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Article

Translation and Psychometric Evaluation of the Greek Version of the Attitudes toward Transgendered Individuals Scale

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Abstract: Numerous investigations have consistently underscored the impact of societal stigma on the well-being of transgender individuals, encompassing both those experiencing gender dysphoria (transgender) and those who have undergone gender-affirming interventions (transsexual). The primary objective of the current research is to translate and adapt the Attitudes Toward Transgendered Individuals Scale into the Greek language. This scale specifically assesses stigma, excluding components such as discreteness and violence, and is tailored to evaluate individuals within the general populace. Employing confirmatory factor analysis (CFA) and assessing gender metric equivalence, the analyses yielded highly favourable outcomes, demonstrating excellent scale fit, reliability, and content validity, reflecting the robustness of the adapted tool for the Greek population.

Keywords: transgender people; transphobia; stigma; attitudes; adjustment

1. Introduction

Contemporary perspectives underscore the critical role of adverse attitudes towards transgender individuals in fostering the development of stigma against this demographic. The term "transgender" refers to individuals experiencing a dissonance between their self-identified gender and the gender assigned to them at birth [1]. Over recent years, the concept of transgenderism has significantly evolved, extending beyond a singular definition to encompass a spectrum of sexual identities [2]. The complexity of this definition is compounded by societal perceptions that often adhere to a binary understanding of gender and sex. The prevailing notion persists that an individual's gender is intrinsically tied to their biological attributes (e.g., identifying as a man if possessing male genitalia and as a woman if possessing female genitalia) [3]. Presently, the term "sex" pertains to the biological makeup of an organism, i.e. chromosomal composition, whereas "gender" encompasses the socially constructed perceptions of roles associated with each gender [4, 5].

Distinguishing between "transsexual" and "transgender" is essential. Broadly speaking, "transgender" denotes an individual whose expression of sexuality diverges from their biological sex [6]. In contrast, a "transsexual" person may undergo surgical and hormonal interventions aimed at aligning their physical attributes with their experienced gender due to the discomfort stemming from the incongruity between their gender identity and biological sex [7]. These distinctions are crucial given the prevalent stigmatization of transgender individuals in the U.S., arising from perceived incongruence between gender identity and birth-assigned gender [8, 9, 10, 11].

Indeed, it is noteworthy that historically, transgender individuals were classified within the category of Gender Identity Disorders in previous editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM). The DSM-5 refined this classification to "Gender Dysphoria," emphasizing the distress stemming from the incongruity between experienced gender identity and biological sex [12].

Transgender stigma significantly impedes opportunities and access to essential resources across various domains, including employment and healthcare, thereby severely impacting their physical and mental well-being [8]. With an estimated 1.4 million Americans identifying as transgender (with millions more worldwide), this demographic contends with some of the highest rates of discrimination, bias, and violence among stigmatized groups [13, 8].

Research findings concerning transgender individuals highlights the widespread impact of stigmatization, often originating from entrenched gender stereotypes [14, 15, 10, 16, 17]. Goffman (1986) described stigma as a defining attribute that diminishes social worth and distorts perceptions of individuals [18]. This pervasive force shapes attitudes and behaviors, perpetuating societal disparities [19].

It is essential to recognize that attitudes towards transgender individuals are complex and influenced by various factors. Tee & Hegarty's (2006) UK survey disclosed that individuals with religious affiliations held more negative views toward transgender people, often aligning with conservative values and a binary gender perspective [20]. Stigma, as indicated by Poteat et al. (2013), profoundly affects transgender individuals, given their sexual orientation challenges societal norms regarding gender (sex) [21]. This leads to dual pressures—external psychological stress from societal expectations and internal conflict related to gender identity.

The stigma directed at transgender individuals manifests in both discrimination and the phenomenon known as transphobia. Transphobia can be explicated through two primary lenses: the cognitive explanation and the dialogical psychological explanation. The cognitive perspective relates to group affiliations and the associated perceptions individuals are expected to hold, perpetuating transphobia as a cognitive bias within certain societal groups. The dialogical psychological explanation operates on a societal level, encompassing three key elements: cultural and temporal variations in the conceptualization of transgender individuals, the emergence of transphobia in response to shifts in the definition of gender, and the reactions of individuals to such changes that challenge established perspectives. This underscores transphobia as a social construct rather than an individual thought process [22].

Differentiating between transgender men and women, research by Norton & Herek (2013) reveals a notable disparity, with transgender men often facing more negative sentiments [3]. Factors such as religious affiliation, an absolutist mindset, and resistance to gender equality, particularly towards women, contribute to these adverse attitudes. Additionally, limited exposure to diverse sexual identities is associated with negative attitudes towards transgender men. Heterosexual men with religious affiliations tend to exhibit more negative attitudes, whereas women with diverse sexual identities and lower religiosity show more positive sentiments [23]. Furthermore, negative attitudes are correlated with the desire to uphold patriarchal norms among men.

The interconnection between transphobia and homophobia is underscored by research conducted by Nagoshi et al. (2008) [24]. Men, in particular, demonstrate higher levels of both homophobia and transphobia, and religious choices play a pivotal role in shaping these attitudes, as highlighted by Fisher et al. (2017) [25].

These findings underscore the imperative for comprehensive research utilizing validated instruments to measure attitudes towards transgender individuals within the Greek population. The current study aims to translate and psychometrically evaluate the Greek version of the Attitudes Toward Transgendered Individuals Scale, offering valuable insights into societal attitudes within this context.

In assessing societal attitudes towards LGBTQIA+ individuals, various scales have been developed to capture different dimensions of these attitudes. Notable scales include the "Attitudes Towards Lesbian and Gay Men" scale for both gay men and gay women by Herek (1994) [26], the

"Genderism and Transphobia Scale" by Hill & Willoughby (2005)[16], the "Transgender Attitudes and Beliefs Scale" by Kanamori et al. (2017) [27], the "Transsexual Prejudice Scale" by Case & Stewart (2013) [28], and the "Attitudes Toward Transgender Individuals Scale" by Walch et al. (2012) [29] which was also employed to measure attitudes within the Greek population.

The efficacy of the Attitudes Toward Transgender Individuals Scale in capturing people's perceptions of transgender individuals has been acknowledged in various studies [27, 30]. Herek (1984) [31] posits that questions regarding transgender individuals primarily focus on perceptions rather than beliefs or attitudes expressed in direct interactions with transgender individuals, given their relative rarity in the general population. Perceptions, according to Prat (1992) [32] are specific meanings attached to phenomena that mediate reactions to situations involving those phenomena, whereas beliefs are rooted in evaluation and judgment [33].

The purpose of this self-report questionnaire is to collect data concerning the perceptions of transgender individuals within the Greek population. Its primary objective is to evaluate whether the model aligns with the requisite psychometric properties indicative of a well-fitting assessment tool. This includes examining its unidimensionality and assessing its metric equivalence.

2. Materials and Methods

2.1. Measuring Tools

The following questionnaires have been administered to facilitate the calibration and refinement of the scale.

2.1.1. Attitudes Toward Transgender People Scale (Walch et al., 2012)

The Attitudes Toward Transgender Individuals Scale is a unidimensional metric gauging the attitudes of heterosexual individuals towards transgender persons, employing a 20-item Likert-type rating system (1 = strongly agree, 5 = strongly disagree). A "Strongly Disagree" response signals a positive attitude towards transgender individuals, with higher values denoting more favorable perspectives [29]. Notably, the scale encompasses individuals both pre- and post-surgery within the transgender category.

The translation of the Attitudes Toward Transgendered Individuals Scale into Greek was achieved using the translation/back-translation method proposed by Brislin (1970) [34]. In all analyses, items 1, 5, 8, 10, 12, 13, 14, 16, and 17 were reversed, as suggested by Walch et al. (2012), [29] to mitigate desirability response bias as outlined by Cronbach [35]. The original scale demonstrated high reliability with an alpha coefficient of 0.94, while within the specific sample, it exhibited a reliability coefficient of 0.93. These coefficients surpass the threshold of 0.9, indicating excellent reliability.

2.1.2. Rosenberg Self-Esteem Scale (Rosenberg, 1995)

The Rosenberg Self-Esteem Questionnaire is a unidimensional scale designed to assess an individual's self-esteem. Comprising 10 items, participants rate their responses on a scale ranging from 1 (strongly agree) to 5 (strongly disagree). Notably, a response of "strongly disagree" indicates lower self-esteem, whereas "strongly agree" signifies higher self-esteem. The original scale demonstrates a reliability coefficient of $\alpha = 0.85$, while within the specific sample, the reliability coefficient is $\alpha = 0.79$ [35].

2.1.3. Attitudes Toward Homosexual Women and Men Scale (Herek, 1984)

The Attitudes Toward Gay Women and Men scale assesses heterosexual individuals' attitudes toward gay individuals. Consisting of 20 questions, participants respond using a graduated scale where 1 signifies "strongly disagree" and 5 signifies "strongly agree" [31]. Higher values on the scale denote a more negative attitude toward homosexual individuals, while lower values indicate a more

positive attitude. Grigoropoulos et al. (2010) validated the scale, reporting a reliability index of $\alpha = 0.91$. In the specific sample analyzed, the reliability index was $\alpha = 0.95$ [37].

2.2. Sample

The random sampling (also known as convenience sampling) method, was employed for sample selection. The sample comprised individuals readily available and accessible during the survey period, conducted from January 1, 2018, to December 31, 2019. A total of 1796 participants from diverse regions across Greece were included, approached at their workplaces and residences. Among them, 1086 were women and 709 were men. Furthermore, demographic information regarding participants' birthplace and current residence was collected and is presented in Table 1.

Table 1. Participants' place of origin.

Place of origin and residence	Percentage of Origin	Rate of Accommodation
Village	2.3%	1.4%
Municipality	16.7%	12.5%
County capital	28%	27.4%
Athens/Thessaloniki	44.2%	55.8%
Island	4.6%	2.2%
Town	4.1%	0.8%
Total	100	100

The average age of the sample is 35.38 years, with a standard deviation (SD) of 14.06. When examining age distribution by gender, women have an average age of 36.81, while men have an average age of 34.45. Regarding religious affiliation, the majority of participants identified as Orthodox Christians, constituting 81.4% of the sample. Concerning economic classification, the predominant proportions were affiliated with the middle class (54%) and the small-medium class (40.1%).

2.3. Statistical Analyses

Data analysis was conducted using R software (version 4.0.1). To assess the factorial structure of the scale within the Greek population, Confirmatory Factor Analysis (CFA) was employed, supplemented by the U3 index to assess participant adaptation. Furthermore, the measurement invariance of the model across gender was evaluated. Finally, potential gender differences in latent variable means were explored. The original scale demonstrated high reliability with a Cronbach's alpha coefficient of 0.93.

3. Results

Prior to the primary analysis, items with negative wording were subjected to reverse coding. Specifically, the reversed-coded questions include Question 1, Question 5, Question 8, Question 10, Question 12, Question 13, Question 14, Question 16, and Question 17. The appropriateness of this reversal was verified using the Mardia test, which examines significance for kurtosis and skewness. The Mardia test results indicated violations of multivariate normality, with Mardia's kurtosis = 8106.775 and Mardia's skewness = 100.221, both yielding p -values < 0.001 . Consequently, the Weighted Least Squares Mean and Variance (WLSMV) algorithm was applied for analysis, chosen for its robustness when dealing with non-normally distributed categorical data, as recommended by Brown (2015) [38].

In this study, we also assessed for aberrant or careless responses, which are indicative of participants responding in a random or inattentive manner. As emphasized by Karabatsos (2003) [39], identifying individuals displaying such behaviors is crucial, given previous research suggesting that such responses can influence the psychometric properties of a scale, including model fit, as highlighted by Meijer and Sijtsma (2001) [40].

In our study, we utilized the U3 indicator [41] to detect individuals exhibiting random or inattentive responses, a method shown to be robust in identifying such behaviors [39]. While the U3 indicator is primarily employed in Item Response Theory Models, its relevance extends to its potential impact on the fit of a Confirmatory Factor Analysis model in the presence of deviant participants.

The initial fit of our original model, prior to outlier removal, indicated moderate to poor fit with $\chi^2 = 2666.134$, $df = 170$, $p < .001$, RMSEA = .090, SRMR = .095, CFI = .95, and TLI = .94. The statistical significance of χ^2 is acknowledged, considering its sensitivity to sample size. Other fit indicators such as RMSEA exceeding 0.08 and SRMR surpassing 0.06 [42] suggested suboptimal fit, although CFI and TLI exceeded the 0.9 threshold.

To enhance fit, we examined modification indices, leading to the introduction of error (residual) correlations for six item pairs: Q12:Q14, Q16:Q17, Q13:Q14, Q5:Q14, Q12:Q13, Q8:Q14. This refinement yielded improved fit indices for the model: $\chi^2 = 1993.487$, $df = 162$, $p < .001$, RMSEA = .079, SRMR = .82, CFI = .96, and TLI = .957. Despite the enhancement, the RMSEA remained marginal, nearing 0.08, and the SRMR did not exhibit a substantial improvement, remaining above 0.06. It is crucial to note that while modification indices guide adjustments, a theoretical basis for error correlations must also be considered in model refinement.

Subsequently, the U3 index was employed for multinomial models to detect and exclude outlier participants. The U3 values were computed, establishing a cut-off point of 0.3159 in this sample. According to this criterion, individuals with values exceeding this threshold were identified as deviant participants, resulting in a reduced sample size of 1551 individuals.

Upon removal of these outliers, the fit indices for the refined model demonstrated significant improvement: $\chi^2 = 796.615$, $df = 170$, $p < .001$, RMSEA = .049, SRMR = .055, CFI = .988, and TLI = .987. Notably, this improved fit was achieved without the need for modification indices, indicating that the initial marginal fit was influenced by the presence of these deviant participants. Furthermore, the omission of error correlations, which require a theoretical basis, was facilitated by the enhanced fit resulting from the removal of outliers.

Table 2 displays the loadings of the questions, all of which surpass the 0.4 threshold, affirming the strength of the relationships between the latent construct and the observed variables.

Table 2. Query loadings.

Questions	Loading
Question 1	0.73
Question 2	0.68
Question 3	0.78
Question 4	0.65
Question 5	0.47
Question 6	0.69
Question 7	0.74
Question 8	0.73
Question 9	0.74
Question 10	0.57
Question 11	0.71
Question 12	0.70
Question 13	0.71
Question 14	0.73
Question 15	0.66
Question 16	0.68
Question 17	0.71
Question 18	0.63
Question 19	0.57
Question 20	0.61

Lastly, the measurement invariance of the final model concerning gender was assessed. Metric equivalence, in this context, ensures that the model maintains the same meaning across different groups (i.e., between men and women) and evaluates the psychometric consistency between these

groups [43]. This examination involves constraining certain parameters of the model to test the hypothesis of whether these parameters affect the fit of the model between groups.

- For each parameter, various models were tested, including:
 - Configural model (initial): Verifying if the structure of the model is identical in both genders.
 - Metric model: Checking if the factor loadings are equivalent between both genders.
 - Scalar model: Assessing the equivalence of intercepts between both genders.
 - Strict model: Examining if the errors (residuals) are equivalent between both genders.
 - Model with constrained loadings, intercepts, errors, and latent means: Evaluating the overall equivalence. The results are presented in Table 3.

Table 3. Comparison of models for invariance measurement.

Model	χ^2	df	p	RMSEA	SRMR	CFI	TLI	ΔCFI	$\Delta RMSEA$	crisis
Configural	796.615	170	<0.001	0.049	0.055	0.988	0.987	-	-	-
Metric	1102.749	359	<0.001	0.052	0.061	0.986	0.985	0.003	0.005	Metric-configural
Scalar	1150.078	378	<0.001	0.051	0.062	0.985	0.985	0.001	0.001	Scalar - Metric
Residual	1205.716	398	<0.001	0.051	0.064	0.985	0.985	0.001	0.001	Residual - Scalar
Latent Means	1664.402	399	<0.001	0.064	0.074	0.976	0.977	0.009	0.013	Means - Residual

Note. ΔCFI = Difference between models in terms of CFI, $\Delta RMSEA$ = Difference of models in terms of RMSEA index

Applying the criterion of $\Delta CFI < 0.01$ and $\Delta RMSEA < 0.015$ [44, 45], the analysis indicates both metric and scalar equivalence. The comparison of models, considering pairwise differences, reveals that the configural and metric models do not exhibit values surpassing those specified for the difference in RMSEA and CFI (specifically, a difference of 0.003 for CFI and 0.005 for RMSEA). Consequently, it is reasonable to assert that the model demonstrates an equivalent fit across genders, suggesting that any statistically significant differences are not attributed to varying perceptions of the questionnaire between the two genders.

This finding is further supported by the scalar model, where differences are also minimal, as well as the residual model, indicating that the overall fit of the questionnaire, inclusive of errors, remains consistent between both sexes. Regarding latent means, although the difference experienced a slight increase, no outliers were observed, affirming the model's equivalence in terms of its construction.

Lastly, we examined the correlations between the Rosenberg Self-Esteem scale and the Attitudes Toward Transgendered Individuals (ATTI) scale, revealing a correlation of $r = 0.05$, $p = 0.0371$. Additionally, with the scale measuring Attitudes towards Homosexual Women and Men, the correlation was found to be $r = -0.36$, $p < 0.001$.

Analyzing the final scores across genders, it was observed that men, on average, exhibit higher levels of transphobia ($M = 67.57$, $SD = 15.34$) compared to women ($M = 72.84$, $SD = 14.76$). This distinction was statistically significant, as indicated by a t-test with Welch correction: $t(1279.2) = -6.7514$, $p < 0.001$

4. Discussion

The present research aimed to evaluate the psychometric properties of the Attitudes Towards Transgender People questionnaire within the Greek population, given the absence of surveys addressing individuals' attitudes towards transgender people in the Greek context. A comprehensive assessment of validity was undertaken, encompassing both the factor structure and metric equivalence across genders.

The psychometric properties of the model demonstrated satisfactory outcomes, with factor analysis revealing good fit and robust loading, eliminating the necessity for question removal. Employing the U3 index to identify and exclude outliers resulted in a substantial improvement in the model's performance. Additionally, our findings support the model's one-dimensional structure, consistent with the framework proposed by Walch et al. (2012) [29]. The high reliability observed further affirms the robustness and adequacy of the model.

Regarding gender, we conducted an assessment of metric equivalence to determine if different groups perceive the concepts measured in the model differently. This is crucial as disparities in understanding between genders could lead to methodological errors and spurious effects [46]. Our findings affirm that meaningful comparisons can be drawn between men and women concerning the final values derived from the questionnaire, alleviating concerns about gender-related disparities in question comprehension.

While it would have been beneficial to account for various demographic variables, the uneven distribution of groups prompted us to focus solely on gender as a covariate. This decision was influenced by the observed trend wherein men, on average, exhibited more negative sentiments towards transgender individuals compared to women. This aligns with previous research findings [24, 29], reinforcing the satisfactory performance of the scale. Additionally, an average negative correlation emerged between transphobia and homophobia. This outcome, reflecting that higher values in the Attitudes Toward Transgendered Individuals (ATTI) scale indicate lower negative feelings toward transgender individuals, aligns with the Scale of Attitudes Towards Homosexual Women and Men, where higher values denote more negative feelings towards homosexual individuals. This correlation is consistent with previous research findings [24, 47].

The present research is subject to several limitations. Firstly, the sample size was insufficient to enable examination of metric equivalence across selected demographics. While we assessed metric equivalence for gender, we could not extend this analysis to religious orientation or place of residence due to unequal sample sizes and disparities in subgroup representation. Moreover, there was a lack of data pertaining to convergent and divergent validity, as similar scales were not included in the study apart from the Attitudes Toward Gay Women and Gay Men Scale. Future studies could address this limitation by including more comparable questionnaires and exploring metric equivalence across diverse demographic groups.

Furthermore, it's worth noting the numerical disparity between men and women in our sample, which warrants further exploration in future studies. Additionally, implementing a test-retest method would be beneficial to evaluate the reliability of repeated measurements. As suggested by Walch et al. (2012) [29], future research could explore whether outcomes, such as positive or negative emotions toward transgender individuals, can predict attitudes toward this demographic group.

Finally, we think it is very important to update the studies on the attitudes of healthcare staff toward transgender people. The pandemic caused an unintended, global economic recession while widening pre-pandemic health inequalities, social and economic, disproportionately affecting vulnerable populations by increasing their health needs[48,49], at the same time the pandemic put too much pressure on health workers[50,51]. In earlier studies, before the pandemic crisis, health professionals showed favorable attitudes toward transgender people [52,53]. During the pandemic and immediately afterward, health workers showed aggression, anger [54,55], and cynicism[56] probably because of the pressure. However, this evidence may be consistent with an increase in negative attitudes towards populations now in greater health need.

5. Conclusions

Our findings suggest that the Greek version of the Attitudes Toward Transgendered Individuals Scale can be used as a reliable and valid instrument for the assessment of attitudes towards transgender individuals in the Greek population.

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