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Metaphors in Specialized Discourses In and Across Cultures

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Visual and Verbal Tropes in Medical Knowledge Dissemination: An English-Italian Cross-Linguistic Study of Lactose Intolerance Websites

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Abstract

The present research analyzes how websites run by clinics and hospitals disseminate medical knowledge on lactose intolerance and how they transmit complex concepts to a general audience by means of visual and verbal figurative tropes. In line with another investigation (Cesiri, forthc.), this study compares four healthcare institutions’ websites in English and four similar websites in Italian by identifying verbal figurative tropes using Lakoff and Johnson’s (1980) Conceptual Metaphor Theory (CMT), and Kövecses’s (2020) Extended Conceptual Metaphor Theory (ECMT), while visual tropes are analyzed through Kress and van Leeuwen’s (2020) model and then interpreted via CMT/ECMT. Results from the two sets of web pages are then interpreted using the concept of (inter)cultural dimensions (Hofstede, 2011) to account for the differences that may exist in the figurative representation of lactose intolerance to the different audiences. Findings reveal that popularization of lactose intolerance is not a culturally neutral process; rather, it is shaped by deeply embedded socio-cultural norms regarding authority and agency, thereby highlighting the necessity for health communicators to adapt multimodal strategies to local cultural expectations to ensure the effective dissemination of specialized medical knowledge across linguistic and cultural borders.

Keywords: Lactose Intolerance; Multimodal Figurative Tropes; (Extended) Conceptual Metaphor Theory; English; Italian; Intercultural Dimensions

1. Introduction

The numerous studies available on medical discourse have often investigated the constructive role that figurative language plays when transmitting specialist knowledge, especially in expert-patient communication (Rossi, 2025). Metaphors are rhetorical devices productively employed by clinicians, patients, and caregivers to conceptualize health and illnesses (Demjén and Semino, 2017); metaphors are also utilized in digital health discourse to navigate the complexities of medical uncertainty and patient engagement, showing that the concrete-to-abstract mapping remains a vital tool for making sense of technical or distressing information in the modern age (Plastina, 2022).

The way in which metaphors are employed to conceptualize illnesses and conditions has been investigated with greater frequency in certain cases more than others. Food allergies, for instance, seem to have attracted little attention with only a few contributions dedicated to how these conditions are conceptualized by means of metaphors, or figurative tropes in general. Recent studies have specifically conducted research on metaphors in food-related conditions in other fields than linguistics and have considered metaphor use in just one language: it is the case of Stjerna and Brady (2023), for instance, who examines the use of metaphors in baby food allergies as a sociological phenomenon in Swedish, while Dobbin-Williams (2024) investigates the use of metaphors in English in mothers with children and teenagers who suffer from life-threatening food allergies. In this case, metaphors are considered from a philosophical-hermeneutics perspective.

As concerns other food-related conditions, to the best of this author's knowledge, no studies are available that consider how expert-expert communication or expert-patients/-laypeople communication proceeds, be it literal or figurative. The present research, therefore, seeks to fill this gap by focusing on the specific condition known as lactose intolerance. In line with another contribution (Cesiri, *forthc.*), this study examines figurative language in four healthcare institutions' websites in English (*Mayo Clinic, the Cleveland Clinic, Johns Hopkins Medicine, the National Institute of Diabetes and Digestive and Kidney Disease*) and four similar websites in Italian (*IRCCS Humanitas Research Hospital, Ospedale Pediatrico Bambino Gesù, Istituto Superiore di Sanità, Fondazione Veronesi*). The aim is to analyze, qualitatively, how these websites – run by clinics and/or hospitals – disseminate medical knowledge on lactose intolerance and how they manage to transmit complex concepts to laypeople. Particular attention is paid to the use of visual and verbal

tropes when specialists describe the condition and its symptoms. Verbal metaphors are identified by means of Lakoff and Johnson's (1980) Conceptual Metaphor Theory (CMT), used as both theoretical framework and operational protocol to identify metaphors, and complemented by Kövecses's (2020) Extended Conceptual Metaphor Theory (ECMT) to interpret findings. Visual tropes are analyzed using Kress and van Leeuwen's (2020) model and then interpreted via CMT and ECMT. This combined approach allows the study to assess whether, and to what extent, the association of visual and verbal figurative expressions in the same communicative space facilitates the transmission of specialized concepts to lay audiences in English and in Italian, respectively.

Finally, considering that the state-of-the-art also presents a gap in the presence of comparative studies investigating food-related conditions, the present contribution interprets the results from the websites in English and those in Italian using Hofstede's (2011) (inter-)cultural dimensions to account for differences/similarities that might exist in the distribution of the tropes chosen to conceptualize lactose intolerance to the two corresponding audiences.

The present paper is structured as follows: Section 2 introduces lactose intolerance, describing it from the medical viewpoint. Section 3 explains the web pages included in the study and the methodology used to analyze them, while Sections 4 and 5 contain the analyses of the visual and verbal tropes. Section 6 elaborates results using the concept of (inter)cultural dimensions. Finally, Section 7 offers some concluding remarks.

2. Lactose intolerance: background information

Lactose intolerance is clinically defined as a “condition characterized by symptoms attributable to lactose malabsorption. This can be caused by a reduced or absent activity of lactase or by a reduced or absent synthesis of the same enzyme” (Catanzaro et al., 2021: 23). There are three types of lactose intolerance (del Carmen Toca et al., 2022): rare congenital primary (genetic, starts in infancy), common late-onset primary (genetic, permanent, starts in childhood), and late-onset secondary (temporary, non-genetic, caused by external factors, regressing with specific dietary changes). Typically, people with lactose intolerance experience symptoms such as pain, abdominal distension, abdominal gas, and diarrhea (*ibid.*).

“Epidemiological survey data show that 70% of the world’s population has some degree of lactase deficiency with ethnic and age differences in incidence” (Li *et al.*, 2023: 1).

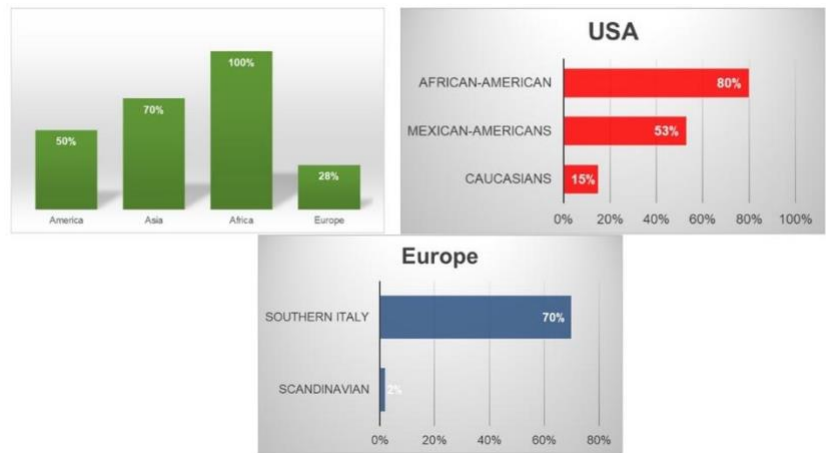


Figure 1. Incidence of Lactose Intolerance on Global Population (Catanzaro *et al.* 2021)

As Figure 1 shows, people with lactose intolerance concentrate on the African continent, with a direct link to the corresponding ethnicity, which also explains the marked presence of African Americans with this condition. Data provided for Europe reveal a predominance of people with lactose intolerance in Southern Italy.

Dekker *et al.* (2019) demonstrate that there has been a +7.5% increase in the number of lactose free dairy products marketed in the years 2017-2022 (Figure 2), which testifies the general interest of the market for these products.

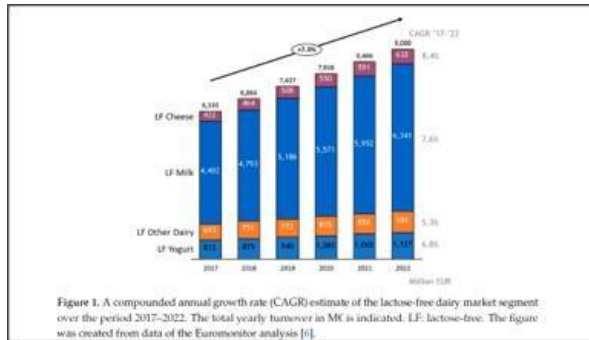


Figure 2. Graph on the production of lactose free products (Dekker et al. 2019)

This trend might be attributed to the global incidence of the condition but also to other diet choices that favor a lactose free diet since it is perceived as a healthier option even when no health-related conditions are present that would justify the elimination of lactose from one’s diet (*ibid.*).

The global incidence of lactose intolerance contrasts with a widespread public unfamiliarity with the condition (Di Stefano *et al.*, 2022): this would justify the numerous media outlets addressing the condition; for instance, a manual Google Search revealed more than 400 dedicated blogs and various commercial supplement websites offering medical advice, a significant informative role is played by clinics and hospitals. The present study specifically examines these institutional websites, in line with Cesiri’s (forthc.) research concerning the popularization strategies of domain-specific terminology on the condition. While the forthcoming study focuses on phraseology, the present contribution explores how expert websites disseminate specialist knowledge to laypeople with specific attention paid to visual and verbal tropes and how they are used to conceptualize complex medical data into accessible information for lay audiences in English and in Italian.

3. The present study: dataset and methodology

The eight websites from Cesiri (forthc.), four English and four Italian, were also used for the present investigation. Identified via Google searches⁶ for

⁶ To ensure the highest possible degree of replicability and to mitigate the effects of algorithmic personalization, searches were conducted on 13/01/2026 using incognito browsing mode with location services disabled.

lactose intolerance and its symptoms (i.e., ‘lactose intolerance/*intolleranza al lattosio*’; ‘lactose intolerance symptoms/*sintomi intolleranza al lattosio*’, respectively), these hospitals’ and clinics’ websites were the only ones appearing on the first results page for both languages. Consequently, all were included, with the English websites based in the USA⁷:

- the Mayo Clinic (<https://www.mayoclinic.org/diseases-conditions/lactose-intolerance/symptoms-causes/syc-20374232>; MC),
- the Cleveland Clinic (<https://my.clevelandclinic.org/health/diseases/7317-lactose-intolerance>; CC),
- the Johns Hopkins Hospital (<https://www.hopkinsmedicine.org/health/conditions-and-diseases/lactose-intolerance>; JHH),
- the National Institute of Diabetes and Digestive and Kidney Disease (<https://www.niddk.nih.gov/health-information/digestive-diseases/lactose-intolerance>; NIDDK).

The four websites in Italian are listed below. One pediatric hospital was included in the analysis since the web page addresses a general kind of audience composed of children, their families, as well as adult patients. Rather than focusing on isolated sections or specific images, the analysis considers the entire digital document – including headings, body text, and visual elements. This approach ensured that the figurative tropes were identified within their original structural and contextual environment.

- IRCCS Humanitas Research Hospital (<https://www.humanitas.it/malattie/intolleranza-al-lattosio/#:~:text=Il%20processo%20di%20fermentazione%20ricchi>

⁷ The NIDDK website content is copyright-free as specified on the institution’s website (<https://www.niddk.nih.gov/copyright>; last visited 13/01/2026). Despite extensive efforts, other US and Italian institutions have not replied to permission requests at the time of writing this article. The author welcomes notifications regarding copyright corrections for future amendments.

ama, testa%20sposatezza%20ed%20eruzioni%20cutanee; HRH),

- Ospedale Pediatrico Bambino Gesù (<https://www.ospedalebambinogesu.it/intolleranza-al-lattosio-80150/>; BG),
- Istituto Superiore di Sanità (<https://www.issalute.it/index.php/la-salute-dalla-a-alla-z-menu/i/intolleranza-al-lattosio>; ISS),
- Fondazione Veronesi (<https://www.fondazioneveronesi.it/educazione-alla-salute/glossario/lattosio>; FV).

Figures 3 and 4 show the web pages dedicated to lactose intolerance in English and in Italian, respectively, illustrating content organization of the visual and verbal components.

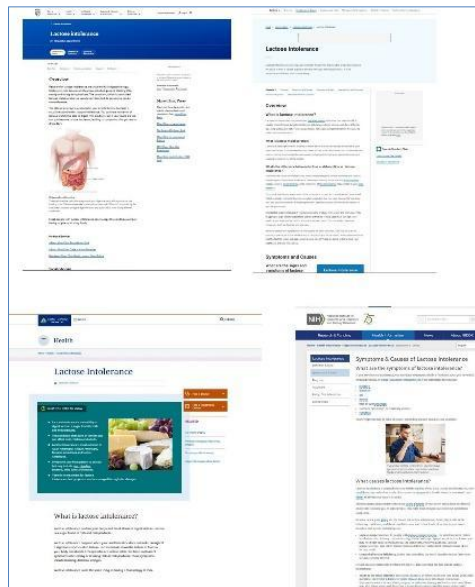


Figure 3. Web pages dedicated to lactose intolerance in English

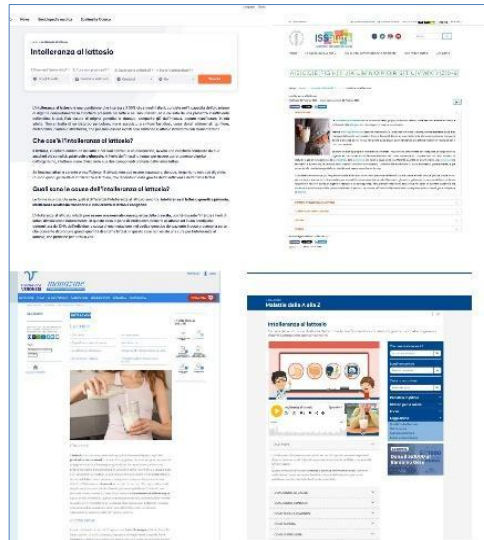


Figure 4. Web pages dedicated to lactose intolerance in Italian

The current analysis is divided into two parts: Section 4 and 5 explore how visual and verbal tropes separately conceptualize the condition. The broader question of how the multimodal organization of this content aids in knowledge dissemination is reserved for future study (see Section 7).

In order to identify the visual tropes, images depicting the condition, its symptoms, and remedies were analyzed using Kress and van Leeuwen's (2020) model. This framework explores how images construct symbolic meanings and metafunctions through a visual grammar. Specific attention is paid to colors and figures as semiotic resources communicating complex socio-cultural meanings. Color is evaluated via six parameters (saturation, luminescence, differentiation, modulation, purity, and hue) that in the model fulfil ideational, interpersonal, and textual functions. Simultaneously, represented participants are categorized into narrative or conceptual structures based on vectors. Narrative processes depict dynamic doing, while conceptual processes represent a stable essence through classificatory or symbolic arrangements, such as carrier and possessive attributes. Finally, the model considers the interpersonal relationship established through the gaze, defining the social and psychological connection between the represented participants and the viewer.

Any instances of tropes identified in the images were further interpreted using Lakoff and Johnson's (1980) CMT and its further elaboration, Kövecses's (2020) ECMT. This ensured the identification of

the domains used to conceptualize the condition in English vs. in Italian. CMT was also employed to identify and analyze the verbal metaphors in the web pages in the two languages.

CMT argues that metaphors are fundamental cognitive tools structuring human thought, maintaining that our conceptual system is inherently metaphorical and facilitates the understanding of abstract target domains through systematic mappings from concrete source domains. This foundational view has later been refined by scholarship, which moves beyond purely cognitive internalism to address the functional and social dimensions of metaphorical language. For instance, Semino (2008) emphasizes the necessity of analyzing metaphors within actual discourse, illustrating how they are not just mental mappings but can be strategically deployed across different genres – such as literature, politics, and science – to shape specific ideological perspectives and emotional responses. Steen (2017) also distinguishes between automatic, subconscious cognitive mappings and those metaphors used intentionally as a communicative device to shift a listener's perspective, thereby highlighting the complex interplay between thought and conscious interaction. In line with these interpretations, Kövecses (2020) further expanded CMT by emphasizing contextual variation. While some metaphors are near-universal due to shared physiology, he postulated that their manifestations are shaped by cultural and personal history through the so-called pressure of coherence. Therefore, ECMT argues that metaphors are both products of the body and reflections of the speaker's specific environment.

As a foundational approach to the study of metaphors, CMT can be used as both a theoretical framework and an operational protocol for investigating cognitive structures (Lakoff and Johnson, 1980). Theoretically, as already explained, CMT posits that metaphors are not merely stylistic creative devices but are fundamental mechanisms of thought that map concrete source domains onto abstract target domains. Methodologically, it functions as an operational protocol, which provides systematic, step-by-step criteria for distinguishing metaphorical from literal language by comparing a lexical unit's contextual meaning against its more basic, concrete, or historically prior sense (Lakoff and Johnson, 1980). This dual nature makes CMT a particularly suitable choice for cross-cultural and intercultural studies as it allows researchers to identify metaphors rooted in shared human experience while providing a standardized system to detect linguistic variations (Kövecses, 2005; Li, 2023).

In fact, to identify a metaphor, Lakoff and Johnson (1980) apply a specific method, which consists in first isolating a Target Domain, which is typically an abstract or complex concept, and then observing how it is described using the vocabulary and logic of a more concrete or physical Source Domain. The operational center of this method involves tracing systematic correspondences, or mappings, where the internal structure of the Source Domain is superimposed onto the Target Domain to allow for reasoning. Subsequently, Lakoff and Johnson (*ibid.*) indicate to look for clustering and consistency in language to prove that these are not isolated instances but part of a pervasive system that shapes how we perceive and act within the world. By analyzing these cross-domain mappings, they demonstrate that the metaphorical nature of an expression is confirmed when the logic of the physical world (the Source) is used to govern the inferential patterns of the abstract world (the Target), thereby revealing the underlying conceptual framework that organizes human experience (*ibid.*).

After the application of this method to identify the verbal metaphors used in the web pages, and to account for the possible distinctions of intercultural communication, this study integrates the findings from the applications of CMT with the use of Kövecses's (2020) ECMT. ECMT expands the traditional CMT's focus on static, pre-stored mappings by emphasizing real-time production driven by the so-called 'pressure of coherence' with one's surroundings. This involves four context types: Situational Context (physical, social, and cultural environments), Discourse Context (linguistic surroundings and topics), Bodily Context (the speaker's immediate physical state), and Conceptual-Cognitive Context (shared ideologies and cultural models). ECMT explains how specific communicative environments creatively influence metaphor selection, connecting universal thought with diverse linguistic applications (*ibid.*).

Therefore, while CMT is used in this study to identify the domains in which visual and verbal metaphors conceptualize lactose intolerance, ECMT is used to identify the contexts to which these metaphors are preferably assigned in English vs Italian. Finally, differences in the results from the English and Italian websites are discussed taking into consideration elements of (inter-)cultural dimensions (Hofstede 2011; see Section 6) to account for differences/similarities that might exist in the distribution of the metaphors chosen to conceptualize lactose intolerance to the audiences in English and in Italian.

4. Visual Tropes⁸

4.1 The Web Pages in English

Starting with the analysis of the visual metaphors in the MC's web page dedicated to lactose intolerance, the only image offered to the audience is the one in Figure 5.



Figure 5. Illustrating lactose intolerance by MC

The image is composed using an abstract modality rather than a naturalistic one (Kress and van Leeuwen, 2020). While colors are not naturalistic, they possess high modality in the medical context through effective color coding for lay audiences. Furthermore, the figure is a stylized human torso: by removing specific individual traits, the designer ensured that the representation remained universal. Even though the figure appears to be a male, this allows readers to project themselves onto the diagram. Consequently, they better understand their own digestive processes and the

⁸ In order to clarify the nomenclature of the tropes used in this study, metaphors are considered as in CMT (Lakoff and Johnson, 1980), which formally defines them as a cross-domain mapping where one conceptual domain (the target) is understood in terms of a different, typically more concrete, domain (the source; see also Landau, 2018 and Müller *et al.*, 2022). Metonymy is defined as a mapping that occurs within a single conceptual domain or Idealized Cognitive Model (ICM). It relies on contiguity, or a 'replacement' relationship where one entity provides mental access to another entity with which it is physically or conceptually associated (Littlemore, 2015). Finally, synecdoche is traditionally viewed as a subcategory of metonymy and is operationalized as a 'part-whole' or 'whole-part' relationship within the same domain (Seto, 1999).

specific mechanisms involved in lactose intolerance. This abstraction facilitates clear knowledge transmission regarding the condition. The image is, in fact, used to represent the organs/system involved in lactose intolerance. However, this is the only image available to illustrate the whole condition, so rather than a visual metaphor, we might consider it a visual synecdoche (Willerton, 2005), namely one image used to indicate the entire condition, i.e., one image representing the system/organs involved in generating the symptoms, where the enzyme is (not) produced, and the location of the condition itself.

The second web page under analysis is the one by the CC, which contains three images that describe different aspects of the condition. They are reported and analyzed in the same order as they are found on the web page.

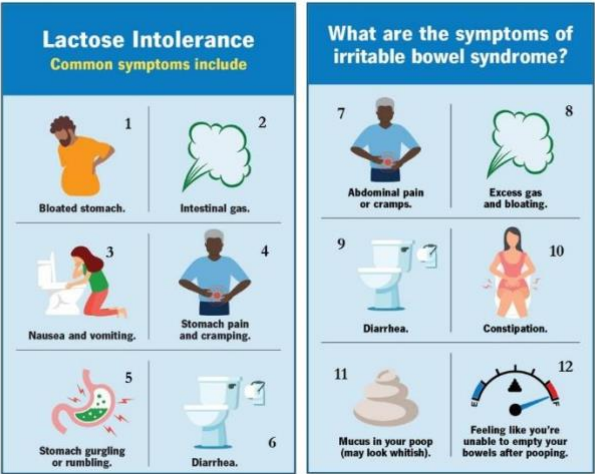


Figure 6. Illustrating symptoms of lactose intolerance (CC)

Figure 6 displays the first two CC images, summarizing lactose intolerance symptoms. The low-saturation, dull colors and blue background may evoke serenity, counteracting negative emotions regarding the condition (Kress and Van Leeuwen, 2002), as confirmed by cross-cultural studies on the impact of this color on human emotions (Güneş and Olguntürk, 2020; Xu, 2025). The human figures utilize abstract modality, while the stylized forms enhance conceptual structures over concrete anatomical details. This abstraction fulfills the Interpersonal Function of Shaping Interaction by creating psychological distance between viewers and participants (Kress and van Leeuwen, 2020). This level of objectivity encourages a detached

experience, allowing the web page to transmit specialist medical content more effectively. Ultimately, these visual choices prioritize the clear communication of underlying concepts rather than realistic surface appearances.

As for the visual tropes, we notice that several rhetorical devices are used to indicate symptoms⁹. Square 1 may be considered a literal representation since it refers to bloated stomach and represents a man with an actual bloated belly, while square 11 displays almost realistically what the audience should expect to see. Squares 2 and 8, 3, 6 and 9 might be considered cases of visual euphemisms that Van Winkle (2024: 54) defines as “a trope [that] enables the depiction of things that, because they are taboo, graphic or unsightly, would otherwise be difficult to show”. In Figure 6, all visual euphemisms are used to refer to products and sounds of the human bowels that, amongst the bodily functions, are generally considered taboos (Chan et al., 2023).

The symptoms shown in Squares 4 and 7, 5, and 12 are cases of visual metaphors. Squares 4, 7, and Square 5 show stomach pain and cramping, and stomach gurgling/rumbling, which are illustrated with symbols of alarm: they can all be conceptualized as LACTOSE INTOLERANCE STOMACH SYMPTOMS ARE THREAT, which is signaled not only by the lightning bolt symbol – typically used to represent danger or high voltage – but also by the posture of the human figures. Their hands are held over their abdomens as if shielding themselves from the onset of cramps and pain. On the other hand, Square 12 displays the feeling of not fully emptying one’s bowels as a tachometer, thereby conceptualizing the symptom as the metaphor INTESTINE IS VEHICLE (ultimately a representation of BODY IS MACHINE metaphor). The interpretation of Square 10 remains ambiguous. Displaying constipation, it might be a visual euphemism, yet alarm symbols appear to conceptualize lactose intolerance symptoms as danger, evoking cramps. A woman on a toilet links it to Squares 6 and 9, despite depicting the opposite phenomenon, thus indicating non-figurative meaning. Consequently, this symptom’s communicative effectiveness fails, appearing redundant or confusing.

According to ECMT (Kövecses, 2020), these tropes can be immediately assigned to the Bodily Context since they describe, figuratively, the physical sensations that lactose intolerance creates in the patients.

⁹ The image in Figure 6 (right) shows Irritable Bowel Syndrome (IBS) symptoms, included because the CC web page links IBS with lactose intolerance due to overlapping symptoms.

However, the metaphors can also be assigned to the Situational Context constituted by the medical environment in which the tachometer is a precision instrument used to measure performance and limits.

Finally, Figure 7 is the last one to appear in the web page and shows the kind of food suggested as viable alternatives that help to reach the daily quota of calcium and other nutrients contained in dairy products.



Figure 7. Plant-based alternatives to dairy products (CC)

The composition of Figure 7 is meaningful, following Kress and van Leeuwen (2020): the milk bottle occupies the center that, in the model, represents the most important element of an image to which all other elements are secondary. The margins of the image are occupied by the representations of the different kinds of vegetable elements that are the dependent elements that provide context and explain the center by showing the various plant-based alternatives to the animal-produced milk. In this representation, the bottle has the highest salience due to its central placement, its larger size, and the contrast of the bright white against the blue background. Colors are saturated, mostly flat with very little shading. Low modulation reduces naturalism and increases the abstract modality (*ibid.*). In this image, both the bottle of milk and the individual plant-based elements can be figuratively considered cases of visual synecdoche, whereby a single image or object is used to represent something else with which it is closely associated or of which it is a part (Hawkins, 2013). This means that the image is not seeking to show viewers specifically milk but represents dairy products in general, while the other plant-based alternatives represent products derived from the corresponding nuts, cereals or legumes, respectively.

The JHH web page contains only one image that is shown in Figure 8, preferring to explain the condition through verbal descriptions. In the

web page this photograph appears next to the text that first defines the condition to the audience.



Figure 8. Dairy products as symbols of lactose intolerance (JHH)

Compositionally speaking, the use of a green background for the whole page might be in association with the natural products of milk. According to Kress and Van Leeuwen (2002), this is the most widespread association of green in many cultures, deriving from its presence in plants, forests, and spring landscapes. It can also symbolize freshness and vitality in contrast with the processed foods that some kinds of cheese might represent and the message to choose healthier and simpler diet options.

JHH chose a real photograph of several kinds of cheese to represent dairy products, which may be interpreted both in its literal, non-figurative sense, since they are the actual kinds of food that trigger symptoms, and as a case of visual metonymy, suggesting an association with the condition as a whole.

The NIDDK web page dedicated to the condition contains seven images to illustrate the condition. The web page is divided into sub-sections that can be accessed via a menu available on the left-hand side of the main page.



Figure 9. Images from the General Introduction (left) and Definition Section (right) (NIDDK)

Figure 9 shows the same image that is, however, displayed in two different sections of the NIDDK web page: the General Introductory Section and the Definition Section, respectively.

Real photographs of dairy products such as milk, yogurt, and cheese appear in a kitchen setting. Highly saturated colors and naturalistic modality anchor these images to reality. While displaying actual trigger foods, they also function as visual metonymies. Positioned in the condition's introduction and definition sections, these pictures serve to create a direct association with the condition.

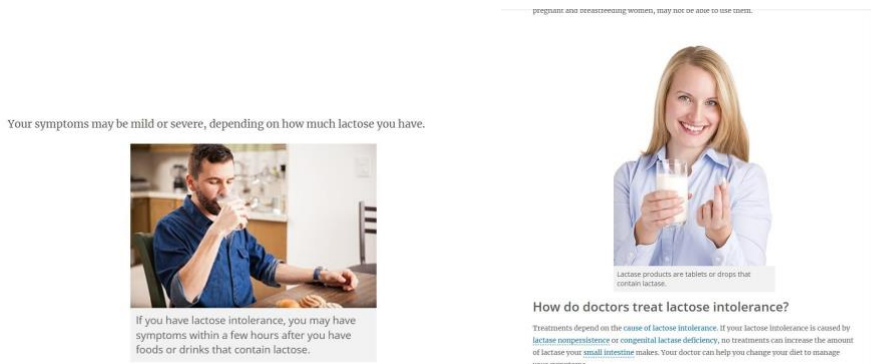


Figure 10. Images from the Symptoms (left) and Treatment (right) Sections (NIDDK)

The two images in Figure 10 are taken, respectively, from the Symptoms and Treatment Sections; they use real photographs, enhancing naturalism. They feature a man and a woman with significant distinctions. Figure 10 (right) displays a so-called offer image (Kress and van Leeuwen, 2020), in which the man avoids direct eye contact with the viewer, focusing instead

on drinking his milk. This style offers the participant to the viewer's gaze without creating direct interaction. Consequently, the viewer remains an objective observer. Such imagery is standard for web pages aiming to provide purely informative content (*ibid.*). The second image (left) in Figure 10 exemplifies demand images. Here, the smiling woman features the represented participant looking directly at viewers to establish immediate relationship. This gaze demands attention, positioning the viewer as a direct recipient. Used to convey intimacy, threat, or appeal, this technique here functions as an invitation (Kress and van Leeuwen, 2020). It encourages people with lactose intolerance to use supplements, promising they can enjoy milk without symptoms, just like her.

Figuratively speaking, both pictures can be considered cases of visual metonymy since the actions symbolized by the participants are associated with the corresponding effect related to the condition. Drinking milk (left image) can be metonymically associated with symptoms, while the sequence Pill-Milk-Smiling Woman (right image) in the section dedicated to Treatment can be a metonymy for the supplements used to integrate the missing enzyme that allow people with lactose intolerance to drink milk.



Figure 11. Images from the Diagnosis (left), and Eating, Diet, and Nutrition (center and right) Sections (NIDDK)

The last three images available for the NIDDK web pages are from the Diagnosis section, and from the Eating, Diet and Nutrition Section. The Diagnosis photograph (left) displays a doctor and patient in conversation.

Since neither looks at the viewer, the audience observes an intimate, projected scene. This composition transmits a sense of reassurance, portraying a future medical appointment where patients feel heard. The patient's smile and relaxed posture, alongside the doctor's explanation, symbolize a path toward healing. It can also be considered a visual synecdoche, which uses the clinical interview to represent the entire process of recovery. The central image features a boy gazing at the viewer, building intimacy. His smile implies safety, suggesting the bowl contains lactose-free food. This serves as visual synecdoche, where the bowl represents the specific products listed in the text below. The third image (right) employs both synecdoche and metonymy: specific items represent an entire lactose-free, calcium-rich diet, while the food itself is directly associated with the essential minerals it provides for the body.

4.2 The Web Pages in Italian

The HRH and the FV web pages in Italian do not present any images, pictures or photographs on their websites, so the analysis of the visual metaphors focuses on the images and photographs available on the BG on the ISS web pages.



Figure 12. Images from the BG's website illustrating lactose intolerance

Figure 12 shows the only two images available on BG web page. They are available at the top of the page, immediately after the title "*Intolleranza al lattosio*" (lit., Lactose Intolerance) and a subtitle explaining in two sentences what the condition is. No caption accompanies the images. Even though the page and the textual contents are dedicated to a general, lay audience,

not specifically to children, the pictures are aimed at a younger audience. The use of moderately saturated, not modulated colors increases the level of abstract modality. The human figures, although drawn as comic-like characters, are depicted with enough detail to recognize a boy and a doctor. So, they are naturalistic enough to count as real (Kress and van Leeuwen, 2020) and be understood by an audience of young children.

In terms of figurative language both pictures use visual synecdoche to represent the condition and the process of diagnosis (left), as well as its unpleasant symptoms (right) expressed by means of the photograph representing a seemingly unhappy child while he sips milk with a straw. The connection here is created by the symptoms generated by the whole condition and the sad attitude of the child while drinking one kind of dairy product.



Figure 13. Image from the ISS's website illustrating lactose intolerance

Similar associations are made by the ISS on its web page but in a more direct way. The photograph provided in Figure 13 is the only image present and illustrates a woman holding her belly as if in pain. The composition of the image does not show the represented participant's gaze or facial expression. She wears a grey jumpsuit, and grey has a negative valence, being associated with miserable and bleak emotions (Goodhew and Kidd 2020), in the image to be associated in turn with the negative physical symptoms generated by lactose intolerance, symbolized by the glass of milk that the woman is holding in her hand. The figurative tropes contained in this image are both visual metonymy and visual synecdoche. The former is identifiable in the glass of milk and the hand on the stomach, representing dairy products and lactose intolerance symptoms, respectively; in the latter the single image stands for the whole condition, its symptoms and the cause-and-effect narrative generated by the glass of milk and the hand gesture on the abdomen.

5. Verbal Metaphors

Verbal metaphors were identified manually from eight web pages and categorized into domains. Results are presented in four tables: two for English (Table 1 and 2) and two for Italian (Table 3 and 4), focusing on the condition and symptoms, respectively. Each table displays the conceptual domain (Metaphor columns), the specific textual conceptualization (Conceptualization columns), and the website source (Website columns), using the abbreviations established in Section 3.

Starting from the web pages in English, the literal description of the condition and its symptoms prevails over the figurative one. Over a total of 9,879 words used to present the condition to the lay audience, metaphors were found in expressions that occupy 107 words to describe the condition, while its symptoms are found in expressions that count a total of 30 words. While this study is a qualitative investigation based on multimodal discourse analysis, we might use these raw figures to value the preference for literal expressions that practitioners show to verbally disseminate specialist knowledge on lactose intolerance.

The verbal metaphorical expressions that could be identified in the web pages to describe the conditions are illustrated in Table 1. Occasionally, one sentence contains two metaphorical expressions that were differentiated by adding emphases (bold type/italics) as indicated in the Metaphor column. Then, the corresponding Conceptualization is highlighted with the same type of emphasis in the relative column.

As already mentioned, the examples contained in the Tables are all the metaphorical expressions that could be identified in the texts. The metaphors identified in the web pages reveal a certain preference for the conceptualization of the impact that lactose intolerance has on the human body and the specific organs involved in/by the condition. The prevailing metaphors are BODY IS MACHINE and DIGESTION IS MOVEMENT, which might be identified in greater detail with DIGESTION IS MOVEMENT FORWARD. The former is not a novel concept in medical discourse, being on the contrary a well-established metaphor with conceptualizations found in all medical areas (Navarro I Ferrando, 2021). In particular, the description of how lactose intolerance works is conceptualized by means of the verb ‘to break down’, which transmits the idea of a machine destructing rather than building components. The only exception being the example from NIDDK in which the concept of building something by the body (“your small

intestine **makes** low levels of lactase”) is, however, associated with negative connotations of the low level of the enzyme.

The second identified metaphor DIGESTION IS MOVEMENT expresses the idea of a movement forward, when nutrients are passed from one point of the intestine to the next one. In the example the idea is the movement of nutrients as if along an assembly line. Hence, it might be considered a sub-conceptualization of the BODY IS MACHINE metaphor with a ‘supra-level’ metaphor that we can identify with HUMAN BODY IS FACTORY.

METAPHOR	Conceptualization	Website
DIGESTION IS MOVEMENT/DIGESTION IS MOVEMENT (FORWARD)	What isn’t absorbed by the intestines <u>continues along</u> the digestive tract and is passed as stool during a bowel movement.	MC
BODY IS MACHINE	Lactose intolerance occurs in people who lack the enzyme they need to break down lactose, the sugar in milk	CC
BODY IS MACHINE + DIGESTION IS MOVEMENT (FORWARD)	Your small intestine breaks nutrients down into smaller molecules that <u>can pass through the intestinal wall into your bloodstream</u> .	CC
BODY IS MACHINE	Lactose intolerance is when your body can’t break down or digest lactose.	JHH
BODY IS MACHINE	a condition in which your small intestine makes low levels of lactase and can’t digest all the lactose you eat or drink	NIDDK
BODY IS MACHINE	your small intestine cannot digest, or break down , all the lactose you eat or drink.	NIDDK

Table 1. Verbal metaphors defining the condition in the websites in English

However, the metaphors and their conceptualizations are all presented in a negative context. From the machine that breaks down components, instead of building them, to the production of low levels of lactase, and ending with a long list of nutrients that transmits an idea of unproductive motion, the connotations that are associated with verbal metaphors to describe lactose intolerance seem to conceptualize the condition negatively in contrast with the disseminating aim of the web page that is to spread knowledge on the condition, support patients during the diagnosis, and improve the patients’

general quality of life. The predominantly negative conceptualization of lactose intolerance in these texts is evidenced by the consistent use of negative grammatical constructions and descriptors of deficiency. Expressions such as ‘break down’ are not inherently pejorative, however they are systematically paired with negative polarity (e.g., ‘cannot digest’, ‘can’t break down’, or reference to the production of ‘low levels’ of lactase). This recurring pattern of “negated capacity” (Fairclough, 1992), whereby the biological process is framed not as a neutral variation, but as a mechanical failure of the body-as-machine. Such a persistent focus on what the body cannot do creates a conceptual subtext of dysfunction. This linguistic framing contrasts with the disseminating aim of these web pages, which is to inform patients; instead, the reliance on deficit-based language (what patients cannot do) may inadvertently reinforce a stigmatized view of the condition as a state of permanent biological inadequacy (Zhu and Smith, 2021).

As for the verbal metaphors employed to illustrate the symptoms created by the condition, the metaphors found in the web pages are drawn from different domains, which include descriptions of how the body can change (SYMPTOMS ARE MOVEMENT), connections with the patients’ emotional sphere (SYMPTOMS ARE EMOTIONS) or with the natural world (HUMAN ORGAN IS ANIMAL/HUMAN ORGAN IS WEATHER PHENOMENON).

METAPHOR	Conceptualization	Website
SYMPTOMS ARE MOVEMENT	bloating	MC
SYMPTOMS ARE EMOTIONS	It causes digestive distress when you eat dairy products	CC
SYMPTOMS ARE SOUNDS/HUMAN ORGAN IS WEATHER PHENOMENON	Stomach gurgling or <u>rumbling</u>	CC

SYMPTOMS ARE EMOTIONS/<u>SYMPTOMS</u> <u>ARE PERSONS</u>	Lactose intolerance symptoms can be unpleasant , but they <u>won't hurt you</u>	JHH
HUMAN ORGAN IS ANIMAL/<u>HUMAN</u> <u>ORGAN IS WEATHER</u> <u>PHENOMENON</u>	stomach “growing” or <u>rumbling</u> sounds	NIDDK

Table 2. Verbal metaphors describing symptoms in the websites in English

While terms such as ‘bloating’ and ‘distress’ are embedded in standard medical nomenclature (e.g., Melchior *et al.*, 2025), their conceptual roots are fundamentally metaphorical. As established in by CMT (Lakoff and Johnson, 1980), as well as by Semino (2008), describing a physiological state through kinetic or affective domains – such as in the mappings SYMPTOMS ARE MOVEMENT OR SYMPTOMS ARE EMOTIONS – is a prime example of how abstract bodily sensations are rendered intelligible through concrete source domains. The term ‘bloating’, for instance, does not merely denote a clinical state but metaphorically maps the internal gas pressure onto the domain of physical expansion and outward motion (Gibbs Jr, 2005). Similarly, the use of ‘distress’ to categorize a physical reaction to lactose represents a metaphorical shift from a physiological symptom to a psychological emotion domain. Therefore, they are not merely conventional, literal descriptions but metaphors that structure the way both experts and laypeople conceptualize the experience of illness.

In addition, two metaphorical domains are particularly worth noting. The metaphor HUMAN ORGAN IS ANIMAL/HUMAN ORGAN IS WEATHER PHENOMENON is used to conceptualize the symptoms by associating the sounds that the stomach produces while it processes lactose and natural phenomena or animals in a way that patients process complex, specialized concepts by means of their real-life experience, which is the function that Gotti (2003) assigns to metaphors in popularizing texts.

SYMPTOMS ARE EMOTIONS, on the other hand, bases the description of the symptoms on the patients’ personal interpretation. Conceptualizations of the condition rely on terms such as ‘distress’ and ‘unpleasant’, descriptors whose perception is inherently idiosyncratic and varies from patient to patient. Consequently, from the perspective of

medical dissemination, such terminology introduces a degree of vagueness and interpretive subjectivity that may conflict with the lay reader's expectations. As Callon (1999) suggests, lay readers seek to rely on the authoritative knowledge of experts to reduce uncertainty; however, the use of imprecise affective descriptors rather than concrete clinical indicators may inadvertently undermine this expert-layperson trust and treatment effectiveness (Peter *et al.*, 2024). While arguably a 'user-friendly' strategy, this lack of terminological precision may fail to provide the objective clarity required for practitioners to accurately inform the public on the physiological realities of lactose intolerance.

Applying ECMT to the verbal metaphors in English, we can argue that metaphors identified in the web pages in English can be assigned to Kövecses's (2020) Bodily Context and Situational Context. Kövecses (2020) argues that our physical, embodied experience acts as a prime for metaphor; since most of the metaphors conceptualize the condition in terms of movement, sound, and emotions, they are drawing directly from the physical and physiological state of the patient, while those metaphors that describe the condition associating it with animals and persons can be assigned to the Situational Context. In fact, according to ECMT, the Situational Context refers to the external environment, the participants in the discourse, and the social roles they play. When the web pages use persons or animals, or the natural world in general, they are shifting from what is felt internally by the patients to how the condition behaves as an external entity in a social situation. In more general terms, we could say that all conceptualizations of lactose intolerance are governed by the Conceptual-Cognitive Context since all the metaphors identified are part of a pre-existing, stable knowledge structure and ideological framework within medical discourse, as is testified by the use of the well-established metaphor BODY IS MACHINE.

This type of metaphor also prevails in the web pages in Italian. All the examples provided in Tables 3 and 4 are the metaphors that could be identified in the web pages. The texts in the web pages in Italian emphasizes keywords in bold type. For this reason, the examples reported contain emphases as in the original. The metaphorical expressions are underlined, while the text in Italian is provided in italics, followed by its translation in English. The translation is as literal as possible to help readers appreciate the meaning of the original expression. Occasionally, as in the case of *disturbi* the closest translation would be 'distress'. However, in this case, the

metaphorical force would be lost and the alternative (albeit not perfectly semantically matching) was provided in brackets, i.e., ‘disturbance’.

In Table 3 we observe that, when describing lactose intolerance, practitioners conceptualize it almost exclusively in terms of the metaphor BODY IS MACHINE, already seen in the web pages in English, testifying its well-established role in defining the functioning of the human body in medical discourse, regardless of the national language in which the specialist writes.

METAPHOR	Conceptualization	Website
SYMPTOMS ARE MOVEMENT	bloating	MC
SYMPTOMS ARE EMOTIONS	It causes digestive distress when you eat dairy products	CC
SYMPTOMS ARE SOUNDS/HUMAN ORGAN IS WEATHER PHENOMENON	Stomach gurgling or <u>rumbling</u>	CC
SYMPTOMS ARE EMOTIONS/SYMPTOMS ARE PERSONS	Lactose intolerance symptoms can be unpleasant , but they <u>won't hurt you</u>	JHH
HUMAN ORGAN IS ANIMAL/HUMAN ORGAN IS WEATHER PHENOMENON	stomach “growling” or <u>rumbling</u> sounds	NIDDK

Table 3. Verbal metaphors defining the condition in the websites in Italian

Even when proteins are defined in terms of speed and catalysts, so through the metaphor MOLECULES ARE VEHICLES, this metaphor can in turn be considered a sub-category of the main metaphor BODY IS MACHINE. Describing proteins in terms of ‘speed’ and ‘catalysts’ invokes a specific

conceptual mapping where molecules are conceptualized as vehicles operating within a mechanical system. This framing aligns with established linguistic theories in scientific discourse (Temmerman, 2000; Knudsen, 2003) positing that the use of kinetic descriptors to explain biochemical functions can indeed be considered a sub-category of the overarching metaphor BODY IS MACHINE. By focusing on the velocity of a reaction rather than just the chemical transformation, the discourse implicitly adopts a source domain of transportation and mechanics to render the microscopic processes of the body more tangible. Temmerman (2000), in particular, argues that these metaphors can be considered lexicalized metaphors (i.e., dead metaphors). However, this is not confirmed by Knudsen (2003), so these metaphors may still structure our conceptual understanding of biological functions as figurative mechanical processes.

On the other hand, with the metaphor BACTERIA ARE PERSONS the conceptualization refers to lactose as being digested by bacteria. In this case, bacteria are given attributes that are characteristic of a more complex organ, typical of a human being, hence they are being personified into more complex entities to explain what kind of process they apply to lactose.

As regards symptoms, it is interesting to notice that, again, an inanimate object is being personified and assimilated to a living organism in the metaphor HUMAN ORGAN IS PERSON (*pancia che brontola*/rumbling belly) through which an anatomic part (“*pancia*”) is given the ability of a speaking person (“*brontola*”).

METAPHOR	Conceptualization	Website
SYMPTOMS ARE MOVEMENT	bloating	MC
SYMPTOMS ARE EMOTIONS	It causes digestive distress when you eat dairy products	CC
SYMPTOMS ARE SOUNDS/HUMAN ORGAN IS WEATHER PHENOMENON	Stomach gurgling or <u>rumbling</u>	CC

SYMPTOMS ARE EMOTIONS/<u>SYMPTOMS ARE PERSONS</u>	Lactose intolerance symptoms can be unpleasant, but they <u>won't hurt you</u>	JHH
HUMAN ORGAN IS ANIMAL/<u>HUMAN ORGAN IS WEATHER PHENOMENON</u>	stomach “growling” or <u>rumbling</u> sounds	NIDDK

Table 4. Verbal metaphors defining symptoms in the websites in Italian

Through another metaphor (HUMAN ORGAN IS WEATHER PHENOMENON), the sounds that stomach and bowel movements produce while digesting lactose are associate to natural phenomena such as rumbling (as if during a thunderstorm) and meteorism, whose etymology assimilates flatulence to strong winds (“Meteorism”, 2026).

All remaining metaphors conceptualize the symptoms of lactose intolerance in terms of human emotions (SYMPTOMS ARE EMOTIONS). In particular, it is worth noting the use of “*disturbi*”, which in English is usually translated into distress; in the Italian texts, it is used with the connotation of ‘disturbances’ since in other cases ‘symptoms’ is also used as variant and synonym, as in this example from the ISS’s web page (“*i disturbi (sintomi) dovuti ad una intolleranza alimentare*”/“disturbances (symptoms) of a food intolerance [...]”), illustrative of other instance found in other web pages in Italian. The term appears to carry a more emotionally charged connotation – evoking notions of ‘disturbance’ or ‘affliction’ – rather than serving as a strictly neutral equivalent to ‘symptoms’. While a comparative analysis of patient versus practitioner perspectives is required to validate this hypothesis, the pejorative undertones of the term are supported by its use in sensitive medical categories. For instance, its presence in conditions like ‘*disturbi alimentari*’ (eating disorders) and ‘*disturbi della personalità*’ (personality disorders) links the terminology to conditions burdened by significant social stigma (Aviram *et al.*, 2006; Easter, 2012).

Finally, the use of “*tolleranza*” (“tolerance”) is also worth examining. The term is opposite of *intolleranza* (intolerance, as in lactose intolerance) and is specifically used to indicate resistance to lactose or the ability to digest lactose. However, as in the case of FV, another alternative would be available, i.e., “*tollerabilità*” (lit., tolerance). In the specific web page, under

the section “*Variabilità dell’intolleranza al lattosio*” (“Variability of lactose intolerance”), we find the sentence “In ogni caso, la **tollerabilità può variare** da persona a persona” (“In any case, tolerance can vary from person to person”; emphases as in the original in Italian), offering an alternative in which “tolleranza”, which had been previously used on the web page and was later resumed in the rest of the text. This case testifies the preference for a metaphorical term that is more emotionally connotated when a synonym bearing no figurative sense was available, possibly to maintain the terminological contrast ‘*intolleranza/tolleranza*’ (intolerance/tolerance) and make the term more familiar to the lay audience.

6. Discussion of Results: (Inter-)cultural Dimensions in Metaphors Conceptualizing Lactose Intolerance

The analysis conducted in this study has identified the visual and verbal tropes used to conceptualize lactose intolerance in websites run by clinics/hospitals in English and in Italian. In particular, it has used CMT and ECMT to analyze the situational contexts in which these metaphors are grounded. From the visual point of view, however, actual visual metaphors are used occasionally – except for INTESTINE IS A VEHICLE (Section 4.1., Figure 6, square 12), ultimately the one recurring to the well-established metaphor BODY IS A MACHINE which prevails in the verbal metaphors both in English and in Italian.

Visually, the web pages in English seem to prefer visual euphemisms, especially when referring to taboo bodily functions, and synecdoche. In this case, they recur to symbolisms of unities to indicate the whole condition or its symptoms, the web pages in Italian, instead, employ more preferably the rhetorical visual devices of visual metonymy and synecdoche, again preferring to symbolize single parts for the whole condition. However, in this case real photographs of dairy products or people in pain are used, which enhanced the naturalistic effect of the images.

Verbally, fewer differences were identified in the two sets of web pages. Both used the metaphor BODY IS MACHINE, which prevails in medical discourse to describe the human body and its functions (Navarro I Ferrando, 2021), especially to describe the condition. However, the web pages in English revealed a preference for a more subjective focus on the symptoms, shifting them on the perception of the patients, while the web

pages in Italian played with the reliance on the observation of the natural world and weather phenomena.

This difference – albeit minimal – in the metaphorical distribution between the web pages in English and in Italian can be interpreted as rooted in cultural values, especially as concerns retention of power, as identified using Hofstede's (2011) notion of cultural dimensions. In his model, Hofstede (2011: 1) defines culture as “the collective programming of the mind that distinguishes the members of one group or category of people from others”. Moreover, as Piller (2025) argues, culture is not a static biological essence but a social construction often employed to sustain specific power asymmetries. In this regard, Hofstede (2011) detected six key dimensions: Power Distance Index (PDI), Individualism vs. Collectivism (IDV), Masculinity vs. Femininity (MAS), the Uncertainty Avoidance Index (UAI), Long-Term vs. Short-Term Orientation (LTO), and Indulgence vs. Restraint (IVR). Each dimension indicates how cultures are characterized in terms of authority, social relationships, achievement, tolerance for uncertainty, time orientation, and self-control. More specifically, PDI describes the level of authority that is accepted and followed, IDV indicates the extent of community and individuality, while MAS represents specific values that society and a certain community hold. UAI describes to what extent nations avoid unknown factors, LTO expresses the level of acceptance/rejection of traditions over innovation in a society. Finally, IVR indexes a country's orientation toward instant gratification versus the disciplined pursuit of long-term rewards (Hofstede, 2011).

Among the six dimensions, PDI is the dimension that might explain the similarities/differences found in the web pages in English vs in Italian. PDI, in fact, expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally (*ibid.*). In the context of this study, doctors can be considered to retain power since they possess the scientific knowledge and, therefore, the ‘power’ to heal patients from the condition, while patients are the less powerful members of the community because they need to rely on the doctors’ knowledge and expertise to find a solution to their condition.

Considering the PDI dimension, the four web pages in English, all based in the USA, appear to prefer an objective and functional presentation of the visual tropes utilizing abstract modality and stylized human figures to represent the digestive system; this universalizes the patient experience and allows for a lower PDI, which seems to encourage patient engagement to manage personal health through objective data. The web pages in English,

in fact, show to employ metaphors referring to the body as a machine to represent bowel function, which aligns with lower uncertainty avoidance by providing clear, performance-based signals rather than emotional ones. Patients, moreover, are empowered in the choice of verbal metaphors that focus on their perceptions of the symptoms rather than on objective medical description.

In contrast, Italian web pages seem to utilize naturalistic imagery – such as photographs of people in visible distress and photographs of food – that prioritize the sensory and emotional reality of the condition. This focus on the emotional impact of the condition reflects a higher PDI and a higher UAI, where patients look to established experts and realistic depictions to reduce ambiguity.

One last aspect worth mentioning is the reliance, in both web pages in English and in Italian on the patients' perceptions of the symptoms. Doctors not only provide lists of symptoms based on medical knowledge, but they also appear to rely on the patients' personal sensory and emotional perceptions, thereby shifting the dynamics of power from their own position as practitioners towards the patients' viewpoint. However, this was seemingly more prevalent in the English web pages rather than in the Italian ones, so we can hypothesize that the English-speaking context of the web pages is anchored more firmly in bodily and emotional states, while the Italian-speaking context of the web pages emphasizes situational and functional coherence (Hofstede, 2011).

7. Conclusions

The findings presented in this study have shown that the web pages in English showed a preference for an abstract modality and stylized diagrams, potentially shifting power to patients through mechanical metaphors. Conversely, the Italian web pages appeared to prefer naturalistic photographs and emotional metonymy, maintaining doctor-centered authority through sensory descriptions of symptoms. While not definitive, and based on the specific dataset observed, these differences seemed to align with Hofstede's (2011) cultural dimensions – particularly Power Distance – providing a conceptual lens through which the culturally different ways in which practitioners navigate professional boundaries could be interpreted.

The study presents, however, some limitations represented by the number of web pages considered for each of the sub-sets of data. This small sample size may not be fully representative of how clinics and hospitals convey information available on the condition in these languages. Moreover, the English-language websites selected are exclusively run by healthcare institutions in the USA. Thus, the findings regarding English cultural dimensions might specifically reflect US cultural norms rather than those of other English-speaking nations. The visual and verbal metaphors were also investigated separately, i.e., without taking into consideration their reciprocal relationship and their organization in the context of the web page. Future research might further expand the number of websites to compare results from this study with those from a larger dataset, which might also include data from other English-speaking countries. A Critical Multimodal Approach may be applied to investigate how images and texts are organized on these web pages, specifically focusing on their reciprocal relationship. This allows for the analysis of how visual and verbal figurative components interact with the rest of the literal content. Furthermore, a critical elaboration of these findings might reveal the power dynamics and hegemonic discourses that influence how figurative language is used to represent lactose intolerance. Finally, since the analysis is restricted to the organization of verbal and visual components on the static web pages, future research will take into account dynamic or interactive elements that are present, such as videos and links to social media as well as the pages and social media accounts by individual practitioners.

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