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Exploration of the Fitness of Law Enforcement Candidates across Different Ethnicities

[1]**Robert G. Lockie**[1], [2]**Joel Martin**[2], [3], [4]**J. Jay Dawes**[3], [5]**Robin M. Orr**[4], [5]**Joseph M. Dulla**[5], [3], [4]**Kristine J. Sanchez**[6]

[1]*California State University, Department of Kinesiology, Fullerton, Fullerton, CA, USA*

[2]*George Mason University, Sport Medicine Assessment Research & Testing (SMART) Laboratory, Virginia, USA*

[3]*Oklahoma State University, School of Kinesiology, Applied Health and Recreation, Stillwater, OK, USA*

[4]*Oklahoma State University, Tactical Fitness and Nutrition Lab, Stillwater, OK, USA*

[5]*Bond University, Tactical Research Unit, Robina, Qld, Australia*

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Abstract: Law enforcement agencies often hire diverse candidates reflective of their community. Candidates should possess good fitness to complete academy; however, ethnicity/sociocultural norms could influence fitness. This study investigated fitness differences between law enforcement candidates of different ethnicities. Retrospective analysis was conducted on data from 2041 candidates (1659 males, 382 females) from a US law enforcement agency. During the hiring process, candidates completed: 60-s push-ups; 60-s sit-ups; 75-yard pursuit run (75PR); 60-s arm ergometer revolutions; and 2.4-km run. Candidates self-reported their ethnicity as one of the following: Asian, Black, Filipino/Pacific Islander, Hispanic, Indigenous, Non-Specified (candidate did not disclose ethnicity or ethnicity not represented in provided options), and White. A univariate analysis, with sex as a covariate, determined between-group differences ($p < 0.05$). Effect sizes (d) were also derived for pairwise comparisons. White candidates completed fewer push-ups than Non-Specified candidates ($p = 0.036$, $d = 0.28$). For the 75PR, Black and Non-Specified candidates were faster than Asian and Hispanic candidates ($p \leq 0.024$, $d = 0.43$–0.53); White candidates were faster compared to Hispanic candidates ($p < 0.001$, $d = 0.27$). Black candidates completed the 2.4-km run slower than the Hispanic, Non-Specified, and White candidates ($p \leq 0.042$, $d = 0.22$–0.56). Ethnicity alone does not determine one's aptitude as a law enforcement officer. However, the data did suggest that certain ethnic groups exhibited select fitness differences. Personnel should understand sociocultural norms that could influence candidate fitness. This study provides further

1 Corresponding author: rlockie@fullerton.edu.au • https://orcid.org/0000-0002-7038-0294 • Phone: +1 657 278 4971
2 jmarti38@gmu.edu
3 jay.dawes@okstate.edu (J.J.D.) • https://orcid.org/0000-0002-2668-8873
4 rorr@bond.edu.au (R.M.O.) • https://orcid.org/0000-0001-8297-8288
5 joseph.dulla@student.bond.edu.au (J.M.D.) • https://orcid.org/0000-0003-0317-5319
6 krissy.sanchez@okstate.edu (K.J.S.) • https://orcid.org/0009-0001-7993-6906

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evidence for ability-based training during academy and the need for a broad fitness battery to assess different characteristics that measure the wide range of physical traits essential for performing occupational tasks.

Keywords: 2.4-km run, 75-yard pursuit run, diversity, push-ups.

INTRODUCTION

Many law enforcement agencies are experiencing challenges with recruitment and retention (International Association of Chiefs of Police, 2024; Police Executive Research Forum, 2021). The International Association of Chiefs of Police (2024) reported agencies in the USA were operating at approximately 91% of their authorized staffing levels. Recruitment and retention challenges are especially pronounced with larger law enforcement agencies. In 2021, agencies with 250–499 sworn personnel experienced a 29% decrease in hiring rate, 22% increase in resignation rate, and 19% increase in retirement rate (Police Executive Research Forum, 2021). Agencies with more than 500 sworn personnel had a 36% decrease in hiring, 21% increase in resignations, and 27% increase in retirements (Police Executive Research Forum, 2021). Larger law enforcement agencies tend to be based in major cities (Rehman, 2024), which are often more racially and ethnically diverse (McPhillips, 2020). To address recruitment shortfalls and become more reflective of the communities they serve, many agencies are attempting to diversify their workforce (Fielding, 2024; U.S. Department of Justice & U.S. Equal Employment Opportunity Commission, 2015). It should be noted that a diverse workforce encompasses many different qualities, including race, ethnicity, sex, religion, sexual orientation, gender identity, language ability, and experience (U.S. Department of Justice & U.S. Equal Employment Opportunity Commission, 2015). However, race or ethnicity is a common focus for agencies attempting to increase diversity and improve recruitment (Fielding, 2024). Although sometimes used interchangeably, race refers to the categorization of people based on shared physical traits. Ethnicity is a characterization of people based on a shared culture (e.g., values, beliefs, and language).

The demographics of a law enforcement agency will likely vary depending on where they are located in a country. For example, in 2020, 61% of federal law enforcement officers in the United States of America (USA) were White, 21% were Hispanic, 10% were Black, 3% were Asian, 1% were Indigenous, and less than 1% were Pacific Islander or Native Hawaiian (Brooks, 2022). In the same year, the demographics of a large law enforcement agency in southern California was 52.5% Hispanic, 31.2% White, 7.5% Black, 5.5% Asian, and 3.3% other ethnicities (Los Angeles County Sheriff's Department, 2021). The recruitment of personnel from more diverse backgrounds can provide numerous benefits to an agency. Law enforcement agencies with community engagement programs and diversity had higher community support, increased trust, and better relationships with their community (Durbin & Cox, 2020; U.S. Department of Justice & U.S. Equal Employment Opportunity Commission, 2015). Indeed, Hispanic criminal justice students who intended to become law enforcement officers believed they could benefit Hispanic communities (Todak et al., 2018). Todak et al. (2018) noted passive benefits by officers looking like people from the community, and then other benefits such as being able to speak the language of the people officers serve. Recruitment and hiring of minority candidates takes on greater importance given the recruitment and retention issues experienced by many law enforcement agencies

(International Association of Chiefs of Police, 2024), especially those in large cities (Police Executive Research Forum, 2021).

As part of the hiring process, agencies may incorporate fitness testing. Candidates may be required to perform to a certain standard on different tests of muscular strength and endurance (e.g., push-ups, sit-ups), speed (75-yard pursuit run [75PR]), and aerobic fitness (e.g., 1.5-mile or 2.4-km run) (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2021b). While fitness testing could be viewed as a barrier to diverse hiring and hiring in general (International Association of Chiefs of Police, 2024), the benefits of ensuring candidate and recruit fitness is well documented. Numerous studies have shown fitter recruits are better able to tolerate the rigors of academy training and successfully graduate and become sworn officers (Korre et al., 2019; Lockie et al., 2020a). To provide some specific examples, recruits from southern California who did not complete academy training were slower in the 75PR, completed fewer push-up and sit-up repetitions in 60 seconds, arm ergometer revolutions in 60 s, had a poorer 2-kg medicine ball throw, and completed fewer shuttles in the 20-m multistage fitness test (Lockie et al., 2020a). Recruits from Massachusetts who did not successfully graduate from academy performed less push-ups and sit-ups in 60 s and were slower in the 2.4-km run (Korre et al., 2019). Moreover, better muscular strength, power, and endurance, and anaerobic and aerobic fitness, can contribute to the faster performance of policing job tasks (Lockie et al., 2024). Lockie et al. (2024) found a faster physical ability test (which included vehicle exit and re-entry, running, obstacle courses, a dummy drag, and dry firing a weapon) significantly ($p < 0.001$) related to more push-up and sit-up repetitions, greater grip strength and sit-and-reach, and a faster 2.4-km run ($r = \pm 0.167–0.434$) in law enforcement recruits. Accordingly, candidates with better overall fitness are generally better prepared for academy and the performance of physically demanding job tasks.

What has yet to be investigated are any potential differences in fitness that could exist between applicants from different ethnic backgrounds. There is limited significant evidence to suggest there are genetic differences between races or ethnicities that could influence fitness test performance (Psatha et al., 2024). Nonetheless, there could be sociocultural impacts relative to ethnicity that influence performance in fitness tests. For example, in a sample of adults from 2017–2020, the prevalence of obesity was higher in Black (49.9%) and Hispanic (45.6%) adults complied to White (41.4%) and Asian (16.1%) adults (Stierman et al., 2021). Higher body fat has been linked to poorer fitness test performance in law enforcement recruits (Lockie et al., 2021a). Previous research has also documented differences in physical activity between different ethnic groups (Saffer et al., 2013). Leisure time physical activity could lead to more favorable body composition profiles in law enforcement personnel (Kukić et al., 2020), as well as better fitness outcomes (Sorensen et al., 2000). More broadly, racial and ethnic differences in regards to access to healthcare (Fang et al., 2014), chronic disease prevalence (Caraballo et al., 2022), and obesity rates (Petersen et al., 2019) have been reported. Thus, it is plausible that there may be differences in fitness test performance between candidates of different ethnicities during the hiring process for a law enforcement agency. If there are differences between candidates of different ethnicities, this would provide further evidence for ability-based training, a training approach that may aid in the success and retention of recruits during academy (Orr et al., 2016).

With pressure on law enforcement agencies to recruit and retain more people (International Association of Chiefs of Police, 2024), more information that could be used to profile potential candidates is of use for training staff. Therefore, the purpose of this study was to compare the fitness test performance of candidates from one law enforcement agency in the Western USA based on self-reported ethnicity. The candidates performed a battery of fitness tests as part of the hiring process (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2021b). Within the hiring process, candidates were also asked to self-report their ethnicity. It was hypothesized that there would be significant differences between the fitness test performance of candidates of different ethnicities.

METHODS

Experimental Approach to the Problem

An analysis of archival data was performed to investigate the differences in fitness between applicants of different ethnicities from one law enforcement agency in the Western USA. The current agency was diverse and reflective of a diverse county (Los Angeles County Sheriff's Department, 2021), which made the agency applicable for the current research. Candidates reported their ethnicity as part of paperwork completed during the hiring process. Fitness test data were collected during the hiring process (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2021b), and all candidates in this study were accepted to a training academy. Fitness testing occurred during one session, typically within the 6–18 months prior to entering a training academy (Lockie et al., 2021b). The dependent variables for this study were: age; push-up and sit-up repetitions; 75PR time; number of revolutions in the arm ergometer test; and 2.4-km run time.

Participants

Data were collected by staff from one law enforcement agency based in the Western USA during the initial hiring process in 2017–2019 and released with consent from that agency. A sample of convenience comprising of 2041 applicants to the agency (age: 26.83 ± 5.90 years), which included of 1659 men (age: 26.91 ± 6.07 years) and 382 women (age: 26.48 ± 5.09 years) were used to inform this study. Height and body mass data were not recorded during the initial hiring process and thus were not available to the researchers, which has occurred in previous first responder research (Orr et al., 2016). These variables may not be collected by an agency to avoid allegations of preferential hiring and retention based on body size. Nevertheless, all available data for the candidates were considered in this study. The institutional ethics committee approved this research (HSR-17-18-370).

Measurements and Procedures

Within the paperwork completed by candidates, they were asked to select their race/ethnicity. The race and ethnicities, with definitions used by the agency, are shown in Table 1. The researchers had no input as to how these ethnicities and definitions were selected; they

were part of standard forms to collect data for the agency to evaluate hiring practices and prepare reports as required by law for the State and Federal Government. In the dataset provided to the researchers, the Filipino and Pacific Islander candidates were combined under one classification. Candidates could also select 'N/A' or 'Non-Specified' if they chose not to disclose their ethnicity, or their ethnicity was not represented in provided options.

Table 1. *Race/Ethnicity category definitions from the law enforcement agency*

Race/Ethnicity	Definition
White	Any person having origins in any of the original peoples of Europe, North Africa, or the Middle East. Does not include persons of Mexican, or Latin American origins.
Black/African American	Not of Hispanic origin. All persons having origins in any of the Black racial groups of Africa.
Hispanic/Latino	All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin.
American Indian (Indigenous)	Any person who presents acceptable written documentation that he/she is either (1) a member of an American Indian tribe, band or organized group including Alaskan Natives recognized by the federal or state government, including individuals who are members of bands or groups terminated since 1940 and whose name appears on a federal or state judgement, claim, or other roll; or (2) is a descendant in the first or second degree of such an American Indian member; or (3) is considered by the Secretary of the U.S. Department of the Interior to be an American Indian for any purpose.
Asian	All persons having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent. This area includes, for example, China, India, Japan, and Korea (excluding persons of Filipino origin or ancestry).
Filipino	Any person whose appearance, surname, speech/language (including all dialects) indicates Filipino origin or ancestry.
Pacific Islander	All persons having origins in the Pacific Islands.

Note. *Filipinos and Pacific Islanders were combined into one group in the dataset provided to the researchers.

As stated, the fitness tests completed by candidates in this study occurred within one testing session conducted by staff from the law enforcement agency. As testing was conducted year-round by the agency, staff followed strict procedures when conducting the tests, which have been described in the literature (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2021b). The staff were all trained by the agency and were proficient in conducting the required tests. The tests were performed in the order detailed in this section. The push-up and sit-up tests, 75PR, and arm ergometer test were conducted outdoors on a concrete surface at the agencies' training facility. The 2.4 km run was performed on a running track. Although weather will vary when testing across a year, this was an unavoidable limitation in this study due to the need for the agency to conduct year-round recruitment and hiring.

Push-ups

Upper-body strength endurance was assessed via a push-up test, where candidates completed as many repetitions as possible in 60 s. Candidates started in the 'up' position, with the body taut and straight, the hands positioned shoulder-width apart, and the fingers pointed forwards. The agency used a standard one-liter water bottle on its side to determine the bottom position of the push-up (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2021b), which was placed underneath the candidate's chest. On the start command, candidates flexed their elbows, lowered themselves until their chests contacted the water bottle, and extended their elbows to return to the start position. Candidates performed as many push-ups as possible using this technique in the allotted time. Results were recorded as single, correctly completed, repetitions.

Sit-ups

Abdominal muscle endurance was assessed via the sit-up test, where candidates completed as many repetitions as possible in 60 s. Candidates laid supine on the ground with their knees flexed to 90°, heels flat on the ground, and arms crossed across the chest and hands positioned on the shoulders. The feet were held to the ground by a test administrator or another candidate. On the start command, participants raised their shoulders from the ground while keeping their arms crossed and touched their elbows to their knees. The participant then descended back down until their shoulder blades contacted the ground, and completed as many repetitions as possible with this technique in 60 s. Results were recorded as single, correctly completed, repetitions.

75-Yard Pursuit Run (75PR)

The 75PR was designed to simulate a foot pursuit for a law enforcement officer (Lockie et al., 2021a; Lockie et al., 2020a), and stressed the candidate's running speed, change-of-direction ability, strength, and power (Post et al., 2022). The 75PR layout is shown in Figure 1. The candidate completed five sprints about a square grid (each side was 13 yards/11.89 m), while completing four, 45° direction changes zig-zagging across the grid. Candidates also stepped over three barriers that were 8 feet (2.44 m) long and 6 inches (0.15 m) high that simulated street curbs during three of the five sprints. Time was recorded by a staff member via a stopwatch, from the initiation of movement at the start of the sprint, until the candidate crossed the finish line. Results were recorded to the nearest 0.10 s.

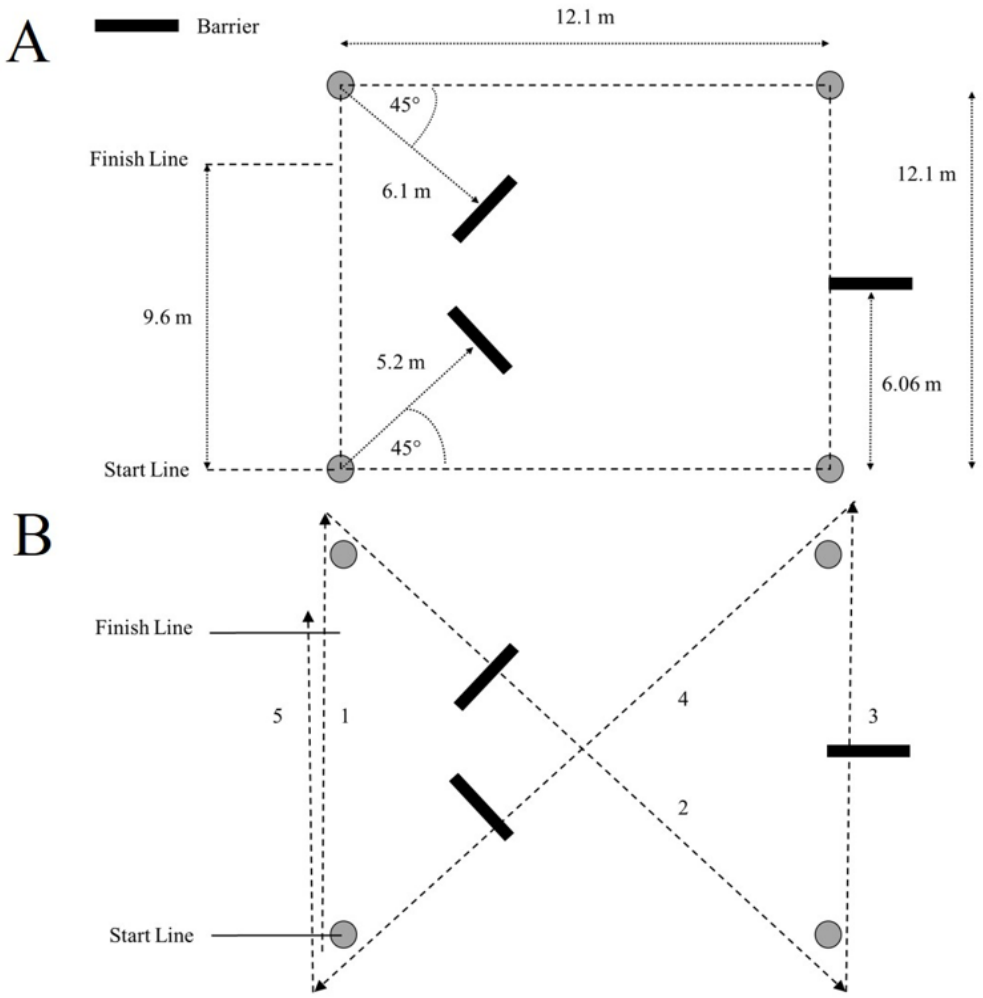

Figure 1. *The dimensions for the 75-yard pursuit run in meters (m; A) and the running direction (numbered in order; B). The barriers were 2.44 m long and 0.15 m high*

Arm Ergometry

The arm ergometer test assessed upper-body muscular endurance. A standard arm ergometer (Monark 881E, Vansbro, Sweden) positioned on a table was used for the test with clear procedures followed by agency staff (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2021b). The candidate knelt on a padded mat so that the crankshaft handle was level with the candidate's shoulder. The test began from a position where the left arm of the candidate was extended and parallel to the ground. The candidate completed 10 revolutions prior to the test to set the resistance at 50 watts. The counter was set to zero before the test commenced. After the staff member initiated the test, candidates completed as many revolutions as possible in 60 s. Results were recorded as number of fully completed repetitions.

2.4-km Run

The 2.4 km run was used to assess aerobic capacity and performed on a 440-yard (402-m) running track. Candidates completed six laps around this track and were instructed to perform this run as quickly as possible. The 2.4-km mile run time was recorded for each candidate on a handheld stopwatch by a staff member to the nearest 0.10 s, before being converted to minutes:seconds (min:s) for this study.

Statistical Analyses

Statistical analyses were processed using the Statistics Package for Social Sciences (Version 29; IBM Corporation, New York, USA). The applicants were split into one of seven ethnic groups based upon their response as part of the application process. The groups were: Asian, Black, Filipino/Pacific Islander, Hispanic, Indigenous, Non-Specified, and White. As stated, within the dataset provided to the researchers, the Filipino and Pacific Islanders candidates were combined in one group. Descriptive data (mean ± standard deviation [SD]) were produced for each variable. For all parts of the analyses, the sexes were combined within each group, which has occurred in previous law enforcement research (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2021a). Due to the expected variation in the number of applicants within the ethnic groups, the statistical approach used in the current study was adapted from previous research (Lockie et al., 2022). Levene's test for equality of variances evaluated the homogeneity of variance of the data, with significance set at $p < 0.05$. If data were found to be heterogeneous, the alpha level required for between-group significant interactions was adjusted to $p < 0.01$ to reduce Type I errors. To compare any differences in age between the ethnic groups, a one-way analysis of variance, with a Bonferroni post hoc adjustment for multiple pairwise comparisons, was used. Significance was set as $p < 0.05$. To compare between-group differences in fitness test performance, a univariate analysis of covariance (ANCOVA; $p < 0.05$), with sex as a covariate and Bonferroni post hoc adjustment for multiple pairwise comparisons, was conducted. Sex was used as a covariate in the ANCOVA as previous studies have shown significant differences in fitness when comparing law enforcement personnel by sex (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2020a). Effect sizes of the ANCOVA were computed with partial eta-square (ηp^2) and categorized as small ($\eta p^2 = 0.01$), medium ($\eta p^2 = 0.06$), and large ($\eta p^2 = 0.14$) (Cohen, 1988; Lakens, 2013). Pairwise comparison effect sizes were calculated using Cohen's d and interpreted as negligible ($d < 0.2$), small ($0.2 \leq d < 0.5$), medium ($0.5 \leq d < 0.8$), and large ($d > 0.8$) (Cohen, 1988). Ridgeline plots were also produced for each fitness test to document the spread of individual performances by ethnicity in each fitness test.

RESULTS

The distribution of the different ethnic groups is shown in Figure 2. The greatest number of candidates were Hispanic, with the next largest group being White candidates. The Asian and Black groups were similar, while there were about 4% of applicants who were Non-Specified with regards to their ethnicity. Filipino/Pacific Islanders totaled approximately 2% of candidates, while Indigenous candidates made up less than 0.4% of the sample.

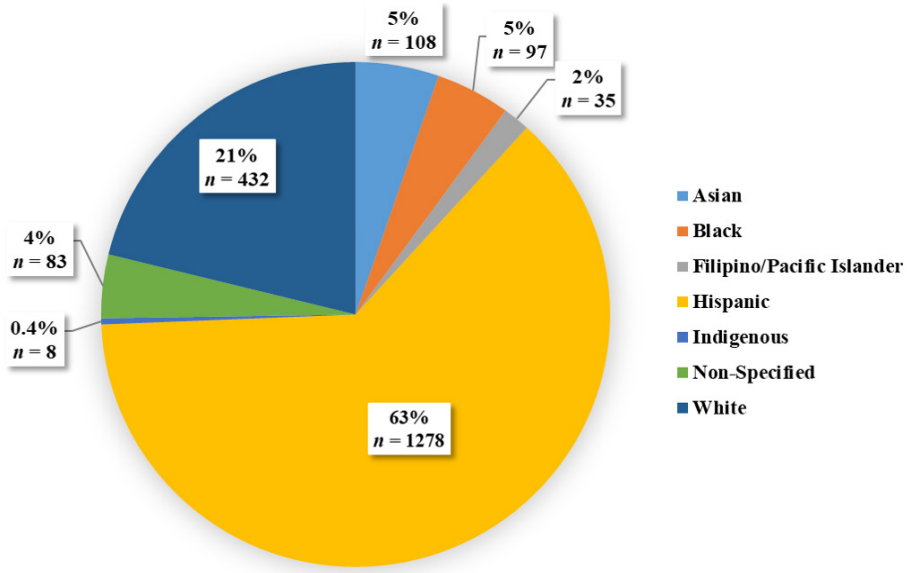

Figure 2. *Breakdown (percentage [%] and number) of ethnic groups within the law enforcement candidates*

The homogeneity of variance data from Levene's test for all variables, and the resulting alpha level used for the ANCOVA, is shown in Table 2. The age and fitness data for the different ethnic groups are displayed in Table 3. Effect size data for the pairwise comparisons are shown in Tables 4 and 5. Although sex was controlled for in the analysis, the number of men and women in each ethnic group was noted. Significant interactions were found for age ($F_6 = 4.955$, $p < 0.001$, $\eta p^2 = 0.014$), push-ups ($F_6 = 3.038$, $p = 0.006$, $\eta p^2 = 0.009$), 75PR ($F_6 = 8.961$, $p < 0.001$, $\eta p^2 = 0.026$), and the 2.4-km run ($F_6 = 5.168$, $p < 0.001$, $\eta p^2 = 0.018$). Non-significant interactions were found for sit-ups ($F_6 = 1.143$, $p = 0.335$, $\eta p^2 = 0.003$) and the arm ergometer ($F_6 = 1.101$, $p = 0.360$, $\eta p^2 = 0.004$). Post hoc analyses were not considered for these two variables.

Table 2. *Homogeneity of variance data from Levene's test for equality of variances, and the resulting p value used for the analysis of covariance (ANCOVA), for age, 60-s push-ups, 60-s sit-ups, 75-yard pursuit run (75PR), 60-s arm ergometer test, and 2.4-km run*

Variables	F_6 value	*p* value	Assumption	ANCOVA
Age	6.104	<0.001	Heterogeneous	$p < 0.01$
Push-ups	0.409	0.873	Homogenous	$p < 0.05$
Sit-ups	0.275	0.949	Homogenous	$p < 0.05$
75PR	1.891	0.079	Homogenous	$p < 0.05$
Arm ergometer	1.350	0.231	Homogenous	$p < 0.05$
2.4-km run	0.859	0.524	Homogenous	$p < 0.05$

Note. *Age was analyzed by a one-way analysis of variance, rather than an ANCOVA.

Table 3. *Age and test performance (mean ± SD) by law enforcement agency candidates stratified by ethnicity in 60-s push-ups, 60-s sit-ups, 75-yard pursuit run (75PR) time, 60-s arm ergometer test, and 2.4-km run time*

	Age (years)	Push-ups (Repetitions)	Sit-ups (Repetitions)	75PR (s)	Arm Ergometer (Revolutions)	2.4-km Run (min:s)
All (♂ = 1659, ♁ = 382)	26.83 ± 5.90	41.85 ± 13.93	39.94 ± 11.21	17.48 ± 1.19	128.66 ± 35.02	12:53 ± 1:36
Asian (♂ = 94, ♁ = 14)	28.83 ± 6.95	43.94 ± 13.45	40.64 ± 8.54	17.47 ± 0.97[c,d]	128.30 ± 20.94	13:11 ± 1:32
Black (♂ = 82, ♁ = 15)	28.23 ± 7.75	41.24 ± 13.51	41.41 ± 9.06	16.99 ± 1.16	125.38 ± 19.82	13:29 ± 1:44[c,e,f]
Filipino/Pacific Islander (♂ = 34, ♁ = 1)	29.63 ± 7.36	49.80 ± 14.09	42.57 ± 9.87	17.39 ± 1.31	129.91 ± 20.93	13:28 ± 1:34
Hispanic (♂ = 1012, ♁ = 266)	26.53 ± 5.34[a,b]	41.44 ± 13.91	39.40 ± 12.13	17.61 ± 1.20[c,d,e]	128.15 ± 18.64	12:49 ± 1:35
Indigenous (♂ = 7, ♁ = 1)	26.75 ± 6.09	42.38 ± 13.26	41.13 ± 6.33	17.63 ± 0.88	132.75 ± 22.61	12:50 ± 1:29
Non-Specified (♂ = 67, ♁ = 16)	26.48 ± 6.23	45.34 ± 14.10	40.95 ± 10.06	17.05 ± 0.99	128.90 ± 19.57	12:36 ± 1:27
White (♂ = 363, ♁ = 69)	26.75 ± 6.34[a]	41.37 ± 13.95[c]	40.63 ± 9.62	17.29 ± 1.17	127.41 ± 19.83	12:55 ± 1:39

Note. [a]Significantly ($p < 0.05$) different from the Asian group.
[b]Significantly ($p < 0.05$) different from the Filipino/Pacific Islander group.
[c]Significantly ($p < 0.05$) different from the Non-Specified group.
[d]Significantly ($p < 0.05$) different from the Black group.
[e]Significantly ($p < 0.05$) different from the White group.
[f]Significantly ($p < 0.05$) different from the Hispanic group.

Table 4. *Pairwise effect size data between Asian (A) and Black (B) law enforcement agency candidates with other candidates stratified by ethnicity (Filipino/Pacific Islander: FPI; Hispanic: H; Indigenous: I; Non-Specified: NS; White: W) for age, 60-s push-ups (PU), 60-s sit-ups (SU), 75-yard pursuit run (75PR), 60-s arm ergometer test (AE), and 2.4-km run (2.4R)*

	A-B	A-FPI	A-H	A-I	A-NS	A-W	B-FPI	B-H	B-I	B-NS	B-W
Age	0.08	0.11	0.37	0.32	0.36	0.31	0.21	0.26	0.21	0.25	0.21
PU	0.20	0.43	0.18	0.12	0.40	0.19	0.62	0.01	0.09	0.30	0.01
SU	0.09	0.21	0.12	0.07	0.03	0.00	0.12	0.19	0.04	0.05	0.08
75PR	0.45	0.07	0.13	0.17	0.43	0.17	0.32	0.53	0.62	0.06	0.26
AE	0.14	0.08	0.01	0.20	0.03	0.04	0.22	0.14	0.35	0.18	0.10
2.4R	0.19	0.19	0.24	0.23	0.39	0.17	0.01	0.41	0.41	0.56	0.34

Table 5. *Pairwise effect size data between Filipino/Pacific Islander (FPI), Hispanic (H), Indigenous (I), Non-Specified (N) and White (W) law enforcement agency candidates for age 60-s push-ups (PU), 60-s sit-ups (SU), 75-yard pursuit run (75PR), 60-s arm ergometer test (AE), and 2.4-km run (2.4R)*

	FPI-H	FPI-I	FPI-NS	FPI-W	H-I	H-NS	H-W	I-NS	I-W	NS-W
Age	0.48	0.43	0.46	0.42	0.04	0.01	0.21	0.04	0.00	0.04
PU	0.60	0.54	0.32	0.60	0.07	0.28	0.01	0.22	0.07	0.28
SU	0.29	0.17	0.16	0.16	0.18	0.14	0.11	0.02	0.03	0.03
75PR	0.18	0.22	0.29	0.08	0.02	0.51	0.27	0.62	0.33	0.22
AE	0.09	0.13	0.05	0.12	0.22	0.04	0.08	0.18	0.25	0.08
2.4R	0.42	0.42	0.58	0.35	0.01	0.14	0.06	0.16	0.05	0.20

The post hoc analyses indicated that with regards to age, the Hispanic ($p = 0.002$, $d = 0.37$, small effect) and White ($p = 0.021$, $d = 0.31$, small effect) candidates were significantly younger than the Asian candidates. The Hispanic candidates were also significantly ($p = 0.044$, $d = 0.48$, small effect) younger than the Filipino/Pacific Islander candidates. The White candidates completed significantly fewer push-ups than the group of candidates who indicated Non-Specified for their ethnicity ($p = 0.036$, $d = 0.28$, small effect). For the 75PR, the Black and Non-Specified candidates were significantly faster than the Asian ($p = 0.013$, $d = 0.45$ and $p = 0.024$, $d = 0.43$, respectively [both small effects]) and Hispanic ($p < 0.001$, $d = 0.53$ and $p < 0.001$, $d = 0.51$, respectively [both medium effects]) candidates. The White candidates were also significantly faster than the Hispanic candidates ($p < 0.001$, $d = 0.27$, small effect). The Black candidates completed the 2.4-km run significantly slower than the Hispanic ($p = 0.001$, $d = 0.41$, small effect), Non-Specified ($p = 0.013$, $d = 0.56$, medium effect), and White ($p = 0.042$, $d = 0.34$, small effect) candidates.

The ridgeline plots for each individual candidate in the fitness tests, relative to their ethnic group, are shown in Figures 3–7. Across all the tests, there was essentially a spread of high and low performers for all of the ethnicities. This occurred even with tests where there may have been significant between-ethnic group differences.

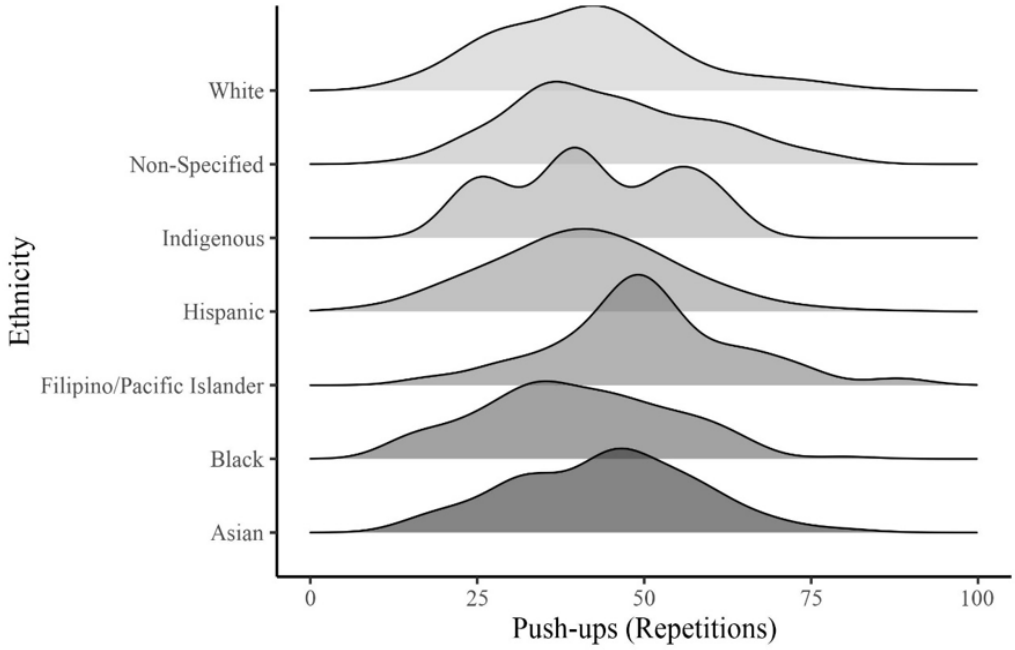

Figure 3. *Ridgeline plots for the push-up test in law enforcement candidates from different ethnic groups*

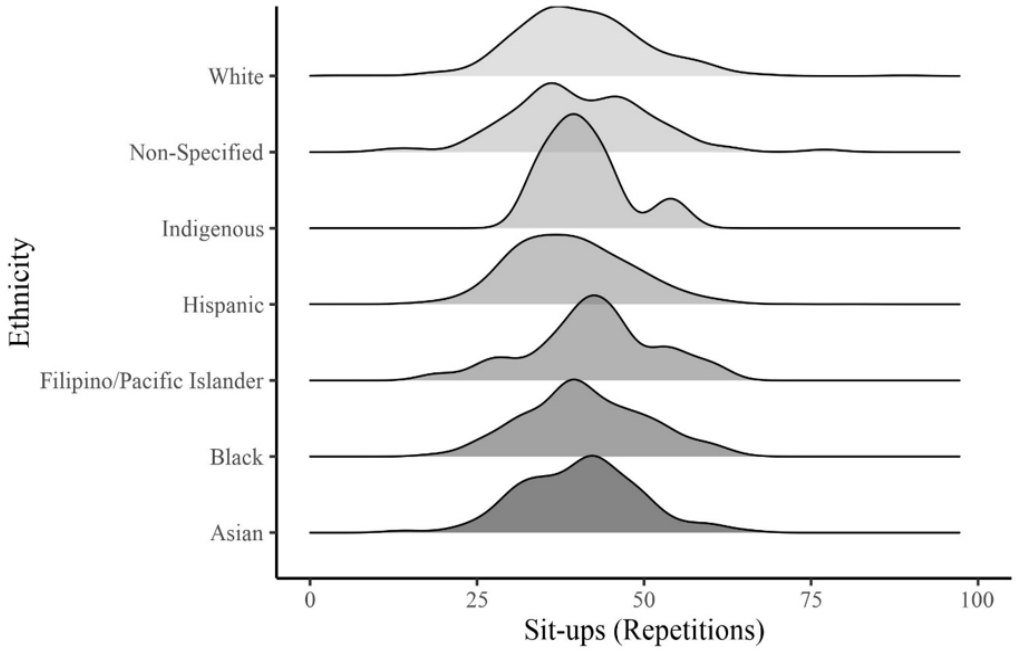

Figure 4. *Ridgeline plots for the sit-up test in law enforcement candidates from different ethnic groups*

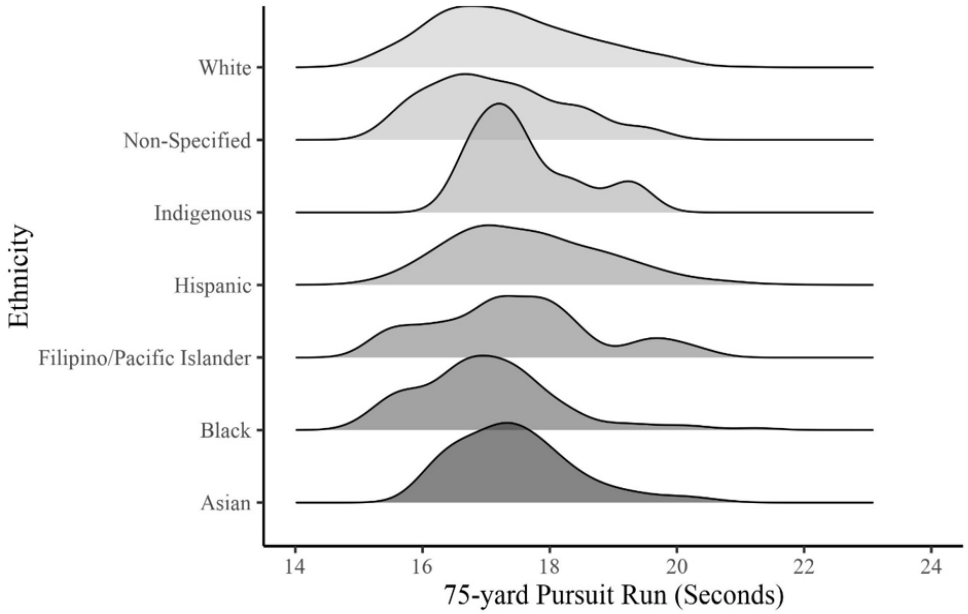

Figure 5. *Ridgeline plots for the 75-yard pursuit run in law enforcement candidates from different ethnic groups*

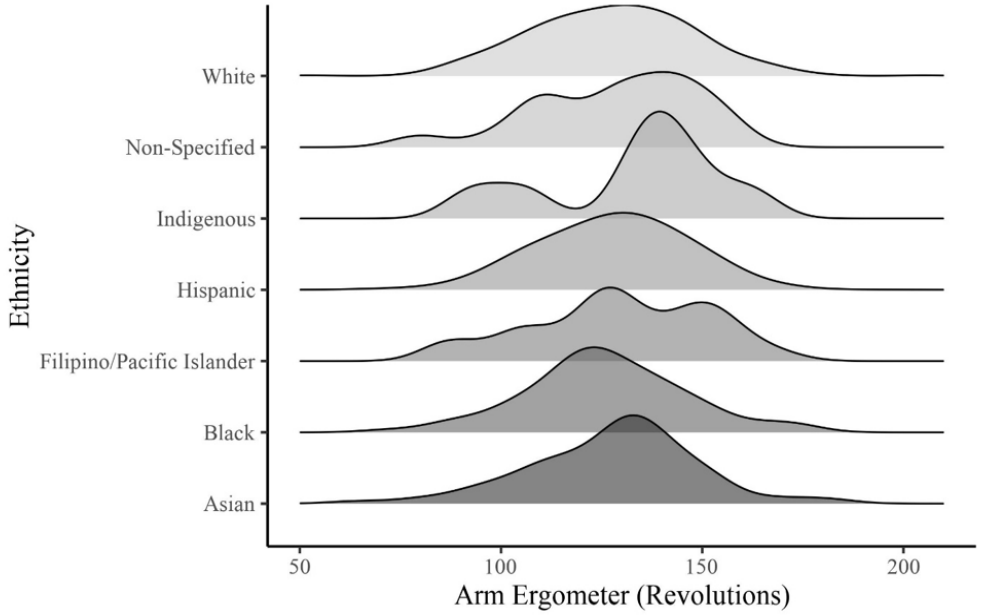

Figure 6. *Ridgeline plots for the arm ergometer test in law enforcement candidates from different ethnic groups*

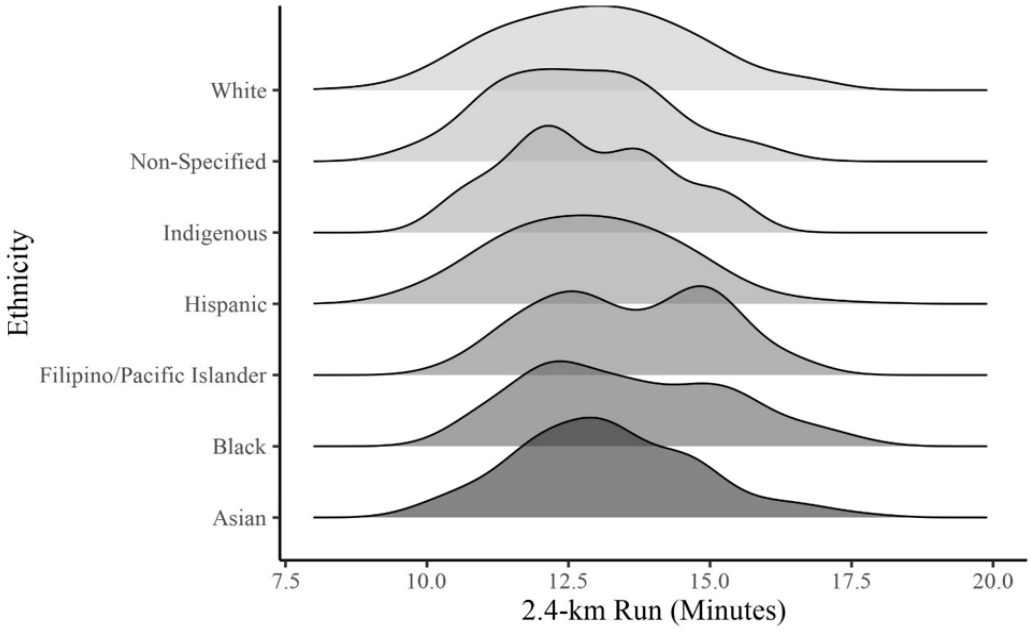

Figure 7. *Ridgeline plots for the 2.4-km run in law enforcement candidates from different ethnic groups*

DISCUSSION

This study compared the fitness test performance of candidates from one law enforcement agency in the Western USA based on their self-reported ethnicity. It should be noted that the data analyzed in this study were from 2017–2019, and the candidate demographics were different from the demographics of the law enforcement agency from 2020 (Los Angeles County Sheriff's Department, 2021). For instance, the Hispanic candidate distribution was approximately 10% higher in the current study compared to 2020 numbers, the White candidate distribution was 10% lower, and the Black candidate distribution was 2% lower (Los Angeles County Sheriff's Department, 2021). Nevertheless, the data analyzed in this study still provide a strong basis for comparing the fitness of law enforcement candidates with different ethnicities. Performance and success within the recruitment process is not solely determined by ethnicity. However, with recruitment and retention issues (International Association of Chiefs of Police, 2024), and the benefits of a diverse workforce (Durbin & Cox, 2020; U.S. Department of Justice & U.S. Equal Employment Opportunity Commission, 2015), it is important for training staff to be mindful of potential ethnic and sociocultural factors that could influence a candidate's fitness. As will be discussed, current data provided some credence to this supposition. Moreover, select differences between ethnic groups provide further support for ability-based training in law enforcement academies.

The mean age of the candidates in this study was comparable to other law enforcement candidate and recruit populations (Bloodgood et al., 2021; Cesario et al., 2018; Lockie et al., 2020a; Lockie et al., 2020b, 2021b). With regards the ethnicity, the Asian candidates for

this agency were older than the Hispanic and White candidates, while the Filipino/Pacific Islander candidates were older than the Hispanic candidates. Job candidates should not experience discrimination based on their age (U.S. Equal Employment Opportunity Commission, 1997). However, Lockie et al. (2020a) found that age significantly related to academy separation (i.e., failing a training academy) in law enforcement recruits ($r = 0.296$, $p < 0.01$), and was also involved in predictive equations relative to academy separation (*1.371 + [0.014 x age] + [-0.003 x multistage fitness test shuttle score] + [-0.033 x 2-kg medicine ball throw score] + [-0.002 x arm ergometer score]*). This is not to say that older candidates, regardless of ethnicity, should not be applying to work in law enforcement. Rather, older candidates may require specific training to achieve an acceptable level of physical fitness prior to academy (Bloodgood et al., 2021; Lockie et al., 2020a).

There were select differences in fitness test performance between the ethnic groups. Firstly, Non-Specified candidates completed more push-ups compared to White candidates. Push-ups are a common test of muscular endurance and a staple exercise within training academies (Lockie et al., 2020b), and better push-up performance has been linked to faster completion of job tasks (e.g., obstacle courses, fence climbs) (Lockie et al., 2024). As a result, the ability to perform push-ups has value to law enforcement candidates. The Non-Specified candidate group was likely a mix of different ethnicities. Candidates who either did not want to document their ethnicity, were an ethnicity not represented in the options provided by the agency, or may have been a mix of different ethnicities, could have been part of this group. The results from this study do not suggest that there are any genetic limitations for the White candidates relative to muscular endurance. Rather, they highlight the inherent fitness variation present in law enforcement candidates, which has also been detailed for recruits during academy (Lockie et al., 2020b). These data support the use of ability-based training in law enforcement academies, which is not always implemented in lieu of 'one-size-fits-all' modalities (Lockie et al., 2020b). Regardless of ethnicity, there may be candidates that enter a training academy with lesser upper-body muscular strength and endurance. Appropriate training, targeted towards the abilities and fitness of the individual, can lead to improvements in muscular endurance as measured by push-ups (Cocke et al., 2016).

There were significant between-group differences for the 75PR, which simulates a foot pursuit. The Black and Non-Specified candidates were 2–3% faster than the Asian and Hispanic candidates, while the White candidates were 2% faster than the Hispanic candidates. Certain differences in body composition could contribute to the current data. In an analysis of adults from the general population, Silva et al. (2010) found that Black and White men and women tended to have greater skeletal muscle mass compared to Hispanic and Asian individuals. Following a review of literature, Nielsen and Christensen (2011) observed that Black adults tended to have a higher percentage of Type IIX and Type IIA muscle fibers compared to White adults, and this could also be the case compared to Hispanic and Asian adults. Although different to the sample from this study, in an analysis of healthy sedentary adult women, Casas et al. (2001) found Hispanic women had a higher body fat percentage compared to White women (38.4 ± 0.8% *vs.* 34.9 ± 1.3%), and stored more fat mass in the trunk. Adult Hispanic men also carried more body fat mass when compared to White men (17.8 ± 9.1 kg *vs.* 14.6 ± 7.6 kg) in all regions of the body (Stults-Kolehmainen et al., 2013). Greater skeletal muscle mass (r = -0.208, $p < 0.001$)

and lower body fat (r = -0.208, p < 0.001) has been found to significantly relate to faster 75PR performance in law enforcement recruits (Lockie et al., 2021a). These results are not to say that Hispanic or Asian candidates do not have the capacity for fast 75PR or foot pursuit abilities. Indeed, even relative to the mean 75PR data, seven of the top 10 fastest candidates were from the Hispanic group (Figure 5). Rather, a candidate that might have limitations in the 75PR may require specific ability-based training to address any shortcomings. For instance, Post et al. (2022) documented that a faster 20-m sprint and 505 change-of-direction speed test, better vertical, standing broad, and lateral jumps, and a greater relative isometric mid-thigh pull as a measure of strength related to a faster 75PR in men and women civilians (r = ±0.41–78, $p \leq 0.01$). Thus, development of muscular strength and power, in addition to linear and change-of-direction ability, could improve the 75PR and foot pursuit ability in candidates of all ethnicities.

The 2.4-km run provides a measure of aerobic fitness and is linked to academy training success (Lockie et al., 2020a). Mean data demonstrated that Black candidates completed the 2.4-km run 3–7% slower than the Hispanic, Non-Specified, and White candidates. Although complex, especially regarding socioeconomic factors such as nutrition, physical activity, and obesity, as well as an individual's inherent physiology, there has been some research that documents Black adults have lower maximal aerobic capacity compared to White adults (Ceaser & Hunter, 2015). Muscle fiber composition could have also affected these results, in that Black adults may have a higher proportion of Type II fibers, and lower proportion of Type I fibers, compared to White adults (Ceaser & Hunter, 2015; Nielsen & Christensen, 2011). Similar to the 75PR data, the current results do not suggest that Black candidates do not have the appropriate aerobic capacity for law enforcement. Indeed, the best performing Black candidate had a 2.4-km run time of 10:24 min:s (Figure 7), which placed them in the top 5% of the sample. Rather, these current data highlight that some candidates, whether due to their individual physiology or cultural background, may require more specific development of aerobic capacity. Furthermore, when considering the mean data, it is interesting to consider the superior performance of Black candidates in the 75PR relative to the 2.4-km run. Law enforcement officers would ideally be 'all-rounders', as they have a need for anaerobic and aerobic capacities (Lockie et al., 2024). Even if a candidate has fast sprinting speed, they should still attempt to optimize their aerobic capacity. Appropriate ability-based strength and conditioning programs can improve multiple fitness components (i.e., anaerobic and aerobic capacities) in law enforcement recruits (Cocke et al., 2016). This should be the approach of law enforcement training staff, regardless of the ethnicity of their candidates and recruits. Furthermore, these differences support the use of wide battery of fitness tests (Zulfiqar et al., 2021), as candidates that may be disadvantaged in one area (e.g., 2.4-km run) may be advantaged in another (e.g., 75PR).

There were no significant between-group differences for the sit-up and arm ergometer tests. In addition to this, the majority of the pairwise comparisons between the ethnic groups for the fitness tests were not significant. The Filipino/Pacific Islander and Indigenous candidates did not significantly differ from any of the other ethnic groups in the fitness tests, although sample size (n = 35 and 8, respectively) could have influenced these results. Further, even with the significant results that were discussed, the effect sizes ranged from small-to-medium. As a result, and this must be clearly stated, ethnicity should not be considered a hiring barrier for an individual being accepted to a law enforcement agency.

Indeed, when considering the spread of individual candidate test results (Figures 3–7), many candidates of different ethnicities were high performers. If a law enforcement agency does not attempt to recruit from diverse and minority sections of their city or county, not only could there be negative impacts with the community (Durbin & Cox, 2020; U.S. Department of Justice & U.S. Equal Employment Opportunity Commission, 2015), but agencies may miss out on hiring potential high-level candidates.

There are study limitations that should be noted. Candidates self-reported their ethnicity relative to the options provided by the law enforcement agency, and candidates who were a mix of different ethnicities may not have been clearly identified. Body composition was not measured in this study, despite potential differences (i.e., skeletal muscle and body fat mass volume and distribution) that could occur in individuals specific to their ethnicity (Casas et al., 2001; Deurenberg et al., 1998; Silva et al., 2010; Stults-Kolehmainen et al., 2013). It is possible that body composition could have impacted fitness test performance (Lockie et al., 2021a), but that cannot be confirmed by the data in this research. Genetic testing would be required to detail any cause-and-effect relationships with fitness and ethnicity. However, this type of research would likely not be possible with law enforcement personnel for a variety of reasons (e.g., invasiveness, time and equipment restraints, available trained staff). The dataset analyzed in this study was from 2017–2019. As acknowledged, there have been demographic changes to the agency from which the data were drawn (Los Angeles County Sheriff's Department, 2021). Height and body mass data were not available for the candidates in this study, which may limit some generalizability of the data. The candidate fitness testing data was all from one agency, and other agencies may use different fitness tests to those in this study. As fitness can vary widely across candidates (Bloodgood et al., 2021; Cesario et al., 2018), recruits (Lockie et al., 2020b), and officers (Lockie et al., 2022), it is recommended that agencies conduct internal analyses of their own candidates, recruits, and incumbent personnel to identify potential impacts of ethnicity in regard to health and fitness, as well as to inform ability-based training approaches.

CONCLUSIONS

To conclude, a law enforcement candidate's ethnicity may add another layer to the wide variation in fitness and ability levels seen at the academy level, as this study found some differences in fitness between candidates with different ethnic backgrounds. Non-Specified candidates completed more push-ups than White candidates. Black and Non-Specified candidates completed the 75PR faster than the Asian and Hispanic candidates, while White candidates were faster than Hispanic candidates. The Hispanic, Non-Specified, and White candidates completed the 2.4-km run faster than Black candidates. The application of these data is that some candidates, whether due to their ethnicity or other sociocultural influences and disparities, may require specific training to develop fitness limitations prior to academy training. Nevertheless, relative to fitness, ethnicity should not be considered a barrier for entering the law enforcement profession. More importantly, recruiting from a diverse sample within the community could allow for the discovery of high-performing and fit candidates that have the potential for success in the law enforcement profession. The current data demonstrated that the best performers in the fitness test involved candidates with a range of different ethnic backgrounds. What the current data also support is

the implementation of ability-based training during law enforcement academies. Training staff should have some understanding of sociocultural norms within their community that could influence the fitness of law enforcement candidates and recruits, as this could aid their program design for optimal retention of personnel.

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