Promising practices for de-escalation and use-of-force training in the police setting: a narrative review

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Abstract

Purpose – A narrative review of existing research literature was conducted to identify practices that are likely to improve the quality of de-escalation and use-of-force training for police officers.

Design/methodology/approach – Previous reviews of de-escalation and use-of-force training literature were examined to identify promising training practices, and more targeted literature searches of various databases were undertaken to learn more about the potential impact of each practice on a trainee's ability to learn, retain, and transfer their training. Semi-structured interviews with five subject matter experts were also conducted to assess the degree to which they believed the identified practices were relevant to de-escalation and use-of-force training, and would enhance the quality of such training.

Findings – Twenty practices emerged from the literature search. Each was deemed relevant and useful by the subject matter experts. These could be mapped on to four elements of training: (1) commitment to training (e.g. securing organizational support for training), (2) development of training (e.g. aligning training formats with learning objectives), (3) implementation of training (e.g. providing effective corrective feedback) and (4) evaluation and ongoing assessment of training (e.g. using multifaceted evaluation tools to monitor and modify training as necessary).

Originality/value – This review of training practices that may be relevant to de-escalation and use-of-force training is the broadest one conducted to date. The review should prompt more organized attempts to quantify the effectiveness of the training practices (e.g. through meta-analyses), and encourage more focused testing in a police training environment to determine their impact.

Keywords Police training, De-escalation, Use-of-force

Paper type Literature review

Police officers are regularly tasked with de-escalating encounters with the public and using force to increase subject compliance and/or as a means to enhance officer and public safety. Responding appropriately in these situations is imperative in order to achieve an optimal resolution. For officers to respond properly, they must be adequately trained so that they can recall a substantial amount of knowledge when required to do so, apply numerous skill sets under pressure, and execute both of these tasks in an unbiased fashion (Todak and James, 2018). Accordingly, many police services offer training programs that are dedicated to de-escalation and use-of-force.

For most police officers, such training likely involves a combination of academic (e.g. in the classroom) and hands-on instruction (e.g. scenario-based training), both at the academy and during regular in-service training, along with field training with a coach officer at the beginning of their career (Belur *et al.*, 2020; Blumberg *et al.*, 2019; Wolfe *et al.*, 2020). However, the nature, frequency, duration, and quality of this training varies across jurisdictions (e.g. Cotton and Coleman, 2008), most likely as a function of training budgets, available workforce, infrastructure and equipment, in-house expertise, organizational support for training and so forth. Attempts to systematically examine how de-escalation and use-of-force training is delivered are relatively rare (with some notable exceptions; e.g. Engel *et al.*, 2020), and more general attempts to survey police training have either failed entirely due to a lack of relevant research (e.g. Huey, 2018), or have been plagued by challenges that make it difficult to draw strong conclusions (e.g. a lack of information included in primary studies; Belur *et al.*, 2020).

Although it may be argued that any exposure to de-escalation and use-of-force through training can be beneficial, training that is grounded in evidence-informed practices is likely to be more effective (Arthur *et al.*, 2003a; Kluger and DeNisi, 1996; Wickens *et al.*, 2013). Indeed, reliance on sound practices when designing and delivering this training should increase the likelihood that officers will respond appropriately during their interactions with the public, thus reducing the probability that individuals involved in these encounters (i.e. subjects, officers and/or bystanders) will be harmed unnecessarily. Effective training should also yield other positive consequences, such as decreasing allegations of excessive force by police officers (Bennell and Jones, 2004), and increasing public confidence and trust in the police (Stanko and Bradford, 2009).

Unfortunately, the extent to which current de-escalation and use-of-force training aligns with sound practices remains unclear. Without knowing whether alignment exists, it is difficult to know which, if any, aspects of police training require improvement. To assess this alignment with evidence-informed practices, it is first necessary to have an understanding of these practices. Several reviews have attempted to do this (e.g. Andersen *et al.*, 2017; Angel *et al.*, 2012; Bennell and Jones, 2004), but each of these reviews is limited in their focus on a restricted set of practices. For instance, drawing primarily from areas of cognitive and educational psychology, Bennell and Jones' (2004) review focused specifically on firearms simulation training and what strategies instructors might use to help facilitate that form of training.

There has yet to be a review that broadly examines evidence-informed practices that might be relevant for de-escalation and use-of-force training. Therefore, this preliminary narrative review aims to identify such practices that are likely applicable to training in these areas. The review should prompt more organized attempts to quantify the effectiveness of these training practices (e.g. through systematic reviews and meta-analyses), and encourage more focused testing in a police training environment to determine the precise impact that these practices have on trainees. Ultimately, the review aims to promote the development of training programs that align more closely with evidence-informed training practices.

Methodology

Within this paper, evidence-informed training practices are defined as those practices that have come to be recognized through research as effective for accomplishing a given training outcome. These practices can include training methods (e.g. *how* training is delivered) and/or a set of circumstances (e.g. *when* training is provided) that enhance the degree to which training can meet its objectives. It is assumed that the desired outcomes of de-escalation and use-of-force training within a policing context are to enhance learning among trainees, increase retention of training material and facilitate the transfer of knowledge, skills and abilities from the training environment to operational contexts.

Literature reviews
In order to compile the vast amount of literature related to these practices, known literature
reviews already conducted on the relevant training were consulted first (e.g., Andersen *et al.*,
2017; Angel *et al.*, 2012; Bennell and Jones, 2004). In addition, the reference sections of these
reports were reviewed to identify other pertinent literature. Documents that were deemed
relevant were then reviewed and references from those documents were collected. This
process was continued until no new relevant references could be identified.

From this collection of documents, 20 evidence-informed training practices could be
identified that appeared relevant to de-escalation and use-of-force training. These practices
relate generally to: (1) commitment to training, (2) development of training, (3) implementation
of training or (4) evaluation and ongoing assessment of training (see Table 1 for a summary of
the practices). Research related to these specific practices was identified by conducting more
targeted searches using 12 different databases (e.g. PsycINFO) and search engines (e.g.
Google Scholar). Combinations of key words related to each practice were used to initiate
these searches (e.g. instructor feedback + education/training/instruction/learning). Searches
were not restricted to any particular discipline or field of study.

Given the lack of previous comprehensive reviews of potentially promising practices
for de-escalation and use-of-force training, a narrative review was deemed suitable as a
first step, to not only gain an appreciation of the current research landscape but also to lay
the foundation for more systematic reviews and meta-analyses. There is a danger of
course that a narrative review can be biased (e.g. due to cherry-picking studies to include
in the review). In an attempt to minimize this possibility, particular attention was paid to

Commitment to training	Development of training	Implementation of training	Evaluation of training
Training is supported by the organization (e.g. necessary resources are provided)	Training is based on adult learning principles	Worked examples are provided for novice trainees	Training is based on research
	Training focuses on relevant competencies	Training is simplified for complex material	Training is monitored and modified as necessary
	Training includes stressful, dynamic scenarios	Appropriate feedback is provided	Monitoring is informed, objective and multifaceted
	Diverse training scenarios are provided	Trainers actively engage trainees	
	Training uses massed vs spaced practice as appropriate	Mental rehearsal is used for experienced trainees	
	Training formats are aligned with learning outcomes	Trainers create a positive environment	
	Training is appropriately ordered	Trainers possess relevant competencies	
	Sufficient training time is provided to achieve a degree of mastery		
	Teaching material is well designed (e.g. understandable)		

Table 1.
Promising practices for
de-escalation and use-
of-force training

existing systematic reviews and meta-analyses when reviewing the literature that emerged from the targeted searches described above.

Subject matter expert interviews
Semi-structured interviews with a small sample ($n = 5$) of subject matter experts (SMEs) were also conducted. These interviews were carried out after the completion of the targeted literature searches. They were conducted either in person or over the phone by at least two members of the research team, with each interview being audio recorded. Each SME was asked to reflect on two things: (1) the degree to which the identified practices were relevant to de-escalation and use-of-force training in the police setting and (2) the degree to which each training practice would likely enhance the learning, retention and transfer of knowledge, skills and abilities if they were incorporated properly into such training. The SMEs included an instructional psychologist, an adult learning specialist, a police training researcher and two experienced police trainers in the areas of de-escalation and use-of-force.

There was complete consensus among these SMEs that the practices outlined below are relevant to de-escalation and use-of-force training and that, if they were incorporated into such training properly, they would likely improve the quality of this training. Given this complete agreement, the SME interviews will not be at the forefront of the paper, but will be referenced in several instances (e.g. discussion of trainee competencies that should be the focus of de-escalation and use-of-force training).

Commitment to training
Although not always obvious to trainees themselves, organizations have a major influence on training and how that training affects learning, retention and transfer of knowledge, skills and abilities. Indeed, commitment to quality training from the organization responsible for that training is likely to be critical if the goals of training are to be realized.

Organizational support
The existing research literature has largely examined what organizations can do, *post-training*, to maximize the impact of training. For example, research has demonstrated that supervisors who support and encourage their trainees to put their training into practice (e.g. by implementing a new skill acquired through training) can increase the degree to which training results will actually be transferred to the field and have an impact on-the-job (e.g. Blume *et al.*, 2010; Nanan *et al.*, 2017; Rouiller and Goldstein, 1993). Over and above playing a critical role in the post-training environment, organizations can also play key roles when training is being developed and delivered to trainees (Salas and Cannon-Bowers, 2001). Indeed, without organizational commitment, training is likely to be sub-optimal. Based on the literature that was reviewed, these forms of support can include ensuring that adequate time is available for training, both at the outset of an officer's career and throughout their career; ensuring that the necessary resources are available for effective training, including the required infrastructure, equipment and human resources; ensuring that the training environment is conducive to learning (e.g. in terms of class size and composition); and ensuring that highly qualified and committed trainers deliver the training and receive the support required to deliver effective training, including curriculum design expertise and opportunities for ongoing professional development (e.g. Andersen *et al.*, 2017; Belur *et al.*, 2020; Reingle *et al.*, 2016).

Development of training
A number of training practices identified from the review speak directly to issues that need to be considered when training is being developed [1]. One of these practices relates to the

underlying philosophy of how training should be developed (and delivered) to maximize performance gains (i.e. that it should be based on adult learning principles). Other issues discussed in this section relate to the competencies that should be focused on in training, the development of effective scenario-based training, how massed and spaced practice should be built into training, the importance of aligning training formats with learning objectives, ordering training appropriately, ensuring that enough time is available for training so that sufficient mastery can be developed, and creating high quality teaching materials.

Adult learning principles
In contrast to *pedagogy*, a child-focused instructional approach, approaches to teaching that are based on the principles of *andragogy* are learner-centered, where the teacher assumes the role of a facilitator (Cochran and Brown, 2016). Teaching practices rooted in *andragogy* are based on several assumptions about adult learners, including that (1) they need to know the value of what they are learning; (2) they are self-directing and autonomous; (3) their experiences affect new learning; (4) their readiness to learn is dependent upon the perceived relevance of what is being taught; (5) their orientation to learning is task-, problem- or life-centered and (6) they tend to be intrinsically motivated to learn (McCay, 2011).

Consistent with the assumptions outlined above, approaches to adult learning allow students to be involved in their instruction, to draw on their own experiences, to learn topics that are relevant to their life or job, and to focus on problem-solving rather than on absorbing a large body of content (Andersen *et al.*, 2017). To facilitate these things, certain teaching tools are commonly built into adult learning environments, many of which would be uncommon in child-oriented learning environments. These tools include, but are not limited to, the analysis of case studies, group discussions and reflections, problem-based learning and the use of simulation or scenario-based training.

There have been numerous calls to base police training on the principles of adult learning to the extent possible (e.g. Birzer, 2003; Birzer and Tannehill, 2001; Murphy, 2017) – a recommendation that appears to be generally supported, both anecdotally and empirically. For example, Andersen and her colleagues (2017) surveyed frontline officers and instructors in Ontario, Canada and observed that many of the officers' reported beliefs about what is effective and what is ineffective in the context of training are congruent with recommendations from adult learning advocates (e.g. many respondents believed that simulation-based practice was the most useful form of training and that incorporating real-life experiences into training can be beneficial). Systematic reviews and meta-analyses also provide support for some of the adult-teaching strategies listed above, such as collective reflection (Belur *et al.*, 2020), problem-based learning (Walker and Leary, 2009) and active, experiential teaching methods (Burch *et al.*, 2014).

The development of relevant competencies
The goal of this paper is not to dictate the specific content that should be built into police training, nor the amount of time that should be dedicated to each training topic. However, it is important to briefly discuss the sorts of competencies that are relevant to de-escalation and use-of-force training. Developing these competencies through training will hopefully allow officers to be more prepared for what they encounter on the streets, which should result in improved performance, better decision-making and enhanced safety.

Numerous competencies are thought to underlie the effective use of de-escalation and use-of force strategies in police–public encounters [2]. At least 10 competencies are supported by empirical research. These competencies include (1) knowledge of relevant policies and laws (e.g. Prenzler *et al.*, 2013; Rajakaruna *et al.*, 2017; Reaves, 2016); (2) an understanding of mental

health issues (e.g. Cotton and Coleman, 2010; Krameddine and Silverstone, 2015); (3) an ability to interact effectively and respectfully with members of diverse groups (e.g. Rosenbaum and Lawrence, 2017; Smith *et al.*, 2017; Tyler and Wakslak, 2004); (4) awareness and management of stress effects (e.g. Andersen and Gustafsberg, 2016; Andersen *et al.*, 2015; McCraty and Atkinson, 2012); (5) strong communication skills (e.g. Kesic *et al.*, 2013; McCamey and Carper, 1998; McLean *et al.*, 2020); (6) decision-making and problem-solving skills (e.g. Boulton and Cole, 2016; Suss and Ward, 2012; Ward *et al.*, 2011); (7) perceptual abilities (e.g. Dror, 2007; Tiesman *et al.*, 2015); (8) relevant motor skills (e.g. Bennell and Jones, 2004; Di Nota and Huhta, 2019; Whittie, 2011); (9) emotion and behavior regulation (e.g. Murphy, 2009; Price and Baker, 2012; Rajakaruna *et al.*, 2017) and (10) professionalism (e.g. McCluskey *et al.*, 1999; Shjarback and White, 2016).

Three additional competencies have not been adequately studied by researchers, but are arguably essential competencies to focus on in police training. None of these competencies emerged from the literature searches, but were supported by the police SMEs we interviewed. The additional competencies include (1) an understanding of the role of the police in a free and democratic society, (2) tactical skills (e.g. related to the use of time, distance, cover, etc.) and (3) post-event articulation abilities (e.g. being able to explain one's actions, post-event, using clear and simple language). The content of training should provide police officers with opportunities to develop a degree of mastery around these basic competencies, and the 10 previously listed competencies, to the extent possible given operational constraints [3]. Mastery of certain competencies (e.g. awareness and management of stress effects) may be particularly important given that insufficient mastery of these skills will negatively impact the implementation of other skills in the field (e.g. communication, decision-making and problem-solving skills).

The use of stressful, dynamic scenarios
Many researchers have recommended that high-fidelity (i.e. realistic) scenarios be included in de-escalation and use-of-force training to help prepare officers for naturalistic conditions (e.g. Andersen and Gustafsberg, 2016; McCraty and Atkinson, 2012; Staller *et al.*, 2019). Armstrong *et al.* (2014) note that scenario-based training will be particularly important for use-of-force encounters, given the relatively low rate at which these encounters occur in real-life settings. Officers are unlikely to gain sufficient experience responding to use-of-force events from their day-to-day calls for service (Baldwin *et al.*, 2018; Hall and Votova, 2013). Nonetheless, they must always be prepared to respond appropriately in case they do find themselves in a situation requiring the use of force, just as they must be prepared to effectively employ de-escalation tactics.

The utility of scenario-based training has been assessed in various ways across numerous studies, especially for use-of-force events (Andersen and Gustafsberg, 2016; Nieuwenhuys and Oudejans, 2011; Staller *et al.*, 2019). For example, consistent with other research, Taverniers *et al.* (2011) found that (1) reality-based training in which officers are at risk of being shot elicits a more similar stress response to that observed in the field, compared to training without the added pressure of return fire; (2) working memory deteriorates significantly during scenario-based training and (3) in spite of the stress experienced and its effects on memory, officers report that they learn more (i.e. acquire task-relevant skills) from high-pressure reality-based training compared to less stressful training scenarios. Importantly, research has also shown that gains from scenario-based training can be maintained over time (e.g. Nieuwenhuys and Oudejans, 2011), and that such training may have value for enhancing communication and judgment, both of which are important for de-escalation (e.g. Chappell, 2006; Helsen and Starkes, 1999; Van Hasselt *et al.*, 2008). Glenn *et al.* (2003) specifically recommend incorporating scenarios into training that requires trainees to

solve problems and to use their knowledge of diverse populations (e.g. persons with disabilities, persons with mental health issues, racialized groups).

This focus on problem-solving during scenario-based training, especially for the purpose of developing adaptive decision-making skills, will be particularly important. Research has demonstrated that a key factor in predicting optimal outcomes in police–public interactions is an officer's ability to respond rapidly and appropriately to dynamic, potentially stressful scenarios by altering their responses in line with changing demands (Boulton and Cole, 2016; Harris *et al.*, 2017; Suss and Ward, 2018). To facilitate the development of adaptive decision-making, de-escalation and use-of-force training will likely have to be delivered in a particular way, with a heavy reliance on the use of dynamic scenarios and a focus on key learning outcomes. In line with recommendations made by Boulton and Cole (2016), these outcomes should include the development of "mental models [of the likely relationships between contextual features of events, potential solutions to challenges, and associated outcomes]. . .sense-making skills to recognize conflict between mental models and current situational cues. . ., and the ability to revise or reject mental models in response to situational assessment" (p. 14).

Diverse training scenarios
When developing scenario-based training, special consideration must be given to the range of scenarios that will be utilized. Obviously, no two calls are exactly alike, and an officer must be able to use their knowledge, skills and abilities in a flexible way, adapting what they know as they respond to each unique incident. In addition to exposing trainees to variants of similar encounters (Harris *et al.*, 2017), a key way in which trainers can use scenario-based training to facilitate the acquisition of knowledge, skills and abilities that will be flexible and transferable to highly dynamic real-world settings will be to develop and deliver a variety of training scenarios (Boulton and Cole, 2016). Consistent with this recommendation, an independent evaluation of the New York Police Department's (NYPD) firearm training program conducted by the RAND Center on Quality Policing also supports the value of student practice on a wide range of scenarios (Rostker *et al.*, 2008). Indeed, Rostker *et al.* (2008) note that, nationally, there is consensus that a major key to improving police training relates to increasing the variety of scenarios experienced by recruits.

There are, however, two important caveats related to the provision of varied scenarios for police training that emerge from the existing literature. First, as discussed in more detail below, it is important to note that any complexity added to the training scenarios should be introduced gradually, especially for novices. The premature introduction of more complex scenarios could result in trainees becoming overwhelmed if the cognitive load (i.e. mental effort) necessary to accomplish the task exceeds their capacity (Paas and van Merriënboer, 1994). The second caveat relates to the way in which the scenarios are executed. Simply exposing trainees to a large number of different scenarios without ensuring they are responding correctly is likely to be ineffective. Consistent with the early work of Rogers (1969), practice improves performance, but only to the extent that the practice is correct (i.e. trainees execute the various scenarios properly).

Massed versus spaced practice
Training can be condensed into a single session, in which practice occurs continually without rest or very little rest (i.e. massed practice), or training can be distributed over time with rest intervals in between sessions (i.e. spaced practice). Generally, researchers have suggested that massed practice can be valuable for *acquiring* knowledge, skills and abilities (e.g. Soderstrom and Bjork, 2015), whereas spaced practice is particularly advantageous for *retaining* and *transferring* knowledge, skills and abilities (Baldwin and Ford, 1988) [4].

The value of massed practice for acquiring knowledge, skills and abilities seems to come from the fact that it provides the opportunity for frequent, repetitive practice, which can promote overlearning, where overlearning refers to the continued practice of a task even after proficiency has been achieved (Pashler *et al.*, 2007). Early work by Schendel and Hagman (1982) demonstrated the benefits of overlearning in training that involved complex motor skills. They concluded that when scheduling restricts the opportunity for refresher training (i.e. spaced practice), overlearning certain procedural tasks through the provision of massed practice may be worthwhile. There are circumstances where massed practice may be beneficial in the context of de-escalation or use-of-force training. For example, it may be useful at the beginning of a training session for advanced learners to ensure all trainees in a cohort possess a basic level of competency in a given skill area before moving on to more complex training tasks. The problem with massed practice, however, is that the learning that occurs from it tends to deteriorate quickly and, therefore, long-term performance that is dependent on that learning can suffer (Roediger *et al.*, 2019).

Spaced practice is an obvious alternative. The advantages associated with spaced practice are consistent with learning theory, which emphasizes the importance of transferring training content to long-term memory (Bransford *et al.*, 2000). Spaced practice has been well supported by meta-analytic research (e.g. Cepeda *et al.*, 2006; Lee and Genovese, 1988), with some of this research even suggesting that spaced practice can be better than massed practice for acquiring knowledge, skills and abilities (e.g. Donovan and Radosevich, 1999). Given the time constraints that usually exist in the police training environment (i.e. trainers often only have access to trainees for a relatively short time period), it may be challenging to fully exploit the benefits of spaced practice. However, potentially useful strategies for incorporating spaced practice into training, even when training time is severely limited, have been proposed (e.g. Carpenter *et al.*, 2012).

One way that curriculum designers and trainers can accomplish spaced practice if time is limited is to have trainees review concepts or practice skills that were learned in previous lessons during later lessons to provide multiple training exposures with space in between. Designers and trainers can also develop periodic homework assignments that include reviewing previous material or practicing previously acquired skills, assuming adequate knowledge/skills have been developed (this could involve self-practice in one's "down time," potentially between scheduled training). Finally, assessments (e.g. scenarios) can be used in training that are purposefully designed to be cumulative in nature so that trainees must continually study/practice/reflect on previously learned material at regular intervals throughout their training in order to prepare for those assessments.

Aligning training format with learning objectives

Although there is very little empirical research on the impact of "matching" the training format to the training task (Arthur *et al.*, 2003a), researchers have argued that different training formats are likely best suited to specific learning objectives (e.g. Costa *et al.*, 2007; Sitzmann *et al.*, 2006; Steadman *et al.*, 2006). In the context of de-escalation and use-of-force training, what this means is that while various training formats such as online modules, classroom teaching, defensive tactics classes, range shooting, judgment simulators and scenario-based training may all have value, these formats may not be equally well-suited to all learning objectives. This needs to be considered when training is being developed and delivered.

Online training and classroom instruction likely have value within the policing domain, especially when it comes to the acquisition of declarative knowledge or when attempting to inform officers' attitudes (e.g. Krameddine *et al.*, 2013; LaMotte *et al.*, 2010). For example, a

very recent evaluation of a social interaction training program, which involved trainees being taught key skills (communication, self-control, de-escalation) before exposing them to real-life incidents through video that had stop points to promote reflection and group discussion, was successful in changing some important attitudes (e.g. toward procedural justice practices; McLean *et al.*, 2020; Wolfe *et al.*, 2020). However, some researchers have argued that these training formats are not likely to be well-suited for the development of complex cognitive or motor skills that will have to be applied in dynamic, potentially stressful field settings (Andersen *et al.*, 2017; Bennell and Jones, 2004). To effectively master these more complex outcomes, police officers will likely need to engage more actively with training material (e.g. Freeman *et al.*, 2014; Gagné, 1984; Prince, 2004). With respect to motor skills in particular, it would seem that defensive tactics classes and range training are particularly useful, especially for relatively inexperienced trainees who have yet to develop essential motor skills (Driskell and Johnston, 1998).

Importantly though, researchers have argued and studies have repeatedly demonstrated that procedures, strategies and skills developed in less realistic training environments (e.g. static target practice on a shooting range) do not necessarily transfer to more realistic settings (e.g. Marion, 1998; Morrison and Vila, 1998; Oudejans, 2008). Consequently, it is crucial that selected training formats allow officers to acquire and practice procedures, strategies and skills under more realistic conditions (e.g. complex, dynamic, stressful scenarios; Bennell and Jones, 2004; Friedland and Keinan, 1992; Nieuwenhuys and Oudejans, 2011).

Computerized simulators that present officers with interactive, video-based scenarios can be useful in this regard. Yet, while research has consistently demonstrated the value of simulators (e.g. Krebs *et al.*, 1999; Pleban *et al.*, 2002; James *et al.*, 2018), this technology is also limited in many ways (e.g. in terms of interactivity), making them unsuitable for some forms of training. In de-escalation training, for example, opportunities must be provided to practice and refine one's interpersonal skills, which involve fluid two-way communication (Andersen *et al.*, 2017). Fortunately, scenario-based training may overcome this limitation.

As a training format, scenario-based training is supported by situated learning theory, which suggests that learning occurs best in the context in which it is intended to be used (Lave and Wenger, 1991). It is also consistent with situated cognition, which argues that knowledge is more likely to be acquired and more fully understood when situated within relevant contexts (Brown *et al.*, 1989). Empirically, studies have demonstrated that scenario-based training allows trainees to develop important skills that will assist them in effectively implementing de-escalation and use-of-force strategies in the field (e.g. Andersen and Gustafsberg, 2016; Nieuwenhuys and Oudejans, 2011; Van Hasselt *et al.*, 2008).

Appropriately ordering training
Research suggests the importance of ordering training content, such that basic knowledge and skills are imparted first using low-fidelity (i.e. less realistic) training formats, with higher fidelity training gradually introduced to focus on the development of higher-order knowledge and skills, and their application under real-world conditions (Bennell *et al.*, 2007). It has been argued that providing novice learners with extremely realistic training (e.g. complex, dynamic, stressful) that focuses on higher-order knowledge, skills and abilities (e.g. transitioning between communication, problem-solving, tactical decision-making and use-of-force interventions) will simply overwhelm their cognitive capacity and prevent meaningful learning from taking place (e.g. Haji *et al.*, 2016; van Merriënboer *et al.*, 2003).

Moreover, some research has suggested that higher forms of learning depend on previous learning conditions being met (Driscoll, 1994). These arguments are consistent with theoretical models of learning outcomes, such as Bloom *et al.*'s (1956) well-known taxonomy and its more recent incarnations (e.g. Anderson and Krathwohl, 2001). Bloom's (1956)

taxonomy suggests that (1) there are different types of learning outcomes (e.g. remembering, understanding, applying, analyzing, evaluating and creating) that represent lower- and higher-order thinking skills and (2) learning high-order skills is dependent on trainees having already attained lower-order skills. Accordingly, careful consideration should be given to the order of training, especially when delivered to novice trainees, so that officers are able to effectively learn, retain and transfer their knowledge, skills and abilities to naturalistic field settings.

Sufficient training time

To acquire the knowledge, skills and abilities that are necessary to effectively apply de-escalation and use-of-force strategies in the field, front-line officers must be exposed to a sufficient amount of training. This needs to be a serious consideration when developing and delivering training. How does one determine, for any set of training circumstances, when desired mastery criteria (i.e. acceptable standards of performance) have been met? As noted, research has demonstrated that overlearning may have a positive impact on certain skills that are essential components of a frontline police officer's repertoire (e.g. pistol skills; Krätzig, 2016). However, if sufficient training time is not available to achieve overlearning, which often appears to be the case in the policing domain (Rajakaruna *et al.*, 2017; Reaves, 2009; Renden *et al.*, 2015), other strategies may have to be adopted to "create more time" in order to maximize training effectiveness.

One strategy is to exploit the benefits of online learning (e.g. Krameddine *et al.*, 2013; LaMotte *et al.*, 2010). In particular, curriculum designers and trainers might want to consider if there are relevant aspects of training that could be appropriately covered through online instruction (e.g. elements that simply require rote memorization). This would free up face-to-face training time for those topics that really require resource intensive training formats. A second strategy is to rely on vicarious learning, which involves attempts to encourage learning among observers while those directly involved in the training are also learning (e.g. during scenario-based training). Research from other domains has clearly identified the potential for vicarious learning across a range of skills (Mohr, 2018; Rummel and Spada, 2005; Stegmann *et al.*, 2012). To the extent that vicarious learning is adopted as a training strategy, it is of course important that it be used with maximum effect. Strategies for accomplishing this will be discussed in more detail below in the section dealing with active engagement of trainees.

Another strategy for maximizing training efficiency is to encourage self-practice, at least for those who have developed some degree of mastery already (otherwise, trainees may simply practice bad habits). There is evidence to suggest that officers who supplement their regular instruction with additional training have fewer problems with skill execution and better overall performance in potentially violent police–public encounters (e.g. Renden *et al.*, 2015). Finally, mental rehearsal, discussed in more detail below, may be a viable option in some cases (e.g. with experienced officers) to provide additional training time when training resources are limited (Arnetz *et al.*, 2009; Colin *et al.*, 2014; Page *et al.*, 2016).

Well-designed teaching materials

While the focus is often on content when developing police training (e.g. the types of scenarios that are designed and delivered to trainees), the quality of teaching materials also needs to be carefully considered. Teaching materials, such as PowerPoint presentations, worksheets and assessments, should be designed in such a way that they increase the likelihood that trainees will learn, retain and transfer the knowledge, skills and abilities that they are supposed to be developing through their training. As Farrow (2003) argues, "The nature and qualities of the

teaching materials that you use can have a substantial effect on the educational experience of your students. Teaching materials can often distract learners rather than help them to learn. . .It is important therefore to know how to create effective teaching materials" (p. 921).

Numerous methods have been proposed to help ensure teaching materials are well designed. For example, Farrow (2003) recommends that instructors follow the LIGHT principle when preparing any type of teaching material. LIGHT stands for links, intelligibility, general style, highlighting and targeting. By *links*, Farrow is referring to the fact that teaching material should have "obvious and direct links to your talk, presentation, or discussion" (p. 921). *Intelligibility* refers to the fact that "teaching material should be easy to understand and learn from" (p. 921). For *general style*, uniformity should be applied to the teaching material, given that "consistency will allow learners to concentrate on the meaning and relevance of what [the trainer is] trying to communicate" (p. 921). *Highlighting* literally refers to the use of various techniques (e.g. underlining, changing color, bolding) to emphasize important material. Finally, *targeting* involves focusing the teaching material on the needs of trainees (i.e. what trainees need to learn), which requires a deep understanding of one's learning objectives and some level of understanding of the trainees themselves, including their pre-existing knowledge, skills and abilities related to de-escalation and use-of-force.

Of course, the LIGHT principle is not the only set of guidelines that can be used to help develop teaching materials; the general point is to consider these sorts of issues so that teaching materials have their intended impact and do not detract from training.

Implementing training

There are numerous decisions that need to be made about how de-escalation and use-of-force training is implemented. Below, several evidence-informed practices related to the implementation of training are discussed. For the most part, these include a range of instructional strategies that trainers can use to help ensure officers have access to the necessary knowledge, skills and abilities when they require them in the field. The final issue that is discussed in this section relates to the competencies of the trainers who deliver de-escalation and use-of-force training.

Worked examples for novices

Arguably, one of the most well-supported instructional methods for enhancing learning is the use of worked examples (e.g. Chen *et al.*, 2020; Rourke and Sweller, 2009; Sweller, 2006). Worked examples may be described as a process whereby an instructor demonstrates to learners the solution to a problem, in a step-by-step fashion. Theoretically, using worked examples in training tends to be effective because they decrease cognitive load (i.e. the amount of mental effort required to accomplish a task) while allowing for task-relevant schemas to be developed (Sweller and Cooper, 1985). Hutchins *et al.*'s (2013) meta-analysis strongly supports the use of worked examples for accomplishing training transfer, although novice learners appear to benefit more from this strategy than experienced trainees.

Unfortunately, as far as the authors are aware, the efficacy of worked examples has yet to be evaluated in a policing context. However, numerous calls have been made to utilize worked examples in this setting, especially for the training of novice officers who may experience so much cognitive overload in training that their learning is impeded (e.g. Bennell *et al.*, 2007; Mugford *et al.*, 2013; Rostker *et al.*, 2008). For example, in their evaluation of the NYPD's firearms training program, Rostker and his colleagues (2008) grounded their work in Gagné *et al.* (1992, 2005) and the Council for Adult and Experiential Learning's instructional principles, both of which endorse the use of worked examples in training.

Simplifying training
One method by which learning, retention and transfer can likely be enhanced in police training, especially for novice learners, is through the simplification of tasks (Angel *et al.*, 2012; Bennell *et al.*, 2007). According to some theories of instructional design (e.g. cognitive load theory; Clark *et al.*, 2006), the initial simplification of a training task will allow learners to more deeply process the material, which is essential for developing and automating cognitive schemas that underlie expertise, as well as for transitioning training material from working memory to long-term memory so that it can be retrieved when needed at a later date.

In order to simplify police training specifically, instructors might consider evidence-informed strategies such as part-task training or variable-priority training. In part-task training, trainers would segment whole tasks (e.g. performance in a scenario) into various subcomponents, or part tasks, to initially focus on promoting the acquisition of part-task skills (e.g. how to approach a subject, how to establish rapport, how to properly transition to a use-of-force intervention option if necessary; Wickens *et al.*, 2013). Such part tasks could be taught in classroom settings or on the range and mastered prior to having the trainee engage in an entire scenario (e.g. an interaction with a person in crisis) on a simulator or in a role-played situation. Alternatively, in variable-priority training, a whole task (e.g. an interaction with a person in crisis) can be presented to a trainee, but the trainee would be encouraged to focus on one aspect of the scenario at a time as they learn to manage the encounter (Johnson *et al.*, 2008).

Meta-analytic research suggests that both of these approaches can be useful, but their value depends on a range of factors. For example, in the meta-analysis conducted by Wickens *et al.* (2013), part-task training was successful when the part-task segments that had been learned occurred sequentially in the whole task (i.e. in the order in which they were learned), but not when the segments needed to be performed concurrently in the whole task. Also noteworthy was the finding that part-task training (and other methods for simplifying training) was more useful with inexperienced learners, which makes sense given that experienced learners will already have developed the tools to perform whole-tasks well.

Appropriate feedback
At a broad level, augmented feedback – or the type of feedback provided to a trainee by their instructor – consists of information about the discrepancy between a given response and a prescribed standard of performance (Bennell and Jones, 2004). More specifically, augmented feedback in the context of police training typically provides (1) a frame of reference for the quality of one's performance, (2) an impetus for the modification of one's performance and (3) a stimulus prompting a subsequent response that is expected to be a closer approximation of the desired behavior. This type of feedback is generally regarded by researchers as an essential factor in the acquisition and retention of desired response patterns (Angel *et al.*, 2012), but it is important to appreciate that feedback is not always effective. Indeed, while some empirical research suggests that augmented feedback can improve trainee performance, other research suggests such feedback can have very little effect on trainee performance, with some research actually suggesting that such feedback can have a negative effect on trainee performance (Kluger and DeNisi, 1996). As such, it is important to consider factors that will influence the impact of such feedback.

In order to enhance the effectiveness of police training, research suggests that particular attention be accorded to the *quality* of feedback. Based on their review of the feedback literature, Hattie and Timperley (2007) argue that three key questions must be answered for trainees in order for feedback to have its desired effect: (1) What are the goals that I am trying to achieve?; (2) What progress am I making toward these goals? and (3) What activities need to be undertaken so that I can make better progress toward these goals? Thus, one of the best

approaches to providing feedback, according to Hattie and Timperley, is to flow from task feedback (i.e. allowing the trainees to see that their performance was problematic), to process feedback (i.e. allowing trainees to see what is necessary to improve their performance), to regulation feedback (i.e. allowing trainees to develop the ability to critically evaluate their own performance) over the course of training.

With respect to feedback quality, additional research suggests that feedback provided by instructors will be more effective if it: (1) focuses on the task rather than the learner, (2) is elaborative (describing the "what, how, and why" of a given problem rather than simply identifying that a response is wrong), (3) is presented in manageable units to avoid confusion and cognitive overload, (4) is specific and clear, (5) reduces uncertainty between current performance and goal performance, (6) is as unbiased and objective as possible and (7) is provided after the trainee has attempted a solution (Shute, 2008). It is certainly the experience of the authors that feedback provided to officers in de-escalation and use-of-force training often does not meet these criteria. For example, in the context of scenario-based training, instructors often provide too much feedback immediately following scenario completion (often indicating to us that they want to correct as many problems during the feedback session as possible given the limited time they have with the trainee). Unfortunately, considering the likely cognitive and physiological state of a trainee immediately following an intense scenario (Andersen et al., 2018), they are unlikely to be in a position to internalize and process a large volume of feedback at this stage.

Actively engaging trainees in training

Research has suggested that trainers should encourage trainees to actively participate in training so as to maximize learning, retention and transfer. Some valuable methods of trainee engagement include having them generate answers to questions, explain reasons for their decisions, and critically reflect on the material and skills they are learning. Specifically, the *production effect* refers to the phenomenon whereby learners better encode items into explicit memory when they speak about study material aloud, rather than silently read it to themselves (Hopkins and Edwards, 1972; MacLeod et al., 2010). It has been shown that merely mouthing the words while one is studying can improve memory (Ozubko et al., 2014). Speaking aloud while learning is also related to the concept of *self-explanation*. When an individual cognitively engages with to-be-learned material, reinterpreting it in such a way that it is more understandable, they are said to be engaging in a process of self-explanation (Chi et al., 1989). Self-explaining is thought to enable students to process information more deeply, which likely enhances the degree to which the information is understood and retained in long-term memory (Sorden, 2005).

Collectively, the literature suggests that talking aloud and then explaining that material to oneself significantly enhances one's understanding and memory of the material (Bisra et al., 2018; Chi et al., 1994; Dodson and Schacter, 2001). Although these learning strategies do not appear to have been tested in samples of police officers specifically, it is likely that they would also apply to police officers in the context of de-escalation and use-of-force training (this was confirmed by the SMEs interviewed as part of this project). These strategies are consistent with adult learning principles, which are frequently recommended for police training (Murphy, 2017), in that they focus on the active engagement of learners in their own learning process and are forms of learner-directed (as opposed to teacher-directed) training.

Based on observations of training, there are two other areas in particular that the authors believe need to be carefully examined to ensure that trainees are being actively engaged in de-escalation and use-of-force training: classroom instruction and vicarious learning during scenario-based training, both of which are used heavily in most jurisdictions. Contrary to what is often practiced in the classroom environment, where trainers lecture *at* trainees,

engagement can likely be increased by using a "present-discuss-apply" strategy. Using this technique, a concept would first be presented to the trainees, it would then be discussed in small groups by trainees, and then it would be applied to an actual video or table-top scenario by the trainees. Such active engagement is likely to encourage deeper processing of the training material, which will likely enhance learning and retention (Johnson and Mighten, 2005; Walker and Leary, 2009). The application phase of this strategy is also likely to increase the probability that trainees will be able to apply said concepts in the field.

Given resource constraints (e.g. limited training time), vicarious learning opportunities appear to be relied on heavily in de-escalation and use-of-force training, as they are in other fields (Mohr, 2018; Rummel and Spada, 2005; Stegmann et al., 2012). These opportunities are provided, for example, when trainees are asked to observe others taking part in scenario-based training. Vicarious learning opportunities of this sort can be highly beneficial, but only if the trainees are actively engaged in this learning; something that rarely happens in the experience of the authors. Engagement in this case can be improved in many ways. For example, trainees can be encouraged to actively engage in this learning opportunity by instructing them that they will be required to participate in post-scenario debriefs, informing them that they may be pulled into the scenario at an unknown point, or requiring them to observe a live stream of the scenario in a separate room, perhaps while being prompted by an instructor to consider key issues.

Mental rehearsal for experienced officers

Another element of training that encourages mastery through the creation and storage of task-relevant schemas is mental rehearsal. Mental rehearsal uses "one's senses to re-create or create an experience in the mind" (Vealey and Greenleaf, 2010, p. 268). The purpose of mental rehearsal is to facilitate the transfer of knowledge from working memory to long-term memory (Leahy and Sweller, 2008). The impact of mental rehearsal has been observed in various domains. For example, meta-analyses of mental rehearsal training in surgery settings show positive effects if the training is provided in addition to physical training, if it is sufficiently long (30–90 min), if it is supervised, and if the learners have some experience with the skills they are mentally rehearsing (e.g. Rao et al., 2015).

Numerous studies have also examined the impact of mental rehearsal interventions on performance outcomes in police training. Mental rehearsal in police training often focuses on relaxation techniques, such as breathing control (e.g. slowing one's rate of breathing when encountering a subject), performance imagery (e.g. imagining a successful response to an armed assailant) and/or attention control (e.g. maintaining focus on the steps necessary to complete a goal; e.g. Colin et al., 2014; Page et al., 2016; Shipley and Baranski, 2002). Overall, mental rehearsal in these types of studies usually demonstrates significant improvement to officer performance during both static (i.e. marksmanship) and dynamic (i.e. scenarios) aspects of police training.

When thinking about incorporating mental rehearsal into de-escalation and use-of-force training, it is important to remember that specific conditions must be satisfied for mental rehearsal to be beneficial (Rao et al., 2015). Perhaps most importantly for these purposes, trainees must have developed some knowledge and proficiency in skills related to the task that is to be mentally rehearsed. Without the prerequisite skills, officers may be unable to fully comprehend how to complete the expected task and they may mentally practice improper techniques (Schuster et al., 2011; Zecker, 1982). Further, it is possible that without developing the necessary schemas/mental models before implementing mental rehearsal, the cognitive demands experienced by trainees may be too high to allot the additional resources required to practice mental rehearsal effectively (Clark et al., 2006). Indeed, when mental rehearsal is improperly implemented or focuses on negative

aspects of the process (e.g. errors that may occur when applying handcuffs to a resisting client), performance degradation can occur (Woolfolk *et al.*, 1985).

Creating a positive training environment
Research has suggested that it is important for trainees to be provided with a learning environment that is highly supportive, nonjudgmental and generally positive (e.g. Kamali and Illing, 2018; Phillips and Russell, 1994). A positive learning environment can be achieved at the level of the specific learning objectives that are set, the general atmosphere created around the training, the response of the trainer to trainees, the way training errors are handled and the approach adopted for debriefings (e.g. Etter and Griffin, 2011; Kluger and DeNisi, 1996; Werth, 2011). Creating a positive learning environment is particularly important given that trainees will undoubtedly already experience pressure or stress in the training environment. For example, when de-escalation and use-of-force training is provided in a group setting, as is typical in police training, trainees will likely be exposed to "social evaluative threat," which occurs when an individual believes there is a possibility of being viewed in a negative light by the people around them (Dickerson and Kemeny, 2004).

Trainer competencies
The final issue to be discussed in this section relates to the competencies of the trainers delivering de-escalation and use-of-force training. Effective trainers do not simply possess knowledge in an area, they also understand *how* to teach, and they have the *practical skills* to do so. In other words, they do not experience the *problem of enactment*, which is often discussed in educational literature. This refers to the discrepancy that can occur between an instructor's theoretical understanding of teaching (e.g. knowledge of theories of effective teaching and learning) and their ability to put that understanding into practice, or to *enact* rigorous teaching methods (Ghousseini and Herbst, 2016; Hammerness *et al.*, 2005).

Just like there are necessary competencies for effectively implementing de-escalation and use-of-force strategies in the field, police trainers should also ideally possess core competencies to be able to deliver training in these areas successfully. To a large extent, these competencies will overlap with the sorts of competencies that one would like to see in frontline officers (i.e. if one must teach officers something, the trainers themselves must possess relevant expertise in these areas). Consistent with the previous discussion of officer competencies, these competencies would likely include (1) knowledge of relevant policies and laws, (2) an understanding of mental health issues, (3) an ability to interact effectively and respectfully with members of diverse groups, (4) awareness of stress effects and their management, (5) strong communication skills, (6) sound decision-making and problem-solving skills, (7) keen perceptual abilities, (8) relevant motor skills, (9) an understanding of the role of the police in a free and democratic society, (10) tactical skills (e.g. related to the use of time, distance, cover, etc.) and (11) post-event articulation abilities (e.g. being able to explain one's actions, post-event, using clear and simple language).

Beyond these competencies, there are also trainer-specific competencies that would likely be related to training effectiveness. Two in particular stand out in the literature as likely being important: having credibility in the eyes of trainees (Choi *et al.*, 2015; Hutchins, 2009) and possessing the ability to effectively impart training material (e.g. by using the instructional strategies described above; Clark *et al.*, 2006). Many of the core competencies highlighted above (1–11) may be acquired naturally by police trainers through their own prior frontline experiences. Credibility, however, must be earned, and an ability to effectively impart training material will likely have to be taught, at least to some extent. Providing police trainers with appropriate instruction that is outside the scope of their natural experiences,

such as experiential training related to evidence-based teaching, will help ensure that the training they deliver to police officers is of high-quality (Darling-Hammond *et al.*, 2007).

Evaluating training

The final set of training practices that were identified in the literature review relate to the evaluation and ongoing assessment of training. These practices all focus on ensuring that training is accomplishing its desired goals or outcomes.

Research-based training

Like other police initiatives (e.g. crime prevention strategies; Huey and Ricciardelli, 2016), it has been argued that police training programs should ideally be based on research that has validated the training (Telep, 2016). As much as possible, validation research of this type should meet certain standards of methodological rigor (e.g. random assignment of research participants to training and control conditions [5]; Huey and Ricciardelli, 2016). Such evaluation research should also determine if the training, as currently delivered, allows trainees to achieve the desired results (Ward *et al.*, 2007).

Very few police training programs can currently be considered evidence-based. Indeed, consistent with other recent reviews (e.g. Engel *et al.*, 2020), the review of de-escalation and use-of-force training in the policing context undertaken for this paper generated little material. There have been some recent limited attempts to evaluate training in these areas (e.g. verbal judo; Giacomantonio *et al.*, 2019; Tact, Tactics and Trust (T3) training; McLean *et al.*, 2020; Wolfe *et al.*, 2020), but the only programs that could be identified with a reasonable amount of high quality evidence to support them included a program for de-escalating encounters involving persons with a mental illness that was developed by Krameddine *et al.* (2013), a trauma resilience training program developed by Arnetz *et al.* (2009), and the international Performance Resilience and Efficiency Program (iPREP), which was designed by Andersen and Gustafsberg (2016) to improve performance in dynamic use-of-force encounters by teaching officers methods for physiological stress control. In cases where a training protocol has not been validated, the effectiveness of that training can only be assumed, and therefore the training should be adopted with an appropriate level of caution.

Monitoring and modifying training

Sherman (2013), a pioneer in the field of evidence-based policing, identified three principles that are central to this field: targeting, testing and tracking. Sherman has argued that police services typically do an adequate job of targeting problems and testing strategies to solve those problems. However, it appears that services rarely monitor and modify strategies (i.e. track them) over the longer term (e.g. Huey *et al.*, 2017). This appears to extend to police training programs as well (Bradley and Connors, 2007). The lack of monitoring and modification of training strategies is problematic, even in cases where the training being offered has been validated through research in other jurisdictions. There are many reasons why a validation study may not generalize across jurisdictions, including but not limited to fundamental differences in trainee skills, training resources and trainer qualifications. Nothing can take the place of a well-developed training evaluation to determine if the goals of training are being achieved.

Evaluations would involve police services systematically monitoring their training to determine whether the training is accomplishing its stated objectives, and modifying said training as needed to ensure it remains efficient and effective (Bradley and Connors, 2007). Such evaluations can take many forms. Although it would be beneficial for large-scale evaluations of training transfer to be conducted, at least periodically, to ensure that training

benefits are being realized "on the street," these types of evaluations can be complex, time-consuming and expensive (Corey, 2012). As a result, larger-scale evaluations of this type should be frequently supplemented with more manageable evaluation methods, such as the real-time assessments of knowledge through the use of in-class clickers, post-training quizzes and appraisals of skills by trained evaluators.

Informed, objective and multifaceted training evaluations
Related to the need to evaluate training, it has been argued that when monitoring training, the evaluation ought to be *informed,* whereby it focuses on outcomes that the training is specifically designed to impact, typically represented by prespecified learning outcomes (Bradley and Connors, 2007; Corey, 2012; Ewell, 2001). Learning outcomes "identify what [trainees] should know, value or be able to accomplish after successfully completing their [training]" (Goff *et al.*, 2015, p. 8). Relatedly, in the assessment of trainee performance, it has been argued that the monitoring process ought to be made as *objective* as possible (Oropesa *et al.*, 2011; Palter *et al.*, 2011). Carefully crafted "assessment models" (e.g. Norris and Wallert, 2011; Vila *et al.*, 2018), which include a clear articulation of learning outcomes, are recommended for this purpose, as are detailed scoring rubrics (Rostker *et al.*, 2008).

Finally, it is important to appreciate that de-escalation and use-of-force training is *multifaceted* in nature. Goals of training may include trainee engagement, knowledge acquisition, attitude and behavior change, and even organizational impact (Kirkpatrick, 1994). As such, various assessment tools are required to effectively evaluate training and pinpoint where potential modifications are required (e.g. satisfaction surveys, knowledge quizzes, training transfer evaluations). Such assessments prevent the need to make inferences about higher-order training outcomes (e.g. learning) from evaluations of lower-order training outcomes (e.g. satisfaction with training). This is critical given evidence that lower-order outcomes do not predict higher-order outcomes very well (Alliger *et al.*, 1997; Arthur *et al.*, 2003b; Saks and Burke, 2012). Moreover, different types of training outcomes appear to degrade at different rates (e.g. knowledge appears to degrade faster than skills; Arthur *et al.*, 1998), so it is important to assess these outcomes separately.

Concluding remarks
This preliminary narrative review aimed to identify evidence-informed training practices that are likely applicable to de-escalation and use-of-force training in the policing domain. As suggested earlier, this review should prompt more organized attempts to quantify the effectiveness of these training practices through systematic reviews and meta-analyses. In addition, the review will hopefully encourage more testing in a police environment to determine the precise impact of these practices on the learning, retention, and transfer of de-escalation and use-of-force training. This is urgently needed, especially considering that many of the studies reviewed in this paper were not conducted within the police setting. While the authors believe the practices highlighted above do generalize to police training – a view supported by the SMEs interviewed as part of this project – future research conducted within this setting may suggest otherwise.

The ultimate goal of this work is to foster the development and/or refinement of de-escalation and use-of-force training programs so that they align more closely with evidence-informed practices. That being said, readers (and people more generally) must manage their expectations in terms of how de-escalation and use-of-force training is delivered in the police setting. Given the many constraints that police trainers encounter, it is far easier to generate a list of evidence-informed training practices than it is to properly implement these practices. Indeed, in the experience of the authors, police trainers appear to be familiar with many of the

practices discussed above, and aspire to apply these methods, but they may not be in a position to deliver such training given a range of factors beyond their control, such as very significant time and resource constraints.

It is also critical that people appreciate that better training is not a silver bullet. The authors believe that many improvements can be made to de-escalation and use-of-force training through the adoption of the sorts of practices outlined in this paper, and that introducing these changes will likely improve the quality of police–public interactions. However, it would be naïve to assume that better training will eliminate unnecessary injuries and deaths occurring during police–public encounters entirely, especially if these result from legitimate mistakes on the part of police officers who have to make extremely challenging decisions under incredibly difficult circumstances. Individuals in other fields who receive far more training than police officers, and far better training, frequently make mistakes under pressure (e.g. elite athletes; Moran, 2004). There is no reason to suspect that police officers would be any different.

Given this likely reality, issues beyond training improvements must be considered if we are to effectively minimize avoidable injuries and deaths when the police interact with the public. While a full discussion of these issues is clearly beyond the scope of the current paper, other things that should be carefully considered include police selection processes, equipment issues, organizational policies and meaningful learning exchanges following encounters where members of the public, or police officers, are seriously injured or killed. While continually finding ways to improve the quality of de-escalation and use-of-force training must be a priority, it is likely that this more holistic approach is what is needed to maximize police and public safety.

Notes

1. It should be noted that it was difficult to assign certain training practices to the development phase of training versus the implementation phase. Any training plan that is developed obviously has to be implemented, so the division between these two categories is fuzzy and should be treated as such.

2. A second literature review highlighting these competencies, and the research that supports them, is being submitted as a separate publication.

3. This is not to say that all competencies must be covered in any given training session. Decisions will need to be made regarding when these competencies should be presented in the overall training schedule (e.g. during recruit training versus in-service training), how much time is dedicated to each competency, and how frequently training is provided for each competency (e.g. each training cycle or less frequently).

4. One issue that is not examined here, but will be important to consider in the future, is how massed and spaced practice sessions are arranged. Most often, training within any given session is blocked (i.e. one training topic is covered in its entirety before moving on to the next training topic). There are other ways to arrange training topics that are likely to result in greater retention and performance, such as interleaved practice where training topics are mixed, or interleaved, in a random or nonrandom fashion (Taylor and Rohrer, 2010).

5. In saying this, if a training program were to become considered a "best" practice, the police service should provide this training to their members. In order to avoid the liability associated with withholding such training, introducing training in phases may allow for methodologically rigorous comparisons (e.g. treatment vs control) while mitigating liability to the police service.

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404

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