REVIEW ARTICLE

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Do Final Fitness Scores Correlate to Final Academic Scores Among Police Cadets?

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Abstract: Objective: The purpose of this investigation was to determine if a relationship between specific physical fitness tests and academic test scores exists with police cadets. Design: Retrospective, non-identifiable data from three training cohorts was selected for this investigation. Methods: 86 (70 males, 16 females) cadets in three different cohorts volunteered for this investigation during a single 16-week (640 hours) police training academy at the same law enforcement agency (LEA). Cadets were screened for five fitness components, consisting of vertical jump, 1-minute push-up test, 300m sprint, 1-minute sit-up test, and the 2.4km run after 16 weeks of fitness training along with a comprehensive reading, mathematics, and general law enforcement exam, following the completion of all 16 law enforcement modules. Results: There was no significant relationship between final fitness scores and final academic exam scores. Conclusion: Specific physical fitness scores did not significantly correlate with final academic exam scores in police cadets. It was noted cadet physical training should focus on psychomotor activities not only to improve academic scores but overall successful fitness outcomes to successfully graduate from a police academy.

Keywords: Law Enforcement, Police Academy, Academic Scores, Physical Fitness Scores

1. Introduction

Law enforcement officers (LEO's) are exposed to a variety of occupational tasks that can be both physically and psychologically demanding (Dawes *et al.*, 2016; Lockie *et al.*, 2022b; Lockie et al., 2018). Consequently, to be successful in these tasks, a police officer must possess an adequate level of technical skill, physical fitness, and cognitive abilities (Kukić *et al.*, 2020; Melton *et al.*, 2023). Failure to perform occupational tasks with high levels of proficiency and accuracy could be detrimental to LEO's and public safety. Therefore, most law enforcement agencies require cadets to complete proper training to adequately prepare these individuals to be effective LEOs (Lockie *et al.*, 2022b; Melton *et al.*, 2023).

Cadets in law enforcement academies (LEAs) are often assessed and measured through physical fitness tests that have relevance to their occupational requirements (Kukić *et al.*, 2020; Lockie *et al.*, 2018; Melton *et al.*, 2023). Physical fitness can be described as the set of qualities an individual has that is associated with the capability to perform physical activity (American College of Sports Medicine, 2025). The selection of these specific fitness tests are utilized nationwide by many police academies but the same exact standards are not consistent across all police academies nationwide (Martinez & Abel, 2021). Passing scores for the police cadets are between the 40 – 75th percentile for each fitness component and differ significantly between male and female candidates, due to physiological gender differences (Martinez & Abel, 2021; Shusko *et al.*, 2017; Siegelman, 2023). Shusko *et al.* (2017) found that cadets with higher levels of muscular endurance upon completion of the academy were more likely to graduate compared to those with lower scores (Shusko *et al.*, 2017). Furthermore, cadets with greater aerobic scores on the 20-meter multi-stage fitness test and 2.4 kilometer (km) run demonstrated higher rates of academy graduation (Dawes *et al.*,

2016; Lockie *et al.*, 2018; Shusko *et al.*, 2017). Dawes *et al.* (2016) investigated retrospective fitness data from three different police cohorts and discovered that push-up scores are highly correlated to police graduation outcomes. These previous findings suggest that fitness levels are not only important for job performance, but also towards a successful outcome in a police academy.

In addition to physical testing, cadets undergo academic and policing skill demonstration examinations to enhance their knowledge of specific criminal or traffic laws, codes, judicial, and tactical procedures of a given agency. Skill demonstration of conflict resolution, tactical weapons, use of force escalation procedures, rendering first aid/CPR, and arresting procedures are also scored besides the fitness scores. Cadets must exhibit proficiency in both academic knowledge and occupational skill-related work (Korre *et al.*, 2019; Lockie *et al.*, 2022b). If any academic or skill demonstration domain is not adequately met, the cadet could be dismissed from the academy. Previous investigations have not measured or considered this important variable for successfully completing a police academy. There are no scientific studies demonstrating if physical fitness scores are related to academic performance. Donnelly *et al.* (2016) performed a meta-analysis consisting of 67 studies over children's cognitive functioning with bouts of physical activity, discovering exercise benefited their cognitive abilities. Physical activities can elicit areas of the brain that support complex brain function during laboratory assignments (Donnelly *et al.*, 2016). Previous research shows a strong relationship with fitness scores among police cadets and successfully completing a police academy but could these fitness scores also enable cognitive functioning of police cadets (Dawes *et al.*, 2016; Lockie *et al.*, 2018; Shusko *et al.*, 2017)? Therefore, the purpose of this study was to determine if final fitness scores correlate to final exam scores among police cadets at the conclusion of the 16-week academy. The research hypothesis is that there will be a significant relationship between final fitness score(s) and final academic exam scores with police cadets.

2. Methods

2.1 Participants

A sample of 70 male and 16 female cadets (Mean + SD: age: 39 ± 17 yrs; height: 175.28 ± 12.72 cm; body mass: 88 ± 25.4 kg) were evaluated in this study from three different cohort academies. All participants were active law enforcement cadets from one law enforcement agency (LEA). Given the retrospective nature of the data gathered, voluntary consent was given by the participants prior to analysis. The supporting institution's Institutional Review Board approved the study (IRB number CSM-2010) and conformed to the recommendations of the Declaration of Helsinki (World Medical Association, 2024). A priori power analysis was undertaken using G*POWER version 3.1 software (Universitat Kiel, Germany), and a minimum 86 subjects were listed to include in this study. A statistical power of 0.893 was deemed acceptable to the researchers.

2.2 Design and Procedures

A retrospective, non-identifiable research design was performed in accordance with previous academies and provided by the police academy instructors to the researchers for analysis (Dawes *et al.*, 2016; Lockie *et al.*, 2022b; Lockie *et al.*, 2018). The physical fitness measures were collected in the following order, based on metabolic expenditure and involved vertical jump (VJ), 1-minute push-up test, 300-meter sprint (300m), 1-minute sit-up test, and 2.4km run. These are the current battery of tests performed by law enforcement agencies in the State of Nebraska where data was collected from and is based off the recommendation and standards of the Cooper Institute (Shusko *et al.*, 2017). The hiring process for most LEAs requires physical ability to be tested and measured during the 16-week academy. The Cooper Institute has been considered the gold standard of law enforcement physical fitness testing due to its longevity and research since the 1970's (Shusko *et al.*, 2017). This battery of testing and recommendations offers both legal liability and standardized normative measures to protect and ensure that LEOs can perform the occupational tasks asked of them. All scores collected were the final physical fitness scores assessed at the end of the 16-week academy.

2.3 Measurements

2.3.1 Vertical jump

VJ height was measured by a Vertical Challenger apparatus (Tandem Sport, Louisville, KY) to provide indirect measurement of lower body power. Similar devices utilizing the methods from this study have shown high reliability in test-retest applications (Lockie *et al.*, 2018). This test provides LEOs with relatable job specific tasks performed during pursuits including jumping and hurdling. VJ height is calculated by the difference between arm reach height and height reached upon jump. Cadets were instructed to approach

the apparatus with both arms overhead and reach the highest vane possible. One countermovement motion was instructed before each attempt as each subject stood static underneath the apparatus. A rest period of 30 seconds was allowed between three attempts. The best score was recorded for statistical analysis.

2.3.2 1-minute push-ups

Upper body muscular endurance was evaluated via a 1-minute push-up test. The test began with participants in a standard up/plank position with arms directly underneath the shoulders and spine aligned parallel to the ground. Cadets were instructed to place hands marginally wider than shoulder width maintaining fingers forward hand position. An instructor then placed a fist on the ground directly below the cadet's chest. Once in position, a "go" command was given by the tester and a stopwatch was started to monitor time. The number of successful repetitions completed in one minute was recorded for statistical analysis.

2.3.3 300-meter sprint

A 300m sprint was performed during the academy as a measurement of anaerobic power of the cadets. A common practice among law enforcement agencies, this test is strongly recommended by the Coopers Institute as part of a public safety fitness assessment battery (Shusko *et al.,* 2017). Performed on a 400-meter track, this 300m sprint assessment was performed only one time per accordance of the Cooper's Institute (Shusko *et al.,* 2017). A standard stopwatch was used to obtain the subject's time in seconds and hundredths of a second and recorded for statistical analysis.

2.3.4 1-minute sit-ups

This test provides measurement of dynamic strength of the abdominal musculature. Parallel to the push-up test, a 1-minute sit-up test is a common standard among law enforcement agencies (Lockie *et al.,* 2022b). Cadets began in a lying supine position with knees bent, feet flat on ground, and hands with fingers interlocked behind the ears. During the movement the cadets must keep feet flat on the ground for repetitions to count. Once in position a "go" command was given by the tester and a stopwatch was started to monitor time. The cadets were required to flex the trunk until elbows touch knees and lower the upper back to the ground for each repetition. The number of successful repetitions completed in one minute was recorded for statistical analysis.

2.3.5 2.4km run

A standard test within law enforcement agencies is the 2.4km run. This aerobic performance assessment is used as a determination for cardiovascular fitness among academy cadets. All cadets were instructed to perform at the fastest pace possible, which was recorded for time in minutes and seconds and converted to fractional minutes for statistical analysis as done by Martinez and Abel (2021). However, many cadets had little to no previous distance pacing experience, reducing the pace as the test was performed.

2.3.6 Academic exam testing

Academic scoring was recorded as a grouped cumulative percentage score throughout the entire academy consisting of law enforcement protocols, court procedures, environmental and physical hazards, drug education, reasonable force, probable cause, and tactical procedural testing. Both skill and knowledge-based testing were used in the academic portion including but not limited to firearm accuracy, code enforcement, local laws, regulations, and situational procedures. A cumulative passing score of 75% or higher was needed to successfully complete the academy in all relevant declared knowledge module exams. The final exam scores were all percentile scores of all passed modules, grouped at the end of the 16-week academy.

2.3.7 Statistical analysis

A Pearson correlation using SPSS (Version 29; IBM Corporation, Armonk, New York) determined the relationship between the final testing of VJ, 1-minute push-up test, 300m sprint, 1-minute sit-up test, 2.4km run, and the final overall academic exam rank score. This was selected based on the collection of raw data and observing the strength of each relationship being non-monotonic.

3. Results

A descriptive analysis of the participants and their physical fitness scores can be found in Table 1. Correlational data for the dependent physical testing variables and the final overall academic scoring. The VJ test ($r = -0.357$; $p = 0.2$), the 1-minute push-up test ($r = 0.157$; $p = 0.5$), the 1-minute sit-up test ($r = -0.138$;

p = 0.6), the 300m sprint (r = 0.059; p = 0.2), and the 2.4km run (r = 0.228; p = 0.41) was shown to have an insignificant, low relationship with the cadets' final academic score rank. However, when comparing the physical fitness scores among each other, the analysis determined that a significant, strong correlation was observed between the 300m sprint and the 2.4km run times (r = 0.847; p = 0.001) among the police cadets. Academic scores were grouped closely together among all participants along with the final fitness scores (see Figures 1a – 1e). Additional correlations were conducted to determine if gender differences and specific fitness tests had any confounding outcomes which they did not and are typical of previous studies with law enforcement personnel as indicated in Lockie *et al.* (2022a) and Martinez and Abel (2021). Removing women from the analysis did not make any major differences with the relationships except for the VJ scores which are predictable outcomes, based on physiological differences (Lockie *et al.*, 2022a; Martinez & Abel, 2021).

4. Discussion

The purpose of this study was to determine if any significant relationship existed between final physical fitness scores and final academic exam scores among law enforcement cadets. There were no significant relationships found among the police cadets. Investigators have observed push-ups performed in 1-minute and the 2.4km run-time demonstrated strong relationships towards successfully graduating from a police academy while looking at retrospective data on over 2600 police cadets in Massachusetts during a six year period (Shusko *et al.*, 2017). However, there was no specific data collected on the cadets' cognitive abilities or final academic exam scores. Of the 9% of cadets who failed to graduate during the six year period, 10% of the cadets voluntarily resigned due to academic reasons, demonstrating a 91% pass rating (Shusko *et al.*, 2017). While no significant correlations were observed between final physical fitness scores and final academic grades with our investigation, potential factors related to the police cadets could have influenced this outcome. The current physical fitness training curriculum at the academy site may not have provided enough cognitive pathways to create a stronger relationship with the final academic score (Basso & Suzuki, 2017; Chang & Etnier, 2009; Chomitz *et al.*, 2009).

Cognitive pathways improve when the brain is stimulated by new experiences and provide the ability to solve problems based on neural adaptations (Hillman *et al.*, 2009a; Kephart, 1964). Newell Kephart was one of the very first scientists to reveal that problem-solving motor activities in grade school children assist brain function not only by improving blood flow and oxygen to the neurons, but creating positive neurological changes that elevated standardized math and English comprehension scores within several weeks (Jahangiri *et al.*, 2019; Kephart, 1964). The Prefrontal Cortex (PFC) and hippocampus are the most important parts of the brain for providing decision-making and memory, a necessary proponent for police officers to make correct choices (Jahangiri *et al.*, 2019).

The PFC involves higher level cognitive outcomes such as reasoning and evaluating choice options, a valuable skill needed to be effective LEOs (Jahangiri *et al.*, 2019; Kephart, 1964; Ludyga *et al.*, 2016). Perhaps, the physical training component lacked in perceptual motor skill development, not allowing improvements in both final fitness scores and final academic scores. If police academy instructors were given the ability to create psycho-motor training in all learning modules, cognitive improvements could transfer to the academic side, resulting in a stronger relationship between final fitness scores and final academic scores.

Table 1. Demographic Information

Variable	Mean	Standard Deviation
Age (years)	39.0	±17.0
Height (cm)	175.28	±12.72
Mass (kg)	88.0	±25.4
Vertical Jump (cm)	66.04	±12.17
Push-ups (1 min.)	44.93	±8.49
Sit-ups (1 min.)	46.13	±4.2
300m sprint (seconds)	54.65	±7.07
2.4km run (fractional minutes)	12:39	±1:52

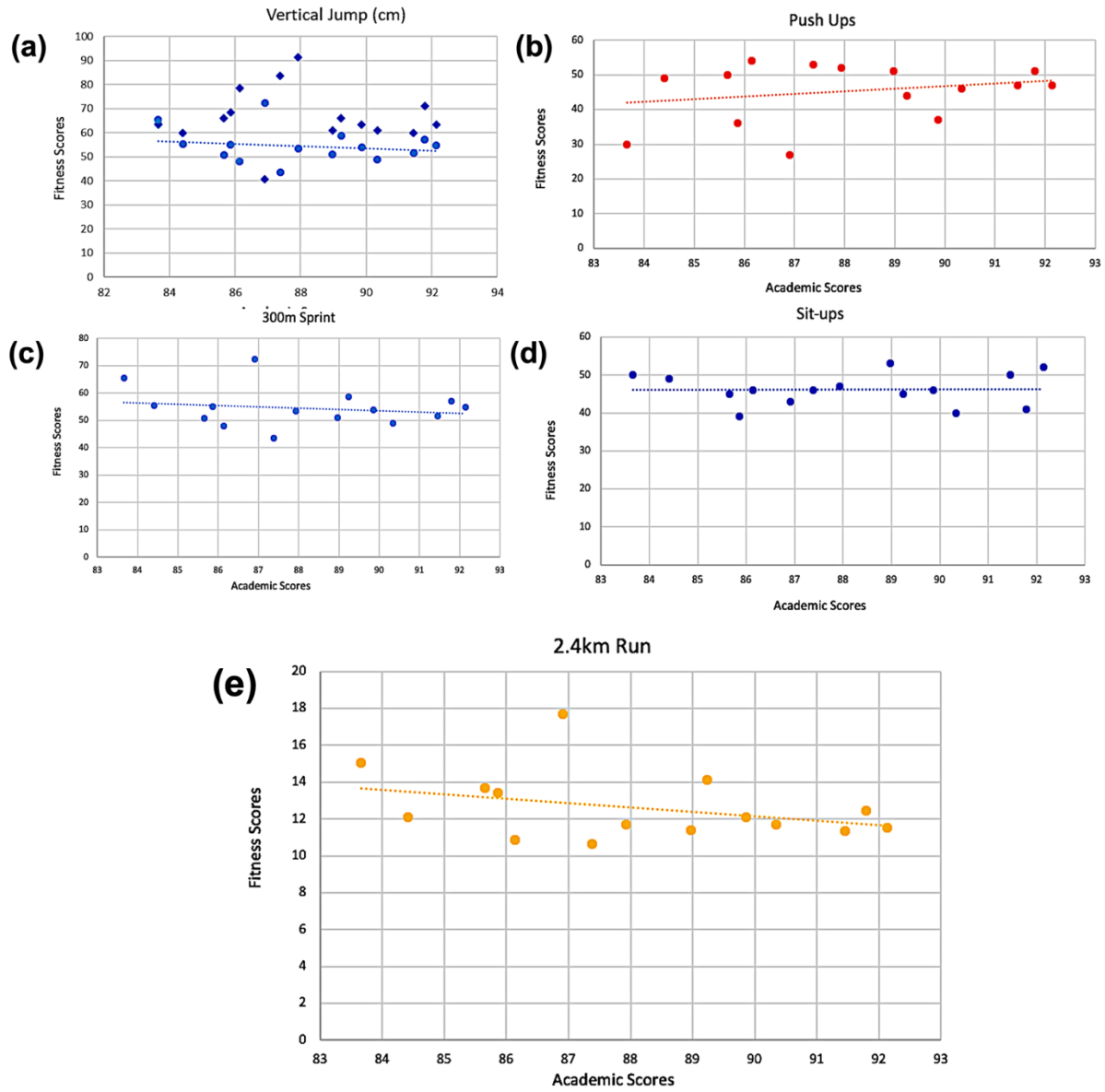

Figure 1a. Scatterplot of Vertical Jump and Academic Scores, **b.** Scatterplot of Push-up Repetitions and Academic Scores, **c.** Scatterplot of 300m Sprint Times and Academic Scores, **d.** Scatterplot of Sit-up Repetitions and Academic Scores, **e.** Scatterplot of 2.4km Run Times and Academic Scores.

Besides the physical fitness training, all cadets undergo rigorous, practical hands-on training mentioned earlier that involves the use of live actors and/or sequential 3D video training that simulates real-life conflicts to make prudent decisions under stressful conditions, considered as everyday police work (Jahangiri *et al.,* 2019). However, the current acceptable physical fitness standards by police agencies due to the nationwide attrition rate of police officers could have affected the outcomes of this study. Even though physical fitness standards are being met by the recruits, the lower fitness scores could've affected the relationship between the final academic ranking and any physical fitness performance test with our study results.

Based upon the information provided to the researchers of this investigation, police academy instructors are not required to uphold specific accreditation or academic degrees to instruct any academy courses. In addition, a combination of physical stress and the lack of standardized pedagogical perceptual skill development while training for 16-weeks could have affected the final academic scores (Jahangiri *et al.,* 2019). Thus, any final fitness improvements with the cadets during the academy would nullify a stronger relationship with their final academic scores.

Lastly gender differences also did not play a role in the investigation outcomes. Past studies have demonstrated this was not a major factor especially

when males will outnumber women cadets in every police academy, but all fitness scores are adjusted for women due to physiological differences (Lockie *et al.,* 2022a; Martinez & Abel, 2021). When the researchers additionally correlated the final physical fitness scores to final academic scores as gender specific, there were no significant changes when grouped separately (Lockie *et al.,* 2022a).

5. Conclusion

This investigation did not see any significant strong relationships between final fitness scores and final exam scores in police academy recruits in three consecutive 16-week cohorts. Limitations of this study are the low female population, even though the researchers discovered the differences were very minimal with final score outcomes. The authors solely speculated this outcome without performing any additional covariates such as stress levels, IQ, education history, or ethnicity. Additionally, the ratio of male to female cadets involved in this study is similar to that of previous investigations with LEOs and LEA academy recruits. This police academy was 16-weeks while other academies are 22-weeks in duration. Police academy instructors do lack the expertise to infuse curricular changes that could enhance cognition if fitness training could be more perceptual-motor focused.

References

American College of Sports Medicine, Ozemek Cemal (2025). ACSM's Guidelines for Exercise Testing and Prescription (Lippincott Connect-ACSM). *Wolters Kluwer Health.*

Basso, J., & Suzuki, W. (2017). The effects of acute exercise on mood, cognition, neurophysiology, and neurochemical pathways: A review. *Brain Plasticity,* 2(2), 127–152. [DOI] [PubMed]

Chang, Y., & Etnier, J. (2009). Exploring the dose-response relationship between resistance exercise intensity and cognitive function. *Journal of Sport and Exercise Psychology*, 31(5), 640–656. [DOI] [PubMed]

Chomitz, V., Slining, M., McGowan, R., Mitchell, S., Dawson, G., Hacker, K. (2009). Is there a relationship between physical fitness and academic achievement? Positive results from public school children in the northeastern United States. *Journal of School Health*, 79(1), 30–37. [DOI] [PubMed]

Dawes, J., Orr, R., Siekaniec, C., Vanderwoude, A., Pope, R. (2016). Associations between anthropometric characteristics and physical performance in male law enforcement officers: A retrospective cohort study. *Annals of Occupational and Environmental Medicine,* 28, 26. [DOI] [PubMed]

Donnelly, J., Hillman, C., Castelli, D., Etnier, J., Lee, S., Tomporowski, P., Lambourne, K., & Szabo-Reed, A. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. *Medicine & Science in Sports & Exercise*, 48(6), 1223–1224. [DOI] [PubMed]

Hillman, C., Buck, S., Themanson, J., Pontifex, M., & Castelli, D. (2009). Aerobic fitness and cognitive development: Event-related brain potential and task performance indices of executive control in preadolescent children. *Developmental Psychology*, 45(1), 114–129. [DOI] [PubMed]

Jahangiri, Z., Gholamnezhad, Z., Hosseini, M., Beheshti, F., Kasraie, N. (2019). The effects of moderate exercise and overtraining on learning and memory, hippocampal inflammatory cytokine levels, and brain oxidative stress markers in rats. *Journal of Physiological Sciences*, 69(6), 993–1004. [DOI] [PubMed]

Kephart, N. (1964). Perceptual-motor aspects of learning disabilities. *Exceptional Children,* 31, 201–206. [DOI] [PubMed]

Korre, M., Loh, K., Eshleman, E., Lessa, F., Porto, L., Christophi, C., Kales, S. (2019). Recruit fitness and police academy performance: A prospective validation study. *Occupational Medicine (Oxford, England)*, 69(8–9), 541–548. [DOI] [PubMed]

Kukić, F., Lockie, R., Vesković, A., Petrović, N., Subošić, D., Spasić, D., Paspalj, D., Vulin, L., & Koropanovski, N. (2020). Perceived and measured physical fitness of police students. *International Journal of Environmental Research and Public Health*, 17(20), 7628. [DOI] [PubMed]

Lockie, R., Beitzel, M., Dulla, J., Dawes, J., Orr, R., Hernandez, J. (2022a). Between-sex differences in the work sample test battery performed by law enforcement recruits: Implications for training and potential job performance. *Journal of Strength and*

Conditioning Research, 36(5), 1310–1317. [DOI] [PubMed]

Lockie, R., Dawes, J., Orr, R. (2022b). Health and fitness data for police officers within a health and wellness program: Implications for occupational performance and career longevity. *Work: A Journal of Prevention, Assessment & Rehabilitation,* 73(3), 1059–1074. [DOI] [PubMed]

Lockie, R., Dawes, J., Orr, R., Stierli, M., Dulla, J., Orjalo, A. (2018). Analysis of the effects of sex and age on upper- and lower-body power for law enforcement agency recruits before academy training. *Journal of Strength and Conditioning Research*, 32(7), 1968–1974. [DOI] [PubMed]

Ludyga, S., Gerber, M., Brand, S., Holsboer-Trachsler, E., Puhse, U. (2016). Acute effects of moderate aerobic exercise on specific aspects of executive function in different age and fitness groups: A meta-analysis. *Psychophysiology*, 53(11), 1611–1626. [DOI] [PubMed]

Martinez, G., & Abel, M. (2021). Effect of a law enforcement academy training program on validated fitness outcomes of cadets. *Journal of Strength and Conditioning Research*, 35(4), 955–962. [DOI] [PubMed]

Melton, B., Ryan, G., Zuege, V., Rochani, H., Anglin, D., Dulla, J. (2023). Physical training in police academies: Comparing fitness variables. Healthcare (Basel), 11(2), 261. [DOI] [PubMed]

Shusko, M., Benedetti, L., Korre, M., Eshleman, E., Farioli, A., Christophi, C., Kales, S. (2017). Recruit fitness as a predictor of police academy graduation. *Occupational Medicine (Oxford, England)*, 67(7), 555–561. [DOI] [PubMed]

Siegelman, P. (2022). Physical fitness and the police: The case for unisex testing. *SSRN* , 55. [DOI]

World Medical Association. (2024). *World Medical Association position statement* [Position statement]. https://www.google.com/search?q=https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsink/

Author Contribution Statement

Andrew L. Shim: Conceptualized the study, designed the methodology, statistically analysed the data, Writing - Original Draft. Marc Tangeman: Formal Analysis, Validation. Robert G. Lockie J: Writing - Review & Editing. Jay Dawes: Writing - Review & Editing. Ian Bonder: Writing - Review & Editing. All the authors read and approved the final version of the manuscript.

Ethics Approval Statement

This study was reviewed and approved by the Institutional Review Board (IRB).

Informed Consent

Written informed consent was obtained from both participants prior to their inclusion in the study.

Conflict of Interest

The authors declare that there was no conflict of interest.

Does this article pass screening for similarity?

Yes

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