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Physiological impact of stress inoculation training in police cadets and its relationship to physical fitness

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Introduction

Law enforcement is inherently stressful due to the personal risk exposure, confrontation of violence and daily involvement in traumatic incidents ⁽²⁾. Law enforcement officers (LEOs) are exposed daily to the unpredictability of work dangers including psychological stress, unexpected physical exertion, shift work and noise ^(1,3).

Decker and Colleges ⁽⁴⁾ identified that, in multiple occasions, LEO's individual heart rates (HR) were near, at or exceeding their predicted maximum HR. These researchers identified heart rates ranging from 185-198 beats per minute in officers driving urgently to attend a domestic incidence ⁽⁴⁾. Physical fitness and psychological preparedness confers increased resilience to stress ⁽⁵⁾. Thus, with increased physical training and stress-provoking situational scenarios, the reactivity of the stress response can be blunted. Research has demonstrated that physiological arousal have impacts on police officer's decision making and on-task performance ⁽⁶⁾.

Stress inoculation training (SIT) aims to promote psychological preparedness and resilience. Commonly adopted in law enforcement training, SIT is often combined with physically challenging scenarios to simulate occupational tasks and demands.

Aims

The primary aim of this study was to assess the physical demands of a SIT. Secondly, the research aimed to explore the relationship between the physical perception of stress to physical fitness.

Methods

Retrospective data were collected for 23 police cadets (18 males) by a US state law enforcement agency. Cadets' fitness was assessed through the one-minute sit-ups and push-ups, VO_{2max} and vertical jump tests. Cadets were put through a series of high stress inoculation scenarios across the course of one event. This event included fighting against multiple opponents in a single force mismatch scenario followed by a deprivation scenario. Participants started the event by exiting the rear entrance of the cadet hallway with a sprint towards and into the academy gymnasium, taking approximately 1 minute and 10 seconds to complete. Once reaching the gymnasium, all cadets were instructed to perform 50 straight punches on a stationary free-standing strike bag followed by 30 front kicks toward an instructor holding a tombstone pad; both scenarios taking approximately 1 minute and 35 seconds to complete.

The participants were commanded to sprint to the center of the gymnasium and complete the 'bull in the ring drill' where they performed repeated punches directed at a pad-holder while additional pad-holders encircled the cadet to redirect their striking and attention. In this scenario, cadets participated in the 'bull in the ring' for an estimated 2 minutes and 45 seconds until they were visibly fatigued. Upon completion, the event administrator ordered encircled pad-holders to tighten their formation and surround the participant. Cadets were vigorously encouraged to plough their way out of the collapsed formation before being redirected into the mat room by a training instructor.

Once participants entered the mat room, they were fitted with a deprivation mask by the safety officer/administrator and redirected to the floor mats in the a specially designed defensive tactics room. Cadets were mounted by two qualified Red Man[®] instructors and told to fight their way out of the situation. Additional RedMan[®] officers were commanded to maintain control over the participant safely until the participant was visibly fatigued. The safety officer and event administrator called an end to the scenario when participants performance was compromised, taking them approximately 1 minute and 45 seconds to complete (mean total time of event = 5.47 minutes \pm 28.32 seconds).

All participants were required to have their initial HR and blood pressure (BP) measurements taken prior to participating in single force mismatch scenarios. All information was collected 30 minutes prior to the first cadet's trial, with cadets not knowing the order they would be performing the event. HR was measured using a heart rate monitor (Polar F270) and BP was measured by paramedics using a sphygmomanometer. Upon completion of the single force mismatch scenarios, peripheral capillary oxygen saturation (SpO₂) levels were measured using a pulse oximeter. HR and BP were re-tested within 2 minutes of completing the event.

Paired t-tests were performed to compared physiological response to the SIT. Regression analysis explored possible relationship between fitness assessments and physiological response to the SIT.

Results

- Cadets took on average, 5.5 \pm 0.05 minutes to complete the SIT.
- As expected, the SIT had a significant effect on HR and systolic BP, with average increases of 58 \pm 23bpm and 40 \pm 20mmHg, respectively.
- Three cadets experienced exaggerated hypertensive response to the SIT with the difference in systolic BP (pre- versus post- event) surpassing 60mmHg.
- Thirteen cadets had post-SIT diastolic BP over the ACSM-recommended threshold for maximal exercise of 90mmHg.
- Cadets were working on average at 87 \pm 6 % of their age-predicted maximum HR (APMHR) with peak levels reaching 97 \pm 5% of APMHR.
- SpO₂ after the SIT averaged 90 \pm 6% with the lowest saturation reaching 68%.
- The scores in fitness assessments did not account significantly for the variability in the physiological responses to the scenarios.



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Conclusion

SIT with a sensory deprivation scenario elicited the desired physiological high-stress response in police cadets, comparable to that experienced by officers undergoing occupational tasks.

Physiological responses to SIT appear to be more dependent on psychological perception and response to stress rather than physical fitness to endure the SIT.

Operational Relevance

The results suggest that the SIT undertaken by the cadets are effective in simulating the stress they will experience. Therefore, an opportunity exists to teach police officers how to mitigate their stress and to ensure physical and more importantly psychological preparedness to endure such stresses.

References

1. Zimmerman F. Cardiovascular Disease and Risk Factors in Law Enforcement Personnel. *Cardiology in Review*. 2012;20(4):159-166.
2. Collins P. Stress in police officers: a study of the origins, prevalence and severity of stress-related symptoms within a county police force. *Occupational Medicine*. 2003;53(4):256-264.
3. Hartley T, Burchfiel C, Fekedulegn D, Andrew M et al. Associations between police officer stress and the metabolic syndrome. *International Journal of Emergency Mental health*. 2011;13(4):243-256.
4. Decker A, Orr R, Pope R, Hinton B. Physiological Demands of Law enforcement Occupational Tasks IN Australia Police Officers. *Journal of Australian Strength and Conditioning*. 2016;26(6):78-79.
5. Silverman MN, Deuster PA. Biological mechanisms underlying the role of physical fitness in health and resilience. *Interface Focus* 2014; 4: 20140040. <http://dx.doi.org/10.1098/rsfs.2014.0040>
6. Arble E, Daugherty AM, Arnetz B. Differential Effects of Physiological Arousal Following Acute Stress on Police Officer Performance in a Simulated Critical Incident. *Frontiers in psychology*. 2019;10:759.