Research

Psikiyatride Güncel Yaklaşımlar-Current Approaches in Psychiatry 2026; 18(Suppl 1):93-108

doi: 10.18863/pgy.1904102

Climate Change Coping Scale: Turkish Adaptation and Psychometric Evaluation among Young Adults

İklim Değişikliği ile Başa Çıkma Ölçeği: Genç Yetişkinlerde Türkçe Uyarlaması ve Psikometrik Değerlendirmesi

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ABSTRACT

Objective: This study aimed to evaluate the validity and reliability of the Turkish version of the Climate Change Coping Scale (CCCS) in young adults.

Method: This methodological study was conducted among young adults aged 18-35 years between October to November 2025. Data was collected using a Personal Information Form and the CCCS. Psychometric analyses included language and content validity, exploratory and confirmatory factor analyses, convergent and discriminant validity, internal consistency coefficients, item-total correlations, and test-retest reliability.

Results: Exploratory factor analysis supported the original 16-item structure and a three-factor solution explaining 60.74% of the total variance. Confirmatory factor analysis demonstrated good model fit (χ^2/df = 2.778, GFI = 0.910, AGFI = 0.879, NFI = 0.896, CFI = 0.924, RMSEA = 0.069). The subscales demonstrated internal consistency, with Cronbach's alpha and McDonald's omega coefficients ranging from 0.79 to 0.88. Factor loadings were satisfactory (0.52-0.84), and test-retest analysis indicated high temporal stability (r=0.86-0.90).

Conclusion: The CCCS is a valid and reliable instrument for assessing climate change-related coping strategies in the Turkish context, supporting its use in research and psychosocial evaluation contexts.

Keywords: Climate change, coping, scale, reliability and validity, young adults

ÖZ

Amaç: Bu çalışmada, İklim Değişikliği ile Başa Çıkma Ölçeğinin (İDBÇÖ) Türkçe formunun genç yetişkinlerde geçerlik ve güvenirliğinin değerlendirilmesi amaçlanmıştır.

Yöntem: Metodolojik tipte gerçekleştirilen bu çalışma, Ekim-Kasım 2025 tarihleri arasında 18-35 yaş arası genç yetişkinlerle yürütüldü. Veri toplama araçları olarak Kişisel Bilgi Formu ve İklim Değişikliği ile Başa Çıkma Ölçeği kullanıldı. Psikometrik analizler kapsamında dil ve kapsam geçerliliği, açımlayıcı ve doğrulayıcı faktör analizleri, benzeşim ve ayrışım geçerliliği, iç tutarlılık katsayıları, madde-toplam puan korelasyonları ve test-tekrar test güvenirliği değerlendirildi.

Bulgular: Açımlayıcı faktör analizi sonucunda ölçeğin özgün 16 maddelik yapısının korunduğu ve toplam varyansın %60,74'ünü açıklayan üç faktörlü bir yapıya sahip olduğu belirlendi. Doğrulayıcı faktör analizi, modelin iyi uyum gösterdiğini ortaya koydu (χ^2/df = 2,778; GFI = 0,910; AGFI = 0,879; NFI = 0,896; CFI = 0,924; RMSEA = 0,069). Alt boyutların Cronbach alfa ve McDonald omega katsayılarının 0,79-0,88 arasında değişmesi, iç tutarlılığın sağlandığını gösterdi. Faktör yüklerinin yeterli düzeyde olduğu (0,52-0,84) ve test-tekrar test analizinde yüksek zamansal kararlılık sağlandığı belirlendi (r = 0,86-0,90).

Sonuç: İDBÇÖ, Türkiye bağlamında iklim değişikliğiyle ilişkili başa çıkma stratejilerinin değerlendirilmesinde kullanılabilecek geçerli ve güvenilir bir ölçüm aracıdır. Elde edilen sonuçlar, ölçeğin araştırmalarda ve psikososyal değerlendirme süreçlerinde kullanımını desteklemektedir.

Anahtar sözcükler: İklim değişikliği, başa çıkma, ölçek, güvenilirlik ve geçerlilik, genç yetişkinler

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Received: 08.03.2026 | **ccepted:** 24.07.2026

Introduction

Climate change has been recognized as one of the most pressing global threats to humanity by the Intergovernmental Panel on Climate Change (IPCC 2022). Increasingly frequent extreme weather conditions, the emergence and spread of infectious diseases, disruptions in food supply systems, and the growing possibility that extensive geographic areas may become uninhabitable have made the impacts of climate change more visible (Bouman et al. 2020). In Europe, temperature increases have exceeded the global average (World Meteorological Organization 2022), and Türkiye is directly affected by these changes. According to data from the Turkish State Meteorological Service, 1,257 extreme weather events were recorded in Türkiye in 2024, representing the second-highest annual figure since records began in 1940 (Meteoroloji Genel Müdürlüğü 2025). Such extreme weather events may also contribute to increased stress and anxiety, particularly among young individuals who perceive climate change as a direct threat to their future (Clayton et al. 2020, Hickman et al. 2021).

Climate change is reported to be a major risk factor for both physical and social health (Radua et al. 2024) and has increasingly become a chronic source of stress that individuals must cope with (Clayton et al. 2020). Its uncontrollable and unpredictable nature intensifies perceived threat and exacerbates psychological difficulties (Radua et al. 2024). Research consistently shows that climate-related worry and awareness are particularly pronounced among young people, indicating that this group experiences climate-related psychological effects more strongly (Ojala 2013, Hickman et al. 2021).Moreover, developmental roles characteristic of this life stage, such as continuing education, entering the workforce, and gaining independence, render young people psychologically more vulnerable to the impacts of the climate crisis (Hickman et al. 2021, Ojala et al. 2021). Consequently, climate change has become not only a present concern but also one of the most significant future-oriented anxieties for young individuals (Hickman et al. 2021).

In this context, effective coping with climate-related challenges is critically important. The coping process begins with the recognition of a stressor (Skinner et al. 2003). According to Lazarus (1984), coping involves cognitive and behavioral efforts that individuals employ to handle internal or external demands perceived as stressful or exceeding their coping resources. Problem-focused, meaning-focused, and emotion-focused coping approaches play an important role in influencing sustainable behaviors, anxiety levels, and psychological well-being (Lazarus 1984, Skinner et al. 2003). In particular, strategies such as hope, trust, and positive reappraisal have been shown to reduce anxiety while simultaneously promoting pro-environmental behaviors (Ojala 2012). In particular, young adults are characterized by future planning and increased engagement with societal issues, which may intensify their sensitivity to climate-related concerns and shape their coping responses (Regnoli et al. 2025). Among young people, adaptive coping strategies are reported to enhance environmental awareness, encourage climate-friendly behaviors, and support psychological well-being (Hickman et al. 2021).

Within the context of climate change, coping is viewed not only as a mechanism for protecting individual mental health but also as a key determinant of sustainable behavior. Coping responses developed in response to the chronic stressor posed by climate threats profoundly shape individuals' motivation to address environmental problems, their intentions to take action, and their level of civic engagement (Ojala 2012, Clayton 2020). Conversely, the absence of effective coping strategies or the predominance of avoidance-based approaches may increase feelings of hopelessness, helplessness, and passivity, thereby undermining both psychological well-being and environmental responsibility among young people (Hickman et al. 2021). In this regard, coping should be considered not merely a means of maintaining internal balance, but a critical psychological resource that enables individuals to confront environmental crises, generate solutions, and sustain hope for the future (Ojala 2012). Given the rapidly rising levels of climate anxiety among young populations, identifying which coping strategies play a protective role offers important avenues for intervention for both mental health professionals and educators.

Against this background, understanding how individuals cope with the climate crisis is of considerable importance. To this end, the Climate Change Coping Scale (CCCS), developed by Ojala (2012, 2013), represents a pioneering instrument designed to assess the strategies used by young people in response

to this global challenge. In addition to its pioneering role, the CCCS is grounded in well-established coping theory and captures multiple subscales of coping, including meaning-focused, problem-focused, and avoidance-oriented strategies. This multidimensional structure allows for a comprehensive assessment of both cognitive and behavioral responses to climate change. In addition, the CCCS has been adapted and validated in different cultural contexts, providing evidence for its cross-cultural applicability. This widespread use and accumulated psychometric evidence further support its suitability for adaptation to the Turkish context. Furthermore, its emphasis on meaning-focused coping is especially relevant in the context of climate change, where individuals often engage in cognitive reappraisal, value-based interpretation, and future-oriented thinking. For these reasons, the CCCS was considered an appropriate instrument for examining climate change coping strategies within the Turkish cultural context. The scale has been applied to different age groups, including adolescents and young adults (Ojala 2012, 2013), and has reliably captured meaning-focused, problem-focused, and avoidance-focused coping strategies. Most recently, the scale was adapted into Italian by Regnoli et al. (2025), who demonstrated that the 16-item, 7-point Likert version constitutes a valid and reliable measurement tool.

Although research on climate change is increasing in Türkiye, there is currently no Turkish-language instrument with established validity and reliability specifically designed to assess coping strategies related to climate change among young adults. Therefore, this study aims to examine the validity and reliability of the Turkish version of the Climate Change Coping Scale, addressing this gap by providing a culturally adapted and psychometrically sound instrument that contributes to cross-cultural research on climate change-related coping processes. By adapting the CCCS into Turkish, this study is expected to contribute to the literature by providing researchers and mental health professionals with a culturally appropriate measurement tool for assessing climate change-related coping strategies and supporting future studies on psychological responses to climate change. It was hypothesized that the Turkish version of the CCCS would demonstrate acceptable psychometric properties, including construct validity, internal consistency, and test-retest reliability, consistent with the original three-factor structure of the scale.

Method

The aim of the present methodological research was to establish the validity and reliability of the Turkish version of the Climate Change Coping Scale (CCCS). Data were collected from young adults aged 18-35 in Türkiye between October 1 and November 30, 2025. The study was conducted online among young adults living in different regions of Türkiye using a web-based survey method.

Sample

Adolescents and young adults were identified as the primary target population in the initial scale development study (Ojala 2012) as well as in later adaptation studies (Regnoli et al. 2025, Martin et al. 2025). Accordingly, young adults aged 18-35 years living in Türkiye were included in the present study. This age group is particularly affected by climate-related psychological concerns, including heightened levels of worry, future-oriented anxiety, and perceived vulnerability to climate change (Hickman et al. 2021, Ojala et al. 2021).

According to the sample size recommendations proposed by Comrey and Lee, a sample of 100 participants is regarded as poor, 200 as fair, 300 as good, 500 as very good, and 1,000 as excellent. Furthermore, many methodological sources suggest that a minimum of 300 participants is adequate for conducting factor analysis (Çokluk et al. 2014). Based on these recommendations, the inclusion of at least 300 participants was targeted. The study was completed with 377 participants who met the inclusion criteria and for whom no further eligible data were obtained. Participants were recruited through online voluntary participation using a convenience sampling method, which may limit the representativeness of the sample in terms of geographical regions and socio-economic diversity.

The inclusion criteria were as follows: (1) being between 18 and 35 years of age, (2) living in Türkiye, and (3) voluntarily agreeing to participate in the study. The exclusion criteria were as follows: (1) being younger than 18 years or older than 35 years and (2) not providing informed consent. Data from three participants

who were older than 35 years were excluded from the study. Therefore, the final sample consisted of 377 eligible participants. The average age of the sample was 20.18 ± 2.56 years (range: 18-33). Of the participants, 75.6% were female, 92.3% were single, 81.1% had completed high school education, and 44.8% reported living predominantly in metropolitan areas.

Procedure

The study adhered to internationally accepted ethical standards, including the principles of the Declaration of Helsinki. Authorization to administer the Climate Change Coping Scale (CCCS) was obtained by e-mail from the original scale developer as well as from the authors who conducted the Italian adaptation. Ethics committee approval was obtained from the Bartın University Ethics Committee (dated 10.09.2025 and numbered 2025-SBB-0882). All participants were provided with detailed information regarding the purpose and procedures of the study, and written informed consent was obtained from those who agreed to participate on a voluntary basis.

Language and Content Validity

Translation Process

To ensure linguistic equivalence, the scale was independently translated from English into Turkish and from Turkish back into English by two bilingual experts with advanced proficiency in both languages. The research team compared the translation outputs and produced a preliminary Turkish version by selecting the most conceptually appropriate expressions. The translation and cultural adaptation process was conducted in accordance with established guidelines, including the International Test Commission (ITC) Guidelines and widely accepted frameworks (Beaton et al. 2000).

Back-Translation

To assess linguistic equivalence, the Turkish version of the scale was independently translated back into English by two experts who had not participated in the initial translation stage. The back-translated English text was then compared with the original instrument by the research team, and only minor discrepancies were observed. To strengthen the accuracy of the translation procedure, the back-translated version was shared with the original developers of the scale. They confirmed that the translated items were conceptually consistent with the original instrument. After incorporating their feedback, the Turkish form of the scale was finalized.

Expert Review

The preliminary Turkish version of the scale was reviewed by 10 academics (associate professors and professors) with expertise in nursing. Each expert assessed the relevance and clarity of the items using a four-point rating system. The level of agreement among experts was examined using Kendall's coefficient of concordance, which demonstrated a statistically significant level of agreement ($W = 0.24$, $p = .008$). Based on the suggestions provided by the experts, necessary revisions were made and the initial finalized Turkish version of the scale was obtained. Following these revisions, the revised version of the scale was further reviewed by three additional experts to evaluate the clarity and appropriateness of the items. Their qualitative feedback supported the comprehensibility and content relevance of the scale items.

Pilot Testing

Previous literature suggests that pilot studies are typically conducted with 20-50 participants to evaluate the clarity and applicability of scale items (Şeker and Gençdogan 2006). In line with this recommendation, a pilot application was carried out with 22 individuals. Participants reported that the items were generally clear and understandable, and no major difficulties were encountered; therefore, no revisions were deemed necessary. Data obtained during the pilot phase were not included in the main study sample.

Data Collection

An online survey prepared with Google Forms was used to collect the study data. The data collection

process was carried out by the researchers. Before data collection, the electronic form was tested by the researchers to evaluate its technical functionality, including accessibility, item visibility, response recording, mandatory response settings, and the overall completion process. Necessary checks were completed before distributing the survey link to participants. The survey link was distributed through social media platforms (WhatsApp and Instagram), and participation was entirely voluntary. Participants were invited through a brief study announcement including information about the purpose of the study and voluntary participation.

In the first section of the form, the inclusion criteria were clearly stated, and participants were asked to confirm their eligibility. Individuals who did not meet the inclusion criteria were explicitly instructed not to proceed with the survey. The same section also included the informed consent form, and participants who did not provide consent were not allowed to advance to subsequent sections. Participants who provided consent were directed to the second section, which included the Personal Information Form and the Climate Change Coping Scale. The online survey consisted of a single screen and included a total of 24 items. The estimated completion time was approximately 10 minutes.

No monetary payment, gift, or other incentive was provided to participants. All items were set as mandatory fields; therefore, no missing data occurred. Participants were allowed to review and modify their responses before submitting the form. A total of 380 individuals started and completed the online survey, and no incomplete submissions were recorded. After excluding three participants who did not meet the age criterion (older than 35 years), data from 377 eligible participants were included in the final analyses. The "Limit to one response" option was activated in Google Forms, requiring participants to sign in with a Google account and allowing only one submission from each account.

Measures

Personal Information Form

This form was prepared by researchers based on previous studies in literature (Martin et al. 2025, Regnoli et al. 2025). The form included eight questions designed to collect demographic information such as age, gender, and marital status.

Climate Change Coping Scale (CCCS)

The Climate Change Coping Scale was first introduced by Ojala (2012) as 14-item instrument measuring coping responses related to climate change. Later, Regnoli et al. (2025) expanded the instrument to a 16-item version. The scale includes three subscales: meaning-focused coping (items 1-5), problem-focused coping (items 6-10), and de-emphasizing/avoidance coping (items 11-16). Responses are given on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). In the study by Regnoli et al. (2025), Cronbach's alpha values were reported as 0.84 for meaning-focused coping, 0.86 for problem-focused coping, and 0.80 for de-emphasizing/avoidance coping, with an overall internal consistency coefficient of 0.90. The scale does not yield a total score; therefore, interpretations should be based on subscale scores, with higher scores indicating greater use of the corresponding coping strategy (Regnoli et al. 2025).

Statistical Analysis

All statistical analyses were performed using IBM SPSS 27 and AMOS 24, and statistical significance was determined at $p < .05$. Descriptive statistics such as means, standard deviations, and percentage distributions were calculated to summarize the data. Content validity was examined through expert evaluations using Kendall's coefficient of concordance (W). The suitability of the dataset for factor analysis was assessed with the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. Exploratory factor analysis (EFA) was conducted to examine the cross-cultural stability of the original factor structure. Construct validity was investigated through confirmatory factor analysis (CFA). The upper 27%-lower 27% group comparison was conducted to evaluate item discrimination and to examine whether the scale effectively distinguishes between individuals with different levels of the construct. Convergent and

discriminant validity were examined using average variance extracted (AVE), composite reliability (CR), maximum shared variance (MSV), and average shared variance (ASV). Reliability of the scale was assessed using Cronbach's alpha, McDonald's omega, and split-half reliability coefficients.

Results

Validity Analyses

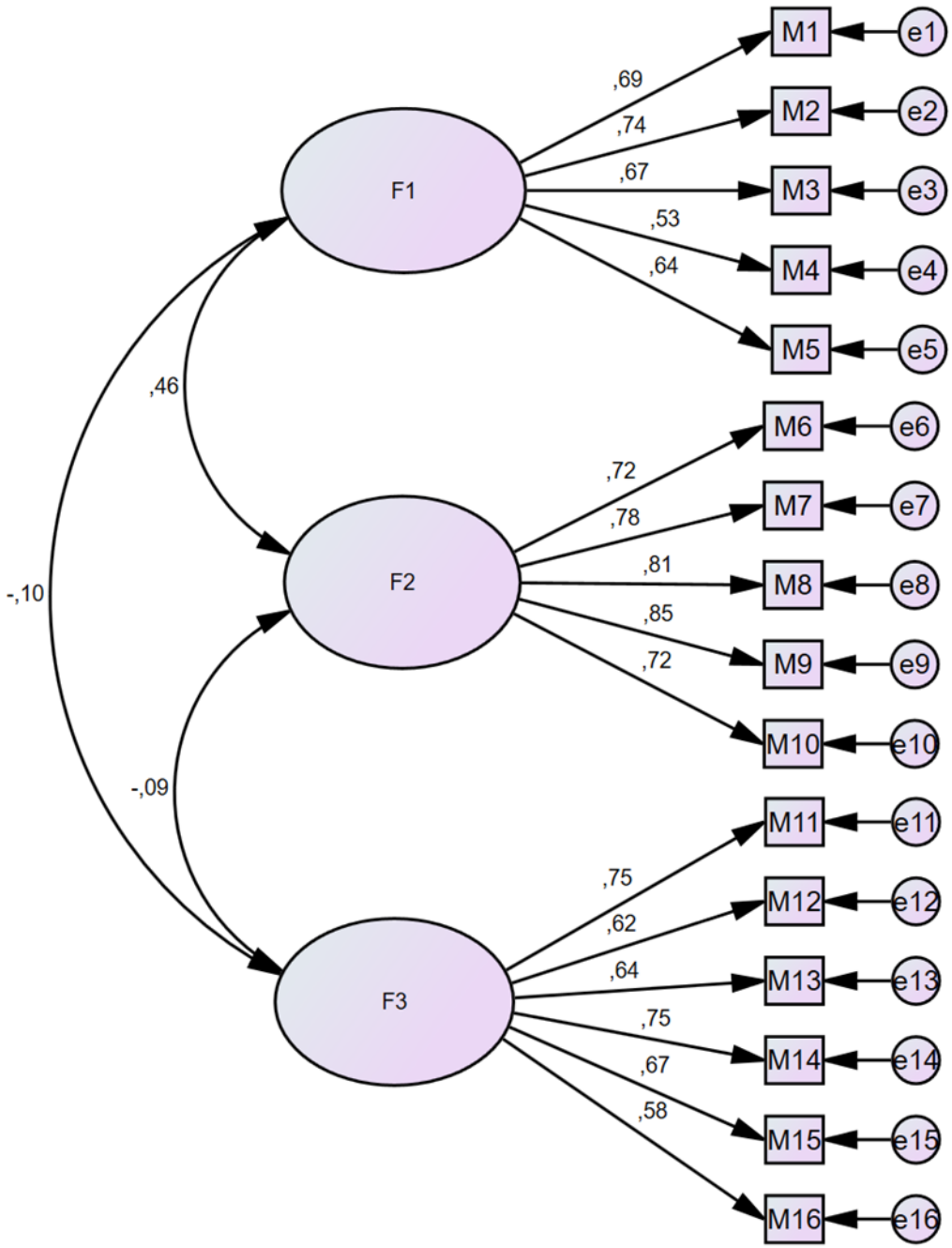
Prior to conducting factor analysis, the adequacy of the dataset was evaluated using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. The KMO value was 0.869, and Bartlett's test yielded a statistically significant result (χ^2 = 2428.277, p < .001), indicating that the data were suitable for factor analysis. Exploratory factor analysis (EFA) yielded a three-factor solution consistent with the original model, with eigenvalues greater than 1. The meaning-focused and problem-focused coping subscales each included five items, whereas the de-emphasizing/avoidance coping subscale consisted of six items. Altogether, these three factors accounted for 60.74% of the total variance, with factor loadings ranging between 0.389 and 0.777 (Table 1).

Table 1. Factor structure, eigenvalues, and cumulative variance of the Climate Change Coping Scale

Items	Factor 1: Problem-Focused Coping	Factor 2: De-emphasizing / Avoidance Coping	Factor 3: Meaning-Focused Coping
Item 9	0.764		
Item 6	0.743		
Item 10	0.718		
Item 8	0.716		
Item 7	0.700		
Item 11		0.777	
Item 13		0.758	
Item 14		0.723	
Item 15		0.722	
Item 12		0.592	
Item 16		0.582	
Item 3			0.590
Item 1			0.588
Item 2			0.540
Item 5			0.447
Item 4			0.389
Eigenvalue	3.397	2.358	1.109
Cumulative Variance (%)	28.531	49.391	60.743
KMO		0.869	
Bartlett's test (χ^2)		2428.277	
p		< 0.001	

KMO: Kaiser-Meyer-Olkin sample adequacy measure.

Confirmatory factor analysis (CFA) was applied to evaluate the adequacy of the factor structure. The goodness-of-fit indices demonstrated an acceptable model fit (χ^2 = 280.608, df = 101, χ^2/df = 2.778, p < .001, GFI = 0.910, AGFI = 0.879, NFI = 0.896, CFI = 0.924, TLI = 0.909, RMSEA = 0.069). Standardized factor loadings ranged from 0.53 to 0.85, with values between 0.53-0.74 for meaning-focused coping, 0.72-0.85 for problem-focused coping, and 0.58-0.75 for de-emphasizing/avoidance coping (Figure 1).



CMIN = 280.608; DF = 101; CMIN/DF = 2.778; p = 0.000; GFI = 0.910; AGFI = 0.879; NFI = 0.896; CFI = 0.924; TLI = 0.909; RFI = 0.865; IFI = 0.924; RMSEA = 0.069

Figure 1. Path diagram of the Climate Change Coping Scale

To further examine construct validity, convergent validity was evaluated using average variance extracted (AVE), whereas composite reliability (CR) was calculated as an indicator of internal consistency. Discriminant validity was investigated using maximum shared variance (MSV) and average shared variance (ASV). The AVE values for the problem-focused coping and de-emphasizing/avoidance coping subscales were 0.531 and 0.507, respectively, both exceeding the recommended threshold of 0.50. The AVE value for the meaning-focused coping subscale was 0.427. Across all subscales, CR values ranged between 0.640 and 0.850. Furthermore, MSV and ASV values were lower than the corresponding AVE values for each subscale, providing evidence of discriminant validity (Table 2).

Table 2. Convergent and discriminant validity results of the Climate Change Coping Scale							
Subscales	**Item**	**λ**	**λ²**	**1-λ²**	**AVE/CR**	**MSV**	**ASV**
Problem-Focused Coping	Item 9	0.764	0.583	0.417	n=5 AVE = 0.531 CR = 0.850	0.169	0.060
	Item 6	0.743	0.552	0.448			
	Item 10	0.718	0.516	0.484			
	Item 8	0.716	0.513	0.487			
	Item 7	0.700	0.490	0.510			
De-emphasizing / Avoidance Coping	Item 11	0.777	0.604	0.396	n=6 AVE=0.507 CR=0.812	0.008	0.060
	Item 13	0.758	0.575	0.425			
	Item 14	0.723	0.523	0.477			
	Item 15	0.722	0.521	0.479			
	Item 12	0.592	0.350	0.650			
	Item 16	0.582	0.339	0.661			
Meaning-Focused Coping	Item 3	0.590	0.348	0.652	n=5 AVE=0.427 CR=0.640	0.169	0.060
	Item 1	0.588	0.346	0.654			
	Item 2	0.540	0.292	0.708			
	Item 5	0.447	0.200	0.800			
	Item 4	0.369	0.136	0.864			

λ=Standardized factor loading; AVE= Average Variance Extracted; CR=Composite Reliability; MSV=Maximum Shared Variance; ASV=Average Shared Variance

Internal validity was further examined using the upper 27%-lower 27% group comparison approach as a preliminary method to assess item discrimination. As expected, statistically significant differences were observed between high- and low-scoring groups for both subscale scores ($p < .001$). These findings provide limited but supportive evidence for the discriminative capacity of the scale (Table 3).

Table 3. Upper-lower 27% group comparisons for the Climate Change Coping Scale						
CCCS Subscales	**Group**	**n**	**$\bar{X}$**	**SS**	**t**	**p**
Problem-Focused Coping	Lower Group	102	12.62	3.97	-35.958	<0.001
	Upper Group		28.62	2.09		
De-emphasizing / Avoidance Coping	Lower Group	102	7.18	1.14	-32.452	<0.001
	Upper Group		24.65	5.32		
Meaning-Focused Coping	Lower Group	102	14.73	3.78	-33.746	<0.001
	Upper Group		28.95	2.09		

X=Mean; SD=Standard deviation; t=Independent t test

Reliability Analyses

The reliability results indicated satisfactory internal consistency. Cronbach's alpha and McDonald's omega coefficients were 0.883 and 0.883 for problem-focused coping, 0.825 and 0.824 for de-emphasizing/avoidance coping, and 0.793 and 0.794 for meaning-focused coping, respectively. In addition, item-total correlation coefficients for all items were above 0.30, demonstrating acceptable item consistency (Table 4).

Correlation analyses exploring the relationships among the subscales and the total scale score revealed statistically significant associations. A very weak negative correlation was observed between problem-focused coping and de-emphasizing/avoidance coping ($r = -0.107$, $p < .05$). In contrast, a weak positive correlation was found between problem-focused coping and meaning-focused coping ($r = 0.411$, $p < .001$), while a very weak negative correlation was detected between de-emphasizing/avoidance coping and meaning-focused coping ($r = -0.102$, $p < .05$) (Table 5). In addition, the relationships among latent factors were evaluated based on the CFA model. The results indicated a moderate positive association between problem-focused coping and meaning-focused coping ($r = 0.46$), and weak negative relationships between problem-focused coping and de-emphasizing/avoidance coping ($r = -0.09$), as well as between meaning-focused coping and de-emphasizing/avoidance coping ($r = -0.10$) (Figure 1).

Table 4. Reliability analysis results of the Climate Change Coping Scale				
Subscales	**Items**	**Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**	**Cronbach's Alpha**
Problem-Focused Coping	Item 9	0.470	0.743	0.883
	Item 6	0.428	0.747	
	Item 10	0.449	0.745	
	Item 8	0.487	0.741	
	Item 7	0.499	0.741	
De-emphasizing / Avoidance Coping	Item 11	0.347	0.754	0.825
	Item 13	0.430	0.746	
	Item 14	0.316	0.765	
	Item 15	0.309	0.757	
	Item 12	0.301	0.774	
	Item 16	0.305	0.758	
Meaning-Focused Coping	Item 3	0.451	0.745	0.793
	Item 1	0.338	0.755	
	Item 2	0.368	0.752	
	Item 5	0.320	0.756	
	Item 4	0.411	0.748	
Part 1 (8 item)				0.81
Part 2 (8 item)				0.72
Spearman-Brown	0.65			
Guttman Split half	0.61			

Table 5. Descriptive statistics and correlations between the Climate Change Coping Scale subscales							
Variables	**X**	**SD**	**Skewness**	**Kurtosis**	**F1**	**F2**	**F3**
F1. Problem-Focused Coping	21.49	6.64	-0.604	-0.242	1		
F2. De-emphasizing / Avoidance Coping	14.69	7.33	0.987	0.441	-0.107*	1	
F3. Meaning-Focused Coping	22.47	5.91	-0.631	0.264	0.411**	-0.102*	1

X=Mean; SD=Standard deviation; *p < .05; ** p < .001

Test-retest reliability was evaluated with a subsample of 33 participants drawn from the main sample, who completed the scale twice with a two-week interval. The correlation between the two administrations was strong (r = 0.864-0.905, p < .001). In addition, intraclass correlation coefficients (ICC) ranged between 0.85 and 0.90, indicating good temporal stability of the scale (Table 6).

Table 6. Test-retest reliability results of the Climate Change Coping Scale (n=33)				
CCCS Subscales	**First assessment X±SD (Min-Max)**	**Second assessment X±SD (Min-Max)**	**r**	**ICC (%95 CI)**
F1. Problem-Focused Coping	21.49 ± 6.64 (5-35)	22.79 ± 6.33 (5-35)	0.905**	0.90 (0.84-0.94)
F2. De-emphasizing / Avoidance Coping	14.69 ± 7.33 (6-36)	16.02 ± 6.98 (6-36)	0.899**	0.88 (0.80-0.92)
F3. Meaning-Focused Coping	22.47 ± 5.91 (5-35)	20.26 ± 6.14 (5-35)	0.864**	0.85 (0.78-0.90)

X̄: Ortalama; SS: Standart sapma; r: Pearson korelasyon katsayısı; ICC: Sınıf içi korelasyon katsayısı; GA: Güven aralığı; **p < 0,001.

Discussion

Climate change has emerged as a major global challenge with wide-ranging consequences, making it increasingly important to understand how individuals respond to and cope with its impacts. Beyond its

environmental implications, climate change has been increasingly associated with psychological outcomes such as anxiety, perceptions of the future, and overall psychological well-being (Hickman et al. 2021, Radua et al. 2024). Consequently, the availability of valid and reliable measurement tools capable of assessing coping strategies related to climate change has become increasingly important.

Within the international literature, the Climate Change Coping Scale originally introduced by Ojala (2012) and later validated in an Italian sample (Regnoli et al. 2025) has been frequently used to assess coping responses associated with climate change. Previous research has demonstrated that the scale shows satisfactory psychometric properties among both adolescent populations (Ojala 2012, 2013, Martin et al. 2025) and young adults (Regnoli et al. 2025). Nevertheless, the lack of a psychometrically validated instrument designed to measure climate change-related coping strategies within the Turkish cultural context represents a notable gap in the literature. The current study attempted to fill this gap by examining the validity and reliability of the Turkish adaptation of the Climate Change Coping Scale.

In the present research, construct validity was investigated through both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA is widely applied in scale development and adaptation studies to explore the underlying subscale structure of measurement tools and to evaluate structural validity (Watkins 2018). Prior to factor extraction, the suitability of the data was examined using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. KMO values above 0.60 generally indicate that the sample size is adequate for factor analysis (Buyukozturk 2010), whereas a significant Bartlett's test suggests sufficient correlations among variables (Yaslioglu 2017). In this study, the KMO value of 0.869 indicated a high level of sampling adequacy, and the significant Bartlett's test result ($\chi^2 = 2428.277$, $p < .001$) confirmed that the dataset was appropriate for factor analysis.

The factor analysis results revealed a three-factor structure, with two subscales containing five items each and the third subscale consisting of six items. Together, these three factors accounted for 60.74% of the total variance. In scale development and adaptation research, explaining more than 40% of the total variance is generally considered an acceptable indicator of construct validity (Basturk et al. 2013). In the original study conducted by Ojala (2012), the three-factor model accounted for 52.5% of the total variance. In the present study, the proportion of explained variance was higher, suggesting that the scale's theoretical structure is well represented in the Turkish sample and that climate change coping strategies can be grouped into distinct subscales within this cultural context. Cultural differences in how individuals perceive and respond to climate change may have contributed to more distinct and internally consistent factor structures. In particular, sociocultural contexts that shape environmental awareness, collective values, and coping orientations may contribute to clearer differentiation between coping subscales. In addition, sample characteristics such as age distribution and contextual relevance of climate-related concerns may have strengthened the factor structure in the present study. Moreover, the results of the confirmatory factor analysis supported the three-factor model. The χ^2/df ratio of 2.778 indicated a good level of model fit. Fit indices such as GFI and CFI exceeded the recommended 0.90 threshold, while the AGFI value (0.879) was slightly below this cutoff but remained within the acceptable range reported in the literature. The NFI value (0.896) also remained within the acceptable range. In addition, the RMSEA value of 0.069 suggested an acceptable level of model error. Taken together, these fit indices fall within the ranges recommended in the literature (Meydan and Sesen 2011; Gurbuz and Sahin 2015) and provide evidence supporting the structural validity of the scale. Modification indices were examined; however, no theoretically meaningful modifications (e.g., error covariances) were identified. Therefore, the original model was retained to preserve its theoretical integrity. These findings also indicate that the original three-factor configuration of the scale is maintained in the Turkish cultural context, demonstrating cross-cultural structural consistency.

Convergent and discriminant validity were also examined using AVE, CR, MSV, and ASV indicators. The AVE values for the problem-focused coping and de-emphasizing/avoidance coping subscales were above the recommended 0.50 threshold, and their CR values exceeded 0.70. Although the AVE value for meaning-focused coping was slightly below the recommended level (0.42), the CR value (0.64) and the Cronbach's alpha coefficient (0.79) indicate acceptable internal consistency and reliability. While AVE is the primary indicator of convergent validity, previous research suggests that values slightly below 0.50 may still be

considered acceptable, particularly when supported by adequate reliability and factor loadings (Hair et al. 2010, Malhotra and Dash 2011, Yaslioglu 2017). In addition, it should be noted that AVE is a relatively conservative measure, and values slightly below the threshold may emerge particularly in multisubscale and conceptually complex constructs. In the present study, item loadings for the meaning-focused coping subscale were within acceptable ranges, which supports the adequacy of the construct despite the lower AVE value. The comparatively lower AVE value observed for meaning-focused coping may be related to the relatively abstract and subjective nature of this construct, which may be more sensitive to cultural and individual differences. In particular, cultural variations in how individuals interpret meaning, cope with environmental stressors, and attribute personal or collective significance to climate change may contribute to greater variability in responses within this subscale. Therefore, this cultural and contextual variability may partially account for the lower shared variance among items in this subscale. Furthermore, the conditions ASV < MSV and MSV < AVE, together with the square root of AVE being greater than the correlations between factors, provide additional support for discriminant validity. Taken together, these findings suggest that the scale demonstrates generally acceptable levels of convergent and discriminant validity, although the results for the meaning-focused coping subscale should be interpreted with some caution. Nevertheless, future studies may further examine this subscale using alternative model specifications or item refinement strategies to enhance the proportion of explained variance.

In terms of content validity, the Kendall's W coefficient indicated a modest level of agreement among experts, which may be related to the complex and subjective nature of the construct. However, other psychometric indicators (e.g., KMO, factor loadings, and reliability coefficients) demonstrated strong results, providing supportive, though not definitive, evidence for the adequacy of the scale. Internal validity was further examined using the upper 27%-lower 27% group comparison approach, which is commonly used to assess item discrimination. As expected, statistically significant differences were observed between high- and low-scoring groups across subscale scores ($p < .001$). These findings provide limited but supportive evidence for the discriminative capacity of the scale and should be interpreted as complementary to the primary psychometric analyses. Reliability represents a core psychometric property reflecting the consistency and stability of measurement results across time and conditions (Capik 2014). Cronbach's alpha coefficients approaching 1.00 indicate strong internal consistency, whereas values below 0.60 suggest inadequate reliability (Schumacker and Lomax 2004, Sencan 2005). McDonald's omega coefficient is considered a robust alternative to Cronbach's alpha, particularly for multiscale or when factor loadings are unequal (McDonald 1999). Omega coefficients above 0.70 are generally considered acceptable, while values exceeding 0.80 indicate a high level of reliability (Dunn et al. 2014). In the present research, Cronbach's alpha and McDonald's omega values ranged between 0.79 and 0.88 across the subscales, suggesting strong internal consistency. These findings are comparable to those reported in earlier studies, where reliability coefficients ranged from 0.75 to 0.94 (Ojala 2012, Martin et al. 2025, Regnoli et al. 2025).

In addition, the pattern of correlations among subscales was consistent with the latent factor correlations obtained from the CFA model, supporting the structural coherence of the scale. Taken together, the similar, and in some cases higher, reliability coefficients obtained in this study further support the robustness of the Turkish adaptation of the scale and its potential applicability across different samples and age groups. Another indicator of internal consistency, split-half reliability, produced a Guttman split-half coefficient of 0.61, which is regarded as acceptable according to the literature (Dundar et al. 2008, Kline 2011).This relatively moderate value may be related to the multidimensional structure of the scale, as dividing the items into two halves may weaken the conceptual integrity of separate subscales. Correlation analyses among the subscales also revealed statistically significant relationships, suggesting that the subscales are interconnected and together reflect the broader construct of climate change coping.

The test-retest analysis demonstrated strong temporal stability, with Pearson correlation coefficients ranging between 0.864 and 0.905 and intraclass correlation coefficients (ICC) ranging between 0.85 and 0.90. While Pearson correlation reflects the stability of rank-order relationships, ICC provides a more stringent estimate of agreement over time by accounting for measurement error. In general, correlation values above 0.70 are considered evidence of satisfactory test-retest reliability (Gurbuz and Sahin 2015).

This result suggests that the coping strategies measured by the scale represent relatively stable psychological tendencies rather than short-term variations. The sample size used for the test-retest analysis is within the acceptable range reported in the literature for reliability studies (Bujang et al. 2024), although larger samples may provide more robust estimates of temporal stability.

Despite these strengths, this study has several limitations. First, the cross-sectional design limits the evaluation of the long-term stability and validity of the scale. In addition, the use of self-report measures and online data collection may have introduced response bias and limited the representativeness of the sample. The convenience sampling method and the unequal distribution of some sociodemographic characteristics, particularly gender and educational level, should also be considered when interpreting the generalizability of the findings. The relatively small sample size used for the test-retest analysis may also limit the interpretation of temporal stability findings. Furthermore, cultural factors specific to the study context may have influenced participants' responses to climate change-related coping strategies. Future studies are recommended to evaluate the psychometric properties of the CCCS in more diverse and representative samples.

Taken together, these findings indicate that the Turkish adaptation of the Climate Change Coping Scale demonstrates satisfactory psychometric properties in terms of both validity and reliability. Results from EFA and CFA support the theoretical three-factor structure, while internal consistency, convergent validity, discriminant validity, and temporal stability analyses provide further evidence for the robustness of the instrument. Accordingly, the CCCS can be regarded as a valid and reliable tool for assessing climate change coping strategies among young adults in Türkiye. The scale may also be useful in community-based mental health research, psychosocial evaluations, and informing preventive and supportive intervention efforts aimed at understanding and strengthening adaptive responses to climate change.

Conclusion

The findings of this study indicate that the Turkish adaptation of the Climate Change Coping Scale possesses demonstrates generally satisfactory psychometric properties in terms of both validity and reliability. The multidimensional structure of the instrument enables the assessment of individuals' coping responses to climate change across distinct domains, supporting its use as an assessment tool in research and psychosocial evaluation contexts. Mental health professionals may use the CCCS to better understand individuals' perceptions of and coping responses to climate change, thereby facilitating a more comprehensive understanding of climate-related psychological experiences such as anxiety, stress, and feelings of hopelessness. The results obtained from the scale may contribute to the development of preventive and supportive mental health interventions, the promotion of adaptive coping strategies, and identification of adaptive and maladaptive coping patterns. Furthermore, the scale may inform the development of psychoeducational programs, group-based interventions, and counseling practices by guiding the design of interventions tailored to individuals' needs. The CCCS may be particularly useful in studies focusing on young adults, as it facilitates a deeper understanding of the psychological implications of climate change. Future studies are encouraged to evaluate the scale in different age groups and clinical populations, to investigate the longitudinal effects of climate change coping strategies on mental health outcomes, and to employ the CCCS as an outcome measure in intervention-based research. In this context, the CCCS may offer a useful tool for advancing research on the mental health impacts of climate change.

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Authors Contributions: The author(s) have declared that they have made a significant scientific contribution to the study and have assisted in the preparation or revision of the manuscript
Peer-review: Externally peer-reviewed.
Ethical Approval: Ethical approval for this study was obtained from the Bartın University Ethics Committee pursuant to date 10.09.2025 and number 2025-SBB-0882. Participants provided informed consent prior to participating in the study.
Conflict of Interest: No conflict of interest was declared.
Financial Disclosure: No financial support was declared for this study.

Addendum 1. Climate Change Coping Scale Turkish version

Instructions

These days, when people talk about climate change, individuals may feel anxious or uneasy. Below are various statements related to this topic. Please indicate to what extent each statement reflects your thoughts or behaviors by checking the option that best matches your level of agreement.

You can use the following introductory phrase before each item:

"When I hear something about climate change..."

İklim değişikliği hakkında bir şeyler duyduğumda...	Kesinlikle katılmıyorum	Katılmıyorum	Kısmen katılmıyorum	Kararsızım	Kısmen katılıyorum	Katılıyorum	Kesinlikle katılıyorum
1. İnsanlığın sorunları çözebileceğine inanıyorum.							
2. Bilim insanlarının gelecekte bir çözüm bulacağına inanıyorum.							
3. Çevre kuruluşlarında görev alan insanlara güveniyorum.							
4. Bazı politikacıların iklim değişikliğini ciddiye aldıklarına inanıyorum.							
5. İklim değişikliği büyük bir sorun olsa da umutlu olmak gerektiğine inanıyorum.							
6. İklim değişikliği sorununu çözmek için neler yapabileceğimi düşünüyorum.							
7. Bu konuda neler yapabileceğime dair araştırmalar yapıyorum.							
8. Bu konuda neler yapılabileceğimizi ailem ve arkadaşlarımla konuşuyorum.							
9. İklim değişikliğini görmezden gelmek yerine bu problemi çözmek için bir şeyler yapmaya çalışıyorum.							
10. Bu konudaki kaygılarımla başa çıkmak için, başkalarına faydalı olacak şeyler yapıyorum.							
11. İklim değişikliğinin abartıldığını düşünüyorum.							
12. İklim değişikliği hakkında fazla bilgim olmadığından önemsemiyorum.							
13. Yazlar daha sıcak olacağı için iklim değişikliğinin olumlu bir şey olduğunu düşünüyorum.							
14. İklim değişikliğini önemsemiyorum.							
15. İklim değişikliğinin Türkiye'de yaşayanları ilgilendirmediğini düşünüyorum.							
16. Benim yaşamım boyunca ciddi bir şey olmayacağını düşünüyorum.							

Scoring

The scale consists of 16 items, which are rated on a 7-point Likert-type scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (7).

The scale consists of three subscales:

1. Meaning-Focused Coping (items 1–5),
2. Problem-Focused Coping (items 6–10),
3. De-emphasizing / Avoidance Coping (items 11–16)

There are no reverse-scored items on the scale. Cronbach's alpha internal consistency coefficients were determined to be 0.79 for the Meaning-Focused Coping subscale, 0.88 for the Problem-Focused Coping subscale, and 0.83 for the De-emphasizing / Avoidance Coping subscale.

There is no cutoff point or total score for the scale. Each subscale is evaluated separately, and higher scores on the subscales indicate that the individual uses the corresponding coping strategy more frequently.