Exploring the Predeployment Phase of an Antarctic Expedition and the Brazilian Pre-Antarctic Training

Michele Macedo Moraes, PhD*; Alexandre Sêrvulo Ribeiro Hudson, PhD†; Ygor Antônio Tinoco Martins, MSc‡; Alice Lamounier Marques, BSc§; Rúbio Sabino Bruzzi, MSc†; Thiago Teixeira Mendes, PhD‡; Rosa Maria Esteves Arantes, MD, PhD*

ABSTRACT

In Antarctica, human access and presence are complex and require detailed planning and preparation in advance. The personnel of National Antarctic Programs (NAPs, i.e., scientists and support personnel, including military, civilians, and mountaineers) stay in different isolation, confinement, and extreme (ICE) environments such as ships, research stations, and scientific summer camps. Antarctica imposes harsh conditions that influence physiological and psychological responses impacting health, mood, and physical and cognitive performances. In this context, we argue why people should prepare in advance for staying in Antarctica and what to expect in ICE environments. We also spotlighted recommendations shared by different NAPs participant guides, including predeployment training. Next, we present a case study of the Brazilian Pre-Antarctic Training (PAT), a theoretical-practical training that provides technical and logistical information and assesses the adaptability and physical capacity of researchers and military personnel to perform fundamental activities in a polar environment. We evaluated and compared the individual’s mood at the beginning and the end of the PAT week and observed group-specific mood changes depending on the sex, functions, and the facilities that participants accessed. Finally, we proposed that conducting training before staying in Antarctica, besides promoting conditions to better plan the voyage and knowledge of the region, can contribute to dealing with the possible mood swings during expeditions and even promote positive affect. Therefore, the psychophysiological effects of PAT are topics for further investigations.

INTRODUCTION

Antarctica is an inhospitable continent composed of the most pristine landscapes on Earth that under the Antarctic Treaty System (ATS) is assured as “a natural reserve, devoted to peace and science.” Despite all the technological development since the first expeditions, human access and presence in Antarctica are still relatively complex, requiring detailed planning and preparation in advance, and demands considerable operational and logistic investment.

Human permanence in Antarctica occurs under isolation, confinement, and extreme (ICE) conditions. Expeditions are carried out by National Antarctic Programs (NAPs) (i.e., scientists and support personnel, including mountaineers and military) and fee-paying tourism. The personnel of NAPs stay in different ICE environments, such as ships, research stations, and scientific summer camps. The duration of expeditions ranges from one season (from a few weeks to 3 months in camps, on ships, and in stations) to a year or more—for the “Hivernauts” on stations (the over-winterers that face conditions comparable with crewmembers residing in space). Antarctica is of particular interest for researchers as a space analog. Antarctica is an open-air laboratory to investigate psychophysiological...
challenges and habitability in space missions and “other worlds.”3,4

Thus, moving to ICE requires preparation in advance. An ICE expedition starts long before the individual departs; the predeployment phase encompasses the moment the individuals realize that they will carry out fieldwork in Antarctica and extends until the beginning of the voyage.5

Herein, we aim to bring to light the predeployment phase5,6 to Antarctica. First, we discuss “why” and for “what” we should prepare for Antarctica, focusing on the main factors personnel of NAPs find and face—some explicit and others apparent. Also, we bring pieces of advice shared by different NAPs participant guides. Finally, an indispensable part of the Antarctic operation is formal NAPs Pre-Antarctic Training (PAT), a theoretic-practical training for living and working in Antarctica. Thus, we present a short case report of mood (PAT), a theoretic-practical training for living and working in Antarctica.

For What Should We Prepare in Advance?

For What Should We Prepare in Advance?

ICE environments provide physical risks arising from low thermal sensation, storms, displacements in rough and snow-covered terrain, extreme photoperiods, and the imposition of some degree of confinement. The stressful factors of ICE conditions can affect psychophysiological responses and influence important regulatory patterns, such as sleep, that may amplify the changes. An Antarctic expedition entails isolation from the usual living group and intense social interaction with a new group and socio-cultural factors.2

Thereinafter, the team must be prepared for particularities of the environmental conditions and thermal defiances. Different factors can trigger psychophysical stress such as cold, tiredness, routine changes, discomorts, and new situations to be faced. Above and despite all preparation, it is necessary to know that unforeseen events can arise; thus, it may be necessary to deal with unexpected situations.

What to expect: on polar ships

Due to physical limits, the ships are confined and restricted places for locomotion. On the ship, dealing with environmental stressors, such as low light, noise, vibration, and balance with consequent motion sickness (characterized by drowsiness, listlessness, and mild depression) is expected. These conditions can harm sleep,14 in addition to resulting in seasickness—particularly on voyages to Antarctica due to navigation in rough waters, such as in the Drake Channel region.15 The challenges of an extended stay on board can be reflected in the crew’s physical and mental health.14–16

What to expect: in summer camps

Camps pose the ICE’s most significant physical hazards due to the cold, such as hypothermia and frostbite. Also, cold is a risk for dehydration—intensified by sweating during physical effort in fieldwork displacements.17 The displacement represents dangers when moving over rough, ice-covered terrain such as falls into crevices or rockslides. The demand for physical effort in the camps even resulted in a training load for untrained individuals.17

As the camps take place in summer, the 24 h of light can influence physiological patterns dependent on circadian regulation, in addition to prolonged exposure to radiation snow.

The psychophysiological effects of staying in ICE

Exposure to ICE can influence physiological and psychological responses.9,10 The adjustment can increase or decrease distress5 affecting mood classified as “negative states” or reducing “positive states.”9,11 Considering that individuals performing logistical and research activities in extreme and risky locations need to maintain attention and focus during the performance of their duties, the mood changes may be detrimental to the individual and also to the broader team, influencing the collective dynamics, team performance, and efficiency12 and even impact group security in ICE. However, ICE expeditions can also induce salutogenesis, postturn growth, and positive emotions9,13 and both negative and positive effects can co-occur.

Why Should We Prepare in Advance?

Why Should We Prepare in Advance?

Planning is critical for ensuring a successful mission. The planning entails studying forms of displacements and the paths to be covered. It is necessary to know the scientific methods to be used in research (in the case of scientists) or the tools to be applied in work (in the case of the military and other support personnel). The equipment used in the Antarctic field should be tested and correctly transported in advance. It is needed to compute the expected expedition duration, the amount of material necessary, the possible locations/time points of permanence, and its accessing routes. In addition, viewing the ATS, people planning to move to Antarctica need to know the protocols and norms of action that they must follow and consider the potential impact on their activities.

In addition to logistical issues and travel, moving to Antarctica undertakes risks. Antarctica imposes harsh conditions on health and performance, which the acronym ICE summarizes. The ICE conditions are found in both natural and built environments (ships, research stations, and summer camps) for arrival and permanence on the frozen continent. In this context, safety is the priority, and participants should not overlook ICE hazards.

Personally, pre-existing social support (i.e., family and friends) should be prepared for departure and the long-term separation (e.g., emotionally and financially). The return is also seen as part of the expedition,7,8 and it is desirable that conditions even cover this period, avoiding increasing a potential challenge of the “reentry.”8
and ice reflect ultraviolet radiation, demanding skin and eye protection.

Additional adversities include the possible proximity of large animals (e.g., seals or sea lions) and storms. White-outs and poor weather commonly impose several days spent in the tent with no fieldwork. Another particular factor of camps in Antarctica is communication restrictions and energy limitations (supplied by fuel-powered generators).

What to expect: in research stations
In Antarctica, around 40 stations with permanent occupancy of 10–250 members differ in size, shape, and features that reflect their construction dates in technology and solutions with different degrees of ecological concern. Nevertheless, there are common points between the research stations. The research stations lodge members over Antarctic summer and an entire year—the “hivernauts,” who go through the months under the extreme light regimes of the poles, from excessive light to the darkness in winter. The stations usually present a greater comfort and less environmental susceptibility than other ICE. However, while staying at the stations, members remain confined to the built-up habitable area and isolated from their home territory. It is still worth noting the difficulty (and potential impossibility) of evacuating the station, especially in winter—which occurs only in cases of extreme need and risks.

HOW TO PREPARE: SHARING PIECES OF ADVICE
We accessed English-language “participant guides” of different NAPs available online, highlighting the standard guidance that potentially serves all Antarctic personnel. Among the words that appear most frequently are: “safety,” “health,” “medical,” “equipment,” “cargo” and “baggage,” “clothing,” and “contact” revealing common points of emphasis. The predominance of the word “station” (and the names of research stations), compared to “vessel” (or “ship”) and “field,” suggests that this ICE is a focus of the guidelines (Fig. S1, Supplemental Material 1).

In general, the guides contain considerations for the expedition’s preparation, the travel route, and the stay in Antarctica. Here, we outlined typical preparation items (Table 1). Each NAP and Antarctic operation have specific demands that the participants need to consult; however, the importance of predeployment (or predeparture) training is notable before departure to Antarctica.

Efficient travel preparations are best made by knowing all the journey paths and forms of transport. It can be helpful for the expeditioners to seek information about the conditions and locations of permanence to prepare and adjust expectations about routine. For example, it may be valuable to know in advance the division of labor and the forms of accommodations occupancy (e.g., if the accommodation will be individual or shared, in a cabin on the ship, a room at a station, or a tent at a campsite). Stations and ships may have facilities that simplify stay and planning, such as laundries and conditions to meet specific dietary requirements (e.g., vegetarian food), internet, and/or telephone access. It is also important that the participants are alert to find out the energy supply and electrical voltage of the locations of permanence. Mainly in camps, individual portable solar chargers are an alternative to assist in charging small equipment, such as mobile devices for work or leisure.

A BRIEF CASE REPORT: MOOD STATES DURING A BRAZILIAN PAT
A strategy to assist in predeployment preparation is the NAPs’ PAT. To prepare the Brazilian Antarctic Program participants for the conditions faced in the expeditions, the Brazilian Navy annually promotes a 1-week theoretical-practical training [the PAT, in Rio de Janeiro (Island of Marambaia)]. During the PAT, researchers and military personnel participate in informative lectures about Antarctica and practical tasks. Also, during the PAT the participants’ capacity to carry out the tasks necessary for a polar expedition is evaluated. Besides, researchers whose work field includes camping remain in an Antarctic-model camp. Since the PAT seeks to simulate aspects experienced in Antarctica (e.g., camping assembly, the pressure to complete tasks on time, the coexistence in reduced groups, and daily physical activities), this week of training may also result in mood changes.

Thus, as a case report, we compared participants’ moods at the beginning and the end of a PAT week for both researchers’ groups staying in accommodation and camp and for military personal staying in accommodation. We hypothesized that for individuals staying in accommodation (lodging) and camping PAT would increase negative mood dimensions (e.g., increasing fatigue) due to physical demand and activities.

Subjects and Experimental Approach to the Problem
This study followed the Brazilian National Health Council regulations (resolution 466/2012) and was approved by the Research Ethics Committee of the Universidade Federal de Minas Gerais (protocol number 1.829.582). Participants in this study include men in lodging (M-L; n = 10, 32.3 ± 9.5 years; data in mean ± standard deviation), women in lodging (W-L; n = 18, 28.5 ± 4.3 years), men in camp (M-C; n = 10, 29.6 ± 7.8 years), women in camp (W-C; n = 8, 29.5 ± 7.5 years), and naval personnel in lodging (N-L, all men; n = 14, 37.3 ± 4.6 years). Allocation to camp or accommodation was dependent on each researcher’s training demands for the future activity to be developed in Antarctica. Campers used an open area to set up a structure similar to that of an Antarctic camp. In the PAT camp, the individual tents were divided by two individuals of the same sex. The campers had access to an external bathroom (with no shower). Also, campers accessed the refectory only for breakfasts and lunches and prepared dinners in the living tents. In the lodge, the individuals stayed in collective rooms separated by sex (with single beds for each participant) and had access to an
TABLE I. Items and Suggestions for Observation and Checking Obtained from NAPs Participant Guides for Antarctic Expeditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Suggestion for observation/checking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Antarctic training</td>
<td>• Specific pre-Antarctic training and qualifications/certifications</td>
</tr>
<tr>
<td>Documents, forms and payment methods</td>
<td>• Passports (at least 6 months validity)/Visas/Credit card valid for the entire period and authorized for use abroad/Money “on hand” to travel/Check necessary forms for NAP and authorizations and/or permits.</td>
</tr>
<tr>
<td>Health</td>
<td>• Medical and dental examination/Immunization: check vaccines that are needed for the journey. Obs. Check what certifications are required by NAP for health items. Also, there are guides that suggest considering making a will.</td>
</tr>
<tr>
<td>Finances</td>
<td>• Organization of regular expenses to be paid. Define how the bank account will be managed. Also, there are guides that suggest considering making a will.</td>
</tr>
<tr>
<td>Preparation of family and close ones</td>
<td>• Explanations about communication during the expedition/Decisions about communicating eventual bad news during the expedition.</td>
</tr>
</tbody>
</table>
| What to take                                  | • Clothing: outdoor and indoor  
• Personnel equipment: computer, mobile phones, tablets, chargers, cables, memory sticks or external hard drive, and batteries.  
• Additional prescription glasses (and contact lens)  
• Personnel sun protection: sunglasses, sunscreen for ultraviolet (UV) rays (UVA and UVB), and lip balm.  
• Water bottle  
• Toiletries  
• Medication: regular medication.  
• Medication: evaluate with your doctor the suitability of and pain relievers, anti-seasickness (in case of ship onboard), and vitamins (especially for overwinters)  
• Recreation resources: books, music and movies on electronic devices, card and board games, art materials, and musical instruments  
• Personnel Protective Equipment (PPE): safety glasses, snow google, laboratorial PPE, and fieldwork PPE.  
Obs. Check the limits for personal load and avoid excess packaging. Clean clothing and materials being taken to Antarctica so that they do not contain species not naturally occurring in Antarctica. In addition, do not take: polystyrene beads, chips or similar, products with microbeads, polychlorinated biphenyls, and pesticides. |

*Know what the NAP provides and what will need to be purchased personally. Abbreviation: NAPs: National Antarctic Programs.

The volunteers answered 24-item Brunel Mood Scale (BRUMS)\(^{21,22}\) to mood states dimension evaluation at the end of the first day of the PAT (“initial measure,” on day 1) and in the afternoon on the last day of the PAT (“final measure,” on day 6). Also, on the first day of the PAT, the volunteers answered the 36-Item Short-Form Health Survey questionnaire\(^{23,24}\) to sample characterization (Table S1, Supplemental Material 2).

**Mood responses questionnaire**

The BRUMS scale is a subclinical psychological questionnaire correlated with mood states and mental health.\(^{25}\) BRUMS is used in different contexts, in general physically active populations\(^{25–27}\) and military personnel,\(^{27}\) including application during expeditions in extreme environments.\(^{10,28}\)

The BRUMS has six dimensions: (1) “Anger,” designating a state of hostility, represented by the words Annoyed, Bitter, Angry, or Bad-tempered; (2) “Confusion,” represented by the words Confused, Muddled, Mixed-up, Uncertain; (3) “Depression,” an emotional state of discouragement, sadness, and unhappiness, represented by the words Depressed, Downhearted, Unhappy, Miserable; (4) “Fatigue,” a state of tiredness and low energy, represented by the words Worn out, Exhausted, Sleepy or Tired; (5) “Tension,” a musculoskeletal tension and worries, represented by the words Panicky, Anxious, Worried, or Nervous; (6) “Vigor,” designating a state of energy and physical strength represented by the words Lively, Energetic, Active, or Alert.\(^{21,22,25}\) Each item is preceded by the question “How do you feel right now?” and should be answered on a Likert-type 5-point scale (from 0 = “not at all” to 4 = “extremely”). Therefore, the total score for each dimension ranges from 0 to 16. For the BRUMS domains, a higher score means a worse outcome, except for ‘vigor’, for which a higher score reflects a better outcome. Total Mood Disturbance index (TMD) was calculated (i.e., the sum of scores for tension, depression, anger, fatigue, and confusion minus vigor score), and a cutoff of ≥24 was used as an indicator of elevated TMD.\(^{29}\)

**Statistical Analysis**

The Shapiro–Wilks test revealed that the parameters evaluated did not show a normal distribution; thus, nonparametric statistical tests were applied. Outlier data were not excluded to internal bathroom with a shower. The lodgers had access to the refectory during all meals and did not need to prepare meals (for additional characterization of the PAT’s activities, see Box S1, Supplemental Material 2).

The volunteers answered 24-item Brunel Mood Scale (BRUMS)\(^{21,22}\) to mood states dimension evaluation at the end of the first day of the PAT (“initial measure,” on day 1) and in the afternoon on the last day of the PAT (“final measure,” on day 6). Also, on the first day of the PAT, the volunteers answered the 36-Item Short-Form Health Survey questionnaire\(^{23,24}\) to sample characterization (Table S1, Supplemental Material 2).

**Mood responses questionnaire**

The BRUMS scale is a subclinical psychological questionnaire correlated with mood states and mental health.\(^{25}\) BRUMS is used in different contexts, in general physically active populations\(^{25–27}\) and military personnel,\(^{27}\) including application during expeditions in extreme environments.\(^{10,28}\)

The BRUMS has six dimensions: (1) “Anger,” designating a state of hostility, represented by the words Annoyed, Bitter, Angry, or Bad-tempered; (2) “Confusion,” represented by the words Confused, Muddled, Mixed-up, Uncertain; (3) “Depression,” an emotional state of discouragement, sadness, and unhappiness, represented by the words Depressed, Downhearted, Unhappy, Miserable; (4) “Fatigue,” a state of tiredness and low energy, represented by the words Worn out, Exhausted, Sleepy or Tired; (5) “Tension,” a musculoskeletal tension and worries, represented by the words Panicky, Anxious, Worried, or Nervous; (6) “Vigor,” designating a state of energy and physical strength represented by the words Lively, Energetic, Active, or Alert.\(^{21,22,25}\) Each item is preceded by the question “How do you feel right now?” and should be answered on a Likert-type 5-point scale (from 0 = “not at all” to 4 = “extremely”). Therefore, the total score for each dimension ranges from 0 to 16. For the BRUMS domains, a higher score means a worse outcome, except for ‘vigor’, for which a higher score reflects a better outcome. Total Mood Disturbance index (TMD) was calculated (i.e., the sum of scores for tension, depression, anger, fatigue, and confusion minus vigor score), and a cutoff of ≥24 was used as an indicator of elevated TMD.\(^{29}\)

**Statistical Analysis**

The Shapiro–Wilks test revealed that the parameters evaluated did not show a normal distribution; thus, nonparametric statistical tests were applied. Outlier data were not excluded to
allow the visualization of scores approaching the extremes of scale ranges. Thus, caution regarding the present data is the possible occurrence of type II error (i.e., false negative). To comparisons of mood states across two-time points of paired data (i.e., beginning and end of the Pre-Antarctic training to all groups), the Wilcoxon test (signed-rank test) was applied. The raw scores of BRUMS were also converted into T-scores normative scores for non-athlete men and women. 30 It is worth mentioning that T-score is a scaled score resulted from the transformation of raw scores to standard scores. 31 The α level was set at 0.05. Statistical analyses were performed using the SigmaPlot 11.0 software (Systat Software Inc.). Data are shown as median and lower and upper quartiles, Q1 and Q3.

Results and discussion

Compared to the initial measure, at the end of the PAT, men in lodging (M-L) presented reduced confusion and tension but also presented reduced vigor and increased scores of anger and fatigue. There were no mood changes for the camping groups (men in camp, M-C; and women in camp, W-C), but men in camp presented a tendency to reduce confusion (P = .06) (Table II). There were no differences in variation ("final measures—initial measures") for any mood dimension between the groups (Fig. S2, Supplemental Material 2) or for TMD (Table II). Also, compared to naval personnel (N-L), men in lodging presented higher values for negative mood categories (Table S2, Supplemental Material 2).

The application of BRUMS allowed researchers access to mood states in both men and women that remained in a camp and lodging and between different social groups such as researchers and military personnel. Group-specific changes depended on the gender, functions, and the facilities that participants accessed. Therefore, besides providing technical and logistical information, the PAT can contribute to the participants’ ability to deal with mood fluctuations that may be faced in Antarctica.

Interestingly, all groups reported absolute high scores for vigor and low scores with no change in depression (Table II). Except for W-L, there were also no changes in vigor. Extreme or unusual environments and outdoor activities are related to increased perception of autonomy, self-sufficiency, and ability to deal with stress, leading individuals to experience positive perceptions. 9, 32 Based on the low scores for depression and high notes of vigor, it is worth evaluating whether the PAT represents a moment for the cultivation of experiences of positive affect, a fuel of an impetus for psychological resilience that facilitates coping with adversity. 33 However, normalization of the data by T-scores showed that after completing the PAT, some individuals had perceptions of their moods in extreme values, which exceeded reference data (of Terry and Parsons-Smith 30; Fig. 1, including some very low scores for "vigor." Also, at the final of PAT, two volunteers presented TMD ≥ 24 (W-C and M-L). It is necessary to understand whether these divergent responses would reflect a lower preparation for the rigors of deployment to a challenging environment and a later individual difficulty in adapting to an ICE condition. Alternatively, divergent mood scores on the PAT could contribute to the development of coping strategies associated with adaptive outcomes, to be employed later, resulting in a

<table>
<thead>
<tr>
<th>TABLE II. Mood States during the Pre-Antarctic Training (PAT)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M-L</strong></td>
</tr>
<tr>
<td><strong>Initial</strong></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Anger</strong></td>
</tr>
<tr>
<td><strong>Confusion</strong></td>
</tr>
<tr>
<td><strong>Depression</strong></td>
</tr>
<tr>
<td><strong>Fatigue</strong></td>
</tr>
<tr>
<td><strong>Tension</strong></td>
</tr>
<tr>
<td><strong>Vigor</strong></td>
</tr>
<tr>
<td><strong>TMD</strong></td>
</tr>
<tr>
<td><strong>Vigor</strong></td>
</tr>
<tr>
<td><strong>TMD</strong></td>
</tr>
<tr>
<td><strong>TMD</strong></td>
</tr>
<tr>
<td><strong>TMD</strong></td>
</tr>
</tbody>
</table>

Values attributed by the participants of the PAT to mood states, evaluated using the Brunel Mood Scale measured at the beginning of the PAT (i.e., “initial measure;” on day 1 of the PAT) and the end of PAT (i.e., “final measure;” on day 6 of the PAT) in men and women who remained in the accommodations of the Brazilian Navy (M-L and W-L, respectively) and in men and women who remained in the camp (M-C and W-C, respectively) during the PAT. Men in lodging (M-L; n = 10), Women in lodging (W-L; n = 18), Men in Camp (M-C; n = 10), and Women in Camp (W-C; n = 8). TMD: total mood disturbance. *Significantly different from the initial value. There were no differences in the initial mood measurements between the M-L vs. M-C, M-C vs. W-C, and W-L vs. W-C (all P > .05); however, W-C tended to present higher values of fatigue compared to W-L (P = .057). Compared to M-L, W-L presented lower values for anger (P = .042), but no other difference was observed in the initial mood measurements. The results are presented as median and the interquartile range (25th–75th percentile). P < .05
salutogenic experience in ICE. Thus, quantifying moods and relating the scores profile to the subsequent ICE experience may contribute to the elaboration of predeployment strategies looking for factors that support human health and well-being in expeditions. Additionally, using BRUMS—a questionnaire of easy and quick application—can contribute to military training to know and assess fitness for duty in extreme conditions and evaluate the recovery humor in return. In this sense, van Wijk et al. showed mood profiling and TMD as screening tools for posttraumatic stress risk in military populations. The present findings are circumscribed to Brazilian PAT conditions from data evaluated on only one occasion. Also, the present discussion regarding the participants’ mood states is limited by the method used—a validated questionnaire with a scale of psychometric response with the possible influence of social expectation on the response. Considering that the questionnaires were answered on days with different activities, the acute effect possibly influenced the observed responses. Hereafter, a leading step will be (1) seek to understand mood changes in other groups during PAT; (2) conduct similar investigations with a larger sample to confirm whether the absence of differences for some dimensions herein reported is reproducible or a false negative; (3) look for the association of mood changes with psychological aspects and with physical and physiological variables, including measures of intensity of physical effort, to comprehend relative physical demands of different groups; (4) perform data collection in the morning, as soon as volunteers wake up, minimizing the effect of the day’s activities on responses; and (5) add comparative baseline measures, a-before PAT, b-after PAT, c-after deployment to ICE, and d-after return, to better understand the dynamics of mood changes and subjects’ emotionality.

**CONCLUSIONS**

The specificities of moving and staying in Antarctica impose (1) demands of knowledge about logistics and legislation to arrive and stay in the region and (2) psychophysical challenges...
during the permanence in the Antarctic ICE environment. Since the participants must prepare in advance, a used strategy to assist in this preparation consist of offering PAT to provide instructions about the protocols to follow. As far as possible—in logistical and climatic terms—it is necessary to simulate the experiences to be faced in Antarctica. Despite the tropical context of Brazilian PAT, relevant patterns have emerged. The training week modulates participants’ mood, increasing fatigue for women in lodging but promoting maintenance of vigor in most groups. Therefore, PAT week can favor individual coping strategies and group interaction, which may enhance Antarctica field expeditions’ salutogenic experiences. Thus, future controlled studies are needed to clarify this hypothesized association, i.e., whether PAT results (in a cause-effect mode) in developing individual coping strategies and whether these gains are extensible to the Antarctic experience.

It is noteworthy that, if research with human groups in Antarctica is still a relatively new area, investigations of strategies to prepare the groups in advance for this confrontation emerge as an even more recent field. For a future perspective, we highlight the importance of comprehending the predeployment phase and the effects of PAT for different audiences, genders, cultural, and geographic contexts to improve the preparation of people moving to the Antarctica ICE environments. Additionally, in the present commentary, we have not addressed the return and reintegration experience and its relation to the predeployment and ICE deployment phases but recognize this as a relevant topic looking for facilitating the “reentry” after an expedition.

ACKNOWLEDGMENTS

The authors thank the military personnel involved in the Brazilian OPERANTAR for logistical support. Especially, the authors thank the volunteers who participated in this study.

SUPPLEMENTARY MATERIAL

Supplementary material is available at Military Medicine online.

FUNDING

This study was supported by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)/Ministério da Ciência, Tecnologia e Inovações (MCTI)/Coordenação de Aperfeiçoamento de Pessoal de Nível Superior—Brasil (CAPES)/Fundão Nacional de Desenvolvimento Científico e Tecnológico (FNDCF)/Programa Antártico Brasileiro (PROANTAR) [442645/2018-0]; Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG) [AEC-00017-18]; CDS-PPM 000304/16; CBB-AQ-01419-14 and Pro-Reitoria de Pesquisa da Universidade Federal de Minas Gerais (PRPq/UFMG). R.M.E.A. received research fellowship from Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) [311976/2021-2]. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior—Brasil (CAPES) —Finance Code 001; MMM postdoctoral fellowship, CAPES/BRASIL [88887.321687/2019-00].

CONFICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest.

AUTHORS’ CONTRIBUTIONS STATEMENT


REFERENCES