



## Developing a mental toughness program for basic military training

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### ABSTRACT

To build a warfighter from the ground up, training should include not only the core competencies required for job performance in the Fleet but also the mental toughness expected to handle the stress, fatigue, and call for sudden action required of all sailors on duty, regardless of occupation. Recruit Training Command (RTC) has embarked on a program to provide explicit training to recruits on the development of toughness in boot camp. This program is multifaceted, including three pilot programs (two all-male pilots, one integrated/mixed gender pilot) for mental skill training. Recruit divisions were assigned to either mental toughness (MT) condition or active control (AC). The MT group received daily, 10-min guided mindfulness exercises, three “just-in-time” trainings in sports psychology skills, and an on-command focusing exercise. Results varied across the three pilots with the exception of on-time graduation rates, which favored the MT condition in every pilot. Taken together, the three MT pilot studies show possible benefits for performance during boot camp with MT practice, and predictable advantages for graduation rates.

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### What is the public significance of this article?—

These studies demonstrate that implementation of a mental skills training program can enhance task performance in military recruits. This type of program is feasible even when using a train-the-trainer model where laypersons (e.g., Recruit Division Commanders; RDCs) teach the materials, as opposed to using subject matter experts (e.g., psychologists), who are a limited resource in the military.

### Introduction

Recruit Training Command (RTC) is the only point of entry for enlisted Navy Sailors and is home to basic training, also known as boot camp. Basic training involves eight weeks of rigorous training intended to equip recruits with the skills necessary to succeed in the fleet. One skill underpinning the effective execution of all technical competencies is mental toughness. The aim of these studies was to develop and test a mental toughness training program, using performance psychology and mindfulness training.

### Evidence-based definition and conceptualization

Mental toughness is often marketed to the public as a personality trait that leads to a stronger mind and increased success, and is often spoken of interchangeably with resilience. The relationship between resilience and mental toughness is a subject of debate but the dissimilarities noted by Cowden et al. (2016), particularly the focus on positive accomplishments instead of a protective factor against negative outcomes, are important context for this study (see also, Gucciardi et al., 2009, 2021; Meredith et al., 2011). Within the psychological literature, there are multiple definitions of mental toughness. Gucciardi et al. (2015) developed a conceptual model and working definition of mental toughness, which was distilled further by Hardy et al. (2014) to “the ability to achieve personal goals in the face of pressure from a wide range of different stressors” (p. 70) with a focus on observable, measurable actions. Gucciardi et al. (2021) recently expanded upon this definition, to include how “in such circumstances, people can decide to persevere with their efforts toward the goal in an attempt to overcome the obstacles, execute alternative strategies by which to achieve the same goal, substitute the goal with another objective in which there

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is an increased likelihood of success, or disengage from the goal altogether.” For the purposes of the present study, we hope to achieve the former—where recruits perform under pressure and persist despite obstacles, obtaining higher performance marks than without mental toughness training.

Although research on mental toughness originated and still primarily exists within the realm of sports, there is significant benefit in applying this concept to the military. The present series of studies were developed using Hardy et al. (2014) definition of mental toughness, which has been validated in military populations (Arthur et al., 2015; Fitzwater et al., 2017; Gucciardi et al., 2021), as well as McNaughton and Corr’s (2004) revised Reinforcement Sensitivity Theory (rRST), based on the neuropsychological model originally proposed by Gray and McNaughton (2000).

Using the rRST conceptualization, we posit that mental toughness training programs should focus on altering neurological processes by inhibiting avoidant responses and/or increasing approach responses. Training which improves emotion regulation (specifically regulation of the fight-flight-freeze response) should increase mental toughness (Arthur et al., 2015; Fitzwater et al., 2017; McNaughton & Corr, 2004). In the present studies, two broad strategies for increasing mental toughness utilizing this conceptualization (mental skills training and mindfulness) were explored for their effectiveness.

### **Mental skills training**

Research on mental skills training has largely focused on sports performance, and although the depth and breadth of skills taught varies, they often focus, at a minimum, on the “Big Four” skills: goal-setting, arousal control, visualization, and self-talk. For instance, in the United Kingdom (UK), researchers worked alongside cricketers to develop imagery, goal setting, refocusing strategies, self-talk, arousal control, and cognitive restructuring (Bell et al., 2013). Results indicated significantly improved fitness tests, indoor assessments, performance statistics, and mental toughness scores as measured by the Mental Toughness Inventory (MTI).

Although empirical studies of mental skills training in the military are limited, prior research has shown that mental toughness can increase through basic training (Godlewski & Kline, 2012), and that soldiers scoring higher on mental toughness measures performed better on the Army Physical Fitness Test (AFPT) and demonstrated higher self-esteem, as well as lower scores on measures of anxiety, depression, hopelessness, anger, and loneliness (Hammermeister et al., 2010). Army researchers conducted studies of basic training which

showed Army recruits trained in mental skills by their Drill Sergeants outperformed the control group on performance evolutions (Adler et al., 2015; Knust et al., 2017). Other studies have shown service members who participated in mental skills training reported increased mental toughness scores on the Military Training Mental Toughness Inventory (MTMTI; Fitzwater et al., 2017); improved sense of belonging, problem-solving coping, attachment security, and graduation rates (Williams et al., 2004) and improved group cohesion (Williams et al., 2007).

### **Mindfulness**

Similar to mental toughness, mindfulness has a myriad of definitions dependent on the context. For the purposes of this study, Jha et al. (2010) definition of mindfulness, “full attention to present-moment experience without judgment, elaboration or emotional reactivity” (p. 54), was used. Research in the military has shown that as little as 12 minutes of daily mindfulness practice can improve working memory capacity, increase positive affect, and reduce negative affect (Jha et al., 2010). Other studies demonstrated improved attentional abilities (Gardner & Moore, 2019; Jha et al., 2015; Van Den Assem & Passmore, 2019), improved working memory abilities, maintenance of optimal athletic performance, enhanced cognitive diffusion (i.e., realizing that what our mind tells us is separate, and sometimes in direct contrast of the literal truth; Gardner & Moore, 2019) and improved biomarkers of stress after a high-intensity simulation exercise (Johnson et al., 2014).

Thus, mental skills training and mindfulness training have been shown to improve performance in military populations. However, to our knowledge, these two types of training have yet to be combined in the basic training environment (as opposed to elite or established units), delivered in a train-the-trainer model, or applied in a real-world setting (i.e., designed and executed by an internal team, rather than temporary, external research staff).

### **Purpose of the current study**

The goal of the present studies was to evaluate the efficacy of a mental toughness training program for recruits, utilizing a train-the-trainer model. While train-the-trainer models have been shown in previous studies (Vanhove et al., 2016) to have inferior effects when compared to one-on-one formats, these previous studies were not conducted in a military setting using trainers that are organic to a military chain of command. Furthermore, based on the sheer number of recruits

who receive training at one time, other training formats were not realistic given these relevant circumstances and staff constraints. Based on prior research of mental toughness in a military setting, it was hypothesized that similar effects could be elicited in Navy recruits. Specifically, the present studies expected increases on measures of physical fitness, personnel inspection scores, capstone event performance, and self-reports of mental toughness for those recruits in the mental toughness condition when compared to their active control counterparts.

## Method

### Background

The three pilot studies described herein were part of a larger process improvement effort within Navy basic training. Procedures were the same for all three pilots unless otherwise noted. At the time of the study, Navy boot camp was eight weeks long. At the outset of basic training, recruits were assigned to divisions of approximately 88 recruits. All divisions were partnered and completed training with a “brother division.” Recruits were required to pass major evolutions (graded events) in order to continue and graduate from training. Some evolutions were graded on an individual basis while others scored the entire division’s performance.

### Procedure

The study design was a random block experimental design due to the logistics of basic training. Brother divisions were randomly assigned to either a mental toughness (MT) condition or an active control (AC), resulting in four divisions of each condition for each pilot. Recruits were blinded to the condition inasmuch that RDCs and instructors presented training as “standard.” RDCs were not blind to the condition as they were directly involved in the intervention. Baseline surveys were given during the processing week, prior to the third official day of training. Follow-up surveys were given during the week of graduation, including one survey given right before the final capstone event known as Battle Stations. Because the mental toughness training was part of a larger process improvement effort, recruits were not required to receive informed consent prior to being assigned to a study condition. However, recruits were not required to complete the research surveys. Informed consent to participate in the research surveys was provided (after being assigned to a condition by nature of their division assignment), prior to the start of training, by a military research

psychologist (dressed in civilian clothes to avoid any undue pressure to consent). Recruits were assured that participation in the research surveys was completely voluntary and could be withdrawn at any time. Other outcome metrics, including but not limited to physical readiness test (PRT) data and inspection results, were analyzed for all recruits as part of the process improvement effort, irrespective of a recruit’s participation in the voluntary research survey.

### Mental toughness condition

After the divisions had been randomly assigned, the RDCs and instructors for the MT divisions were trained on how and when to use the mental toughness skills by a clinical psychologist. With the exception of a 30-min classroom lesson given by a uniformed clinical psychologist, all mental toughness training was executed using RDCs and instructors.

Performance psychology interventions focused on self-talk, visualization (also referred to as mental rehearsal), and arousal control (referred to as energy management with recruits). Self-talk was introduced by the instructors who work at the gymnasium in the form of a 10-min lesson prior to recruits’ baseline physical assessment, during which they were encouraged to practically apply the self-talk skills. Visualization was introduced by swimming instructors with 10 min of classroom instruction and a 5-min exercise before the initial swim qualification. Energy management was introduced in a 10-min classroom activity prior to a line handling lab as well as a 5-min exercise halfway through the lab.

Mindfulness exercises consisted of four phases, all conducted by RDCs. The first phase consisted of instructions on how to “recalibrate,” which is a term that references a brief diaphragmatic breathing exercise designed to lower their heart rate. The exercise consists of breathing in, over a slow count of 5 seconds, and exhaling, over a count of 7 seconds. Recruits were instructed to continue what they were doing while engaging in this deliberate slow-paced breathing. RDCs led recruits in scheduled practice of recalibration during the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> days of training. The RDCs were also permitted to reinforce recruits’ use of mindfulness skills by directing recruits to “recalibrate” at unscheduled times, on-command, if they deemed it was appropriate (e.g., prior to a high-pressure event or if the recruit was underperforming). Recruits were encouraged to recalibrate any time they needed, but they were instructed not to stop doing their current activity to do so.

The second phase of mindfulness training took place during the recruit’s 2<sup>nd</sup> and 3<sup>rd</sup> week of training during their “evening routine” (i.e., flexible training time at the

end of the day). In the second phase, RDC's led recruits through a 10-min scripted progressive muscle relaxation (PMR) exercise. In this exercise, the recruits were instructed to isolate muscle groups starting from the feet and working their way up the body until they reach their head. They were instructed to tense the body part as tightly as they could for 10 seconds, and then to release. They were provided basic education on the benefits of this exercise.

The third phase of mindfulness training took place during the recruits' 4<sup>th</sup> and 5<sup>th</sup> weeks of training. In this phase, the RDC's led recruits through a 10 min scripted exercise that consisted of a shortened PMR sequence, as described above, followed by a basic body scan. The body scan script encouraged the recruit to focus on different parts of their body in a more general sense, without specifically trying to make any changes or adjustments. They were provided basic education on the benefits of this exercise, and how practice over time can help increase their ability to focus, gain awareness, and normalize the experience of how feelings and sensations in the body are continuously changing.

The final phase of mindfulness training took place during the recruits' 6<sup>th</sup> and 7<sup>th</sup> weeks of training. In this phase, the RDC's led recruits through a 10 min scripted exercise that consisted of a "mental scan." The mental scan script encouraged the recruit to observe their thoughts and emotions as they happen in the moment, and to not get "caught up" with any particular thought or feeling that may arise. The script directed the RDC to give them prescribed periods of silence. These periods afforded them the opportunity to gain awareness of when they do get carried away with their thoughts, and exercise discipline by refocusing their minds to the mindfulness task at hand. Recruits were provided basic education on the benefits of this exercise, and how it can also be a tool to help gain self-awareness.

#### **Active control condition**

In place of the mindfulness practice, the AC condition was directed to engage in 10 minutes of silent, undirected reflection (e.g., journaling) during the evening routine, wherein they were not allowed to do anything related to training (e.g., reading, cleaning, etc.). It was also requested that the RDC's do not use this time to apply any sort of pressure on the recruits. The intent here was to ensure the potential success of the experimental group would not have been due to the fact that they were not spending the time doing training activities and/or under pressure from their RDCs. All other training evolutions were completed as usual.

**Surveying.** The research team surveyed recruits three times during boot camp to obtain demographics and self-ratings on mental toughness using the Mental Toughness Questionnaire, 48-item version (MTQ48; Clough et al., 2002). Respondents utilize a Likert scale to answer questions such as "I usually enjoy a challenge," "I generally feel that I am in control of what happens in my life," etc. Self-ratings of perceived stress was measured using the Perceived Stress Scale (PSS; Cohen et al., 1983). Example items include "In the last month, how often have you felt nervous and stressed?" and "In the last month, how often have you felt that you were on top of things?" answered with a Likert scale. Finally, recruits gave ratings of their RDCs using a modified version of the Differentiated Transformational Leadership Inventory (DTLI; e.g., Fitzwater et al., 2017). Recruits rate their RDC using a Likert scale on items such as "My RDC helps team members to develop their strengths" and "My RDC gets me to rethink the way that I do things." The first MTQ48 and PSS surveys were administered as a baseline prior to the start of training. The PSS was re-administered immediately prior to the capstone event, and the MTQ48 was administered a second time between the capstone event and graduation, in conjunction with the DTLI.

#### **Research survey measures**

**Demographic data.** Participants were asked their age and gender.

**MTQ48.** This is a self-report of mental toughness based on thoughts and feelings at the time of survey administration, using a 5-point Likert scale ranging from (1) *strongly disagree* to (5) *strongly agree*. Items are divided into six subscales including challenge (8 items), commitment (11 items), emotional control (7 items), life control (7 items), confidence in abilities (9 items), and interpersonal challenge (6 items).

**PSS.** This is a 10-item self-report of perceived stress based on feelings and thoughts over the past month. It is rated on a 5-point Likert scale, ranging from (0) *never* to (4) *very often*, with higher scores indicating higher self-rated levels of stress.

**DTLI.** The 26-item self-report DTLI (modified to address the leaders as RDCs), asked recruits to rate their RDCs performance throughout boot camp. Items rate agreement on a 5-point Likert scale from (1) *not at all* to (5) *all of the time*. There are seven subscales – inspirational motivation (4 items), appropriate role



model (3 items), fostering acceptance of group goals (4 items), individual consideration (4 items), high-performance expectation (4 items), intellectual stimulation (3 items), and contingent reward (4 items) – with a maximum score of 130, with higher scores being more indicative of better leadership than lower scores.

### Process improvement metrics

**Internal performance data.** Performance grading metrics were collected from existing data as part of the process improvement. This included information already collected by RTC staff and recruits' administrative "hard cards" where all recruit performance records are tracked by hand, some eventually transferred into electronic databases.

**Physical assessments.** Data from three physical fitness assessments (PFA) were collected at baseline, midway through training, and at the end of training. This includes pass/fail status and raw data from a timed 1.5 mile run, push up count, and curl up count. Pass or fail status for the third-class swim qualification was also collected.

**Academic and inspections.** Academic test scores from two tests taking place during the second and fifth weeks of training were retrieved from hard cards. Although inspections are graded at the division level, the number of individual strikes given to each recruit are also recorded. Individual strike scores were collected for dynamic material inspection (DMI) (i.e., proper storage of uniforms and bunk makeup), two personnel inspections (PI) (i.e., proper wear of uniforms) in the second and fifth weeks of training, weapons turnover inspection (WTI) (i.e., proper weapons handling) in the fourth week of training, and static inspection (SI) (i.e., proper cleaning of and storage in living quarters) in the fifth week of training.

**Battle-stations and graduation.** During the final week of training, after all other requirements have been met, recruits participate in a capstone event, which includes multiple evolutions testing different competencies (e.g., firefighting, damage control, first aid, etc.) and takes place over several hours. Divisions are divided into small groups that, for various reasons, may include members of other divisions (e.g., if the recruit failed with their division). Divisions are given a score as well as a pass/fail grade. Individuals are given individual strikes by the facilitators as well as a pass/fail. Certain mistakes result in automatic failure. Individual strike numbers and pass/fail status were collected, as was

data on whether a recruit graduated on time with their original division.

## Results

### Pilot one

Participants were 238 male Navy recruits across eight recruit divisions (four MT and four AC). There were 97 recruits in the AC condition divisions, and 141 recruits in the MT condition divisions. For summary of Pilot One significant effects, see Table 1.

### Descriptive statistics

#### Demographics

Data were analyzed on 238 male Navy recruits aged between 18 and 35, with a mean age of 20.73 ( $SD = 2.88$ ). The self-reported racial composition of the recruits was 62.7% White, 15.9% Black/African-American, 3.4% Asian, 1.0% Native Hawaiian/Pacific Islander, 0.6% Native American, 12.0% declined to report.

#### Physical fitness assessment (PFA)

**Initial PFA.** Independent samples t-tests were performed to compare curl-up and push-up counts between MT recruits and AC recruits. MT recruits did not significantly differ ( $M = 61.83$ ,  $SD = 14.12$ ) from AC recruits ( $M = 59.24$ ,  $SD = 17.77$ ) on curl-ups, but MT recruits performed significantly more push-ups ( $M = 44.90$ ,  $SD = 17.80$ ) than AC recruits ( $M = 39.62$ ,  $SD = 16.29$ ) ( $t(236) = 2.33$ ,  $p = .02$ ). No difference was found between MT recruits ( $M = 781.97s$ ,  $SD = 80.75$ ) and AC recruits ( $M = 787.16s$ ,  $SD = 86.16$ ) on the 1.5 mile run. Chi-square tests were performed to determine whether the passing rates on each PFA element and the overall PFA passing rate between MT and AC recruits. MT recruits did not pass the curl-up element significantly higher than AC recruits (i.e., 73.8% vs. 71.2% respectively), or on the 1.5-mile run (44.0% vs. 52.6%), but were at a significant advantage on passing the push-up element (53.2% vs. 38.1%;  $\chi^2(1, N = 238) = 5.22$ ,  $p = .022$ ). Passing rates for the overall PFA did not significantly differ between MT recruits (27.0%) and AC recruits (24.7%).

**Table 1.** Pilot One significant effects summary.

	MT	AC
Initial PFA Push-Ups	*	
Final PFA Run	*	
Battle Stations		***
PI One	*	
SI	***	
PSS	**	
DTLI Inspirational Motivation Subscale	*	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

**Final PFA.** On the Final PFAs, the MT recruits and their AC counterparts, did not significantly differ in passing rates for any of the individual events or overall. On the curl-up portion both groups' success rate was 97.9% ( $X^2(1, N = 238) < .001, p = .97$ ). 98.6% of the MT group passed the push-ups compared to 99.0% of the AC group,  $X^2(1, N = 238) = .07, p = .79$ . For the run element, MT recruits passed at a rate of 97.2% and the AC group passed at a rate of 99.0%,  $X^2(1, N = 238) = 0.91, p = .02$ . Overall, pass rates were 97.9% and 96.9% for the MT and AC groups, respectively,  $X^2(1, N = 238) = .68, p = .35$ . Both groups improved equally from the initial PFA to the final PFAs on all three PFA elements, regardless of training condition. MT recruits' performance did not significantly differ ( $M = 16.96, SD = 11.35$ ) from AC recruits ( $M = 19.02, SD = 16.76$ ) on curl-ups ( $t(236) = 1.13, p = .26$ ). MT recruits performed similarly more push-ups ( $M = 26.43, SD = 14.33$ ) as AC recruits ( $M = 29.61, SD = 12.17$ ) ( $t(236) = 1.79, p = .075$ ). No significant difference was found between MT recruits ( $M = 97.83s, SD = 57.70$ ) and AC recruits ( $M = 107.25s, SD = 53.16$ ) performance on the 1.5 mile run ( $t(236) = 1.28, p = .203$ ).

**Swim Qualification.** MT recruits passed at a higher rate (90.8%) than AC recruits (87.6%), but not at a significant level,  $X^2(1, N = 238) = .607, p = .44$ .

**Capstone event performance and additional scored activities.** A lower strike count at the end of Battle Stations indicates better performance. AC recruits ( $M = 1.64, SD = 1.55$ ) incurred significantly fewer individual strikes on average than MT recruits ( $M = 2.02, SD = 1.34$ ) ( $X^2(8, N = 238) = 30.23, p < .001$ ). MT recruits received fewer hits (1.09) on average than AC recruits (1.44) on the DMI, but not significantly so ( $p > .05$ ). MT and AC recruits performed very similarly on their WTI, averaging .38 and .38 hits, respectively. On the first PI MT recruits received significantly fewer hits (.51) on average than their AC counterparts (.71) ( $X^2(3, N = 238) = 11.16, p = .012$ ). MT recruits received fewer hits (.24) on average than AC recruits (.33) on the second PI as well, but not significantly so ( $p > .05$ ). On the SI, MT recruits received significantly fewer hits (1.27) on average than the AC recruits (1.89) ( $X^2(8, N = 238) = 28.83, p < .001$ ).

**Graduation.** At the completion of all training, recruits still with their original divisions are considered "On-Time." On-Time Graduates (OTGs) require no additional time or resources to complete the boot camp curriculum. Setbacks or delays in training require recruits to remain at boot camp for longer periods of time than originally scheduled. This setback

is at least one week minimum to allow the recruit to join the next training cohort. MT divisions ( $M = 60.25, SD = 12.97$ ) averaged more OTGs than AC divisions ( $M = 54.50, SD = 7.85$ ). This means that, on average, the MT divisions graduated five more individuals "On-Time" than their AC counterparts. The difference was not statistically significant ( $t(6) = .758, p = .447$ ). However, a later analysis combining divisions across the three pilots reveals a significant effect upon OTGs,  $p < .05$  (further discussion to follow).

**MTQ48.** MTQ48 scores for each recruit were summed across the six subscales. At baseline, MT recruits ( $M = 170.75, SD = 22.29$ ) did not differ from AC recruits ( $M = 169.27, SD = 23.22$ ) ( $t(236) = .496, p = .62$ ), nor were there differences prior to graduation between MT recruits ( $M = 168.80, SD = 21.39$ ) and AC recruits ( $M = 167.87, SD = 23.82$ ) ( $t(236) = .361, p = .752$ ). No significant effects were detected between conditions on any of the six subscales.

**PSS.** At baseline, MT recruits ( $M = 12.45, SD = 6.31$ ) reported similar stress scores as AC recruits ( $M = 13.27, SD = 6.19$ ) ( $t(236) = .994, p = .321$ ). At posttest, AC recruits ( $M = 14.41, SD = 6.62$ ) reported significantly higher stress scores than MT recruits ( $M = 12.27, SD = 5.99$ ) ( $t(236) = 2.60, p = .01$ ).

**DTLI.** Scores from recruits were compared between MT recruits and AC recruits to determine whether RDC leadership styles varied significantly between the two conditions. RDCs of MT recruits were overall rated only slightly higher ( $M = 97.57, SD = 18.71$ ) than RDCs from divisions with AC recruits ( $M = 95.30, SD = 15.62$ ), but not significantly so. However, MT recruits ( $M = 15.70, SD = 3.45$ ) rated their RDC's significantly higher than AC recruits ( $M = 14.62, SD = 3.04$ ) on the Inspirational Motivation subscale ( $t(236) = 2.48, p = .014$ ).

## Pilot Two

### Participants

Participants were 323 male and female Navy recruits. The total proportion of males to females was 55.7% male, 44.3% female. MT divisions were 54.1% male and AC divisions were 57.5% male. The sample was comprised of 180 males and 143 females aged between 17 and 36 with a mean age of 20.9 ( $SD = 3.29$ ), and with a racial composition of 56.7% White, 23.1% Black/African American, 3.1% Asian, 0.8% Native American, 0.6% Native Hawaiian/Pacific Islander, and 11.0%

**Table 2.** Pilot Two significant effects summary.

	MT	AC
Initial PFA Push-Ups (Males Only)	**	
Second PFA Push-Ups (Males Only)		*
Second PFA Curl-Ups (Females Only)		*
Battle Stations	***	
Firefighting	**	
MTQ48 Life Control Subscale		*
DTLI		*

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

declining to answer. For a summary of Pilot Two significant effects, see Table 2.

### Procedure, interventions, and measurements

A different group of RDCs were randomly selected and were trained by a different psychologist from Pilot One. RDCs were observed only once at the beginning of the study as opposed to at the start of each exercise. To minimize extraneous variables, recruits who were set back in training and started with different divisions were not allowed to be placed in either the MT or AC divisions (not the case with Pilot One where set back recruits continued to join the division, even if they did not join the study). All measurements were the same as Pilot One.

### Descriptive statistics

**Initial PFA.** Because of differing standards, male performance and female performance were analyzed separately for the three PFAs. Male recruits in the MT condition were compared to their male AC counterparts on curl-ups, push-ups, 1.5-mile run time, and the passing rates for each element as well as an overall passing score. Male AC recruits performed significantly more push-ups ( $M = 48.75$ ,  $SD = 15.63$ ) than MT recruits ( $M = 39.65$ ,  $SD = 15.39$ ) ( $t(178) = 6.48$ ,  $p = .005$ ). Differences between run times and curl-up performance were not statistically significant, nor was the overall passing rate. Female recruits showed no significant differences in initial PFA performance between AC and MT divisions.

**Mid-cycle assessment and final PFA.** On the second PFA, male AC recruits surpassed their male MT recruit counterparts on push-ups. Male AC recruits averaged 7.08 more push-ups ( $t(178) = 2.98$ ,  $p = .036$ ). None of the other performances differed significantly between male AC recruits and male MT recruits for the second PFA. For female recruits, AC recruits performed 6.32 more curl-ups ( $t(141) = 2.82$ ,  $p = .034$ ). Run times between females on the second PFA were not different. On the Final PFA, AC male recruits and MT male recruits did not significantly

differ from one another on any of the events. For females, AC and MT recruits demonstrated no significant difference in any event.

**Swim qualification.** Passing the swim qualification was not affected by training condition,  $X^2(1, N = 323) = .607$ ,  $p = .32$ .

### Capstone event performance and additional scored activities

Comparisons between recruits in capstone event performance, inspections, weapons turnover, and a firefighting exercise (not evaluated in Pilot One) were made irrespective of gender. AC recruits averaged less strikes (.83) than the MT recruits (1.09) on the DMI, but not significantly so ( $p > .05$ ). AC recruits and MT recruits performed very similarly on the first PI averaging .51 and .53 strikes respectively. MT recruits averaged slightly less strikes (1.18) than the AC recruits (1.36) on the SI, but not significantly so ( $p > .05$ ). AC recruits averaged slightly less strikes (.20) than the MT recruits (.24) on the second PI, but not significantly so ( $p > .05$ ). AC recruits averaged slightly less strikes (.14) than the MT recruits (.19) on the WTI, but not significantly so ( $p > .05$ ). For capstone event performance, the recruits in the MT conditions committed significantly fewer strikes (1.40) than ACs (2.07),  $X^2(8, N = 323) = 35.37$ ,  $p < .001$ . Firefighting reps and sets performance was significantly better for the MT recruits who averaged .61 strikes compared to the AC recruits who averaged .95 strikes ( $X^2(6, N = 323) = 17.09$ ,  $p = .008$ ).

**Graduation.** In Pilot Two, divisions with MT training averaged 65.5 OTGs, compared with 51.25 recruits from AC divisions, which was not statistically significant ( $t(6) = 2.03$ ,  $p = .09$ ).

**Surveying.** At baseline, both conditions rated their stress at relatively equivalent levels (AC  $M = 16.18$ , MT  $M = 16.19$ ), and were similar again before the capstone (AC  $M = 12.66$ , MT  $M = 13.15$ ). PSS scores before the capstone were significantly lower than at baseline for both groups ( $t(323) = 7.26$ ,  $p < .001$ ); however, this decrease in score did not interact with condition. Both conditions reported significantly more self-rated mental toughness on the MTQ48 before graduation (overall  $M = 179.50$ ) than at baseline (overall  $M = 165.68$ ), for recruits who filled out the MTQ48 both times ( $t(323) = 13.55$ ,  $p < .001$ ). The only between condition effect was detected on the Life Control subscale from the second administration of the MTQ48; AC recruits reported a small but significant advantage over MT recruits ( $M = 25.89$ ,  $SD = 3.40$  and  $M = 24.94$ ,

$SD = 3.75$ ) ( $F(1, 321) = 4.89, p = .028$ , partial  $\eta^2 = .015$ ). AC recruits also gave their RDCs higher ratings on every subscale including the overall DTLI ( $M = 103.95$ ) than MT recruits ( $M = 98.22$ ) ( $F(1, 321) = 10.81, p = .001$ , partial  $\eta^2 = .033$ ).

### Pilot Three

#### Participants

The total number of participants were 324 male Navy recruits, aged between 17 and 39, with a mean age of 19.5 ( $SD = 3.14$ ). For summary of Pilot Three significant effects, see Table 3.

#### Procedure, interventions, and measurements

The procedure was largely the same as Pilot Two with a few key differences. First, RTC leadership recommended recruits not be able to lead the exercises, even after a few days of RDCs doing so, due to a desire to increase participation of RDCs in MT training. Therefore, RDCs always led the exercises. Second, instead of always occurring during evening routine, on half of the days, the mindfulness exercises occurred at the end of a physical training (PT) session. This was a suggestion from the second pilot RDCs due to wanting to give the recruits the experience of dropping their heartrate and breathing rate from an elevated state. Third, all RDCs participating were required certification due to the variability in Pilot Two (possibly due to lack of standardization). For logistical reasons, RDCs audio recorded the first two times they introduced each exercise and were given feedback within one business day (as opposed to being observed in person). Lastly, on their printed daily schedule, there were written prompts to reinforce self-talk at the beginning of all PT sessions and a prompt to reinforce mental rehearsal whenever using hands-on trainers. All measurements were the same as Pilot Two.

### Results

**PFA.** Unlike with previous pilots, neither condition fared statistically better than their counterparts in any of the PFA measurements analyzed.

**Table 3.** Pilot Three significant effects summary.

	MT	AC
Firefighting	***	
MTQ48 Baseline Interpersonal Confidence Subscale	*	
MTQ48 Final Overall	**	
MTQ48 Final Commitment Subscale	*	
MTQ48 Final Emotional Control Subscale	*	
MTQ48 Final Interpersonal Confidence Subscale	*	
MTQ48 Final Emotional Control Subscale	**	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

**Swim qualification.** Passing rates for the swim qualification were also not significantly different.

**Capstone event performance and additional scored activities.** Recruits were compared on inspections, weapons turnover, capstone event performance, and fire-fighting reps and sets. AC recruits and MT recruits earned a similar number of strikes on average, .90 and .88 respectfully, on the DMI. No significant difference was found between AC recruits ( $M = .49$ ) and MT recruits ( $M = .63$ ) on the first PI. MT and AC recruits received the same average strikes (.81) on the SI. MT recruits averaged slightly less strikes (.26) than the AC recruits (.28) on the second PI, but not significantly so ( $p > .05$ ). No significant difference was found between AC recruits ( $M = .16$ ) and MT recruits ( $M = .17$ ) on the WTI. Capstone event performance between the two conditions was similar between AC strikes ( $M = 1.12$ ) and MT strikes ( $M = 1.26$ ). MT recruits did have significantly fewer strikes ( $M = .38$ ) on the firefighting reps and sets exercise than AC recruits ( $M = .68$ ) ( $X^2(4, N = 324) = 18.99, p < .001$ ).

**Graduation.** In Pilot Three, divisions with MT training averaged 64.75 OTGs, compared with 61.5 recruits from AC divisions, which was not statistically significant ( $t(6) = .76, p = .48$ ).

**Surveying.** At baseline, recruits were similar on PSS scores, 15.6 and 14.8, respectively, for MT and AC recruits. MT recruits averaged higher on the MTQ48 subscale of Interpersonal Confidence ( $t(322) = 1.98, p = .048$ ), although the MT intervention had not started at the time of these surveys. On the second administration of these surveys (i.e., before the capstone for PSS and after the capstone for MTQ48), MT recruits scored higher on each of the six MTQ48 subscales, and significantly so on three of six subscales (i.e., Commitment, Emotional Control, and Interpersonal Confidence) as well as the overall scale,  $t(322) = 3.00, p = .003$ . MT recruits also rated their RDCs higher ( $M = 106.29, SD = 14.31$ ) on the overall DTLI than their AC counterparts ( $M = 101.63, SD = 12.07$ ) ( $t(322) = 3.14, p = .002$ ). MT recruits rated their RDCs higher on all seven subscales of the DTLI, four (i.e., Inspirational Motivation, Appropriate Role Model, Foster Acceptance of Group, and Individual Consideration) significantly so ( $p < .05$ ).

#### On-time graduates

An on-time graduate (OTG) is a recruit that graduates from their original division on schedule without any setbacks during training. A general-linear model was conducted examining the number of OTGs between the AC



and MT condition across all three pilots. OTGs were the dependent variable, Condition (i.e., AC or MT) was a fixed factor, and Pilot (i.e., One, Two, or Three) was used as a covariate. The result revealed a significant main-effect for condition with MT divisions ( $M = 63.5$ ,  $SD = 9.41$ ) producing more OTGs compared to AC divisions ( $M = 55.75$ ,  $SD = 8.6$ ) ( $F(1, 21) = 4.57$ ,  $p = .045$ , partial  $\eta^2 = .179$ ). No significant difference was detected across Pilots ( $p = .21$ ).

## Discussion

The goal of the present studies was to evaluate the efficacy of a mental toughness training program for recruits, integrated into training and utilizing a train-the-trainer model, ensuring feasibility, acceptability, and sustainability. These studies offer insight into developing a program, which integrates mental toughness training into basic accessions military training, but need to be replicated to demonstrate effectiveness and consistency. A key feature of these studies is that they were conducted using a train-the-trainer model and in a more realistic and not sterilized research environment. This is a strength in terms of sustainability and feasibility, but a significant limitation in the quality of the data and conclusions drawn.

Of note is the consistent pattern of results pertaining to on-time graduates. In each of the three pilots, OTGs in the MT condition outnumbered the OTGs from AC divisions. When pooled and controlled for pilot, a strong main-effect for the condition emerged. The average difference in OTGs was 7.75 recruits per division. The minimum setback time for a recruit at RTC is seven days (some setback for longer periods). A recruit costs \$190 a day to train. That is \$1,330 per week per recruit. If 7.75 recruits per division are setback at least one week, that would cost \$10,307.50 per division. If RTC graduates, conservatively, 400 divisions per year (FY17-FY21 average divisions per year = 450), OTGs receiving MT have the potential to save \$4,000,000 a year on training time alone.

Results were not replicated across the three studies, which we largely attribute to the changing populations and methods from one pilot to another. In particular, since the RDCs and instructors could not be blinded, it is not known how much of the results are attributable to the instructional skill in the RDCs. It is also not known the impact of time of year (anecdotally there are seasonal differences between quality of recruits who begin training immediately after high-school graduation versus later in the calendar year). Since two were all-male and one was integrated, it is also not clear how gender differences may have played a role, which has been demonstrated in other related studies (Adler et al., 2015; Lin et al., 2017; Challburg & Brown, 2016).

Strengths of these studies include the focus on a non-elite military population. Very few studies on mental skills training use amateur populations, particularly basic accessions military populations. Another strength and area for future research is the potential for mindfulness as a performance enhancement tool. By far the biggest strength is the highly realistic nature of this study. Since mental toughness training was a preexisting process improvement effort, research was integrated into operations as opposed to operations being dictated by the research team. Ultimately, this has made the train-the-trainer mental toughness model acceptable, feasible, and sustainable for the Navy.

Limitations primarily stem from the lack of standardization between pilots and other ideal research methods. For example, the Battle Stations facilitators (who score strikes) were not evaluated on interrater reliability since the study relied upon existing staff and methods. Another limitation were the outcome measures used. MTQ48, for example, was developed using a different conceptualization of mental toughness, but is self-report and easy to administer. The level of buy-in among the RDCs was not measured and due to the exploratory nature of the program, they were taught the skills after already establishing their typical training methods. Future research should utilize RDCs who only are exposed to training recruits with mental toughness skills integrated. It should also assess training motivation of the RDCs, and results should look specifically at how training effects differ depending upon the motivation of the RDCs to deliver the training. Equally as important, will be measuring recruits motivation to learn the skills, and how it impacts the performance outcome. Recent studies (Niederhauser et al., 2022) have shown that the higher the participant's motivation for training, the higher the benefit they received from it. In fact, Niederhauser's (2022) study on training resilience showed that participants with little motivation to receive resilience training showed the same negative impact as participants in the control group.

Our study findings are consistent with previous research that has identified the impressive contribution of mindfulness training on human performance (Jha et al., 2010; Gardner & Moore, 2019; Jha et al., 2015). Our findings are also commensurate with studies that have demonstrated the benefit of mental skills training of observable, measurable performance (Adler et al., 2015; Bell et al., 2013; DeWiggins et al., 2010; Fitzwater et al., 2017; Gucciardi et al., 2009, 2015, 2021). Taken together, the results of the current study provide support for the utility of mindfulness and mental toughness training to benefit operational performance. These findings highlight the potential merit

of better understanding how both mindfulness and mental skills training can provide benefit to the Naval service beyond just boot camp.

Sustained intervention will be crucial for long term-success and continual improved performance under pressure. At the time of this publication, a follow-on training program has been developed and implemented for all instructors that fall under the Naval Education and Training Command. The aim of this training is to gain subject matter expert-led training on all of the mental toughness tools and skills that are taught at Recruit Training Command, and to develop reinforcement plans for their particular specialty school. This way, as recruits make the transition from recruit to sailor, the concepts are being reinforced in all follow-on training schools they may attend. Future areas of research include gathering objective data on the effectiveness of this dissemination and implementation strategy.

Other areas of future research include self-report from recruits about how often they use skills pre and post training. Results could be impacted by the recruits' motivation to use what they are taught, not just how they were instructed. Anecdotally, many RDCs have told us that learning these skills (in order to teach them) has forced them to internalize the skills for themselves. It would be interesting to note if RDCs were significantly impacted by the training. To improve practice effects, future training should provide more opportunities to practice performance psychology techniques (self-talk, mental rehearsal, and arousal control) as these were only introduced once in 8 weeks in the present study. Lastly, we are under no delusions that skills taught for 8 weeks and never reinforced will have longitudinal impact. However, once these perishable skills are integrated into follow-on training and during the first year of service, it would be important to know what long-term impact this type of training could have in the realm of performance enhancement. Given how few studies of mental skills training in a basic accessions military setting exist, the potential for growth and exploration in this area is vast and exciting.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

## Data availability statement

The data that support the findings of this study are available from the corresponding author, DH, upon reasonable request.

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