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ORIGINAL ARTICLE

INSTRUMENTS FOR ASSESSING TOBACCO-RELATED HEALTH LITERACY: TRANSLATION AND ADAPTATION TO EUROPEAN PORTUGUESE

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ABSTRACT

Objectives: To translate and culturally adapt to European Portuguese the tobacco-related health literacy assessment instruments "Attitudes Towards Tobacco Use," "Tobacco-Use Motives," "Motivation to Decline Tobacco Use in the Future," "Smoking Outcome Expectation Scale," and "Anti-Smoking Self-Efficacy Scale"; and to conduct the preliminary validation of the translated versions. Methodology: Translation and cross-cultural adaptation in accordance with the Institute for Work & Health recommendations and preliminary validation study using a sample of 144 adolescents from two public schools in central Portugal in April and May 2019. Results: Snus-related items were removed due to their lack of relevance in the Portuguese context. Thus, two instruments consisted of only one item each. The European Portuguese versions of the instruments presented Cronbach's alpha scores of 0.799, 0.673, 0.905, and 0.890. Conclusion: The present study contributed to developing European Portuguese versions of instruments for assessing tobacco-related health literacy among adolescents.

DESCRIPTORS: Validation Study; Scales; Health Literacy; Tobacco; Adolescents.

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INTRODUCTION

Health literacy empowers children and adolescents to become better informed and critical about their future health choices [1]. Some studies [2] have observed that adolescents with low literacy levels are more likely to engage in risky behaviors, such as substance use. Therefore, it is essential to develop health literacy interventions and assessment instruments appropriate for children and adolescents and tailored, for example, to tobacco-related issues.

The mobile health game Fume [3] was developed for children and adolescents to improve their tobacco-related health literacy. The mobile game was developed in the University of Turku, Finland, and launched in 2016 in Finnish, Swedish, and English. Since then, the development of a Portuguese version has been considered relevant.

The instruments used in the impact assessment study of Fume were also used in the impact assessment of the Portuguese version. Besides allowing the comparison between the results obtained and the original versions, these instruments were relevant not only to evaluate the impact of the Portuguese versions but also due to the lack of instruments developed in Portugal or adapted for the Portuguese population, specifically adolescents, to assess tobacco-related health literacy and anti-smoking self-efficacy. Therefore, the translation and adaptation of the assessment instruments to European Portuguese were deemed necessary.

The present study aimed (i) to translate and culturally adapt to European Portuguese the assessment instruments "Attitudes Towards Tobacco Use," "Tobacco-Use Motives," "Motivation to Decline Tobacco Use in the Future" [4], "Anti-Smoking Self-Efficacy Scale" (ASSES) and "Smoking Outcome Expectation Scale" (SOES) [5]; and (ii) to conduct the preliminary validation of the instruments translated and adapted to European Portuguese.

METHOD

This study resulted from a partnership between the Nursing School of Coimbra, Portugal, and the University of Turku, Finland, and is part of a master's thesis.

It is a methodological study developed in two phases: the translation and cross-cultural adaptation to European Portuguese of the instruments "Attitudes Towards Tobacco Use," "Tobacco-Use Motives," "Motivation to Decline Tobacco Use in the Future," developed by Parisod et al. [4], and the ASSES and the SOES, developed by Chen et al. [5]; and the preliminary validation of the translated versions.

The assessment instruments "Attitudes Towards Tobacco Use," "Tobacco-Use Motives," and "Motivation to Decline Tobacco Use in the Future" were developed within the scope of the impact assessment study of the health game Fume, based on a previous study and aimed at identifying the determinants of tobacco-related health literacy from the adolescents' perspective [6].

The instrument "Attitudes Towards Tobacco Use" includes two subscales, each with an item measured from "one" (very stupid) to "four" (very ok). This instrument aims to assess adolescents' attitudes towards cigarette smoking and snus use. Its score ranges from "one" to "four" points, with "one" corresponding to the most negative attitude towards cigarette smoking/snus use [4].

The instrument "Tobacco-Use Motives" includes two subscales, one concerning the social reasons that can lead adolescents to cigarette smoking and the other to snus use.

Both have three items each, and each item is scored from "one" (not at all) to "four" points (surely), with the total score ranging from 3-12 points, with three points representing fewer reasons for cigarette smoking/ snus use [4].

The instrument "Motivation to Decline Tobacco Use in the Future" includes two subscales, one regarding the motivation to decline future cigarette smoking and the other the motivation to decline future snus use. Each subscale contains one item, whose score ranges from "one" (not at all) to "four" points (surely). The total score of one corresponds to the highest motivation to decline future cigarette smoking or snus use [4].

The ASSES and the SOES were developed in 2015 [5] to measure preadolescents' expectations on smoking outcomes and their anti-smoking self-efficacy.

The ASSES consists of 15 items rated from "one" (cannot do at all) to "four" (certainly can do), with the total score ranging from 15-60 points. The closer the final score is to 60 points, the higher the self-efficacy level to adopt anti-smoking behaviors [4].

The SOES has six items rated from "one" (strongly disagree) to "four" (strongly agree), assessing adolescents' expectations regarding smoking outcomes. It is divided into two 3-item subscales, the Positive Smoking Outcome Expectation Scale (POS-SOES) and the Negative Smoking Outcome Expectation Scale (NEG-SOES). The POS-SOES, whose score ranges from 3-12 points, assesses positive feelings about smoking. A high total score indicates a high level of agreement with the idea that smoking conveys feelings of maturity, popularity, and courage [4-5]. The NEG-SOES, whose score also ranges from 3-12 points, evaluates negative feelings associated with smoking. A high total score represents a high level of agreement with the adverse effects of tobacco [4-5].

In the first phase of the study, the translation and cross-cultural adaptation of the instruments followed the Institute for Work & Health [7] recommendations. The process was divided into the following stages [7]: Stage I - Initial translation of the instruments, from the source language to the target language, by two translators with different profiles: one acquainted with the concepts addressed and the other unfamiliar; Stage II - Synthesis of the two translations resulting from Stage I, with the elaboration of a common translation and resolving any existing discrepancies; Stage III - Back-translation of the common translation resulting from Stage II to understand whether it accurately reflects the same content of the original version, it is carried out by two translators unfamiliar with the original version and whose mother tongue is the source language of the original instruments; Stage IV - Multidisciplinary expert committee that examines all the prepared versions of the instruments and develops pre-final versions for field testing; and Stage V - Testing of the pre-final version of the instruments applied to people who fit the target population.

The second phase of the study focused on the preliminary validation of the translated versions into European Portuguese of the instruments, by analyzing their internal consistency through Cronbach's alpha (α), using Pestana and Gageiro's classification [8]: very good (if $\alpha \geq 0.9$), good (if $0.8 \leq \alpha < 0.9$), reasonable (if $0.7 \leq \alpha < 0.8$), weak (if $0.6 \leq \alpha < 0.7$) or inadmissible (if $\alpha < 0.6$). The corrected item-total correlation was calculated, assessing the correlation between each item and a scale score that excluded that item. This correlation is expected to be greater than 0.3 [9]. Cronbach's alpha if item deleted [8] was also calculated and compared with the total Cronbach's alpha. The statistical analysis was performed using the IBM SPSS Statistics software, version 25.0.

This study was conducted within the framework of the impact assessment study of No Fume, the Portuguese version of the health game Fume for adolescents.

Due to difficulties in gathering a significant sample of the population for whom the instruments were specifically developed, the evaluation moments used to assess the impact of the Portuguese version of No Fume were also used to collect data for the preliminary validation of the European Portuguese versions of the instruments. Thus, the translated versions of the instruments were administered in two moments, 2 weeks apart,

to a convenience sample consisting of adolescents aged between 10-13 years old.

Data collection occurred between April and May 2019 in two public schools of the second and third cycles of basic education in central Portugal.

To ensure that all ethical and legal principles were met, the study was submitted to the Ethics Committee of the Health Sciences Research Unit: Nursing (UICISA: E) of the Nursing School of Coimbra, Portugal, and approved by decision number P521-09/2018. The consent of the original authors of the instruments was requested, and they formalized their authorization via e-mail.

The rights to self-determination, anonymity, and data confidentiality were guaranteed throughout the whole process to protect the adolescents who participated in the study. The adolescents and their guardians signed an informed consent form.

RESULTS

Translation and Cross-cultural Adaptation

During the first phase, the instruments were translated into European Portuguese by two translators. Next, the two translations were synthesized, and a common translation was elaborated. This common version was then translated back into the source language (English). These stages took place without significant discrepancies, and a consensus was easily reached on the terms to be used in the final versions. Finally, a committee of three specialists in mental health nursing and psychiatry developed and reviewed the pre-final versions.

The instruments "Attitudes Towards Tobacco Use," "Tobacco-Use Motives," and "Motivation to Decline Tobacco Use in the Future" were developed based on Finnish adolescents' tobacco-related cultural reality [4]. Thus, besides the items referring to conventional cigarette smoking, these instruments also include the same questions about snus use. All items referring to snus use in these instruments were excluded from the translated versions due to lack of relevance in the Portuguese context.

The instrument "Tobacco-Use Motives" was translated without discrepancies between the translations and resulted in the European Portuguese version *Motivos para Uso de Tabaco*. The removal of the snus-specific item from the instruments "Attitudes Towards Tobacco Use" and "Motivation to Decline Tobacco Use in the Future," which contained two items each, one for cigarette smoking and the other for snus use, caused the translated versions to consist of only one item each. Thus, these were not considered scales in the European Portuguese versions but items: the items *Atitudes face ao Uso de Tabaco* and the *Motivação para Recusar a Utilização de Tabaco no Futuro*.

In their European Portuguese versions, the SOES was renamed *Escala de Expetativas sobre Fumar*, and the subscales POS-SOES and NEG-SOES were renamed *Escala de Expetativas Positivas sobre Fumar* and *Escala de Expetativas Negativas sobre Fumar*, respectively. The SOES six original items were kept. The first three refer to the *Escala de Expetativas Positivas sobre Fumar*, and the other three refer to the *Escala de Expetativas Negativas sobre Fumar*, as in their original versions.

The instrument ASSES was translated without discrepancies and in the European Portuguese version was renamed *Escala de Autoeficácia Antitabaco*.

Preliminary Validation

A convenience sample (Table 1) was constituted with 144 6th-grade adolescents attending public school clusters in central Portugal, during the 2018/2019 school year, to pre-test and carry out the preliminary validation of the instruments.

Table 1 – Demographic characteristics of the participants in the preliminary validation study of the instruments (n=144). Coimbra, Portugal, 2021

Variable		n (%)
Sex	Female	84 (58,3)
	Male	60 (41,7)
Age	10 years	2 (1,4)
	11 years	83 (57,6)
	12 years	54 (37,5)
	13 years	5 (3,5)
Nationality	Angolan	1 (1,7)
	Brazilian	7 (4,9)
	Luso-French	1 (0,7)
	Portuguese	132 (91,7)
	Syrian	1 (0,7)
	Venezuelan	2 (1,4)

Source: Authors (2021)

The internal consistency analyses of the instruments *Motivos para Uso de Tabaco, Escala de Expectativas sobre Fumar* and *Escala de Autoeficácia Antitabaco* were conducted in two moments by analyzing Cronbach's alpha, the corrected item-total correlation, and Cronbach's alpha if item deleted. Cronbach's alpha and the other measures were not calculated for items *Atitudes face ao Uso de Tabaco* and *Motivação para Recusar Utilização de Tabaco no Futuro* because these instruments have only one item each.

In the first moment, the instrument *Motivos para Uso de Tabaco* presented a Cronbach's alpha of 0.697 (Table 2). The item mean ranged from 1.15 (item one) to 1.20 (item three). In the second moment, Cronbach's alpha was 0.799. The item mean ranged from 1.16 (item two) to 1.22 (item three). If item three was deleted in the second moment, Cronbach's alpha would increase from 0.799 to 0.824 (Table 2). The corrected item-total correlation did not present scores lower than 0.3, with all scores higher than 0.490.

Table 2 - Item and Item-Total Statistics for the instrument *Motivos para Uso de Tabaco*, in the 1st and 2nd Moments. Coimbra, Portugal, 2021

Evaluation	Items	Item Statistics		Item-Total Statistics	
		Mean	Standard Deviation	Corrected Item-Total	Cronbach's alpha if Item deleted
1st Moment	Item 1	1,15	0,418	0,565	0,569
	Item 2	1,17	0,532	0,51	0,613
	Item 3	1,2	0,54	0,49	0,643
	Total Cronbach's Alpha = 0,697				
2nd Moment	Item 1	1,17	0,473	0,698	0,67
	Item 2	1,16	0,468	0,685	0,685
	Item 3	1,22	0,531	0,56	0,824
	Total Cronbach's Alpha = 0,799				

Source: Authors (2021)

The *Escala de Expectativas Positivas sobre Fumar* presented, in the first moment, a Cronbach's alpha of 0.595 (Table 3). The item mean varied from 1.33 (item one) to 1.78 (item two). Cronbach's alpha in the second moment was 0.673. The item mean varied from 1.30 (item one) to 1.70 (item two). In the analysis of the item-total statistics, it was observed that Cronbach's alpha would not increase if any of the items were deleted either in the first or second moment. The corrected item-total correlation scores in the first and second moments were higher than 0.30, increasing from the first to the second moment.

Table 3 - Item and Item-Total Statistics for *Escala de Expectativas Positivas sobre Fumar*, in the 1st and 2nd Moments. Coimbra, Portugal, 2021

Evaluation	Items	Item Statistics		Item-Total Statistics	
		Mean	Standard Deviation	Corrected Item-Total	Cronbach's alpha if Item deleted
1st Moment	Item 1	1,33	0,591	0,39	0,531
	Item 2	1,78	0,883	0,454	0,433
	Item 3	1,45	0,719	0,402	0,497
	Total Cronbach's Alpha = 0,595				
2nd Moment	Item 1	1,3	0,639	0,511	0,567
	Item 2	1,7	0,872	0,524	0,533
	Item 3	1,43	0,783	0,448	0,627
	Total Cronbach's Alpha = 0,673				

Source: Authors (2021)

In the first moment, the *Escala de Expectativas Negativas sobre Fumar* presented a Cronbach's alpha of 0.683, with the item mean ranging between 3.53 (item five) and 3.76 (item six). In the second moment, Cronbach's alpha was 0.905, with the item mean ranging between 3.58 (items one and two) and 3.75 (item three). Most participants answered *concordo fortemente* (strongly agree) to the item *Fumar prejudica a nossa saúde* (Smoking harms our health - item three). Like with the *Escala de Expectativas Positivas sobre Fumar*, deleting items from the *Escala de Expectativas Negativas sobre Fumar* (Table 4) would not be beneficial. The corrected item-total correlation scores were high.

Table 4 - Item and Item-Total Statistics for the Escala de Expectativas Negativas sobre Fumar, in the 1st and 2nd Moments. Coimbra, Portugal, 2021

Evaluation	Items	Item Statistics		Item-Total Statistics	
		Mean	Standard Deviation	Corrected Item-Total	Cronbach's alpha if Item deleted
1st Moment	Item 1	3,59	0,653	0,489	0,604
	Item 2	3,53	0,749	0,526	0,551
	Item 3	3,76	0,753	0,482	0,611
	Total Cronbach's Alpha = 0,683				
2nd Moment	Item 1	3,58	0,874	0,779	0,893
	Item 2	3,58	0,849	0,825	0,852
	Item 3	3,75	0,78	0,835	0,848
	Total Cronbach's Alpha = 0,905				

Source: Authors (2021)

In the first moment, the *Escala de Autoeficácia Antitabaco* had a Cronbach's alpha of 0.856, with the item mean varying between 3.26 (item six) and 3.94 (item eight), showing that most participants answered *talvez possa* (maybe I can - coded as "three") and *posso fazer* (I can do - coded as "four"). In the second moment, Cronbach's alpha was 0.890, with the item mean ranging from 3.39 (item seven) and 3.93 (item one). Cronbach's alpha would be higher in both moments if items four, five, and seven were deleted in the pre-test and item seven in the post-test (Table 5). In the corrected item-total correlation, only item five showed a correlation below 0.3, and only in the first moment.

Table 5 - Item and Item-Total Statistics for the Escala de Autoeficácia Antitabaco, in the 1st and 2nd Moments. Coimbra, Portugal, 2021 (continues)

Evaluation	Items	Item Statistics		Item-Total Statistics	
		Mean	Standard Deviation	Corrected Item-Total	Cronbach's alpha if Item deleted
1st Moment	Item 1	3,84	0,605	0,358	0,854
	Item 2	3,81	0,621	0,392	0,852

	Item 3	3,82	0,662	0,41	0,852
	Item 4	3,65	0,915	0,328	0,857
	Item 5	3,69	0,883	0,293	0,859
	Item 6	3,26	0,887	0,521	0,846
	Item 7	3,4	0,874	0,309	0,858
	Item 8	3,94	0,385	0,542	0,85
	Item 9	3,42	0,978	0,555	0,844
	Item 10	3,43	0,948	0,672	0,836
	Item 11	3,5	0,888	0,722	0,834
	Item 12	3,41	0,954	0,677	0,836
	Item 13	3,69	0,624	0,525	0,847
	Item 14	3,53	0,774	0,616	0,841
	Item 15	3,45	0,836	0,587	0,842
	Total Cronbach's Alpha = 0,856				
2nd Moment	Item 1	3,93	0,389	0,488	0,887
	Item 2	3,9	0,418	0,563	0,884
	Item 3	3,89	0,463	0,47	0,886
	Item 4	3,79	0,723	0,447	0,888
	Item 5	3,79	0,733	0,457	0,888
	Item 6	3,41	0,791	0,439	0,889
	Item 7	3,39	0,825	0,353	0,894
	Item 8	3,92	0,396	0,511	0,886
	Item 9	3,6	0,791	0,665	0,878
	Item 10	3,62	0,751	0,767	0,873
	Item 11	3,68	0,71	0,723	0,875
	Item 12	3,65	0,755	0,761	0,873
	Item 13	3,75	0,589	0,606	0,881
	Item 14	3,73	0,665	0,66	0,879
	Item 15	3,61	0,683	0,647	0,879
	Total Cronbach's Alpha = 0,890				

Source: Authors (2021)

DISCUSSION

The lack of instruments assessing tobacco-related health literacy developed in Portugal or translated and validated for the Portuguese population, specifically adolescents, originated the decision to translate and adapt the assessment instruments presented in this study.

The items in the original versions related to snus use, a smokeless tobacco product

for oral consumption, were excluded from the translated versions of the instruments. Apart from some Nordic countries, where the use of this product exceeds cigarette consumption, snus use is low in the rest of the world [10]. Moreover, specific snus-related data are not documented in Portugal. Many reports only use the general term tobacco [11] to characterize the prevalence, meaning that these products may be included in general tobacco consumption. Thus, considering the lack of scientific evidence on snus use in Portugal that would justify an approach and intervention including this product, the only tobacco use considered in the assessment instruments wss cigarette consumption.

Internal consistency represents the mean of correlations between the items of an instrument [9]. Thus, to assess this measure, instruments need to have more than one item. It was impossible to evaluate the internal consistency of the instruments *Atitudes face ao Uso de Tabaco* and *Motivação para Recusar Utilização de Tabaco no Futuro* because the translated versions only have one item each, hindering the instruments' quality assessment. Nevertheless, these instruments fulfill the aim of assessing some of the factors that influence tobacco-related health literacy. Their questions are simple and objective and derive from a study identifying the determinants of tobacco-related health literacy [6].

Considering their internal consistency, the instruments *Motivos para Uso de Tabaco, Escala de Expectativas sobre Fumar (Escala de Expectativas Positivas sobre Fumar and Escala de Expectativas Negativas sobre Fumar)* and *Escala de Autoeficácia Antitabaco* revealed a higher Cronbach's alpha in the first moment than in the second.

When comparing with Parisod's [4] results, regarding the Finish versions of the instruments, the Cronbach's alpha in the instrument *Motivos para Uso de Tabaco* was lower in both the first ($α = 0.85$) and second moment ($α = 0.86$). Nevertheless, both studies revealed an increase in alpha scores from the first to the second moment, with higher alpha scores in the study of the translated version of the instrument. The original version presented good [8] internal consistency, while the internal consistency of the translated instrument was reasonable in the first moment and good in the second.

The *Escala de Expectativas Positivas sobre Fumar* presented a Cronbach's alpha that pointed to weak internal consistency [8]. Parisod (4) also observed internal consistency scores that were weak in the first moment ($α = 0.59$) and reasonable in the second moment ($α = 0.71$). Thus, when comparing with the validation results of the instrument's original version ($α = 0.78$), these alpha scores were lower, with the version developed in Taiwan showing better internal consistency than the Finnish version and the European Portuguese version showing reasonable internal consistency (5,8), with a Cronbach's alpha higher than 0.7.

The *Escala de Expectativas Negativas sobre Fumar* revealed weak internal consistency in the first moment but increased significantly to very good in the second. The version validated in Finland [4] presented a Cronbach's alpha of 0.71 in the pre-test and 0.87 in the post-test, with its internal consistency varying between reasonable and good. When comparing with the instrument's original version [5], the validation results pointed to a Cronbach's alpha of 0.76 and, therefore, a reasonable internal consistency [8].

The *Escala de Autoeficácia Antitabaco* revealed good internal consistency scores in both moments [8]. Parisod's version [4] had a Cronbach's alpha of 0.89 in the first moment and 0.91 in the second, presenting good and very good internal consistency scores, respectively. The original version also presented good internal consistency, in accordance with the classification adopted by Chen [5], and very good according to Pestana and Gageiro[8], presenting an alpha score of 0.90. The versions validated in Turkey [12] showed the best internal consistency of all versions (ASSES: $α = 0.93$; POS-SOES: $α = 0.85$; NEG-SOES: $α = 0.91$).

The limitations of this study are that it was carried out in a specific region of Portugal, which does not allow for the generalization of results, and its sample size, which can be considered small. Therefore, given their importance to the research process, further studies are recommended to test the validity of the instruments.

CONCLUSION

From this study of translation and cross-cultural adaptation to European Portuguese resulted the items *Atitudes face ao Uso de Tabaco and Motivação para Recusar a Utilização de Tabaco no Futuro and the instruments Motivos para Uso de Tabaco, Escala de Expetativas sobre Fumar* and *Escala de Autoeficácia Antitabaco*.

In the preliminary validation, the translated versions proved to be compatible with the analysis of the proposed constructs, as their internal consistency scores ranged from good to very good in the second evaluation moment, except for the scale assessing positive expectations, which showed lower scores, although higher than 0.65. Considering the importance of assessment instruments to the research process, further studies are recommended to understand the best instruments to evaluate tobacco-related health literacy in adolescents.

Regarding the lack of assessment instruments adapted for the Portuguese population, specifically adolescents, the translation and adaptation of these instruments were relevant because they constituted the first contribution to developing European Portuguese versions of specific instruments for assessing tobacco-related health literacy among adolescents.

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