

Psychological Skill Strategies and Physical Performance

Implications for Military Readiness

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Attributes of a well-rounded tactical athlete (i.e., soldier) include being physically and mentally ready to meet the demands associated with combat.¹ Low levels of physical fitness, high incidences of musculoskeletal injuries, and adverse mental health conditions are the largest barriers to tactical athletes' health and military readiness.² Holistic approaches to improve military readiness promote physical fitness by emphasizing underlying factors that support physical performance, such as psychological skills and movement competency.³ Consequently, the relationship between psychological and physical development should be intensively examined as an Army human resources priority to develop a more comprehensive understanding of the factors associated with the development of military readiness in current and future soldiers and offer insights into optimizing soldier performance.

Psychological skill proficiency is the consistent use of a set of cognitive and behavioral skills such as goal setting, imagery, attentional control, and various thought-control strategies associated with self-regulation and optimal performance.⁴ The use of

psychological skills is critical for performance optimization and cognitive function in high-stress environments such as military combat.⁵ Various psychological skills, including imagery, attentional control, emotional control, and activation, are key elements of the U.S. Army's implementation of the Holistic Health and Fitness (H2F) initiative.⁶ As with any skill, psychological skills must be learned, practiced, and developed to improve performance.⁷ The relationship between psychological skills and fitness performance suggests that training military recruits on the use of these skills may improve their mental and physical readiness.

Psychological skill utilization is beneficial for physical fitness performance in athletes, and emerging evidence supports the use of psychological skills to enhance physical performance in tactical populations.⁸ U.S. Army soldiers demonstrating strong psychological skill profiles performed better than their peers in the Army Physical Fitness Test (APFT).⁹ Unfortunately, the associations between psychological skills and physical fitness performance on the newly adopted Army Combat Fitness Test (ACFT) remain unknown. The ACFT was designed to reduce attrition and

preventable injury prevalence by better representing the physical demands associated with the modern soldier.¹⁰ The ACFT battery places an increased emphasis on total body strength, power, and coordination relative to the APFT, which primarily assessed cardiorespiratory and muscular endurance.¹¹

Possessing functional motor competence (FMC) is a critical antecedent to physical fitness (i.e., muscular strength and endurance, cardiorespiratory endurance) and performance-related outcomes underlying military combat and ACFT performance.¹² FMC encompasses the neuromuscular coordination and control required to successfully perform a broad range of functional movement skills that impact the performance of physical military readiness attributes (e.g., agility, power, muscular strength).¹³ High levels of FMC are related to increased performance on the ACFT and decreased musculoskeletal injury risk.¹⁴ The inclusion of FMC along with fitness in this study provides a comprehensive view of overall military readiness due to the critical role motor skills play in executing complex physical tasks required for military physical fitness tests, including the ACFT.

With the increase of females in the military, it is critical to understand differences between the sexes to develop tailored training programs that enhance readiness across all soldiers. Given that females generally score lower than males in military physical fitness tests and experience higher stress levels and injury rates, it will be prudent to examine if they utilize psychological skills differently to cope with the challenges encountered.¹⁵ The purpose of this study is to examine the potential need for tailored training requirements to accommodate differences between males and females. The underlying hypothesis is that, though female athletes generally do not differ from male athletes in their use of psychological skills, female tactical athletes may face unique stressors and distinct challenges in military environments distinct from their male counterparts that can be mitigated by training. Consequently, improving psychological coping skills in female military recruits may be a potential pathway to overcoming such challenges to enhance fitness and FMC among females in the military.

Objectives of Study

No formal research study using accepted social research methodology of which we are aware has

examined the interrelationship of psychological skill use, physical fitness, and FMC in the focused way this study was conducted to understand the determinants shaping future military personnel development. The purpose of this study was to explore whether there were differences in psychological skill use between men and women in a sample of Army Reserve Officers' Training Corps (AROTC) cadets. This was done to ascertain whether there was sufficient evidence to continue pursuing the hypothesis that males and females use psychological skills differently than one another as such skills relate to physical fitness.

A second major purpose of this study was to begin developing a foundational baseline of data on the hypothesis for use in future examinations of relationships of psychological skill use, physical fitness levels, and FMC. The utility of the collected data and its subsequent analysis suggest a need for more in-depth research aimed at tailoring mental training and resilience opportunities in ways adapted to the needs of males and females in terms of scope, efficiency, and cost effectiveness.¹⁶

Methods

Design and Setting

This study featured an observational exploratory design with convenience sampling. All physical fitness testing took place in an outdoor track and field facility and all FMC testing took place in an enclosed gymnasium at a university. Testing took place during the fall semester of 2019.

Participants

Participants in this study were cadets ($N = 90$, males = 65, females = 25, $M_{\text{age}} = 21.6 \pm 4.1$ years) from an AROTC population at a large southeastern U.S. university. Cadets had between one and three years of experience in the AROTC program. Participants were not eligible for the study if they had any musculoskeletal injuries in their lower extremities or torso within one year before the testing date.

Instrumentation

Test of Performance Strategies-2. The Test of Performance Strategies-2 (TOPS-2) is a sixty-four-item self-report questionnaire that examines athletes' use of sixteen psychological skills across practice and competition settings. The TOPS-2 includes eight

practice subscales: goal setting, emotional control, automaticity, relaxation, self-talk, imagery, attentional control, and activation.¹⁷ The same eight subscales are included for competition settings; however, attentional control is replaced with negative thinking. The practice and competition sub-scales consist of thirty-two items each (four items per skill). Each item is scored on a five-point Likert-response scale with “1” indicating *never engage in the described behavior* and “5” indicating *always engage in the described behavior*. A score of five indicates more frequent use of skills, excluding negative thinking and emotional control, where a lower score is favored. The TOPS-2 has demonstrated internal consistency (0.66 to 0.81) and good psychometric properties (CFI, TLI $\geq .95$; RMSEA $\leq .06$) among male and female young adult athletes of varying ability levels from various sports.¹⁸ Reference means from previous research are compared to the present data, and scores greater than 2.99 out of five on the TOPS-2 scale indicate the use of the respective psychological skill.¹⁹

Physical fitness assessments. The ACFT iteration used in this study is a six-component physical fitness assessment consisting of muscular strength, muscular endurance, cardiovascular endurance, power, and agility assessments. The ACFT components include a three-repetition maximum deadlift, standing power throw, hand-release push-ups, sprint-drag-carry, plank or leg-tuck, and a two-mile run. For the purposes of this study, all ACFT components except plank were assessed because the plank component was added to the ACFT in 2022 after these data were collected. The leg tuck was assessed but not used in the data analysis because of high female failure rates and the subsequent removal of the leg-tuck component from the ACFT in 2022 when the plank component replaced it. Grip strength was added to the fitness assessments for our study because it is a strong predictor of total body strength and is commonly assessed in tactical athletes.²⁰ All ACFT components were completed following guidelines from the U.S. Army Center for Initial Military Training.²¹ ACFT scoring was conducted by AROTC cadre, trained in the administration of the ACFT. Grip strength (recorded in kilograms) was measured using a baseline hydraulic handgrip dynamometer (JAMAR Plus+). Participants were instructed to stand with their arms straight down and their hands at their sides and squeeze with maximum effort for five

seconds. This procedure was repeated on alternating hands for three trials with each hand. The highest grip on each hand was averaged and measured to the nearest 0.01 kg for data analysis.

Functional motor competence assessments. The FMC portion of testing included five assessments of product-oriented locomotor and object control motor skills: standing long jump, hopping speed, throw-catch task, walking backward on balance beam, and supine-to-stand time.

Standing long jump. The standing long jump assessment measures how far a participant can jump and land with both feet. Participants stood behind a line (marked with a piece of tape placed on the ground) and jumped with both feet simultaneously, sticking the landing after they jumped so distance could be measured and recorded by trained research staff. Jump distance was measured to the nearest centimeter from the taped line to the back of their backmost heel. Participants completed three maximal effort trials, and the maximum jump distance was used for data analysis.²²

Hopping speed. The hopping speed task is a measure of how fast participants can hop six meters on one leg. Two cones were set up six meters apart, with a one-meter acceleration zone outside of each cone to begin at. Participants were instructed to start at the outermost cone and hop as fast as possible to the last cone on one leg. Once the participant crossed the one-meter mark to the second cone, the timer was started. The timer stopped when the participant reached the next cone, six meters away. Participants repeated this until they completed two trials on each leg. The minimum hop time to the nearest 0.01 seconds was used for data analysis.

Throw-catch task. The throw-catch task is a measure of how many times the participant can throw a tennis ball against a wall and catch it in thirty seconds. Participants were instructed to stand three times their height away from the wall during the task. The total number of clean catches without dropping the tennis ball were counted and recorded by trained research staff. The maximum number of throw and catches from two trials was used for data analysis.²³

Walking backward on balance beam. The walking backward on balance beam task is a measure of balance and stability where a participant is to walk backward

on three balance beams with widths of 6, 4.5, and 3 cm. Participants were instructed to walk backward on the balance beams, starting with the 6 cm and increasing in difficulty to the 4.5 cm and the 3 cm beams. The number of steps on each beam were recorded by trained research staff, with a maximum of eight steps per beam and a maximum of seventy-two steps for all trials. The maximum number of steps was used for data analysis.²⁴

Supine to stand. The supine-to-stand assessment is a measure of the amount of time it takes to transition from a supine position on the floor to a standing position. Participants were instructed to start in the supine position with their hands by their side. The raw measurement of the time it takes the participant to touch the wall at shoulder height, measured to the nearest 0.01 seconds, was recorded. Participants completed three trials with the minimum time used for data analysis.²⁵

Procedures

A convenience sample of AROTC cadets were recruited as participants for this study. The southeastern university's institutional review board reviewed and approved this study. All participants completed informed consent before testing. All study participants received a participant ID, which was used to maintain anonymity during data collection and analysis. Participant sex, date of birth, ethnicity, BMI, and age were obtained through university records. Sex was self-reported as biological sex at birth. All data collection took place during the fall academic semester during the cadet's normal training times (0600–0700 hrs.). Fitness and FMC testing took place in the same week but not on the same day. Cadets completed a brief aerobic warm-up with their cohort prior to testing. At least two minutes of rest was given between each assessment. Cadets completed the ACFT according to the guidelines for the U.S. Army Center for Initial Military Training, and all testing was facilitated by trained research staff.²⁶ All participants were familiarized with the testing procedures on the day of testing. The TOPS-2 questionnaire was distributed as a hard copy to fill out on the same day as FMC testing. Participants had adequate time before and after FMC testing to complete the questionnaire to reduce survey fatigue. Trained research personnel recorded and double-entered the data into a secure database following testing.

Analysis

We conducted all data analyses using R statistical software (Version 2022.12.0 + 353).²⁷ We converted the raw scores from each ACFT event (hex-bar deadlift, sprint-drag-carry, push-ups, standing power throw, and two-mile run) and grip strength to z-scores and summed them to create a composite fitness score. Sprint-drag-carry and two-mile run times were reverse-coded to reflect a higher z-score for faster times. Raw scores of each FMC assessment (standing long jump, hopping speed, throw-catch task, walking backward on balance beam, and supine-to-stand time) were converted into z-scores and summed to create a composite FMC score. Supine-to-stand and hop assessments were reverse-coded to reflect a higher z-score for faster times. On the TOPS-2 subscales, we reverse coded emotional control and negative thinking so higher scores reflect use of the skill to maintain consistency with all other skills. Use of psychological skills was determined based on an average TOPS-2 subscale score of above 2.99 out of five for each skill. Next, we conducted Pearson product-moment correlations with 95 percent confidence intervals (CI) to determine associations between TOPS-2 scores, fitness composite scores, and FMC composite scores. We interpreted correlations of $r < .40$ as weak associations, correlations of $r = .40-.59$ as moderate associations, and correlations of $r > .60$ as strong associations.²⁸ Welch's independent sample *t*-tests were conducted to determine the differences between FMC composite scores and fitness composite scores for males and females. We conducted two one-way multivariate analyses of variance (MANOVA) to determine if there were significant sex differences across psychological skills in (1) practice settings and (2) competition settings in our sample. α was set at $p < .05$ for statistical significance. Post hoc analyses were conducted using univariate analysis of variance (ANOVA) to determine which psychological skills were used significantly less by males or females on our sample. To accommodate multiple comparisons across eight psychological skills for each setting, a Bonferroni adjustment was applied, setting the α level to .006 for *p*-value calculation to confirm statistical significance. For significant ANOVA results, partial eta-squared (η_p^2) was used to determine the unbiased estimate of effect size for each comparison. We interpreted η_p^2 as $\eta_p^2 = 0.01$ for small effect, $\eta_p^2 = 0.06$ for moderate effect, and $\eta_p^2 = 0.14$ for large

effect.²⁹ Due to a small sample size with fewer females than males, we also calculated the common language effect size as a measure to determine the likelihood that a randomly selected male cadet in our sample will have a higher TOPS-2 score than a randomly selected female cadet in our sample.³⁰

Results

Demographics

Our final sample of participants for this study ($N = 90$, males = 65, females = 25) included cadets ages 17 to 37 years ($M_{\text{age}} = 21.6$ years, $SD = 4.1$). The race/ethnicity distribution was Asian = 5; Black or African American = 11; Hispanic or Latino = 5; White = 64; Other = 5, and mean BMI (kg/m^2) values were Female $M_{\text{BMI}} = 25.1 \pm 3.3$; Male $M_{\text{BMI}} = 24.7 \pm 3.6$. The male average BMI in our sample falls into the normal classification of BMI for adults (18.5–24.9) and the female average BMI in our sample falls into the overweight classification of BMI (25.0–29.9) for adults.³¹

Correlation Analyses

For fitness, significant positive correlations were found with thirteen of sixteen psychological skills including all psychological skills in practice settings and activation, automaticity, goal setting, imagery, and relaxation in competition settings ($r = .21-.46$, $p < .05$). The strongest positive correlation was found between activation in practice settings and fitness ($r = .46$ [95% CI .28, .61], $p < .001$).

For FMC, significant positive correlations were found with six psychological skills: automaticity, goal setting, relaxation in competition settings, and activation, goal setting, and imagery in practice settings ($r = .21-.32$, $p < .05$). Means, standard deviations, and correlation coefficients for TOPS-2 results can be found in tables 1 and 2.

Sex Differences

Male cadets demonstrated significantly higher fitness composite scores ($M = 2.31$, $SD = 3.51$) than female cadets ($M = -5.99$, $SD = 3.23$; $t[47.1] = -10.7$, $p < .001$, $g = -2.44$, 95% CI [-9.87, -6.74]). Significant differences were also found in FMC composite scores between male cadets ($M = 1.22$, $SD = 2.76$), who had significantly higher FMC composite scores, and female cadets ($M = -3.23$, $SD = 2.31$ $t[51.8] = -7.75$, $p < .001$,

$g = -1.74$, 95% CI [-5.60, -3.29]). Mean and standard deviations of raw scores for each fitness and FMC component can be found in table 3.

Overall, males in our sample demonstrated the use of twelve out of sixteen psychological skills and females demonstrated the use of eight out of sixteen psychological skills, indicated by a mean score of greater than 2.99 out of five. Males in our sample scored higher on average than females in all skills except for four: emotional control (competition and practice), self-talk, and negative thinking (practice). Values for psychological skills by sex can be found in table 4.

MANOVA revealed a significant effect of sex on psychological skills in practice settings, $V = .20$, $F(8, 81) = 2.50$, $p = .02$, $\eta_p^2 = .20$. MANOVA results indicate that sex has a moderate effect on psychological skill use in our cadet sample during military training practice, accounting for approximately 20 percent of the variance in psychological skill use among ROTC cadets.

MANOVA results also indicate a large effect of sex on psychological skills in competition settings, $V = .25$, $F(8, 81) = 3.30$, $p = .002$, $\eta_p^2 = .25$, with sex accounting for approximately 25 percent of the variance in psychological skill use among ROTC cadets.

Lastly, univariate ANOVA results indicate that moderate-to-large effects of sex on the use of practice imagery $F(1,88) = 14.21$, $p < .001$, $\eta_p^2 = .14$, competition relaxation $F(1,88) = 8.48$, $p = .005$, $\eta_p^2 = .08$, and competition automaticity $F(1,88) = 8.22$, $p = .005$, $\eta_p^2 = .09$, with males demonstrating a higher use of each skill. Common language effect size revealed that a TOPS-2 score of any randomly selected male cadet in our sample is 61.8 percent more likely to be higher than a TOPS-2 score from a female cadet in our sample.

Discussion

A comprehensive and integrated approach to training has the potential to significantly improve fitness and performance trajectories. Adapted approaches to tactical performance development involve recognizing that physical performance and psychological skills are interconnected and enhancing one may have positive effects on the other. Research indicates that psychological skills are associated with high levels of FMC and fitness may be useful for developing training for current and future military personnel. Improving psychological skills in female military recruits may also be a potential

Table 1. Psychological Skills in Competition: Means, Standard Deviations, and Correlations With Confidence Intervals

Variable	<i>M</i>	<i>SD</i>	Correlations	
			Fitness	FMC
Fitness	0	5.10		
FMC	0	3.30	.61* [.46, .73]	
Activation	3.44	.70	.28* [.08, .46]	.20 [-.01, .39]
Automaticity	3.12	.66	.29* [.09, .47]	.28* [.08, .46]
Emotional control	2.24	.64	.20 [.01, .39]	.09 [-.11, .29]
Goal setting	3.65	.62	.38* [.19, .54]	.31* [.11, .49]
Imagery	3.33	.84	.26* [.06, .45]	.16 [-.05, .35]
Negative thinking	2.38	.75	.18 [-.38, .54]	.09 [-.12, .29]
Relaxation	3.32	.71	.37* [.18, .54]	.30* [.10, .48]
Self-talk	3.30	.73	.12 [-.09, .31]	.04 [-.16, .25]

Note. *M* and *SD* represent mean and standard deviation, respectively. Fitness and functional motor competence (FMC) represent the composite z-score. Values in brackets indicate the 95 percent confidence intervals for each correlation.

* $p < .05$.

(Table by authors)

Table 2. Psychological Skills in Practice: Means, Standard Deviations, and Correlations With Confidence Intervals

Variable	<i>M</i>	<i>SD</i>	Correlations	
			Fitness	FMC
Fitness	0	5.10		
FMC	0	3.30	.61* [.46, .73]	
Activation	3.20	.73	.46* [.28, .61]	.21* [.01, .40]
Automaticity	3.24	.51	.25* [.05, .44]	.13 [-.08, .33]
Emotional control	2.46	.58	.21* [.01, .40]	.01 [-.19, .22]
Goal setting	3.44	.40	.35* [.15, .51]	.27* [.06, .45]
Imagery	3.28	.79	.43* [.24, .58]	.32* [.12, .49]
Negative thinking	3.39	.51	.38* [.18, .54]	.20 [-.01, .39]
Relaxation	2.59	.83	.29* [.09, .47]	.04 [-.17, .25]
Self-talk	3.54	.64	.24* [.03, .42]	.07 [-.13, .27]

Note. *M* and *SD* represent mean and standard deviation, respectively. Fitness and functional motor competence (FMC) represent the composite z-score. Values in brackets indicate the 95 percent confidence intervals for each correlation.

* $p < .05$.

(Table by authors)

pathway to enhancing fitness and FMC among the growing number of females in the military.

A key finding in the target study group was that fitness was positively associated with thirteen of

sixteen psychological skills, and individuals in our sample who used more psychological skills during competition and practice had significantly higher fitness performance on ACFT components. We did

Table 3. Descriptive Statistics of Fitness and FMC Component Scores by Sex

Skills	Males (n = 60)			Females (n = 25)		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Fitness						
Deadlift (lb)	263.38 (59.77)	140.00	354.00	158.00 (41.13)	110.00	290.00
Sprint-drag-carry (s)*	103.03 (11.75)	79.00	151.00	139.56 (20.12)	99.00	176.00
Push-ups	38.52 (12.32)	10.00	60.00	24.08 (7.83)	1.00	33.00
Standing power throw (m)	9.23 (2.06)	4.10	15.40	5.22 (1.62)	2.00	9.80
2-mile run (s)*	974.46 (108.79)	771.00	1305.00	1130.64 (168.06)	853.00	1557.00
Grip strength (lb)	47.14 (9.43)	22.15	67.30	29.85 (6.50)	19.05	46.40
FMC						
Standing long jump (cm)	227.05 (31.33)	130.00	293.00	168.14 (21.12)	131.50	235.00
Hopping speed*	1.82 (0.25)	1.25	2.56	2.37 (0.34)	1.94	3.35
Throw-catch task (catches)	16.43 (3.49)	8.00	24.00	13.52 (3.23)	4.00	18.00
Walking backward on balance beam (steps)	43.62 (12.76)	21.00	70.00	43.80 (12.18)	13.00	60.00
Supine to stand (s)*	1.34 (0.26)	0.88	2.22	1.52 (.025)	1.10	2.13

Note. M and SD represent mean and standard deviation, respectively; FMC = functional motor competence.

* Lower values indicate better performance.

(Table by authors)

not find strong associations between psychological skill use and FMC in males or females in our sample. However, associations between psychological skills and fitness in our sample, coupled with previous findings of associations between fitness and FMC in tactical samples, provide insight for future research directions that emphasize psychological skills training and behavioral strategies to improve fitness and FMC in tactical populations.³² The link between psychological skills and FMC performance is supported within the motor performance literature.³³ Currently, there is a need for more research to support the potential influence of psychological skills as a critical and underappreciated antecedent to FMC.

The study revealed that male cadets in our sample had higher FMC and fitness levels than female cadets. The significant differences between males and females in fitness and FMC levels in this study support previous literature from military-related samples as well as nontactical athletes.³⁴ The results of this study suggest support for further investigating training methods that optimize the development of FMC and

fitness for females in AROTC and military recruit settings. Recent evidence indicates that 95.5 percent of females in an AROTC sample failed the ACFT.³⁵ In addition, 74 percent of individuals with low FMC failed the ACFT, highlighting the importance of FMC development.

Lastly, females in our sample demonstrated the use of fewer psychological skills use males. This finding contradicts previous literature indicating female athletes in nontactical populations demonstrate higher proficiency than males in some psychological skills, including relaxation and self-talk, or showed no significant differences in psychological skill proficiency between males and females.³⁶ Females in our sample demonstrated the use of eleven of sixteen psychological skills (i.e., scale means > 2.99 on the five-point scale) across practice and competition settings, compared to males who demonstrated the use of fifteen of sixteen skills. Females in our sample utilized four fewer psychological skills when compared to female athletes in a TOPS-2 validation sample.³⁷ More specifically, the unused psychological skills of females in our sample

**Table 4. Descriptive Statistics of TOPS-2 Scores by Sex
(Measured on a 0–5 scale)**

Skill (Setting)	Males (n = 65)	Female (n = 25)
	Mean (SD)	Mean (SD)
Activation (p)	3.30 (0.76)	2.92 (0.58)
Activation (c)	3.50 (0.74)	3.28 (0.54)
Automaticity (p)	3.29 (0.51)	2.31 (0.47)
Automaticity (c)	3.24 (0.67)	2.81 (0.53)
Emotional control (p)	2.63 (0.60)	2.39 (0.51)
Emotional control (c)	2.28 (0.64)	2.22 (0.64)
Goal setting (p)	3.48 (0.40)	3.33 (0.37)
Goal setting (c)	3.73 (0.66)	3.46 (0.47)
Imagery (p)	3.46 (0.71)	2.81 (0.79)
Imagery (c)	3.44 (0.81)	3.05 (0.85)
Relaxation (p)	2.67 (0.88)	2.37 (0.63)
Relaxation (c)	3.46 (0.68)	2.99 (0.70)
Self-talk (p)	3.59 (0.67)	3.42 (0.57)
Self-talk (c)	3.29 (0.76)	3.33 (0.67)
Attentional control (p)	3.47 (0.50)	3.20 (0.48)
Negative thinking (c)	2.52 (0.77)	2.33 (0.67)

Note. TOPS-2 = Test of Performance Strategies-2; SD = standard deviation; (p) = practice settings; (c) = competition settings; **Bold** = scores greater than 2.99, indicating use of the skill.

(Table by authors)

included imagery, activation, automaticity, and relaxation. These skills have the potential to improve confidence, self-esteem, and motivation, which are known to enhance performance, and have been associated with a higher likelihood of passing military physical fitness assessments.³⁸ Further research should be conducted in ROTC or military recruit populations such as senior military colleges to determine if the finding that females demonstrate lower psychological skills than males in all TOPS-2 subcategories can be replicated.

Limitations

We recognize that this study does not contain the same fitness components as the current iteration of the Army Fitness Test (AFT; official as of 1 June 2025). Because these data were collected prior to the Army replacing the leg-tuck component with a plank (2022) and removing the standing power throw component (2025). We omitted the leg-tuck component and did

not assess the plank component; however, we still included the standing power throw component, which was not removed until June 2025. Therefore, we could not calculate total AFT scores for analysis.

Another limitation was the unbalanced male and female samples, with females making up only 28 percent of our sample. However, our sample is representative of the military, where females only make up approximately 15 percent of total military enrollment.³⁹ University ROTC programs are separate from the military and results should not be interpreted as active military personnel, but military recruits. These results were also limited by the use of subjective measures of psychological skills (i.e., TOPS-2 questionnaires) for which we made assumptions that participants answered questionnaires truthfully. A longitudinal, within-subjects design examining psychological skills, FMC, and fitness performance over time would provide a more robust and generalizable

understanding of the impact that psychological skills have on physical development training and specific needs for both males and females.

Conclusions and Practical Applications

It is important to acknowledge that as a single stand-alone research project, the results obtained cannot be asserted to be generalizable to the Army population. However, the results are conclusive enough to justify one of our key recommendations that the methodology be replicated as closely as possible in other Army-sponsored studies to examine the validity of the conclusions to ascertain whether a broad verifiable pattern emerges. A second recommendation is that this study serve as a baseline foundational data source for other similar studies attempting to replicate the methodology in a concerted effort to build up a sufficient database that could be used to reliably make generalizations about differences observed among the sexes with regard to the features examined in the general Army population.

Notwithstanding, the results of this study do suggest the need to enhance psychological skills, physical fitness, and FMC training in females, specifically in AROTC and military recruits, as our sample demonstrated the use of fewer psychological skills, lower fitness, and lower FMC levels. In addition to their physical size, on average, males in military populations may perform better on fitness assessments due to higher

levels of psychological skills and FMC, which further disadvantages females in military populations.⁴⁰

As such, this study does provide what could be construed as initial evidence of differences among the sexes in their associations among psychological skill use, FMC, and fitness levels. If this pattern were to be broadly validated by further research, in line with the U.S. Army's H2F initiative, evidence supporting psychological skills training in combination with FMC and fitness training might lead to lower injury rates, lower spending on injuries in the military, and a stronger and more physically and mentally prepared military.

Future research should examine such relationships between each ACFT component and psychological skills to pinpoint skills that are most critical for improving performance in tactical tasks for both males and females. Additionally, future research should consider other variables that should be included in holistic performance assessment batteries such as motivation and mental health, as psychological skills may work to mitigate adverse mental health symptoms such as anxiety and depression.⁴¹ Overall, our study opens potential research directions for examining psychological skills training interventions to improve readiness in military populations. With the Army's continued integration of H2F, understanding the relationships among physical, psychological, and mental performances is essential to enhancing the long-term health and well-being of soldiers across their careers and in doing so strengthening the U.S. military overall. ■

Notes

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