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ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Attitudes Towards Artificial Intelligence Scale Translation and validation in Greek

OBJECTIVE **To translate and validate the Attitudes Towards Artificial Intelligence Scale (ATAI) in a sample of the general population in Greece.** METHOD **We employed the forward-backward method to translate and adapt the ATAI in Greek language. We examined the reliability of the ATAI by calculating Cronbach's alpha. Also, we performed a test-retest study to examine the reliability of the ATAI by calculating the intraclass correlation coefficient (ICC). We examined the construct validity of the ATAI by performing confirmatory factor analysis (CFA). We examined the concurrent validity of the ATAI using the Artificial Intelligence Attitude Scale (AIAS-4) and the Short Trust in Automation Scale (S-TIAS).** RESULTS **We found that the ATAI had very good reliability since ICC for the factor "acceptance" during the test-retest was 0.985 (95% confidence interval [CI]: 0.968 to 0.993, p<0.001). Also, the ICC for the factor "fear" during the test-retest was 0.971 (95% CI: 0.940 to 0.986, p<0.001). Moreover, Cronbach's coefficient alpha for the factor "acceptance" was 0.797, and for the factor "fear" was 0.705. We found that the Greek version of the ATAI had the two-factor structure as the original version. All indices indicated an acceptable two-factor model. In particular, x^2/df was 0.961, RMSEA was <0.001, GFI was 0.986, AGFI was 0.947, TLI was 1.000, IFI was 1.000, NFI was 0.972, and CFI was 1.000. Concurrent validity of the Greek version of the ATAI was very good since we found statistically significant correlation between the ATAI and the AIAS-4 (acceptance scale: r=0.762, p<0.001; fear scale: r=-0.151, p=0.113), and the S-TIAS (acceptance scale: r=0.648, p<0.001; fear scale: r=-0.140, p=0.140).** CONCLUSIONS **The Greek version of the ATAI is a reliable and valid tool to measure attitudes towards artificial intelligence in the general population.**

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2027, 44(1):78–82

O. Konstantakopoulou,[1]
A. Katsiroumpa,[1]
I. Moisoglou,[2]
P. Gallos,[3]
O. Galani,[3]
M. Tsiachri,[1]
P. Lialiou,[4]
K. Lamprakopoulou,[5]
P. Galanis[1]

[1]Laboratory of Clinical Epidemiology, Faculty of Nursing, National and Kapodistrian University of Athens, Athens
[2]Faculty of Nursing, University of Thessaly, Larissa
[3]Faculty of Nursing, University of West Attica, Athens
[4]Laboratory of Computational Biomedicine Research, Department of Digital Systems, University of Pireus, Pireus
[5]Laboratory of Embedded Systems Design and Applications, Department of Electrical and Computer Engineering, University of Peloponnese, Patras, Greece

Κλίμακα "Attitudes Towards Artificial Intelligence Scale": Μετάφραση και στάθμιση στην ελληνική γλώσσα

Περίληψη στο τέλος του άρθρου

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Artificial intelligence (AI) is profoundly transforming critical sectors, such as healthcare, education, and public administration. The accelerated diffusion of large-scale, user-facing systems –particularly generative AI– has intensified both optimism and apprehension regarding equity, safety, and labor market implications.[1,2] Understanding attitudes toward AI is therefore essential, as these attitudes significantly influence acceptance, trust, and the actual adoption of AI-enabled technologies and services.[3,4] Empirical evidence from healthcare and public service contexts

indicates that expectations and willingness to engage with AI are closely associated with trust in providers, institutional frameworks, and governance mechanisms. Furthermore, perceived threats to the preservation of human interaction can attenuate support for AI-driven care, even when anticipated efficiency gains are substantial.[5] These observations underscore the necessity of employing rigorously validated instruments capable of capturing nuanced public perceptions, thereby informing context-sensitive implementation strategies and communication approaches.

In recent years, multiple instruments have been developed to assess attitudes toward AI. For the general population, Sindermann et al introduced the ATAI, a brief five-item measure with a two-factor structure, demonstrating acceptable internal consistency and structural validity across diverse samples. This scale was specifically designed to capture overall positive perceptions of AI's societal impact.[6] Other researchers have proposed group-specific tools or broader instruments that examine perceived benefits, risks, and behavioral intentions related to AI use. Collectively, this expanding body of measurement approaches illustrates the feasibility of assessing AI attitudes but also reveals considerable variability in factor structures, item content, and target populations. Such heterogeneity raises important questions regarding cross-cultural applicability and the comparability of scores across different languages and contexts.[5,7–12]

From a theoretical standpoint, attitudes toward AI are closely linked to established models of technology acceptance. The technology acceptance model (TAM) suggests that perceived usefulness and perceived ease of use are key determinants of attitudes and behavioral intentions toward technological adoption. Similarly, the Unified Theory of Acceptance and Use of Technology (UTAUT) synthesizes eight prior frameworks, identifying performance expectancy, effort expectancy, social influence, and facilitating conditions as primary predictors, with moderating effects from variables such as age and experience. Although these models were not originally designed to address AI in its broad sense, they offer constructs –such as perceived usefulness, usability, social norms, and institutional readiness– that align closely with contemporary perceptions of AI (e.g., anticipated benefits, ease of interaction, normative pressures, and organizational support). Consequently, these theoretical foundations provide a rationale for conducting convergent validity assessments when developing or validating any scale measuring attitudes toward AI.[13–15]

The relationship between attitudes and trust has become increasingly significant in the context of AI. Evidence from scoping reviews and survey-based research in healthcare suggests that trust operates at multiple levels, encompassing confidence in technological capabilities, clinician-patient relationships, and institutional frameworks, and often serves as a mediator or moderator of adoption outcomes. Population-level surveys indicate that expectations of direct benefits from AI in clinical care remain relatively modest, while highlighting the critical role of governance, transparent communication, and demonstrable patient benefit. These findings underscore the importance of culturally sensitive instruments for assessing attitudes toward AI, as such measures can inform locally tailored policies and implementation strategies.[16–19]

In this context, we translated and validated the ATAI[6] in a sample of the general population in Greece.

MATERIAL AND METHOD

The study sample consisted of 112 participants residing in Greece, and data collection was conducted in September 2025. To translate and adapt the ATAI into Greek, we employed the forward-backward translation method. Specifically, two independent scholars translated the original English version into Greek, after which two additional scholars performed a back-translation into English. A fifth scholar reviewed the entire process and resolved any discrepancies to ensure semantic and conceptual equivalence.[20]

The ATAI measures acceptance of and fear toward AI. It includes five items with answers rated on a 0–10 scale. The acceptance score is calculated as the mean score of two items, and the fear score as the mean score of three items. These two scores range from 0 to 10. Higher acceptance scores indicate higher levels of acceptance of AI, whereas higher fear scores indicate greater fear of AI.[6]

We examined the reliability of the ATAI by calculating Cronbach's alpha. Cronbach's alpha higher than 0.6 indicates acceptable internal reliability. Also, we performed a test-retest study to examine the reliability of the ATAI by calculating the intraclass correlation coefficient (ICC) (absolute agreement method).

We examined the construct validity of the ATAI by performing confirmatory factor analysis (CFA).[21] We examined the concurrent validity of the ATAI using the Artificial Intelligence Attitude Scale (AIAS-4),[11] and the Short Trust in Automation Scale (S-TIAS).[22]

The AIAS-4 measures general attitude toward AI and includes four items with answers on a scale from 1 to 10. Total score is the mean score of the 10 items, and, thus, total AIAS-4 score ranges from 1 to 10. Higher scores indicate more positive attitudes towards AI.[11]

The S-TIAS measures trust in AI and includes three items with answers rated on a 1–7 scale. The total score is calculated as the mean score of the three items, and, thus, total S-TIAS score ranges from 1 to 7. Higher scores indicate higher levels of trust in AI.[22]

Ethical considerations

We applied the guidelines of the Declaration of Helsinki to perform this study.[23] Additionally, the study protocol was approved by the Ethics Committee of Faculty of Nursing at National and Kapodistrian University of Athens (reference approval #01, 14.9.2025).

Statistical analysis

We performed CFA to examine the construct validity of the ATAI. In particular, we calculated Chi-square/degree of freedom (x^2/df); root mean square error of approximation (RMSEA); goodness of fit index (GFI); adjusted goodness of fit index (AGFI); Tucker-Lewis index (TLI); incremental fit index (IFI); normed fit index (NFI); comparative fit index (CFI).[24,25] Acceptable value for x^2/df is <5, for RMSEA is <0.10, and for all other measures in the CFA >0.90. We used the AMOS version 21 (Amos Development Corp, 2018) to conduct the CFA.

We calculated Pearson's correlation coefficient between the ATAI and the AIAS-4 and the S-TIAS to examine the concurrent validity of the ATAI. Also, we calculated ICCs between the two ATAI measurements in test-retest study.

P-values less than 0.05 were considered statistically significant. Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS), version 28.0 (IBM SPSS Statistics for Windows; IBM Corp, Armonk, NY).

RESULTS

The study population included 105 participants from the general population. Among them, 82.1% (n=92) were females and 17.9% (n=20) were males. The mean age of our sample was 35.6 years (standard deviation [SD]: 14.9).

We found that the ATAI had very good reliability since ICC for the factor "acceptance" during the test-retest was 0.985 (95% confidence interval [CI]: 0.968 to 0.993, p<0.001). Also, the ICC for the factor "fear" during the test-retest was 0.971 (95% CI: 0.940 to 0.986, p<0.001). Moreover, Cronbach's coefficient alpha for the factor "acceptance" was 0.797, and for the factor "fear" was 0.705.

We found that the Greek version of the ATAI had a two-factor structure as the original version (fig. 1). All indices indicated an acceptable two-factor model (tab. 1). In particular, x^2/df was 0.961, RMSEA was <0.001, GFI was 0.986, AGFI was 0.947, TLI was 1.000, IFI was 1.000, NFI was 0.972, and CFI was 1.000 (tab. 1). Moreover, it standardized regression weights for the five items ranged from 0.36 to 0.90.

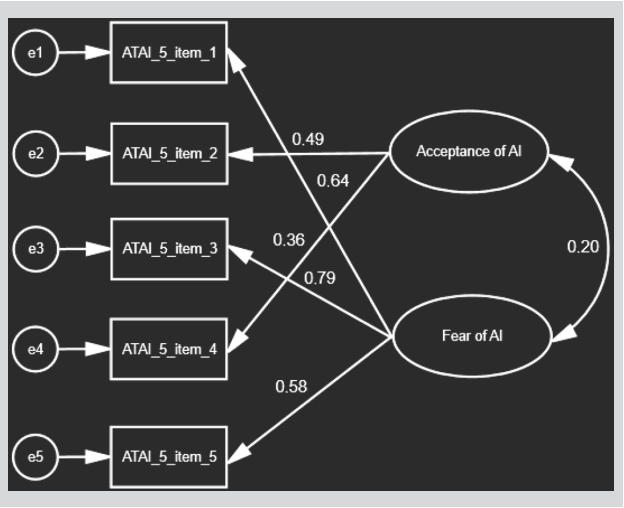


Figure 1. Confirmatory factor analysis (CFA) for the Greek version of the Attitudes Towards Artificial Intelligence (ATAI) Scale.

Concurrent validity of the Greek version of the ATAI was very good since we found statistically significant correlation between the ATAI and the AIAS-4 (acceptance scale: r=0.762, p<0.001; fear scale: r=-0.151, p=0.113), and the S-TIAS (acceptance scale: r=0.648, p<0.001; fear scale: r=-0.140, p=0.140).

DISCUSSION

We translated and validated the ATAI into Greek to provide researchers and healthcare professionals with a reliable instrument for assessing attitudes toward AI within the general population. The findings indicated that the Greek version of ATAI demonstrates strong psychometric properties, confirming its validity and reliability as a measure of attitudes toward AI. Furthermore, the analysis supports a two-dimensional structure of the scale for evaluating attitudes toward AI in the general population.

Our analysis demonstrated excellent reliability for the

Table 1. Confirmatory factor analysis for the Greek version of the Attitudes Towards Artificial Intelligence Scale.

Model	x^2	df	x^2/df	RMSEA	GFI	AGFI	TLI	IFI	NFI	CFI
Two-factor five-items	3.844	4	0.961	<0.001	0.986	0.947	1.000	1.000	0.972	1.000

x^2/df: Chi-square/degree of freedom, RMSEA: Root Mean Square Error of Approximation, GFI: Goodness of Fit Index, AGFI: Adjusted Goodness of Fit Index, TLI: Tucker-Lewis Index, IFI: Incremental Fit Index, NFI: Normed Fit Index, CFI: Comparative Fit Index

Greek version of the ATAI. Specifically, the ICC was 0.985 for the "acceptance" factor and 0.971 for the "fear" factor. Internal consistency was also satisfactory, with Cronbach's alpha values of 0.797 for "acceptance" and 0.705 for "fear". CFA supported a two-factor structure consistent with the original scale, with all fit indices indicating an acceptable model: x^2/df=0.961, RMSEA <0.001, GFI=0.986, AGFI=0.947, TLI=1.000, IFI=1.000, NFI=0.972, and CFI=1.000. Concurrent validity was strong, as evidenced by significant correlations between the ATAI and the AIAS-4 (acceptance: r=0.762, p<0.001; fear: r=-0.151, p=0.113) and the S-TIAS (acceptance: r=0.648, p<0.001; fear: r=-0.140, p=0.140).

This study had several limitations. First, the use of a convenience sample from the general population to validate the Greek version of the ATAI restricted the generalizability of the findings. Future research should aim to replicate validation efforts using more diverse and representative samples within Greece. Second, concurrent validity was assessed through self-reported instruments, including the S-TIAS and AIAS-4, which may introduce response bias. Further studies are encouraged to examine additional forms of validity, such as predictive and discriminant validity, to strengthen the evidence base for the ATAI.

In conclusion, the Greek adaptation of the ATAI demonstrated strong psychometric properties, confirming its validity and reliability as an instrument for assessing attitudes toward artificial intelligence in the general population. By introducing a culturally adapted and validated measure, this study enables systematic monitoring of public and professional perceptions of AI, supports the evaluation of educational and implementation initiatives, and facilitates cross-cultural comparisons with research employing the original ATAI or other validated tools. These contributions provide policymakers and organizational leaders with robust, contextually relevant evidence to guide AI adoption strategies, ensuring they are informed by accurate insights into perceived benefits, risks, and appropriate applications of AI.

ΠΕΡΙΛΗΨΗ

Κλίμακα "Attitudes Towards Artificial Intelligence Scale": Μετάφραση και στάθμιση στην ελληνική γλώσσα

Ο. ΚΩΝΣΤΑΝΤΑΚΟΠΟΥΛΟΥ,[1] Α. ΚΑΤΣΙΡΟΥΜΠΑ,[1] Ι. ΜΩΥΣΟΓΛΟΥ,[2] Π. ΓΑΛΛΟΣ,[3] Ο. ΓΑΛΑΝΗ,[3] Μ. ΤΣΙΑΧΡΗ,[1] Π. ΛΙΑΛΙΟΥ,[4] Κ. ΛΑΜΠΡΑΚΟΠΟΥΛΟΥ,[5] Π. ΓΑΛΑΝΗΣ[1]

[1]Εργαστήριο Κλινικής Επιδημιολογίας, Τμήμα Νοσηλευτικής, Εθνικό και Καποδιστριακό Πανεπιστήμιο Αθηνών, Αθήνα, [2]Τμήμα Νοσηλευτικής, Πανεπιστήμιο Θεσσαλίας, Λάρισα, [3]Τμήμα Νοσηλευτικής, Πανεπιστήμιο Δυτικής Αττικής, Αθήνα, [4]Εργαστήριο Υπολογιστικής Βιοϊατρικής, Τμήμα Ψηφιακών Συστημάτων, Πανεπιστήμιο Πειραιά, Πειραιάς, [5]Εργαστήριο Σχεδιασμού Ενσωματωμένων Συστημάτων και Εφαρμογών, Τμήμα Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών, Πανεπιστήμιο Πελοποννήσου, Πάτρα

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ΣΚΟΠΟΣ Η μετάφραση και η στάθμιση της κλίμακας "Attitudes Towards Artificial Intelligence Scale" (ATAI) στα Ελληνικά. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Για τη μετάφραση της κλίμακας στα Ελληνικά εφαρμόστηκε η διαδικασία της «προς τα εμπρός-προς τα πίσω μετάφρασης». Για τον έλεγχο της αξιοπιστίας της ATAI υπολογίστηκε ο συντελεστής Cronbach's alpha. Επί πλέον, εφαρμόστηκε η μέθοδος ελέγχου-επανελέγχου για τον έλεγχο της αξιοπιστίας της ATAI, υπολογίζοντας τον συντελεστή ενδοταξικής συσχέτισης. Για τον έλεγχο της εγκυρότητας κατασκευής της ATAI πραγματοποιήθηκε η επιβεβαιωτική ανάλυση παραγόντων. Για τον έλεγχο της συγκλίνουσας εγκυρότητας της ATAI χρησιμοποιήθηκε η κλίμακα "Artificial Intelligence Attitude Scale" (AIAS-4) και η κλίμακα "Short Trust in Automation Scale" (S-TIAS). **ΑΠΟΤΕΛΕΣΜΑΤΑ** Διαπιστώθηκε ότι η ATAI έχει πολύ καλή αξιοπιστία, καθώς ο συντελεστής ενδοταξικής συσχέτισης για τον παράγοντα «αποδοχή» στη μέθοδο ελέγχου-επανελέγχου ήταν 0,985 (95% διάστημα εμπιστοσύνης [ΔΕ]: 0,968–0,993, p<0,001). Επί πλέον, ο συντελεστής ενδοταξικής συσχέτισης για τον παράγοντα «φόβος» στη μέθοδο ελέγχου-επανελέγχου ήταν 0,971 (95% ΔΕ: 0,940–0,986, p<0,001). Ακόμα, ο συντελεστής Cronbach's alpha για τον παράγοντα «αποδοχή» ήταν 0,797 και για τον παράγοντα «φόβος» ήταν 0,705. Η ελληνική έκδοση της ATAI είχε δύο παράγοντες, όπως ακριβώς και η πρωτότυπη έκδοση της κλίμακας. Όλοι οι δείκτες επιβεβαίωσαν τη μορφή της ATAI με τους δύο παράγοντες. Πιο συγκεκριμένα, ο δείκτης x^2/df ήταν 0,961, ο δείκτης RMSEA ήταν <0,001, ο δείκτης GFI ήταν 0,986, ο δείκτης AGFI ήταν 0,947, ο δείκτης TLI ήταν 1,000, ο δείκτης IFI ήταν 1,000, ο δείκτης NFI ήταν 0,972 και ο δείκτης CFI ήταν 1,000. Η συγκλίνουσα εγκυρότητα της ATAI ήταν πολύ καλή, καθώς βρέθηκαν στατιστικά σημαντικές συσχετίσεις

μεταξύ της ATAI και της AIAS-4 (παράγοντας «αποδοχή»: r=0,762, p<0,001, παράγοντας «φόβος»: r=-0,151, p=0,113) και της S-TIAS (παράγοντας «αποδοχή»: r=0,648, p<0,001, παράγοντας «φόβος»: r=-0,140, p=0,140). **ΣΥΜΠΕΡΑΣΜΑΤΑ** Η κλίμακα ATAI είναι ένα αξιόπιστο και έγκυρο εργαλείο για την εκτίμηση των στάσεων του γενικού πληθυσμού στην Ελλάδα απέναντι στην τεχνητή νοημοσύνη.

Λέξεις ευρετηρίου: Αξιοπιστία, Εγκυρότητα, Ελληνικά, Κλίμακα "Attitudes Towards Artificial Intelligence Scale", Τεχνητή νοημοσύνη

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Corresponding author:

P. Galanis, 123 Papadiamantopoulou street, 115 27 Athens, Greece
e-mail: pegalan@nurs.uoa.gr