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The Reception of Translated and Adapted Texts on Disease Prevention for Preadolescents Using Graphic Medicine Strategies[1]

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Abstract

In recent years, the links between translation studies and graphic medicine have strengthened to enhance the dissemination of specialized health information for lay audiences. While in the Anglo-Saxon context, graphic medicine has typically used only comics as a genre for health information dissemination, in Spain, other textual genres, such as infographics, have also entered into the domain of graphic medicine. An example of the translation-graphic medicine pairing in the Spanish context is the oncoTRAD project, within which numerous health-related materials aimed at patients and their close ones have been designed. Despite the important number of materials produced, their reception by target audiences has not been studied. To address this gap, this article substantially expands on a prior pilot study examining the reception by children and preadolescents of translated and adapted disease prevention texts, counting on a larger sample (n = 154) and an improved questionnaire. Findings show a positive reception of a comic and an infographic on disease prevention targeting children. These findings highlight the potential of the translation-graphic medicine pairing for disseminating health information among children and preadolescents, thereby contributing to the improvement of health literacy in our societies.

Keywords: translation, graphic medicine, reception, lay audience, preadolescents

La recepción de textos sobre prevención de enfermedades traducidos y adaptados para preadolescentes mediante estrategias de la medicina gráfica

Resumen

En los últimos años, los vínculos entre los Estudios de Traducción y la Medicina Gráfica se han fortalecido para contribuir a la mejora de la divulgación de la información especializada sobre salud para públicos legos. Mientras que en el ámbito anglosajón la medicina gráfica se ha limitado principalmente

1 This article is part of the ERDF research project OncoTRAD: Medicina gráfica y Traducción al servicio del paciente oncológico y su entorno en la Sociedad Andaluza [Graphic Medicine and Translation in Support of Oncology Patients and Their Environment within Andalusian Society] (1381162-R), which was funded by the Andalusian Government. The principal investigators were Dr. Ingrid Cobos López (University of Córdoba) and Dr. Juan de la Haba Rodríguez (Hospital Universitario Reina Sofía de Córdoba). The funding period for this project was from 01/01/2022 to 31/12/2022.

al uso del cómic como género para divulgar información, en España se han incluido otros géneros textuales, como las infografías, dentro de la medicina gráfica. Un ejemplo del binomio traducción-medicina gráfica en el contexto español es el proyecto oncoTRAD, en el que se han desarrollado numerosos materiales sobre temas de salud dirigidos a pacientes y sus entornos. A pesar de la cantidad de materiales producidos, no se había estudiado la recepción de estos por parte de sus públicos meta. Para paliar esta laguna, se llevó a cabo un estudio piloto de la recepción por parte de niños y preadolescentes de textos traducidos y adaptados usando estrategias propias de la medicina gráfica. Este artículo amplía sustancialmente dicho estudio, con una muestra mayor (n = 154) y un cuestionario mejorado. Los resultados muestran una recepción positiva de un cómic y una infografía sobre la prevención de enfermedades diseñados para niños. Estos hallazgos destacan el gran potencial del binomio traducción-medicina gráfica para divulgar información sobre salud entre niños y preadolescentes, contribuyendo así a la mejora de la alfabetización en salud en nuestras sociedades.

Palabras clave: traducción, medicina gráfica, recepción, público lego, preadolescentes

La réception de textes traduits et adaptés sur la prévention des maladies pour les préadolescents à l'aide de stratégies de médecine graphique

Résumé

Ces dernières années, les liens entre les études de traduction et la médecine graphique se sont renforcés afin d'améliorer la diffusion d'informations sanitaires spécialisées auprès d'un public généraliste. Alors que dans le contexte anglo-saxon, la médecine graphique n'utilise généralement que des bandes dessinées pour diffuser des informations sur la santé, en Espagne, d'autres genres textuels, tels que les infographies, sont également entrés dans le domaine de la médecine graphique. Le projet oncoTRAD, dans le cadre duquel de nombreux documents relatifs à la santé ont été conçus à l'intention des patients et de leurs proches, est un exemple de la combinaison traduction-médecine graphique dans le contexte espagnol. Malgré le nombre important de documents produits, leur réception par les publics cibles n'a pas été étudiée. Pour combler cette lacune, cet article développe de manière substantielle une étude pilote antérieure sur la réception par des enfants et des préadolescents de textes de prévention des maladies traduits et adaptés, en s'appuyant sur un échantillon plus large (n = 154) et un questionnaire amélioré. Les résultats montrent que la bande dessinée et l'infographie sur la prévention des maladies destinées aux enfants ont été bien accueillies. Ces résultats soulignent le potentiel du couple traduction-médecine graphique pour la diffusion d'informations sur la santé auprès des enfants et des préadolescents, contribuant ainsi à l'amélioration de la littératie en santé dans nos sociétés.

Mots-clés : traduction, médecine graphique, réception, public profane, préadolescents

Introduction

Health literacy represents "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" (World Health Organization [WHO], 1998, p. 10). Higher levels of health literacy usually lead to a more effective use of healthcare services and improved overall health outcomes (Baker et al., 2004; Howard et al., 2006).

Health literacy can be developed throughout life, ideally with the support of the various institutions involved in this process (Thompson et al., 2018; WHO, 1986). In developing health literacy, it is important to highlight the role of promoting knowledge from an early age, as science can sometimes be perceived—especially among children—as disconnected from everyday life (Ávila et al., 2007). There are some initiatives aimed at bringing science closer to all types of audiences, including children. In this regard, initiatives such as theatrical performances (see, for instance, Hidalgo Morillo, 2012) or scientific outreach activities, such as the European Researchers' Night, can be mentioned. These activities often originate from a specific field of knowledge, which seeks to disseminate its own scientific advances.

In a more cross-disciplinary way, translation studies have contributed to the dissemination of scientific knowledge through initiatives in areas such as subtitling (López Rodríguez & Bolívar Pérez, 2019; Ramírez Almansa, 2021), Easy-to-Read (Jiménez Hurtado & Medina Reguera, 2022), or, in recent years, the combination of translation and graphic medicine (Cobos López, 2021a; Prieto-Velasco, 2024). Graphic medicine is a field of study that undoubtedly contributes to the development of health literacy, as noted by numerous authors (Czerwiec et al., 2024; Epstein, 2024; Wombles, 2021, among others). Examining the various definitions of "graphic medicine", a particularly relevant perspective comes from Ian Williams, who coined the term and provided valuable insights into his choice of that very term:

> In 2007 I coined the term 'graphic medicine' […]. I also began to use it as a handy term to denote the role that comics can play in healthcare and, over time, it has been adopted as the accepted term for this area of study and practice. My use of the word 'medicine' was not meant to connote the foregrounding of doctors over other healthcare professionals or over patients or comics artists, but, rather the suggestion that use of comics might have some sort of therapeutic potential – 'medicine' as in the bottled panacea rather than the profession. (Williams, n. d.)

Meanwhile, Mayor Serrano (2018) defined "graphic medicine" as an interdisciplinary field that explores how comics represent illness, healthcare practices, and medical information, while also assessing their effectiveness in educating both healthcare professionals and the public. Graphic medicine's interdisciplinary nature is reflected in the *Graphic Medicine Manifesto*, where Squier (2015) highlights its connections to areas such as women's studies, environmental studies, or disability studies.

In light of this, and as previously mentioned, recent years have seen a strengthening of the connection between translation studies and graphic medicine, bringing together two highly interdisciplinary fields. One of the pioneering research projects in Spain was oncoTRAD, aimed at disseminating cancer-related information in a reader-friendly and accessible way by translating scientific publications originally published in English into Spanish (Cobos López, 2019, 2021a, 2021b). As part of this project, different materials were produced, including comics (Cobos López, 2022), infographics (Hermán-Carvajal, 2024), and even video stories (Gallego López, 2021), each tailored to a specific audience. However, despite the large amount of material produced

and a well-stablished methodology, the reception of oncoTRAD's materials had not yet been evaluated.

To address this gap, a preliminary pilot study (Hermán-Carvajal, 2024) with a small sample was conducted to find out how children and adolescents—one of the project's priority target groups (Cobos López, 2022)—assessed the materials. The results showed a positive reception, but the questionnaire used had minor presentation flaws, leading some participants to overlook some questions. Additionally, the wording of one of the items might have been somewhat confusing for participants, which made it necessary to improve the questionnaire before presenting it to a larger sample. To address those deficiencies, we conducted a new study involving a larger sample and an optimized questionnaire to more accurately measure the reception of texts dealing with cancer and disease prevention presented in comic, infographic, and plain text formats.

Taking all the above into account, this study had two objectives:

- To analyze the reception by children and preadolescents of adapted materials within the framework of the oncoTRAD project.
- To compare the reception by children and preadolescents of two distinct graphic medicine formats (comic and infographic) created within the framework of the oncoTRAD project with the reception of a linguistically adapted plain text.

To achieve these objectives, this article begins with a theoretical contextualization that examines the relationship between textual genres, graphic medicine, and translation. Next, we present a review of studies on the reception of graphic medicine materials. The article then outlines the methodology employed in the study, covering questionnaire design and administration, and data analysis. The next section presents the results of the quantitative and qualitative analysis, followed by an analysis of the findings. The article concludes by summarizing the main findings, highlighting limitations, and suggesting directions for future research.

1. Textual Genres, Graphic Medicine and Translation

An important aspect of the concept of graphic medicine is the range of textual genres it encompasses. While Williams (n. d.) refers to comics as the "vehicle" for graphic medicine, following the approach of the Anglo-Saxon Graphic Medicine movement, the approach in Spain seems to be more expansive. It includes virtually any genre with a strong graphic-visual component that helps improve access to health knowledge. Mayor Serrano (2018) attributes this distinctive feature of the Spanish context to the influence of the *Medicina Gráfica* website (https://medicinagrafica.blog), created in 2017 by Mónica Lalanda and others (Cobos López, 2021a). This site broadened the definition of "graphic medicine" as it did not only include comics but also animated videos, stories, or infographics.

This inclusive approach, which brings more textual genres under the umbrella of graphic medicine, has been particularly advocated within translation studies by Cobos López (2021a), who identifies comics, graphic novels, graphic pathographies, infographics, illustrations, and patient brochures as genres specific to graphic medicine. In this line, Gallego López (2021), building on Cámara Aguilera's (2003) literacy skills classification of young readers, designed video stories for children aged 0–6, comics for those aged 6–12, and infographics for adolescents aged 12–18. Furthermore, within the frame of this classification, Gallego López (2021) adapted three articles covering key clinical aspects of cancer, including diagnosis, etiology, pathology, and treatment. Although infographics were initially designed to be read by adolescents aged 12–18 in Gallego López's (2021) proposal, we thought they could also be positively presented

to younger children. For this reason, they were included in the pilot study aimed at evaluating the reception of adapted materials based on the principles of graphic medicine (Hermán-Carvajal, 2024).

Graphic medicine employs techniques that can be classified as intralingual translation (Jakobson, 1959), intergeneric translation (García-Izquierdo & Montalt, 2013), heterofunctional translation (García-Izquierdo & Muñoz-Miquel, 2015), and intermodal translation (Prieto-Velasco & Montalt-Resurrecció, 2019). Intralingual translation refers to translation within the same language, while intergeneric translation involves transforming one textual genre into another (e.g., converting a research article on cancer into a comic). Also, heterofunctional translation refers to a shift in the purpose and function of the translated text compared to the original (for instance, a research article assumes both the author and reader possess specialized knowledge, whereas a comic may assume the reader has limited knowledge about cancer). Finally, intermodal translation involves translating between different modes (e.g., turning a text into an image). Therefore, the connection between translation and graphic medicine is abundantly clear, not only due to its inherently cross-disciplinary spirit of information dissemination, but also because of the techniques used for adapting (or translating) information.

These translations and adaptations, either at the linguistic level or in terms of specialization, enable specialized information to reach lay audiences who do not speak the language of the original research articles—typically written in English—or audiences who lack the knowledge to understand highly specialized information. This includes not only children who are still in the process of learning but also adults unfamiliar with the field of medicine, among other groups. When carrying out these translations and textual adaptations, it is essential to evaluate the reception by target readers, as their different impressions will determine whether the translation and adaptation are being done appropriately or if other approaches need to be adopted.

2. Reception of Graphic Medicine Materials

Given the inherently patient-centered nature of graphic medicine, assessing how patients perceive materials created in alignment with the movement's philosophy is crucial. However, studies examining the reception of such materials remain relatively scarce, especially those focused on how children respond to them.

A notable study on children's evaluation of materials incorporating graphic medicine elements was conducted by Grootens-Wiegers, De Vries, Vossen, et al. (2015), in which focus groups with 77 Dutch children aged 11–12 were held. Participants were asked ten questions about the appeal of text and images in research information forms, textbooks, and nonfiction books. The discussions addressed topics such as text understandability, the most and least attractive books, text characteristics and layout, the role of images, the ideal nonfiction book and information form, the quantity and type of images, and the use of challenging words. The findings indicate that the inclusion of images could enhance both comprehension and engagement with the texts.

In a related study by Grootens-Wiegers, De Vries, van Beusekom, et al. (2015), a science communicator collaborated with pediatricians to create a draft comic strip. This draft was shared with children participating in a clinical trial and two school classes. Feedback collected through surveys and interviews informed subsequent revisions, which were later re-evaluated in four school classes comprising children of varying ages and educational levels. During the initial evaluation, children (ages 10–13) gave feedback on the storyline, wording, and layout of the comic strip. They described it as "fun"

and "informative." On average, after the re-evaluation, results indicated that children correctly grasped and retained the key messages.

The pilot study expanded upon in this article (Hermán-Carvajal, 2024) also evaluated the reception of materials adapted with graphic medicine elements in a sample of 53 Spanish children aged 10–11. The results regarding the improved comprehension and engagement with the texts were similar to those found in the studies by Grootens-Wiegers, De Vries, Vossen, et al. (2015) and Grootens-Wiegers, De Vries, van Beusekom, et al. (2015).

For adult audiences, Lattuca et al. (2018) observed that viewing a dedicated educational video, compared to standard information, enhanced patients' understanding and satisfaction prior to scheduled coronary angiography. The sample consisted of older individuals, with a mean age of 67.3 years (SD = 11.6). Similarly, Brand et al. (2019) conducted a study that supplemented an informed consent form for patients undergoing coronary angiography and percutaneous coronary intervention with a comic. The findings showed that medical graphic narratives enhanced patient comprehension, alleviated anxiety, and increased satisfaction. Again, the sample had a mean age of 67.7 years (SD = 12.1), which is notably older than the demographic targeted in our study.

Graphic medicine has also been evaluated in studies with university students. For instance, Pomputius & Tennant (2023) examined students' knowledge and use of graphic medicine resources, as well as their perceived utility and effectiveness. Their findings suggested that graphic medicine can serve as a valuable tool in both educational and clinical contexts. Likewise, De Stefano et al. (2023) analyzed responses from health sciences students, concluding that a co-creative, collaborative use of graphic medicine could be an effective strategy for raising awareness about body donation.

As can be observed, there are studies suggesting a positive reception of materials adapted using techniques specific to graphic medicine. However, despite the inherently patient-centered nature of graphic medicine, studies conducted with the target readers of these materials are still scarce. Therefore, carrying out the present study could contribute to the characterization of the reception of materials created within the field of graphic medicine[2].

3. Methodology

The methodology followed in this study has three components: first, questionnaire design; second, questionnaire administration; and third, data analysis.

3.1. Questionnaire Design

The questionnaire used for this study was nearly identical to the one used in the pilot study described in Hermán-Carvajal (2024), except for some reworded items and adjustments in how the information was presented, which will be highlighted later in this section.

The design of the questionnaire, including both the selection of texts for evaluation and the development of the various items, took certain factors into consideration.

First, regarding text selection, we built on Cobos López's (2022) adaptation of the article "Association Between Soft Drink Consumption and Mortality in 10 European Countries" (Mullee et al., 2019), which was transformed

2 When we refer to "techniques specific to graphic medicine," we mean, for example, the use of images to facilitate the understanding of specialized information. It is important to note that we are not implying that these techniques are used exclusively in graphic medicine, but rather that they form the foundation of this movement. In works such as Grootens-Wiegers, De Vries, Vossen, et al. (2015), for instance, the use of visuals is not referred to as "graphic medicine," even though the proposal could essentially be framed within this movement.

into a comic simulating a classroom setting. This comic was chosen as one of the materials developed within the oncoTRAD project, aligning with the first objective of this research.

In this adaptation, determinologization strategies were crucial in ensuring the accessibility of the material produced. Campos Andrés (2013) describes determinologization as a formal, communicative, and cognitive phenomenon characterized by processes that modify specialized lexical units to enhance the comprehensibility of specialized texts for non-expert audiences. It is important to note that some conceptions of determinologization argue that this process entails changes whereby the term "no longer designates the same concept that the original term did" (Meyer & Mackintosh, 2000, p. 115). However, this article adopts the perspective of Campos Andrés (2013), which is also supported by authors in the joint field of graphic medicine and translation, such as Cobos López (2021a).

To meet the second objective—comparing the reception of different text genres—the same article was adapted into an infographic using Canva. One of the key challenges in this adaptation was reorganizing the information, as the infographic format inherently lacks the narrative structure of the comic (in this case, a classroom lesson likely familiar to the study participants). In addition to these two graphic medicine formats, a plain text version was created. This adaptation firstly involved an interlinguistic translation of the key aspects noted by Mullee et al. (2019) from English into Spanish, followed by an intergeneric/heterofunctional translation, employing determinologization strategies to make the specialized content more accessible to a younger audience. The content of all three texts was kept as similar as possible. The three materials can be found in Appendix 1.

In the creation of the infographic and the text, as outlined in Hermán-Carvajal (2024), certain strategies were employed to tailor the content to the target audience. These strategies included: (a) direct appeals to the reader, (b) neutralization of references to death, (c) use of colors with specific emotional and cultural connotations, (d) anthropomorphization, (e) use of emojis, and (f) determinologization strategies.

Direct appeals to the reader, using second-person singular or plural verbs, might help create a sense of empathy, making the audience feel that the material has been designed specifically with their needs in mind. The neutralization of references to death was intended to align with oncoTRAD's goal of presenting information in the most reader-friendly way possible (Cobos López, 2019). This is particularly important since the concept of death tends to trigger high levels of anxiety in children, especially in those over the age of ten (Orbach et al., 1985).

Colors were strategically used to associate ideas with their positive or negative implications. For example, in a Spanish school context where green is usually used to indicate correctness and red to mark errors, this material used green to highlight topics related to good health and red to point out behaviors that may harm health, such as the consumption of sugary drinks.

On the other hand, anthropomorphization involves attributing human characteristics to non-human elements. An example of this was giving human characteristics to a stomach in our infographic, to convey the idea that poor dietary habits could make it "sad". This adds an emotional layer that may resonate more effectively with younger readers.

Additionally, emojis were incorporated as a quick and familiar way to express opinions, assuming that the target audience is already used to these visual symbols, and determinologization strategies were also used to simplify the language and make the content more understandable for younger readers. In the original comic by Cobos López (2022), various

determinologization strategies were applied to reduce the level of specialization, following Campos Andrés' (2013) conception of said strategies[3], so that the information would be easily understood by children. To further lower the complexity, in the infographic and plain text versions, the term *problemas digestivos* (digestive problems) used in Cobos López's (2022) comic was replaced with *dolor de barriga* (tummy ache), a phrase likely to be more familiar and understandable to the study's target audience.

These texts were evaluated using a questionnaire specifically designed for the pilot phase of this study (Hermán-Carvajal, 2024). The questionnaire was created following Bell's (2007) recommendations for designing surveys for children. These guidelines addressed aspects such as syntactic formulation, the length and order of the questions, the use of scales, the terminology used in both the questions and answers, as well as the order and type of responses, to ensure the questionnaire's maximum effectiveness.

Thus, a simple syntactic formulation was chosen, with short questions presented in the most logical order possible. The questionnaire included dichotomous questions (yes/no), open-ended questions, multiple-choice questions, and 5-point Likert scale questions. Instead of using numbers to label the scale points, words were used to clarify what each level represented. There was only one Likert-type item where participants were asked to give an overall score for each text on a scale from 0 to 10. This scale was chosen due to the participants' familiarity with it, as it is the most commonly used grading system in the Spanish educational system. Finally, some questions were strategically placed throughout the questionnaire to verify the consistency of the participants' responses.

3 Campos Andrés (2013) identifies six types of determinologization procedures: definition, paraphrasing, synonymy, hypernymy, analogy, and exemplification. She provides numerous examples drawn from fact sheets for patients speaking English or Spanish.

Each material to be evaluated was presented first, followed by questions aimed at assessing some aspects, such as its perceived difficulty or how enjoyable the material was. The items in the questionnaires were based on the responses given by children in the studies conducted by Grootens-Wiegers, De Vries, Vossen, et al. (2015) and Grootens-Wiegers, De Vries, van Beusekom, et al. (2015), which aimed at evaluating how children receive and understand medical texts adapted with the inclusion of images. The selected items were based on the responses that were most relevant for assessing the achievement of one of the objectives of the oncoTRAD project: how children-friendly the developed materials were.

Three versions of the questionnaire were then developed to minimize potential bias, such as the possibility that viewing one type of material first might influence the perception of the following ones. In one version, the order was comic-text-infographic (CTI version); in another, text-infographic-comic (TIC version); and in the last one, infographic-comic-text (ICT version).

However, all versions included a final section where participants were asked to choose from multiple-choice items which material best matched what was being asked (for example, which material they found the easiest, the most boring, or the most fun). This section was intended to reduce bias and gather more accurate data on how the materials were received. For the full list of items, refer to Appendix 2 (original version in Spanish) and Appendix 3 (version translated into English). Although most of the questionnaire remained the same as in the pilot test, the following changes were made to improve the reliability of the responses:

- The last page contained multiple-choice questions. Approximately 20% of the participants in the pilot study did not answer these questions, which was attributed to an issue with the layout of the questionnaire booklet.

We believe this occurred because, in some versions of the booklet, these questions were printed on the reverse side of the page asking about the last material, which may be why some participants missed them. Therefore, we decided to adjust the layout.

- Some participants reported difficulties in reading Cobos López's (2022) comic due to the size it was printed in the pilot test. For this study, the size was enlarged to make it easier to read.

- In the item *¿Qué te gustaría tener en los libros de texto del cole? Aquí puedes marcar una o dos respuestas* (What would you like to have in your school textbooks? You can mark one or two answers), we inferred from the answers that including the word "textbooks" might lead participants to select "text" from the available options, thinking it was the "correct" answer. Therefore, we changed it to: "What would you like to have in your schoolbooks? (You can mark one or two answers)".

A within-subjects approach was chosen for this study (i.e., all participants answered the same questionnaire), with the only variation being the order in which the materials were presented. A between-subjects approach, which involves creating control and experimental groups, was avoided, as it might have limited the amount of information gathered for the reception of each material (Charness et al., 2012)—something undesirable given the exploratory nature of this research.

3.2. Questionnaire Administration

An Andalusian school that had previously expressed interest in collaborating with the oncoTRAD project was contacted. An information sheet was sent to the school's management team, providing an overview of the oncoTRAD project. The sheet explained the reception test design, highlighted the absence of risks, and outlined the potential benefits of the research. It also included the questionnaires to be used and emphasized the assurance of student anonymity, with no personal information being collected apart from gender and age for statistical purposes. This ensured that responses would remain completely anonymous and untraceable.

The school fully supported the administration of the test and informed families accordingly. On the day in which the reception test took place, the questionnaire was distributed among 5th and 6th-grade primary school students. After making students aware of the fact that participation was voluntary and that opting out would carry no negative consequences, printed questionnaire booklets were distributed in class, and students were given approximately 35 minutes to complete them. They were briefed on the purpose of the reception test, and any questions that arose during the process were answered. In each group, the questionnaires for each version (ICT, TIC, and CTI) were distributed evenly, so that approximately one-third of the students in each class completed each model. Students seated next to one another were administered different versions of the questionnaire, preventing answer sharing and ensuring that responses genuinely represented the participants' opinions.

3.3. Analysis

Since this study employed a mixed-methods approach, combining quantitative and qualitative data, the analysis followed a dual track. For the quantitative analysis, the open statistical software Jamovi (The jamovi project, 2024) was used. An initial examination was conducted to assess whether the order of the questionnaire versions influenced participants' evaluations of the materials.

Overall, those who completed the CTI booklet exhibited a slightly different response pattern compared to participants who completed the TIC and ICT booklets. This suggests that the order in

which the materials were presented may have had some effect on the results. As this possibility was anticipated based on Bell's (2007) guidelines, the inclusion of data from three different questionnaire models is believed to have helped mitigate potential bias stemming from any single version.

For the qualitative analysis, responses to open-ended questions were coded according to recurring themes, with the most significant insights being highlighted in this article.

4. Results

This section first presents the results of the quantitative analysis, followed by those of the qualitative analysis, both derived from responses provided by the same sample. The sample consisted of 154 participants, where 66 were boys and 88 were girls. The mean age was 10.34 years, with a standard deviation of 0.67 years. Regarding the questionnaire models, 52 participants completed the CTI model, another 52 completed the ICT model, and 50 completed the TIC model. This balanced distribution across the different questionnaire versions enhances the reliability of the results.

4.1. Quantitative Analysis Results

Table 1 provides descriptive statistics for the items rated on a Likert scale. These items were designed to assess three key aspects: how easy or difficult the material seemed to the participant, how boring or enjoyable they found it, and the overall grade they assigned based on their level of liking. For the first two aspects, a 5-point scale was used, chosen for its clear alignment with the labels explaining each level. For the overall rating, participants were asked to score the material on a 0–10 scale, consistent with the Spanish school grading system, which, as previously mentioned, might help the participants better choose an answer.

Table 1. Descriptives of the Likert-Scale Items

Descriptives							
		N	Mean	Median	SD	Minimum	Maximum
Comic	Boring-Fun	154	3.65	4.00	0.926	1	5
	Difficult-Easy	154	4.01	4.00	0.953	1	5
	Grade	154	8.54	9.00	1.622	1.00	10.0
Text	Boring-Fun	154	3.12	3.00	0.983	1	5
	Difficult-Easy	154	3.64	4.00	1.014	1	5
	Grade	154	7.94	8.00	2.058	0.00	10.0
Infographic	Boring-Fun	154	3.74	4.00	0.815	2	5
	Difficult-Easy	154	3.88	4.00	0.956	1	5
	Grade	154	8.56	9.00	1.830	0.00	10.0

Notes: Answers for "Boring-Fun" ranged from 1 (very boring) to 5 (very fun); answers for "Difficult-Easy" ranged from 1 (very difficult) to 5 (very easy); answers for "Grade" ranged from 0 (I do not like this material at all) to 10 (I like this material a lot).

Table 2. Friedman ANOVA Test Results for the Likert-Scale Items

Friedman ANOVA test			
Variable	**χ^2**	**df**	**p**
Boring-Fun	60.9	2	<.001***
Difficult-Easy	15.4	2	<.001***
Grade	23.7	2	<.001***

Note: * p < 0.05, ** p < 0.01, *** p < 0.001.

As shown in Table 1, an initial analysis of the means reveals that the comic and the infographic were rated similarly. The infographic received a higher overall rating than the comic and was considered more fun, while the comic was perceived as easier. However, the differences were minimal. On the other hand, the text was rated as more boring, more difficult, and received a lower overall grade compared to both the comic and the infographic. These results suggest that, at first glance, the two materials adapted using graphic medicine techniques and genres were better received than the plain text, which was adapted using determinologization strategies.

In any case, to determine whether the differences were statistically significant, a non-parametric Friedman ANOVA test[4] was conducted to check for differences among the three types of materials for each of the variables analyzed. Table 2 presents the results of this analysis.

As significant differences are observed in all comparisons (p<0.001***), a Wilcoxon non-parametric test[5] was conducted to identify which specific pairs showed these differences, since some of the groups compared did not follow a normal distribution. The results of this analysis are presented in Table 3.

Table 3. Wilcoxon Test Results for the Likert-Scale Items

Paired samples T-Test (Wilcoxon)			
Pair		**Statistic**	**p**
Boring-Fun (Comic)	Boring-Fun (Text)	4089	<.001***
	Boring-Fun (Infographic)	1717	.285
Boring-Fun (Text)		790	<.001***
Difficult-Easy (Comic)	Difficult-Easy (Text)	2912	<.001***
	Difficult-Easy (Infographic)	1774	.087
Difficult-Easy (Text)		2028	.010**
Grade (Comic)	Grade (Text)	5013	<.001***
	Grade (Infographic)	2781	.205
Grade (Text)		2041	<.001***

Note: * p < 0.05, ** p < 0.01, *** p < 0.001.

As shown in Table 3, all comparisons between the infographic and the comic revealed no significant differences, whereas all comparisons between the infographic and the text, as well as between the comic and the text, showed statistically significant differences. This validates the previously observed differences from a statistical perspective. Based on these results, we can conclude that the 5th and 6th-grade students in our sample perceived the two materials translated and subsequently adapted using graphic medicine techniques as easier and more fun than the text, which was only adapted through determinologization strategies.

Another interesting aspect to highlight is that there were some differences in the evaluation of each item based on the participants' gender. Tables 4 and 5 present the values for girls and boys, respectively.

As shown in Table 4, the differences between the various items in the girls' sample closely

4 The Friedman ANOVA test compares three or more related groups to check if their medians are significantly different. More information on Friedman's test can be found in Pereira et al. (2015).

5 Wilcoxon tests are non-parametric methods used to determine whether there is a significant difference between two datasets and are especially useful when the data does not follow a normal distribution. More information on Wilcoxon tests can be found in Divine et al. (2013).

Table 4. Wilcoxon Test Results for the Likert-Scale Items Answered by Girls

Paired Samples T-Test (Wilcoxon) - Girls			
Pair		Statistic	p
Boring-Fun (Comic)	Boring-Fun (Text)	1236	<.001***
	Boring-Fun (Infographic)	554	.386
Boring-Fun (Text)		135	<.001***
Difficult-Easy (Comic)	Difficult-Easy (Text)	799	<.001***
	Difficult-Easy (Infographic)	597	.110
Difficult-Easy (Text)		580	.036*
Grade (Comic)	Grade (Text)	1359	.06
	Grade (Infographic)	782	.236
Grade (Text)		588	.004**

Note: * p < 0.05, ** p < 0.01, *** p < 0.001.

Table 5. Wilcoxon Test Results for the Likert-Scale Items Answered by Boys

Paired Samples T-Test (Wilcoxon) - Boys			
Pair		Statistic	p
Boring-Fun (Comic)	Boring-Fun (Text)	846	.006**
	Boring-Fun (Infographic)	327	.511
Boring-Fun (Text)		253	<.001***
Difficult-Easy (Comic)	Difficult-Easy (Text)	671	.071
	Difficult-Easy (Infographic)	323	.431
Difficult-Easy (Text)		447	.126
Grade (Comic)	Grade (Text)	1171	.002**
	Grade (Infographic)	609	.466
Grade (Text)		443	.002**

Note: * p < 0.05, ** p < 0.01, *** p < 0.001.

follow the same patterns as in the overall sample, with the only exception being that the overall rating given by the girls for the comic and the text does not show a statistically significant difference.

Regarding boys, as seen in Table 5, no statistically significant differences were found in the perceived difficulty in the different materials. This suggests that, while the boys found the materials adapted with graphic medicine to be more enjoyable and gave them higher overall ratings, they did not perceive them as easier than the plain text.

Another interesting aspect to consider is whether the differences observed varied according to age. In our sample, participants were aged 9 ($n = 13$), 10 ($n = 79$), 11 ($n = 58$), and 12 ($n = 4$). Due to the low number of participants aged 9 and 12, and since these ages represent the extremes of our sample, we compared the statistical behavior of the differences between the two largest groups: participants aged 10 and 11.

In Table 6, the analysis of the 10-year-olds reveals that most patterns align with the overall sample (see Table 3), except for the perceived difficulty between the text and the infographic, where no significant differences were found. This suggests that 10-year-olds found the comic easier than both the infographic and the text. This finding corresponds with Gallego

Table 6. Wilcoxon Test Results for the Likert-Scale Items Answered by 10-Year-Olds

Paired Samples T-Test (Wilcoxon) – 10-Year-Olds			
Pair		Statistic	p
Boring-Fun (Comic)	Boring-Fun (Text)	907	0.002**
	Boring-Fun (Infographic)	286	0.119
Boring-Fun (Text)		175	<.001***
Difficult-Easy (Comic)	Difficult-Easy (Text)	645	0.032*
	Difficult-Easy (Infographic)	599	0.110
Difficult-Easy (Text)		699	0.389
Grade (Comic)	Grade (Text)	1133	0.015*
	Grade (Infographic)	835	0.765
Grade (Text)		503	0.016*

Note: * p < 0.05, ** p < 0.01, *** p < 0.001.

Table 7. Wilcoxon Test Results for the Likert-Scale Items Answered by 11-Year-Olds

Paired Samples T-Test (Wilcoxon) – 11-Year-Olds			
Pair		Statistic	p
Boring-Fun (Comic)	Boring-Fun (Text)	730	<.001***
	Boring-Fun (Infographic)	404	0.715
Boring-Fun (Text)		109	<.001***
Difficult-Easy (Comic)	Difficult-Easy (Text)	512	<.001***
	Difficult-Easy (Infographic)	159	0.260
Difficult-Easy (Text)		198	0.007**
Grade (Comic)	Grade (Text)	984	0.016*
	Grade (Infographic)	357	0.042*
Grade (Text)		265	<.001***

Table 8. Number of Responses to the Global Question

Global Opinion Items						
	Most Fun	Most Boring	Most Difficult	Easiest	Liked the Most	Liked the Least
N	149	146	149	146	147	144
Not Answered	5	8	5	8	7	10

López's (2021) suggestion that age 12 marks the beginning of the ideal age range for effectively using infographics.

In Table 7, the answers of 11-year-olds showed consistency with the overall sample, with one key exception: a significant difference in the overall ratings between the comic and the infographic. The infographic received a higher average score of 8.7, compared to 8.34 for the comic. Thus, the 11-year-olds rated the infographic significantly higher than the comic. This may support Gallego López's (2021) idea that as children approach adolescence, their preference for infographics increases. However, to confirm this trend, a larger sample of responses from adolescents older than 11 would be necessary.

It is important to note that these results reflect the participants' immediate evaluation of each material after viewing and reading it. However, to compare this with an overall assessment, and as noted in the questionnaire design section, several global questions were included at the end of the questionnaire. Table 8 shows the number of responses regarding which material was considered the most fun, the most boring, the easiest, the most difficult, and which one they liked the most and the least.

As shown in Table 8, the vast majority of participants answered these final questions. This represents a substantial improvement compared to the pilot test, where approximately 20% of participants left these questions unanswered. In this case, only 1.9% of participants did not respond to any questions on the last page[6]. Notably, some questions, such as those regarding which material was considered the most boring and which was liked the least, received fewer responses than others. These

6 Only three participants did not answer any questions on the last page of the questionnaire. There were two participants who answered the last two items of the questionnaire, but did not respond to any of the previous items (presented in Tables 8, 9, and 10).

Table 9. Global Opinion Items on Each Material

	Global Opinion Items					
	Most Fun	**Most Boring**	**Most Difficult**	**Easiest**	**Liked the Most**	**Liked the Least**
Number of Answers	149	146	149	146	147	144
Not Answered	5	8	5	8	7	10

Table 10. Global Opinion Items on Each Material by Age

		Global Opinion Items – by Age					
Material	**Age**	**Most Fun**	**Most Boring**	**Easiest**	**Most Difficult**	**Liked the Most**	**Liked the Least**
Comic	10	67.9%	7.9%	44.0%	21.9%	61.0%	11.7%
	11	58.2%	5.6%	36.4%	14.8%	54.5%	9.4%
Text	10	5.1%	80.3%	13.3%	63.0%	7.8%	70.1%
	11	3.6%	83.3%	10.9%	70.4%	5.5%	75.5%
Infographic	10	26.9%	11.8%	42.7%	15.1%	31.2%	18.2%
	11	38.2%	11.1%	52.7%	14.8%	40.0%	15.1%

instances often correspond to comments written by participants next to the boxes they were asked to tick, such as "there is no boring material" or "I liked all of them." Table 9 presents the specific responses to each of the items.

While the post-material reading ratings initially indicated that the comic was perceived as the easiest, most fun, and most liked by participants, the global assessment after viewing all the materials reveals a slight shift. The comic remains the most fun and most liked material, but in terms of perceived difficulty, the infographic is now considered the easiest material. The text was still perceived as the most boring, the most difficult, and the least liked by the sample. Regarding the ratings based on participants' gender, the trends were similar to those of the overall sample. The only exception was that the boys reported finding the comic to be the easiest material (45.3%), closely followed by the infographic (43.8%).

Regarding the ratings based on participants' age, the results are presented in Table 10. As previously done, only the ratings from participants aged 10 and 11 are included.

When analyzing the global item data by age, some interesting patterns emerge. A slightly higher percentage of 10-year-olds consider the comic (44.0%) to be the easiest material, compared to those who opted for the infographic (42.7%). Among 11-year-olds, these numbers reverse, with 36.4% rating the comic as the easiest, while 52.7% consider the infographic as the easiest one. Another interesting result is in the "liked the most" category, where 54.5% of 11-year-old participants indicated that the comic was their favorite, compared to 40% who favored the infographic. This contrasts with the evaluation made immediately after reading each material, where the 11-year-olds rated the infographic with a higher overall score of 8.7, compared to the comic's 8.34.

Beyond these insights, it is particularly noteworthy that the infographic sees increased ratings in "most fun", "easiest" and "liked the most" between ages 10 and 11 (see Gallego López, 2021).

Table 11. Overall Opinion on Material Presentation

Do You Like the Way This [Material] Is Presented?		
Material	**Yes**	**No**
Comic	95.4%	4.6%
Text	87.0%	13.0%
Infographic	98.7%	1.3%

Table 12. Questions About the Use of Materials in a School Setting

Use of Materials in a School Setting		
Material	**Use in Schoolbooks**	**More Used in School**
Comic	73.5 %	52.3%
Text	16.6%	16.6%
Infographic	49.7 %	64.2%

In addition to the answers to these items, Table 11 shows the responses to the item "Do you like the way this [material] is presented?", which could be interpreted as an overall "acceptance" or "rejection" of each material. This was a yes/no question, offering a quick way to gauge the participants' overall opinion. Since it appeared before the specific questions about each material, it could serve as a useful indicator of the participants' first impressions before their evaluation of the specific items.

As shown above, the presentation of all materials was predominantly positively evaluated, although the text format elicited more negative reactions from participants compared to the comic and infographic. Furthermore, the infographic had the lowest rate of rejection (1.3%), though the difference compared to the comic (4.6%) was minimal. This provides further evidence of the participants' preference for materials adapted using graphic medicine techniques.

Lastly, in the items "What would you like to have in your schoolbooks?" and "What would you like to be used more in school to teach you about health and illness topics?", the results continued to align with the overall trends of the questionnaire, as shown in Table 12. It is important to note that participants could select one or two materials as their answer to these questions.

As shown in Table 12, comics and infographics emerged as the preferred genres among the study participants. Most participants expressed a preference for greater use of comics (73.5%) in their textbooks to learn about health topics and for more infographics (64.2%) to be used in the general school context for health education. Additionally, infographics (49.7%) were also identified as materials that participants would like to see included in textbooks, and comics (52.3%) were also highlighted as a material they wished to see used more frequently in the school setting. These trends were consistent among both boys and girls, as well as among participants aged 10 and 11. Therefore, these preferences seem to be entirely representative across the entire sample.

4.2. Qualitative Analysis Results

Building on the quantitative analysis, it is essential to identify which elements of each material appealed to the participants and which did not. The response rate to the open-ended questions "What did you like most about [material]?" and "Is there anything you did not like about [material]?" was lower than the response rate to the other items.

Regarding the question "What did you like most about [material]?", the comic received 108 responses (a response rate of 70.1%), the infographic received 83 (53.9%), and the text received 73 (47.4%). For the question "Is there anything you did not like about [material]?", the comic garnered 15 responses (a response rate of 9.7%), the infographic received 11 (7.1%), and the text received 26 (16.9%).

Based on the response patterns, we believe that the low response rate to the question "Is there anything you did not like about [material]?" indicates that participants had nothing specific to point out, as particularly in the cases of the comic and the infographic, several responses noted that there was "nothing" they disliked.

Regarding what participants liked most about each material, about 35% of those who answered this question for the comic highlighted graphic elements, such as the use of colors, illustrations, layout, and the very format of the comic itself. Approximately 19% mentioned the teacher in the comic as their favorite aspect, while around 18% indicated that they liked "everything". About 16% pointed out the way advice was given, and around 10% noted the children in the comic and their "sincerity" as their favorite elements. Other aspects were mentioned less frequently, such as finding the comic entertaining or noting that it contained minimal text. In summary, we can highlight that, in addition to the graphic elements, the comic's setting in a school context was very positively received by the participants.

Regarding the negative aspects mentioned about the comic, the most frequent responses (out of the 15 received) were that it contained too much text, was too short, that the advice was not written on the board (a perceived lack of reality), or that the language used was not "contemporary". Yet, there were also responses noting that there was "nothing" they disliked about the comic.

As for the infographic, approximately 48% of the responses regarding what participants liked most were related to graphic elements, such as the use of colors, illustrations, emojis, or the overall layout. Around 15% mentioned that they liked everything, while approximately 12% mentioned the "fun way" in which advice was given using, for instance, exclamations and questions marks. About 8% highlighted the synthesis of advice through the phrase *la suma más importante* (the most important sum). Other noted aspects included the depiction of girls participating in sports in the infographic and its "logical order".

With regard to the negative feedback on the infographic, out of the 11 responses, around 46% indicated they disliked "nothing". The remaining responses highlighted a variety of concerns, such as the overuse of exclamation marks, the perception that the infographic was boring, or the lack of different colors.

Regarding the positive feedback on the text, around 36% of the responses mentioned that they liked the advice included in the text. Approximately 20% indicated that they liked "everything" or "almost everything" about the text, while 9% appreciated its brevity. About 8% highlighted the presentation of the text as a positive aspect, and 6% mentioned the use of exclamation marks. The remaining responses pointed out aspects mentioned by only one or two participants, so they are not included here due to their limited representativeness.

As for the negative feedback, around 40% of the responses indicated that the text was "too long" or had "too much text". Approximately 34% mentioned the lack of graphic elements and colors, while around 16% pointed out that it was "boring" or "very boring". Other issues were mentioned by only one participant each.

5. Analysis

The results presented in this study highlight the positive reception of textual genres associated with graphic medicine among children and preadolescents. Notably, apart from the comic—the primary medium of graphic medicine in the English-speaking context—, the infographic, one of the textual genres incorporated into the Spanish conception of graphic medicine, was also highly rated by the participants. In general, there were no statistically significant differences between participants' assessments of the

comic and those of the infographic (in terms of difficulty, fun or overall rating). However, significant differences emerged when comparing these graphic medicine formats with plain text, which was adapted using only determinologization strategies.

As shown in the mean ratings of the various items in Table 1, while there are significant differences between the comic-infographic pair and the plain text, this does not imply that the text was poorly received by the participants. The interlinguistic translation, followed by the heterofunctional translation applied to the text, resulted in the text being considered easy (3.64), somewhat fun (3.12), and positively rated overall (7.94). However, these values were higher in the evaluations of the comic and infographic.

As discussed throughout this article, it is interesting to relate these findings to the proposal on textual genres for disseminating cancer-related information by Gallego López (2021) within the frame of graphic medicine. In that proposal, comics were considered the most suitable genre for children aged 6–12, while infographics were preferred for adolescents aged 12–18, in line with the literacy skills described by Cámara Aguilera (2003). Indeed, in our study, participants (with a mean age of 10.34 years) rated the comic slightly more favorably than the infographic, but the differences were rarely statistically significant. In fact, among the 11-year-old participants, there was a statistically significant difference in the overall rating of the infographic (8.7) versus the comic (8.34). As shown in Table 10, the infographic was rated more favorably by 11-year-olds than by 10-year-olds, a finding consistent with the previous pilot study conducted with a different, smaller sample (Hermán-Carvajal, 2024).

This might suggest that a sample of 12-year-old adolescents might rate the infographic even more positively, potentially leading to statistically significant differences between the infographic and the comic. In any case, in our sample, as already noted, the infographic was also well-regarded by participants under 12, fulfilling one of the key objectives of the oncoTRAD project: the dissemination of cancer and disease prevention information in a clear and reader-friendly manner (Cobos López, 2019).

Beyond the quantitative data, it is particularly relevant that the graphic elements were cited as the most liked aspects of both the comic and the infographic. This preference aligns with the types of visual resources commonly found in online information for young audiences on topics such as infectious diseases (Hermán-Carvajal & Tercedor Sánchez, 2022) and mental health (Hermán-Carvajal & Tercedor Sánchez, 2024). The negative aspects of these formats, as reported by participants, were minimal although, in some cases, their responses were contradictory. For instance, while some criticisms of the comic noted that it was too short, others mentioned that it contained too much text. Similarly, a few participants criticized the infographic for its use of colors or excessive exclamation marks. However, these criticisms represent a very small proportion of the overall sample. Thus, it can be concluded that both comics and infographics were generally well-received by preadolescents as effective formats for communicating disease prevention information.

6. Conclusions

This study had two main objectives: (1) to analyze the reception by children and preadolescents of adapted materials within the framework of the oncoTRAD project, and (2) to compare the reception of two distinct graphic medicine genres (comic and infographic) with that of a linguistically adapted plain text.

Regarding the first objective, the reception of a comic and an infographic designed as part of the oncoTRAD project was analyzed. Both genres were very positively regarded, with participants finding them easy to understand, fun, which reflected in high overall ratings,

exceeding 8.5 out of 10. Both genres were rated similarly, suggesting that using comics or infographics could be highly beneficial for disseminating health information to preadolescents. Participants highlighted the graphic elements, the school setting in the comic, and the "fun" presentation of the information in both materials as key positive aspects.

For the second objective, we compared the reception of the comic and infographic with that of a plain text adapted using determinologization strategies. Although the plain text was also positively rated, deemed easy and somewhat fun, it consistently received lower scores than both the comic and infographic across all metrics, with the differences being statistically significant. Negative feedback about the plain text focused on it being boring, its length or its excessive amount of words.

One interesting finding is the small age-related differences in material perception. Participants aged 11 rated the infographic more favorably than those aged 10, suggesting that infographics may become more appealing as adolescence begins. This raises the possibility that the comic might need to be adapted for older adolescents to maintain its appeal.

Some minor gender-based differences were also observed. Boys generally found the materials adapted through graphic medicine strategies to be more enjoyable and gave higher overall ratings, although there were no statistically significant differences between their perceived difficulty of the text and the two graphic medicine genres. In contrast, for girls, no statistically significant difference was observed between their overall ratings for the comic and the text.

This study provides valuable insights into how preadolescent audiences perceive the materials designed within the oncoTRAD project, addressing a gap in the literature and contributing to the development of materials in the future based on participant feedback. Additionally, it highlights the importance of graphic elements in preadolescents' evaluations of health-related information.

The main limitation of this study is the small number of materials evaluated and the limited set of questionnaire items. While this initial approach offered a useful preliminary understanding of how preadolescents receive materials adapted through graphic medicine techniques, future studies would benefit from including a broader range of materials covering health-related topics. Additionally, incorporating more specific questionnaire items could allow for a deeper evaluation of aspects highlighted in the open-ended responses. For example, future questionnaires could ask participants directly about the use of "humorous" elements, the amount of text in the comic, or the inclusion of emojis, among other features.

Overall, this article highlights the need for continued collaboration between the fields of translation studies and graphic medicine to improve access to scientific health information for diverse audiences, ideally contributing to the enhancement of health literacy in society.

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References

Ávila, F., Bautista, S., Betancourt, J., Calderón, J., García, C., & Triana, R. (2007). *Ciencia y cotidianidad, competencias culturales básicas. X Reunión de La Red de Popularización de La Ciencia y La Tecnología En América Latina y El Caribe (RED POP - UNESCO) y IV Taller «Ciencia, Comunicación y Sociedad»,* May 9–11, San José, Costa Rica.

https://d9.cientec.or.cr/pop/2007/CO-JulianBetancourt.pdf

Baker, D. W., Gazmararian, J. A., Williams, M. V., Scott, T., Parker, R. M., Green, D., Ren, J., & Peel, J. (2004). Health literacy and use of outpatient physician services by Medicare managed care enrollees. *Journal of General Internal Medicine, 19*(3), 215–220. https://doi.org/10.1111/j.1525-1497.2004.21130.x

Bell, A. (2007). Designing and testing questionnaires for children. *Journal of Research in Nursing, 12*(5), 461–469. https://doi.org/10.1177/1744987107079616

Brand, A., Gao, L., Hamann, A., Crayen, C., Brand, H., Squier, S. M., Stangl, K., Kendel, F., & Stangl, V. (2019). Medical graphic narratives to improve patient comprehension and periprocedural anxiety before coronary angiography and percutaneous coronary intervention: A randomized trial. *Annals of Internal Medicine, 170*(8), 579. https://doi.org/10.7326/M18-2976

Cámara Aguilera, E. (2003). Traducción del medio mixto en literatura infantil y juvenil: algo más que traducción. *Actas del I Congreso Internacional de La Asociación Ibérica de Estudios de Traducción e Interpretación, AIETI*. Granada, February 12–14. https://www.aieti.eu/wp-content/uploads/AIETI_1_ECA_Traduccion.pdf

Campos Andrés, O. (2013). Procedimientos de desterminologización: traducción y redacción de guías para pacientes. *Panace@, 14*(37), 48–52. https://www.tremedica.org/wp-content/uploads/n37-tradyterm-OCamposAndres.pdf

Charness, G., Gneezy, U., & Kuhn, M. A. (2012). Experimental methods: Between-subject and within-subject design. *Journal of Economic Behavior & Organization, 81*(1), 1–8. https://doi.org/10.1016/j.jebo.2011.08.009

Cobos López, I. (2019). Traducir para el paciente: acercamiento y adaptación como modalidad de traducción. *Quaderns de Filologia - Estudis Lingüístics, 24,* 211–228. https://doi.org/10.7203/qf.24.16307

Cobos López, I. (2021a). La medicina gráfica como herramienta para la traducción y la adaptación de textos biosanitarios. *Mutatis Mutandis. Revista Latinoamericana de Traducción, 14*(2), 397–426. https://doi.org/10.17533/udea.mut.v14n2a06

Cobos López, I. (2021b). La traducción social como instrumento para la medicina gráfica. *Panace@, 22*(54), 63–74. https://www.tremedica.org/wp-content/uploads/panacea21-54_08_Tribuna_CobosLopez.pdf

Cobos López, I. (2022). Traducción y multimodalidad para la divulgación de la ciencia dirigida a un público infantil. *MonTI. Monografías de Traducción e Interpretación, 14,* 87–118. https://doi.org/10.6035/MonTI.2022.14.03

Czerwiec, M., Jane Zhao, Q., Álvarez, I., & Ortega, P. (2024). Graphic medicine and visual communication techniques for public health and healthcare in linguistically diverse settings. In P. Ortega, G. Martínez, M. Lor, & A. S. Ramírez (Eds.), *The handbook of language in public health and healthcare* (pp. 469–491). Wiley. https://doi.org/10.1002/9781119853855.ch24

De Stefano, A., Rusciano, I., Moretti, V., Scavarda, A., Green, M. J., Wall, S., & Ratti, S. (2023). Graphic medicine meets human anatomy: The potential role of comics in raising whole body donation awareness in Italy and beyond. A pilot study. *Anatomical Sciences Education, 16*(2), 209–223. https://doi.org/10.1002/ase.2232

Divine, G., Norton, H. J., Hunt, R., & Dienemann, J. (2013). A review of analysis and sample size calculation considerations for wilcoxon tests. *Anesthesia & Analgesia, 117*(3), 699–710. https://doi.org/10.1213/ANE.0b013e31827f53d7

Epstein, H.-A. B. (2024). Health literacy in graphic medicine: medical comics and graphic pathologies. *Journal of Consumer Health on the Internet, 28*(1), 56–62. https://doi.org/10.1080/15398285.2024.2330868

Gallego López, S. (2021). *El lenguaje del cáncer: la traducción al servicio de los más pequeños.* Universidad de Córdoba. http://hdl.handle.net/10396/22619

García Izquierdo, I., & Muñoz-Miquel, A. (2015). Los folletos de información oncológica en contextos hospitalarios: la perspectiva de

pacientes y profesionales sanitarios. *Panacea, 16(*42), 225–231. https://www.tremedica.org/wp-content/uploads/n42_tribuna-EGIzquierdoAMMiquel.pdf

García-Izquierdo, I., & Montalt, V. (2013). Equigeneric and intergeneric translation in patient-centred care. *HERMES - Journal of Language and Communication in Business, 51*, 39–51. https://doi.org/10.7146/hjlcb.v26i51.97436

Grootens-Wiegers, P., De Vries, M. C., van Beusekom, M. M., van Dijck, L., & van den Broek, J. M. (2015). Comic strips help children understand medical research. *Patient Education and Counseling, 98(*4), 518–524. https://doi.org/10.1016/j.pec.2014.12.005

Grootens-Wiegers, P., De Vries, M. C., Vossen, T. E., & Van den Broek, J. M. (2015). Readability and visuals in medical research information forms for children and adolescents. *Science Communication, 37*(1), 89–117. https://doi.org/10.1177/1075547014558942

Hermán-Carvajal, A. (2024). Preferencias informativas de los niños y preadolescentes en materia de prevención del cáncer: un estudio piloto de recepción desde la medicina gráfica. In I. Cobos López (Ed.), *Traducción (biosanitaria), Medicina Gráfica y Comunicación médico-paciente* (pp. 73–102). Tirant lo Blanch.

Hermán-Carvajal, A., & Tercedor Sánchez, M. (2022). Textos audiovisuales sobre salud para adolescentes y jóvenes adultos: análisis de estrategias lingüísticas aplicadas a través del uso de elementos emocionales. *Panace@, 23*(56), 41–55. https://doi.org/10.5281/zenodo.7701063

Hermán-Carvajal, A., & Tercedor Sánchez, M. (2024). Recursos léxicos y visuales para acercar el conocimiento sobre temas de salud mental a los adolescentes en Instagram y TikTok. In I. Cobos López (Ed.), *Traducción (biosanitaria), Medicina Gráfica y Comunicación médico-paciente* (pp. 309–332). Tirant lo Blanch.

Hidalgo Morillo, B. (2012). Rosalind Franklin: la verdadera historia del ADN. [Theater play]. ECO. *Revista Digital de Educación y Formación del profesorado*, (9), 1–11. https://revistaeco.cepcordoba.es/wp-content/uploads/2018/05/Hidalgo.pdf

Howard, D. H., Sentell, T., & Gazmararian, J. A. (2006). Impact of health literacy on socioeconomic and racial differences in health in an elderly population. *Journal of General Internal Medicine, 21*(8), 857–861. https://doi.org/10.1111/j.1525-1497.2006.00530.x

Jakobson, R. (1959). On linguistic aspects of translation. In R. A. Brower (Ed.), *On translation* (pp. 232–239). Harvard University Press. https://doi.org/10.4159/harvard.9780674731615.c18

Jiménez Hurtado, C., & Medina Reguera, A. (2022). Metodología de la traducción a lectura fácil: retos de investigación. In M. P. Castillo Bernal & M. Estévez Grossi (Eds.), *Translation, Mediation and Accessibility for Linguistic Minorities* (vol. 128, pp. 205–222). Frank & Timme.

Lattuca, B., Barber-Chamoux, N., Alos, B., Sfaxi, A., Mulliez, A., Miton, N., Levasseur, T., Servoz, C., Derimay, F., Hachet, O., Motreff, P., Metz, D., Lairez, O., Mewton, N., Belle, L., Akodad, M., Mathivet, T., Ecarnot, F., Pollet, J., … Bouleti, C. (2018). Impact of video on the understanding and satisfaction of patients receiving informed consent before elective inpatient coronary angiography: A randomized trial. *American Heart Journal, 200,* 67–74. https://doi.org/10.1016/j.ahj.2018.03.006

López Rodríguez, C. I., & Bolívar Pérez, M. I. (2019). Subtítulos para promover la cultura científica realizados por profesionales y voluntarios. In A. J. Chica Núñez & S. Martínez Martínez (Eds.), *Acceso al patrimonio cultural, científico y natural. Contribuciones desde la traductología* (pp. 43–59). Tragacanto.

Mayor Serrano, M. B. (2018). Qué es la medicina gráfica. *Tebeosfera*. https://www.tebeosfera.com/documentos/que_es_la_medicina_grafica.html

Meyer, I., & Mackintosh, K. (2000). When terms move into our everyday lives: An overview of de-terminologization. *Terminology, 6*(1), 111–138. https://doi.org/10.1075/term.6.1.07mey

Mullee, A., Romaguera, D., Pearson-Stuttard, J., Viallon, V., Stepien, M., Freisling, H., Fagherazzi, G., Mancini, F. R., Boutron-Ruault, M.-C., Kühn, T., Kaaks, R., Boeing, H., Aleksandrova, K., Tjønneland, A., Halkjær, J., Overvad, K., Weiderpass, E., Skeie, G., Parr, C. L., … Murphy, N. (2019). Association between soft drink consumption and mortality in 10 European countries. *JAMA Internal Medicine, 179*(11), 1479–1490. https://doi.org/10.1001/jamainternmed.2019.2478

Orbach, I., Gross, Y., Glaubman, H., & Berman, D. (1985). Children's perception of death in humans and animals as a function of age, anxiety and cognitive ability. *Journal of Child Psychology and Psychiatry, 26*(3), 453–463. https://doi.org/10.1111/j.1469-7610.1985.tb01946.x

Pereira, D. G., Afonso, A., & Medeiros, F. M. (2015). Overview of Friedman's test and post-hoc analysis. *Communications in Statistics - Simulation and Computation, 44*(10), 2636–2653. https://doi.org/10.1080/03610918.2014.931971

Pomputius, A., & Tennant, M. R. (2023). Assessing health students' knowledge of and perceived utility and effectiveness of graphic medicine materials. *Medical Reference Services Quarterly, 42*(4), 330–345. https://doi.org/10.1080/02763869.2023.2260674

Prieto-Velasco, J. A. (2024). Traducción intersemiótica y divulgación inclusiva del conocimiento científico mediante cómics médicos: una aproximación metodológica al proyecto IncluMed. In I. Cobos López (Ed.), Traducción (biosanitaria), *Medicina Gráfica y Comunicación médico-paciente* (pp. 17–50). Tirant lo Blanch.

Prieto-Velasco, J. A., & Montalt-Resurrecció, V. (2019). Encouraging legibility and comprehensibility through multimodal patient information guides. *Linguistica Antverpiensia, New Series – Themes in Translation Studies, 17,* 196–214. https://doi.org/10.52034/lanstts.v17i0.476

Ramírez Almansa, I. (2021). Medicina gráfica y traducción: adquisición del conocimiento especializado y de la lengua extranjera a través del subtitulado alemán-español de videografías sobre vacunología. *Lenguas Modernas, 58*, 155–189. https://lenguasmodernas.uchile.cl/index.php/LM/article/view/66438

Squier, S. M. (2015). The uses of graphic medicine for engaged scholarship. In M. K. Czerwiec, I. Williams, S. M. Squier, M. J. Green, K. R. Myers, & S. T. Smith (Eds.), *Graphic medicine manifesto* (chapter 2; pp. 41–66). Penn State University Press. https://doi.org/10.5325/j.ctv14gpf04

The JAMOVI project. (2024). JAMOVI (2.5). https://www.jamovi.org/

Thompson, S. R., Watson, M. C., & Tilford, S. (2018). The Ottawa Charter 30 years on: Still an important standard for health promotion. International *Journal of Health Promotion and Education, 56*(2), 73–84. https://doi.org/10.1080/14635240.2017.1415765

Williams, I. (n. d.). Graphic medicine. *What is "graphic medicine"?* https://www.graphicmedicine.org/why-graphic-medicine/

Wombles, C. (2021). Graphic medicine: Comics as a patient education resource. *Journal of Consumer Health on the Internet, 25*(3), 310–318. https://doi.org/10.1080/15398285.2021.1949937

World Health Organization—WHO—(1986). *Ottawa Charter for Health Promotion, 1986.* https://iris.who.int/bitstream/handle/10665/349652/WHO-EURO-1986-4044-4380361677-eng.pdf?sequence=

World Health Organization—WHO— (1998). *Health promotion glossary.* https://iris.who.int/bitstream/handle/10665/64546/WHO_HPR_HEP_98.1.pdf

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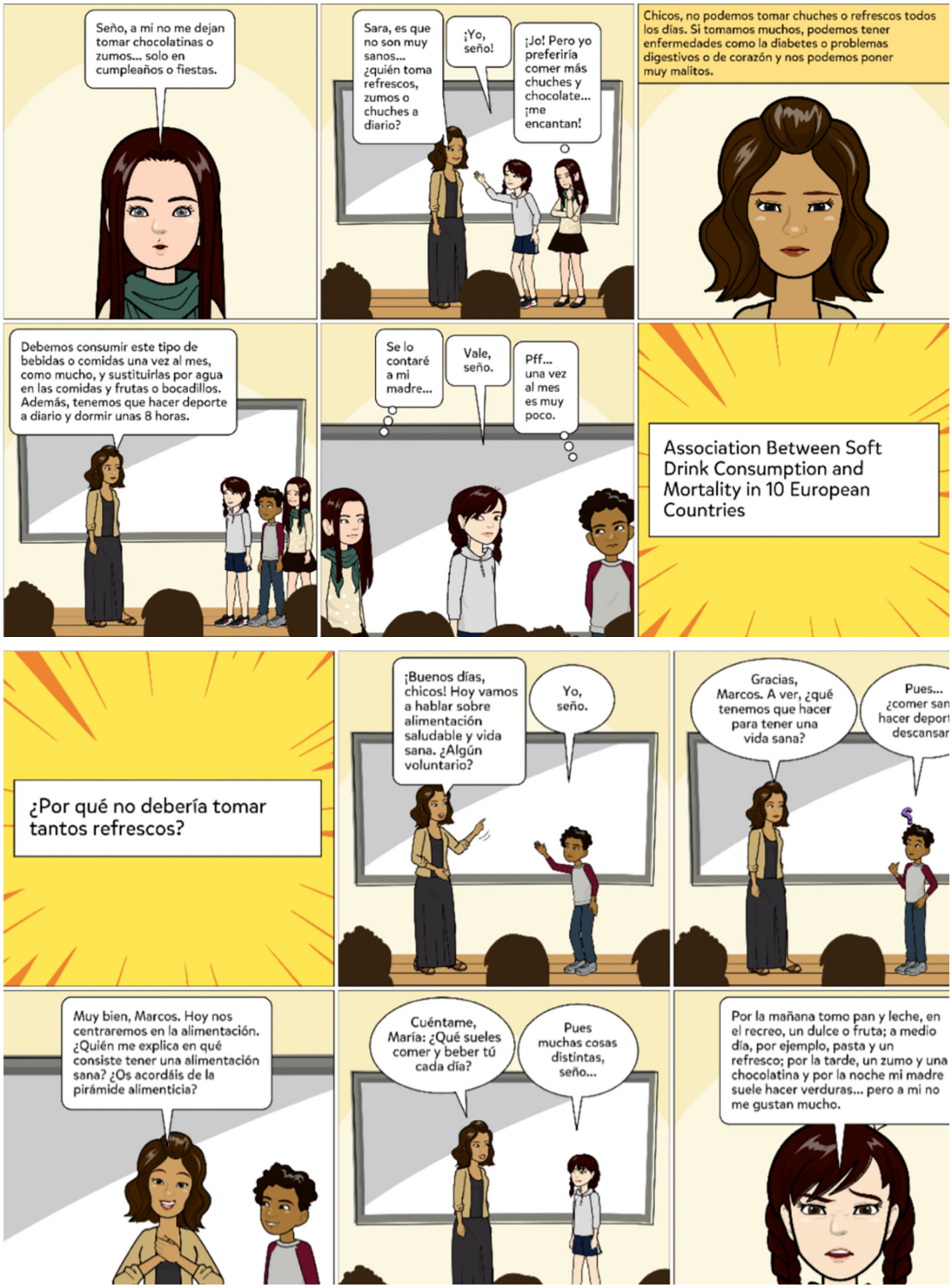
Appendix 1

Materials Evaluated by the Participants: Comic



Source: Cobos López (2022)

Materials Evaluated by the Participants: Text

¿Refrescos en una vida sana?

Es habitual que cuando los niños y las niñas quedáis con vuestros amigos para estar juntos, como para ir a comer o para ir a algún cumpleaños, toméis refrescos o algunos alimentos como chuches o chocolatinas. ¿Te has parado a pensar alguna vez en si deberías tomarlos? ¡Estás a punto de conocer la respuesta!

Tomar refrescos, chuches o chocolatinas puede ser malo para la salud. Pueden provocar problemas de salud como dolor de barriga, problemas de corazón o diabetes. ¡Puede que te encuentres muy mal si tomas muchos refrescos o chuches!

Aunque es verdad que los refrescos y las chuches pueden ser malos para tu salud, si tus amigos y tú quedáis para una ocasión muy especial, no pasa nada si os bebéis un refresco u os coméis alguna chuche o chocolatina. Eso sí: ¡para tener una vida sana, los puedes tomar, solamente, una vez al mes!

Estarás pensando: «¿entonces qué puedo comer o beber?». Los científicos recomiendan que te tomes agua, fruta o un bocadillo en lugar de refrescos o chuches.

¡No olvides que, para tener una vida sana, es esencial que practiques deporte a diario y que duermas, por lo menos, ocho horas todos los días!

Source: Hermán-Carvajal (2024)

Materials Evaluated by the Participants: Infographic

Source: Hermán-Carvajal (2024)

Appendix 2. Questionnaire Items in Spanish (Original Version)

Items used to evaluate each material

1. ¿Te gusta la forma en la que está presentado este [material]?

□ Sí □ No

2. Imagina que eres profe y tienes que ponerle una nota al texto. Si tuvieras que darle una nota desde 0 (no te gusta nada) a 10 (te gusta mucho) que indique lo que te gusta este texto, le darías un:

Escribe un número desde el 0 hasta el 10: _____

3. ¿Cómo de divertido o aburrido te parece este [material]?

□ Muy aburrido □ Aburrido □ Normal □ Divertido □ Muy divertido

4. ¿Cómo de fácil o difícil te parece este [material]?

□ Muy difícil □ Difícil □ Normal □ Fácil □ Muy fácil

5. ¿Qué es lo que más te ha gustado del [material]? Escríbelo aquí:

6. ¿Hay algo que no te haya gustado del [material]? Si hay algo que no te haya gustado, escríbelo aquí:

Global opinion items

¡Ya queda muy poco para terminar! Responde a las siguientes preguntas, marcando una de las respuestas en cada caso, salvo donde se indique otra cosa:

19. De todo lo que has tenido que leer, ¿qué te ha parecido lo más divertido?

□ Cómic □ Infografía □ Texto

20. De todo lo que has tenido que leer, ¿qué te ha parecido lo más aburrido?

□ Cómic □ Infografía □ Texto

21. De todo lo que has tenido que leer, ¿qué es lo que te ha gustado más?

□ Cómic □ Infografía □ Texto

22. De todo lo que has tenido que leer, ¿qué es lo que te ha gustado menos?

□ Cómic □ Infografía □ Texto

23. De todo lo que has tenido que leer, ¿qué te ha parecido más fácil?

□ Cómic □ Infografía □ Texto

24. De todo lo que has tenido que leer, ¿qué te ha parecido más difícil?

□ Cómic □ Infografía □ Texto

25. ¿Qué te gustaría tener en los libros del cole? (Aquí puedes marcar una o dos respuestas)

□ Cómic □ Infografía □ Texto

26. ¿Qué te gustaría que se usase más en el cole para enseñarte sobre temas de enfermedades y salud? (Aquí puedes marcar una o dos respuestas)

□ Cómic □ Infografía □ Texto

Appendix 3. Questionnaire Items in English (Translated Version)

Items used to evaluate each material

1. Do you like the way this [material] is presented?

□ Yes □ No

2. Imagine you are a teacher and you have to grade this [material]. If you had to rate it from 0 (you do not like it at all) to 10 (you like it a lot), what score would you give this [material]?

Write a number from 0 to 10: _____

3. How fun or boring did you find this [material]?

□ Very boring □ Boring □ Neutral □ Fun □ Very fun

4. How easy or difficult did you find this [material]?

□ Very difficult □ Difficult □ Neutral □ Easy □ Very easy

5. What did you like most about [material]? Write it here.

6. Is there anything you did not like about [material]? If there is something you did not like, write it here.

Global opinion items

You are almost done! Please answer the following questions, selecting one answer for each of them, except where otherwise indicated:

19. Out of everything you have read, which material did you find the most fun?

□ Comic □ Infographic □ Text

20. Out of everything you have read, which material did you find the most boring?

□ Comic □ Infographic □ Text

21. Out of everything you have read, which material did you like the most?

□ Comic □ Infographic □ Text

22. Out of everything you have read, which material did you like the least?

□ Comic □ Infographic □ Text

23. Out of everything you have read, which material did you find the easiest?

□ Comic □ Infographic □ Text

24. Out of everything you have read, which material did you find the most difficult?

□ Comic □ Infographic □ Text

25. What would you like to have in your schoolbooks? (You can mark one or two answers)

□ Comic □ Infographic □ Text

26. What would you like to be used more in school to teach you about health and illness topics? (You can mark one or two answers)

□ Comic □ Infographic □ Text