Persistence of threat-induced errors in police officers' shooting decisions

Arne Nieuwenhuys [a, b, *], Geert J.P. Savelsbergh [b, c], Raôul R.D. Oudejans [b]

[a] *Behavioural Science Institute, Radboud University Nijmegen, The Netherlands*
[b] *MOVE Research Institute Amsterdam, Faculty of Human Movement Sciences, VU University Amsterdam, The Netherlands*
[c] *Academy of Physical Education, Amsterdam University of Applied Sciences, The Netherlands*

ARTICLE INFO

ABSTRACT

This study tested whether threat-induced errors in police officers' shooting decisions may be prevented through practice. Using a video-based test, 57 Police officers executed shooting responses against a suspect who rapidly appeared with (shoot) or without (don't shoot) a firearm. Threat was manipulated by switching on (high-threat) or switching off (low-threat) a "shootback canon" that could fire small plastic bullets at the officers. After an initial pretest, officers were divided over four different practice groups and practiced their shooting decisions for three consecutive weeks. Effects of practice were evaluated on a posttest. On the pretest, all groups experienced more anxiety and executed more false-positive responses under high-threat. Despite practice, these effects persisted on the posttest and remained equally strong for all practice groups. It is concluded that the impact of threat on police officers' shooting decisions is robust and may be hard to prevent within the limits of available practice.

© 2014 Elsevier Ltd and The Ergonomics Society. All rights reserved.

1. Introduction

Gaining control over automated, fear-related, responses is not easy (e.g., Bargh, 1999). Yet, in several professions, being able to manage your anxieties is essential for performance. For instance, police officers are often confronted with the aggressive behavior of civilians. In such situations, it is important that officers make the right decisions and do not let feelings of fear and anxiety influence their operational performance (e.g., Anderson et al., 2002).

Under anxiety, people generally tend to show increased attention for threat (Easterbrook, 1959; Eysenck et al., 2007) and are more likely to interpret situations in a threat-related manner (Bishop, 2007). In addition, anxiety is believed to facilitate behavioral responses to threat (e.g., avoidance), which make it harder to efficiently execute goal-directed action (Frijda, 1988; Zajonc, 1980). Although police officers are required to perform well under stressful circumstances, several studies have shown that anxiety does not leave them — or their performances — unaffected (e.g.,

Hulse and Memon, 2006; Nieuwenhuys et al., 2009; Nieuwenhuys and Oudejans, 2010; Nieuwenhuys et al., 2012b; Shipley and Baranski, 2002; Vickers and Lewinski, 2012).

In the current study we follow-up on a previous experiment in which we showed how threat-induced increases in anxiety negatively influence police officers' shooting decisions (Nieuwenhuys et al., 2012b). Based on this finding, the aim of the current study was to explore the extent to which the making of such errors may be prevented through practice.

In our previous experiment (Nieuwenhuys et al., 2012b), we asked police officers to take shooting decisions (i.e., shoot or don't shoot) in relation to video-images of a suspect that rapidly appeared with or without a firearm. If the suspect appeared with a firearm, officers were supposed to shoot at the suspect. If the suspect appeared without a firearm, officers were supposed not to shoot at the suspect. Threat was manipulated by switching on (high-threat) or switching off (low-threat) a so-called 'shootback-canon' that could fire small plastic bullets at the officers' legs. It appeared that officers were more anxious and showed a larger bias towards shooting in the high-threat compared to the low-threat condition. That is, shooting responses became faster and the percentage of unarmed suspects that was accidentally shot at, almost doubled (i.e., from 11.8% to 18.3%). While the officers' gaze patterns (as measured with a mobile eye-tracker) did not differentiate

* Corresponding author. Behavioural Science Institute, Radboud University Nijmegen, Montessorilaan 3, 6525 HR Nijmegen, The Netherlands. Tel.: +31 24 3612094.

E-mail addresses: a.nieuwenhuys@psych.ru.nl (A. Nieuwenhuys), g.j.p. savelsbergh@vu.nl (G.J.P. Savelsbergh), r.oudejans@vu.nl (R.R.D. Oudejans).

between correct and incorrect shooting responses (i.e., officers fixated the same locations and detected the suspect equally fast), incorrect shooting responses (at unarmed suspects) were made almost 20% (88 ms) faster than correct shooting responses (at armed suspects). These results indicated that when the officers made a shooting error, they tended not to wait for visual information about the suspect's firearm but immediately responded to the suspect's appearance, which – on average – appeared 100 ms earlier in the video recordings. Because shooting errors occurred almost twice as often in the high-threat than in the low-threat condition, it was concluded that threat-induced increases in anxiety may have biased officers towards responding on the basis of threat-related inferences and expectations (i.e., *expecting* that the suspect would appear with a firearm) rather than actual visual information about the presence of a firearm (see Correll et al., 2011; Fleming et al., 2010 for similar findings; see Nieuwenhuys and Oudejans, 2012; Payne, 2006; for a more theoretical discussion on this type of effects).[1]

Because the ability to make good decisions under stressful circumstances is critical for police officers, the current study aimed to test the extent to which threat-induced errors in shooting decisions may be prevented through practice. Although erroneous shooting decisions by police officers have great societal impact, to our knowledge there are no studies directly addressing this topic. However, related work on unintended stereotyping and weapon identification (Correll et al., 2007; Plant and Peruche, 2005; Plant et al., 2005), as well as some of our own experiments on the effects of anxiety on police officers' shot accuracy (Oudejans, 2008; Nieuwenhuys and Oudejans, 2011), indicate that this might be possible. In addition, recent work by Vickers and Lewinski (2012) showed that experienced police officers outperformed less-experienced police officers on a high-threat shooting decision task. Although these authors did not control for the anxiety that was experienced by participants, this finding indirectly suggests that high-threat shooting decisions are sensitive to practice.

1.1. Weapon identification, unintended stereotyping and representative design

When people sit in front of a computer screen and are asked to rapidly judge images of a person holding a gun or another (non-threatening) object, they are more likely to falsely report guns in relation to Black rather than White individuals (e.g., Correll et al., 2002; Payne, 2001). According to Payne (2006) the key mechanism here is that intuitively, Black individuals are more strongly associated with violence. Seeing a Black individual automatically triggers this stereotype and causes people to more often respond on the basis of threat-related associations, rather than the actual sight of a gun (see also Correll et al., 2011). Effects of unintended stereotyping on weapon identification are widespread and are very hard to willfully suppress (e.g., Payne et al., 2002). However, there are indications that with practice, the observed bias can be eliminated within a relatively short period of time (i.e., by performing an additional 80 trials on the same task; e.g., Correll et al., 2007; Plant and Peruche, 2005; Plant et al., 2005; but also see Luini and Marucci, 2013).

Although the effects of unintended stereotyping have clear parallels with the threat-induced shooting bias shown by Nieuwenhuys et al. (2012b; i.e., the bias to respond on the basis of threat-related inferences and associations rather than visual information about the presence of a gun), it is important to note that pressing a button on a computer keyboard is not the same as actually shooting at another person. Similarly, implicit threat-related associations that are connected to the ethnicity of a suspect are different from the actual possibility of getting hit, which remains uninvestigated in the weapon identification literature (Nieuwenhuys et al., 2012b). In this respect, several studies have shown that such differences in the reality of a task and the specificity and nature of responses can have large consequences for the detection of visual information, decision making, and the eventual action that is undertaken by participants – with experienced participants showing greater sensitivity to threat (Nieuwenhuys et al., 2012a), more accurate perception and better decision making under more representative circumstances (e.g., Dicks et al., 2010; Mann et al., 2010; see Pinder et al., 2011; for a more theoretical discussion of this topic). As a consequence, it remains to be seen whether the positive effects of practice, as reported by Correll et al. (2007) and Plant and Peruche (2005), would hold under more representative circumstances, where police officers' can actually get hit and indicate their shooting decisions based on actual shooting responses.

1.2. Training with anxiety: shot accuracy vs. shooting decisions

Under high threat, police officers are more inclined to shoot (Nieuwenhuys et al., 2012b) and tend to shoot with lower accuracy (Nieuwenhuys and Oudejans, 2010). Recently, however, we showed that by training with anxiety, police officers can improve their shot accuracy under stressful circumstances (Nieuwenhuys and Oudejans, 2011; see also Oudejans, 2008). Nieuwenhuys and Oudejans (2011) had two groups of police officers practice their shot accuracy – either against opponents that carried a handgun loaded with colored-soap cartridges (high-threat; experimental group) or against opponents that carried an imitation handgun (low-threat; control group). Importantly, this study did not involve decision making (i.e., making the decision to shoot or not shoot): participants always shot at the suspect and only practiced their shot accuracy (i.e., hit the suspect). Before training, high threat caused a decrease in shot accuracy for both groups. After training, the experimental group was able to maintain accuracy under high threat. Shot accuracy of the control group, on the other hand, was still negatively affected by threat (see Oudejans, 2008; Oudejans and Pijpers, 2009, 2010, for similar results). Analyses of gaze behavior indicated that improved shot accuracy was likely related to improved goal-directed attention (i.e., maintaining relatively long fixations on the target while reducing distraction from other sources of information). These results are comparable with effects of visual attention training (e.g., Harle and Vickers, 2001; Vine and Wilson, 2011; Wood and Wilson, 2011) and indicate that by training with anxiety participants can learn to maintain visual attentional control, also under high threat circumstances (Oudejans and Nieuwenhuys, 2009; see also Eysenck et al., 2007).

Importantly, studies on training with anxiety, as well as studies on visual attention training, have always focused on some form of shot accuracy (e.g., darts throwing, basketball free throw shooting, soccer penalty kicks, and police officers' handgun shooting). In the current study, however, we focused on decision making. Clearly, being able to accurately shoot at a target is not the same as deciding to shoot or not shoot at another person. That is, shooting clearly is a motor task, while taking the decision to shoot is arguably more cognitive (Nieuwenhuys and Oudejans, 2012). Because different

---

[1] It is of interest to note that in a related study by Mitchell and Flin (2007) the priming of officers' threat-related expectations (by means of neutral vs. high-threat briefing information) did *not* significantly affect shooting decisions and accompanying response times in a subsequent shoot vs. don't-shoot scenario. Although this study has some clear experimental weaknesses (e.g., limited control over scenarios, participants executing only one single trial) it does indicate that increased threat-related expectations may not always bias officers towards shooting.