

Thomasson, J., Gorman, D. R., Lirgg, C. D., & Adams, D. J. (2014). An Analysis of Firearms Training Performance among Active Law Enforcement Officers in the USA. *The Police Journal: Theory, Practice and Principles*, 87(4), 225-233. doi:10.1350/pojo.2014.87.4.685

Abstract: The purpose of this study was to examine the effects of differing stressors, associated with common exercises for handgun training of law enforcement officers, on performance and heart rate. Law enforcement officers were tested in groups for static shooting, shooting with running, and simulated combat; shoot-house exercises were performed individually. The firearms exercises performed on hit rate percentages yielded a significant effect on performance. Post hoc testing indicated that simulation and shoot-house exercises were significantly different from all other drills (lower performance due to stress induced hormonal heart rate). Static shooting hit rate and run-shoot hit rate drills were significantly different from the simulation and shoot-house drills but were not significantly different from each other (equal performance – No increase in hormonal heart rate).

The results indicated significant differences in only two comparisons: static shooting heart rate (M = 118) and shoot-house heart rate (M = 145.28) and static shooting and simulation (M = 159.8). The run-shoot heart rate (M = 139.4) was not significantly different from any other exercise. It's not the heart rate that matters, it's what drives the heart rate. Shoot-house and simulations adversely impact performance while exercise heart rate does not.

Finally, based on the results of this study, it is unclear as to whether current qualification methods are even valid. If it is possible to qualify as competent to carry and use a handgun by passing a test such as the run-and-shoot range exercise. It would seem that law enforcement officers have not truly been tested sufficiently for their ability to operate a handgun adequately in a combat/stressful situation. As can be seen in the average heart rates, the run-and-shoot and shoot-house exercises did not result in a greatly different maximum heart-rate level while the actual performance results were very different. One further potential issue with the use of run-and-shoot drills for handgun qualifications is the lack of standard guidelines as to what even constitutes a sufficient level of stress.

Thompson, A. G., Swain, D. P., Branch, J. D., Spina, R. J., & Grieco, C. R. (2015). Autonomic Response to Tactical Pistol Performance Measured by Heart Rate Variability. *Journal of Strength and Conditioning Research*,29(4), 926-933. doi:10.1519/jsc.0000000000000615

This research concluded that individuals with a greater decrease in heart rate performed better by accomplishing the match faster. Individuals with less change in stress-related heart rate performed better through improved accuracy. Higher heart rates derived from sympathetic nervous system response, not exercise heart rate, can adversely affect shooting performance.

Even mild, acute stress rapidly degrades cognitive performance, attention, and decision making. Decreases in parasympathetic drive are often associated with amygdala activation and inhibition of the pre-frontal cortex resulting in higher cognitive demands. Cognitive demands link perceived stress directly to motor performance.

Thus, lower resting heart rates are associated with improved performance while under duress.