

Article

Perception of the Special Troops (Commando) Soldiers Regarding Physical Fitness, Motor Control and Psychological Skills

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Abstract: Physical fitness and motor skills are considered important attributes for the military, affecting their professional performance. The high physical and psychological demand that the special forces are subjected to requires the acquisition of a set of volitional skills such as resilience, effort, perseverance, or resistance to frustration, which are worthy of further research. This study aimed to analyse the perception of the special troops (commandos) in physical fitness, motor control and psychological skills. A total of 35 male soldiers that ended the commando recruit training program (21.69 ± 2.36 years old) were investigated. A questionnaire was applied to verify differences in perception of physical fitness, motor capacity, physical effort and military training during recruit training according to age, education, work experience and sports background. Descriptive statistics were used to characterize the participants. All data collected were analysed using IBM-SPSS Statistics, version 24. Our results revealed differences in the importance given to the training of motor skills within military training ($\chi^2 = 19.284$; $p = 0.023$), conditional motor skills – speed ($\chi^2 = 17.378$; $p = 0.043$), coordinative motor skills—motor control ($\chi^2 = 20.616$; $p = 0.014$), psychological skills in a military context ($\chi^2 = 13.730$; $p = 0.008$), volitional skills—resistance to frustration ($\chi^2 = 21.568$; $p = 0.043$) and volitional skills—psychological resistance ($\chi^2 = 29.144$; $p = 0.004$). The participants highlighted the importance of instructors having scientific knowledge in physical education to provide military physical training to be better prepared for this purpose. We concluded that motor skills and psychological abilities tend to be equally important in the context of military training. Physical fitness and motor skill development can be considered essential in military training for most of the inquired participants.

Keywords: commandos; military training; motor skills; psychological skills



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1. Introduction

The word commando, broadly speaking, originates from the Boer combat units (Kommando), where they confronted the British army in South Africa at the beginning of the 20th century during the Boers' War (Transvaal War) [1]. In Portugal, the commando denomination appears through a group of troops that were assigned special missions in India. Later, this name emerges in the military region of Angola during the Ultramar War from 1965 onwards [1].

The aspects of physical fitness and motor skill in military training have increasingly received attention in the literature [2–4]. On this basis, there is a tendency to assess the physical fitness and motor skills of military personnel according to the tests they have to perform within advanced training [5]. Most military institutions tend to establish the practice of exercise, which is the basis for some training methodologies [5]. Therefore, physical fitness and motor skills are regarded as important within the military context and in future professional performance [6–8].

Military training is different from other training methods, as it is extremely demanding, rigorous and disciplined [9]. According to Fletcher and Chatelier [9], discipline is essential within military instruction and training at various decision levels. Operationally and within military training, Litva [4] notes that it is necessary to take into consideration the development of cardiovascular, respiratory, and circulatory skills, which later impact the aerobic and anaerobic responses to exercise. Accordingly, it also seems important to consider aspects such as motor coordination [10] and psychological resistance, which may be equally important to overcome the adversities that these troops face [3]. O'Donnell [11] describes a specific military training where marching, running, motor efficacy and anaerobic work are promoted. The author [11] advocates circuit training where the simultaneous development of anaerobic work and motor efficacy (e.g., completing a course rapidly and efficiently) occurs along with speed and endurance running, jumps, dynamic balance over obstacles, and strength work, among other suggestions. In several rescue operations performed in different countries, where specific extreme training and military preparation are required [12], special troops offer efficient and competent responses in emergency or crisis scenarios. Military personnel require complementary knowledge such as tactical planning capacity, equipment and training exercises for landing operations, metrology and territory planning [13,14].

Other important aspects that may significantly affect coordination, response and motor performance are the number of hours of sleep, water rationing and the lack of adaptation to extreme environmental conditions [15]. A military operation that requires long sleep deprivation periods and inadequate hydration may significantly impair reaction time, visuomotor acuity, and attention in war scenarios. Additionally, an eventual decrease in sleep hours and psychological fatigue during long military operations, when associated with poor feeding, great stress and anxiety conditions, may influence the physiological responses of the organism, affecting the physical and psychological capacity of soldiers. In this context, cognitive wear may lead the soldier to commit basic information processing errors at the level of the central nervous system, resulting in slower assimilation of the most relevant aspects of the tasks [15,16]. The sleep thematic emerges in the literature as one of the main aspects that affect the troops in general, having been considered to be one of the aspects that contribute the most to increase combat stress [15,16].

Special troops such as the commandos can be metaphorically seen as elite athletes, as they permanently need to maintain their physical fitness through a rigorous and intense military training regime [17]. Hence, this population has received some attention from researchers in sport sciences and training methodology, having applied test protocols to measure their physical fitness, perception and motor capacity, resulting in a multidisciplinary work involving exercise physiologists, physicians and biomechanics experts to optimize the training process (volume, duration, intensity and frequency) and reduce the prevalence of musculoskeletal injuries during recruitment [17,18].

To better understand some variables of physical fitness and motor capacity involved in the motor performance of elite troops, self-reported questionnaires have been used [19], which assess the recruits' perception regarding the training process and how they may respond to their demands [20]. Although this method may be subjective [21], due to the possibility of respondents modifying their responses according to the instructor's expectations, this is an important means of collecting information that may be later confronted with the actual training applied, allowing a comparison to be made between the recruits' perception and expectations regarding training and reality [17,22,23]. Ac-

According to this, the context of high physical and psychological demand the special forces are subjected to requires acquiring a set of volitional skills such as resilience, effort, perseverance, or resistance to frustration worthy of future research. Therefore, based on the previously presented state of the art, these troops must be prepared to respond to complex and demanding situations that test the limits of their psychomotor skills in different theatres of operation [22,23].

Rintamäki et al., Tomczak, and Vasiliki [24–26] stated that the military tends to direct its conduct by following principles with respect to hierarchy, as well as ethical and deontological conduct. Therefore, it is necessary to understand if the profile, the competencies, and the training of the instructor may stimulate or inhibit these characteristics. Patrick et al. [27] analysed the nature of the instructors' behaviours and their leadership during military training. The authors [27] concluded that appropriate models that encompass clear, objective, and adequate instructions and give pedagogical feedback on their actions may be an option as opposed to more traditional authority methods, which assume that instructors with a degree in physical education are better prepared to assess aspects related to physical fitness compared to their peers designated as permanent officers. In this research, it is also assumed that the instructors with a degree in physical education contribute to the implementation of programmes of physical exercise, being recognized by the soldiers as very useful in this area and considered very relevant to the military experience and leadership of the permanent officers [26]. Despite the above, the state of the art is not well established concerning the trainees' perception of their physical fitness, the effort to which they will be put through during instruction, and the motor skills (conditional and coordinative) involved in military training. This is a transversal aspect to the assessment of volitional skills such as effort, perseverance, or spirit of sacrifice.

Taking this into consideration, this study aimed to analyse the perception of the special troops (commandos) regarding physical fitness, motor control, and psychological skills and verify if they are different according to age, academic qualifications, and soldiers' previous jobs. Finally, it was important to understand the degree of satisfaction of the sample regarding military training during recruitment and to assess whether most of the sample considered it essential that the instructors had graduated in physical education to train them in a military context.

2. Materials and Methods

2.1. Sample

All participants were adult male volunteers and signed a university-approved ethical consent form. Sample characteristics are presented in Table 1.

The eligibility criteria included being a soldier of 1 of the 2 commando courses under analysis, aged 18 or over, and having physical and psychological robustness to perform the tests applied. The non-probabilistic sample selected by convenience consisted of 22 of the 27 soldiers who had successfully completed one commandos course and 13 soldiers who had successfully completed the other, with a total of 35 elements. The tests were conducted following the ethical guidelines set by the University of Coimbra, the Declaration of Helsinki, and the Oviedo Convention. Ethical approval was obtained from the local institutional review board (CEPC 32018), and written permission for the research was also obtained from the head commander of the Portuguese Armed Forces through the personnel commander of the Portuguese army.

Table 1. Participants' sociodemographic characteristics.

Sociodemographic Characteristics (N = 35)	n	%
Age (years) [19; 28]; mean \pm SD (21.69 \pm 2.36)		
19 years	4	11.40%
20 years	10	28.60%
21 years	7	20.00%
22 years	3	8.60%
23 years	6	17.10%
25 years	2	5.70%
27 years	2	5.70%
28 years	1	2.90%
Education Level		
Basic education (9 years)	6	17.10%
Secondary school (year 12)	24	68.60%
Bachelor's degree	2	5.70%
Master's degree	3	8.60%
Physical Activity		
Prior sports experience	31	88.60%
No prior sports experience	4	11.40%
Work Experience		
Independent worker	3	8.60%
Employee	14	40.00%
Work Class		
Primary sector	4	11.40%
Secondary sector	5	14.30%
Tertiary sector	9	25.70%

2.2. Instruments and Procedures

In this study, the perception of soldiers regarding military training was measured using the questionnaire developed by Seidi [1] and Lisita [7]. This instrument was composed of 18 questions, mostly closed, and divided into 3 different categories: (i) sociodemographic characterization of the participants; (ii) perception of physical training, physical effort, and military training; and (iii) perception of the soldiers regarding the training and preparation of the instructors. The total reliability of the instrument (Cronbach's alpha) is 0.853. The questionnaire was applied individually and in-person to 2 groups as follows: the first group was composed of the 13 soldiers that finished 1 edition of the commando course, and the second group was composed of 22 soldiers that finished a different edition of the commandos course. The questionnaires were anonymous and confidential, and nobody could be identified in any phase of the research. Before responding to the questionnaire, all participants signed an informed consent, which was validated by three jurists and one witness that confirmed the process. According to the current civil law and military regulations, all candidates for the commando course must fulfill a set of prerequisites that were taken into consideration in the present research.

2.3. Data Analysis

Descriptive statistics were used to characterize the participants (absolute frequency and percentage), measures of central tendency (average) and measures of dispersion (amplitude and standard deviation), when applicable. The nonparametric Chi-squared test was used to compare the groups concerning age, education, prior work experience and prior sports experience with the dependent variables perception of physical fitness, motor capacity and training given their qualitative nature [28].

The data analysis was conducted using IBM SPSS (version 24.0) software for Windows, and a statistical significance of 5% ($p < 0.05$) was defined.

3. Results

Most of the participants (97.1%) considered the development of motor skills essential in military training and more important than the training of psychological skills (Table 2).

Table 2. Perception of motor skill training, physical effort and training of military personnel in the context of military physical training.

Perception of Military Personnel in the Context of Military Physical Training	n	%
Development of motor skills is essential in military training		
Yes	34	97.1
No	1	2.9
Training of motor skills is more important than the training of psychological skills		
Yes	7	20
No	28	80
Importance of motor skill training for military		
Not important	1	2.9
Important	5	14.3
Very important	13	37.1
Extremely important	16	45.7
Perceived effort during military training		
None	0	0
Minimal	1	2.9
Moderate	4	11.4
Maximal	14	40
Exhaustion	16	45.7

The training of conditional skills, namely, speed, resistance and flexibility, were perceived as very important in the context of military training for most of the sample. Coordination skills such as kinesthetic differentiation, balance, pace and spatial orientation were equally relevant to the sample in the context of military training. Most of the sample also considered it extremely important to take into account aspects such as change, adaptation, learning, reaction and motor control. Regarding the exercises, obstacles, and specific tests that the participants were subjected to during the period of the commando course, most perceived that they carried out the collective combat track with difficulty and carried out the induced conditioning combat shooting track and the individual combat shooting track with extreme difficulty.

The 42 km walking in the commando course was perceived as difficult for most participants. Furthermore, the mountain walking (final course operational exercise) exercises were perceived as greatly difficult. Additionally, most participants perceived that the final course's operational and psychophysical exercises were performed with extreme difficulty. Finally, regarding volitive capabilities, most participants highlighted perseverance, willpower, resistance to frustration, psychological resistance, capacity for suffering and self-overcoming as key elements in military training. In this item, the most relevant data emerges in 45.7% of the sample, which indicated a very exhausting effort carried out during the military training in the commando course (Table 3).

Most of the military personnel considered that the instructors were well prepared for motor skill training in the context of military physical training. A degree and knowledge in physical education were considered important to apply military physical training and could contribute to reducing injuries in the context of military physical training. The majority of the military personnel were satisfied with the commandos course's physical training and felt an evolution in the development of their motor, physical and psychological skills.

Table 3. Perception about instructors' preparation and satisfaction with military physical training.

Perception of Preparation of Instructors for the Training of Motor Skills	n	%
Not prepared	1	2.9
Little prepared	2	5.7
Prepared	6	17.1
Very well prepared	15	42.9
Extremely well prepared	12	34.3
Importance of having a graduate degree in physical education to apply military physical training		
Yes	24	68.6
No	11	31.6
Importance of having knowledge in physical education to apply military physical training		
Yes	27	77.1
No	8	22.9
Instructors who graduated in physical education are better prepared to apply military physical training		
Yes	27	77.1
No	7	20
Did not answer	1	2.9
Instructors who graduated in physical education are better prepared to reduce the incidence of injuries		
Yes	29	82.9
No	6	17.1
Satisfaction with the military physical training practiced during the commandos course		
Not satisfied	0	0
Little satisfied	1	2.9
Satisfied	6	17.1
Very satisfied	14	40
Extremely satisfied	14	40
Degree of the evolution of motor, physical and psychological skills due to training		
None	0	0
Little evolution	3	8.6
Some evolution	5	14.3
Great evolution	13	37.1
Extreme evolution	14	40

3.1. Differences Due to Age

There were statistically significant differences in the coordinating motor skills—kinesthetic differentiation ($\chi^2=33.874$; $p = 0.037$).

3.2. Differences Depending on Academic Qualifications

Statistically significant differences were found in the degree of importance attributed to the training of motor skills in the context of military training ($\chi^2 = 19.284$; $p = 0.023$) for conditional motor skills—speed ($\chi^2 = 17.378$; $p = 0.043$) and coordinating skills—motor control ($\chi^2 = 20.616$; $p = 0.014$).

3.3. Differences in Terms of Work(s) Developed or Job(s) before Entering the Military Service

Statistically significant differences were found in the items “Do you consider that the training of motor skills is more important than the training of psychological skills in a military context?” ($\chi^2 = 13.730$; $p = 0.008$); “Conditional motor skills—resistance” ($\chi^2 = 17.306$; $p = 0.027$); “Volitional abilities—resistance to frustration” ($\chi^2 = 21.568$; $p = 0.043$); “Volitive skills—psychological resistance” ($\chi^2 = 29.144$; $p = 0.004$) and “Volitive skills—overcoming” ($\chi^2 = 21.965$; $p = 0.038$).

3.4. Differences in Terms of Sport Practiced before Starting to Recruit

No statistically significant differences were found.

3.5. Differences Depending on the Perception of the Military Regarding the Training and Preparation of Instructors Depending on Age, Academic Qualifications, Work(s) Developed or Job(s) before Entering the Military Service and Sports Practice before Starting Recruitment

3.5.1. Differences Depending on Age

Statistically significant differences were found in the item “Did you feel that you had a physical break after starting the commando course?” ($\chi^2 = 16.131$; $p = 0.024$).

3.5.2. Differences Depending on Academic Qualifications

Statistically significant differences were shown in the item “Subjective perception of effort during military training—accuracy” ($\chi^2 = 32.760$; $p = 0.005$); in the item “Subjective perception of effort during military training—mountain walking (end of course operational exercise)” ($\chi^2 = 21.538$; $p = 0.043$) and “Do you consider important that instructors/monitors have scientific knowledge in the field of physical education to give military physical training?” ($\chi^2 = 7.825$; $p = 0.05$).

3.5.3. Differences in Terms of Work(s) Developed or Job(s) before Entering Military Service

No statistically significant differences were found.

3.5.4. Differences in Terms of Sports Practice before Starting the Recruit

Statistically significant differences were found in the item “Subjective perception of effort during military training—natural environment work” ($\chi^2 = 10.412$; $p = 0.034$); in the item “Subjective perception of effort during military training—inverted week” ($\chi^2 = 9.644$; $p = 0.047$); in the item “Subjective perception of effort during military training—10 km walk” ($\chi^2 = 11.008$; $p = 0.012$) and in the item “Subjective perception of effort during military training—20 km walk” ($\chi^2 = 9.554$; $p = 0.049$).

4. Discussion

This study aimed to analyse the perception of the special troops (commandos) regarding physical fitness, motor control and psychological skills. The results showed a tendency to attribute importance to the military skills, namely the self-esteem and self-confidence of the soldiers [29]. In this sense, Tomczak and Stupnicki [30] described a broad set of contemporary military physical skills that are essentially based on running and motor coordination work. These authors point out that running competency, either in speed or endurance, is associated with good motor coordination and is essential to special troops, as they must move rapidly and in a coordinated manner in hostile terrain. Moreover, they suggest two great areas: (i) speed-agility work, with short sprints and slaloms, and (ii) strength-speed work, where the military is subjected to dynamic exercises in a circuit [30].

Regarding the rate of perceived effort during military training, particularly in the individual combat exercise, it is important to emphasize that after 48 h of continuous combat, the soldier may present a significant reduction in his cognitive performance, including diminished memory, logical and semantic reasoning. This type of fatigue induced by sleep deregulation is also able to produce disturbances in perception, motor coordination, attention, and concentration. For example, firing a weapon is one of the tasks that is impaired by sleep deprivation, particularly in visual acuity [31]. On the other hand, Miller et al. [32] and Crowley et al. [32] stated that soldiers might be subjected to great sleepless periods that may diminish the immune system, making the body more prone to infections and disease. Moreover, according to Tomczak [10], the eventual sleep deprivation may affect soldiers’ performance, mainly in dynamic balance, kinesthetic differentiation, and reaction time tasks. Additionally, the effects of sleep deprivation and sleep disturbances tend to be more effective and produce more negative effects in the motor performance of soldiers with poorer fitness, where higher stress and anxiety levels are prevalent [32].

It is assumed that psychological performance tends to be essential during military training, mainly to respond to future combat conditions in various theatres of operation [33]. In this sense, methodologies of physical fitness assessment in military training have suffered

profound changes over the last years [2]. This includes, for example, continuous running and fartlek training, circuit training, gymnastics, the Cooper test, abdominal tests, push-up tests, pull-up tests, speed and flexibility tests, among others. Various concepts close to sports training methodology have emerged, such as (i) aerobic power and capacity, (ii) anaerobic power and capacity, (iii) motor coordination, (iv) strength and (v) flexibility [2]. Avila et al. [34] highlight that the armed forces, in general, place great importance on military physical training and physical education in the preparation, leadership and action of their troops. For example, the same authors describe that, in the various battles that the United States Armed Forces have fought, it was highlighted that the fitness and physical capacity of their troops tended to be a determinant in war.

Additionally, the participants claimed to have performed a very exhausting effort during military training. Considering the high physical and psychological demand in military training, Vrijkotte et al. [29] analysed the reasons that led to the dropout of trainees during recruitment, concluding that the majority of these participants could not overcome the physical fatigue, psychological tension and stress that they were subjected during this phase. The authors also describe the application of a questionnaire, the Social Desirability Questionnaire, to obtain a pre-evaluation of the motivations, limitations, social influences, and psychomotor profiles of the soldiers. Hence, it is important to know the recruits' perception to adequately "dose" the effort to which they will be submitted during training. This aspect is transversal to the assessment of volitional skills (effort, perseverance and spirit of sacrifice), which are equally important to the training and performance of special troops. In this context, it is still important to be aware that an inadequately applied physical load or one that does not follow the principle of progression may injure the troops, causing soldiers to take an abrupt and premature leave of the training program. Thus, it is important to emphasize that Rosendal et al. [29] stated that a part of injury prevalence in the military results from the fact that soldiers do not respond successfully to physical loads, psychological pressure and an eventual reduction of sleep hours. These aspects may also be responsible for personality disturbances, depression and anguish. Considering the above, a military that is not properly prepared for such intense physical loads may abandon recruit training precociously. In this context, Rosendal et al. [29] also point out that exhausting physical military training tends to be responsible for a higher prevalence of injury in endurance running and constant strength work. Despite this, the development of physical and coordinative capacity in military training, when well designed, has a positive effect on self-esteem, self-confidence, work, team spirit, responsibility, punctuality, and safety in performing various tasks. Therefore, and considering that the military is not fit enough to withstand significant physical loads, high-intensity, and high-volume training before a few weeks of training, exercise prescription should be progressive, increasing as the training programme develops [35].

The capacity to transport loads and fighting equipment is different for each troop and is influenced by multiple factors that are categorized into three groups: (i) soldier characteristics (the capacity to overcome physical and psychological adversities, body mass index, age, strength, experience in carrying combat gear), (ii) task and mission characteristics (mission location and type of terrain), and (iii) environment conditions (cold, rain, heat, humidity, and altitude) [35]. Concomitantly, the duration of operations, timetables and rest periods, and limitations in regular feeding and hydration may also affect the soldiers' physical fitness and psychological conditions [35]. Within the domain of physical fitness, the literature suggests [36,37] the cumulative effect of transporting very heavy loads may contribute to lower limb fractures and hip and vertebral injuries. Therefore, a revision from the Center of Training and Recruitment of the Army and Defense Force of Australia pointed out that lower limb fractures represent more than 50% of all registered occurrences [36,37]. Overload injuries are highly prevalent in military training, as recruits are subjected to long and exhaustive periods of instruction, with limited recovery periods [38]. Facing these elements, it is important that special troops, such as the commandos, have excellent physical and motor capacity and are able to support a great variety of physical and mechanical

loads in extreme environmental conditions. The motor skills (conditional and coordinative) and volitional skills (effort, perseverance, and spirit of sacrifice) tend to be relevant in military training [35].

Regarding conditioning motor skills, the participants stated that it was extremely important to undergo endurance training in the military context. It is therefore important to take into consideration that to be successful in their missions, special troops such as the commandos must act rapidly and efficiently to reach their goals. These task forces act in extreme war scenarios, where their operatives need to have great physical and emotional control to overcome the adversities they face in the terrain [39]. Therefore, by highlighting the courage of these operatives, the danger they face is high and may leave physical and psychological marks [40]. Facing these factors, the physical and psychological demands that are required for special troops, mainly during recruitment, are very high and not suitable for everyone [41]. For example, in addition to from the eventual physical loads that the commandos and rangers, among others, are subjected to during their recruitment and military training, they also have to learn how to transport the added weight of their combat equipment many times through sinuous terrain. In this case, the diversity and complexity of military operations demand the transport of other specific equipment that is ported on foot for long stretches and in adverse environments [35].

Coordinative motor skills were found to be extremely important to the participants. For instance, rhythm, balance, and spatial orientation were considered by the participants as extremely important in military training. In this regard, we assume it is relevant to embrace a diverse set of physical activities during military training that will allow the soldiers to learn to quickly and coordinatively react in a hostile territory [30].

Data show that there is a tendency to associate the commandos' course with these types of skills. Regarding the exercises, obstacles, and specific events to which the subjects were subjected during recruitment, the sample felt they had difficulty completing the collective combat track. On the other hand, the participants felt the individual combat shooting exercise was also extremely difficult. These results are in line with Vrijkotte et al. [3], which point to the importance of better understanding these elements, particularly to understand the dropout reasons during recruitment better, as well as to understand better in which way the successful recruits overcome the physical and psychological stress they face during this phase. In agreement with Litva [4], it seems that it is necessary to consider the individual cardiovascular, respiratory, and circulatory skills that may affect the aerobic and anaerobic responses to exercise. Vieira de Carvalho et al. [42], supported in Dreyfuss [43], concluded that the amount of water and food available must be well planned to respond to the demands of hot or cold weather according to the characteristics of each mission and the availability of these resources. During military exercises, the authors also concluded that it is still necessary to have a good plan of water rationing so that eventual dehydration is avoided with good monitoring of environmental conditions and a permanent assessment of signs and symptoms related to extreme temperatures. The same authors also stated that extreme weather conditions might compromise soldiers' physical performance and capacity during military activities.

Concerning psychophysical exercise, the individual combat shooting drill and dynamic shooting drill were regarded as the most difficult to complete. In line with O'Donnell [11], the adoption of specific military training seems to be relevant, particularly in areas that may enhance marching, endurance running or motor efficacy, as well as multifunctional physical activities. This author suggests a circuit training that simultaneously develops anaerobic work and motor efficacy (i.e., quickly and efficiently finishing a course or drill) along with running, jumps and dynamic balance over obstacles, strength work, and passing and balancing over scattered objects, among other drills.

The participants experienced an extreme degree of motor, physical and psychological development. According to this, we assume that it is important that special troops are endowed with an excellent motor and physical capacity and can withstand a great variety of physical and mechanical loads in extreme conditions [35]. Moreover, Dreyfuss [44] and

King et al. [43] verified that the success of the North American armed forces regarding the low incidence of dehydration-related problems during the Gulf War occurred due to proper military training as well as an adequate acclimation and an efficient fluid replacement strategy. Following this, Vieira de Carvalho et al. [42] also noted that the troops' uniforms showed characteristics that could impair or reduce the efficiency of the body's thermoregulatory systems involved in heat dissipation, such as conduction, convection, radiation, and evaporation, as they covered most of the body surface and acted as a thermic insulator that could increase dehydration.

Additionally, the participants experienced a great development of motor, physical and psychological skills during military training. In this sense, the military soldiers revealed not having felt any physical break after the beginning of the course. These results are in line with Avila et al. [34], which consider that the armed forces generally attribute importance to physical military training and the soldiers' preparedness. By analysing the effects of military training in special troops, Oksa, Rintamaki and Makinen [45] also noted the negative influence of temperature in these operatives. For example, a very cold environment may abruptly increase the reaction time and reduce muscular efficiency, thus diminishing motor capacity. Conversely, a very high temperature may also diminish the sensorial perception of the soldiers. Additionally, there is a tendency to reduce motor performance more rapidly in cold environments than in hot environments. For example, fine motor skills such as tying knots are more affected by lower temperatures due to muscle rigidity. However, these assumptions require more research, as adaptation to these conditions is individualized [45].

As to satisfaction with military training during the commandos course, according to the state of the art, it is important to reinforce that the programme leaders must clearly and unequivocally explain to the recruits the benefits they aim to achieve. In this case, punishment must be avoided when the recruits fail during the execution of the programme. Additionally, a good training programme should be well planned and well organised [46].

Finally, another aspect of this research is the fact that the majority of the participants consider it essential that the instructors hold a degree in physical education to apply military physical training. In turn, most of the sample also considered it important that the instructor have scientific knowledge in physical education, as they feel they are better prepared to apply physical military training. Transversally, they also claim that these instructors are better prepared to reduce the prevalence of injury in this context. In line with Pereira [2], we also consider that military training has evolved significantly over the last years, such that fundamental instruction that has been applied through qualified instructors has begun to include individual sports (athletics, fencing and wrestling) and team sports (football, basketball, volleyball or handball), which are very important for the development of the soldiers' motor skills.

5. Study Limitations

Although the present study concerns special troops that are admitted each year, the small number of military trainees in the sample is a limitation of this study. The application of questionnaires or related instruments, even in the face of a robust and very demanding validation from a scientific point of view, deserves a careful evaluation of the results obtained, since, for various reasons, the answer given by the respondents may, eventually, not correspond to what happens. It is also possible that the answers include, for example, a high degree of subjectivity related to the perception of physical effort by the participants. In line with Halson [21], although the questionnaires can be economic matrix instruments in the analysis of the perception of the load training, the degree of effort, the satisfaction, and the evolution of the commando course formation, as is the case in this study, these depend, operationally, on subjective information, which, potentially, may need to be complemented and corroborated with physiological data.

6. Conclusions

The results allow us to conclude that in the sample studied, the physical fitness and motor skills aspects in military training are considered relevant to the evolution of special troops in psychomotor terms. In this sense, military institutions, instructors and trainees can significantly benefit if they obtain a deeper knowledge of the tests they are carrying out in a laboratory context and in a real teaching and learning situation. Because military training is different from other training methods, physical fitness and motor skills are regarded as important within the military context and for future professional performance. Therefore, it is necessary to take into consideration the development of cardiovascular, respiratory, and circulatory skills that later impact the aerobic and anaerobic responses to exercise, motor coordination, and psychological resistance, which may be equally important to overcome the adversities that these soldiers face. On the other hand, speed and endurance running, jumps, dynamic balance over obstacles, and strength work can improve military training and better prepare trainees as the performance of the tests themselves impose different skills during the training period. These aspects can help special troops such as the commandos to be more efficient and competent in emergency or crisis scenarios. Apart from physical and psychological competency, military personnel are required to have complementary knowledge, such as tactical planning capacity, equipment and training exercises for landing operations, metrology and territory planning. In this context, cognitive wear may lead the soldier to commit basic information processing errors at the level of the central nervous system, resulting in slower assimilation of the most relevant aspects of the tasks. Special troops need to maintain their physical fitness through a rigorous and intense military training regime. Hence, this population should be utilized for the test protocols to measure their physical fitness, perception and motor capacity, resulting in multidisciplinary work involving exercise physiologists, physicians and experts in biomechanics to optimize the training process (volume, duration, intensity and frequency) and reduce the prevalence of musculoskeletal injuries during recruit.

In sum, better understanding some variables of physical fitness and motor capacity that are involved in the motor performance of elite troops is an important means of collecting information that may be later confronted with the actual training applied, allowing the comparison between the recruits' perception and expectations regarding training and reality. These troops must be prepared to respond to complex and demanding situations that test the limits of their psychomotor skills in different operation theatres. Finally, it is necessary to understand if the profile, competencies, and training of the instructor may stimulate or inhibit these characteristics.

It is central to note that this study shows only a trend of skills and psychological abilities in the context of military training, which deserves further investigation with a more robust and abundant sample that can be evaluated at several moments throughout the tests to which the participants are subjected. Furthermore, it is important to associate psychological skills with physiological aspects, such as VO₂ max and other indicators that can make this study more interdisciplinary. On the other hand, taking into account that the participants may miss the truth or not respond with what they really think in terms of responses to the questionnaires, it is important to cross-reference the results of this instrument with focus group techniques, which effectively allow for the assessment of the ecological validity of their experiences and responses.

Featured Application: This study has practical applications for the commandos and other elite troops, as it allows a profile to be drawn regarding the trainees' perceptions of psychomotor skills in a military training context, linking them with the exercises that are effectively administered during the instruction period, both in recruitment and in the commando course itself.

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Data Availability Statement: The datasets generated during and/or analysed during the current study are available in the Universidade de Coimbra repository, <https://estudogeral.uc.pt/bitstream/10316/86477/1/Disserta%C3%A7%C3%A3o%20-%20Carlos%20Monteiro.pdf> (accessed on 10 January 2022).

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