limited resources dedicated to police training.

Design/methodology/approach – Drawing on research related to stress exposure training, principles of adult learning, the event-based approach to training and policing more broadly, the authors show how carefully crafted training scenarios can maximize the benefits of police training.

Findings – The authors' review highlights various training principles that, if relied on, can result in scenarios that are likely to result in the development of flexible, sound decision-making skills when operating under stressful conditions. The paper concludes with an example of scenario development, which takes the reviewed principles into account.

Originality/value – The authors hope this discussion will be useful for police instructors and curriculum designers in making evidence-informed decisions when designing training scenarios.

Keywords Scenario-based training, Police training, Critical incident, De-escalation, Use of force

Paper type Research Paper

Police officers are tasked with preserving and protecting life, which occasionally places them in situations where the use of force (UoF) is required to gain control of the situation (Di Nota and Huhta, 2019). Fortunately, in both Canada and the US, the application of force [1] is statistically rare, with estimates suggesting that UoF is applied in approximately 0.1% of all police-public interactions (e.g. Bozeman *et al.*, 2018; Hall and Votova, 2013). However, given the vast number of police-public interactions in North America (Baldwin *et al.*, 2018), this low rate translates into a reasonably high number of UoF events in any given year (Shjarback and White, 2016). Police UoF, even when reasonable, can have severe consequences (e.g. strained community relations, subject and officer injuries/death, lawsuits, etc.; Geller and Scott, 1992; White and Fradella, 2016). In addition, the legal system is increasingly considering whether police agencies are liable for providing insufficient and/or inappropriate UoF training (e.g. R v. The Royal Canadian Mounted Police, 2017). Litigation, along with changes to police training, often occurs in the wake of adverse outcomes of police UoF (e.g. the Braidwood Commission, 2010).

In order to optimize outcomes (e.g. increasing public and officer safety; improving public relations; the effective use of police resources, etc.), UoF training being delivered to police officers needs to reflect operational realities, as well as adhere to principles of adult learning in order to maximize the extent to which the training transfers to the operational context. Such approaches have been undertaken in various settings outside of policing (e.g. the healthcare setting; Nguyen *et al.*, 2016). Surprisingly, given the potential implications of tense police-public interactions, somewhat limited empirical attention has been dedicated to this topic in the police setting specifically (see, however, James *et al.*, 2014, 2016; Wollert and Quail, 2018). This special issue was initiated because, despite the vast amount of resources dedicated to training and the potential implications of delivering training in a suboptimal manner, there is currently a lack of empirical work relating to police training (Huey, 2018).

In order to best prepare officers for the complex nature of incidents they often encounter (e.g. high-stress, limited information, etc.; Terrill, 2014; Verhage *et al.*, 2018), there has been an increasing emphasis on developing officers who are able to effectively make decisions in dynamic environments (e.g. Morrison, 2006; Werth, 2011). Relatedly, there has been a call for training to move away from focusing on whether the application of force was reasonable, to centering training on the use of tactics and sound decision-making throughout the encounter in order to appropriately manage volatile situations (Pauwels *et al.*, 1994 as cited in Adang, 2012; Rajakaruna *et al.*, 2017). This may include the implementation of preventative strategies to gain control of the situation when appropriate. Preventative strategies aim to minimize the likelihood that the situation will escalate and may include isolating an upset individual from peers or giving them more space and time so that the individual feels less confined and therefore may be less likely to display aggression.

The current paper focuses specifically on designing training for police responses to critical incidents, which the authors consider to include various encounters that officers may be tasked with resolving (e.g. a person in crisis and domestic dispute). Critical incidents are situations marked by rapidly changing, ambiguous and unpredictable events that must be resolved under time pressure with a focus on the management of risk (Alison and Crego, 2008; Klein, 1993; Power and Alison, 2019). Under these conditions, officers often make life or career-threatening decisions (Cannon-Bowers and Salas, 2008) that may additionally result in long-term negative impacts on the community and the reputation of the police service (e.g. Alison and Crego, 2008; Wheatcroft *et al.*, 2012).

Various situations may meet the threshold of a critical incident (e.g. a high-profile homicide investigation; Wheatcroft *et al.*, 2012). However, considering the increased call for improvements to police training in the area of critical incident resolution (e.g. Birzer, 2003; Birzer and Tannehill, 2001; Police Executive Research Forum, 2016), the remainder of this paper is focused on training, as it relates to the resolution of potential UoF encounters. Based on previous literature in high-stress environments, including policing, we argue below that one of the best ways to train officers to respond to critical incidents effectively is by incorporating sound scenario-based training (SBT) into both pre-service and in-service training. We appreciate that the principles we discuss can be applied to SBT for other critical incidents (e.g. crisis negotiations, casualty combat care, etc.) and various training formats such as using role players or video-based simulation (which have both been shown to be effective; Gaba *et al.*, 2001; Kratzig *et al.*, 2011).

Before we review the relevant literature, we would like to acknowledge the challenging task that police trainers and curriculum designers face when providing training to ensure public and officer safety. This task becomes especially difficult when working within the confines of the limited resources provided (e.g. in terms of the time available for training). Therefore, this paper hopes not to condemn current training practices but to provide guidance to practitioners to optimize these limited resources in order to improve current training practices, especially as they relate to SBT.

Scenario-based training

Scenario-based training, also referred to as simulation-based training, is concerned with replicating the characteristics of the operational environment while maintaining the safety of those involved (Alison *et al.*, 2013; Wollert and Quail, 2018). In order for SBT to be successful, the demands (e.g. time pressure) of the task must appear authentic to the individual in order to elicit psychological and physiological responses that are similar to those that would be elicited in an operational setting, allowing officers to practice in a high-fidelity manner (i.e. the operational and training environment closely represents each other; Alison *et al.*, 2013;

Andersen *et al.*, 2016; Klein and Woods, 1993). Considering this, professional actors or qualified instructors are used as confederates in the scenario to act as distractions or subjects that respond to the officer's intervention(s) (Di Nota and Huhta, 2019).

There is a large body of literature from a variety of contexts that highlights the value of SBT in developing high-caliber personnel. For example, in the aviation, military and medical fields, the use of SBT has demonstrated improvements in both individual and team performance regarding communication and technical skills (Blickensderfer *et al.*, 2012; Driskell *et al.*, 2008; Gaba *et al.*, 2001). While there are many benefits to the implementation of SBT, in order to maximize the learning, retention and transfer of knowledge, skills and abilities (KSAs), this training needs to be situated within the frameworks of stress exposure training (SET) and adult learning. A brief overview of these perspectives will be provided below.

Stress exposure training
Considering the demands on an officer during a critical incident, the responding officer(s) are likely to experience high levels of stress (Cannon-Bowers and Salas, 2008; Wheatcroft *et al.*, 2012). Salas *et al.* (1996) specifically define stress as "a process whereby environmental demands evoke an appraisal process in which perceived demand exceeds resources, and that results in undesirable physiological, psychological, behavioral, or social outcomes" (p. 6). Stress can result in a wide variety of consequences to the individual including, but not limited to, physiological changes (e.g. increased heart rate), emotional reactions (e.g. fear, anxiety), and cognitive deficits (e.g. narrowed attention; Andersen and Gustafsberg, 2016). Perhaps most importantly, these consequences of stress can result in adverse outcomes through detriments to officer performance (e.g. tactics, arrest skills, the appropriateness of shooting decisions and hit rates when shots are fired; Nieuwenhuys *et al.*, 2009, 2015). For example, during SBT the Spielberger State Trait Personality Inventory (STPI) and State Trait Anger Expression Inventory (STAXI; Spielberger and Reheiser, 2009) were used to measure various emotions, including anxiety and anger. This study revealed that low to moderate levels of anxiety were associated with higher levels of performance; however, high levels of anxiety were related to less optimal performance (Norris and Wollert, 2011). Further, elevated levels of anger were also associated with reductions in performance (Norris and Wollert, 2011).

Given the implications of stress on performance, SET was developed for the primary purpose of preparing individuals to maintain high levels of performance in operational environments that are characterized by high levels of stress (Driskell *et al.*, 2008). SET has three main phases, which will be discussed briefly in turn, but see Driskell *et al.* (2008) for a more detailed explanation that is beyond the scope of this paper.

The first phase, *information provision,* involves making the trainees aware of why stress training is important and providing them with information regarding the effects of stress (e.g. physiological, emotional and cognitive). This phase increases familiarity with the operational environment, making it less novel and increasing its predictability. The second phase is *skill acquisition.* This phase involves the development of skills required to perform effectively under stress. Numerous strategies can be incorporated into this phase in order to assist in skill acquisition including, but not limited to, physiological control techniques (e.g. biofeedback), overlearning and mental rehearsal. The final phase, *application and practice*, involves practicing the acquired skills in an environment that approximates operational realities. This means that the practice environment takes into account some of the context of the real-world situations officers' face (e.g. time pressure, task load and ambiguity).

While introducing stress facilitates the learning process and gives officers experience operating under those conditions (which will ultimately better prepare them for the field;

e.g. Oudejans and Pijpers, 2010), training should not overwhelm the officers to the point where they experience maladaptive stress that may actually impede their ability to encode and retrieve information effectively (e.g. Di Nota and Huhta, 2019). Therefore, SET advocates for a phased approach that involves lower levels of realism (and therefore stress) at the beginning of training and higher levels once competency develops (Friedland and Keinan, 1992). This approach allows trainees to become familiar with the training environment and develop a sense of control and competency without being overwhelmed (Driskell *et al.*, 2008). Overall, training under realistic conditions increases the likelihood of transfer to naturalistic settings given that the extent to which training transfers to the real world has been demonstrated to depend on the similarity of the two environments (Salas *et al.*, 2009; Wollert and Quail, 2018).

A meta-analysis conducted by Saunders *et al.* (1996) examined the impact of SET on performance. Their analysis of 37 studies across various domains (e.g. sport and medical) revealed that SET significantly improved performance with a moderate effect size ($r = 0.296$), which they argue is comparable to other well-established training strategies, such as overlearning and mental rehearsal. Another, more recent meta-analysis that focused on pressure training, which is similar to SET, reported similar results, including for training delivered in the law enforcement context (Low *et al.*, 2020).

The inclusion of stressors. In order to increase the stress of a scenario, Wollert and Quail (2018) describe the inclusion of various types of "stressors." These stressors include time pressure (e.g. a countdown in which the subject indicated they would harm themselves), task load (e.g. interruptions from another individual), threat of pain (e.g. a shock being delivered to the officer if they are shot), ambiguity (e.g. officers given unreliable dispatch information), novelty (e.g. the subject drawing a firearm after a knife had been discarded), role conflict (e.g. enforcing the law vs. being concerned for the mental health of the subject), noise (e.g. loud music playing), performance pressure (e.g. video recording of the scenarios), distance (e.g. confined space), coordination (e.g. responding with other officers to an active shooter) and role ambiguity (e.g. confusion about who is responsible for what in a multiple officer response).

In the authors' experience and consistent with previous research (Andersen *et al.*, 2016, 2018; Colin *et al.*, 2014), the inclusion of such stressors in SBT successfully induces high levels of stress. For example, many of the stressors described above were recently incorporated into a scenario created by the authors (and others) for a research project examining stress, memory and performance among police officers. We equipped 118 officers with heart rate monitors while they completed the scenario. During the scenario, the average maximum heart rate observed was 150.03 beats per minute (SD = 18.05), which was 75.09 beats per minute over their resting rate (SD = 16.20) [2]. This level of stress parallels or exceeds that experienced when officers are carrying out their operational duties (Andersen *et al.*, 2016; Anderson *et al.*, 2002; Baldwin *et al.*, 2019). Consistent with Driskell *et al.* (2008), another indication that officers were experiencing high levels of stress was that we observed degradations in cognitive processing (e.g. officers not recognizing a pistol stoppage) and complex motor skills (e.g. racking the slide before the magazine was fully inserted, so the pistol chamber was empty). The combination of these findings supports the implementation of stressors into SBT as a valid method to increase demands on the responding officers.

Event-based approach to training. A particularly attractive feature of SET is that this approach involves mapping the training environment to operational realities using a procedure known as the event-based approach to training (EBAT; e.g. Fowlkes *et al.*, 1998). While there are numerous approaches to the EBAT, they all strive to identify the KSAs required of operational tasks and ensure that these KSAs are the foundation of the scenario development process (Nguyen *et al.*, 2016). Specifically, once the essential KSAs have been identified, they become learning objectives within training. Training is then developed to place the individual in situations that elicit the demonstration (or not) of the KSAs (commonly

referred to as a trigger event; Johnston *et al.*, 1997). Finally, the EBAT ensures that an individual's performance on the predefined KSAs is observed and feedback is provided to rectify any shortcomings in the individual's response to the trigger event (Nguyen *et al.*, 2016). This process is completed through six stages, which will be explained briefly below (but see Fowlkes and Burke (2005) for greater detail).

The first step of the EBAT is identifying the goals of the specific training. There are various ways in which these goals can be identified, including internal documents like task lists and standard operating procedures, as well as through procedures like cognitive or task analyses. In the second step, scenarios and trigger events are developed in order to examine the extent to which competencies identified in the first step are displayed. Specifically, trigger events are elements of a scenario that provide an opportunity for trainees to demonstrate a given skill. Step three is characterized by developing performance criteria and corresponding measures that allow trainers to capture the nature of trainee responses relative to the various competencies. These performance measures should be specific to the scenario (i.e. instead of developing one universal performance measure, more specific measures of KSAs that are relevant to the scenario are developed). Step four involves the trainers using performance measures to assess scenario performance and provide feedback. Ideally, the performance measures would assist trainers in diagnosing performance issues and facilitate the process of providing actionable feedback. Step five involves tracking performance data over time in order to allow for the identification of any gaps in training so that it can be adapted and improved. Finally, the task lists and training objectives are updated based on identified training needs (e.g. through identifying training gaps).

The EBAT has been incorporated into numerous fields (e.g. medicine, aviation and military) and is grounded in theories of human information processing and the recognition-primed decision model, which explains expertise as the ability to recognize important environmental cues, mentally simulate likely outcomes and suggest typical responses for the type of situation that is encountered (e.g. Klein, 1993, 2008; Salas *et al.*, 2009). Despite these foundations, evaluations of the EBAT are limited.

In one small-scale study, Fowlkes *et al.* (1994) used a high-fidelity simulator to compare teams of active duty military pilots across various performance outcomes (e.g. prioritizing tasks associated with an emergency, such as engine power loss). Pilots ($n = 6$) that completed a two-day training program that adopted the EBAT were compared to pilots ($n = 6$) who did not. Despite the pilots having an equal amount of experience with operations and the flight simulator, those who completed the training based on the EBAT outperformed those who did not (meeting 82 versus 74% of the performance indicators, respectively).

More recently, Sawyer *et al.* (2013) examined teams of neonatal resuscitation staff ($n = 42$), who underwent a six-hour training program that adopted the EBAT. During simulated procedures, the teams performed significantly better on various outcomes (e.g. better communication and situational awareness) after training compared to before training. Unfortunately, there was no control group used in this evaluation, so despite the staff having received EBAT training, the improvements may be due to other variables, such as familiarization with the tasks.

Overall, we could find little research examining the EBAT, and the research that does exist has notable limitations. However, given the theoretical foundations of the approach and the limited research that has been conducted that supports the EBAT, this appears to be a promising approach for use in the policing context.

Adult learning principles
Unlike pedagogical, or child-centered, approaches to learning which require learners to act as receivers of the information presented to them by their teachers (Cochran and Brown, 2016), police training should be based on principles of andragogy or adult-centered learning, which

focuses more on teaching strategies that encourage active participation and reflection, with the trainer acting more like a facilitator than a teacher. In accordance with assumptions underlying adult learners (e.g. McCay, 2011), such training must be relevant to the operational demands of an officer's job and allow them to develop and fine-tune the KSAs that are necessary to carry out their duties, such as communication, decision-making and problem-solving under stress.

Consistent with this thinking, it is essential that the method of instruction (e.g. lectures, range training and scenarios) aligns with the nature of the material being delivered and the KSAs being targeted (Bennell and Jones, 2004). For example, it would be counterproductive to train a physical skill (e.g. manipulating a firearm) solely through classroom instruction. Considering that the classroom environment does not mimic operational conditions, nor allows officers to practice the full range of necessary skills that are relevant to potential UoF events, this is not the appropriate domain to practice all KSAs (Rajakaruna et al., 2017). Therefore, when developing a training program, it is crucial to consider the best training format and strategy for each KSA.

The need to align KSAs with the appropriate training format is highlighted through the fact that, despite officers achieving on average 85% accuracy during handgun qualifications (Anderson and Plecas, 2000), accuracy rates during a critical incident typically range between 15% and 35% (Donner and Popovich, 2018; Morrison and Vila, 1998). In fact, despite the considerable increase in time dedicated to firearms training, accuracy rates have remained relatively stable over time, resulting in some researchers suggesting there has been little return on this investment (e.g. Vila and Morrison, 1994). Arguably, this finding is due in part to the fact that there is a disconnection between training and operational environments (e.g. Bennell and Jones, 2004). The static nature of the range (where the vast majority of firearms training occurs) clearly does not approximate the physiological and psychological demands associated with critical incidents (Morrison and Vila, 1998). The extent to which you see the transfer of KSAs is dependent on the degree to which training maps onto the operational environment (Salas et al., 2009). Therefore, to optimize officer performance in dynamic, high-demand encounters (e.g. where they face danger, time pressure, conflicting information, etc.), officers need to practice in this same environment (Norris and Wollert, 2011).

The implementation of SBT is consistent with the perspective that the learning, retention and transfer of KSAs are optimized if taught in the context that they will be applied (e.g. Lave and Wenger, 1991). Thus, in order to maximize the extent to which KSAs transfer to real-world encounters, the use of varied training scenarios, which will allow for the development of flexible and adaptive problem-solving skills, is essential (Barnett and Koslowski, 2002; Boulton and Cole, 2016). Beyond maximizing the alignment between training format and desired learning outcomes, SBT aligns with numerous other principles of adult learning as well (e.g. high-fidelity scenarios are interactive, represent real-world issues that officers will face on the job and allow officers to learn by actively participating in the learning process; Cochran and Brown, 2016; McCay, 2011).

Related to the issue of including officers in the learning process, post-scenario debriefings are an essential process. During these debriefs, officers can articulate their decision-making process and instructors can provide feedback regarding officer performance. Feedback is essential to the learning process because it assists trainees in identifying areas of weakness so that they can adapt their behavior in order to improve future performance (Bennell and Jones, 2004; Wollert and Quail, 2018). Considering the need to include adult learners in the learning process, the feedback should be highly interactive (for a review of promising practices related to adult learning, see Bennell et al., 2020). In line with adult learning principles, officers have often expressed that they enjoy when instructors relate concepts in training to their own experience as an officer and when other officers in training engage in this discussion as well (Rajakaruna et al., 2017).

Despite the intuitive value of adopting adult learning practices, there is little empirical evidence examining its use in police training. However, meta-analyses across various domains (e.g. college education and professional in-service training) have generally found that instructional approaches that actively involve the learner in training, as compared to lecture-based methods, produce better outcomes (Burch *et al.*, 2014; Callahan *et al.*, 2003). The benefits of this approach are most salient when the outcomes require learners to *apply* their KSAs, rather than merely *recalling* material that was taught during training (Walker and Leary, 2009). Therefore, adult-learning approaches are likely valuable to incorporate into police training, particularly in SBT.

Considerations for developing critical incident response scenarios

Having discussed the research regarding SBT and the frameworks (i.e. SET, EBAT and adult learning) that can be used to maximize its effectiveness, we will now discuss various considerations for how the research reviewed above can be used to develop critical incident scenarios that are tailored to the needs of an individual police service.

Reflecting operational realities

It is critical that SBT reflects operational realities. While different KSAs (e.g. communication for de-escalation and the use of intervention options) are often taught separately in training, the reality is that calls for service often require officers to implement a variety of skills. While it may be beneficial to provide initial training in a way that isolates separate skills, it is essential that training also focuses on skill integration. In fact, some researchers have suggested that integrating UoF and de-escalation training will assist in training flexible decision-making and problem-solving (Rajakaruna *et al.*, 2017). Relatedly, the integration of these types of training will allow officers to practice transitioning between various verbal and nonverbal de-escalation techniques and UoF intervention options. Finally, including scenarios in training that require officers to de-escalate reduces the expectation that officers have to use force in training (and in the field).

The scenarios that officers encounter during training should be data-driven and informed by operational realities whenever possible (e.g. Fowlkes and Burke, 2005). Indeed, to maximize officer preparedness, the distribution of factors presented in SBT should be approximately equivalent to what officers face operationally. Assuming that appropriate data is collected, a service can determine the most frequent call types (e.g. domestic disturbances and mental health calls), situational factors (e.g. lighting, indoors/outdoors and around vehicles), subject characteristics (e.g. intoxication) and UoF interventions applied when relevant (e.g. pepper spray). With this information, training can be developed that presents a range of scenarios and scenario characteristics (e.g. lighting and subject characteristics) that are approximately proportional to what officers experience in reality. For example, if approximately 30% of an agency's UoF encounters occur in low-light conditions, the same proportion of training situations should occur in low-light. Further, scenarios should also be consistent with organizational policy. For example, scenarios should include two member responses to domestic disturbances when agency policy dictates this. This will require officers to practice operating with a partner to resolve critical incidents.

A good example of this approach to developing SBT has been reported by James *et al.* (2014, 2016). To develop shoot/no-shoot simulations to measure racial bias in officer decision-making, James and their colleagues reviewed 30 years of officer-involved shootings for common situational factors, which were incorporated into their scenarios. Our recommended refinements to this approach would include a greater focus on local-level data to develop jurisdiction-specific scenarios to the extent possible and using this approach to develop

scenarios that go beyond shoot/no-shoot simulations (as demonstrated in James *et al.*, 2018). Obviously, a well-rounded training program should include simulated encounters that are not restricted to those that culminate in a shooting, but instead involve a diverse array of encounters that reflect everyday policing (i.e. including benign situations).

As alluded to above, one notable limitation to our recommended approach is that it requires high-quality data that is representative of real operations. However, when this type of data is not available, incidents may be purposively sampled to ensure that officers are exposed to a wide variety of calls that mimic those they will likely face in the field (e.g. wellbeing check, traffic stop, alarm call, etc.). During this process, a wide variety of calls and call factors (e.g. situational factors) can be selected to produce diverse scenarios. Once the characteristics of calls are decided upon, reports from calls for service with these same features can be reviewed. These reports may form the script of the scenario. For example, if an agency decided that two scenarios were going to involve domestic disturbance calls, and one was going to occur in regular lighting conditions in a house, a trainer could pull the file for a similar call and use some of the call details to create the dispatch information and role player instructions. Emerging issues that are being experienced in the field may also be incorporated into SBT. For example, officers are often being video-recorded by the public when interacting with individuals (Brown, 2016). Therefore, this may be included in particular scenarios so that officers can become comfortable operating under such conditions. However, it's important that officers are not disproportionately exposed to interactions that are exceedingly rare (e.g. ambush style attacks against officers), as it may promote hypervigilance.

Tailoring scenarios to expertise

Previously, we discussed the importance of having scenarios that are stressful for officers. However, the difficulty level of scenarios should be tailored to the proficiency of the officer (e.g. Angel *et al.*, 2012; Bennell *et al.*, 2007; Mugford *et al.*, 2013). One way this can be achieved is by altering the inclusion of various stressors mentioned previously (e.g. time pressure, task load and ambiguity) within the same scenario script. Specifically, highly proficient members (e.g. those on a specialty team such as a tactical unit) would likely benefit from more complex scenarios that include a variety of stressors. Without such training, the growth of these officers may be stunted or trainers could even harm their learning process (Mugford *et al.*, 2013). In contrast, the number of stressors may be reduced for general patrol officers with little additional training or recruits in the police academy that may experience training anxiety when practicing basic skills (Mugford *et al.*, 2013). As the general patrol officer or recruit becomes more experienced, the scenarios should be altered to reflect this heightened proficiency.

Understanding and measuring performance as a process

While the EBAT emphasizes the development of predetermined KSAs that illustrate the officer's proficiency in specific areas, we also argue that "acceptable" responses from the officer should not be too restrictive, nor should they focus solely on the outcome. Instead, performance evaluations should take into account the appropriateness of the decision-making process, as there are typically numerous ways to achieve the same outcome (Salas *et al.*, 2009), and the same outcome may not even be desirable across different situations (e.g. across officers with different skills).

This approach is consistent with how officers are taught to determine the appropriate response given their perceptions of the totality of the situation, and their abilities to manage the incident. It is also consistent with the reasonableness standard to which they are held during reviews of their response to an incident (e.g. *Graham v. Connor,* 1989). This approach further recognizes that due to the subjective nature of risk assessments, no two officers will

perform identically despite efforts to keep the scenarios consistent. This is a consequence of the fact that an officer's perceptions, like any individual's, are influenced by previous experiences (Boivin, 2017; Vickers and Lewinski, 2012) including, but not limited to, their policing experience, previous training, values and emotional response (e.g. Norris and Wollert, 2011).

To illustrate the importance of having trainers focus on the decision-making process, rather than just outcome, an example will be provided to demonstrate how perceptions can influence decision-making. Two of the authors once observed an officer completing a scenario involving a male threatening suicide with a handgun to his head. The officer had effectively communicated with the subject who, in the process of lowering the pistol, pointed it at the officer, at which point the officer fired. While the scenario was not scripted in a manner that the officer would use force (i.e. the individual was putting the gun down and complying), considering the officer's perception of risk, the decision to shoot was arguably reasonable. This example highlights the importance of having instructors who can incorporate various types of information about a trainee's performance (e.g. demonstration of physical skills and risk assessment) into their assessment of the officer in order to diagnose any issues, discuss the appropriateness of the response and provide practical feedback (e.g. Salas *et al.*, 2009).

Training good decision-makers

In our experience, it often appears as if the scenarios in a training program are scripted in order to precipitate a particular response from the officer (e.g. the subject is displaying assaultive behavior in which case an intermediate weapon should be deployed). Such a subject behavior-driven response is a lower-level application of the EBAT and represents an introduction to SBT and decision-making. With the increased focus on training officers to be better decision-makers under stressful conditions, they must be provided with an adequate environment to develop this ability. The EBAT is equally suited to train higher-level, flexible decision-making. This requires the officer to take into consideration the totality of the circumstances, as well as using sound tactics to reduce the likelihood of using force and minimizing any force applied. In order to train higher-level decision-making, scenarios should be developed in a way that allows the officer to go beyond performing a desired response and instead involves the consideration of numerous factors (e.g. the distance of a subject armed with a knife, the presence of cover/concealment, back-up, intervention options available, lighting, etc.) to determine an appropriate method to resolve the incident. In these more complex scenarios, there is not necessarily one "correct" response, but instead numerous acceptable outcomes.

Issues related to feedback

One of the most important elements of training is the delivery of sound feedback (Angel *et al.*, 2012). Given this importance, providing feedback should not be rushed and in our experience the debrief component may last longer than the scenario itself. Consistent with other aspects of SBT, the amount and delivery of feedback should be tailored to officer proficiency (Vickers, 2007). However, there is evidence that regardless of abilities, delaying feedback increases future performance (Schmidt and Lee, 2011). The delay in feedback may prevent an individual's cognitive capacities from becoming overwhelmed (Mugford *et al.*, 2013), as officers often require considerable time following the completion of a scenario for their stress response to return to baseline (Andersen *et al.*, 2016, 2018). Further, a delay will allow the officer to process information themselves first, which results in a deeper understanding of the KSAs (Vickers, 2007). Relatedly, the delay of feedback will help prevent the officer from becoming reliant on instructor feedback to diagnose performance errors (Vickers, 2007). In addition, the level or amount of feedback provided should be gradually reduced as the

officer becomes more proficient (Hattie and Timperley, 2007). However, instructor feedback should be replaced with the officers' feedback, as they develop the abilities to self-diagnose performance issues and possible ways to improve future performance (Hattie and Timperley, 2007; Vickers, 2007).

One of the biggest concerns surrounding the provision of continual feedback is that it may negatively influence skill retention and transfer in the long-term despite the apparent short-term benefits to performance (Angel *et al.*, 2012; Schmidt and Lee, 2011). When continual feedback is provided, dependence may be developed in which the officer is not able to identify performance errors (Schmidt and Lee, 2011). Considering that instructors are not present in the operational context, performance is likely to significantly degrade once this form of feedback is removed (Angel *et al.*, 2012).

It is recommended that when feedback is provided, it should probe for an understanding of the KSAs instead of merely stating the positive aspects of the officer's performance or articulating how performance deviated from a desired goal (Schmidt and Lee, 2011; Vickers, 2007). In this sense, and consistent with adult learning, feedback provided should be student-centered as they are actively engaged in the feedback process, which includes a focus on critical thinking and problem solving. With this approach to feedback, the instructors' role is to facilitate the officers' learning process. Considering the value and uniqueness of student-centered feedback it is critical that instructors are provided training in this approach so that they are proficient in feedback provision. For example, Wollert and Quail (2018) suggest that debriefing sessions may start with probing questions such as "describe what happened during the scenario?", "what information did you collect prior to arriving on scene?," and "what was your initial assessment of the situation" (p. 142-143). Further, to develop the officer's problem-solving abilities, it is recommended that instructors ask how the officer would change their response if they were to complete the same scenario again. For a more detailed discussion of debriefing sessions and student-centered feedback see Wollert and Quail (2018).

Instructors should also focus on the most significant issues they observed instead of inundating the officer with corrective feedback. Generally, it is recommended to focus on a few main issues to prevent the individual from becoming overloaded with information (Mugford *et al.*, 2013; Norris and Wollert, 2011). As mentioned above, this is especially important after SBT given that officers (especially novices) may still be in a heightened state of physiological arousal following completion of their scenario (Andersen *et al.*, 2016, 2018) or experiencing high levels of cognitive load.

One final point related to feedback is worth mentioning. In our experience, there is debate over whether trainers should pause scenarios to provide feedback, as there is considerable variation in the facilitation of SBT. While scenarios should always be stopped if there is a safety concern, there are two perspectives regarding the use of "pauses" in SBT. Murray (2004) suggests that there are three situations where a scenario should be stopped. The first is an unnatural pause, which indicates that the progress of the scenario has declined, and the officer is unsure of how to proceed. The second situation is referred to as the goofy loop. This is when an officer attempts the same intervention numerous times without success (e.g. repeatedly telling the subject to drop a weapon). The final situation where scenarios should be paused is during a "meltdown" in which the officer becomes overwhelmed by their physiology (e.g. high HR), psychological state (e.g. becoming defeated) or a technological issue (e.g. technical failure of the pistol; Murray, 2004). The competing perspective is that the interruption of SBT when safety issues are not present may create a dependency of the trainee on the instructor. Specifically, if officers are not provided the opportunity to recognize their errors in performance, they are less apt to self-regulate their performance (Schmidt and Lee, 2011; Vickers, 2007).

Considering the need for officers to develop proficiency in diagnosing and correcting performance errors in the field, restrictions on when the scenario should be paused for

instructor feedback should be in place. This is not to suggest that there are not situations outside of safety concerns where the scenario should be paused. For example, consistent with Murray (2004), if an officer has a meltdown in which they are severely struggling with the demands of the scenario, then it should be paused to allow them a moment to gain their composure. However, generally, it is beneficial to allow officers to gain experience working through any issues that arise under high-demand conditions. Given that the stakes are ultimately low during training, this provides an ideal environment for officers to make mistakes, which is a necessary process of learning (Lorenzet *et al.*, 2005). That being said, future research should empirically examine the consequences of pausing SBT to provide feedback.

When to conclude a scenario
Scenarios should run through the entire call duration (e.g. from dispatch, to arriving on scene, resolving the incident and controlling the scene and applying first aid to any injured parties; Wollert and Quail, 2018). Given that the information provided by dispatch regarding the presence of weapons is often incorrect and can strongly influence officer responses (e.g. Taylor, 2020), it is crucial that front-end misinformation is injected into SBT so that officers can practice dealing with this in an environment where mistakes do not come at a high price. At the opposite end of the scenario, there is evidence that following a shooting, officers are less proficient in their abilities at controlling the scene, subjects and potential witnesses (Pinizzotto *et al.*, 2006). Specifically, officers are more prone to make errors when controlling the subject (e.g. handcuffing) or communicating with dispatch (e.g. calling medical attention for injured parties; Federal Law Enforcement Training Center, 2004).

In our experience, scenarios often start too late (e.g. they do not include dispatches) or end too early (e.g. after the application of force, but before the officer meaningfully resolves the event such as handcuffing the subject, checking the safety of the environment, etc.). The lack of practice on these skills may result in insufficient skill development and retention, which may contribute to performance problems in the field. It is also critical that SBT include post-event articulation so that officers get practice (and feedback) on this important skill.

Putting it all together
The following section will briefly provide an overview of how various principles discussed above can be applied to SBT. To illustrate this, we will use an example of how trainers could develop a scenario once KSAs have been identified through a task analysis, a review of standard operating procedures, and focus groups with officers of diverse backgrounds. The specific KSAs we will focus on in this example are effective communication, continually conducting a risk assessment, selecting appropriate intervention option(s) and transitioning between intervention options.

First, an appropriate context to train these KSAs must be decided on. From running statistics on the organization's calls for service or through discussion with officers it may become apparent to the trainers that domestic disputes are common, challenging and provide an appropriate context to train the KSAs. The trainers (together with curriculum designers ideally) could then review previous reports from a call for service involving a domestic dispute in order to use the call details as the basis for the scenario script that provides the context for the call (e.g. the amount of dispatch information provided). Consistent with policy, which dictates that domestic disturbances are a two-officer scenario, the scenario would require coordination of response efforts (e.g. contact and cover officer).

Next, the trainers must decide what trigger events should be embedded in the scenario to provide opportunities for the officer(s) to demonstrate the KSAs. Going back to the domestic

dispute, the hypothetical scenario script could involve a mother calling the emergency line because her son and his boyfriend were arguing, and her son was becoming aggressive. After the police arrive and start talking to the males, one of the males pulls out a knife and threatens to die by suicide in front of the officers. In this case, the officer(s) should start communicating with the individuals once on scene, and this communication should continue when the individual presents the knife and expresses his intent to harm himself. Making this more challenging, the scenario could involve the main subject providing minimal information in response to police presence, which should act as a cue that the officer(s) need to try to build rapport with the individual to facilitate a smooth interaction.

Similarly, the KSAs involved in conducting a risk assessment and selecting an appropriate intervention should be an ongoing process and the presence of the knife should act as a trigger for officers to select appropriate tactics (e.g. creating time and space if appropriate, selecting an intervention option). The subject drawing the edged weapon may also act as a trigger for the officers to communicate with the individual (e.g. displaying empathy), with the other officer (e.g. if transitioning to a less-lethal intervention option) and with dispatch (e.g. getting paramedics on standby). Finally, the scenario could be written such that if the officers effectively communicate, then the individual can drop the knife and surrender to the police (or, despite their efforts, the individual may force the officers to use force).

Now that the scenario has been decided upon, performance measures would need to be developed in order to determine the extent to which participating officers demonstrate these KSAs. Wollert and Quail (2018) advocate for a rating scale that includes 0 (unobservable), 1 (unacceptable), 2 (marginal), 3 (acceptable) and 4 (desirable). Ideally, subject matter experts would review each scenario to determine potential officer responses that would correspond to each performance level. For example, within the context of remedying a Taser malfunction in the above scenario, officers would receive a score of 1 (unacceptable) if they require numerous attempts to load a new cartridge, are unsuccessful at doing so, or fail to recognize the Taser did not deploy. However, an individual would receive a score of 4 (desirable) if they quickly load a new cartridge (Wollert and Quail, 2018). It is important to have subject matter experts identify these concrete behaviors at each rating level because it reduces the likelihood that instructors will rely on their own subjective ideas about performance, thereby increasing consistency across instructors.

While some KSAs are unique to a particular aspect of the scenario (e.g. reloading a Taser cartridge after a malfunction), others are applicable throughout the scenario (e.g. communication). When this is the case, performance can be evaluated at various phases of the scenario (e.g. the initial contact, once the knife has been presented and after the knife was dropped). This approach will allow for more detailed feedback as it is not an aggregate measure of performance (e.g. an officer may keep an appropriate distance from the subject, except for the phase where the knife was presented).

Performance measures can assist in identifying areas where officers struggle and may facilitate the instructor in providing feedback. Further, in line with the EBAT, objective and reliable performance data is essential to identifying gaps in the training over time (Fowlkes and Burke, 2005). This feedback should occur during a post-scenario debrief that involves the officer articulating their decision-making process and reflecting on their performance. Following this debrief, instructors should probe for understanding of the KSAs and then provide actionable suggestions for improvement. Instructors may also want to consider video recording the scenario. Not only would this help with their detailed assessment of officer performance, but it could also be used in the debriefing and feedback stage to provide the officer with concrete data about how they performed and what they can do to improve their performance during subsequent scenarios. Research is starting to show the value of such an approach in the training context for enhancing learning, retention and transfer of KSAs (e.g. Phelps et al., 2018).

In line with tailoring the scenario to the officer, the difficulty of this example scenario could easily be modified depending on two factors: (1) the location of the scenario within the training program and (2) the proficiency of the officer completing the scenario. In the first case, scenarios occurring early in training could (and should) be made slightly easier in order to allow officers to acclimate to the SBT environment (consistent with the phased approach to SET described above). In the latter case, officers of greater proficiency (e.g. from a tactical team) would likely require more challenging scenarios. In either case, the intensity of the scenario could be tailored to the officer through the inclusion (or lack thereof) of the stressors identified by Wollert and Quail (2018), which we described above (e.g. time pressure, distance, etc.). For example, the inclusion of a stereo blaring loud music could be added to the previously described scenario in order to impede the officers' ability to effectively communicate with the subject and add an additional challenge for officers to overcome.

The scenario script should clearly identify when the scenario should be concluded. As discussed above, ideally this would occur when the situation has been fully resolved. In the case of the domestic situation, this could occur when the individual has been calmed down and apprehended under the relevant mental health act, the individual has been arrested (including handcuffing and search), and/or first aid has been administered following any injuries.

Conclusion

There is an ongoing emphasis in police training to develop sound decision-making skills for dynamic and stressful environments (Rajakaruna *et al.*, 2017; Werth, 2011). Relatedly, there is a growing appreciation for the need to de-emphasize specific outcomes in SBT (e.g. whether an officer makes an appropriate shooting decision) in favor of focusing on the process for resolving critical incidents (e.g. Pauwels *et al.*, 1994 as cited in Adang, 2012; Rajakaruna *et al.*, 2017). Surprisingly, given the potential implications of tense police-public interactions (e.g. strained community relations), limited attention has been dedicated to developing good decision-makers in the police setting specifically. However, the literature from a variety of contexts provides valuable insight regarding how critical incident scenarios can be developed and implemented in order to maximize their effectiveness.

The current paper reviews key frameworks and training principles that, if relied on, should result in training scenarios that are likely to result in the development of flexible, sound decision-making skills when police officers encounter stressful conditions. While the current paper focused on potential UoF events using role players in SBT, the same approach may be applied to other critical incidents (e.g. crisis negotiations), other types of police training (e.g. casualty care in evaluating the common types of injuries and how to treat them) and other training modalities (e.g. tabletop exercises for incident commanders). We believe that adopting a more evidence-based approach to SBT holds great promise. However, in line with the principles of evidence-based policing, it is essential that the implementation of any new training strategy be empirically examined to ensure its effectiveness.

Notes

1. There is currently debate regarding the definition of UoF (e.g. Hickman *et al.*, 2008), and the rate of police UoF drastically changes depending on the definition used (Garner *et al.*, 2002; Hickman *et al.*, 2008). Some definitions include low-levels of force, such as threats of arrest, handcuffing, searches and pat-downs (Terrill and Mastrofski, 2002). Use of force rates based on these definitions will be relatively high. Other definitions focus on physical UoF options (e.g. takedowns or punches; Lundstrom and Mullan, 1987), which would result in much lower rates of force. The statistics presented in this section are based on research where force included the application of physical force (e.g. strikes), police canines and the application or display of intermediate weapons (e.g. conducted energy weapons), or lethal force.

2. While this study did not control for movement, visual inspection of the heart rate and movement data during the scenario indicated there was relatively little movement during the scenario and therefore we do not expect movement to significantly impact observed heart rate.

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