



## What do you Bring to the Table? Exploring Psychological Attributes that Predict Successful Military Training

Beattie, Stuart; Du Preez, Tommie; Hardy, Lewis; Arthur, Calum

### Military Psychology

DOI:

<https://doi.org/10.1080/08995605.2023.2285693>

E-pub ahead of print: 28/11/2023

Publisher's PDF, also known as Version of record

[Cyswllt i'r cyhoeddiad / Link to publication](#)

*Dyfyniad o'r fersiwn a gyhoeddwyd / Citation for published version (APA):*

Beattie, S., Du Preez, T., Hardy, L., & Arthur, C. (2023). What do you Bring to the Table? Exploring Psychological Attributes that Predict Successful Military Training. *Military Psychology*. Advance online publication. <https://doi.org/10.1080/08995605.2023.2285693>

#### Hawliau Cyffredinol / General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

#### Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## What do you bring to the table? Exploring psychological attributes that predict successful military training

Stuart Beattie, Thomas Du Preez, Lew Hardy & Calum Arthur

**To cite this article:** Stuart Beattie, Thomas Du Preez, Lew Hardy & Calum Arthur (28 Nov 2023): What do you bring to the table? Exploring psychological attributes that predict successful military training, *Military Psychology*, DOI: [10.1080/08995605.2023.2285693](https://doi.org/10.1080/08995605.2023.2285693)

**To link to this article:** <https://doi.org/10.1080/08995605.2023.2285693>



© 2023 The Author(s). Published with license by Taylor & Francis Group, LLC.



Published online: 28 Nov 2023.



Submit your article to this journal [↗](#)



Article views: 136



View related articles [↗](#)



View Crossmark data [↗](#)

# What do you bring to the table? Exploring psychological attributes that predict successful military training

Stuart Beattie<sup>a</sup>, Thomas Du Preez<sup>a</sup>, Lew Hardy<sup>a</sup>, and Calum Arthur<sup>a,b</sup>

<sup>a</sup>Institute for Psychology of Elite Performance, School Health and Behavioural Sciences, Bangor University, Gwynedd, UK; <sup>b</sup>NHS

## ABSTRACT

The psychological characteristics that new recruits bring when starting military basic training (MBT) may help or hinder successful completion rates. The first part of this study explores how psychological characteristics assessed at the start of MBT influence retention and performance outcomes upon completion. At the start and upon completing MBT, a sample of 204 UK male Infantry recruits undergoing a 26-week Combat Infantryman's Course were assessed on personality traits (psychoticism, neuroticism, and extroversion); a set of relevant cognitions (i.e. effortful control); motivation (i.e. internalization of military core values); and an assessment of mentally tough behavior. Recruits who successfully completed MBT were significantly higher in age, psychoticism, and mentally tough behavior. The second part of the study explored how MBT influenced these variables across time. A subsample of 132 male Infantry recruits that passed basic military training first time were analyzed. Across the 26-week course, there was a significant increase in extraversion, and a significant decrease in neuroticism, and external regulation. Results differed slightly when we removed the lowest passing group from the analysis and whether MANOVA or Logistic Regression analysis was used. Results indicate that what you bring to the table will influence pass and retention rates.

## ARTICLE HISTORY

Received 21 April 2023  
Accepted 13 November 2023

## KEYWORDS

Personality; mentally tough behavior; effortful control; military core values

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



Controlling the controllables is an essential part of any military organization. But what the military has less control over is the preexisting psychological make-up of new recruits. In this study, recruits who were older, had higher levels of psychoticism, and demonstrated higher levels of mentally tough behavior under pressure at the start of training were more likely to pass training first time around. Training (26-weeks) also influenced the psychological make-up of new recruits who significantly increased in extraversion but decreased in neuroticism and external regulation.

The overarching objective of military organizations is to attain maximum defense effectiveness. This would only be achievable if the right person is allocated to a position that is fitting to his or her skills and character (Steege & Fritscher, 1991). Therefore, military basic training (MBT) plays an important role for the formation, preparation, and integration of new recruits into their new roles within military organizations. Attrition during training can prove to be a cumbersome problem for the military, as training establishments not only have to invest more time and

resources to recruit a replacement but lose any potential return in terms of personnel, cost, time, and operational aims (White et al., 2014). Understanding what characteristics relate to successful performance may allow the military to intervene at an early opportunity to increase retention and pass rates. The first aim of the present study was to explore which psychological attributes and behaviors British main-line infantry recruits bring to the start of MBT that influence retention and performance.

## Personality

Across a range of military settings, personality traits have been linked to performance outcomes during training (e.g., Chappelle et al., 2011). For example, research has shown that emotional stability and extraversion positively correlate with successful military pilot training (Bartram & Dale, 1982). McDonald et al. (1990) illustrated that successful candidates of U.S. Naval Special Forces were more emotionally stable and agreeable than unsuccessful candidates. Picano et al. (2002) found that straightforwardness (e.g., agreeableness) and activity (e.g., extraversion) significantly discriminated between successful and unsuccessful

**CONTACT** Thomas Du Preez  [pes624@bangor.ac.uk](mailto:pes624@bangor.ac.uk)  Institute for Psychology of Elite Performance, School Health and Behavioural Sciences, Bangor University, Normal Site, George Building, Holyhead Rd, Bangor LL57 2PZ, UK.

© 2023 The Author(s). Published with license by Taylor & Francis Group, LLC.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

candidates for selection on non-routine missions under demanding conditions. Dean et al. (2006) found that openness to experience, conscientiousness, and extraversion predicted U.S. Marine recruits' performance on simulation-based training. Further, Glicksohn and Bozna (2000) found bomb-disposal and anti-terror operatives reported low levels of neuroticism (more emotionally stable) and psychoticism (low levels of impulsivity). However, to date, research on personality profiles of main-line British infantry recruits is very limited. One reason may be that military organization focuses more on structure and functioning, as opposed to individual differences.

### **Effortful control**

Effortful control may also play an important role in the successful performance of recruits during training. Developing in childhood, effortful control refers to a self-regulatory skill relating to the control of emotional and behavioral responses to unfavorable situations (Rothbart & Bates, 2006; Rothbart et al., 1994, 2011). Evans and Rothbart (2007) divided effortful control into three facets that can be used to manage emotions and behavior termed attentional control (i.e., ability to shift attention when required to do so), inhibitory control (i.e., ability to inhibit inappropriate behavior), and activation control (i.e., ability to execute an action when there is a propensity to avoid it).

During MBT, recruits may find the ability to maintain attentional, behavioral, and activation control more difficult when under physical stress (e.g., physical fatigue or sleep deprivation) or when emotions are running high (e.g., heightened fear, anxiety, or anger). To this extent, maintaining effortful control can be key to successful performance under stress (Gaillard, 2008). Further, when entering a new environment such as MBT, recruits may require higher levels of effortful control to adapt and successfully perform in novel situations and environments. Recruits with high inhibition control will have a larger capacity to detect errors, engage in planning, and as a result, inhibit a dominant response to perform a subdominant response. Recruits with high levels of activation control may have the capacity to activate behaviors that otherwise would not have been performed (e.g., performing a task when under enemy fire). To the best of the authors' knowledge, this self-regulation component of effortful control has not been examined within military recruits.

### **Core values**

According to Pathak et al. (2016), soldiers have two sets of values which are essentially not very different from

each other (i.e., personal core values and military core values). Military values can be described as a set of essential and guiding principles of an organization that hold intrinsic value and importance to those inside the organization (Collins & Porras, 1996). However, differences between personal and military values can result in job dissatisfaction, resulting in a loss of motivation.

Motivation to internalize core values will largely depend on the extent to which recruits feel supported in relatedness, autonomy, and competence (Deci & Ryan, 1985).

Intrinsic motivation will be enhanced if these three psychological needs are met (Ryan & Deci, 2007). Self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000) classifies motivation as amotivation, extrinsic motivation, and intrinsic motivation. Amotivation refers to the lack of motivation to participate in the activity. Extrinsic motivation refers to behavior motivated by expected outcomes and contingencies not inherent to the activity. Intrinsic motivation refers to behavior motivated to actively engage in new activities with the absence of external rewards (Ryan & Deci, 2007), which can result in long-term commitment (Markland & Ingledew, 2007). According to Collins and Porras (1996), organizations with clear and affirmed core values will attract and retain individuals with compatible personal values, whereas those with incompatible personal values will be repelled.

### **Mental toughness**

The stresses of MBT on recruit performance and adaptation can be significant. One important psychological characteristic that has been shown to allow individuals to maintain performance under pressure is mental toughness (Arthur et al., 2015; Bell et al., 2013; Godlewski & Kline, 2012; Gucciardi et al., 2014, 2021). Mental toughness (MT) is a term that is commonly used to describe an individual who has demonstrated some form of mentally tough behavior (MTb) under difficult circumstances (Beattie et al., 2020; Hardy et al., 2014). However, it is important to distinguish the difference between MT and MTb. MT is assessed via self-report questionnaires (e.g., the Mental Toughness Index; Gucciardi et al., 2014), and MTb is assessed via a reliable informant assessment (i.e., through observational behaviors; Arthur et al., 2015; Beattie et al., 2019; Hardy et al., 2014).

MT and MTb have both been shown to be important factors in relation to military training environments. For example, due to growing concerns about attrition rates of military recruits undergoing MBT in the Canadian Forces, Godlewski and Kline (2012) found that self-report levels of

MT were an important factor for successful adjustment. Gucciardi et al. (2014) found self-report MT predicted completion rates of a 6-week selection test for entry into the Australian Special Forces. Findings not only revealed that MT was significantly associated with successful completion of the selection test but that MT was important for sustaining prolonged performance across time. Further, across two studies examining MBT and selection to the Parachute Regiment (P-Company), MTb predicted performance over and above that of self-report levels of MT and fitness levels (Arthur et al., 2015).

### **Purpose of the present study**

The present study sets out to examine what psychological variables new recruits brought to the table and how those variables differentiated successful from nonsuccessful recruits. According to the research reviewed, we hypothesized that recruits who successfully complete MBT first time around will be significantly higher at the start of training in the personality traits of psychoticism, extraversion, and emotional stability, but lower in the personality trait of neuroticism. Recruits will score significantly higher on effortful control (i.e., attentional, inhibitory, and activation control), acceptance of core values (integrated regulation), and display significantly higher levels of MTb. We also examined the possibility that age may differentiate between the groups.

## **Study 1**

### **Method**

#### **Participants**

A total of 271 male infantry recruits ( $M_{age} = 20.72$  years,  $SD = 3.05$ ) that started the Combat Infantryman's Course (CIC) took part in the study. From this sample, 29 recruits failed to complete the CIC due to medical reasons and as a result, were omitted from further analyses. Data from a further 38 recruits were omitted because of deviant responding or having submitted incomplete data sets. The final sample size used for statistical analyses was 204 male Infantry recruits ( $M_{age} = 20.69$  years,  $SD = 3.12$ ).

#### **Training**

CIC lasts 26 weeks and enables recruits to make the initial transition from being a civilian to becoming a soldier. CIC consists of arduous training with the purpose to equip recruits with the necessary knowledge and skills that will be required of them to achieve high levels of performance in military tasks and combat operations within a variety of environments. Of the

total sample, 153 recruits ( $M_{age} = 21.01$ ;  $SD = 3.17$ ) successfully passed CIC training first time, whereas 51 recruits ( $M_{age} = 19.76$  years;  $SD = 2.78$ ) were unsuccessful in completing the CIC training first time.

### **Measures**

#### **Personality**

The Eysenck Personality Questionnaire – Revised Short version (EPQR-S; Eysenck et al., 1985) is a 36-item self-report questionnaire that provides scores on extraversion (12 items), neuroticism (12 items), and psychoticism (12 items). The EPQR-S scales have demonstrated good internal reliability (Cronbach's  $\alpha = 0.77$ – $0.88$ ). The psychoticism (P) scale draws on facets such as lack of empathy, hostility, and cruelty (e.g., "Would you like other people to be afraid of you?"). The extraversion (E) scale draws on facets such as sociability and dominance (e.g., "Do you enjoy meeting new people?"). The neuroticism (N) scale draws on facets such as depression, anxiousness, and moodiness (e.g., "Would you call yourself a nervous person?"). Each item is answered on a "yes" or "no" basis with each scale ranging from zero to a possible maximum score of 12.

#### **Effortful control**

Effortful control was measured using the effortful control factor scale from the Adult Temperament Questionnaire – Short Form (ATQ-S; Evans & Rothbart, 2007). This questionnaire contains three sub-scales called attentional control (seven items), inhibition control (five items), and activation control (seven items). The attentional control scale measures the ability to focus or shift attention when necessary (e.g., "It's often hard for me to alternate between two different tasks"). The inhibitory control scale measures the ability to inhibit inappropriate behavior (e.g., "it is easy for me to inhibit fun behaviour that would be inappropriate"). The activation control scale measures the ability to act when there is a strong tendency to avoid the action (e.g., "I can keep performing a task even when I would rather not do it"). Each item is scored on a 7-point Likert scale anchored by 1 (extremely untrue of you) to 7 (extremely true of you). Cronbach's  $\alpha$  reliability coefficients reported for the 19-item Effortful Control factor is .78, where Cronbach's  $\alpha$  reliability for each sub-scale ranges from .60 to .73 (Evans & Rothbart, 2007).

#### **Internalisation of core values**

The level of internalization of recruits' value system was assessed by administering the General Core Value (GCV; Hardy & Arthur, 2010). The GCV contains 15 items that measures the degree to which recruits have internalized the core values of the British Army. The GCV measures three levels of internalization termed external regulation (five

items), introjected regulation (five items), and integrated regulation (five items). External regulation assesses the motivation to internalize core values based on external rewards and punishments (e.g., “*I have to show the core values because if I don’t people will think I’m not a good soldier*”). Introjected regulation assesses the motivation to internalize contingencies of reward and punishment (e.g., “*I should try to show the core values because I would feel dishonourable if I didn’t*”). Integrated regulation assesses motivation and behaviors imbedded within the person (e.g., “*The core values are an essential part of being a good soldier*”). Each item was scored on a 7-point Likert scale anchored by 1 (not at all true) to 7 (very true). Hardy and Arthur (2010) reported good internal Cronbach’s  $\alpha$  for the three scales of external regulation (.79), introjected regulation (0.87), and integrated regulation (0.84).

### **Mentally tough behaviour**

MTb was measured by means of the informant-rated 8-item Military Training Mental Toughness Inventory (MTMTI) which is an extension of the 6-item MTMTI (Arthur et al., 2015) with two additional items. The 8-item MTMTI contains items which focus on military personnel’s performance under pressure situations. Section commanders were asked to evaluate how well each recruit under his command was able to maintain a high level of performance when faced with demanding situations during training (e.g., “*When he is suffering from fatigue*”). The responses were scored on a 7-point Likert scale, anchored by 1 (never) to 7 (always). For the section commanders to evaluate each recruit’s MTb accurately at the start of training, the recruit had to spend a minimum of 4 weeks under the section commander’s command. In the present study, Cronbach’s  $\alpha$  for the 8-item MTMTI was .92.

### **Performance outcome**

Performance data for recruits was obtained at the end of the CIC training at week 26. Every successful recruit received a performance grade on completion of CIC training, which indicated how well the recruit performed during training. Performance grades for the recruits in the present study ranged from an “A” pass indicating the highest performance grade to an “E” pass being recorded as a failure. To quantitatively interpret pass grades, we assigned a number to the grade from the highest to the lowest. That is a pass grade of A = 10 points, A- = 9 points, B+ = 8 points down to D = 2 points, and E = 1 point (fail).

### **Procedure**

After obtaining University ethical approval (S/PhD06–13/14), British Infantry instructors and recruits who started at

week 1 of the CIC were approached to participate in the study. Both recruits and instructors were briefed on the purpose of the study as well as on the measures that would be used throughout the research. Instructors and recruits were assured about the confidentiality of data and that their responses would be used only for research purposes. It was also emphasized to the recruits that they would not be identifiable in the final report and that their individual responses would not be discussed with any of the training staff or other military personnel. Recruits and instructors were informed that participation is voluntary, and they could withdraw at any time. Informed consent was obtained from recruits and instructors before the start of the study.

Self-report questionnaires from recruits as well as informant rated MTb data from training instructors were collected at three separate time points during CIC training. First, all self-report questionnaires were administered to recruits on the Thursday in Week 1 of MBT. Second, informant rated MTb data was collected from the training instructors at week 4 of training. Finally, all data (self and informant report questionnaires) and performance data for each recruit were obtained at the end of MBT (week 26).

### **Data analysis**

Multivariate analysis of variance (MANOVA) using SPSS software (Version 27) was used to test the hypothesized differences between recruits who passed MBT successfully first time and those recruits who failed. One limitation of the use of MANOVA is that it assesses the individual contribution of the variables analyzed, whereas binary logistic regression analysis examines the individual contribution while controlling for the other variables. Therefore, we also explored individual relationships while controlling for the other variables in the model.

## **Results**

### **Performance outcome**

Recruits who successfully completed MBT first time ( $n = 153$ ) contained 29 participants who passed with a performance grade ranging from A to B-. There were 56 participants who passed with a performance grade of C+, and 68 participants passed with a performance grade ranging C to D. Average pass rate equated to a C. Those recruits who failed to pass MBT first time ( $n = 51$ ) contained recruits who were discharged ( $n = 18$ ), back-squadded ( $n = 14$ ), or were discharged from the military of their own will ( $n = 19$ ).

### Results for pass group ( $n = 153$ ) vs. fails ( $n = 51$ )

Means, standard deviations, and Pearson's correlations for all variables across all 204 recruits are presented in Table 1 and Table 2. Variables that had significant and positive correlations with pass rates were MTb, psychoticism, activation, and attentional control. The only variable negatively correlated to pass rates was neuroticism. The MANOVA result was statistically significant with Pillai's trace ( $V = 0.13$ ,  $F(11,191) = 2.69$ ,  $p < .01$ ) indicating that a combination of predictor variables affected whether the recruit successfully passed or failed to complete MBT training. A post-hoc power analysis was conducted using G\*Power version 3.1.9.4. With Pillai's  $V = 0.13$ , two independent groups with 11 outcome variables revealed a power level of 97% for detecting a medium effect at a significance criterion of  $\alpha = .05$ . The MANOVA effect size was estimated at .134, indicating that the multivariate combination of variables

predicted 13.4% of the variance in pass/fail rates. The MANOVA was followed up with a series of independent t-tests on each of the predictor variables (see Table 2 for means and standard deviations).

### Age

Independent t-tests results indicated a statistically significant difference between the groups on age  $t(96.8) = 2.66$ ,  $p < .01$ . The effect size, as measured by Cohen's  $d$  (e.g., small = 0.2, medium = 0.5, large = 0.8) was  $d = 0.40$ , indicating a medium effect. The pass group was significantly older at the start of MBT than the failure group.

### Personality

Independent t-tests results indicated a statistically significant difference between the groups on psychoticism  $t(114.8) = 2.76$ ,  $p < .01$ ,  $d = 0.38$  and neuroticism  $t(79.6)$

**Table 1.** Means, standard deviations, and intercorrelations among variables for all recruits starting MBT ( $N = 204$ ).

	1	2	3	4	5	6	7	8	9	10	11	12
1 MTb	–											
2 Psychoticism	.03	–										
3 Extraversion	–.08	–.13	–									
4 Neuroticism	–.03	.10	–.39**	–								
5 Externalisation	–.01	–.04	.12	–.01	–							
6 Introjection	.07	–.22**	.08	.08	.63**	–						
7 Integrated	.02	–.23**	.22**	.01	.49**	.63**	–					
8 EC Activation	.03	–.23*	.29**	–.44**	.11	.17*	.19	–				
9 EC Attention	–.04	–.07	.15*	–.51**	–.02	–.07	.05	.48**	–			
10 EC Inhibition	–.07	–.11	–.14*	–.21**	–.09	.03	.00	.30**	.35**	–		
11 Pass Score	.21**	.17*	.03	–.19*	.04	–.03	.06	.14*	.17*	.04	–	
12 Age	–.02	.09	.03	–.14*	–.12	.00	.03	–.03	.15*	.00	.13	–

MTb = Mentally Tough behavior; EC = Effortful Control.

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

**Table 2.** Means and standard deviations for pass and failure groups on study variables at the start of military basic training.

Dependant Variable	Sample 1 (204 Recruits) (153 pass; 51 fail)			Sample 2 (136 Recruits) (85 pass; 51 fail)		
	Pass	Fail	Cohen's $d$	Pass	Fail	Cohen's $d$
Age	21.01* (3.17)	19.76* (2.78)	0.40	21.04** (2.95)	19.76** (2.78)	0.45
MTb	4.18* (1.05)	3.78* (1.38)	0.35	4.27* (1.07)	3.78* (1.38)	0.43
Psychoticism	2.69* (1.90)	2.00* (1.41)	0.39	2.51* (1.82)	2.82* (1.97)	0.46
Extraversion	9.84 (2.74)	9.56 (3.31)	0.10	9.80 (2.82)	9.56 (3.31)	0.07
Neuroticism	4.44* (2.89)	5.47* (3.17)	–.035	4.22* (2.64)	5.47* (3.17)	–0.44
CV Externalisation	5.40 (1.12)	5.36 (1.18)	0.10	5.42 (1.01)	5.36 (1.18)	0.45
CV Introjection	4.79 (1.46)	4.78 (1.48)	0.00	4.74 (1.49)	4.78 (1.48)	–0.03
CV Integrated	6.21 (0.80)	6.00 (1.04)	0.25	6.15 (0.81)	6.00 (1.04)	0.17
EC Activation	5.06 (0.85)	4.80 (0.94)	0.30	5.13** (0.84)	4.80** (0.94)	0.38
EC Attention	4.51 (1.05)	4.17 (1.13)	0.31	4.62** (1.03)	4.17** (1.13)	0.41
EC Inhibition	4.16 (0.81)	4.21 (0.68)	–0.06	4.23 (0.88)	4.21 (0.69)	0.02

MTb = Mentally Tough behavior; CV = General Core Value; EC = Effortful Control.

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

= -2.04,  $p < .05$ ,  $d = -0.34$ . The effect sizes indicated a small-to-medium effect. The pass group started MBT scoring significantly higher on the personality dimension of psychoticism but significantly lower in neuroticism.

### MTb

Independent t-tests result indicated that there was a significant difference in MTb between the pass and failure group at week 4 of training,  $t(70.57) = 1.88$ ,  $p = .06$ . The effect size was  $d = 0.34$ , indicating a small-to-medium effect.

### Results for pass group ( $n = 85$ ) vs. fails ( $n = 51$ )

To be able to accurately identify the psychological variables that differentiate between recruits who were successful in passing MBT first time and those who were unsuccessful in completing the MBT first time, we reexamined the data by omitting recruits from the successful group, with the lowest performance grades ranging from C to D ( $n = 68$ ) from further analysis. This decision was based on the premise that recruits with low-performance grades and recruits from the unsuccessful group may have overlapping psychological characteristics, which may affect the accuracy of the interpretation of the results. The mean age of the pass and fail group were ( $M_{age} = 21.04$  years,  $SD = 2.78$ ) and ( $M_{age} = 19.76$  years,  $SD = 2.78$ ), respectively.

The MANOVA result was significant with Pillai's trace ( $V = 0.20$ ,  $F(11,124) = 2.77$ ,  $p < .01$ ) indicating that a combination of predictor variables influenced whether the recruit successfully passed or failed to complete MBT training. A post-hoc power analysis was conducted using G\*Power version 3.1.9.4 (Faul et al., 2007). With Pillai's  $V = 0.20$ , two independent groups with 11 outcome variables revealed a power level of 98% for detecting a medium effect at a significance criterion of  $\alpha = .05$ . The MANOVA effect size was estimated at .197, indicating that the multivariate combination of variables predicted 19.7% of the variance. The MANOVA was followed up with a series of independent t-tests on each of the predictor variables (see Table 2 for mean and standard deviations).

### Age

An independent t-test indicated a significant difference between the groups on age  $t(134) = 2.57$ ,  $p < .01$ ,  $d = 0.45$ . The effect sizes indicated a medium effect. The pass group was significantly older than the failure group at the start of MBT.

### Personality

Independent t-tests indicated a significant difference between the groups on psychoticism  $t(135) = 2.59$ ,  $p$

< .05,  $d = .045$  and neuroticism  $t(135) = -2.51$ ,  $p < .05$ ,  $d = -.44$ . The effect sizes indicated a medium effect. The pass group scored significantly higher on the personality dimension of psychoticism and significantly lower neuroticism than the failure group (see Table 2 for means and standard deviations).

### Effortful control

Independent t-tests revealed significant differences between the two groups on attentional  $t(135) = 2.34$ ,  $p < .05$ ,  $d = .41$  and activation control  $t(135) = 2.16$ ,  $p < .05$ ,  $d = .38$ . The effect sizes indicated small-to-medium effects. Inspection of the data showed that the pass group scored significantly higher on attentional control and activation control than the group who failed.

### Core values

Results from the t-tests showed no statistical differences between the two groups.

### MTb

An independent t-test indicated that there was a significant difference in MTb between the pass and failure group at week 4 of training,  $t(135) = 2.41$ ,  $p < .05$ ,  $d = .42$ . The effect size indicated a medium effect. Recruits in the pass group were perceived to be significantly higher on MTb as rated by the section commanders than those in the failure group (see Table 2 for means and standard deviations).

### Logistic regression analysis

We ran two models to explore how each variable contributed to the model while controlling for the others. The first model was based on our data of 204 recruits (i.e., group 1 = 153 passes vs. group 2 = 51 fails) and the second was based on our data of 136 recruits (i.e., group 1 = 85 passes vs. group 2 = 51 fails). In terms of power analysis, Peduzzi et al. (1996) suggests that there should be at least 10 cases for every predictor variable used in the analysis. As we have 11 predictor variables, we require a sample size of at least 110 recruits.

In terms of the first model, controlling for other variables, age ( $b = -.125$ , Wald = 3.64, OR = .883,  $p = .056$ ) and MTb ( $b = -.289$ , Wald = 3.52, OR = .749,  $p = .06$ ) were marginally significant. Psychoticism ( $b = -.316$ , Wald = 7.18, OR = .729,  $p < .01$ ) and integrated regulation ( $b = -.551$ , Wald = 4.02, OR = .576,  $p < .05$ ) were significant predictors (see Table 3). As the Odds Ratio (OR) values were smaller than 1.0, increasing values of age, MTb, psychoticism, and integrated regulation were associated with a lower probability of failing training.



**Table 3.** Results for logistical regression analysis with variables recorded at the start of MBT for pass ( $n = 153$ ) and failure ( $n = 51$ ) groups.

	B	S.E.	Wald	df	Sig.	OR	95% C.I. for OR	
							Lower	Upper
Age	-.125	.065	3.644	1	.056	.883	.776	1.003
MTb	-.289	.154	3.527	1	.060	.749	.554	1.013
Psychoticism	-.316	.118	7.188	1	.007	.729	.579	.919
Extraversion	.045	.073	.375	1	.540	1.046	.906	1.206
Neuroticism	.081	.077	1.090	1	.296	1.084	.932	1.262
GCV Externalisation	.080	.215	.140	1	.709	1.084	.711	1.650
GCV Introjected	.111	.191	.341	1	.559	1.118	.769	1.624
GCV Integrated	-.551	.275	4.025	1	.045	.576	.336	.987
EC Activation	-.408	.269	2.308	1	.129	.665	.393	1.126
EC Attention	-.089	.216	.171	1	.679	.915	.599	1.396
EC Inhibition	.230	.263	.770	1	.380	1.259	.753	2.107

In terms of the second model, controlling for other variables, age exhibited a negative relationship with passing ( $b = -.135$ , Wald = 3.30, OR = .874,  $p = .069$ ). Psychoticism ( $b = -.344$ , Wald = 4.87, OR = .682,  $p < .05$ ) and MTb ( $b = -.383$ , Wald = 6.79, OR = .682,  $p < .01$ ) were significant predictors (see Table 4). No other variables were significant. As the Odds Ratio values were smaller than 1.0, increasing values of age, MTb, and psychoticism were associated with a lower probability of failing training.

## Discussion

The purpose of the present study was to identify whether certain psychological attributes and behaviors could differentiate between soldiers who passed or failed a 26-week MBT program. The present study delivered mixed support for our hypotheses. When independent predictor variables were examined, recruits who successfully completed MBT first time were significantly older at the start of MBT, significantly higher on the personality trait of psychoticism and significantly lower on neuroticism. Recruits also demonstrated significantly higher levels of MTb ( $p = .06$ ). When we controlled for all variables in the model, logistic regression analysis revealed that age ( $p = .056$ ), MTb ( $p = .06$ ), psychoticism, and integrated regulation were important characteristics in passing MBT first time around.

When further examining the data by removing 68 of the lowest passing recruits, the above significant differences hold for the MANOVA results. However, recruits passing MBT first time around were also significantly high on attentional and activation control (although these results were borderline significant). Variance accounted for increased from 13.4% to 19.4% across models. When we controlled for all variables in the model, a logistic regression analysis revealed that age ( $p = .07$ ), psychoticism, and MTb were important characteristics in passing MBT first time around.

## Study 2

The second part of the study sets out to explore how psychological attributes and behaviors change over time during MBT. Ekman et al. (1962) found that an eight-week MBT program had a positive influence on recruits' personality traits of hypochondriasis, psychopathic deviate, and hypomania, suggesting recruits became more manipulative, aggressive, and impulsive during training. Across a seven-week MBT programme, Vickers et al. (1996) found that recruits became significantly more conscientious and less neurotic, leading to lower substance abuse and absenteeism.

More recently, Jackson et al. (2012) conducted a longitudinal study to explore whether military training

**Table 4.** Results for logistical regression analysis with variables recorded at the start of MBT for pass ( $n = 85$ ) and failure ( $n = 51$ ) groups.

	B	S.E.	Wald	df	Sig.	OR	95% C.I. for OR	
							Lower	Upper
Age	-.135	.074	3.302	1	.069	.874	.755	1.011
MTb	-.383	.174	4.873	1	.027	.682	.485	.958
Psychoticism	-.344	.132	6.769	1	.009	.709	.547	.919
Extraversion	.019	.081	.056	1	.813	1.019	.869	1.196
Neuroticism	.059	.088	.452	1	.501	1.061	.893	1.260
GCV Externalisation	.016	.231	.005	1	.945	1.016	.646	1.599
GCV Introjected	.090	.203	.197	1	.657	1.094	.735	1.629
GCV Integrated	-.416	.303	1.889	1	.169	.659	.364	1.194
EC Activation	-.469	.305	2.370	1	.124	.625	.344	1.137
EC Attention	-.168	.244	.477	1	.490	.845	.524	1.363
EC Inhibition	.083	.289	.083	1	.773	1.087	.617	1.915

influenced the Big-5 personality traits (NEO-FFI; Costa & McCrae, 1992) within a German military conscription sample. The first personality assessment occurred in the participants' final year of high school prior to conscription. Participants were then reassessed a further 3 times (on average every 2 years). Jackson et al. also compared the military training group with participants who chose to perform civilian community service. Findings indicated that individuals who enlisted into the military tested lower on agreeableness after training than those individuals who performed civilian community service. Research outside of the military has also found that challenging life events may influence personality traits (e.g., Bleidorn et al., 2018; Specht et al., 2011).

The purpose of the present analysis was to extend current research by examining how MBT influences other personality traits and the psychological variables we report in study 1. However, due to the lack of research in this area, our hypotheses are rather speculative. Also, for brevity, we refrain from fully articulating our theoretical justification for the following hypotheses as the research in which we base them on is reported in the introduction. We hypothesized that MBT would increase the traits of psychoticism and extraversion, and temper neuroticism. We also hypothesized that MBT would have a significant positive impact on the psychological variables of effortful control (attentional, inhibition, and activation control). Recruits would significantly increase in the core values of introjected and integrated regulation but decrease in external regulation. We also expected to see a significant increase in MTb.

## Method

### Participants

This part of the study contained all 153 recruits ( $M_{age} = 21.01$ ;  $SD = 3.17$ ) that made it to the end of MBT.

### Measures and procedure

The same measures and procedure were used to that reported above.

### Data analysis

The effect of MBT on the psychological parameters tested within the present study was explored by conducting repeated-measures multivariate analysis of variance (MANOVA) test using SPSS software (Version 27).

### Results

Means and standard deviations for all psychological variables at baseline (week 1; week 4 MTb) and at the end of training (week 26) are displayed in Table 5. Results from the repeated measures MANOVA test indicated that there was a significant change over time in MBT on the psychological attributes tested, Pillai's trace  $V = .255$ ,  $F(10, 122) = 4.17$ ,  $p < .01$ ,  $\eta^2 = .25$ . In terms of personality traits, extraversion significantly increased across training,  $F(1, 131) = 13.27$ ,  $p < .01$ ,  $\eta^2 = .09$ , whereas neuroticism significantly decreased across training  $F(1, 131) = 14.32$ ,  $p < .01$ ,  $\eta^2 = .09$ . In relation to other psychological variables, only external regulation levels significantly decreased across time  $F(1, 131) = 4.96$ ,  $p < .05$ ,  $\eta^2 = .02$ . There were marginal effects in activation control ( $p = .064$ ) increasing across time, and integrated regulation decreasing across time ( $p = .057$ ).

### Discussion

The second purpose of this study was to examine the effects that MBT has on personality and psychological attributes of British Infantry recruits who completed

**Table 5.** Means and standard deviations at the start (week 1; week 4 MTb) and end (week 26) of training of all 153 recruits who pass MBT first time.

Dependent Variable	Time 1		Time 2	
	M	SD	M	SD
MTb	4.18	1.05	4.31	1.34
Psychoticism	2.69	1.90	2.86	1.84
Extraversion	9.84**	2.74	10.54**	2.27
Neuroticism	4.44**	2.89	3.56**	2.74
GCV Externalisation	5.40*	1.12	5.19*	1.18
GCV Introjected	4.79	1.46	4.90	1.44
GCV Integrated	6.21	.80	6.08	.95
EC Activation	5.06	.85	5.21	.81
EC Attention	4.51	1.05	4.65	1.04
EC Inhibition	4.16	.81	4.18	.85

MTb = Mentally Tough behavior; GCV = General Core Value; EC = Effortful Control.

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

a 26-week MBT course. Extraversion levels significantly increased during MBT, whereas neuroticism significantly decreased supporting previous findings (e.g., Vickers et al., 1996). Findings also indicated that external regulation significantly decreased during MBT. Perhaps, the most unexpected finding was the non-significant increase in MTb levels during MBT.

## General discussion

In terms of results, across both analyses (MANOVA and Logistic Regression), Study 1 found that recruits who passed training first time were significantly higher on the personality trait of psychoticism, MTb, and age. The MANOVA further revealed lower levels of neuroticism and the regression model revealed higher levels of integrated regulation were important factors in passing MBT. The results remained consistent when we removed the lowest passing group from the analyses. The MANOVA additionally revealed that higher levels of attentional activation were an important contributor to passing first time, whereas integrated regulation was no longer significant in the regression analysis (but age, psychoticism, and MTb remained significant). Study 2 found that across 26 weeks of MBT, recruits significantly increased in the trait of extraversion, decreased in the trait of neuroticism, and the recruits became less externally regulated.

Higher levels of psychoticism were consistently associated with passing MBT first time. This is perhaps not surprising with psychoticism being associated with tough mindedness which would aid recruits passing MBT (Eysenck & Eysenck, 1976). Psychoticism was positively correlated with pass scores but not with MTb, which might at first appear counterintuitive. One alternative explanation for this finding may be that recruits with high psychoticism scores may be sensation seekers (Zuckerman, 1971). The military is a high-risk vocation and provides an environment for sensation seekers to flourish (e.g., Hobfoll et al., 1989). Neria et al. (2000) found that high sensation seeking is a trait that can act as a marker of resilience to stress. Sensation seekers are therefore more likely to choose and stay within a profession that offers them an environment to engage and act on their sensation seeking behaviors. Psychoticism traits did not increase across training, perhaps because applicants to this course already came with a degree of tough mindedness and aggression.

Across all analyses, MTb was a significant contributor to recruits passing MBT first time. This would support the work of Arthur et al. (2015) where MTb predicted performance over and above self-report levels

of mental toughness and fitness levels. In the current study, MTb seemed to act independently of other variables as MTb was not significantly correlated with any other variable (except for pass rates). Therefore, in this study, the recruit's ability to maintain high levels of performance under difficult circumstances happened regardless of age, personality, motivation, and attentional control. In sport, Bell et al. (2013) assessed the efficacy of an MTb intervention. Important characteristics to increasing MTb were exposure to punishment-related stimuli, transformational delivery, and individualized psychological skills training. However, in the current study, it is not clear how much of these characteristics the recruits were exposed to before signing up for MBT or how much they received during the first 4-weeks of MBT. Further, MTb did not significantly increase across the 26 weeks of training. As noted, MTb was assessed at week 4 of training. At week 8, recruits move from training at the barracks to training out in the field. Field operations are inherently more demanding than training at the barracks. Therefore, at week 26, recruits were rated as displaying similar levels of MTb but under more difficult circumstances.

Age was also a consistent predictor in whether recruits passed training first time or not. Those passing MBT first time around were on average almost 18 months older than those who failed. It is quite probable that those older recruits brought with them other experiences in life which helped them deal with MBT. For example, in the current study, there was a negative correlation between age and neuroticism (see also Donnellan & Lucas, 2008). That is, older recruits were less neurotic (or more emotionally stable). In the MANOVA results, higher levels of neuroticism were associated with the failure group (who were significantly younger). Previous research also links neuroticism to poor military outcomes (e.g., Glicksohn & Bozna, 2000; McDonald et al., 1990). Any decrease in neuroticism during MBT suggests that recruits became more emotionally stable, ruminated less about negative events, and became less anxious (Carver & Connor-Smith, 2010; Perkins et al., 2007). Perhaps recruits became more efficacious due to their training. Research has also shown that there may be other risk factors associated with recruiting younger soldiers. For example, Ogden et al. (2022) found that younger recruits (i.e., age 16–19) are more at risk of suffering from exercise-related heat stress. This would indicate that physical maturity is also an important discriminator between those who pass and those who fail MBT first time around.

Upon examining attentional control strategies, results varied across analyses. For example, according

to MANOVA results, it was only when we selected recruits who had passed above the average grade of C that we found significant effects. At the start of training, these top performing recruits were significantly higher on attention and activation control strategies. Higher levels of attentional control could give recruits the capacity to inhibit task irrelevant stimuli, shift their attention more freely to task relevant information, and update their working memory as new information is processed (Eysenck et al., 2007). In relation to activation control, successful recruits may also be better equipped to perform an action when in normal circumstances one was inclined to avoid such an action (Rothbart et al., 2014). For example, rappelling off an abseil tower when having a fear of heights would require activation control. However, these effects disappeared when controlling for all the other variables in the regression analysis. Perhaps, the high negative correlation that attentional and activation control had with neuroticism contributed to this finding as neuroticism has been shown to be negatively associated with attentional control (Hahn et al., 2015).

In terms of internalization of core values, there were no significant differences in core values reported at the start of training within our MANOVA results. However, according to the logistic regression analyses, when controlling for all other variables in the regression model, integrated regulation (e.g., core values are an essential part of being a good soldier) was a significant predictor for passing MTB first time. However, this relationship became non-significant when we selected recruits who had passed above the average grade of C. As the internalization of core values data was collected during week 1 of MBT, it may have been too early for recruits to internalize any values.

In relation to study 2, when we examined all 152 recruits who passed MBT first time, extraversion significantly increased, whereas neuroticism and external regulation decreased across the 26-week period. However, research examining how military training influences personality is rather scant. Outside of military settings, research has examined how important life events influence personality. For example, Specht et al. (2011) found that conscientiousness increased over a four-year period in young adults entering the labor market for the first time. Bleidorn (2012) found that openness, agreeableness, and conscientiousness increased while neuroticism decreased in the transition between school and college. The sociogenomic model of personality (Roberts & Jackson, 2008) promotes behavioral changes (normally in response to situations or goals pursuits) can influence changes in personality. Therefore, these minor changes in extraversion and neuroticism may have come about by the recruit modifying their behavior in pursuit of their military goals.

Study 2 also revealed a significant decrease in external regulation. External regulation assesses the motivation to internalize core values based on external rewards and punishments. Therefore, across time, recruits were less motivated to internalize core values based upon the obtainment of reward or the avoidance punishment. This is an indication that one part of the equation for introjection to occur has been fulfilled, suggesting that training instructors were more supportive of competence, but less supportive of relatedness. The feeling of relatedness may increase once recruits join their mother units and have proven themselves to other unit members during exercises or combat situations.

The present study is not without limitations. First, the findings of this study are based on psychological attributes of male infantry recruits at the start of MBT. As a result, it may have limited applicability to female recruits entering military service, or applicable to other arms of service (e.g., Navy, Air Force). A further limitation of our study is that we are unaware of what experiences recruits had before they signed up to MBT. It is perhaps plausible that many were part-time army reservists. Depending on the analyses conducted, there were subtle differences in the significance and strength of predictors depending on whether their relationship with passing was analyzed independently or as part of a multivariate analysis (i.e., logistic regression model).

In summary, we were able to identify psychological attributes that can differentiate between recruits who would successfully complete basic military training first time and recruits who would be unsuccessful in completing basic military training first time. Findings are also unique in showing that MTB has a unique and standalone contribution to recruits successfully passing MBT. Future research may want to further explore this relationship to better understand its antecedents. Together with standard recruitment tests, the psychological tests identified in this study can help the recruitment officer identify primary candidates who may require a more individualized approach if they are to pass MBT first time. This will help increase retention and result in higher return investment from those individuals.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Data availability statement

The data that support the findings of this study are openly available in Open Science Framework at <http://doi.org/10.17605/OSF.IO/JEYMK>.

## References

- Arthur, C. A., Fitzwater, J., Hardy, L., Beattie, S., & Bell, J. (2015). Development and validation of a military training mental toughness inventory. *Military Psychology, 27*(4), 232–241. <https://doi.org/10.1037/mil0000074>
- Bartram, D., & Dale, H. C. A. (1982). The Eysenck personality inventory as a selection test for military pilots. *Journal of Occupational Psychology, 55*(4), 287–296. <https://doi.org/10.1111/j.2044-8325.1982.tb00102.x>
- Beattie, S., Alqallaf, A., Hardy, L., & Ntoumanis, N. (2019). The mediating role of training behaviors on self-reported mental toughness and mentally tough behavior in swimming. *Sport, Exercise, & Performance Psychology, 8*(2), 179–191. <https://doi.org/10.1037/spy0000146>
- Beattie, S., Hardy, L., Cook, A., & Gucciardi, D. F. (2020). Mental toughness training. In N. J. Hodges & A. M. Williams (Eds.), *Skill acquisition in sport: Research, theory, and practice* (3rd ed., pp. 255–270). Routledge.
- Bell, J., Hardy, L., & Beattie, S. (2013). Enhancing mental toughness and performance under pressure in elite young cricketers: A 2-year longitudinal intervention. *Sport, Exercise, & Performance Psychology, 2*(4), 281–297. <https://doi.org/10.1037/a0033129>
- Bleidorn, W. (2012). Hitting the road to adulthood: Short-term personality development during a major life transition. *Personality & Social Psychology Bulletin, 38*(12), 1594–1608. <https://doi.org/10.1177/0146167212456707>
- Bleidorn, W., Hopwood, C. J., & Lucas, R. E. (2018). Life events and personality trait change. *Journal of Personality, 1*(1), 83–96. <https://doi.org/10.1111/jopy.12286>
- Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual Review of Psychology, 61*, 679–704. <https://doi.org/10.1146/aanurev.psych.093008.100352>
- Chappelle, W. L., McDonald, K., Teachout, M. S., & Salinas, A. S. (2011). *NEO personality inventory revised normative data that distinguish U.S. Air Force AC-130 gunship sensor operators from enlisted airmen who fail training and peers in the general population* (Technical Report No: 88ABW-201105080). Wright-Patterson AFB, Air Force Research Laboratory.
- Collins, J., & Porras, J. I. (1996). Building your company's vision. *Harvard Business Review, 74*, 65–77. <https://hbr.org/>
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO personality inventory. Professional manual*. Psychological Assessment Resources.
- Dean, M. A., Conte, J. M., & Blankenhorn, T. R. (2006). Examination of the predictive validity of big five personality dimensions across training performance criteria. *Personality & Individual Differences, 41*(7), 1229–1239. <https://doi.org/10.1016/j.paid.2006.04.020>
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum Press.
- Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the big five across the life span: Evidence from two national samples. *Psychology and Aging, 3*(3), 558–566. <https://doi.org/10.1037/a0012897>
- Ekman, P., Friesen, W. V., & Lutzker, D. R. (1962). Psychological reactions to infantry basic training. *Journal of Consulting Psychology, 26*(1), 103–104. <https://doi.org/10.1037/h0041781>
- Evans, D. E., & Rothbart, M. K. (2007). Developing a model for adult temperament. *Journal of Research in Personality, 41*(4), 868–888. <https://doi.org/10.1016/j.jrp.2006.11.002>
- Eysenck, H. J., & Eysenck, S. B. G. (1976). *Psychoticism as a dimension of personality*. Hodder and Stoughton.
- Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion, 7*(2), 336–353. <https://doi.org/10.1037/1528-3542.7.2.336>
- Eysenck, S. B. G., Eysenck, H. J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality & Individual Differences, 6*(1), 21–29. [https://doi.org/10.1016/01918869\(85\)90026-1](https://doi.org/10.1016/01918869(85)90026-1)
- Gaillard, A. W. K. (2008). Concentration, stress and performance. In P. A. Hancock & J. L. Szalma (Eds.), *Performance under stress* (pp. 59–75). Ashgate Publishing Limited.
- Glicksohn, J., & Bozna, M. (2000). Developing a personality profile of the bomb-disposal expert: The role of sensation seeking and field dependence–independence. *Personality & Individual Differences, 28*(1), 85–92. [https://doi.org/10.1016/S0191-8869\(99\)00083-5](https://doi.org/10.1016/S0191-8869(99)00083-5)
- Godlewski, R., & Kline, T. (2012). A model of voluntary turnover in male Canadian forces recruits. *Military Psychology, 24*(3), 251–265. <https://doi.org/10.1080/08995605.2012.678229>
- Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2014). The concept of mental toughness: Tests of dimensionality, nomological network, and traitness. *Journal of Personality, 83*(1), 26–44. <https://doi.org/10.1111/jopy.12079>
- Gucciardi, D. F., Lines, R. L. J., Ducker, K. J., Peeling, P., Chapman, M. T., & Temby, P. T. (2021). Mental toughness as a psychological determinant of behavioral perseverance in special forces selection. *Sport, Exercise, & Performance Psychology, 10*(1), 164–175. <https://doi.org/10.1037/spy0000208>
- Hahn, S., Buttaccio, D. R., Hahn, J., & Lee, T. (2015). *The Quarterly Journal of Experimental Psychology, 6*(6), 1041–1048. <https://doi.org/10.1080/17470218.2015.1032986>
- Hardy, L., & Arthur, C. (2010). *Confidential report on a study into section commanders course at the infantry battle school (Brecon)*.
- Hardy, L., Bell, J., & Beattie, S. (2014). A neuropsychological model of mentally tough behaviour. *Journal of Personality, 8*(1), 69–81. <https://doi.org/10.1111/jopy.12034>
- Hobfoll, S. E., Rom, T., & Segal, B. (1989). Sensation seeking, anxiety, and risk taking in the Israeli context. In S. Einstein (Ed.), *Drug and alcohol use* (pp. 53–59). Springer Science.
- Jackson, J. J., Thoemmes, F., Jonkmann, K., Lüdtke, O., & Trautwein, U. (2012). Military training and personality trait development: Does the military make the man, or does the man make the military? *Psychological Science, 23*(3), 270–277. <https://doi.org/10.1177/0956797611423545>
- Markland, D., & Ingledew, D. K. (2007). Exercise participation motives. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 23–34). Human Kinetics.
- McDonald, D. G., Norton, J. P., & Hodgdon, J. A. (1990). Training success in U.S. navy special forces. *Aviation, Space, and Environmental Medicine, 61*(6), 548–554. <http://www.ingentaconnect.com/>

- Neria, Y., Solomon, Z., Ginzburg, K., & Dekel, R. (2000). Sensation seeking, wartime performance, and long-term adjustment among Israeli war veteran. *Personality & Individual Differences*, 51, 921–932. [https://doi.org/10.1016/S0191-8869\(99\)00243-3](https://doi.org/10.1016/S0191-8869(99)00243-3)
- Ogden, H. B., Rawcliffe, A. J., Delves, S. K., & Roberts, A. (2022, March 3). Are young military personnel at a disproportional risk of heat illness? *BMJ Military Health*, e002053. Published Online First. <https://doi.org/10.1136/bmjilitary-2021-002053>
- Pathak, V., Rani, A., & Goswami, S. (2016). Value based leadership. In N. Maheswari & V. V. Kumar (Eds.), *Military psychology* (pp. 267–282). SAGE Publications India Pvt Ltd.
- Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstein, A. R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology*, 12(12), 1373–1379. [https://doi.org/10.1016/s0895-4356\(96\)00236-3](https://doi.org/10.1016/s0895-4356(96)00236-3)
- Perkins, A. M., Kemp, S. E., & Corr, P. J. (2007). Fear and anxiety as separable emotions: An investigation of the revised reinforcement sensitivity theory of personality. *Emotion*, 7(2), 252–261. <https://doi.org/10.1037/1528-3542.7.2.252>
- Picano, J. J., Roland, R. R., Rollins, K. D., & Williams, T. J. (2002). Development and validation of a sentence completion test measure of defensive responding in military personnel assessed for nonroutine missions. *Military Psychology*, 14(4), 279–298. [https://doi.org/10.1207/S15327876MP1404\\_4](https://doi.org/10.1207/S15327876MP1404_4)
- Roberts, B. W., & Jackson, J. J. (2008). Sociogenomic personality psychology. *Journal of Personality*, 76(6), 1523–1544. <https://doi.org/10.1111/j.1467-6494.2008.00530.x>
- Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon, R. M. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology: Vol. 3. Social, emotional and personality development* (pp. 99–166). Wiley.
- Rothbart, M. K., Derryberry, D., & Posner, M. I. (1994). A psychobiological approach to temperament. In J. E. Bates & T. D. Wachs (Eds.), *Temperament: Individual differences at the interface of biology and behavior* (pp. 83–116). American Psychological Association.
- Rothbart, M. K., Ellis, L. K., & Posner, M. I. (2011). Temperament and self-regulation. In K. D. Bohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 441–460). The Guilford Press.
- Rothbart, M. K., Sheese, B. E., & Posner, M. I. (2014). Temperament and emotion regulation. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 305–320). The Guilford Press.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67. <https://doi.org/10.1006/ceps.1999.1020>
- Ryan, R. M., & Deci, E. L. (2007). Active human nature: Self-determination theory and promotion and maintenance of sport, exercise, and health. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 1–19). Human Kinetics.
- Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: The impact of age and major life events on mean-level and rank-order stability of the big five. *Journal of Personality & Social Psychology*, 101(4), 862–882. <https://doi.org/10.1037/a0024950>
- Steege, F. W., & Fritscher, W. (1991). Psychological assessment and military personnel management. In R. Gal & A. D. Mangelsdorff (Eds.), *Handbook of military psychology* (pp. 6–36). NY: Wiley & Sons.
- Vickers, R. R., Jr., Hervig, L. K., Paxton, E., Kanfer, R., & Ackerman, P. L. (1996). *Personality change during military basic training* (Report No. 97-34). Naval Health Research Center.
- White, L. A., Rumsey, M. G., Mulins, H. M., Nye, C. D., & LaPort, K. A. (2014). Toward a new attrition screening paradigm: Latest army advances. *Military Psychology*, 26(3), 138–152. <https://doi.org/10.1037/mil0000047>
- Zuckerman, M. (1971). Dimension of Sensation Seeking. *Journal of Consulting & Clinical Psychology*, 36, 45–52. <https://doi.org/10.1037/h0030478>