A Retrospective Study of Law Enforcement Academy Recruit Fitness Over a 15 Year Period

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ABSTRACT

Recruits at law enforcement training academies are often assessed across a range of fitness capabilities, such as muscular endurance, muscular-strength, aerobic capacity, and flexibility. Over recent years, however, the general population (which tactical populations such as law enforcement agencies recruit from) has trended towards higher levels of obesity and poorer body composition. This could negatively impact fitness capabilities. If departments are hiring recruits from a less-fit population, it could potentially alter how they train and assess fitness levels for future recruits. **PURPOSE:** To investigate changes in the fitness of law enforcement recruits over a 15-year period utilizing an archival dataset. **METHODS:** Retrospective analysis was performed on recruits from one agency in the southeastern United States across four time periods (2003, *n*=93; 2006, *n*=137; 2009, *n*=74; 2018, *n*=167). The following variables were recorded for all recruits within the first two weeks of their respective training academy: body mass index (BMI); sit-and-reach; combined grip-strength; 60-s sit-ups and push-ups; 2.4-km run; and a timed physical ability test (PAT) which was unique to the agency involving a battery of occupationally specific tasks to be completed. This PAT incorporated tasks such as a vehicle exit and re-entry, ~201 m runs, an obstacle course and dry-fire weapon drills. Data were analyzed via univariate analysis of covariance with significance set at $p<0.05$ and sex and age acting as covariates. Sexes were combined within year groupings and Bonferroni post-hoc analysis was used for pairwise comparison analysis. **RESULTS:** The 2018 recruits had a significantly greater BMI compared to all preceding years (2003, 2009: $p<0.001$; 2006, $p=0.04$). The sit-and-reach scores for the 2018 recruits was significantly ($p<0.001$) lower than the 2003 recruits. Grip strength scores were greater for the 2006 and 2018 recruits compared to the 2003 recruits ($p<0.001$). The 2006 and 2009 recruits completed more push-ups than the 2003 recruits ($p=0.002$). The 2006 and 2018 recruits completed more sit-ups compared to the 2003 recruits ($p<0.005$). 2.4-km run-times were significantly longer for 2018 recruits compared to all preceding years ($p<0.05$). Finally, compared to the 2003 recruits, PAT times were shorter for 2009 and 2018 recruits. **CONCLUSIONS:** As BMI scores increased over the years, so did completion times in tests that had an aerobic component (the 2.4-km run and PAT). These data suggest BMI may negatively affect the aerobic fitness of recruits. In contrast, muscular endurance (push-ups, sit-ups) generally did not follow negative trends over the time course of this analysis. However, sit-and-reach scores declined over time within the years of analysis. Reduced flexibility could affect injury rates and task-performance in active-duty officers, which highlights this as a potential area of focus in terms of job-readiness post-graduation during academy. **PRACTICAL APPLICATIONS:** Documenting fitness trends in recruit populations could allow staff to better allocate training time during academy. The increased BMI scores and reduced aerobic fitness (2.4-km run, PAT) for recruits from the most recent year of analysis could indicate that training staffs should implement measures needed to manage BMI and enhance aerobic fitness. Although further research is required, this may improve performance metrics and enhance graduation rates within these populations.

INTRODUCTION

- Law enforcement officers (LEO) spend most of their working hours performing mundane or sedentary activities, such as sitting in a vehicle for indefinite periods. However, when emergencies occur, they must be able to rely on a certain level of physical fitness to successfully fulfill their role as first-responders. (1, 6)
- Law enforcement academies (LEA) act as gatekeepers to the occupation, designed to train and test a broad domain of technical and physical capabilities in their recruits to determine if they are qualified to serve as LEOs in their communities (2, 5).
- Academy length and focus can vary as there is no national mandated standard. Regarding fitness testing, most agencies employ some method of assessing for muscular endurance, aerobic capacity, strength, flexibility and an occupationally-specific physical ability test (PAT) (1, 6).
- Agencies draw recruits from the general population, which has suffered from increases in obesity, with adults qualifying as obese increasing from 30.5% in 2002 to 42.4% in 2018 (8). Further, physical inactivity is at its' highest concentrations (>25%) in the region where the study took place, possibly contributing to higher BMI scores and potentially higher adiposity (4).
- The purpose of this study was to investigate changes in the fitness of law enforcement recruits over 15 years utilizing an archival data set to determine whether recruit fitness has been affected by the population changes over time.

METHODS

- Retrospective analysis was performed on 471 recruits from one agency in the southeastern United States divided across four time periods (2003, 2006, 2009, and 2018). 2018 data were collected after a hiring freeze that occurred within the department.
- Trained agency staff members collected data during a single session across all years. The assessments included: BMI; sit-and-reach; combined grip strength (CGS); 60-s push-ups; 60-s sit-ups; 2.4-km (1.5-mile) run; and an agency-specific PAT. Centers for Disease Control and Prevention (CDC) guidelines (8) were used to classify BMI for recruits (Table 1).
- A univariate analysis of covariance ($p < 0.05$), with sex and age as covariates, determined if there were significant differences between groups. Within each year grouping, sex and age were combined and a Bonferroni post-hoc analysis was used for pairwise comparison analysis.

Table 1. CDC scoring categories for BMI (8).

	Underweight	Healthy weight	Overweight	Obese
BMI	<18.5	18.5 – 24.9	25.0 – 29.9	>30.0

RESULTS

- Descriptive data and pairwise comparisons grouped by years in Table 2. None of the groups qualified as "healthy weight" per CDC guidelines.
- The 2018 recruits had significantly higher BMI (2003, 2009; $p < 0.001$; 2006, $p = 0.04$) and longer 2.4-km run times ($p < 0.05$) compared to all preceding years. 2018 recruits also had a significantly lower ($p < 0.001$) sit-and-reach than 2003 recruits.
- 2018 recruits had higher CGS scores ($p < 0.001$), completed more sit-ups ($p < 0.005$) and completed the PAT faster ($p < 0.0001$) than the 2003 recruits.

Table 2. Descriptive data (mean ± standard deviation) for each assessment, grouped to year, sexes and ages combined.

	2003 (*n* = 93)	2006 (*n* = 137)	2009 (*n* = 74)	2018 (*n* = 167)
Age	29.71 ±7.49	28.61 ± 7.27	27.49 ± 6.17	29.19 ± 6.20
Height	1.76 ± 0.09	1.73 ± 0.09	1.76 ± 0.09	1.73 ± 0.09
Mass (kg)	83.94 ± 17.59	82.86 ± 14.82	78.77 ± 13.12	87.44 ± 17.99
BMI	27.04 ± 4.23	27.67 ± 3.78‡	25.5 ± 3.66†	29.27 ± 4.91*†‡
Sit-and-reach (cm)	34.37 ± 6.72	33.34 ± 6.64	32.97 ± 7.89	31.56 ± 7.67*
Combined grip strength (kg)	94.78 ± 21.70	101.81 ± 26.65*	99.49 ± 21.22	98.89 ± 22.21*
Push-ups	43.81 ± 19.78	51.16 ± 21.31*	54.27 ± 21.40*	48.68 ± 24.05*
Sit-ups	37.81 ± 8.43	41.89 ± 9.82*	41.39 ± 10.51	40.23 ± 11.90*
2.4-km run (s)	771.34 ± 100.03	773.93 ± 109.42	797.50 ± 105.36	881.82 ± 197.34*†‡
Physical Ability Test (s)	271.27 ± 48.86	259.30 ± 59.02	240.05 ± 83.85*	253.38 ± 67.81*

*Significant ($p < .05$) different than 2003. †Significantly different ($p < 0.05$) than 2006.
‡Significantly different ($p < 0.05$) than 2009.

CONCLUSIONS

- Following population trends (4), recruits in 2018 had the highest BMI when compared to preceding years; however, this did not translate into worse performance across all fitness measures. The 2018 recruits did have a lower sit-and-reach than 2003 recruits, supporting previous research that found recruits with higher body fat percentages tended to have lower flexibility (8). Poor performance on the sit-and-reach could indicate and increased injury risk (3).
- The 2018 and 2003 recruits had significantly higher CGS scores than 2003. This is of benefit though, as recruits with higher grip strength were found to be at a reduced risk of injury while training at a LEA (10).
- 2018 had the slowest times on the 2.4-km run, in line with prior research that found higher body fat percentages were associated with slower run times in a similar population (11). This is of importance, as recruits with higher levels of aerobic fitness were found to be more likely to graduate from a LEA (9).
- Significant differences were only found between 2003 and each respective class in push-up performance. The 2018 and 2006 recruits performed significantly more sit-ups than the 2003 group. Lower push-up and sit-up performance has been noted as significant independent predictors in a recruit's failure to graduate from a LEA (8). The superior muscular endurance shown by the 2018 recruits could have influenced their PAT performance.
- The 2018 (and 2009) recruits had significantly faster times on the PAT than the 2003 group. This supports previous research that found better performance in the 60-s push-up and sit-up assessments to be associated with better times on a PAT (7).

PRACTICAL APPLICATIONS

- With consideration to population obesity trends, LEA staff should urge recruits to prepare for success by attempting to attain and maintain a healthy BMI range prior to entrance, as this may facilitate better performance in fitness assessments, reduce injury risk, and increase likelihood of graduation.
- LEAs should ideally utilize a CSCS or TSAC-F to design training plans for specific fitness domains (e.g., aerobic capacity) that current recruits might be deficient in. Where possible, training plans for post-academy fitness maintenance should be provided to successful graduates in order to combat the more sedentary aspects of the occupation.

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