

LINGUISTIC AND EXTRALINGUISTIC STRATEGIES OF HYBRIDIZATION, SIMPLIFICATION AND REFORMULATION IN ENGLISH AND ITALIAN MULTIMODAL POPULARIZED DISCOURSE

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Abstract

This paper explores the linguistic and audiovisual features of medical-discourse reformulation in a selected corpus of English and Italian scripts from the TV shows *1000 Ways to Die* (*1000 modi per morire*), *Curious and Unusual Deaths* (*Strani modi per morire*), and *Rare Anatomy* (*Rare Anatomy: Casi estremi*), which actualize new forms of popularization by mixing journalistic, documentary and humorous discourses with reality-TV and docudrama genres. The analysis is grounded on a cognitive-functional approach, according to which the authors' mental representation of the implied receivers influences the process of text construction, thus aiming at making specialized knowledge more accessible by means of different strategies of speech hybridization that are tailored to the imagined audience. In particular, regarding source-text production, the authors of the first and second TV shows seem to have in mind male viewers, since they resort to a specific integration between taboo jokes, derogatory humour and lexical reformulation accessible to non-experts. At the same time, the third TV series adopts mainly the conventional strategies of linguistic simplification to explain specialized knowledge, along with the emotional presentation of real stories about rare diseases. The analysis focuses on the interaction between the extralinguistic features and verbal characteristics of audiovisual scripts so as to help describe multimodal popularization, which can now be found in a number of different text types, from magazines to sitcoms. Finally, this study also inquires into the extent to which the lexical, structural and functional dimensions of the selected corpus of target versions stem from the interaction between the equivalent reformulation of medical discourse and the respect for the technical limits of voice-over.

1. Introduction, research objectives and rationale

The term 'popularization' labels the lexical and structural reformulation and "re-contextualization" (Calsamiglia and van Dijk 2004) of specialized knowledge for the general audience (Gotti 2005). Academic investigation of popularization has focused overwhelmingly (Myers 2003: 272) on written texts, but in order to reflect "the expansion and differentiation of the sciences" (Whitley 1985: 10), as well as to advance the current state of research (Gotti 2013; Cavalieri 2015), scholars are also exploring the multimodal nature of the process, examining the extent to which the verbal and extra-

linguistic semiotic resources interact to make the original information more accessible to the magazine readers, or to the viewers of audiovisual programmes.

This paper analyses a selected corpus of examples from three TV series, *1000 Ways to Die* (henceforth 1WTD), *Curious and Unusual Deaths* (henceforth CAUD), and *Rare Anatomy* (henceforth RA), which mix conventional linguistic reformulation with a multimodal hybridization of journalistic (Broersma 2010), documentary (Gifreu 2011), and humorous (Guido 2012) discourses, and reality-TV and docudrama genres. A cognitive-functional model is adopted, according to which the selection of the linguistic and extralinguistic features of these popularized texts is not arbitrary, but subject to the characteristics of implied receivers, whose interest is supposedly captured by a particular variety of topics, pictures and videos which simultaneously try to convey scientific literacy (Berti 2013: 175) and pique their (sometimes even morbid) curiosity towards the fatal accidents and rare diseases explored in the selected series. Section 2 defines general and multimodal popularization from the theoretical viewpoint, whereas the comparison between the English and Italian versions of the selected corpus of extracts (Sections 4.1 and 4.2) pinpoints the lexical, syntactic and visual strategies which aim to make the definitions of a number of specialized notions more accessible to the receivers. At the same time, this study also inquires into the effects of the spatial and temporal limitations of voice-over on the equivalence levels of the target-language retextualizations.

2. Multimodal popularization: definition and main features

According to the “canonical view” of popularization (Grundmann and Cavaillé 2000), the notion is usually associated with the type of “exposition” (Cloître and Shinn 1985) concerning the production of “popular” texts that are destined “for the largest audience possible” (Grego 2013: 152) and aimed at conveying “specialist knowledge for education or information” purposes (Gotti 2013: 9; see also Whitley 1985: 3). The investigation of the lexical and syntactic features of written texts (Gotti 2005) has revealed that authors resort to devices such as periphrasis, juxtaposition, metaphors and generalizations to facilitate the non-experts’ acquisition of the disciplinary knowledge. Although books or articles in both magazines or newspapers represent the main forms of popularization (see Gotti 2005, 2013), novel realizations can be identified, where linguistic recontextualization represents one of the communicative resources that senders choose to achieve the intended informative function, and is integrated by the exploitation of the multimodal construction to actualize innovative or even peculiar forms of “hypermodal” (Lemke 2002) or “hybrid” discourse (Santamaria, Bassols and Torrent 2011; Moschini 2014). Due to such hybridization, which is seen as one of the distinguishing features of contemporary media (Fairclough 2003; Catenaccio 2008), the rigid separation between genres and styles gives way to different forms of “spectacularization” (Moirand 2005) and “marketization” (Zhang and O’Halloran 2014) of specialized knowledge, which modify the conventional documentary genre (Holmes and Jermyn 2001: 2) through the interaction between medical and humorous discourses, or the combination of real-life images and re-enactments of medical stories, “to allow potential readers to understand the scientific content” (Silletti 2015: 67).

Yet, despite labelling popularization as a “pluricode discourse” (Cavaliere 2015: 87) where texts, images and colours interact to transmit the semantic and communicative

levels of the authors' messages, academic research prevalently ignores the actualization of the interaction between verbal, acoustic and visual elements (Myers 1997), with some exceptions (Miller 1998; Santamaria *et al.* 2011; Berti 2013; Iaia 2013; Zhang and O'Halloran 2014; Cavalieri 2015; Silletti 2015). For this reason, this paper analyses a selected corpus of English and Italian scripts from 1WTD, CAUD, and RA to further highlight a number of strategies by which 'multimodal popularization' is performed. The latter notion entails that both the linguistic and audiovisual dimensions of the episode scripts are meant to enhance the general audience's scientific literacy in the medical field. Additionally, since a cognitive-functional model (Widdowson 1996; Langacker 2008) is applied here to the study of the production of these text types, the linguistic and extralinguistic features of the examined programmes are interpreted in the light of the authors' mental representation of the potential receivers (Silletti 2015) in terms of their gender, age, alleged interests, or background knowledge. In other words, the selection and combination of the semiotic modes as meaning-making resources (Halliday 1978) are not arbitrary, but support the senders' illocutionary force (Austin 1962) – namely, to attract the receivers' attention and explain scientific knowledge (Miller 1998) – and the perlocutionary effect of enhancing the latter's knowledge, but not their secondary culture (Widdowson 1979). In fact, the analysed series mix verbal simplification and the inclusion of animated, fictional or actual images to provide a multimodal composition (Kress and van Leeuwen 2006) that usually gives rise to two main types of segments – the entertaining and the explanatory – whose features are tailored to the implied audience.

Since 1WTD premiered on the prevalently "male oriented" (Buckman 2015) Spike TV, with a "target audience of men 18-49" (Mahmud 2008), and CAUD was broadcast on Discovery Channel, "dominant on the men side of the 25-54 demo" (Kissell 2015), their viewers are imagined as young adult males. Indeed, the episodes usually tell stories of clumsy and ill-fated people, where the common informative purpose of the explanatory segments is integrated by derogatory (Zillmann 1983) comments or, in the entertaining ones, by nonsensical and exaggerated characterizations. Furthermore, their scripts also display more vivid representations of the causes and effects of diseases or accidents (which are usually the conclusion of trivial events or sexual practices), whereas the potential recipients are also expected to activate an "arousal/safety" psychological strategy (Rothbart 1973), when their experience of a sensation of arousal provoked by being able to laugh about someone else's death, or to mock others in their misfortune, is softened by the relief response prompted by the exaggerated characterizations. On the other hand, RA is produced and aired by The National Geographic Channel, which aims to captivate and entertain "a global community", as one can read on its website (<http://www.nationalgeographic.com/about/>), as well as "to reach a broader and consistently upscale audience" (Littleton 2016). This may justify why RA authors prefer stories of young people suffering from rare diseases and resort to unscripted, real-life images accompanied by comments and interviews with members of their families, without producing derogatory representations of the protagonists, underlining instead their strength (see examples (11) and (12) below). It seems that this structure – along with the more emotional tone of the narration and representations of the entertaining segments – is meant to prompt an empathic reaction from the viewers.

Three examples of the audiovisual hybridization are represented in the following multimodal transcription:

VISUAL DIMENSION	VERBAL DIMENSION	DISCOURSE
	<p>Sheldon Morgan recently moved back into his mother's house</p>	<p>Interaction between journalistic discourse and reality-TV genre</p>
	<p>Hemothorax, which is blood filling a chest cavity, and prevents lungs from filling with air</p>	<p>Interaction between popularization discourse, documentary and horror film genres</p>
	<p>And like a typical teenager, he's fallen in love.</p>	<p>Interaction between journalistic discourse and unscripted, reality-TV genre</p>

Table 1. Multimodal transcription of three extracts from CAUD (first row), 1WTD (second row), and RA (third row)

As regards the Italian versions, we think that the interaction of discourses and genres may lead one to question the appropriateness of voice-over, the translation mode of the analysed case studies. Although its selection may be supported in economic and functional terms by being cheaper than dubbing and by its higher degree of credibility (Franco, Matamala and Orero 2010), thanks to the fact that the source-text soundtrack can be heard in the background (Espasa 2004), its technical constraints (Agost and Chaume 1999) may force translators to reduce fragments by omitting what they do not consider relevant to convey the authors' intentions. Yet, any condensation can undermine the pragmatic equivalence of the target-language popularization, unless linguistic reduction is associated with a critical examination and usage of the extralinguistic frame. Since the verbal explanations are usually accompanied by visual illustrations, translations may be planned in order to pursue a multimodal compensation between what is uttered in the target language because of the time limits and what receivers could infer from what is depicted, thus giving viewers the supposedly appropriate amount of data to access the authors' discourse (a practical example can be found in extract (5) below).

3. Method and corpus

The analysis of a selected corpus of scenes from 1WTD, CAUD, and RA aims at exploring the interaction between images and linguistic reformulation to make the causes

of rare diseases, the origins and mechanisms of certain medical conditions, or the function of human organs more accessible to the recipients. The entire corpus of examples is made up of 40 definitions, and the following Sections will focus on the most representative types, which are divided into two main groups. The first one (examined in Section 4.1) encompasses the use of juxtaposition, periphrasis and simplification, whereas the second group (Section 4.2) explores the definitions conveyed through metaphors. Finally, the investigation of the Italian versions – which represents only an initial step of an ongoing research about the multimodal analysis of the target versions of these TV shows – will also inquire into the equivalence levels between the original and adapted texts, and into the effects of voice-over on the structural and functional levels of the target scripts.

4. Analysis

4.1. *Juxtaposition, periphrasis, and simplification*

In the selected audiovisual texts, the structural device of juxtaposition is used to explain how diseases affect human bodies, the function of their organs, or the consequences of medical conditions. The following extract (1), from RA, for example, aims at illustrating the function of capillaries:

	ENGLISH VERSION	ITALIAN VERSION
(1)	His blood then enters much smaller pipes called capillaries, which deliver the supplies to his cells.	Le arterie di Son affluiscono in vasi più piccoli detti capillari, che portano il nutrimento alle cellule.

Two popularization strategies interact to define the structure and function of the capillaries of Son, a Vietnamese child suffering from a rare vascular malformation. At first, capillaries are metaphorically compared to pipes; then the narrator says that their function consists in delivering “the supplies to the cell”, through an inductive process that places the term after its definition. Besides showing the common strategies of popularization, extract (1) also illustrates its multimodal connotation: a specific image – visible in Figure 1 below – is in fact selected to accompany the narrator’s description:



Figure 1. The structure of capillaries in Son’s malformation

Figure 1 activates a relationship of “complementarity” (Compte 2009) with the narrator’s utterances, and in particular the colour of the veins on the right changes from red to blue to highlight and reproduce Son’s malformation. The “smaller pipes” can actually be observed, therefore viewers can witness the alternative network of vessels caused by the disease. The target version, instead, exemplifies the compromises due to the time limits of voice-over: the translation is more condensed, some repetitions are avoided, and other parts are deleted. In particular, since blood has already been mentioned in one of the previous utterances, the translators do not repeat the noun in the reformulation of extract (1), but produce a less explicit explanation of the specialized notion. The target version indeed mixes two sentences from the source text: whereas the English segment starts with the statement of the “normal” arteries in most of Son’s body and then describes the non-conventional path of his blood, which enters the “small pipes” because of the malformation, the Italian script contains only one sentence with one subject – “arteries”. This seems to validate the fact that the translation choices usually stem from the translators’ interpretation of source versions in terms of relevance, insofar as they opt for the more rigorous adaptation of what is considered essential to preserve the main objective of the sender’s discourse. In fact, they choose to preserve the main popularization strategy, rather than reproducing the utterances that are mainly included for entertainment and emotional reasons, to mark the child’s unfortunate condition.

A similar translation strategy is also adopted in extract (2) below, for the popularization of lymph:

	ENGLISH VERSION	ITALIAN VERSION
(2)	This fluid, called lymph , contains infection-fighting white blood cells .	Questo fluido contiene globuli bianchi che combattono le infezioni .

The examination of extract (2) shows the cognitive-functional nature of text production and translation. As regards the former process, the noun “lymph” is introduced by the verb “called”, to show its specialized use within the community of doctors. Then, the narrator also describes white blood cells in the same utterance, opting for the syntactic strategy of “premodification”, which Gotti (2005: 73) attributes to specialized texts and not to the language of popularization. This choice, which hence seems uncommon, could be seen as a consequence of the need to reformulate two medical notions within the restricted temporal frame of the explanatory segment under consideration. In this light, authors may have preferred to provide a more detailed explanation of lymph, rather than of the white blood cells, perhaps considered as a notion with which viewers are already familiar. At the same time, with regard to the Italian version, the introduction of “lymph” only later in the script, without naming the fluid at the beginning of the segment, reveals the influence of the translators’ interpretation of the source text. In other words, this entails that they have to decide what could be omitted from their renderings to cope with the limits of voice-over, as well as to reproduce the intended communicative objective. In fact, even though the target script does not include the specification “called lymph”, the medical notion is effectively spread, and the main illocutionary force of the senders’ conversation is nonetheless preserved.

The following extract depicts instead the typical interaction between the specialists' and narrators' utterances in multimodal popularization to retextualize the medical discourse:

	ENGLISH VERSION	ITALIAN VERSION
(3)	Dr Ungar: "[...] there are very specific, er, sets of signals and other things in developing human body that tell the blood vessels how to grow, where to grow, what to supply, what to— how far to go, when to stop growing. " Narrator: "It's believed that in people like Michael these genetic signals [...]"	Dott. Ungar: "[...] ci sono molte specifiche - eh - indicazioni e fattori nello sviluppo del corpo umano che dicono come devono crescere i vasi sanguigni, dove crescere, dove portare il sangue, a quale velocità crescere, e quando fermare la crescita. " Narratore: "Si pensa che in soggetti come Michael queste indicazioni genetiche [...]"

In extract (3), juxtaposition is not activated, but the general audience's knowledge is supposedly increased thanks to the doctor's periphrasis listing the functions of the signals. It is only when the narrator takes the floor that the inclusion of the adjective "genetic" provides a more 'specialized' label, reflecting an inductive logical process. This form of cooperation between the doctors' utterances and the narrators' comments (see also extract (17) in Section 4.2 below) seems to be one of the constant features of this form of audiovisual popularization – it can in fact be found also in the following extract (4), from 1WTD, when pulmonary oedema and the causes of suffocation are explained:

	ENGLISH VERSION	ITALIAN VERSION
(4)	Narrator: "It caused their lung cavities to swell up and fill with liquid. A reaction known as pulmonary oedema. " Dr Burstein: " Oedema is swelling pulmonary lungs. [...] If you fill [lungs] with fluid, [...] gas can't be exchanged. "	Narratore: "A causa di ciò, le loro cavità polmonari si sono gonfiate e riempite di liquido, una reazione nota come edema polmonare. " Dott. Burstein: " La parola 'edema' significa gonfiore. [...] Se [i polmoni] si riempiono di fluidi, [...] i gas non possono essere scambiati. "

Example (4) shows the same 'narrator-specialist' relationship highlighted in extract (3), along with the increased simplification of medical discourse in the Italian script, when the narrator's definition of "oedema" is replaced by its generalization. This is further proof of the fact that the adapted scripts are the outcome of the interaction between the translators' interpretation of the authors' intentions, the need to reformulate the source utterances in pragmalinguistic equivalents, and the need to respect the limits of voice-over. Since target versions have to cope with a restricted temporal slot, translators may tend to include condensed sentences, although this could raise concerns in terms of functional equivalence, as in extract (5) below:

	ENGLISH VERSION	ITALIAN VERSION
(5)	With the complete air-way obstruction [...] you would soon die after, due to the lack of oxygen.	Con le vie aeree ostruite [...] alla fine si muore per ipossia.

Dr Svoboda explains that the “air-way obstruction” may prevent one from letting “air in” and “out”, in the portion of extract (5) that is not transcribed. After the latter illustration, the notion is further reformulated with a periphrasis at the end of Svoboda’s turn above, as “lack of oxygen”. It is worth pointing out, however, that the Italian fragment contains a more specific, non-popularized correspondent, “*ipossia*”, which may not be immediately understood by the target audience. The condensed solution is needed because of the technical constraints of voice-over, and the viewers’ understanding might have been compromised had images not assisted the verbal dimension. In fact, the doctor’s turn is completed from the extralinguistic perspective by a series of animations representing the consequences of suffocation, presumably allowing the achievement of the informative goal through a multimodal retextualization of the medical knowledge under investigation.

Definitions by means of juxtaposition and the “*x is P*” structure (Gotti 2005: 209) can be found in extracts (6) and (7) below, respectively from 1WTD and CAUD:

	ENGLISH VERSION	ITALIAN VERSION
(6)	This resulted in massive hemothorax, which is blood filling a chest cavity, and prevents lungs from filling with air , thus resulting in suffocation.	Questo ha causato un massiccio emotorace, ovvero la cavità toracica si è riempita di sangue, i polmoni non sono più riusciti a riempirsi d’aria , e l’uomo è morto soffocato.
(7)	This reflex is called laryngospasm . Laryngospasm is an involuntary muscular contraction of the vocal chords .	Questo riflesso è noto come laringospasmo . Il laringospasmo è una contrazione muscolare involontaria delle corde vocali .

In extract (6), popularization is pursued through a deductive process when “hemothorax”, the specialized notion that causes Marcel’s death, is explained along with its consequences. The latter – namely, the inability of air to pass through the lungs due to the presence of blood, and “suffocation” – are communicated by means of a sentence introduced by “thus”, whereas the linguistic dimension interacts again with an animated representation of the fracture in the main character’s chest cavity (see Figure 2 below):

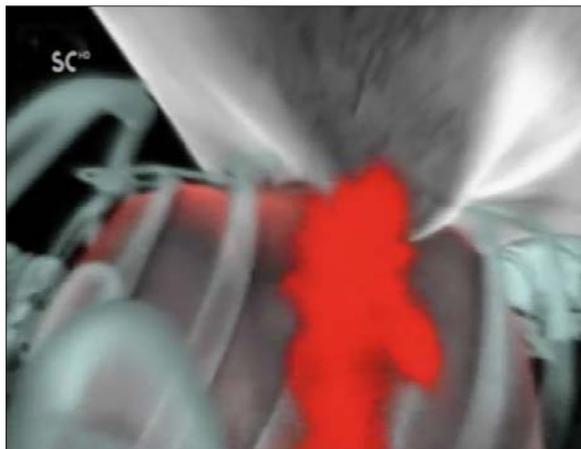


Figure 2. Representation of hemothorax

In the target version of extract (6), linguistic and functional equivalence is achieved: the translation respects the original deductive process entailed by the inclusion of the definition – where the conjunction “*ovvero*” indicates the start of the explanation – but also the other parts of popularization are reproduced, describing the final consequence of the man’s condition. The above image then proves that the selection of the extralinguistic and linguistic features is affected by the implied receivers: if Figures 1 and 2 are compared, one may notice that the latter displays a more explicit representation of blood filling lungs, as in a horror movie, suggesting that 1WTD would appear to be mainly addressed to male viewers. The characteristics of potential recipients can actually be inferred from the themes of the episodes as well, for 1WTD and CAUD narrate the fatal consequences of actions that generally involve clumsy people or sexual accidents. For example, extract (7) above is from CAUD and explains the causes of Sheldon’s death. When about to feed his cat, he slips on some ice, hits his head and falls unconscious into the cat bowl, becoming a victim of “dry drowning”, a process that is explained by Dr Goldman. In this case, the multimodal nature of popularization is actualized by the pluricode reformulation of what happens when water is inhaled and hits one’s larynx, since the specialist’s utterance is completed by the visual representation of laryngospasm (see Figure 3 below):



Figure 3. Visual representation of laryngospasm

As for the linguistic dimension, laryngospasm is firstly simplified and described as a “reflex”, and this simplification then introduces the proper, more detailed definition, reproducing a deductive process that sees the medical term before its description. The linguistic and functional features are respected and rendered in the equivalent Italian script, which has a similar syntactic construction to the narrators’ utterance, where the simplification of “*laringospasmo*” – “*questo riflesso*”, ‘this reflex’ – is followed by the juxtaposition of its definition.

A final example of popularization by means of linguistic reformulation is found in extract (8) below, from CAUD, about the death of a college student, Jamal, who decides to compete in a spitting contest with his male friends. Before his turn, the student takes a run trying to apply the physical law of conservation of momentum (which is explained), but the party turns into tragedy, as Jamal falls from the balcony:

	ENGLISH VERSION	ITALIAN VERSION
(8)	Jamal is employing principles of momentum. The amount of momentum that an object has depends on two physical quantities: the mass, and the velocity of the object. The mass – Kattan’s body. The velocity – his forward motion.	Jamal sta applicando la legge di conservazione della quantità di moto. La quantità di moto di un oggetto dipende da due quantità fisiche: la massa e la velocità dell’oggetto in movimento. La massa di Jamal è il suo corpo, la sua velocità viene dal movimento in avanti.

The popularization of the physical notion lies in the lexical, syntactic and visual features of the source text. The disciplinary content is in fact explained by means of periphrases that provide actual examples specifying what the young man’s body and velocity represent in terms of the physical principle. Also in extract (8), then, a visual representation of the scientific formula is added (Figure 4) to increase the viewers’ knowledge:

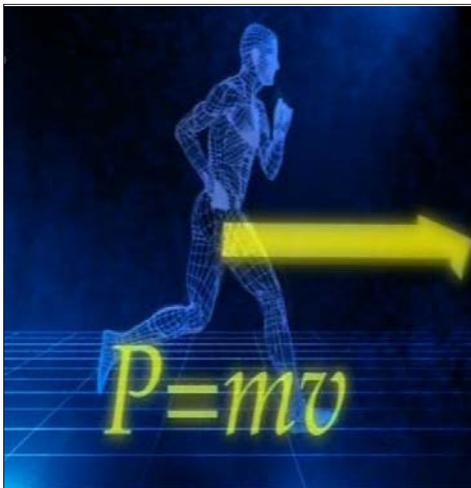


Figure 4. Visual representation of principles of momentum

The Italian script achieves an equivalent informative function, defining how momentum is obtained and indicating the two quantities in relation to Jamal’s story. After the explanatory segment, though, the clip ends with the comment (9), which ironically indicates the experiment’s tragic conclusion:

(9) It was a case of using the right principle... in the wrong way.

The resulting derogatory type of representation is consistent with the show’s black humour, and simplifies again the influence of the implied receivers on script production. Similar instances of humorous

discourse are shared, in fact, by 1WTD, as is evident in example (10), when the narrator concludes the story of Stu, a tyrannical, oppressive swimming instructor, by comparing his dead body to a fish:

(10) He was making a good impression of a goldfish – the kind you wind up flushing down the toilet.

The comparison between Stu and a goldfish produces a derogatory representation and eventually results in the activation of an arousal/safety reaction to the black humour in the comment on his story, whereby laughter over someone's death may be softened by their previous behaviour. These types of narrators' comments are not present in RA, which instead addresses a more general audience, and pursues the emotional involvement of viewers by underlining the "superhuman" strength of the main characters who face their conditions with courage, as is evident in extracts (11) and (12) below:

(11) But back home in Warren, Michigan, where he's been living on his own for a year, [Jason] muscled through his days with superhuman determination.

(12) As Son is wheeled in the O.R., he's scared, but stoic as always.

This section has analysed the examples of popularization by means of linguistic reformulation. The following section inquires into the multimodal actualization of another of the most common strategies of explanation of specialized knowledge – metaphors.

4.2. *Metaphors*

Popularization in the selected corpus of scripts is also performed through the inclusion of metaphors, which are meant to facilitate the viewer's understanding thanks to the activation of mental connections with everyday objects and notions that belong to their experience. Two examples of metaphors can be found in extracts (13) and (14) below, from the RA episode concerning blood:

	ENGLISH VERSION	ITALIAN VERSION
(13)	Blood is the river of life.	Il sangue è il fiume della vita.
(14)	This incredible plumbing system is as efficient to our survival as our heart, lungs, or brain.	Questo incredibile sistema idraulico è essenziale per la nostra sopravvivenza tanto quanto il cuore, i polmoni e il cervello.

Blood and the human circulatory system are compared to rivers and a "plumbing system", drawing upon the implied receivers' background knowledge. Additionally, the second metaphor recalls the association with the "small pipes" mentioned earlier in the episode (cf. extract (1) above) and therefore suggests that authors perhaps imagine a constant attention on the part of viewers, thus inserting intratextual references to the popularization strategies already employed in the same instalment. The original associations are preserved in the Italian versions, which therefore do not present modifications, but produce functional and linguistic equivalents. Also in extracts (13) and (14) popularization has a multimodal nature because words are supported by images such as the visual representation of blood as a river, from (13):



Figure 5. Representation of blood as a river

A similar visual representation of blood is adopted as a backup to another metaphor, when Michael's vascular malformation is described:

	ENGLISH VERSION	ITALIAN VERSION
(15)	Like cars in a maze of congested streets, many of [red blood cells] get backed up in the nooks and crannies of [Michael's] malformed vessels.	Come auto in un dedalo di strade congestionate, molti [globuli rossi] si fermano negli angoli e nelle fessure dei vasi sanguigni malformati.

In this fragment, two metaphorical associations can be identified, one between the circulatory system and “congested streets”, the other correlating Michael's red blood cells with cars, both conveyed through an interactive relationship between the narrators' utterances and the images, such as those represented in Figure 6:

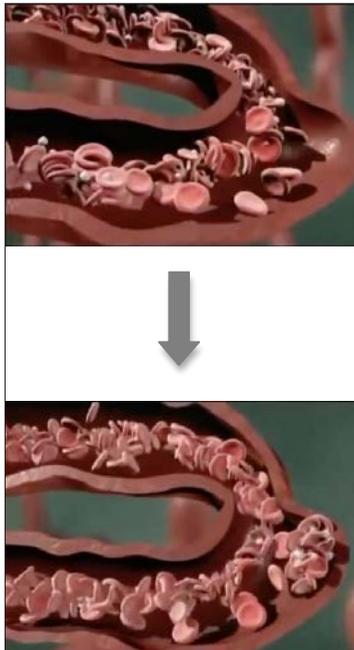


Figure 6. Metaphorical representation of red blood cells as cars in a congested street

Another metaphor can be found in the following extract (16), about the need for muscles to work in pairs:

	ENGLISH VERSION	ITALIAN VERSION
(16)	So, every muscle plays a role like— each one's an instrument, it's got to play with the other.	È un po' come un'orchestra, in cui ogni muscolo svolge una funzione.

The entire muscular system is compared to an orchestra, using a notion that – according to the authors – implicates the need for cooperation to ensure a successful performance and therefore facilitates the comprehension of muscle coordination, which is necessary to perform any action. The Italian metaphor is here more explicit than the original one, and this may be due to the time restrictions afforded by voice-over, which does not allow translators to preserve the hesitations and fragmented syntax from the source utterances. Yet, if (16) is compared to (17), when Dr Kaplan describes the causes of the Bone-Fibrodysplasia Ossificans Progressiva, one may notice that also hesitations and repetitions are not always given the same importance:

	ENGLISH VERSION	ITALIAN VERSION
(17)	F.O.P. is like an atom bomb, where the fuse – the fuse of the atom bomb – is the mutant gene.	La F.O.P. è come una bomba atomica, dove la miccia – la miccia della bomba atomica – è il gene mutato.

Dr Kaplan's turn comes after the definitions of genes and proteins on the part of the narrator, who indeed resorts to two more metaphors: genes are labelled as “the body's blueprint”, whereas proteins are considered as “the body's building blocks”. When the specialist takes the floor, another parallelism is created, between F.O.P. and atom bombs, so that receivers can infer the seriousness and unpredictability of the rare disease. From an audiovisual-translation perspective, it is worth observing that the doctor's aside and the consequent fragmented structure are left in the Italian version despite the temporal constraints of voice-over, perhaps because they have been considered as strategies that increase accessibility to the specialized knowledge, and are therefore essential in terms of pragmatic equivalence.

Finally, examples of multimodal metaphors are found in extracts (18) and (19), which respectively show the features of nerve cells and the consequences of F.O.P.

The multimodal transcriptions of (18) and (19) exemplify the connection between metaphors and visual representations to make the medical con-

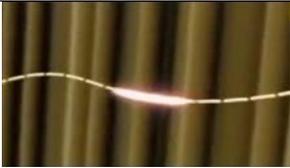
	VISUAL DIMENSION	VERBAL DIMENSION
(18)		[...] the electric signals Jason's brain sends to his muscles travel down transmission lines made of nerve cells .
(19)		Over time the lungs become encased in a virtual straightjacket , making it harder and harder for patients to breathe.

Table 2. Multimodal representation of two extracts from RA

ditions more accessible and support the implied viewers' adequate reception. In particular, the narrator in (18) resorts to the expression "transmission lines" to refer to the networks of nerve cells in the human body, and his metaphorical association is multimodally reproduced through a mainstream representation of connections between two nodes of a network. At the same time, also example (19) symbolizes the multimodal nature of the popularization strategies under examination, and in particular the figure reflects the semantic and pragmatic dimensions entailed by the metaphor. The suffocation caused by the insufficient mobility of the chest cavity is illustrated by the rigid ribs that imprison the lungs, hence the depiction of a group of caged organs that do not move and prevent one from breathing supports the metaphorical association with a straightjacket from the extralinguistic viewpoint.

5. Conclusions

The study of the selected corpus of English and Italian scripts has described the use of juxtaposition, periphrasis and metaphors to reformulate medical knowledge for the general audience, and has illustrated the association between the conventional lexical and syntactic features of popularization and the visual support to the narrators' and specialists' utterances. The resulting composition can be defined as multimodal, for the integration between different semiotic modes is essential to render the explanation of the structure and function of human organs, or of the causes and effects of rare diseases, more accessible to viewers. At the same time, the examination of the target versions has revealed that the translations are generally committed to preserving the original aim of increasing accessibility to medical notions, despite the modifications and condensations determined by the need to cope with the temporal and spatial constraints of voice-over, the mode that is conventionally preferred for the audiovisual translation of documentaries in Italy.

In order to advance the state of research, one interesting approach may be represented by a multidisciplinary examination of this pluricode, hypermodal and hybridized discourse, for example to inquire into the possible cases of misinterpretation and miscommunication caused by the differences between source and target linguacultural backgrounds. At the same time, the exploration of other examples of multimodal popularization may help to pinpoint the main features of this process, in order to identify the analogies and differences between the various subgenres, such as sitcoms or other TV shows. Finally, it may be worth investigating the empirical effects of multimodal reformulations to reveal whether the actual audience's response confirms the authors' expectations in terms of the acquisition of (supposedly) more accessible knowledge.

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