Climate Climate Change Anxiety Scale (CCAS): proprietà psicometriche in studenti universitari

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Sommario

Nel 21° secolo, l'urgenza di affrontare il cambiamento climatico è stata esacerbata, dando origine a effetti psicologici negativi tra gli individui. L'ansia da cambiamento climatico, caratterizzata da una persistente apprensione per le catastrofi ambientali legate al cambiamento climatico, è emersa come un fenomeno degno di nota. Per valutare questo fenomeno, i ricercatori hanno introdotto la *Climate Change Anxiety Scale* (CCAS), uno strumento self-report composto da 22 item. Questo studio ha esaminato le proprietà psicometriche della versione italiana della CCAS a 22 item su 189 studenti universitari. Utilizzando l'analisi fattoriale confermativa (AFC), è stata esaminata la struttura fattoriale della versione italiana della CCAS. L'affidabilità è stata misurata attraverso l'alfa di Cronbach, mentre la validità concorrente è stata stabilita con il *Positive and Negative Affect Schedule* (PANAS) e il *Patient Health Questionnaire-4* (PHQ-4). La CCAS ha mostrato un adattamento ai dati adeguato per un modello a quattro fattori (deterioramento cognitivo-emotivo, danno funzionale, esperienza del cambiamento climatico, impegno comportamentale). È stata confermata anche la validità concorrente con PANAS e PHQ-4. La versione italiana della CCAS si è rivelata uno strumento affidabile per valutare l'ansia da cambiamento climatico, anche nel contesto italiano, presentando prospettive promettenti per la ricerca e gli interventi volti a migliorare il benessere nel fronteggiare le sfide ambientali.

Parole chiave

Climate Change Anxiety Scale, Eco-ansia, Ansia ecologica, Benessere.

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Climate Change Anxiety Scale (CCAS): Psychometric Properties in University Students

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Abstract

In the 21st century, the necessity to face climate change has become urgent, giving rise to adverse psychological effects among individuals. Climate change anxiety, characterized by persistent apprehension about environmental catastrophes linked to climate change, has emerged as a noteworthy phenomenon. To gauge this phenomenon, researchers have introduced the *Climate Change Anxiety Scale* (CCAS), a self-administered instrument composed of 22 items. This study examined the psychometric properties of the Italian version of the 22-item CCAS, involving 189 university students. Utilizing confirmatory factor analysis (CFA), the factor structure of the Italian version of the CCAS was scrutinized. Reliability was gauged through Cronbach's alphas, while concurrent validity was established with the *Positive and Negative Affect Schedule* (PANAS) and the *Patient Health Questionnaire-4* (PHQ-4). The CCAS exhibited an adequate fit for a four-factor model (cognitive-emotional impairment, functional impairment, experience of climate change, and behavioural engagement). Concurrent validity with PANAS and PHQ-4 was also confirmed. The Italian version of the CCAS was found to be a reliable tool for assessing climate change anxiety, even within the Italian context, presenting promising prospects for research and interventions to enhance well-being in the face of environmental issues.

Keywords

Climate Change Anxiety Scale, Climate Change Anxiety, Eco-Anxiety, Ecological anxiety, Well-being.

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Introduction

The global climate crisis is the most crucial issue for societies and economies in the twenty-first century and presents a significant concern for environmental and human health (e.g. Heeren & Asmundson, 2023; Morrison et al., 2022). Climate change is characterized by a shifting of temperature as well as weather variability, including a rise in the severity and likelihood of extreme environmental occurrences (Mariappan et al., 2023). Downstream effects of climate change impact the environment (e.g. desertification, forest fires, forest degradation, reducing ecosystem functionality and biodiversity, as well as lack of fresh water supplies), negatively affecting economic growth and human health (Watts et al., 2021). In this perspective, the health of populations is damaged in several ways (Nadeau et al., 2022; World Health Organization, 2021), with widespread negative psychological effects (Nadeau et al., 2022; Palinkas & Wong, 2020).

The reports provided by the United Nations Intergovernmental Panel on Climate Change (IPCC) emphasized that the objective to limit global warming could be attained if climate neutrality (i.e. worldwide zero carbon emissions) is attained between 2030 and 2050 (IPCC, 2022). However, global temperatures are set to continue to rise until 2050 despite many climate preventive actions having been planned (IPCC, 2022). Thus, concerns about a sustainable future for life on Earth are coming to characterize the most compelling worldwide scientific and political debates (Cianconi et al., 2023). In this scenario, a growing body of literature has highlighted an emergent psychological phenomenon concerning the climate crisis, namely «eco-anxiety» (Boluda-Verdú et al., 2022). Eco-anxiety is defined in terms of «a chronic fear of environmental doom» characterized by worries regarding the inadequacy of climate action and the adverse consequences of the warming of the planet (Clayton et al., 2017). Other labels that are used interchangeably by scholars are climate anxiety (Boyd et al., 2023), climate change worry (Stewart, 2021), ecological stress (Helm et al., 2018), environmental distress (Higginbotham et al., 2006), and ecological grief (Cunsolo & Ellis, 2018).

Scholars have developed measurement tools to assess eco-anxiety. In this regard, the most widely used tool (Boluda-Verdú et al., 2022) is the Climate Change Anxiety Scale (CCAS) (Clayton & Karazsia, 2020). This 22-item scale evaluates difficulties caused by the changing climate with regard to four factors, which encompass cognitive-emotional impairment, functional impairment, the experience of climate change, and behavioural engagement. Cognitive-emotional impairment encompasses concerns, difficulties in concentration, and occurrences of nightmares or crying. Functional impairment relates to how an individual's apprehensions concerning climate change interfere with their capacity to socialize or work. The experience of climate change denotes an individual's exposure to the phenomenon. At the same time, behavioural engagement pertains to individuals

actively involved in sustainability efforts and who acknowledge the necessity for a behavioural response (Clayton & Karazsia, 2020).

The interest in this construct has prompted researchers to explore its psychometric properties in populations beyond English speakers. Notably, various studies have validated the abbreviated version of the scale, consisting of 13 items loading on the first two factors, namely cognitive-emotional impairment and functional impairment. These studies include the German (Wullenkord et al., 2021), Polish (Larionow et al., 2022), French (Mouguiama-Daouda et al., 2022), Filipino (Simon et al., 2022), Korean (Jang et al., 2023), Japanese, Chinese (Tam et al., 2023) and Italian (Innocenti et al., 2021) versions of the scale.

However, it's crucial to note that Mouguiama-Daouda and colleagues (2022) were the only ones who explored the psychometric properties of the original four-factor solution in French-speaking participants. Their study utilized confirmatory factor analysis, revealing acceptable fit indices for a correlated four-factor solution. Data from a cross-national survey run on adolescents showed that 59% of them expressed profound concern about climate change, and more than 45% had impairment of everyday activities attributed to eco-anxiety (Hickman et al., 2021). Moreover, research has shown that younger individuals (Léger-Goodes et al., 2022; Sciberras & Fernando, 2022; Thomas et al., 2022) and university students are particularly vulnerable to these adverse effects, as they are more exposed to climate issues and their related concerns through social media (Searle & Gow, 2010). Despite this, the psychometric properties of the 22-item CCAS in the Italian context have not been thoroughly investigated in university students. Consequently, the current research aims to evaluate the psychometric properties of the 22-item CCAS – Italian version, contributing to its broader applicability within the context of Italian university students.

Methods

Participants and Procedure

To translate the Italian version of the *Climate Change Anxiety Scale* (CCAS) from English into Italian, the back-translation method was employed. A total of 189 university students from Tuscany, Central Italy, voluntarily took part in the research (M_{age} = 21.59, SD = 4.27; male = 27%, female = 73%). Prior to their involvement, each participant provided written and informed consent in compliance with Italian privacy legislation (Legislative Decree DL 196/2003) and the EU General Data Protection Regulation (EU 2016/679). To mitigate presentation order effects, the administration order was balanced.

Instruments

The Italian version of the *Climate Change Anxiety Scale* (CCAS) (Clayton & Karazsia, 2020), developed by Di Fabio and Svicher, was utilized in the study. This self-report questionnaire consists of 22 items (5-point Likert scale), originally demonstrating four factors: cognitive-emotional impairment, functional impairment, the experience of climate change, and behavioural engagement (Clayton & Karazsia, 2020).

The *Positive and Negative Affect Schedule* (PANAS) – Italian version (Terraciano et al., 2003) was utilized. PANAS consists of twenty adjectives reflecting Positive Affect (PA) and Negative Affect (NA) (5-point Likert scale) (Cronbach's alpha PA = 0.81; Cronbach's alpha NA = 0.85).

The *Patient Health Questionnaire-4* (PHQ-4) – Italian version (Giuliani et al., 2021) was employed. It comprises four items assessing feelings of anxiety, tension, difficulty in controlling worry, loss of interest, and feeling down (Cronbach's alpha = 0.79).

Statistical analysis

Confirmatory factor analysis (CFA) was employed to investigate the factor structure of the CCAS-Italian version. The tested four-factor model included four correlated factors with item loadings on cognitive-emotional impairment (8 items), functional impairment (5 items), experience of climate change (3 items), and behavioural engagement (6 items). Fit indices were considered: Comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). Values > 0.90 and > 0.95 for the CFI and TLI, respectively, underlined acceptable and good fit. Differently, RMSEA values < 0.08 suggested a reasonable fit, with a further distinction of values below 0.05 indicating a good fit (Hu & Bentler, 1999). Concurrent validity with PANAS and PHQ-4 was assessed through correlations. RStudio 2022.12.0 for Mac, along with *Lavaan* 0.6-15, *SemPlot* 1.1.6, and *Psych* 2.3.3 packages, were used for statistical analyses.

Results

Table 1 reports the results of the CFA for the *Climate Change Anxiety Scale* (CCAS). Confirmatory factor analysis identified a four-factor solution for the Italian version of the CCAS for university students, fitting adequately to the data. Figure 1 presents the path diagram of the correlational model of the CCAS. Table 2 displays the four factors' factor loadings and Cronbach alphas, indicating good factor loadings and reliable internal consistency.

Table 3 reports correlations among the Italian versions of the CCAS, PANAS, and PHQ-4. The Cognitive-Emotional Impairment, Functional Impairment, and Experience of Climate Change factors exhibited statistically significant and positive correlations with PHQ-4, negative correlations with PANAS PA, and positive correlations with PANAS NA. The Behavioural Engagement factor showed a statistically significant and negative correlation with PHQ-4, a positive correlation with PANAS PA, and a negative correlation with PANAS NA (Table 3).

Table 1

Fit indexes of the Climate Change Anxiety Scale (CCAS) – Italian version (n = 189).

Model	Chi-square(df)	CFI	TLI	RMSEA [90% CI]
Four-Factor	362.253(203)***	0.926	0.916	0.064 [0.054-0.075]

Note. CFI = Comparative Fit Index; TLI = Tucker-Lewis index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Squared Residual. For the CFI and TLI, values greater than 0.90 indicate acceptable fit and greater than 0.95 for good fit. Values less than 0.08 for the RMSEA indicate a reasonable fit (Hu & Bentler, 1999).

Table 2

Climate Change Anxiety Scale (CCAS)– Italian version: Factor Loadings of Confirmatory Factor Analysis and Cronbach Alphas (n = 189).

Item	CEI	FI	ECC	BE
CCAS 1	0.69			
CCAS 2	0.88			
CCAS 3	0.92			
CCAS 4	0.89			
CCAS 5	0.49			
CCAS 6	0.83			
CCAS 7	0.89			
CCAS 8	0.69			
CCAS 9		0.70		
CCAS 10		0.36		

CCAS 11		0.87		
CCAS 12		0.80		
CCAS 13		0.61		
CCAS 14			0.79	
CCAS 15			0.69	
CCAS 16			0.37	
CCAS 17				0.55
CCAS 18				0.64
CCAS 19				0.58
CCAS 20				0.68
CCAS 21				0.43
CCAS 22				0.39
Cronbach's Alpha	0.91	0.79	0.70	0.74

Note. CCAS = Climate Change Anxiety Scale; CEI= Cognitive-Emotional Impairment; FI= Functional Impairment; ECC= Experience of Climate Change; BE= Behavioural Engagement.

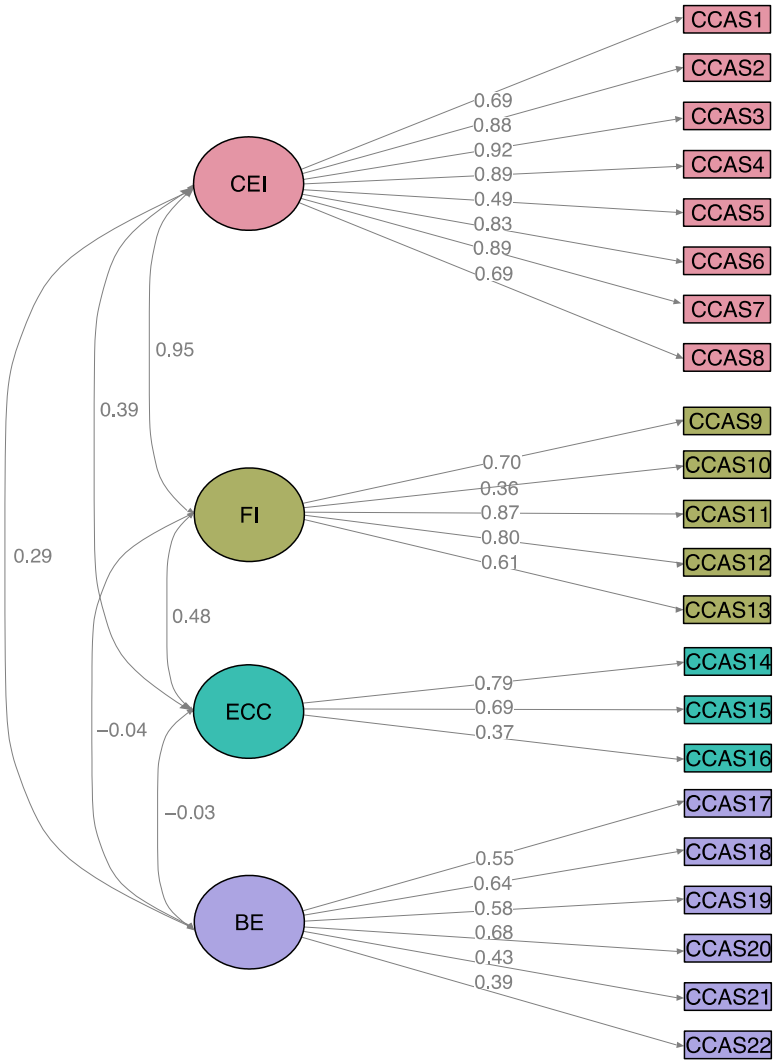
Table 3

Correlations among CCAS, PHQ-4, and PANAS (n = 189)

	PHQ-4	PANAS PA	PANAS NA
1. CCAS CEI	0.26**	-0.22**	0.24**
2. CCAS FI	0.22**	-0.18**	0.25**
3. CCAS ECC	0.17**	-0.14*	0.19**
4. CCAS BE	-0.21**	0.15**	-0.13*

Note. CCAS = *Climate Change Anxiety Scale;* CEI = Cognitive-Emotional Impairment; FI = Functional Impairment; ECC= Experience of Climate Change; BE= Behavioural Engagement; PANAS PA = *Positive and Negative Affect Schedule Positive Affect;* PANAS NA = *Positive and Negative Affect Schedule Negative Affect;* PHQ-4 = *Patient Health Questionnaire-4.*

Figure 1



Note. CEI = Cognitive-Emotional Impairment; FI = Functional Impairment; ECC = Experience of Climate Change; BE= Behavioural Engagement; CCAS = *Climate Change Anxiety Scale*.
Climate Change Anxiety Scale (CCAS) – Italian version: Path diagram of the four-factor model (n = 189).

Discussion

The present study utilized CFA to evaluate the psychometric properties of the Italian version of the CCAS, a self-reported scale measuring Climate Change

Anxiety (Clayton & Karazsia, 2020). Our results align with the original English version, confirming the presence of four specific factors (Clayton & Karazsia, 2020). Reliability for each factor was deemed satisfactory. Concurrent validity was demonstrated through significant positive associations with negative affect and psychological distress, as well as negative associations with positive affect. While our study is limited to university students in Tuscany, Central Italy, it represents the first investigation of the psychometric properties of the 22-item CCAS in Italian university students. Future research could explore different populations across Italy, such as workers and high-school students. Furthermore, relationships with current promising constructs, such as eco-generativity, could be investigated (Di Fabio & Svicher, 2023a, 2023b). In summary, the Italian version of the CCAS for university students exhibits good psychometric properties, revealing a reliable four-factor structure, establishing it as a promising tool for measuring the dimensions of climate change anxiety, in accordance with Clayton and Karazsia's (2020) original model.

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