

## Cross-cultural adaptation of the writer-reader relationship in non-translated and translated English health information websites on HIV and TB diagnostic testing

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The ideal multilingual health information website is relatable to all readers. Natives and immigrants should have a culturally adapted website in their language hosted by their place of residence that imparts the facts and incites a call to action to improve health, and ultimately reduces disease in the diverse community. The writer's word choices and attitude as conveyed through the text influence the reader's decision-making process. This paper will examine the differences between the non-translated and translated English versions of multilingual health information websites on HIV and TB diagnostic testing. These samples pertain to a large interdisciplinary study whose purpose is to determine whether the multilingual health communication websites are appropriately written regarding health literacy, and whether each cultural population, in terms of language adaptation, would receive the health information as intended. The study questions whether there exist differences between the translated and non-translated texts in English, Spanish and Catalan; this paper focuses on the two English sub-corpora. A comparable corpus of seventy-three multilingual health information websites underwent a quantitative and a qualitative analysis. The methodology is based on adaptations of Clerehan et al.'s (2005) Evaluative Linguistic Framework to assess the writer-reader relationship. The findings show statistically significant differences between the two English sub-corpora as regards the writers' and translators' approach; the non-translated English sub-corpus contained more relational and engagement markers, whereas the translated English sub-corpus had more persuasion markers. These results should serve researchers and professionals in the translation and language sciences as well as the public health field for, respectively, future

studies and techniques to improve the composition of multilingual health information texts in culturally diverse countries.

**Keywords:** Cross-cultural adaptation; persuasion; relational and engagement markers; translation; writer-reader relationship

## 1 Introduction

Cross-cultural adaptation (or cultural adaptation), which involves translation and cultural adjustment of content (Guillemin 1995), is essential for effective communication about infectious diseases such as the two deadliest prior to the COVID-19 pandemic: HIV and tuberculosis (TB) (Taylor 2023). Such adaptation is particularly important for multilingual health websites, which inform about disease etiology and pathophysiology, diagnostic testing, treatments, prognosis, and prevention. Multilingual health information websites play a crucial role in promoting compliance with recommended measures to reduce disease spread.

Despite its importance, language accessibility has been neglected in HIV/AIDS-related health communication (Batchelor et al. 2019). Lack of culturally adapted health information results in health disparities (Garcimartín Cerezo et al. 2014) and higher incidence of disease, impacting not only the targeted language communities, but also their broader regions and countries.

For translators of multilingual health information websites, adhering to cross-cultural adaptation guidelines (Guillemin 1995) can be time-consuming, but its cost-effectiveness and benefits for audience compliance have been proven by sociologists, psychologists and researchers specialized in methodology, along with health communication experts (Guillemin 1995). However, the issue of how to assess the quality of cross-cultural adaptation remains unsolved, as there are currently no standardized methods for this purpose.

Existing health information website quality instruments (e.g., HON<sup>1</sup>) have failed to consider cross-cultural adaptation, linguistics and translation (see, for example, Lawrentschuk et al. 2012; Wiriyakijja et al. 2016; Rew et al. 2018). Therefore, exploring cross-cultural adaptation of multilingual health information websites about HIV and TB testing calls for a linguistic framework and methodology.

An important aspect of cross-cultural adaptation is the tone of the text, which is influenced by interpersonal metadiscourse and reflects the writer's attitude

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1 The Health on the Net (HON) Foundation is a World Health Organization-sponsored multilingual non-government organization, whose mission is to accredit human health websites employing the main principles of the "basic ethical standards in the presentation of information." The HON Code is one example of a self-regulatory initiative to promote high ethics and quality in health information websites (Risk & Dzenowagis 2001).

towards the reader (Hyland 1998; Ho 2016). Hyland and Jiang's 2018 study found a significant shift in the use of metadiscourse markers in academic writing over the past half-century, pointing towards a greater focus on reader engagement. This change, characterized by an increased presence of the author's identity and a heightened anticipation of reader responses, may have implications for health professionals. Effective health promotion doesn't simply involve stating the facts, but also persuading the reader through how the message is delivered.

One metadiscursive device is relational and engagement markers, which directly address and interact with readers (Hyland 2005). They include second-person pronouns and verb forms, inclusive first-person plural pronouns, directives, and interruptions. A pilot study by Suau-Jiménez (2010) found nearly identical usage of these markers in English and Spanish academic and semitechnical texts, with the only notable difference being the English preference for passive voice.

Persuasion markers can be effectively used by writers to promote compliance, convincing readers of epidemiological facts and the benefits of the proposed course of action. The abovementioned study by Hyland and Jiang's (2018), which analyzed scientific discourse across four disciplines (applied linguistics, biology, electrical engineering, sociology), found that, despite the variation in persuasion patterns by discipline, there was a growing trend towards the writers' increased awareness of the reader.

The aim of this study<sup>2</sup> is to analyze the cultural adaptation of the writer-reader relationship in multilingual health information websites on HIV and TB testing in English, Spanish and Catalan. The research questions are:

1. In health information websites on HIV and TB diagnostic testing in English, Spanish and Catalan, are there variations regarding the writer-reader relationship between:
  - a. The non-translated texts in English, Spanish, and Catalan?
  - b. The non-translated and translated texts in English?
2. What are the key cross-linguistic differences?

This paper will present the methodology, results, and discussion, concluding with limitations, implications and recommendations for future research.

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<sup>2</sup> Since this paper showcases a part of a larger study, the aim, the research questions, and the methodology are carried over from Hochberg (2023a) and Hochberg (2023b).

## 2. Methodology

This paper presents a section of a larger study where a comparable corpus was created through Google searches.<sup>3</sup> The keywords were “HIV,” “tuberculosis,” “diagnosis” and “test” in English, Spanish and Catalan. The corpus<sup>4</sup> included 73 multilingual health information websites that contained sections on HIV or TB diagnostic testing in English, Spanish and/or Catalan. The selected websites were publicly available and provided information on HIV or TB diagnostic testing in at least two of the languages mentioned. Table 1 shows the breakdown into languages. The corpus was divided into non-translated (L1) and translated (L2) sub-corpora for each language (Table 1).

TABLE 1. The six sub-corpora

Group	English L1	English L2	Spanish L1	Spanish L2	Catalan L1	Catalan L2
Number of websites	52	16	7	65	8	2
Total number of words	34,351	6,245	2,383	43,420	4,047	1,749
Average number of words per text	661	390	340	668	506	875

The anticipated and unavoidable discrepancies between sub-corpora were addressed through statistical analysis. While considering all six sub-corpora in the statistical analysis, this paper focuses on the English sub-corpora.

After building the corpus, the writer-reader relationship was assessed. Similarities and differences between languages and between translated and non-translated texts were determined through statistical and discourse analysis.

The texts were analyzed using the Evaluative Linguistics Framework (ELF) (Clerehan et al. 2005) based on the theoretical framework called Systemic Functional Linguistics (SFL) (Halliday & Matthiessen 2014). SFL suggests that the text, its surrounding context of situation, and the three elements of *register* (field, tenor and mode) interact with each other. This research focuses on the *field* (layman’s vs specialized terminology), *tenor* (writer-reader relationship) and

3 The searches were conducted using an anonymous browser, following a protocol similar to Alioshkin Cheneguain et al. (2020).

4 The corpus is available upon request to the author.

*mode* (websites as a form of planned written texts). The reader's perception of the text is also influenced by the cultural context.

From the SFL viewpoint, *tenor* in social indicators comprises *power* and *solidarity* (Martin 1998; Tebble 1999). *Power* involves negotiation (e.g., exchange and speech function) and appraisal (e.g., engagement, affect, judgment) at the discourse level. *Solidarity* reflects involvement (e.g., naming), through which the writer expresses informality or formality with the reader (Egins 2004) and establishes trust, respect, and empathy with the reader (Tebble 1999). Successful advice and recommendations promote compliance via culturally adapted expressions of *solidarity* and *power* through relational and engagement markers and persuasion markers.

Based on SFL, the Evaluative Linguistic Framework (ELF) (Clerehan et al. 2005) has been implemented and adapted by developers and researchers to analyze health communication, including translated questionnaires and caregiver information materials (see, for example, Petkovic et al. 2015; Clerehan & Buchbinder 2016; Cavalieri et al. 2019). This study applied the ELF to multilingual health information websites.

For this new register, the ELF (ELF-W) was adapted to analyze the writer-reader relationship incorporated markers to determine the writers' attitude through their use of language to engage and persuade the reader. The ELF-W writer-reader relationship question pertinent to this paper was – “What was the writer's tone?” – which was answered via relational and engagement and persuasion markers.

The ELF-W discourse analysis was followed by statistical analysis using R (R Core Team 2021) and RStudio (RStudio 2021), which normalized the data and detected significant findings. Mean proportions with 95% standard error were used to compare the sub-corpora. Linear models used chi-square tests (with *p*-value) to compare the three non-translated language sub-corpora with each other, which were applied to each marker. Omnibus test and pairwise contrasts (*b* coefficient and *z*-score with *p*-value) were computed to compare between non-translated and translated sub-corpora within each of the three languages. Effect size was measured using Cohen's *d*.

### 3. Results and discussion

This section presents the key findings of the study regarding the writer-reader relationship in the non-translated and translated English sub-corpora. First, for context, the results are provided for the non-translated English, Spanish and Catalan sub-corpora (Table 2). This is followed by a comparison between the English non-translated and translated sub-corpus (Table 3). The results, both statistical and qualitative, contribute to answering the research questions.

TABLE 2. Statistical analysis comparing between the three non-translated sub-corpora<sup>5</sup>

	Chi-square	P	Contrast	Cohen's d	Significance
Relational/ engagement markers	4.377	0.112	EN>CA	1.348	0.123
			ES>CA	1.261	0.470
			EN>ES	0.086	1.000
Persuasion markers	0.311	0.856	CA>EN	-0.114	1.000
			ES>CA	0.099	1.000
			ES>EN	-0.213	1.000

TABLE 3. Statistical analysis comparing between the English non-translated (L1) and translated (L2) sub-corpora

	$\beta$	SE	z	p	Contrast
Relational/engagement markers	-0.027	0.012	-2.263	0.024	L1>L2
Persuasion markers	-0.002	0.001	1.989	0.047	L2>L1

The next two subsections will discuss the results of the two writer-reader relationship markers.

### 3.1 Relational and engagement markers

The use of relational and engagement markers did not show any significant differences among the three non-translated sub-corpora. This suggests that cultural differences related to this marker may not be a major concern for translators when adapting health information websites on HIV and tuberculosis diagnostic testing. This finding supports Suau-Jiménez's (2010) findings.

Due to the similarities between the three non-translated sub-corpora, the following result demonstrates differences between translated and non-translated sub-corpora without a need to culturally adapt relational and engagement markers in the translation process. The English non-translated sub-corpus contained significantly more relational and engagement markers compared to its translated counterpart ( $\beta = -0.026$ ,  $SE = 0.012$ ,  $z = -2.263$ ,  $p = 0.024$ ). This confirms the existence of differences between translated and non-translated texts. However, it raises the question of why the translated English sub-corpus had significantly fewer relational and engagement markers compared to its non-translated counterpart.

<sup>5</sup> EN = English, ES = Spanish, CA = Catalan.

In both the translated and non-translated English sub-corpora, second-person pronouns with directives were the most frequently used. However, the translated sub-corpus had more inclusive first-person plural pronouns than the non-translated sub-corpus (Table 4).

TABLE 4. Comparison of subcategories of relational / engagement markers between English non-translated (L1) and translated (L2) sub-corpora. The data are shown as [occurrences (mean)].

	English L1	English L2
Relational / engagement markers	1,901 (36.56)	156 (9.75)
Directives	356 (6.85)	10 (0.63)
Questions & asides that disrupt the ongoing discourse	0 (0)	0 (0)
Second-person pronouns & verbs (except imperatives)	1,543 (29.21)	140 (8.81)
Inclusive first-person pronouns	2 (0.04)	6 (0.38)

Writers use relational and engagement markers to directly address the reader or include them as a collective “we.” The use of pronouns and verb forms is important for successful health information campaigns, considering cultural implications. Chen et al. (2016) found that similarity and familiarity between the narrator and the reader increase persuasiveness. Empathy is displayed by the writer (Diani 2019). One example (1) can be found in the translated English text on the website hosted by the Spanish organization Grupo de Trabajo Sobre el Tratamiento del VIH (n.d.a):

(1) When a strange agent enters *our* organism, the organism reacts producing some proteins called antibodies, which later turn into *our* defence system against this agent. Once antibodies are produced as a part of fight against pathogens, symptoms similar to influenza symptoms can be produced at times accompanied by high fever and swollen glands. The same happens, when HIV enters *our* body (punctuation error in the original, italics added).

When the narrator uses the first-person plural to appear more relatable to the reader, it creates a sense of severity– “this could happen to me!”–via empathy– “feeling the writer’s pain.” This can lead the reader to get tested for HIV or TB.

Considering pronoun usage, verb forms, and cultural implications is crucial for successful health information campaigns. The use of the first-person plural can have different cultural implications based on language. Aijón Oliva (2020) found that the inclusive first-person plural is commonly used in persuasive discourse to engage the reader and imply their responsibility for taking action: “We” implies “you.” This indirect approach helps to avoid accusatory tones and maintain politeness (Aijón Oliva 2020; De Cock 2011). Additionally, using “we” instead of “you” can reduce power distance between the writer and the reader. This study supports previous research by Herrando-Rodrigo (2010) and Diani (2019) by finding a statistically significant result regarding relational and engagement markers. The writers adopt the reader’s voice to create a sense of shared experience in the medical situation, aiming to engage and empower the reader.

“We” could also be perceived by the reader as inclusive, emphasizing solidarity without singling out individuals. A text by NYC Health (n.d.) (2) proclaims:

(2) “Together *we* can stop the spread of HIV and other STIs” (italics added).

Applications like this are useful in collective cultures and for minority target audiences. They help the writer appear non-accusatory and nonjudgmental. Even in individualistic countries like the United States and the United Kingdom (Hofstede, 2015), health information reflecting collectivism can effectively persuade readers (Kemmelmeier & Jami 2021) from minority communities with interdependent cultures. On the other hand, using an “us versus them” mentality, common in politics to emphasize ideological differences (Proctor & Su 2011) is not suitable for HIV or TB diagnostic testing messages. Expressing solidarity without using “them” is more effective for health information campaigns.

The use of the distancing first-person plural pronoun can establish a hierarchical distance<sup>6</sup> between the writer representing the organization hosting the website and the reader. By addressing the reader as “you,” the writer asserts authority and decision-making power. For example: “*We* will determine the appropriate test type based on *your* history.”<sup>7</sup> The choice of pronoun sets the tone and context, emphasizing authority with the distancing “you” or solidarity with the inclusive “we.” Using a third-person pronoun instead of the first-person plural pronoun reduces power distance while maintaining the second-person pronoun. This approach is exemplified in the following excerpt (3) from the Health Service Executive (2014) website:

<sup>6</sup> Power, as defined within the SFL framework, is considered.

<sup>7</sup> This is an arbitrary example written by this study’s author.



- (3) The doctor will decide what other tests *you* will need based on this result (italics added).

In the English non-translated sub-corpus, relational and engagement markers primarily comprised second-person pronouns and imperative verbs. Diani (2019) observed that the use of second-person pronouns establishes a close connection with the reader, fostering solidarity in a discursal conversation and recognizing the reader as an individual. The Centers for Disease Control and Prevention website writer (August 2017) (4) exemplifies this usage of “you” as an engagement marker:

- (4) *Doing it* – testing for HIV – can give **you** important information and help keep **you** – and others – safe. [...] Knowing **your** HIV status can give **you** peace of mind – and testing is the only way **you** can know for sure. Knowing **your** status is also important because it helps **you** make healthy decisions to prevent getting or transmitting HIV. HIV testing is a normal part of life and if everyone else is *doing it*, **you** can too! (italics in the original, bold added)

The writer reinforces the reader’s identity through the repetition of the second-person pronoun, and uses the possessive to refer to their health care providers. This is common in health information websites, where readers are advised to consult their health care provider (Diani, 2019). As demonstrated below (5), the Healthfinder website writer (United States Department of Health & Human Services Office of Disease Prevention & Health Promotion February 2019) empathizes with and instructs the reader:

- (5) Visiting the doctor can be stressful. It helps to have questions for the doctor or nurse written down ahead of time. *Print* this list of questions and take it to *your* appointment (italics added).

The directive followed by a second-person possessive pronoun reinforces the writer’s authority and aims to demonstrate the reliability of their arguments (Herrando-Rodrigo 2010). Second-person imperatives serve as a persuasion tool for the writer, instructing along with advising and recommending (Diani 2019), as exemplified by Healthfinder (United States Department of Health & Human Services Office of Disease Prevention and Health Promotion June 2019) (6).

- (6) Here are other steps *you* can take to help prevent HIV:
- *Use* a latex condom with water-based lubricant every time **you** have vaginal or anal sex.

- [...]
- *Limit your* number of sexual partners (italics added).

According to Hyland & Jiang (2018) and Diani (2019), what and how questions and asides that disrupt the discourse are engagement devices implemented by the writer to imitate a consultation with a health expert. While the author of this paper disagrees with Diani (2019) on whether the questions are “disruptive,” the argument about their role as relational and engagement markers is valid, as exemplified in this extract (TeensHealth 2018) (7):

(7) How Do the Tests Work?

Most HIV tests use a blood sample, either from a blood draw or finger prick. Others use saliva (spit), but this is a little less accurate than blood tests.

This reader-centric approach features a health expert communicating with the public.

The study found that relational and engagement markers in multilingual health information websites on HIV and TB diagnostic testing helped the writer to effectively connect with the reader to inform, advise, empathize and instruct. Differences were observed in the use of relational and engagement markers between the translated and non-translated English texts, with the translated English texts using more inclusive first-person plural pronouns and the non-translated texts implementing more second-person pronouns.

### 3.2 Persuasion markers

Differences in formality levels were found between the English, Spanish and Catalan non-translated sub-corpora, but no significant differences existed in the comparison. This suggests similar usage frequency of persuasive words among writers in the three original languages. The Spanish and Catalan non-translated sub-corpora showed similar persuasive approaches, while the English non-translated sub-corpus differed, though not significantly. This aligns with a study by Dafouz-Milne (2008) on English and Spanish news editorial articles, which found that texts with more metadiscourse markers were more persuasive.<sup>8</sup>

This study’s discourse analysis revealed that the English non-translated sub-corpus featured a more conversationally informal tone, whereas the Spanish and

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<sup>8</sup> Dafouz-Milne (2008) acknowledged the limitation of the fluid concept of persuasion, noting that it may be perceived differently depending on the group.

the Catalan writers leaned towards a formal tone. The choice of persuasive words in the English non-translated sub-corpus reflected either a casual informal tone that reduced the power distance with the reader, and in the case of the Spanish and the Catalan non-translated sub-corpus, a respectful yet authoritative formal tone.

The linear regression model confirmed that the English-translated sub-corpus had significantly more persuasion markers compared with its non-translated counterpart ( $\beta = 0.002$ ,  $SE = 0.001$ ,  $z = 1.988$ ,  $p = 0.047$ ). This finding adds to the answer to research question 1.b., that there exist differences between the translated and non-translated texts. The most frequently used persuasion words in the English non-translated (L1) and translated (L2) sub-corpora are shown in Table 5.

TABLE 5. The most frequently used persuasion markers in the English non-translated (L1) and translated (L2) sub-corpora.

English L1	English L2
Recommend	Recommend
Importance	Beneficial words
Better / best	
Good	
Beneficial words	
Encourage	

The non-translated English sub-corpus contained a higher frequency of persuasion markers with a conversational, less formal tone. In the English non-translated sub-corpora, the most frequently used persuasion word was “recommend” in various forms, which was found on seventeen websites.<sup>9</sup> In the translated English sub-corpus, variations of “recommend” were also frequently used (CESIDA 2018; Explain TB n.d.; Grupo de Trabajo Sobre el Tratamiento del VIH n.d.b; World Health Organization 2018; World Health Organization 2019), as shown in examples (8), (9), and (10).

- (8) The staff will assess your situation and will **recommend** which test to take (CESIDA 2018).

<sup>9</sup> These examples are available upon request to the author.

- (9) You don't have to take the test – it's your choice; it is **recommendable**, though, if you had HIV risk practice (Grupo de Trabajo Sobre el Tratamiento del VIH n.d.b).
- (10) The WHO **recommendation** to initiate ART in all people living with HIV will contribute significantly to reducing HIV transmission (World Health Organization 2018).

Whether this persuasive word was in noun, verb, or adjective form, the translated English sub-corpus adopted a more tactical, polite, and formal approach.

Regarding tenor, appealing to the reader in a less formal manner reduced the power distance and expressed solidarity without sacrificing politeness. The writers of the English non-translated sub-corpus selected casual or conversational persuasive words. Six websites in the non-translated English sub-corpus incorporated the word “better” or “best” in their persuasive clauses (Centers for Disease Control and Prevention August 2017; Centers for Disease Control and Prevention 2019; GMHC n.d.; Pebody 2015; Planned Parenthood n.d.; Thompson et al. 2019). Five websites emphasized the positive in persuading the reader by using less forceful deontic modality such as “it is a good idea to” (Planned Parenthood n.d; TeensHealth 2018). Less forceful does not necessarily imply weaker but communicating on a more casual as opposed to authoritative level as an expression of solidarity with the reader. This change in tenor in terms of solidarity occurred without sacrificing politeness. Instead of the more formal tone of suggestion “it would be beneficial,” the writers of the English non-translated sub-corpus opted for “good for” (The American Foundation for AIDS Research 2018; HealthReach 2017c) and “good ways of” (POZ 2016).

The English non-translated sub-corpus used various persuasive techniques ranging from informal to formal to emphasize the benefits for the reader. Examples of the informal in the English non-translated sub-corpus include “it will help” (San Francisco AIDS Foundation n.d.), “it is most helpful to” (GMHC n.d.), and one that contains an expression of probability with a hedge word, “may benefit from” (AIDSinfo 2019). Examples of the more formal suggestions include “there are still great health benefits to” (Centers for Disease Control and Prevention 2019) and “one benefit to” (Planned Parenthood n.d.). These words indicate that heeding the health message's call to action would be advantageous to the reader. These examples reflect individualism, which is prevalent in economically developed English-speaking countries such as the United States and the United Kingdom (Hofstede 2015).

The non-translated sub-corpus used individualistic words of suggestion to persuade the reader. Two writers took an informal tone to “encourage” (Whitman-

Walker Health n.d.) the readers, because getting tested is “a smart thing to do” (POZ 2016). This informal tone reduces the power distance between the writer and the reader, so that the latter perceives the former as human (Kelleher 2009), as opposed to the Internet or the institution providing the information. The friendly tone fosters camaraderie and warmth, which are interpersonal aspects of the writer-reader relationship that are important for promoting healthy actions. The writers of the websites in the English non-translated sub-corpus imparted their professional knowledge in a less formal manner, without completely eliminating the hierarchy.

However, the findings reveal a broader variety of formal beneficial words in the English-translated sub-corpus. Two websites expressed the suggestion as “it is advisable” (BCN Checkpoint n.d.; Xunta de Galicia Consellería de Sanidade n.d.), which conveys more authority (Eggin 2004). The use of the word “benefit” in the translated sub-corpus was more formal. For instance, the Xunta de Galicia Consellería de Sanidade (n.d.) website writer emphasized “therapeutic and preventive benefits of early diagnosis.” One website used a less formal approach by stating that the call to action “can help” (Grupo de Trabajo Sobre el Tratamiento del VIH n.d.a), indicating a level of probability (Eggin 2004). In contrast, a World Health Organization website writer stated that the call to action “is best practice” and “effective” (World Health Organization 2018), reflecting the authoritative knowledge of the writer.

The formal tone in the English-translated sub-corpus was likely transferred from the non-translated texts in the other languages. The following example is from the BCN Checkpoint (n.d.) website, hosted in Catalonia, first showing the Catalan source text (11) and then the translated English text (12):

(11)*Per tant, si ets una persona sexualment activa és **aconsellable** que et facis la prova del VIH almenys un cop o dos a l'any.* (Therefore, if you are a sexually active person **it is advisable** to get tested for HIV at least once or twice a year.) (Punctuation error in the original, bold added).

(12)If you are therefore a sexually active person, **it is advisable** that you take the HIV test at least once or twice a year (bold added).

As demonstrated in the example above with the persuasion marker in bold type, the translated English text maintains the formal tenor of the source Catalan text.

In the English non-translated websites, several other persuasive markers were found. These markers emphasized the importance of HIV and tuberculosis

testing. They used phrases like “can be an important step toward” (GMHC n.d.), “important part of” (United States Department of Health & Human Services Office of Disease Prevention and Health Promotion June 2019; POZ 2016), “is important” (Office on Women’s Health 2018; HealthReach 2017b), “the important message is” (HealthReach 2017a), and “it is very important to” (Kaiser Permanente 2015). These expressions reflect the writer’s persuasive tone. Stressing the “importance” of getting tested for HIV and tuberculosis is a direct appeal (Hoey 1991) in the context of the health information campaign.

The English non-translated sub-corpus exhibits a shift towards a more informal and persuasive tone, characterized by decreased distance and increased solidarity. This distinguishes it from the translated English sub-corpus. Dafouz-Milne (2008, 110) noted that readers prefer texts that establish “a dialogic tenor” without being too patronizing or assertive. However, the formal shift in the tenor of the English-translated texts creates a sense of unequal power distance between the writer and the reader. Yu, Shen & Min (2022) found that readers tend to trust scientific information presented in a formal tone by the authoritarian Chinese government. It is important to investigate whether this reader credibility extends to scientific institutions and if cultural differences play a role. These differences in persuasive formality between the non-translated and translated English sub-corpora are crucial for translators to be aware of in order to culturally adapt the message and persuade the target language readers naturally. These results indicate insufficient cultural adaptation during the translation process into English. To enhance persuasiveness, it is necessary to align the health communication message to the cultural frame (Suau Jiménez 2010; Uskul & Oyserman 2010). Therefore, translations from languages with a formal tone to target languages with readers accustomed to an informal tone should be appropriately culturally adapted.

#### 4 Conclusions

This paper addressed the research questions “in the health information websites on HIV and TB diagnostic testing in English, Spanish and Catalan, are there variations regarding the writer-reader relationship between the non-translated texts, the non-translated and the translated texts in English, and what are the key cross-linguistic similarities and differences?” While there were no significant differences in relational and engagement markers between the three non-translated sub-corpora, the English non-translated texts contained significantly more relational and engagement markers than the English-translated sub-corpus. The English non-translated sub-corpus used more second-person pronouns to convey solidarity in a more individualistic manner, while the English-translated

texts expressed solidarity through inclusive first-person plural pronouns. The English-translated sub-corpus had more persuasion markers, resulting in a more formal and polite tone, likely a transferal without any cross-cultural adaptation from the Spanish and the Catalan non-translated source texts. These findings are important for writers and translators aiming to create successful cross-culturally adapted health information texts that promote reader compliance.

This study has limitations. The sub-category names may mask different text subtypes, and thus communication strategies. A “translated” health information website in Spanish hosted by a New York City public health department caters to a different readership—e.g., Latin American immigrants from multiple culturally diverse developing regions and their descendants in a predominantly English-speaking developed country—from a “non-translated” website in Spanish hosted by a Madrid-based non-profit organization, where a similar immigrant population might anticipate a lack of cross-cultural adaptation for the Latin American population. The health literacy levels among the target audience in Spain may differ from the Latin American population (see, for example, Sørensen et al. 2015; Johnson et al. 2019<sup>10</sup>). Other limitations include sole researcher bias and the exclusion of images. This study focused on texts, providing a partial picture. Future research should include visual content and involve a research team for a more objective analysis. While the mixed methods approach strengthens the methodology, its reliability and validity conducted by an individual, as opposed to a team of researchers, should be tested. This study is the first to combine the qualitative ELF approach with statistical analysis to assess the writer-reader relationship in multilingual health information websites.

This study contributes to the understanding of cross-cultural differences in multilingual health information websites and online medical communication with lay audiences. The findings benefit health professionals along with translation and language sciences teachers and researchers by suggesting writing and translation approaches to improve health literacy. To reduce health disparities in access to online medical information written for the public, it is important for writers and translators to implement strategies—including adapting the writer’s attitude as perceived by the reader using relational and engagement markers and persuasion markers according to language—to foment health literacy and empower the reader to make informed decisions about getting tested and treated.

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10 Johnson et al. (2019) noted that, compared with 28% of White adults, 65% of Hispanics have limited health literacy levels. In Spain, 58.3% of the population has limited (“low” or “problematic”) health literacy (Sørensen et al. 2015).

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