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Three Faces of Pandemic-Related Fear: Psychometrics of Physiological, Cognitive, and Behavioral Measures of Coronaphobia in the Cypriot Population

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Abstract

Coronavirus anxiety is defined as a psychological contrast characterized by excessive fear, obsessive thoughts, and reassurance-seeking behaviors associated with COVID-19. As current scales have been tested primarily in North American populations, we aimed to translate and culturally adapt three measures of dysfunctional coronavirus anxiety—the Coronavirus Anxiety Scale (CAS), the Obsession with COVID-19 Scale (OCS), and the Coronavirus Reassurance-Seeking Behaviors Scale (CRBS)—for the first time in Greek-speaking populations. To translate existing scales, we followed best practices for cross-cultural comparisons using forward translation (English to Greek) and backward translation (Greek to English) with expert translation review, prior to conducting pilot testing and confirmatory factor analysis in a bespoke survey population. A total of 405 adults from Cyprus participated in this study. The results indicated that the Greek versions of these measures demonstrated adequate reliability (Cronbach's alphas > 0.70) and strong factor structure, as supported through confirmatory factor analysis. However, only the CAS exhibited evidence of both convergent and divergent validity. Our study makes several innovative contributions which have broad implications for crisis preparedness, including providing a framework for mental health interventions in future pandemics or Black Swan events.

Keywords: anxiety; obsession with COVID-19; reassurance-seeking behaviors; coronavirus; psychometric validity; reliability

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1. Introduction

The COVID-19 pandemic has profoundly affected psychological well-being across the world, particularly in Greece and Cyprus, where strong social cohesion and family ties and community interconnectedness have amplified anxiety and fear of infection. The unprecedented public health measures and social isolation have changed the collective resilience and exposed mental health vulnerabilities within Greek-speaking populations. As of

28 November 2022, Greece had reported over 5 million confirmed cases and 34,178 deaths, while Cyprus had reported over 600,000 confirmed cases and 1226 deaths, according to the World Health Organization (WHO) [1]. The mental health impact of the COVID-19 pandemic extended far beyond university students, affecting multiple vulnerable populations. Older adults were particularly susceptible to heightened anxiety and depression during the pandemic due to increased isolation, fear of contracting the virus, and limited access to healthcare and social services. Research shows that older individuals were more likely to experience severe anxiety related to COVID-19, due their higher risk of severe illness or death from the virus [2]. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), anxiety is defined as excessive fear and apprehensive expectation, often accompanied by physiological symptoms such as muscle tension, restlessness, and sleep disturbances. Understanding this construct is essential for contextualizing coronaphobia as a specific form of anxiety triggered by the COVID-19 pandemic. Frontline healthcare workers were also significantly impacted. The constant exposure to COVID-19, long work hours, and fear of infection led to a notable rise in mental health issues such as anxiety, depression, and burnout among these workers [3]. Additionally, individuals with pre-existing mental health conditions or residing in psychiatric facilities were at heightened risk during the pandemic [4]. Studies reported that the uncertainty and disruption caused by COVID-19 exacerbated conditions such as generalized anxiety disorder, depression, and obsessive–compulsive disorder [5].

1.1. Psychological Impact of the Pandemic

The pandemic has had a widespread impact beyond healthcare, causing major stress in individuals and society due to the threat of illness and death, disruptions to daily life, and restrictive public health measures [6]. Recent studies reported an increased prevalence of anxiety and depression worldwide, which is related to the COVID-19 pandemic [7]. This trend was also observed in Greece, where anxiety and depression rates among university students during COVID-19 lockdown were 35.8% and 51.2%, respectively, which was an alarming increase [8]. Broader mental health problems emerged, including post-traumatic stress disorder (PTSD), substance abuse and sleep disorders [9–11]. Psychological distress was further exacerbated by social determinants, such as unemployment, isolation and disruptions to educational and family life, highlighting the complex and multi-layered impact of the pandemic [9,12].

1.2. Coronaphobia and Its Assessment

One mental health condition that emerged from the COVID-19 pandemic was coronaphobia—a dysfunctional fear and anxiety over the coronavirus [13]. While a certain level of concern is understandable during a global health crisis, excessive fear and anxiety about COVID-19 can be debilitating and psychologically distressing [13,14]. Previous studies have validated the Coronavirus Anxiety Scale (CAS), the Obsession with COVID-19 Scale (OCS), and the Coronavirus Reassurance-Seeking Behaviors Scale (CRBS) across diverse cultures, including Turkey, Republic of Korea, Brazil, and Pakistan, demonstrating satisfactory psychometric properties. However, no equivalent validation exists for Greek-speaking populations, limiting cross-cultural comparability and clinical application. Coronaphobia represents a unique manifestation of anxiety centered around COVID-19. While fear of the virus is common, the intensity observed in coronaphobia may be driven by hypervigilance, widespread media exposure, and uncertainties surrounding the virus's long-term effects. Individuals prone to specific phobias or health anxiety may be particularly vulnerable due to pre-existing psychological factors. Coronaphobia can be understood within broader anxiety disorder frameworks, sharing features with health anxiety such as

obsessive thoughts and reassurance-seeking, while being distinct in its specific focus on COVID-19. The physiological symptoms associated with the CAS (e.g., dizziness, digestive distress) suggest that this fear also significantly impacts bodily perceptions, aligning with somatic symptom disorders.

To address this, three screening tools have been developed to detect coronaphobia:

1. The Coronavirus Anxiety Scale (CAS) measures physiological reactions, such as dizziness, sleep disturbances, paralysis, and digestive distress triggered by information or thoughts about the coronavirus [15]. This measure retained its initial unifactorial structure across studies, supporting concurrent validity [14].
2. The Obsession with COVID-19 Scale (OCS) measures disturbing thoughts, perceptions, intrusions, and dreams about the coronavirus [16];
3. The Coronavirus Reassurance-Seeking Behaviors Scale (CRBS) evaluates excessive reassurance-seeking behaviors, such as frequent temperature checks, compulsive internet searches, and repeated medical evaluations for fear of infection [17].

These scales have been validated in several countries but have not been adapted and validated for Greek-speaking populations, which limits their clinical and research applicability.

Cultural context plays a crucial role in how coronaphobia is experienced and expressed. In Greek and Cypriot societies, strong family values and social cohesion may heighten anxiety about the health and well-being of loved ones during pandemic. Fear of infecting family members could intensify coronaphobia, particularly in tight-knit communities. In Cypriot society, collectivism and close family bonds may intensify anxiety about infecting loved ones, while cultural stigma surrounding mental illness can discourage individuals from seeking professional help. These sociocultural factors underline the need for culturally adapted tools to accurately measure pandemic-related fear and anxiety. Additionally, both cultures emphasize resilience and collective action, which may either help mitigate or exacerbate anxiety, depending on individual coping mechanisms. Cyprus's strict lockdown measures may have further contributed to coronaphobia by increasing social isolation and feelings of helplessness. Although numerous studies have confirmed the psychometric utility, clinical utility, and cross-cultural validity of the CAS [14], relatively less research has been conducted to the OCS and CRBS. Anxiety can manifest in various ways, including physical symptoms, which are just one aspect that mental health professionals consider in diagnosis and treatment [18]. Taken together, these factors highlight the importance of developing and validating culturally appropriate tools for assessing coronaphobia. This study aims to provide psychometrically robust Greek versions of the CAS, OCS, and CRBS, contributing to both local mental health practice and the broader literature on pandemic related anxiety in Greek-speaking populations.

1.3. Study Purpose and Objectives

Considering that Greece implemented some of the strictest isolation measures in Europe and experienced a high number of deaths, it is important to identify individuals and groups, such as university students, who may be struggling with obsessive thought patterns related to the virus. The objective of this study was to translate, culturally adapt, and psychometrically validate the Greek-language versions of the CAS, OCS, and CRBS in a sample of Cypriot adults. We aimed to examine (a) the internal consistency and construct validity of the three scales, (b) their convergent validity with related psychological constructs, and (c) potential differences in coronaphobia-related symptoms across key demographic characteristics. It was hypothesized that all three scales would demonstrate high internal consistency (Cronbach's $\alpha > 0.70$) and satisfactory validity indicators within the Cypriot cultural context. Our study contributes to cross-cultural psychometric research and enhances the early detection of pandemic-related anxiety and obsessive behaviors

arising from Black Swan events. Furthermore, the findings support evidence based, targeted mental health interventions in clinical and community settings in Cyprus and contribute to public health preparedness and mental health policy planning for future large-scale, unpredictable crises.

2. Materials and Methods

2.1. Participants and Procedure

A cross-sectional online survey was conducted between February and April 2021 in individuals living in Cyprus. We conducted a power analysis using G*Power software version 3.1.9.7 [19]. For example, for ANOVA tests and a true effect size f = 0.196 (eta-square = 0.037), a = 0.05 and power (1 − β) = 0.8 with a number of groups = 7, the required minimum sample size was calculated as n = 364 with an achieved power of 0.804. Reducing the number of groups to six yielded a required sample size of n = 342, and so on. The logistic regression power analysis is more complex and requires additional exploration. Bujang et al. recommend a minimum sample size of 500 to ensure reliable and valid estimates for the targeted population [20]. Furthermore, the concept of event per variable (EPV) and sample size formula (n = 100 + 50i, where i represents the number of independent variables in the final model) are also introduced. In our study we have used logistic regression with less than 6 independent variables indicating that a sample size of approximately 400 is sufficiently robust to yield reliable results.

During this period, there were various restrictions due to the COVID-19 pandemic. Movement was restricted between 9 p.m. and 5 a.m., allowing only essential activities such as work, urgent medical needs (e.g., visits to medical centers, hospitals or pharmacies) and emergency assistance for people who could not take care of themselves or needed self-protection. Social gatherings in homes were generally prohibited, with the exception of a brief permission for up to two people in February, which was later expanded to eight people. There were also restrictions on weddings and baptisms to limit social contact. Access to parks, amusement parks and beaches were only permitted for the purpose of physical exercise. During this period, the number of new daily COVID-19 cases started at around 120 in February and rose to around 900 by the end of April. The number of daily deaths, which started at 200 in February, also rose to 300 by the end of April.

The aforementioned restrictions may have influenced the participants' responses and willingness to participate. Movement restrictions may have increased isolation and anxiety, affecting mental health and survey responses. Moreover, social distancing measures may have limited access for older adults or those without internet access, while the younger individuals may have been overrepresented due to the prevalence of social media. The increasing number of COVID-19 cases and deaths during this period may have increased anxiety and coronaphobia reported by the participants.

We recruited participants through social media platforms (Facebook® v315, Instagram® v185, Viber® v15.2.0.0 and WhatsApp® v2.21.7), using a snowball system sampling approach to ensure greater participation. Participants were invited to fill out an online survey prepared on Google Forms. We shared the survey link in community groups, university forums and professional networks relevant to the Cypriot population. Before starting the survey, we provided the participants with a Plain Language Information Statement and an informed consent form, and we required them to actively provide their consent by clicking a checkbox before proceeding with the survey.

Participants had to be adults (>18 years old), residents of Cyprus and proficient in the Greek language. The survey responses were anonymized and no personally identifiable information was collected at any stage of the study. We stored the data collected daily, in an encrypted form on a password-protected server accessible only to the research team.

The study complied with the ethical guidelines of the Declaration of Helsinki and was approved by the Cyprus National Bioethics Committee (ΕΕΒΚ ΕΠ 2021.01.44).

2.2. Measures

2.2.1. Background Information

Questions related to background information asked participants' age, gender, education, profession, nationality, insurance, monthly income, and marital status.

2.2.2. The Coronavirus Anxiety Scale (CAS)

The Coronavirus Anxiety Scale (CAS) is a measure of anxiety related to COVID-19, also known as coronaphobia [15]. People's behavior and psychological health are affected by coronaphobia, which results in excessive health-related worries, elevated stress levels, despair, anxiety, loneliness, and suicidal thoughts, an increase in safety-seeking behaviors, and reduced resilience and functioning in daily life [14,16]. The CAS assesses five physiological reaction items: dizziness, disrupted sleep, feeling frozen or paralyzed, loss of appetite, and nausea or abdominal discomfort. Each item is ranked on a 5-point scale, ranging from 0 (not at all) to 4 (nearly every day over the last two weeks). A score of $\geq$9 identifies individuals with clinically significant anxiety requiring professional attention. The CAS has been psychometrically validated in various countries, such as Turkey [21], Colombia [22], Brazil [23], Bangladesh [24], Republic of Korea [25], and Spain [26].

2.2.3. The Obsession with COVID-19 Scale (OCS)

The Obsession with COVID-19 Scale (OCS) is a self-report mental health screening tool that assesses persistent troubling thoughts, intrusive perceptions and disturbing dreams linked to COVID-19. The OCS has four items, with each one rated on a 5-point ranking system from 0 (not at all) to 4 (nearly every day over the last two weeks). A combined score of 7 or more indicates a probable dysfunctional thinking regarding COVID-19 [13]. The validity and reliability of the OCS have been tested in the United States [17], Turkey [21], Republic of Korea [25], Pakistan [27], and Brazil [28]. The OCS distinguishes between nonfunctional COVID-19 thinking patterns (81% sensitivity and 93% specificity) and those without them (73% sensitivity and 76% specificity) using an improved cutoff score of 9. The findings validate and support the OCS as a useful instrument of the cognitive facet of coronaphobia for clinical research and practice [16].

2.2.4. Coronavirus Reassurance-Seeking Behaviors Scale (CRBS)

The Coronavirus Reassurance-Seeking Behaviors Scale (CRBS) was created to estimate how frequently individuals are involved with reassurance-seeking behaviors, such as frequent temperature checking, internet searching and repeated consultations with doctors, explicitly in correlation with COVID-19 [17]. The CRBS has five items and each one is rated on a 5-point scale from 0 (not at all) to 4 (nearly every day over the last two weeks). Total scores range between 0 and 20, and a high score correlates with high engagement in reassurance-seeking behavior [17]. In one survey, CRBS was studied and reported to correlate with neuroticism and hypochondriasis [29]. CRBS, which measures the behavioral facet of coronavirus anxiety, has been validated in the United States [17] and Republic of Korea [30]. Strong internal consistency reliability (=0.90) characterizes the CRBS [17].

The aforementioned three scales—CAS, OCS and CRBS—complement each other by capturing different facets of coronaphobia, enabling a comprehensive evaluation of this condition.

Prior to the distribution of the questionnaire, a linguistic validation as described in the 'Principles of Good Practice' [31] was performed for all three scales.

2.3. Translation Procedure

Three bilingual researchers (M.B., K.S.K., and E.J.) independently translated the CAS, OCS and CRBS into Greek language. They then reached a consensus on the final translation. The Greek versions of these scales were translated back into English by a native speaker (K.A.) fluent in both languages. Minor discrepancies related to cultural and linguistic equivalence were reviewed and verified by two bilingual mental health professionals (K.A. and P.G.). The scales were then piloted with 10 participants. Based on their feedback, the Greek versions of the three scales were revised and finalized.

2.4. Statistical Analysis

IBM SPSS Statistics version 26 was used to analyze the frequency and percentage of sociodemographic variables and the scores on the three scales (CAS, OCS, and CRBS). Although total scores may be treated as continuous variables, preliminary assessment of their distributions using Lilliefors tests indicated statistically significant deviations from normality. First, we performed nonparametric tests (Kruskall–Wallis tests) due to a lack of normality (Lilliefors tests) for analyzing relationships between scale scores. Given the ordinal nature of individual scale items and the observed skewness in total scores, nonparametric methods were considered more appropriate and conservative for primary analyses. Chi-square tests were conducted to determine the relationship between the scores and sociodemographic characteristics which are categorical variables, and within the scores. We conducted Spearman's correlation tests (again, because of the lack of normality) among the scores for clarification. Parametric alternatives (e.g., ANOVA, Pearson correlations) were considered; however, nonparametric approaches were prioritized to reduce the risk of inflated Type I error under violated distributional assumptions. Logistic regression was performed to model the relationship between the measured scores (CAS, OCS, and CRBS) and the sociodemographic variables. Logistic regression is preferred because it does not require a linear relationship between the dependent and independent variables, the error terms (residuals) do not need to be normally distributed, and homoscedasticity is not required. Finally, Confirmatory Factor Analysis (CFA) using IBM SPSS Amos 26, was used to test the hypothetical models of the measures, based on the literature. The psychometric properties of the Greek scales were consecutively investigated. To evaluate internal consistency reliability, we employed Cronbach's alpha and omega values, which are a more reliable indicator of reliability.

3. Results

A total of 405 participants (66.4% women and 33.6% men) responded to the survey. The descriptive details are shown in Table 1. Overall, our sample was predominantly female, middle-aged (31–50 years), married, highly educated, and employed mainly in the private and public sector. Although mean CAS, OCS, and CRBS scores revealed generally low levels of coronophobia, subsequent analyses indicated sociodemographic differences. Specifically, higher CAS scores were observed among women, individuals employed in education-related professions, housewives, and participants with lower monthly income, while healthcare workers and higher income groups reported lower anxiety levels. Age- and profession-related differences were also observed for OCS and CRBS scores, indicating that obsessive thoughts and reassurance-seeking behaviors varied across demographic subgroups despite low overall mean scores.

Table 1. Descriptive characteristics of the sample (n = 405).

Characteristics	*n*	%
Gender		
Male	136	33.6
Female	269	66.4
Age		
18–30	84	20.7
31–40	159	39.3
41–50	86	21.2
51–80	76	18.8
Marital Status		
Single	140	34.6
Married	226	55.8
Divorced	20	4.9
Widowed	19	4.7
Nationality		
Greek	14	3.5
Cypriot	386	95.3
Other	5	1.2
Professional field		
Education	98	24.2
Healthcare	54	13.3
Catering—Food	19	4.7
Other	234	57.8
Insurance		
Public Health Insurance	298	73.6
Private insurance	87	21
Other	10	2.5
No answer	10	2.5
Profession		
Public employee	77	19
Private employee	199	49.1
Freelancer	45	11.1
Housewife	18	4.4
Retired	14	3.5
Other	52	12.9
Monthly income (€)		
<500	54	13.3
500–1000	70	17.3
1001–1500	105	25.9
1501–2000	84	20.7
2001–2500	49	12.1
>2500	43	10.6
Education		
Primary School	2	0.5
High School	64	15.8
College/University Degree	339	83.7

The mean scores for the CAS, OCS, and CRBS were 2.54, 2.52, and 2.61, respectively, indicating relatively low levels of coronaphobia within this sample. Detailed descriptive statistics for these measures are presented in Table 2.

Table 2. Descriptive characteristics of the scores.

	n	Range	Minimum	Maximum	Mean	Std. Error	Std. Deviation
CAS	405	19	0	19	2.54	0.168	3.372
OCS	405	16	0	16	2.52	0.156	3.141
CRBS	405	13	0	13	2.61	0.129	2.604

3.1. Nonparametric Tests

First, Lilliefors test was conducted to explore the normality among the scores, but the results indicated deviations from normality (all p-values < 0.001). Consequently, nonparametric tests, including the Kruskall–Wallis and Mann–Whitney tests, were employed based on the number of independent samples in each analysis. The Mann–Whitney test revealed that CAS scores were higher among women compared to men (p-value < 0.001). A Kruskall–Wallis test indicated significant differences in CAS scores by profession (H = 14.202, df = 6, p-value = 0.027) and in CRBS scores (H = 14.002, df = 6, p-value = 0.030). Housewives had higher CAS scores compared to retirees (p-value = 0.003), public employees (p-value = 0.002), and private employees (p-value = 0.002). Similarly, housewives exhibited higher CRBS scores than public employees (p-value < 0.001).

Another nonparametric indicated differences in CAS scores across professional fields (H = 7.838, df = 3, p-value = 0.049), with education professionals reporting higher CAS scores than healthcare workers (p-value = 0.004). Finally, CAS scores varied significantly by monthly income (H = 20.072, df = 5, p-value = 0.001). Participants earning more than €2500 per month reported lower CAS scores compared to those earning less than €2000 (all p-values < 0.007).

3.2. Chi-Square Tests

Chi-square tests were conducted to investigate the relation between scores and categorical sociodemographic variables. The results indicated that CAS scores were significantly associated with marital status (p-value 0.043), professional sector (p-value 0.005), and insurance sector (p-value 0.022). CRBS scores were related only to professional status (p-value 0.019). A proportion test further revealed that private sector employees have lower level of reassurance compared to housewives. OCS scores were significantly associated with age (p-value 0.006) and professional status (p-value 0.008).

Finally, we examined the relation between the three scores of the Coronaphobia questionnaire. A significant association was found between CAS and CRBS (chi-square = 807.708, p-value < 0.001). Performing a proportion test we found that individuals with low reassurance-seeking behaviors were more likely to experience low stress levels rather than high stress levels. Due to the lack of normality, Spearman's correlation test was conducted yielding a moderate positive correlation (r = 0.398, p < 0.001).

Similarly, CAS and OCS were significantly related (chi-square = 22.637, p-value < 0.0001). Proportion tests indicated that individuals with low obsessive behaviors had a higher probability of experiencing low stress compared to high stress. Spearman's correlation test showed a stronger positive relationship between CAS and OCS (r = 0.544, p < 0.001).

Moreover, we detected significant association between OCS and CRBS (chi-square = 59.118, p-value < 0.001) and the proportion test revealed that people with low obsessive behaviors were more likely to exhibit low reassurance-seeking behaviors rather than high levels. Spearman's correlation test indicated a strong positive correlation between OCS and CRBS.

Overall, these findings demonstrate positive relationships among the CAS, OCS, and CRBS.

3.3. Logistic Regression

To explore the relationship between the scores and sociodemographic characteristics, a logistic regression analysis was performed to investigate these associations in a unified manner for each score. The analysis found that healthcare workers were five times more likely to have low CAS scores compared to education personnel (p-value = 0.042). Additionally, younger age groups (18–30 and 31–40 years) are three times more likely to have low OCS scores compared to the 51–80 age group (p-value = 0.042). Finally, private sector employees were three times more likely to have low OCS and CRBS scores than housekeeping employees, though this finding approached but did not reach statistical significance (p-value = 0.070).

3.4. Factor Structure

The Confirmatory Factor Analysis (CFA) was used to confirm the three-dimensional model previously proposed in the literature. The fit indices for this model were as follows:

$$\frac{x^2}{df} = 3.34, NFI = 0.903, RFI = 0.881, TLI = 0.914, CFI = 0.93, RMSEA = 0.076,$$

These results indicate a good model fit. Specifically, the x^2/df ratio is below the recommended threshold of 5, and the values of the Non-Normed Fit Index (NNFI), Relative Fit Index (RFI), Tucker–Lewis Index (TLI), and Comparative Fit Index (CFI) are close to or exceed the benchmark value of 0.90. Additionally, the Root Mean Square Error of Approximation (RMSEA) index is less than 0.10, further supporting the model's adequacy [32].

Tables 3–5 summarize the results of the Factor Analysis (FA) conducted for the CAS, OCS, and CRBS, respectively. The item loadings reflect the strength and direction of the association between each item and the underlying construct measured by the scale. Item correlations indicate the degree of similarity between pairs of items in their measurement of the underlying construct. Additionally, item–total correlations indicate the extent to which each item contributes to the overall construct measurement. A higher Average Variance Extracted (AVE) value (>=0.50) indicates a stronger measurement of the underlying construct, while a higher Cronbach's alpha value and Composite Reliability (CR) value (>=0.70) indicate stronger consistency and reliability.

Table 3. Summary of the results from the Confirmatory Factor Analysis (CFA) on the Coronavirus Anxiety Scale (CAS), Cronbach's alpha, item–total and interitem correlations obtained from the five items of the CAS.

CAS Items	Mean ± SD	Factor Loadings	Item–Total Correlation	Inter-Item Correlations			
				2	3	4	5
1. I felt dizzy, lightheaded, or faint, when I read or listened to news about the coronavirus.	1.02 ± 1.318	0.626	0.589	0.535	0.580	0.395	0.370
2. I had trouble falling or staying asleep because I was thinking about the coronavirus.	0.48 ± 0.877	0.751	0.673		0.613	0.502	0.489
3. I felt paralyzed or frozen when I thought about or was exposed to information about the coronavirus.	0.53 ± 0.860	0.777	0.742			0.551	0.588
4. I lost interest in eating when I thought about or was exposed to information about the coronavirus.	0.23 ± 0.529	0.798	0.623				0.661

Table 3. *Cont.*

CAS Items	Mean ± SD	Factor Loadings	Item–Total Correlation	Inter-Item Correlations			
				2	3	4	5
5. I felt nauseous or had stomach problems when I thought about or was exposed to information about the coronavirus.	0.29 ± 0.674	0.752	0.606				
Mean ± SD	2.54 ± 3.37	AVE	0.53				
Cronbach's alpha	0.812	CR	0.87				

All factor loadings and item–item Pearson correlations were statistically significant ($p < 0.001$). SD: Standard deviation, AVE: Average Variance Extracted, CR: Composite Reliability.

Table 4. Summary of the results from the Confirmatory Factor Analysis (CFA) on the Obsession with COVID-19 Scale (OCS), Cronbach's alpha, item–total and inter-item correlations obtained from the four items of the OCS.

OCS Items	Mean ± SD	Factor Loadings	Item–Total Correlation	Inter-Item Correlations		
				2	3	4
1. I had disturbing thoughts that I may have caught the coronavirus.	0.75 ± 0.870	0.753	0.659	0.666	0.520	0.249
2. I had disturbing thoughts that certain people I saw may have the coronavirus.	0.94 ± 0.909	0.766	0.689		0.569	0.230
3. I could not stop thinking about the coronavirus.	0.81 ± 1.123	0.637	0.614			0.294
4. I dreamed about the coronavirus.	0.11 ± 0.376	0.088	0.307			
Mean ± SD	2.61 ± 2.6	CR	0.84			
Cronbach alpha	0.747	AVE	0.47			

All factor loadings and item–item Pearson correlations were statistically significant ($p < 0.001$). SD: Standard deviation, AVE: Average Variance Extracted, CR: Composite Reliability.

Table 5. Summary of the results from the Confirmatory Factor Analysis (CFA) on the Coronavirus Reassurance-Seeking Behaviors Scale (CRBS), Cronbach's alpha, item–total and interitem correlations obtained from the five items of the CRBS.

CRBS Items	Mean ± SD	Factor Loadings	Item–Total Correlation	Inter-Item Correlations			
				2	3	4	5
1. I took my temperature to see if I was infected with the coronavirus disease.	0.55 ± 0.947	0.665	0.51	0.431	0.464	0.399	0.329
2. I read information on the internet to see if I had symptoms of the coronavirus disease.	0.72 ± 0.919	0.706	0.671		0.697	0.570	0.319
3. I read or watched videos to see if I was infected with the coronavirus disease.	0.43 ± 0.823	0.746	0.732			0.646	0.348
4. I spoke with other people about my symptoms to see if I was infected with the coronavirus disease.	0.55 ± 0.845	0.681	0.682				0.488

Table 5. *Cont.*

CRBS Items	Mean ± SD	Factor Loadings	Item–Total Correlation	Inter-Item Correlations			
				2	3	4	5
5. I spoke with a medical professional about my symptoms to see if I was infected with the coronavirus disease.	0.27 ± 0.563	0.640	0.458				
Mean ± SD	2.52 ± 3.14	AVE	0.50				
Cronbach's alpha	0.813	CR	0.87				

All factor loadings and item–item Pearson correlations were statistically significant ($p < 0.001$). SD: Standard deviation, AVE: Average Variance Extracted, CR: Composite Reliability.

3.5. Internal Consistency Reliability

The internal consistency of the CAS, OCS, and CRBS was assessed using multiple reliability metrics. The Cronbach's alpha values were 0.812, 0.747, and 0.813 for CAS, OCS, and CRBS, respectively, suggesting that these scales are reliable, as they exceed the commonly accepted threshold of 0.70 for internal consistency [33]. Furthermore, the omega values of 0.824, 0.825, and 0.801 for CAS, OCS, and CRBS, respectively, confirm the reliability of these scales [34]. The Composite Reliability (CR) values were 0.87 for CAS, 0.84 for OCS, and 0.87 for CRBS, all surpassing the 0.70 threshold. These results indicate that the items within each scale measure the same underlying construct consistently and reliably [35].

The corrected total correlations in the CAS and CRBS are relatively high, ranging from 0.589 to 0.742 for CAS and 0.458 to 0.732 for CRBS. These findings indicate that the items in these scales measure the intended construct well and have strong relationships with the overall score of the scale. In contrast, the OCS displayed weaker item–total correlations, ranging from 0.307 to 0.689. Notably, the item "I dreamed about the coronavirus" in the OCS exhibited a low corrected item–total correlation of 0.307 and a low loading of 0.088. This suggests that the item may not be a strong predictor of the overall OCS score and has a weaker relationship with other items in the scale.

3.6. Convergent Validity

To test the convergent validity, we used the CR index and the AVE index. For a factor to demonstrate convergent validity, the CR index must exceed the AVE index, and the AVE index must be greater than 0.50. Among the three scales, only the CAS met these criteria, with an AVE index of 0.53, indicating acceptable convergent validity. In contrast, the AVE indices for the OCS and CRBS were below 0.50, suggesting that these factors do not meet the criteria for convergent validity. This finding indicates that the CAS has better convergent validity compared to the OCS and CRBS.

3.7. Discriminant Validity Test

Discriminant validity was assessed using the Fornell–Larcker criterion [36], a statistical test that evaluates the degree of independence between constructs in a model. This method compares the square root of the Average Variance Extracted (AVE) with the correlation coefficients between the constructs. The results presented in Table 6 indicate that discriminant validity is established for this measurement model. The findings support the independence of the constructs, confirming their discriminant validity.

Table 6. The square root of the Average Variance Extracted (AVE) (in bold) and correlations between the scales.

Constructs	CAS	OCS	CRBS
CAS	**0.728**		
OCS	0.398	**0.685**	
CRBS	0.544	0.559	**0.707**

4. Discussion

We aimed to translate, culturally adapt, and psychometrically validate the Greek versions of the Coronavirus Anxiety Scale (CAS), Obsession with COVID-19 Scale (OCS), and Coronavirus Reassurance-Seeking Behaviors Scale (CRBS) in a Cypriot adult population, with the hypothesis that these instruments would demonstrate acceptable reliability and validity. Overall, the findings support this objective, indicating that the three scales function as reliable screening tool for assessing distinct dimensions of coronaphobia within the Cypriot cultural context. These results are consistent with findings from similar studies conducted in other cultural contexts, such as Turkey [21] and Republic of Korea [25], confirming the multidimensional nature of coronaphobia [13]. The CAS demonstrated the strongest overall psychometric performance and high internal consistency, while studies in Republic of Korea and Brazil reported comparable results for the CAS and OCS [25,28].

While Lee [15] reported higher Cronbach's alpha values for the CAS, the slightly lower values in our study may reflect cultural or contextual differences in the Cypriot population.

The CAS demonstrated the strongest overall psychometric performance, particularly in terms of contrast clarity and validity, suggesting that physiological manifestations of pandemic-related anxiety may be more clearly distinguishable in non-clinical community samples. These findings reinforce the suitability of the CAS as a brief and robust screening tool for identifying heightened coronavirus-related anxiety in population-based settings [17].

The comparatively weaker convergent validity observed for the OCS and CRBS may reflect the greater conceptual overlap between cognitive and behavioral anxiety processes, which are more difficult to disentangle, especially with generally low symptom severity. This pattern may also be influenced by cultural characteristics of the Cypriot society, which is shaped by collectivist values, strong family networks, and close social ties. In such contexts, reassurance-seeking behaviors and repeated discussions about health concerns may be socially normative responses rather than clear indicators of psychopathology, potentially attenuating the discriminative capacity of cognitively and behaviorally focused items. Notably, one OCS items ("I dreamed about the coronavirus") demonstrated a particularly weak association with the underlying construct. This finding suggests that this item may be less culturally or clinically salient in the Cypriot populations and supports consideration of item revision or removal in future adaptations, particularly when the scale is applied in non-clinical or low symptom samples. The present findings should be interpreted within the context of the scales' intended use as a screening rather than diagnostic instrument. The CAS, OCS, and CRBS are designed to identify individuals who may require further psychological evaluation, not to establish clinical diagnoses. The absence of clinical interviews limits conclusions regarding diagnostic accuracy, underscoring the need for cautious interpretation in both research and applied settings. Our study contributes to cross-cultural psychometric research by demonstrating that pandemic-related anxiety constructs can be meaningfully assessed across different sociocultural contexts. By providing a validated Greek language tool for use in Cyprus, the study enhances early identification of pandemic-related psychosocial distress and supports preparedness for future Black Swan events such as pandemics.

Future research should focus on clinical populations, longitudinal designs, and revised items structures, particularly for the OCS, to strengthen further the evidence base and clarify the role of coronaphobia screening tools in both routine mental health care and emergency public health responses.

Limitations

Several limitations of the study should be considered when interpreting the results. First, this investigation was carried out online, thus the sample may not be representative of the population since participation requires internet access, which may exclude people from certain socioeconomic, geographical or age groups. Second, self-reported data is subject to biases, such as social desirability and short-term memory. Third, the absence of an attention check item could have impacted the legitimacy of the results. Fourth, the fact that the present study did not evaluate the cutoff points of the scales poses another potential limitation in terms of the ability to accurately detect the presence of dysfunctional coronavirus anxiety in its participants. It is important to clarify that the CAS, OCS, and CRBS were developed primarily as screening tools, not for definitive diagnosis. These scales can help identify individuals who may be experiencing heightened levels of coronaphobia and should be flagged for further evaluation by a mental health professional.

Another limitation is the absence of follow-up or video consultations with psychiatrists for individuals with high scores. In clinical practice, individuals with elevated scores on these scales should undergo a thorough psychiatric assessment to confirm the presence of coronaphobia or other related mental health issues.

Finally, some correlations described in the results section may be autocorrelations—associations between components that measure the same thing. For example, correlations between the CAS, OCS, and CRBS are expected due to their shared focus on aspects of coronaphobia. These relationships underscore the interconnected nature of physiological, cognitive, and behavioral dimensions of pandemic-related fear but highlight the need for careful interpretation of these associations.

5. Conclusions

The Greek versions of the CAS, OCS, and CRBS are reliable screening tools for assessing coronaphobia in Greek-speaking populations. However, these scales should not be used in isolation for diagnostic purposes. Their use is intended for early identification rather than standalone diagnosis, and elevated scores should be followed by comprehensive mental health assessment conducted by qualified professionals.

The use of validated Greek-language tools contributes to cross cultural psychometric research and addresses the need for culturally sensitive tools to assess pandemic-related psychological distress in Cyprus. While our findings are based on cross sectional data, future longitudinal research is warranted to examine symptom trajectories over time and to further evaluate these measures in clinical populations.

For public health professionals, these scales may be incorporated into population-level screening protocols to identify groups at increased risk of the pandemic-related anxiety, facilitating early and targeted interventions. Such applications are particularly relevant for preparedness planning in future large-scale health crises such as pandemics.

In clinical and policy contexts, the use of these scales can support needs-based service planning by informing intervention strategies and mental health resource allocation. Their use may enhance responsiveness to the psychological consequences of public health emergencies and contribute to more resilient mental health systems.

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