CONTRIBUTORS

Mario S. Staller (1, 2, 3) ; Benjamin Zaiser (1); Swen Körner (1, 3)

1. *University of Liverpool, Department of Psychological Sciences, Tactical Decision Making Research Group*
2. *Leeds Beckett University, Carnegie Faculty; Institute for Sport, Physical Activity and Leisure*
3. *German Sports University Cologne, Institute of Pedagogy and Philosophy*

FROM REALISM TO REPRESENTATIVENESS

CHANGING TERMINOLOGY TO INVESTIGATE EFFECTIVENESS IN SELF-DEFENCE

STALLER, ZAISER & KÖRNER

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ABSTRACT

Physical assaults are an inherent problem of modern society. One strategy available to try to prevent violence is to strengthen one's personal capacities to defend oneself. This is the scope of various self-defence programs and systems within the civil domain. While training in self-defence facilitates the use of self-protective strategies in real life situations, it is important to ascertain whether individuals learn the skills taught in self-defence classes and whether they are able to perform the skills when these are required. In order to test the effectiveness of self-defence skills in an ethically acceptable way, instructors and scholars have to design environments in which valid and practically relevant results about the performance of the learner can be obtained. The imprecise nature and the multidimensional use of terms like 'realism' and 'reality-based' leads to difficulties in designing such environments. In this article, we argue for the need to shift the emphasis from 'realistic' to 'representative' design in testing and learning environments, with the aim of developing transferable self-defence skills within the civil domain. The Trade-Off Model of Simulation Design that we propose is intended to help instructors and scholars to make more informed decisions when designing tasks for testing or training.

Physical assaults are an inherent problem of modern society [e.g. Kajs, Schumacher, and Vital 2014; Tiesman et al. 2014]. One approach to trying to prevent violence is to strengthen personal capacities to defend oneself [Koss 1990]. This is the realm of various self-defence programs and systems within the civil domain. While training in self-defence facilitates the use of self-protective strategies in real life situations, it is important to assess whether individuals learn the skills taught in self-defence classes and whether they are able to perform the skills when these are required [Gidycz and Dardis 2014]. In order to test the effectiveness of self-defence skills in an ethically acceptable way, instructors and scholars need to design environments in which valid and practically relevant results about the performance of the learner can be obtained. In this paper, we argue for abandoning the term 'realistic' when it comes to testing and learning self-defence skills. Instead, we suggest focusing on representative designs of such tasks. The Trade-Off Model of Simulation Design that we propose is offered to help instructors and scholars make more informed decisions in designing tasks for self-defence skill testing or training.

The Transferability of Self-Defence Skills

A central goal of self-defence training is to increase participants' self-defence skills [Brecklin 2008]. Yet, the majority of studies in that context focus on the application of such skills in simulated assaults [Ozer and Bandura 1990], the demonstration of learned techniques [Pava et al. 1991; Henderson 1997], or the self-perception of learned skills [Hollander 2004, 2014; Boe 2015]. Only a few studies in the law enforcement domain have tried to investigate participants' actual competence to deal with intense violent encounters [Jager, Klatt, and Bliesener 2013; Renden et al. 2015].

Renden and colleagues investigated the ability to manage violence on-duty of Dutch police officers via an online questionnaire (n = 922). The results showed that, even though officers performed well enough to manage violent situations, they seemed neither clearly positive nor negative about the usefulness of the learned skills. Furthermore, the officers indicated a wish for more realistic training. Hence, Renden and colleagues recommend (a) providing more training, (b) delivering training that is 'more comparable to the high-pressure situations that officers face in the line of duty' [Renden et al. 2015: 17], and (c) considering teaching more reflex-like skills that are easier to learn and execute. In another study, Jager and colleagues [2013] conducted an online questionnaire with German police officers from North Rhine-Westfalia (n = 18.356) in order to map the victimization of police officers to violence while on duty. Subsequent interviews (n = 36) with participants of that study, who experienced physical violence on the streets, revealed that the attacks on the street differed substantially from the ones they were confronted with in the training environment. One officer described the difference between the incident and the training experience as follows: 'The attackers don't stand around and attack you stupidly; they charge at you. It's chaos. It looks different' [Jager et al. 2013: 346, translated from German]. Additionally, attacked officers perceived the surprising character and the aggressiveness of the situations as very demanding. Based on these results and the participants' notion that training should be designed more realistically, Jager and colleagues [2013] recommend practicing self-defence skills in training situations that resemble real incidents.

Both studies reveal that the performance of self-defence skills is different in training (the learning environment) as compared to a real incident (the criterion environment). This difference between the learning environment and the criterion environment is fundamental to the understanding of the acquisition of self-defence skills. The development of skills that transfer into the real world is the underlying goal of self-defence training. In the context of perceptual motor skills, including self-defence skills, transfer involves the ability to use prior experiences from perceptual motor skill performance and learning trials in self-defence situations (training sessions or real incidents) and then to adapt these experiences to similar or dissimilar contexts [Collard, Oboeuf, and Ahmaidi 2007]. Therefore, the effectiveness of training programs refers to the transferability of self-defence skills from the learning environment to the criterion environment, where optimal performance is needed (see Figure 1 overleaf).

Transferability of skills to real incidents can only be measured through the analysis of performance in the criterion environment, whether in the civil or law enforcement domain. Corresponding studies focus only on self-reports of participants in the field of law enforcement [Jager et al. 2013; Renden et al. 2015]. What is missing and what future studies should address are analyses of performance in real incidents based on objective data like video footage (for example, from CCTV or body-cams). A major drawback of analysing performance in the criterion environment is the delayed feedback, since it is ethically impermissible to actively seek violent confrontations in order to capture performance after new skills have been taught. Therefore, the performance of self-defence skills has to be tested in a testing environment that simulates the criterion environment. Valid results about the transferability of self-defence skills can only be obtained if the testing environment is representative to the criterion environment (red arrow). The same is true for the learning environment: the more representative the learning environment, the better the transfer of skills from that environment to performance situations [Broadbent et al. 2015].

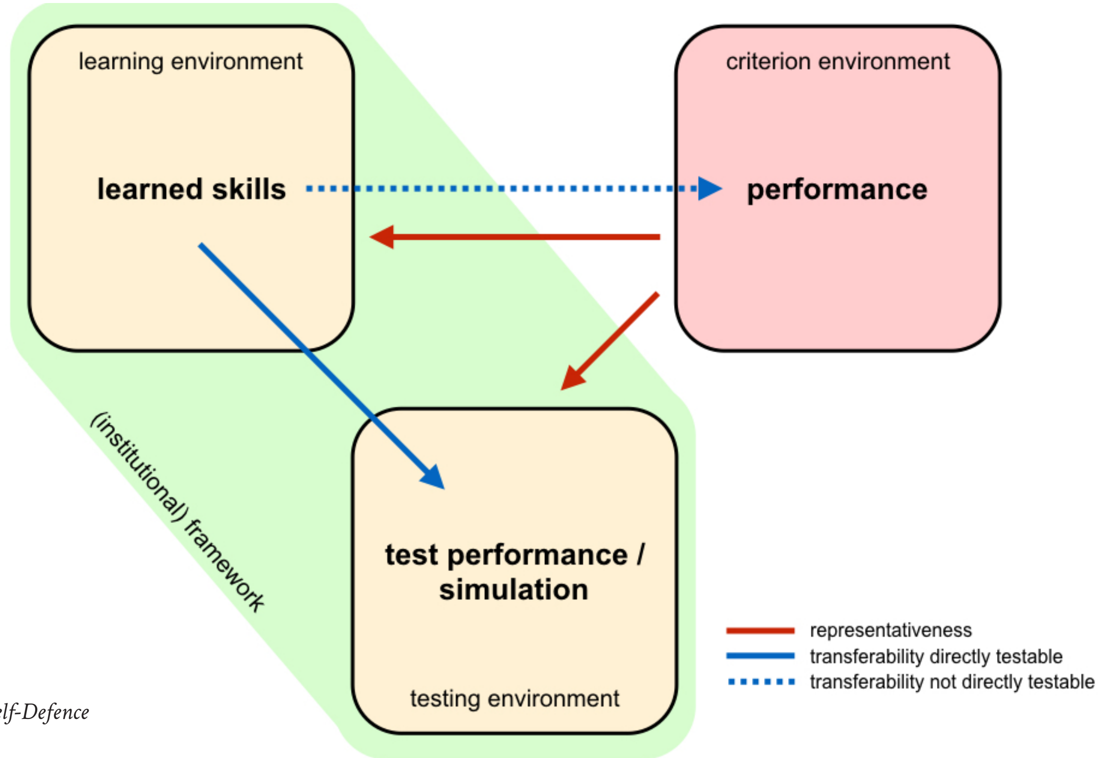

Figure 1: Representativeness in Self-Defence

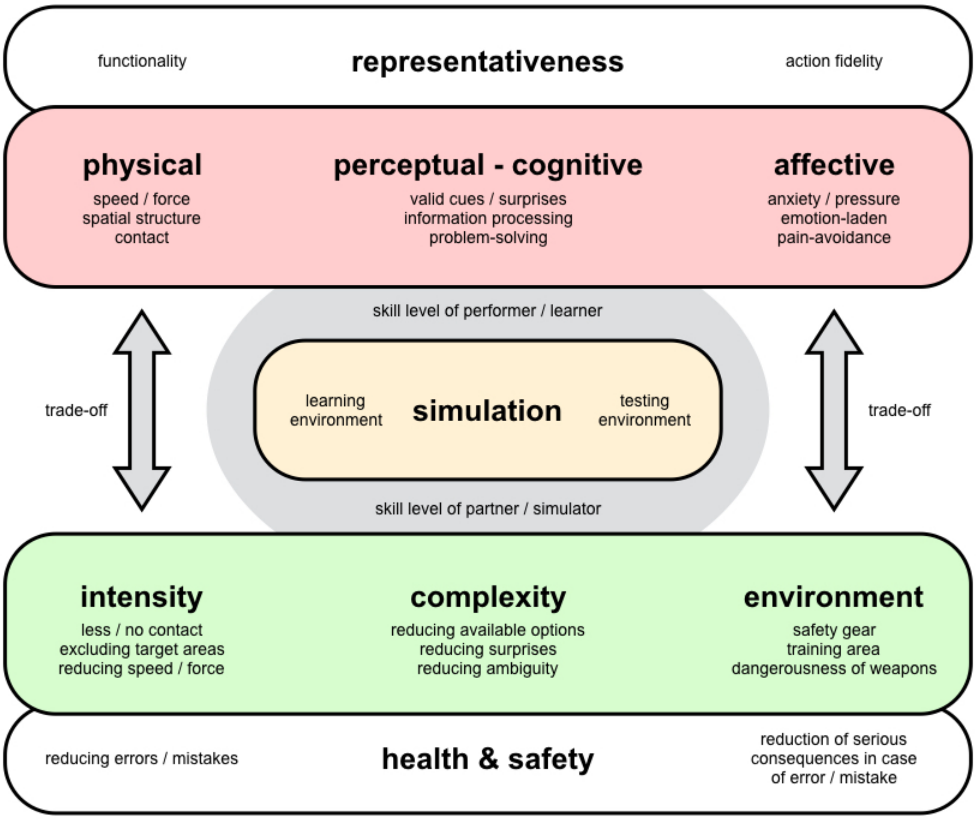

Figure 2: The Testing of Generated Solutions for Self-Defence Problems

THE SIMULATION OF REALITY OF SELF-DEFENCE TASKS

Practitioners and scholars in the self-defence domain regularly refer to 'realistic' or 'reality-based' training with regards to the design of corresponding learning or testing environments [Murray 2004; Wagner 2005; Oudejans 2008; Dzida, Hartunian, and Santiago 2010; Wollert, Driskell, and Quali 2011; Hoff 2012; Armstrong, Clare, and Plecas 2014]. Yet, there are various definitions and explanations of what the term 'realism' exactly refers to in the context of learning environments. For example, Armstrong and colleagues define a realistic environment as an environment that 'replicates what an officer would expect to encounter in a real-life situation' [Armstrong et al. 2014: 52], whereas Hoff states that the 'more realistic the environment, the greater the benefit' [Hoff 2012: 21] without giving further explanations of what 'realistic' refers to. In the context of scenario-based training, Wollert and colleagues point out that a scenario is a simulation of reality and that in order 'to be realistic it must "feel right" to the user' [Wollert et al. 2011: 47]. Furthermore, they use the term 'scenario fidelity' in order to describe 'how accurately the scenario reflects realistic conditions' [Wollert et al. 2011: 47]. To accommodate for the evasive nature of the term, they introduced three dimensions: equipment, sensory and psychological fidelity. Yet, these dimensions do not emphasize the functional properties of the simulation that align with learning or testing objectives. Scholars in the medical domain also suggest abandoning the mere term of 'fidelity' in simulation design, due to its imprecise nature and its lack of emphasis regarding functional task alignment [Hamstra et al. 2014].

At this point it is worth noting that skill transfer can be fostered in many activities during a training session and not necessarily through the means of scenario-based training [Staller 2015; Staller and Zaiser 2015]. Nevertheless, a simulation of reality (via scenario-based training) is the only viable way to test the effectiveness of technical and tactical solutions to problems encountered in the field (see Figure 2). Deliberate testing of learned self-defence skills in the field is ethically impermissible, whereas the testing in ideal conditions leads to the erroneous assumption that generated (technical and tactical) solutions work in the field. Therefore, the simulation of reality has to include conditions that are prevalent in violent encounters, such as surprise attacks, aggressiveness, and high amounts of pressure [Miller 2008; Jager et al. 2013; Jensen and Wrisberg 2014].

At the same time the scenario designer has to ensure the safety of the participants by omitting the real-world features that bear the risk of injuring participants [Murray 2004; Wollert et al. 2011]. For example, practicing self-defence techniques in highly dynamic and surprising situations using real guns or knives bears the risk of serious injury if the learner makes a mistake. Another option would be to work with real guns or real knives, but to drastically reduce the speed, the dynamics and the surprising character of the situation [Staller 2015].

THE CONCEPT OF REALISTIC TRAINING IS FLAWED

This example illustrates the imprecise nature of the term 'realistic' in training or testing environments. Both situations can be described as realistic in reference to one aspect (Situation a: dynamic, surprising attack; Situation b: use of real weapon) but unrealistic in reference to another (Situation a: use of mock weapon; Situation b: slow, unsurprising attack). It seems that in most cases practitioners refer to the physical resemblance of the training setting as resembling reality or not. Yet, from a learning perspective, the 'functional alignment with the learning task, the instructional design, and the instructor likely have far greater impact on immediate learning, retention and transfer to new settings' [Hamstra et al. 2014: 389].

Based on these observations, we argue for abandoning the term 'realistic' (and related terms like 'reality-based') and for shifting the emphasis onto *representativeness* in learning and testing environments. In the sport research domain, representative tasks allow the performer to search the environment for reliable information, integrate this information with existing knowledge, and complete an appropriate action [Broadbent et al. 2015]. The representativeness of a given task consists of two critical components: functionality of the task and action fidelity [Pinder et al. 2011; Broadbent et al. 2015]. The former refers to whether the constraints a performer is exposed to and must act upon in the task are the same as in the performance environment. The latter requires that the performer be allowed to complete a response that is the same as in the performance environment. Central to these ideas is the relationship between perceptual-cognitive and motor processes as well as emotional responses associated with the task [Pinder et al. 2011; Broadbent et al. 2015; Headrick et al. 2015]. As such, representative task design emphasizes the need to ensure that the task constraints of the practice activity represent (i.e., simulate) the particular task constraints of the criterion environment [Pinder et al. 2014].

Self-defence environmental constraints that the performer must act upon can involve (a) physical, (b) perceptual-cognitive, and (c) affective elements. The physical design refers to elements that mainly influence the intensity of attacks and attacker behaviour, which the defender has to cope with (functionality), such as the speed or level of force [Staller 2015], the spatial structure [Staller 2015], or the level of contact of the attack [Staller and Abraham 2016]. This is connected to the intensity of the executed motor skills of the defender (action fidelity), like the speed [Staller 2015], the spatial structure [Staller 2015], and the contact-level of the defence [Pfeiffer 2014]. Perceptual-cognitive elements impact decision-making, in terms of choosing which skill to perform and how to perform it (functionality), in relation to the presentation of valid cues [Staller and Abraham 2016] or situational constraints, and when the attack is surprise [Jensen and Wrisberg 2014]. Therefore, such constraints mainly put load on the information-processing and problem-solving abilities of the performer (action fidelity) [Staller and

Zaiser 2015]. Finally, affective components influence the emotional state in which the defender has to perform (functionality), like anxiety caused by situational constraints creating pressure on the performer [Nieuwenhuys et al. 2009; Renden et al. 2014] or emotion-laden situations [Headrick et al. 2015]. This allows the performer to experience the emotions associated with the task and how this impacts their thoughts and action (e.g. pain-avoidance) [Nieuwenhuys, Savelsbergh, and Oudejans 2011; Renden 2014]. Performers are able to learn (learning environment) or test (testing environment) their coping skills with these emotional demands (action fidelity). Even though the functionality of the task is related to the action fidelity of the performer, it is worth disconnecting them for learning and safety reasons. For example, in order to allow the performer to learn to recognize cues that reveal an immediate attack, the attacker may be allowed to attack very fast with a low level of contact (functionality – physical design). At the same time, the defender may be allowed to defend very fast with no level of contact (action fidelity – physical design). While high levels of representative task design cannot be achieved simultaneously in each element without compromising health and safety issues [Wollert et al. 2011], the self-defence coach has to carefully manipulate environmental constraints of practice or testing tasks so that the representativeness of single elements are elevated at the expense of others depending on the specific focus of the practice or testing activity.

HEALTH AND SAFETY IN TESTING AND LEARNING ENVIRONMENTS

The designer of the learning or testing environment has to ensure the safety of participants as well as the safety of training partners or role players. Since performance mistakes are going to happen, the instructor has to make sure that, when they happen, they have no serious consequences (e.g. injury/death). This can be achieved by (a) a reduction of intensity, (b) a reduction of task complexity, or (c) environmental changes. Changes in intensity refer to measures that focus on making self-defence and combat techniques less dangerous in testing or training settings. Possible options include the reduction of permissible contact (as defender or as attacker), the exclusion of target areas, or the reduction in speed and applied force. The reduction of task complexity aims at lowering the load of the perceptual-cognitive processes of the performer. By reducing surprises, ambiguity, and available options, the probability of mistakes in the decision-making component in self-defence performance decreases, leaving the performer more attentional resources for the associated motor processes. Finally, environmental changes refer to measures by the task designer, which reduce the risk of injury by altering the physical structure of the training or testing environment. This can be achieved, for example, by using different forms of safety gear, using replica

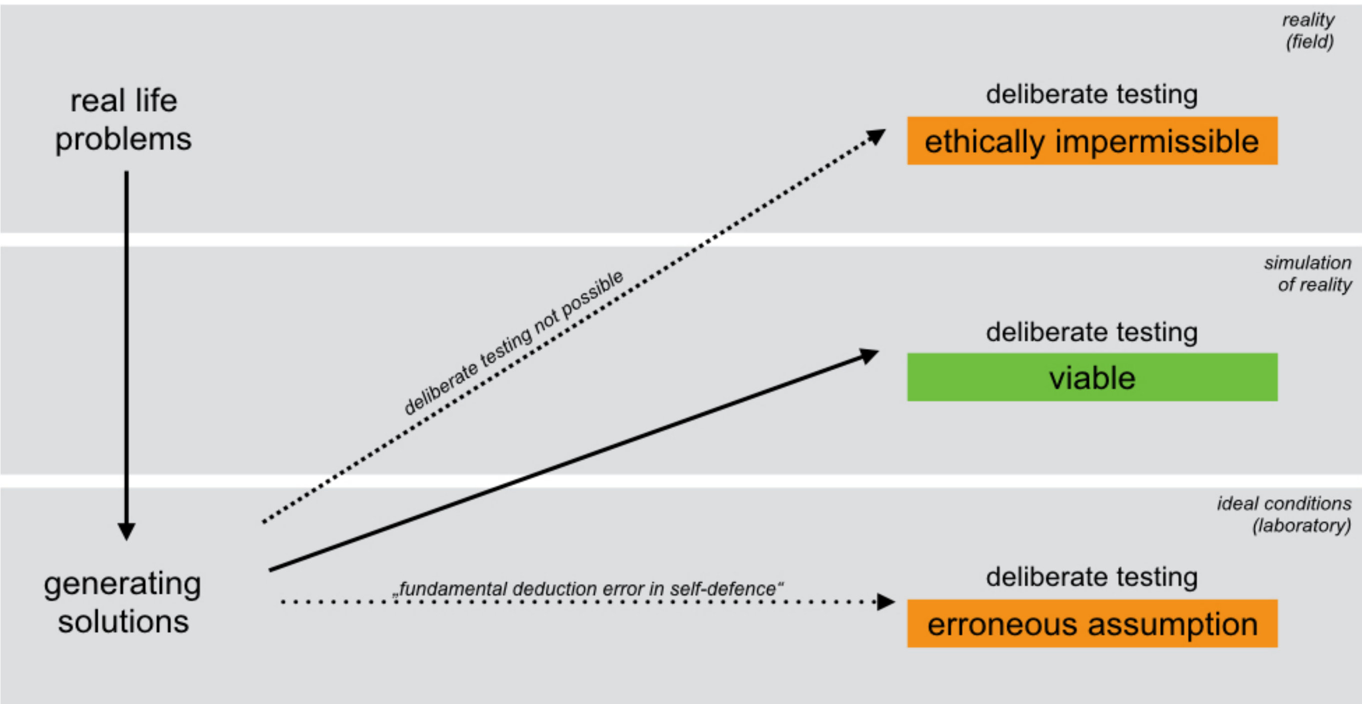

Figure 23 The Trade-Off Model of Simulation Design

weapons that are less dangerous than original weapons, or modifying the training area by providing mats or removing sharp or dangerous devices.

Since the design of any activity in self-defence training has to take the individual into account [Staller and Zaiser 2015], the described safety options have to be tailored to the participant. For example, a role player attacks a participant with gloves and reduced force in his punches (environmental change; reduction in intensity), whereas a more skilled participant is attacked with full force and lighter gloves (lesser level of environmental change; no reduction in intensity). Because of the different skill levels of the defenders, the risk of mistakes stays the same. The more skilled the instructor, the better their estimation will be of the probability of mistakes and injuries.

THE TRADE-OFF MODEL OF SIMULATION DESIGN

The analysis of representativeness and health and safety in the context of self-defence simulation design leads to the conclusion that these two concepts are of a competitive nature. The more health and safety features are implemented in a certain learning or testing environment, the more the level of overall representativeness will decline and vice versa. Miller describes these alterations in the simulation (compared to a real incident) as 'deliberate flaws' in the design of training activities. Without referring to the two components of representativeness, he describes 'unrealistic' performance of what an attack will be like (functionality) and the restriction of being allowed to perform injuring techniques (action fidelity) as two major flaws in simulations. According to Miller, the most prominent flaw is 'when the solution to the drill is based on the *flaw* [such as] using medium speed defences to defeat slow-motion attacks' [Miller 2008: 107]. However, beyond this excellent analysis of the associated problems with poor representativeness in simulations, a systematic way of designing representative, yet safe, simulations is still missing.

The Trade-Off Model of Simulation Design (TOMSD; see Figure 3 opposite) provides a possibility for the self-defence coach to systematically manipulate simulations in training settings. The TOMSD illustrates the relationship between representativeness and health and safety together with the skill level of the participants and conveys its implications for the design of effective self-defence learning and testing environments.

The different components of representativeness and the different components of health and safety in self-defence learning and testing environments enable the designer to make informed and precise decisions about the 'trade-off' between the two competing concepts. Since a 100% level of overall representativeness cannot be achieved (this would be the criterion environment, in which it is ethically impermissible to perform), the instructor may design a task in order to ensure the health and safety of the participants in which a higher level of representativeness can be achieved in one component while representativeness would be reduced in another component. For example, if the attacker attacks with a real knife, which reflects a high level of representativeness regarding the affective constraints under which the individual performs, the designer may consider reducing speed, which reduces the intensity of the attack, in order to ensure health and safety.

CONCLUSION

The effective design of testing environments in self-defence simulations is paramount to the testing of effectiveness of self-defence skills. The imprecise nature and the multidimensional use of terms like 'realism' and 'reality-based' leads to difficulties in designing such environments. Therefore, we argue to shift the emphasis from a realistic to a representative design of testing environments. This provides the instructor with a more precise tool to make informed decisions about the trade-off between representativeness and health and safety when he or she designs tasks for the testing of self-defence skills. It has to be reiterated that a full level of representativeness cannot be achieved without posing at least some risk to the health and safety of the participants. The proposed TOMSD can be applied to the design of any learning environment that aims at the development of transferable skills.

REFERENCES

Armstrong, Jennifer, Joseph Clare, and Darryl Plecas. 2014. 'Monitoring the Impact of Scenario-Based Use-of-Force Simulations on Police Heart Rate: Evaluating the Royal Canadian Mounted Police Skills Refresher Program', *Western Criminology Review* 15.1, 51-59.

Boe, Ole. 2015. 'Does Practicing Close Combat Improve the Perceived Ability to Perform Better?', *Procedia - Social and Behavioral Sciences* 190, 409-415.
doi.org/10.1016/j.sbspro.2015.05.018

Brecklin, Leanne R. 2008. 'Evaluation Outcomes of Self-Defense Training for Women: A Review', *Aggression and Violent Behavior* 13.1, 60-76.
doi.org/10.1016/j.avb.2007.10.001

Broadbent, David P., Joe Causer, A. Mark Williams, and Paul R. Ford. 2015. 'Perceptual-Cognitive Skill Training and Its Transfer to Expert Performance in the Field: Future Research Directions', *European Journal of Sport Science* 15.4, 322-31.
doi.org/10.1080/17461391.2014.957727

Collard, Luc, Alexandre Oboeuf, and Said Ahmaidi. 2007. 'Motor Skills Transfer from Gymnastics to Swimming', *Perceptual and Motor Skills* 105.1, 15-26.
doi.org/10.2466/pms.105.1.15-26

Dzida, Sarah, Atina Hartunian, and Jeannine Santiago [eds]. 2010. *The Ultimate Guide to Reality-Based Self-Defense.* Valencia, CA: Black Belt Books.

Gidycz, Christine A. and Christina M. Dardis. 2014. 'Feminist Self-Defense and Resistance Training for College Students: A Critical Review and Recommendations for the Future', *Trauma, Violence, & Abuse* 15.4, 322-333.
doi.org/10.1177/1524838014521026

Hamstra, Stanley J., Ryan Brydges, Rose Hatala, Benjamin Zendejas, and David A. Cook. 2014. 'Reconsidering Fidelity in Simulation-Based Training', *Academic Medicine* 89.3, 387-92.

Headrick, Jonathon, Ian Renshaw, Keith Davids, Ross A. Pinder, and Duarte Araújo. 2015. 'The Dynamics of Expertise Acquisition in Sport: The Role of Affective Learning Design', *Psychology of Sport and Exercise* 16, 83-90.
doi.org/10.1016/j.psychsport.2014.08.006

Henderson, Margit C. 1997. *Women's Self-Defense Training: An Applied Analysis of Self-Efficacy Theory*. Dissertation Abstracts International, Section B: The Sciences and Engineering, Vol 57 (12-B), Jun 1997, 7727.

Hoff, Timothy. 2012. 'Training for Deadly Force Encounters', *FBI Law Enforcement Bulletin* 3 (April), 20-24.

Hollander, Jocelyn A. 2004. '"I Can Take Care of Myself": The Impact of Self-Defense Training on Women's Lives', *Violence Against Women* 10.3, 205-235.
doi.org/10.1177/1077801203256202

Hollander, Jocelyn A. 2014. 'Does Self-Defense Training Prevent Sexual Violence against Women?', *Violence Against Women* 20.3, 252-269.
doi.org/10.1177/1077801214526046

Jager, Janine, Thimna Klatt, and Thomas Bliesener. 2013. *NRW-Studie: Gewalt Gegen Polizeibeamtinnen Und Polizeibeamte.* Kiel: Institut für Psychologie, Christian-Albrechts-Universität.

Jensen, Peter R. and Craig A. Wrisberg. 2014. 'Performance Under Acute Stress: A Qualitative Study of Soldiers' Experiences of Hand-to-Hand Combat', *International Journal of Stress Management* 21.4, 406-23.
doi.org/10.1037/a0037998

Kajs, Lawrence, T., Gary Schumacher, and Cheryl A. Vital. 2014. 'Physical Assault of School Personnel', *The Clearing House: A Journal of Educational Strategies, Issues, and Ideas* 87.3, 91–96.
doi.org/10.1080/00098655.2014.891879

Koss, Mary P. 1990. 'The Women's Mental Health Research Agenda: Violence against Women', *American Psychologist* 45.3, 374-380.
doi.org/10.1037/0003-066X.45.3.374

Miller, Rory. 2008. *Meditations on Violence.* Wolfboro, NH: YMAA Publication Center.

Murray, Kenneth R. 2004. *Training at the Speed of Life - Volume One: The Definitive Textbook for Military and Law Enforcement Reality Based Training.* Gotha, FL: Armiger Publications.

Nieuwenhuys, Arne, Simone R. Caljouw, Maaike R. Leijsen, Bart A. J. Schmeits, and Raôul R. D. Oudejans. 2009. 'Quantifying Police Officers' Arrest and Self-Defence Skills: Does Performance Decrease Under Pressure?', *Ergonomics* 52.12, 1460-1468.
doi.org/10.1080/00140130903287981

Nieuwenhuys, Arne, Geert J. P Savelsbergh, and Raôul R. D. Oudejans. 2011. 'Shoot or Don't Shoot? Why Police Officers are More Inclined to Shoot When They are Anxious', *Emotion* 12.4, 827-833.
doi.org/10.1037/a0025699

Oudejans, Raôul R. D. 2008. 'Reality-Based Practice Under Pressure Improves Handgun Shooting Performance of Police Officers', *Ergonomics* 51.3, 261-273.
doi.org/10.1080/00140130701577435

Ozer, Elisabeth M. and Albert Bandura. 1990. 'Mechanisms Governing Empowerment Effects: A Self-Efficacy Analysis', *Journal of Personality and Social Psychology* 58.3, 472-486.
doi.org/10.1037/0022-3514.58.3.472

Pava, Wendy S., Py Bateman, Marcia K. Appleton, and Jane Glascock. 1991. 'Self-Defense Training for Visually Impaired Women', *Journal of Visual Impairment & Blindness* 85.10, 397-401.

Pfeiffer, Ralf. 2014. 'Abstoppen = Durchziehen', Conference Paper, Kampfkunst und Kampfsport in Lehre und Forschung, Ludwigsburg, Germany.

Pinder, Ross A., Keith Davids, Ian Rennshaw, and Duarte Araújo. 2011. 'Representative Learning Design and Functionality of Research and Practice in Sport', *Journal of Sport & Excercise Psychology* 33, 146-155.

Pinder, Ross A., Ian Renshaw, Jonathon Headrick, and Keith Davids. 2014. 'Skill Acquisition and Representative Task Design', in *Complex Systems in Sport,* edited by Keith Davids et al., London: Routledge, 319-333.
doi.org/10.1123/jsep.33.1.146

Renden, Peter G., Annemarie Landman, Suzanne F. Geerts, Sander E. M. Jansen, Gert S. Faber, Geert J. P. Savelsbergh, and Raôul R. D. Oudejans. 2014. 'Effects of Anxiety on the Execution of Police Arrest and Self-Defense Skills', *Anxiety, Stress, and Coping* 27.1, 100-112.
doi.org/10.1080/10615806.2013.810213

Renden, Peter G., Arne Nieuwenhuys, Geert J. P. Savelsbergh, and Raôul R. D. Oudejans. 2015. 'Dutch Police Officers' Preparation and Performance of Their Arrest and Self-Defence Skills: A Questionnaire Study', *Applied Ergonomics* 49, 8-17.
doi.org/10.1016/j.apergo.2015.01.002

Staller, Mario S. 2015. 'Entscheiden und Handeln: Didaktische Überlegungen im polizeilichen Einsatztraining anhand eines Reglermodells für motorische und kognitive Anforderungen', *Polizei & Wissenschaft* 2, 24-36.

Staller, Mario S. and Benjamin Zaiser. 2015. 'Developing Problem Solvers: New Perspectives on Pedagogical Practices in Police Use of Force Training', *The Journal of Law Enforcement* 4.3, 1-15.

Staller, Mario S. and Benjamin Zaiser. 2015. 'Auf dem Weg zur Expertise als Einsatztrainer: Selbst-bestimmtes Lernen im Rahmen der regelmäßigen Dienstverrichtung' ['On the Way to Expertise as a Police Use-of-Force Trainer: Self-Directed Learning on the Job'], *Polizei & Wissenschaft* 4, 39-49.

Staller, Mario S. and Andrew Abraham. 2016. '"Work on Your Problem-Solving": Krav Maga Experts' Views on Optimal Learning Environments for Self-Defence Training', *International Journal of Coaching Science* 10.2, 91-113.

Tiesman, Hope M., Scott Hendricks, Srinivas Konda, and Dan Hartley. 2014. 'Physical Assaults among Education Workers', *Journal of Occupational and Environmental Medicine* 56.6, 621-627.
doi.org/10.1097/JOM.0000000000000147

Wagner, Jim. 2005. *Reality-Based Personal Protection*. Valencia, CA: Black Belt Books.

Wollert, Terry N., James E. Driskell, and Jeff Quali. 2011. *Stress Exposure Training Guidelines: Instructor Guide to Reality-Based Training. Homeland Security*. Available at: http://www.virtualtacticalacademy.com/files/stress_exposure_training_manual_9-26B.pdf.

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