

# Adaptation and validation into Portuguese language of the HIV Antibody Testing Attitude Scale

Adaptação e validação para português da HIV  
*Antibody Testing Attitude Scale*

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## Descritores

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## Abstract

**Objective:** To culturally adapt and validate a version in European Portuguese language of the HIV Antibody Testing Attitude Scale.

**Methods:** Study conducting a methodological investigation for the adaptation and validation of an attitude measurement instrument. The instrument translation and back-translation were performed. Then, a pre-test was conducted. The study used a sample of 317 subjects from the academic community - students, professors and other professionals - who were contacted in the *campus*. Ethical principles were observed.

**Results:** Three analyses were conducted using the method of principal component analysis (PCA) with five, four and three factors. A three-factor solution was achieved, which presents 50.82% variance. In the analysis of inter-item correlation, values between -0.018 and 0.749 were observed. Internal consistency shows Cronbach's alpha coefficients of 0.860 overall and between 0.865 and 0.659 in the three factors.

**Conclusion:** The instrument version shows psychometric properties that allow its use in Portuguese-speaking countries.

## Resumo

**Objetivo:** Adaptar culturalmente e validar uma versão em Português Europeu da HIV *Antibody Testing Attitude Scale*.

**Métodos:** Estudo referido a investigação metodológica, para adaptação e validação de instrumento de medida atitudinal. Realizou-se a tradução, retrotradução. Seguiu-se pré-teste. Amostra de 317 sujeitos que pertencendo à comunidade académica na qualidade de estudantes e funcionários docentes e não docentes que foram abordados no *campus*. Foram observados os princípios éticos.

**Resultados:** Realizaram-se três ensaios de análise fatorial de componentes principais a cinco, quatro e três fatores. Redundou numa solução a três fatores que que explica 50,82% da variância. Na análise da correlação inter-itens observaram-se valores entre -0,018 e 0,749. A consistência interna revela coeficientes de alfa de Cronbach de 0,860 no global e entre 0,865 e 0,659 nos três fatores.

**Conclusão:** a versão do instrumento mostra propriedades psicométricas que permitem a sua aplicação em países lusófonos.

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## Introduction

Testing for seropositivity for the human immunodeficiency virus (HIV) is important for the health of individuals and the community. The identification of HIV antibodies is possible through tests conducted in conventional laboratories and rapid tests. The protocol of rapid tests includes, besides the blood sample, a questionnaire about behaviors, emotional support and specific guidance.<sup>(1)</sup>

The group of activities involving rapid tests is commonly referred to as Voluntary Counselling and Testing (VCT).<sup>(1,2)</sup> The World Health Organization (WHO) recommends it to health centers, programs or campaigns.<sup>(3)</sup> In Portugal, rapid tests are conducted under the National Program of HIV/AIDS Infection Control and Prevention 2012-2016.<sup>(4)</sup> Despite the rapid test benefits for HIV/AIDS status awareness, stigmatization may occur.<sup>(5)</sup> Insufficient information is an obstacle to rapid tests, as well as beliefs of invulnerability to HIV infection, thus justifying additional education.<sup>(6,7)</sup> HIV/AIDS rapid tests in a university environment are performed in projects conducted in Africa, India, and the United States, contextualized in educational policies.<sup>(8-12)</sup> Attitudes towards HIV/AIDS rapid tests show the predisposition to the test and are analyzed in clinical studies, among the general population, groups of homosexual orientation, ethnic minorities or emigrants, and university students via application of scales.<sup>(6,11,12)</sup> The use of foreign instruments, if any, should be encouraged, concentrating efforts, improving versions, and comparing different samples.<sup>(13)</sup> However, instrument validation requires a detailed process, as complying with lexical rules does not ensure an identical meaning.<sup>(14)</sup> Despite the methodologies defined for the translation, adaptation and validation of instruments, a great variation occurs in this type of study. Some authors define guiding lines, from the first translation to psychometric analysis, maintaining linked, consistent, and rigorous processes.<sup>(15,16)</sup>

Although the bibliography of this study was extensively analyzed, no instruments were found in Portuguese to evaluate the attitudes towards HIV/AIDS rapid tests, which will be a useful tool, considering that 203 million people in 12 countries

speak Portuguese.<sup>(17)</sup> In view of the broad interest in studying HIV/AIDS and the benefits of instrument accessibility, the objective of this study was to validate the HIV-Antibody Testing Attitude Scale in the Portuguese language.<sup>(12)</sup>

## Methods

This study was conducted to validate the HIV Antibody Testing Attitude Scale (HTAS). The instrument was translated in the literary dimension by an English teacher and in the conceptual dimension by a health psychologist, both from Portugal and fluent in English. After an analysis conducted by a bilingual individual, who corrected inconsistencies, the first translated version was obtained. Another bilingual collaborator performed the back-translation. Consent was obtained via email from one of the original authors (Peltzer), when he also agreed to participate as the judge of the reverse translation. A pre-test was then conducted with 30 students, who confirmed the understanding of the items after cognitive debriefing.

The participants were chosen by convenience, confirmed their availability and consent and were recruited from the seven departments of the university campus. The inclusion criterion required participants to belong to the academic community. The sample size was based on the rule that suggests 300 subjects in validation studies.<sup>(16)</sup> In total, 372 subjects were contacted, and 317 completed questionnaires were returned.

This study was conducted under the HIV/AIDS Project in the Academic Community, registered in the Investigation Center in Health Sciences and Technology (CICTS) from the University of Évora.

HTAS is an instrument initially developed with 32 variables.<sup>(18)</sup> A psychometric study with a multinational sample (that is, Nigeria, South Africa, Uganda, and Zimbabwe) rearranged the construct in 22 items.<sup>(12)</sup> Prior studies showed HTAS organized in four factors in the first version<sup>(18)</sup> and five factors in subsequent versions.<sup>(12,19)</sup>

This instrument uses a five-point Likert scale ranging from 1 “strongly disagree” to 5 “strongly agree”. The score is obtained by a sum after reversing negative items. Higher scores indicate more favorable attitudes. It takes about 8 minutes to fill it.

Data were collected in a single episode, replacing the retest with the split-half method, and later analyzed with IBM SPSS Statistics®, version 20. The significance value for this study was  $p < 0.05$ .

Study obtained positive opinion of the ethics committee for research in the areas of Human Health and Welfare of the University of Évora under No. 13009.

## Results

The mean age of the 317 participants was 21.214 years ( $SD = 2.176$ ), ranging between 18 and 30 years, 122 (38.50%) were male and 195 (61.50%) female.

Data sustainability was observed for factor analysis. The Kaiser-Meyer-Olkin index ( $KMO = 0.860$ ) showed sample adequacy. Bartlett’s test showed statistical significance ( $X^2=2599.885$ ;  $gl=231$ ;  $p=0.000$ ). Commonalities ranged from 0.318 to 0.818. The initial solution without rotation presented 57.93% variance, explained by five

factors of Eigenvalues above one, assuming the construct multidimensionality.

With a declivity plot as illustrated in figure 1, and because the authors of HTAS studies identified different factors, a principal component analysis (PCA) was conducted with five, four and three factors.

The PCA with varimax rotation, using five factors and retaining those with factor loading of 0.4 or above showed the first factor presents 28.93% variance, with Eigenvalue 6.366, and containing 5 items referred to as “fear” regarding the HIV/AIDS test. This factor includes item 12, which, in the original scale is in the dimension of “general concerns” about the rapid test. The second factor (Eigenvalue 2.132) accounts for 9.68% of total variance and includes six items related to “trust and support” regarding the HIV test. It does not include item 6 of the original scale, but it includes item 19, which, in the instrument of the authors was located in the dimension of “concerns about confidentiality”. The third factor of Eigenvalue 1.758 accounts for 7.98% of total variance. It includes five items reported as “friends’ concerns” and two items which, in the original scale, were in other dimensions: item 9, located in “general concerns”, and item 6, located in “trust and support”

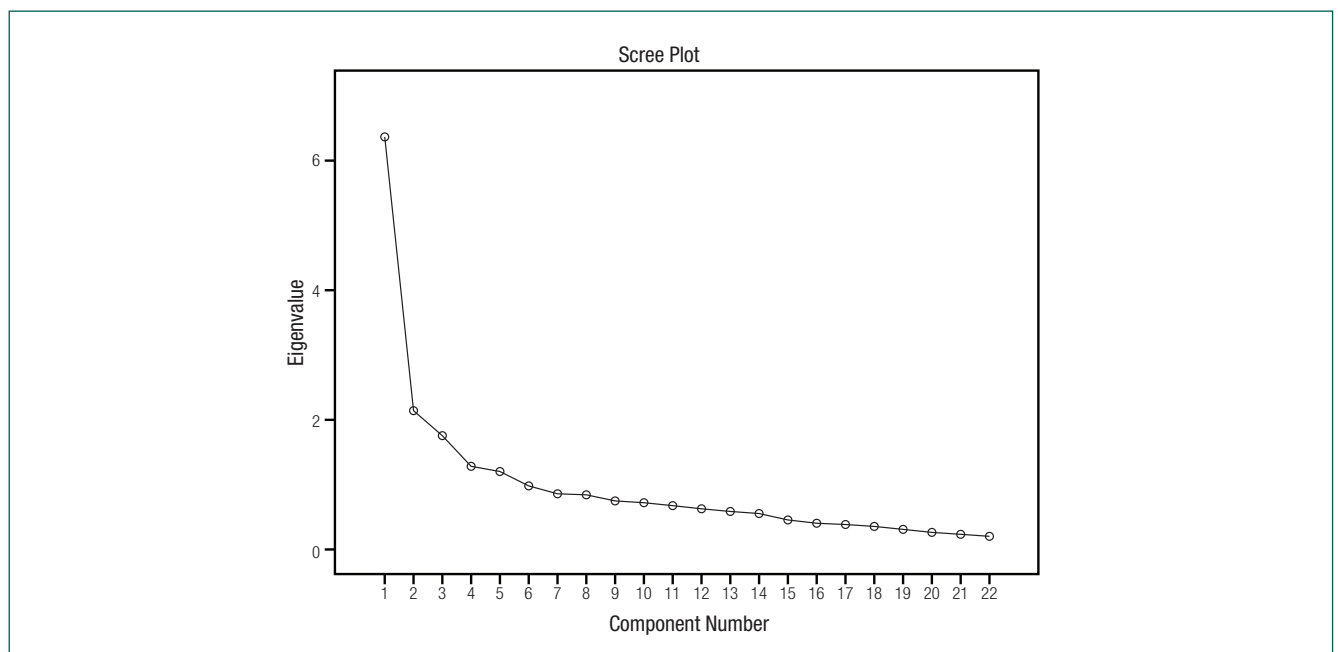


Figure 1. Declivity plot

regarding the HIV test. The fourth factor, Eigenvalue 1.282, accounts for 5.82% of total variance and its two items refer to “confidentiality”. When compared to the original scale, it does not have item 19. The fifth factor, Eigenvalue 1.208, represents 5.48% variance and refers to “general concerns” about the HIV test; it is comprised of four items. This dimension does not include item 9, which is present in the original scale.

The second analysis with PCA was conducted, with varimax rotation and four factors. Two items lost their factor validity (item 7 and item 22). Total variance was 52.44%. The first factor had eight items that accounted for 28.93% of total variance and Eigenvalue 6.36%. The items referred to a mix of “concerns about friends and family and revelation of personal acts”. The second factor (Eigenvalue 2.132), accounted for 9.68% of total variance and included seven items related to “trust and support” regarding the HIV test. The third factor, with two items, referred to “confidentiality of health professionals”, Eigenvalue 1.758, accounted for 7.98% of total variance. The fourth factor, Eigenvalue 1.282, accounted for 5.82% of total variance and had three items related to a mix of “confidentiality and alienation from the test importance and intrusion in personal life”.

The third analysis was conducted using three factors. Two items lost their factor validity (items 8 and 22), loading under 0.4, and item 19 was present in two factors with almost similar factor loadings (i.e. 0.477 and 0.425) and the total variance was 46.61%. After removing items 8, 19, and 22, the last study was conducted with three factors, now with total variance of 50.82%.

Regarding the nature of the items, the organization grouped meanings of “fear”, “trust”, and “confidentiality”. The first factor gathered ten variables that expressed fear regarding the HIV rapid test, presenting 30.89% of total variance and Eigenvalue 5.870. The second factor, including six items, expressed trust in the decision to be tested for HIV and showed 10.72% variance and Eigenvalue 2.038. The third factor, with three items, referred to confidentiality and presented 9.20% variance and Eigenvalue 1.749. The factors were organized as indicated in table 1.

Considering the three-factor model, which does not include items 8, 19, and 22 of the original scale, the adequacy of items was observed in each subscale. In the first factor, related to the dimension of “fears”, the item-subscale correlation ranged between 0.329 and 0.733; in the second factor, regarding the dimension of “trust”, it ranged from 0.325 to 0.635; and in the third

**Table 1.** Items and factor loadings of the orthogonal solution with varimax rotation

Items	Factor 1	Factor 2	Factor 3
20-Os meus amigos olhavam-me com desprezo se eu fizesse o Teste VIH	0.790		
14-Teria receio que alguém descobrisse que eu tinha feito o Teste VIH	0.746		
12-Ficava envergonhado/a se os meus amigos descobrissem que decidira fazer o Teste VIH	0.738		
13-As pessoas iriam pensar que eu estou infetado com VIH se eu decidisse fazer o Teste	0.719		
21-Os meus amigos tratar-me-iam mal se eu fizesse o Teste VIH	0.702		
15-Não faria o Teste VIH porque seriam perguntadas coisas muito pessoais	0.679		
16-Os meus pais ficavam preocupados se soubessem que eu estava a pensar fazer o Teste VIH	0.574		
11-Não considero a possibilidade de fazer o Teste VIH porque iam perguntar-me coisas que eu fiz	0.536		
9-Toda a pessoa que faz o Teste VIH é nojenta	0.488		
7-Tenho receio que ao fazer o Teste VIH o meu nome fique nos registos públicos	0.465		
2-Sinto-me à vontade para falar com os meus amigos sobre a decisão de fazer o Teste VIH		0.836	
3-A minha família apoiava-me na minha decisão em fazer o Teste VIH		0.754	
1-Os meus amigos apoiam a minha decisão em fazer o Teste VIH		0.726	
4-Não me importaria se alguém conhecido me visse a dirigir-me para fazer o Teste VIH		0.614	
5-Tenho facilidade em falar sobre o Teste VIH com a minha família		0.575	
6-Os meus amigos não me tratavam de maneira diferente se eu fizesse o Teste VIH		0.419	
17-A informação sobre o Teste VIH é mantida em absoluta confidencialidade pelos técnicos de saúde			0.896
18-Eu confio que os técnicos de saúde guardam de maneira confidencial a informação			0.870
10-O Teste VIH não é totalmente confidencial			0.475

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization a. Rotation converged in 4 iterations Note: Eigenvalues below 0.40 were omitted

**Table 2.** Descriptive statistics for the overall scale and subscales

Scale/Subscales	Number of items	Amplitude	Mean (SD)	Cronbach's alpha coefficient
Overall scale	18	50-90	76.473 (9.12)	0.860
Subscale "fears"	9	9-45	38.555 (5.92)	0.865
Subscale "trust"	6	16-30	25.927 (3.39)	0.733
Subscale "confidentiality"	3	3-15	11.990 (2.32)	0.659

factor, related to "confidentiality", from 0.280 to 0.604.

Inter-item correlations in the three-factor model ranged from -0.018 to 0.736. Item 7 presented correlations with the other items, all below 0.30, which does not contribute to the main measurement. These items did not present correlations of 0.80 or above; thus, they were not redundant. Regarding the scale homogeneity, and after removing item 7, corrected item-total correlations ranged between 0.286 and 0.697.

Regarding correlations between subscales and overall scale, item 7 was removed from subscale "fears". Correlations between the total scale and the subscales presented the following values: total scale versus subscale "fears"  $r=0.900$ , versus subscale "trust"  $r=0.746$  and versus subscale "confidentiality"  $r=0.539$ .

Construct validity: the split-half method was used to analyze the construct validity. The first group of items presented a Cronbach's alpha coefficient of 0.766 (items: 1, 3, 5, 9\_r, 11\_r, 13\_r, 15\_r, 17, 19, and 21\_r) versus 0.750 from the second group (items 2, 4, 6, 10\_r, 12\_r, 14\_r, 16\_r, 18, and 20\_r). The correlation between both forms presented  $r=0.819$ , with Spearman-Brown correction coefficient of 0.901.

Table 2 shows the descriptive statistics for the overall scale and subscales. In the overall scale and subscale "fears", Cronbach's alpha coefficients are strong, in "trust", they are acceptable, and in "confidentiality", they are insufficient.

In the Mann-Whitney test, no significant difference was observed when comparing the values of male and female participants, when using the overall HTAS ( $U(317)=12.866$ ;  $Z=1.224$ ;  $p=0.221$ ), or in subscales "trust" ( $U(317)=12.684$ ;  $Z=1.002$ ;  $p=0.316$ ), "fears" ( $U(317)=12.235$ ;  $Z=0.431$ ;  $p=0.666$ ) or "confidentiality" ( $U(317)=13.199$ ;  $Z=1.664$ ;  $p=0.096$ ).

## Discussion

In face of the lack of a bilingual population, the instrument was translated and back-translated, with the agreement of the authors.<sup>(12,16)</sup> The judgment of the original author ensured security when reproducing the instrument in the Portuguese language. The items are simple, which allows easy linguistic procedures and content validation.

When observing the scree plot, it was not possible to conclude with objectivity if the model should use three factors. Indeed, it is not always easy to assign a number of factors based on the point of the line where it starts to become horizontal,<sup>(20)</sup> then PCA was used. As the instrument was still unknown in Portuguese, after the initial solution, it started with a number of dimensions identified in prior studies.<sup>(12,18)</sup> The orthogonal rotation was justified by the multidimensional perspective of the construct, as it intended to maximize high correlations and minimize low correlations. The varimax rotation emphasized the loadings and evidenced the independence of factors.<sup>(20)</sup> After successive analyses, the interpretation resulted in three dimensions.

The PCA of three-factor model showed, in the nature of variables presented, an explicit organization, leading to the interpretation of a dimension of "fears" regarding the decision to get tested and the opinion of friends and family and exposure of private life; a dimension of "trust", related to the support from friends and family; a dimension of "confidentiality", regarding the roles involving secrecy of health professionals. The three-factor interpretation was selected, because, besides the mathematical aspects of the PCA, the results from four- and five-factor models are dispersed in the variables presented. The selection of successive PCAs, extracting different numbers of factors and rotating them, in an intuitive interpretation,<sup>(13)</sup> fa-



vored diversity and suggested a clear three-factor solution. Then, the results did not support the same number of dimensions found in African universities, but the interpretation based on three-factors makes sense, as it names the dimensions after the organization of variables presented.<sup>(12,18)</sup> Variance based on three factors, after removing items 8, 19, and 22 (50.82%) was near the value obtained with the five-factor model (51%), and above the value from the four-factor model (44%) obtained in a previous study.<sup>(12,18)</sup> Explained variance, even not ideally reaching 75%, could reach the minimum of 50%.<sup>(20)</sup> In the validation of instruments in a foreign language, the PCA is a justified procedure, as it standardizes the way local participants perceive the original construct, but applied to another one.

Regarding the overall scale, most items showed a good measurement reliability, observed in the internal consistency, indicating the variables presented in the three dimensions are correlated.<sup>(21)</sup> The first and the second factors, when addressing items of opposed nature, solidly discriminated the dimensions. The third factor, with a Cronbach's alpha coefficient of 0.659, showed insufficient consistency, but still acceptable in social sciences.<sup>(21)</sup> The relative fragility of internal consistency of the factor may be interpreted by the small number of items.<sup>(16)</sup> Perhaps, the nature of items may not be strange, as the guaranteed confidentiality of health professionals is a measurement of broad spectrum at the level of agreement of all subjects. Other studies also consider it a determinant when choosing a health service, constituting a relevant concern.<sup>(6)</sup> The results from the dimension "confidentiality" suggest greater variability of intra-subject responses and lower inter-subject variability. In this study, despite the homogeneous inter-item variance, the corrected values of item-total correlations, precisely for the three variables that constitute the third factor, were the lowest.

With no chance of test-retest or procedure of parallel forms, as the subjects were contacted only once in the university campus, the split-half method evaluated the instrument precision. The values of correlations between the two halves were satisfactory.<sup>(16)</sup> The

strategy of ordinance of items for the analysis considered odd items versus even items, as proposed by Spearman.<sup>(21)</sup> Thus, the effect of the position of items on correlations between the two halves is reduced. The split-half method provided a response to the assumption that the two parts are equivalent forms and shows the HTAS has global coherence. Regarding the test-retest, the split-half method offers the advantage of not biasing the results, either through the memory of subjects when answering the same questionnaire for the second time or through alterations in the interval between applications. It occurs in particular in psychological variables, such as attitudes, opinions, as it is the case in this study.<sup>(13)</sup>

Overestimation or underestimation of the number of factors is a risk, perhaps leading to limitations. It is seen in the response and justifies the factor analysis in a future study. Despite these limitations, the scree plot observation method is the best option considering the Kaiser's criterion which tends to remove an excessive number of factors.<sup>(13)</sup>

Considering the study was developed in an academic community, whose mission is to promote knowledge, provide clarification and education in health, it is assumed the interviewees reduced the stigmatization of getting tested for HIV. At the same time, providing a chance to give an opinion, in the academic dimension, about a subject that is typically discussed in clinical areas, conditioned some subjects. Thus, some level of social desirability was admitted in this study.

## Conclusion

The current version of the HTAS is a valid measurement that evaluates attitudes towards the HIV/AIDS rapid test. The factor-based organization supports a three-factor model that does not coincide with the original model, but it was the result of interpretation of the local population. The current validation is useful in Portugal, and it may be of interest to Portuguese-speaking communities around the world. Attitudes towards HIV/AIDS rapid tests should be known urgently to promote the test and start therapeutic solutions.

## Collaborations

Frias A and Sim-Sim M collaborated in the phases of study conception, analysis, data interpretation, article writing, relevant critical review of the intellectual content and final approval of the version to be published. Chora M and Caldeira E contributed to article writing, relevant critical review of the intellectual content and final approval of the version to be published.

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