

Adapting to the Extremes: The Role of Personality, Ego Resiliency, and Values in Polar Expeditions

Agnieszka SKORUPA^{1,✉}, Paola BARROS-DELBEN², and Alicja WALOTEK³

¹Institute of Psychology, University of Silesia in Katowice, Katowice, Poland

²Human Factor Laboratory, Federal University of Santa Catarina, Brazil

³Faculty of Social Sciences, University of Silesia in Katowice, Katowice, Poland

✉ agnieszka.skorupa@us.edu.pl

1. INTRODUCTION

Working in isolated, confined, and extreme (ICE) environments, such as Arctic and Antarctic research stations, presents numerous psychological challenges (Palinkas and Suedfeld 2021). These challenges make psychological resilience, personality traits, and personal values critical to successful adaptation. This study investigates the relationships between personality, ego resilience, and values in the context of adaptation to ICE conditions. It further explores gender, regional, duration-based, and national differences in these psychological variables, building upon previous research (e.g., Bishop et al. 2010; Kaczmarek 2019; Nicolas et al. 2019; Smith et al. 2017).

2. CONTEXT AND BACKGROUND

Research has consistently shown that certain psychological predispositions play a key role in how individuals cope with and adapt to stress-inducing environments (Kaczmarek 2019). Ego-resiliency, as demonstrated in studies by Kaczmarek, Sęk, and Ziarko (Kaczmarek et al. 2011), facilitates flexible adaptation, which is essential in ICE environments. Traits such as low neuroticism, high extraversion, openness to experience, and agreeableness have been associated with better adaptation in polar conditions (Bishop et al. 2010; Terlak 1982). Values are equally relevant. According to Smith et al. (2017), values such as self-direction, stimulation, universalism, and benevolence were prioritized by individuals in extreme environments. Previous studies have also indicated that cultural and gender differences might influence group dynamics and adaptation outcomes (Grant et al. 2007; Sandal et al. 2006; Strewe et al. 2019).

3. RESEARCH QUESTIONS

The following research questions were posed:

- (1) Are personality traits, ego resiliency, and personal values related to adaptation to ICE environments?
- (2) Are there differences between men and women in the explored psychological characteristics?
- (3) Are there differences between individuals working at Arctic versus Antarctic stations in the explored psychological characteristics?
- (4) Are there differences between individuals on short-term versus year-round stays in the explored psychological characteristics?
- (5) Are there differences between individuals of different nationalities in the explored psychological characteristics?

4. METHODOLOGY AND RESULTS

a. Participants

The 109 individuals (35.78% women) took part in the study. Participants aged 26–77 ($M = 48.84$, $SD = 13.91$), all with professional experience in polar stations, participated. 60.55% had worked in Antarctica, 15.6% in the Arctic, and 23.85% in both. 44.95% had short-term experience, 30.28% long-term, and 24.77% both. The study involved participants of various nationalities; therefore, the questionnaires were provided in three language versions: Polish, English, and Portuguese. The Polish version was completed by 48 participants, the English version by 44, and the Portuguese version by 17. In total, 44.04% of participants identified as Polish, 26.61% as American, 15.60% as Brazilian, and 13.76% represented other nationalities.

b. Measures

The following measurements were applied in the study:

- ICE-Q (Isolated and Confined Environments Questionnaire)
- HEXACO Personality Inventory
- PVQ-40 (Portrait Values Questionnaire)
- ER-89 (Ego Resiliency Scale)

c. Results

Preliminary study outcomes are as follows:

The analyses revealed several significant associations between psychological traits and adaptation to ICE (Isolated, Confined, and Extreme) environments. Extraversion was found to be moderately positively correlated with self-rated adaptation ($\rho = 0.27$; $p = 0.038$). Further analysis of the HEXACO personality traits showed that different traits were differentially associated with various dimensions of adaptation as measured by the ICE-Q. Physical adaptation was negatively correlated with emotionality ($\rho = -0.34$; $p = 0.008$). Social adaptation was positively associated with agreeableness ($r = 0.45$; $p < 0.001$) and conscientiousness ($r = 0.31$; $p = 0.015$). Emotional adaptation showed positive associations with honesty–humility ($\rho = 0.32$; $p = 0.012$) and openness to experience ($\rho = 0.35$; $p = 0.006$). Total adaptation scores were positively correlated with agreeableness ($\rho = 0.35$; $p = 0.007$) and honesty–humility ($\rho = 0.27$; $p = 0.037$).

No significant relationship was found between ego resiliency and subjective adaptation ($\rho = 0.13$; $p = 0.318$). Interestingly, ego resiliency showed a significant negative correlation with professional adaptation ($r = -0.30$; $p = 0.021$), suggesting that higher levels of ego resiliency may be associated with lower perceived professional adjustment in ICE contexts.

Subjective adaptation was significantly positively correlated with several value dimensions, including conformity ($\rho = 0.38$; $p = 0.002$), power ($\rho = 0.30$; $p = 0.019$), and universalism ($\rho = 0.26$; $p = 0.045$), with a trend-level association observed for tradition ($\rho = 0.25$; $p = 0.051$).

Associations were also found between values and specific ICE-Q dimensions. Physical adaptation was positively related to conformity ($\rho = 0.38$; $p = 0.002$), tradition ($\rho = 0.27$;

$p = 0.037$), and universalism ($\rho = 0.27$; $p = 0.040$). Social adaptation was significantly associated with conformity ($r = 0.36$; $p = 0.005$), tradition ($r = 0.26$; $p = 0.042$), and security ($r = 0.29$; $p = 0.024$). Emotional adaptation was positively associated with universalism ($\rho = 0.37$; $p = 0.004$), and negatively associated with power ($\rho = -0.29$; $p = 0.026$). Finally, overall adaptation was positively related to conformity ($\rho = 0.35$; $p = 0.006$).

Analyses revealed significant gender differences in certain personality traits and values. Women scored significantly higher than men on honesty–humility ($M = 47.08$ vs. $M = 43.76$; $p = 0.003$) and emotionality. No significant gender differences were observed in ego resiliency ($U = 308.00$; $p = 0.347$).

Regarding personal values, men reported significantly higher scores on security ($p = 0.005$), tradition ($p = 0.004$), achievement ($p < 0.001$), and power ($p = 0.006$), whereas women scored higher on universalism ($p = 0.045$).

When examining regional differences based on deployment location (Arctic vs. Antarctic), conscientiousness was the only personality trait that differed significantly across groups ($F(2) = 6.87$; $p = 0.032$); however, post-hoc comparisons did not yield significant pairwise differences. No significant regional differences were found in ego resiliency ($F(2, 106) = 0.09$; $p = 0.910$).

In terms of values, a significant difference emerged for security ($F(2, 106) = 3.18$; $p = 0.045$), with participants stationed exclusively in Antarctica reporting higher levels of this value dimension.

No significant differences were found in ego-resiliency levels between participants of different nationalities. However, significant cross-national differences emerged in several personal value dimensions. Brazilians scored higher in security and conformity compared to Poles and Americans. Participants of other nationalities scored lower in achievement than Americans and Brazilians. Additionally, Poles scored lower in hedonism compared to participants of other nationalities.

5. CONCLUSIONS

The findings show that personality traits and personal values significantly impact adaptation to isolated, confined, and extreme (ICE) environments. Extraversion, agreeableness, and honesty–humility were linked to better adaptation, especially in social and emotional domains. Surprisingly, ego-resiliency did not predict better adjustment and was negatively related to professional functioning. Values such as conformity, universalism, and tradition supported higher adaptation, particularly in physical and social areas. Cultural differences, like Brazilians scoring higher in security and conformity, suggest national values may shape adaptation styles. These insights may guide recruitment and training for polar missions, highlighting the importance of interpersonal traits and shared values.

References

- Bishop, S.L., R. Kobrick, M. Battler, and K. Binsted (2010), FMARS 2007: Stress and coping in an arctic Mars simulation, *Acta Astronaut.* **66**, 9–10, 1353–1367, DOI: 10.1016/j.actaastro.2009.11.008.
- Grant, I., H.R. Eriksen, P. Marquis, I.J. Orre, L.A. Palinkas, P. Suedfeld, et al. (2007), Psychological selection of Antarctic personnel: The “SOAP” instrument, *Aviat. Space Environ. Med.* **78**, 8, 793–800.
- Kaczmarek, R. (2019), Lęk jako korelat stresu i wypalenia zawodowego [Anxiety as a correlate of stress and burnout], *Zesz. Nauk. PWSZ* **1**, 50–62 (in Polish).

- Kaczmarek, Ł.D., H. Sęk, and M. Ziarko (2011), Sprężystość psychiczna i zmienne pośredniczące w jej wpływie na zdrowie, *Prz. Psychol.* **54**, 1, 29–46 (in Polish).
- Nicolas, M., G. Martinent, P. Suedfeld, and M. Gaudino (2019), Assessing psychological adaptation during polar winter-overs: The isolated and confined environments questionnaire (ICE-Q), *J. Environ. Psychol.* **65**, 101317, DOI: 10.1016/j.jenvp.2019.101317.
- Palinkas, L.A., and P. Suedfeld (2021), Psychosocial issues in isolated and confined extreme environments, *Neurosci. Biobehav. Rev.* **126**, 413–429, DOI: 10.1016/j.neubiorev.2021.03.032.
- Sandal, G.M., G.R. Leon, and L. Palinkas (2006), Human challenges in polar and space environments, *Rev. Environ. Sci. Biotechnol.* **5**, 2–3, 281–296, DOI: 10.1007/s11157-006-9000-8.
- Smith, N., F. Kinnafick, and B. Saunders (2017), Coping strategies used during an extreme Antarctic expedition, *J. Hum. Perform. Extrem. Environ.* **13**, 1, 1–11, DOI: 10.7771/2327-2937.1078.
- Strewe, C., D. Moser, J.-I. Buchheim, H.-C. Gunga, A. Stahn, B. E. Crucian, B. Fiedel, H. Bauer, P. Gössmann-Lang, D. Thieme, E. Kohlberg, A. Choukèr, and M. Feurecker (2019), Sex differences in stress and immune responses during confinement in Antarctica, *Biol. Sex Differ.* **10**, 20, DOI: 10.1186/s13293-019-0231-0.
- Terlak, J.F. (1982), *Człowiek w Sytuacjach Ekstremalnych: Izolacja Antarktyczna*, Wydawnictwo Ministerstwa Obrony Narodowej, Warszawa (in Polish).

Received 15 September 2025

Accepted 20 October 2025