Proprietà psicometriche della versione italiana della *Climate Change Anxiety Scale*

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Sommario

La sfida del cambiamento climatico è diventata sempre più pressante nel 21° secolo, portando gli individui a fare esperienza di stati psicologici negativi. L'ansia da cambiamento climatico si riferisce alla paura cronica di un disastro ambientale causata dalle preoccupazioni per il cambiamento climatico. Per valutare questo fenomeno, i ricercatori hanno sviluppato una scala self-report di 22 item: la *Climate Change Anxiety Scale* (CCAS). Questo studio ha l'obiettivo di valutare le proprietà psicometriche della versione italiana del CCAS a 22 item in 411 studenti universitari. La struttura fattoriale della versione italiana del CAAS è stata analizzata mediante l'analisi fattoriale confermativa (AFC). L'affidabilità dello strumento è stata valutata utilizzando l'alfa di Cronbach, per misurare la validità concorrente sono stati utilizzati PANAS e PHQ-4. La versione italiana della CAAS ha dimostrato un buon adattamento ai dati per un modello di ordine superiore con quattro fattori (deterioramento cognitivo-emotivo, danno funzionale, esperienza del cambiamento climatico e impegno comportamentale), regrediti su un fattore di ordine superiore di ansia da cambiamento climatico. È stata confermata anche la validità concorrente con PANAS e PHQ-4. La versione italiana della CAAS è uno strumento affidabile per misurare l'ansia da cambiamento climatico anche nel contesto italiano. Ciò apre promettenti opportunità di ricerca e di intervento per rispondere questo tema promuovendo il benessere.

Parole chiave

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

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Psychometric Properties of the Italian Version of the *Climate Change Anxiety Scale*

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Abstract

The challenge of climate change has become increasingly pressing in the 21st century, leading individuals to experience negative psychological effects. Climate change anxiety refers to the chronic fear of environmental doom caused by concerns about climate change. To assess this phenomenon, researchers have developed a 22-item self-report scale: the *Climate Change Anxiety Scale* (CCAS). This study aimed to evaluate the psychometric properties of the Italian version of the 22-item CCAS in 411 university students. The factor structure of the Italian version of the CAAS was analysed using confirmatory factor analysis (CFA). Reliability was assessed using Cronbach's alphas, and concurrent validity was evaluated using the Positive and Negative Affect Schedule (PANAS) and the Patient Health Questionnaire-4 PHQ-4. The Italian version of the CAAS demonstrated a good fit for a higher-order model with four factors (cognitive-emotional impairment, functional impairment, experience of climate change, and behavioural engagement) regressed onto a higher-order climate change anxiety factor. Concurrent validity with PANAS and PHQ-4 was also confirmed. The Italian version of the CAAS is a reliable instrument for measuring climate change anxiety also in the Italian context. It opens promising opportunities for research and intervention aimed at coping with this issue, promoting well-being.

Keywords

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

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Climate change is one of the most crucial issues for the 21st century, impacting not only the environment but also human health (e.g., Heeren, Mouguiama-Daouda, & Contreras, 2022; Morrison et al., 2022). The health of populations is damaged in several ways (Nadeau et al., 2022) with an increase in negative psychological effects (Palinkas & Wong, 2020). In turn, a widespread emerging research line in applied psychology has examined anxiety, worry, and concerns that individuals have experienced in facing the challenges of climate change (e.g., Boluda-Verdú et al., 2022). In this scenario, literature has highlighted an emergent psychological phenomenon concerning the climate crisis, labelled «eco-anxiety» (Boluda-Verdú et al., 2022; Clayton et al., 2017). Eco-anxiety is defined as «a chronic fear of environmental doom» belonging to concerns about the insufficiency of climate action and the negative repercussions of global warming (Clayton et al., 2017, p. 68). Climate change worry (Stewart, 2021), climate anxiety (Boyd, Parr, & Philo, 2023), ecological stress (Helm et al., 2018), ecological grief (Cunsolo & Ellis, 2018), environmental distress (Higginbotham et al., 2006), and solastalgia (Galway et al., 2019) are other terms that researchers often use interchangeably. Eco-anxiety is often regarded as a person's healthy response to climate change as opposed to a more nuanced pathology-based response like those common in anxiety disorders (Usher, Durkin, & Bhullar, 2019). However, scholars claim that anxiety about climate change may serve as a trigger for underlying mental health issues (Gunasiri et al., 2022; Usher, Durkin, & Bhullar, 2019). In this respect, young individuals have been demonstrated to experience greater discomfort as a consequence of climate change than older people. According to data from an internationally conducted survey of adolescents, 59% were extremely or very worried about climate change, and more than 45% experienced daily functional impairments (e.g., hurting their ability to work and/or socialize) because of eco-anxiety (Hickman et al., 2021). To better understand and measure the extent of this phenomenon, research has advanced several measurement tools and, according to the literature (Boluda-Verdú et al., 2022), the *Climate Change Anxiety Scale* (CCAS) (Clayton & Karazsia, 2020) is the most widely used instrument.

The *Climate Change Anxiety Scale* (CCAS) (Clayton & Karazsia, 2020) is a 22-item self-report scale that assesses four factors of climate change anxiety, namely cognitive-emotional impairment, functional impairment, experience of climate change and behavioural engagement. Cognitive-emotional impairment is described by worry, difficulties in concentrating, and nightmares/crying. Functional impairment consists of the presence of a person's worries about climate change, which interferes with the capability of socializing or working. Experience of climate change indicates the occurrence of individual exposure to climate change. Behavioural engagement deals with people that are not only engaged with sustainability but also agree with the importance of a behavioural response (Clayton & Karazsia, 2020).

The construct aroused the interest of researchers, and the psychometric properties of the scale were tested in other populations than the English-speaking one. However, to the best of our knowledge, the majority of these studies validated the short version of the scale, which comprised 13 items loading on the first two factors (cognitive-emotional impairment; and functional impairment), such as the German (Wullenkord et al., 2021), Polish (Larionow et al., 2022), French (Mouguiama-Daouda et al., 2022), Filipino (Simon, Pakingan, & Aruta, 2022), Korean (Jang, Chung, & Lee, 2023), Japanese, Chinese (Tam, Chan, & Clayton, 2023), and Italian (Innocenti et al., 2021) versions.

Only Mouguiama-Daouda and colleagues (2022) explored the psychometric properties of the original four-factor solution in a French-speaking sample, via confirmatory factor analysis, reporting partially acceptable fit indices for a correlated four-factor solution. However, the psychometric properties of the 22-item CAAS, according to the best of our current knowledge, was not explored in the Italian version of the CAAS. Therefore, the present study aims to evaluate the psychometric properties of the Italian version of the 22-item CAAS for its use also in the Italian context.

Methods

Participants and Procedure

The back-translation method was used to translate the Italian version of the CAAS from English into Italian. Four hundred and eleven (n = 411) university students from Tuscany, Central Italy (mage = 19.75, DS = 1.29; male = 49.3%, female = 50.7%) participated in the present study voluntarily. Each participant gave written and informed consent in accordance with Italian privacy legislation (Law Decree DL 196/2003) and the EU General Data Protection Regulation (EU 2016/679). The administration order was balanced to counteract presentation order effects.

Instruments

Climate Change Anxiety Scale (CCAS) – Italian version. The Italian version (by Di Fabio & Svicher) of the CAAS (Clayton & Karazsia, 2020) is a self-report questionnaire composed of 22 items rated on a 5-point Likert scale. The original version of the scale showed four factors: cognitive-emotional impairment, functional impairment, the experience of climate change, and behavioural engagement (Clayton & Karazsia, 2020).

Positive and Negative Affect Schedule (PANAS) — *Italian version* (Terracciano, McCrae, & Costa, 2003). The Italian version of the PANAS (Watson, Clark, &

Tellegen, 1988) is composed of twenty adjectives, ten reflecting Positive Affect (PA) (examples «interested», «enthusiastic», «determined») and ten dealing with Negative Affect (NA) (examples «distressed», «afraid», and «irritable») rated on a 5-point Likert scale. The Cronbach's alpha for PA was 0.79, whereas for NA it was 0.82.

Patient Health Questionnaire-4 (PHQ-4) — *Italian version* (Giuliani et al., 2021). *Patient Health Questionnaire-4* (PHQ-4) (Löwe et al., 2010) — *Italian version* (Giuliani et al., 2021). The Italian version of the PHQ-4 consists of four items. Two items investigate feelings of anxiety, tension, and difficulty in controlling worry. The other two items investigate loss of interest and feeling down. For all items, the response options are «not at all», «several days», «more than half the days» and «almost every day», with scores of 0, 1, 2, and 3, respectively (Löwe et al., 2010). The Italian version showed good psychometric properties (Giuliani et al., 2021). In the current study, the total score was used. Cronbach's alpha was 0.82.

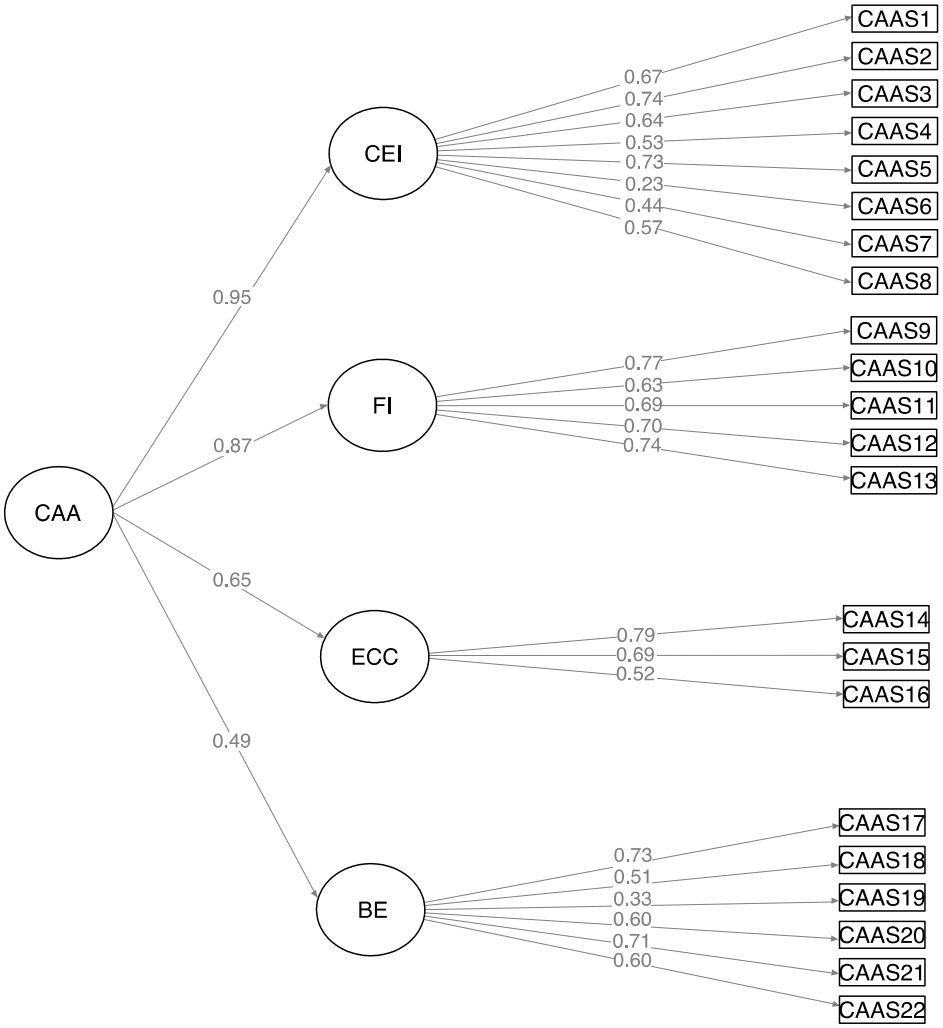
Statistical analysis

The factor structure of the Italian version of the CAAS was investigated via confirmatory factor analysis (CFA). The weighted least square mean and variance adjusted (WLSMV) estimator was used since 11 items out of 22 were found out of the skewness and kurtosis range of +1 and -1 (Tabachnick & Fidell, 2007). A higher-order model consisting of item loading on its respective factors (cognitive-emotional impairment: 8 items; functional impairment: 5 items; experience of climate change: 3 items, and behavioural engagement: 6 items) regressed onto a higher-order climate change anxiety factor. The model was evaluated considering the following fit indices: the Comparative Fit Index (CFI) and the Tucker-Lewis index (TLI) (values greater than 0.90 show a good fit); and the Root Mean Square Error of Approximation (RMSEA) (values lower than 0.08 show a good fit) (Browne & Cudeck, 1993). Concurrent validity with PANAS and PHQ-4 was assessed via Spearman's Rho correlations. All the analyses were implemented using RStudio 2022.12.0 for Mac. The Packages *Lavaan* 0.6-15 *SemPlot* 1.1.6 and *Psyhc* 2.3.3 were implemented.

Results

The CFA showed a higher order model of the Italian version of the CAAS with an adequate fit to the data, showing the following statistics: $\chi 2(df) = 801(556)$; CFI = 0.96; TLI = 0.95; RMSEA = 0.046 [0.039-0.053]. Figure 1 illustrates the Path diagram of the higher-order Model of the CAAS.

Figure 1



Italian Version of the *Calling and Vocation Questionnaire*: Path diagram of higher-order model (n = 411)
Note: CAS: Climate Change Anxiety.

Table 1 reports the Cronbach's alphas for the four factors and the higher order factor (i.e., total score), showing adequate reliability for all four factors and the higher order factor.

Table 2 reports the Spearman Rho Correlation Among Italian version of the CAAS, PANAS, and PHQ-4. The Italian version of the CAAS showed a statistically significant and positive correlation with PANAS NA and a statistically significant and negative correlation with PANAS PA. Moreover, the Italian

version of the CAAS reported a statistically significant and positive correlation with PHQ-4.

Table 1

Italian Version of the *Climate Change Anxiety Scale:* Cronbach's alphas for higher-order measurement model (n = 411)

CAAS Factors	Cronbach's α
CAAS Cognitive-Emotional Impairment	0.842
CAAS Functional Impairment	0.814
CAAS Experience of Climate Change	0.716
CAAS Behavioural Engagement	0.785
CAAS Total Score	0.883

Note: CCAS = *Climate Change Anxiety Scale.*

Table 2

Spearman Rho Correlation Among Italian Version of the Climate Change Anxiety Scale, Positive and Negative Affect Schedule, and Patient Health Questionnaire-4 (n = 411)

CAAS Factors	PANAS PA	PANAS NA	PHQ-4
CAAS Cognitive-Emotional Impairment	0.186***	-0.223***	0.230***
CAAS Functional Impairment	0.160**	-0.243***	0.201***
CAAS Experience of Climate Change	0.147**	-0.170***	0.166***
CAAS Behavioural Engagement	0.150**	-0.114*	0.204***
CAAS Total Score	0.200***	-0.215***	0.253***

Note: CCAS = *Climate Change Anxiety Scale.* PANAS PA = Positive and Negative Affect Schedule Positive Affect; PANAS NA = Positive and Negative Affect Schedule Negative Affect

Discussion

The current study implemented CFA to study the psychometric properties of the Italian version of the CAAS, a self-reported scale developed to measure Climate Change Anxiety (Clayton & Karazsia, 2020). Our results are in line with those observed in the original English version, showing the presence of four specific factors (Clayton & Karazsia, 2020). Furthermore, our results also

highlighted the presence of a higher-order factor that allows us to compute a total score for the scale, in line with the original construct that was advanced to provide a measure of climate change anxiety (Clayton & Karazsia, 2020). Reliability for each of the four factors and the higher-order factor was found to be good. The concurrent validity of the Italian version of the CAAS was highlighted by statistically significant and positive associations with negative affect and psychological distress as well as via statistically significant and negative associations with positive affect.

The current study has limitations and strengths. The first is inherent to our participants, who were university students from Tuscany, Central Italy. Further research could expand the study of the psychometric properties of the Italian version of the CAAS also in different populations of university students from other regions of Italy. However, to the best of our knowledge, the current study is the first that investigates the psychometric properties of the 22-item CAAS in Italian university students, and young adults were described as the population that reports a higher worry about climate change (Hickman et al., 2021). Therefore, our results are worthy of attention. In brief, the Italian version of the CAAS demonstrated good psychometric properties, revealing a reliable higher-order four-factor structure. Thus, the Italian version of the CAAS is a promising instrument to measure climate change anxiety and its four dimensions, according to the original Model of Clayton and Karazsia (2020).

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