

SCIENTIFIC CONTROVERSIES AND POPULAR SCIENCE IN TRANSLATION Rewriting, Transediting or Transcreation?

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Abstract – Over the centuries, the circulation of scientific ideas has been granted in one or a limited number of languages. Despite the advantages of avoiding a scientific Babel, popular science is largely communicated to the public using their first language(s), and is often the result of translation from other languages – most notably English. While science may partly be communicated to the public for information, at the leading edge of research it is often popularised for its newsworthiness and/or to involve the public in debates concerning social issues or political decisions. The question addressed in this paper is how the ‘news’ elements in popular science are mediated in the target language and culture and to what extent processes such as rewriting, transediting and transcreation are at work. Methods and strategies for science communication are compared and contrasted using an Italian and English parallel/comparable corpus of newspaper, magazine and news agency articles reporting on the recent scientific controversy over vaccines. Corpus articles are collected using the LexisNexis database. Data are checked against a small monitor corpus of key articles collected as the controversies developed. Within corpus texts, mediating strategies are tested and issues concerning the achievement of intended effects in scientific controversy popularizations are considered. The discourse of controversies will be investigated in translation as a test case for rewriting, transediting or transcreation with an eye to different audiences, while bearing in mind that the ease of communication and circulation of ideas may have blurred cultural specificities and impacted the presentation of scientific topics to some extent.

Keywords: translation; popular science; transediting; rewriting; transcreation; corpus linguistics

1. Introduction

¹ Maria Teresa Musacchio wrote sections 2.2, 4.2 and 5; Virginia Zorzi wrote sections 1, 2.1, 3 and 4.1.

Science and technology are embedded in many aspects of modern life, so that there is an increasing need for publicly available information about research activities, results and applications. Science communication takes place in a number of contexts (academic, institutional, educational, public, etc.) where language is used to construct scientific knowledge and has specific discursive features (Halliday, Martin 1993). Substantial differences between typical instances of popular and specialised scientific communication lie in their purposes and functions. Popularisation cannot be regarded as a mere simplification of specialised research accounts (Myers 1990). One of the primary sources of scientific information in non-specialised contexts is news, whose production is affected by a number of factors such as news selection, time constraints, and embargo policies from specialised journals. In communicating science, journalists do not only need to inform the audience, but also to entertain them (Siegfried 2006; Bianucci 2008). However, when science brings up contentious issues, especially concerning ethics, politics and public health, other communicative purposes, closer to argumentation and persuasion, come into play along with information and entertainment. Scientific controversies, especially when their impact is perceived as relevant at the public level, emphasise the increasing awareness on the part of society at large – including public institutions, private companies, scientists themselves, and citizens – of the importance for scientists to communicate research activities and results outside specialised contexts. The nature of science as an international enterprise, involving collaboration among scientists from different countries, and the ease of communication and circulation of ideas through the web may have blurred cultural specificities and impacted the presentation of scientific topics as regards structure, plan and rhetoric in different languages.

Linguistic studies on the discourse of public communication of science range across and combine different perspectives. Discourse-analytical approaches were adopted to investigate the blurred boundaries between specialised and popular discourses (Myers 2003), and to identify the strategies employed in the language of popular science. These include narrative patterns (Myers 1994; Seguin 2001), reported speech (Calsamiglia, López Ferrero 2003), denominations, explanations, descriptions (Calsamiglia, van Dijk 2004), text organisation, accommodation strategies, stance (Hyland 2010), proximity (Scotto di Carlo 2014), metaphors (Williams Camus 2016), and markers of newsworthiness (Molek-Kozakowska 2017). LSP studies also contributed to the analysis of popular science language, focusing on text structure and phenomena such as repetition, vagueness, expository and colloquial styles, reader construction, and attribution practices (Garzone 2006). In surveying similar phenomena on examples from different popular sources, Gotti (2012) defined popularisation as a form of rewriting scientific

research documents. Rewriting was regarded as a sort of translation because it gives rise to a text that is not completely equivalent to its original and that requires recontextualisation to make it suitable for the lay public. In multidisciplinary approaches to science communication, the idea of popular science as a kind of translation has been abandoned as it projects the idea that popularisation leads to simplified, inaccurate content. At the same time, the idea emerged that science is co-constructed by the different stakeholders involved to meet the prevailing communicative needs on contextual grounds. Most linguistic investigations dealt with examples of ‘established’ or ‘unproblematic’ science at popular level, that is, they illustrated cases when scientific knowledge follows a ‘standard’ communication flow from researchers to lay audiences, where it is generally accepted, as experts’ authority is recognised. On the contrary, little attention has been paid to situations where scientific results and applications are at the centre of public debates.

Similar developments occurred in translation, where re-contextualisation to make texts suitably accessible to a given audience is seen as a form of refraction (Lefevere 1992). This process is not described as rewriting, but as intercultural mediation (IM), which considers the impact of cultural distance (Katan 2013) and has been explored in technical and scientific translation by Sager (1994). In translation, the re-contextualisation processes deriving from IM may be subsumed under the heading of ‘constrained communication’ (Chesterman 2004, pp. 10-11). In other words, a mediated text is a mixture of two textual and socio-cultural events and is located in a space that lies between the two: “Mediation regularly occurs in the popularisation of scientific research articles in newspaper reporting” (Ulrych 2015). Re-contextualisation refers to the transformation of information in mediated discourse through additions, deletions, substitutions, rearrangements, and elaborations. As part of mediation, rewriting is a metalinguistic process that reinterprets or manipulates content to serve a range of ideological motives. In translation, texts are rewritten and often ‘standardised’ to make them more accessible to the target audience and fit the text to the target culture expectations. Mediation generally implies trying to understand what the author(s) actually meant and identifying possible sources of language or culture interference. Besides rewriting, mediation includes other modes, such as transediting and transcreation. Originally defined by Stetting (1989, p. 374) as a form of rewriting combining translation and editing, transediting is a pragmatic translation strategy meant to smooth and improve the readability of a text (Chesterman 1997, p. 112). Forms of transediting include cleaning-up transediting or linguistic adaptation to achieve target text efficiency; situational transediting or adaptation to suit the intended function(s) of the target text; and cultural transediting or adaptation

to the needs and conventions of the target culture (Stetting 1989, pp. 373-377). Transcreation is a practice going beyond translation to recast the source text in a new language while preserving the intended content (Pedersen 2014). So far, studies on the translation of popular science (cf. Garzone 2006, Olohan, Salama-Carr 2011, Byrne 2012, Olohan 2016) have focused on the communication of science to the lay public for information and entertainment. Mediation as a broad concept encompassing rewriting, transediting and transcreation strategies is used here as a useful framework to account for what occurs in translating when scientific controversies are relayed.

This study focuses on mediation in a scientific controversy, where scientific knowledge is debated among actors with different interests and priorities, and non-specialised sectors of society may have a key role in its construction and development (Bucchi 2008). A cross-cultural element is also considered, in that methods and strategies for science communication are compared and contrasted using English and Italian comparable corpora of newspaper, magazine and news agency articles with a view to drawing information and analysing a parallel corpus of articles translated from English into Italian. In particular, this paper will focus on the controversies over vaccines and vaccine safety, where the plural form ‘controversies’ is used because the debate covers a variety of issues and episodes. A recent study published in *Ebiomedicine* (Larson *et al.* 2016) shows that vaccines are perceived differently across cultures and countries, which means that the debate is, at least partly, culturally defined. This has implications for the mediating strategies which might be employed in translating such controversial content from source to target language. These strategies will be considered here, along with issues concerning the achievement of intended effects on the part of authors. However, the public communication of scientific controversies has discursive and translational features that have not been fully explored. They will be investigated here as a test case for mediation, with an eye to their broader cultural context, and the presence of different audiences.

2. Method and corpus

2.1 Comparable corpora

Our method to analyse the media coverage of vaccine-related debates consists of two main steps. The first is a quantitative and qualitative analysis on comparable English and Italian corpora, whose results are used as a basis for the second step, which consists in a qualitative analysis of English-to-Italian translations of news items concerning the debate. The quantitative analysis on

comparable corpora was performed on a collection of newspaper articles downloaded through Lexisnexis Academic using two separate Boolean queries including the concepts of ‘vaccine’, ‘safety’ and ‘risk’ in the two languages.

The English texts retrieved come from a wide range of national and local newspapers mostly based in English-speaking countries – mainly the UK, the US, Canada and Australia – but also include international editions of newspapers from other countries, such as China and India. As for the Italian texts, they were published in national newspapers mainly featuring *La Stampa*, *Il Corriere della Sera*, and in local sources from the ‘Quotidiano Nazionale’ group (mainly *Il resto del Carlino*, *Il Giorno*, *La Nazione*). All articles were published between 2012 and 2017 – a period when the debate was lively and characterised, in some countries, by a drop in vaccination rates and an increase in cases of infectious diseases such as measles. After retrieval, the corpus was cleared of unwanted text strings (such as Lexisnexis metadata) and split into single-text files before analysis with the Antconc software (Anthony 2017). Corpus size and components are shown in Table 1.

After pre-processing, frequency lists were produced. Subsequently, keywords were extracted by comparing the retrieved texts to reference corpora of general web language (Baroni *et al.* 2009). These lists contributed to an overview of the main themes and most relevant concepts characterising the corpora. Once themes were identified, key words/phrases were further inspected through collocation analysis.

Language	Time period	No. of Tokens	No. of texts
English	2012-2013	106,149	250
	2014-2015	133,301	250
	2016-2017	169,434	325
Total		408,884	825
Italian	2012-2013	164,229	329
	2014-2015	129,620	324
	2016-2017	86,215	201
Total		380,064	854

Table 1

Size and components of the comparable corpora retrieved from Lexisnexis.

The qualitative analysis was performed on a smaller corpus, manually retrieved from newspaper, news agency and magazine websites (see Table 2). Here, the main focus was the exploration of metaphorical language, with particular attention to texts referring to the same piece of news reported across different sources and languages (marked in bold in Table 2). Other features surveyed included terminology, its management, and the ways in which the connections between vaccines and their side effects were dealt with.

Title	Year	Source	Tokens	Total
English				
Large study finds no vaccine link to nerve disorder	2013	<i>Reuters</i>	709	
Study Finds No Vaccine Link to Guillain-Barré	2013	<i>New York Times</i>	234	
MMR vaccine not linked to autism, even in high-risk kids	2015	<i>Reuters</i>	571	
Large Study Finds MMR Vaccine Doesn't Cause Autism, And May Lower Autism Risk	2015	<i>Forbes</i>	668	
No link between MMR and autism, major study concludes	2015	<i>Guardian</i>	649	
Vaccine refusal tied to increased risk of measles and pertussis	2016	<i>Reuters</i>	603	3,434
Italian				
Nessun legame tra il trivalente e l'autismo	2015	<i>Repubblica</i>	233	
Vaccini e autismo, un nuovo studio smentisce correlazione	2015	<i>Repubblica</i>	882	
Vaccini e autismo, nuovo studio Usa smentisce relazione	2015	<i>La Stampa</i>	454	
Salute, governo rende obbligatori 12 vaccini per asili e materna	2017	<i>Reuters</i>	165	
Vaccini, Senato approva decreto, va alla Camera	2017	<i>Reuters</i>	120	
Decreto vaccini, via libera dal Senato	2017	<i>Corriere della Sera</i>	1,165	
Vaccini, sì al decreto su obbligo a scuola: «Saranno 12 quelli richiesti»	2017	<i>Corriere della Sera</i>	710	
Vaccini, Senato approva decreto: sanzioni abbassate, monodose, niente farmacie, obbligatori da 12 a 10. Ecco cosa cambia	2017	<i>Il Fatto Quotidiano</i>	1,238	
Vaccini, sì a decreto per obbligo a scuola. Da 4 a 12 quelli obbligatori. Chi rifiuta rischia maxi multe e potestà genitoriale	2017	<i>Il Fatto Quotidiano</i>	1,171	6,138
Overall total				9,572

Table 2

Composition of the comparable corpora used for qualitative analysis.

2.2 Parallel corpora

Similarly to the comparable corpora, our parallel corpus was analysed in two steps. First, a quantitative analysis was conducted to establish similarity of the English source texts with the comparable English corpus. Our parallel minicorpus was retrieved from two sources of translations: the *Project Syndicate* website, where all articles are written in English, but translations in many languages, sometimes including Italian, are present; and *Internazionale*, an Italian weekly magazine mainly consisting of articles translated into Italian. Once the articles were identified, the English source text was retrieved as well. The *Project Syndicate* articles were published between 2013 and 2017 while the *Internazionale* articles all belonged to the

same issue as they were translations of three articles from the interspecialist journal *Science*. Corpus size and composition are summarised in Table 3.²

Title				
English	Date	Source	Tokens	Overall Total
The Full Value of Childhood Vaccines by S. Berkley (FVCV)	18.04.2013	<i>Project Syndicate</i>	763	
An Advocacy of Dunces by D. Ropeik (AD)	16.04.2014	<i>Project Syndicate</i>	906	
Militant Islamism and Vaccine Skepticism by J. Kennedy and D. Michailidou (MIVS)	22.10.2015	<i>Project Syndicate</i>	877	
When Populism Can Kill by D. Michailidou and J. Kennedy (WPCK)	20.07.2017	<i>Project Syndicate</i>	905	
The Science of Persuasion by K. Kupferschmidt (SP)	20.04.2017	<i>Science</i>	3,511	
Vaccines on Trial by M. Wadman (VT)	20.04.2017	<i>Science</i>	2,241	
False: Vaccination Can Cause Autism/Mercury in Vaccines Acts as a Neurotoxin/Countering Mercury from Vaccines Can Make Children Better/Spreading out Vaccines Can Be Safer for Kids by L. Wessel (F)	20.04.2017	<i>Science</i>	1,188	10,391
Italian				
Il vero valore della vaccinazione infantile by S. Berkley	18.04.2013	<i>Project Syndicate</i>	801	
Quando attivismo fa rima con egoismo by D. Ropeik	16.04.2014	<i>Project Syndicate</i>	1,031	
L'islamismo militante e lo scetticismo sui vaccini by J. Kennedy and D. Michailidou	22.10.2015	<i>Project Syndicate</i>	928	
Quando il populismo rischia di uccidere by D. Michailidou and J. Kennedy	20.07.2017	<i>Project Syndicate</i>	990	
La guerra dei vaccini by K. Kupferschmidt	12.05.2017	<i>Internazionale</i>	3,570	
Parola ai giudici by M. Wadman	12.05.2017	<i>Internazionale</i>	2,267	
I miti da sfatare by L. Wessel	12.05.2017	<i>Internazionale</i>	1,361	10,948

Table 3
Size and composition of the parallel corpus.

Once frequency lists were produced the ten most frequent words were compared with keywords in the English comparable corpus to establish whether similarity was enough to warrant comparison and contrast. On the other hand, the most frequent words in the Italian texts in the parallel corpus were compared with those of the English source texts to check whether they 'lean to' their English source texts as is generally assumed of translations.

Second, qualitative analysis was performed on the whole parallel corpus, but focus was on the *Internazionale* translations as the texts were meant for a readership of scientists as source texts, but were translated into Italian for the lay public. The hypothesis to be tested in this case was whether the change in readership caused more additions, deletions, substitutions, rearrangements, and elaborations in translation and whether these could be described as forms of rewriting, transediting or transcreation.

² Articles are followed by an acronym in brackets to be easily identifiable when examples are quoted in Section 4.2.

3. Quantitative analysis of the comparable corpora: results and discussion

3.1 Comparable corpora

Quantitative analysis relies on established tools in corpus-related approaches, starting with an overview of frequency lists, obtained by excluding a set of stopwords and applying lemmatisation.³ The lemmas found at the top of such lists were used as the main reference for a more in-depth analysis of the single word forms contributing to each lemma and potentially revealing distinct patterns of use and shades of meaning. Subsequently, keywords were extracted. Keyness is a quality of words whose “frequency (or infrequency) in a text or corpus is statistically significant, when compared to the standards set by a reference corpus” (Bondi 2010, p. 3). Scott, Tribble (2006, p. 56) see keywords as reflecting the ‘aboutness’ and style of a text. Keyness can also point to authors’ stance and identity, and to assumptions, values and beliefs of the discourse community in which a text was produced. If combined with contextual information, keywords can help identify the conceptual and organisational structures of texts beyond single words (Bondi 2010; Scott 1997; Scott, Tribble 2006). Moreover, analysing keyness in two different corpora dealing with a similar subject can provide empirical evidence about how topic representation in different contexts (Stubbs 2010). This idea is applied here to comparable corpora, adopting a cross-linguistic and cross-cultural perspective.

The core themes emerging from frequency (Table 4) partly reflect the initial query made to Lexisnexis.

Rank	English		Italian	
	Lemma	Relative Frequency	Lemma	Relative Frequency
1	VACCINE	1.34%	VACCINO	0.70%
2	RISK	0.75%	ANNO	0.52%
3	FLU	0.68%	VACCINAZIONE	0.52%
4	CHILD	0.63%	RISCHIO	0.45%
5	SAY	0.62%	POTERE	0.44%
6	HEALTH	0.57%	CASO	0.32%
7	CAN	0.49%	MALATTIA	0.31%
8	VACCINATION	0.44%	TUTTO	0.26%
9	YEAR	0.43%	BAMBINO	0.24%
10	DISEASE	0.42%	MEDICO	0.24%

Table 4
Frequency lists in the English and Italian comparable corpora
showing top-ranking concepts as lemmas.

³ Someya’s lemmatisation list, retrieved from <http://www.laurenceanthony.net/software/antconc/>, was applied to English, while Měchura’s lemmatisation list, retrievable from <http://www.lexiconista.com/datasets/lemmatization/>, was applied to Italian.

Vaccines and health risks occupy top ranks; on the other hand, the idea of safety, also part of the query, is not so prominent. This suggests that popular press media tend to frame the controversy in terms of risks and dangers – whether they are associated to vaccines or vaccine refusal – rather than emphasizing safety.

Together with most frequent words, collocations are a major component in corpus-based studies and are here extracted and analysed on a set of items selected from frequency and keyword lists, which were regarded as particularly informative for this analysis. According to Sinclair (1991, p. 170), collocation can be defined as “the occurrence of two or more words within a short space of each other in a text”: it is therefore a type of syntagmatic relation between words (Stubbs 1996). With reference to statistics, Baker *et al.* (2008, p. 278) define it as “the above-chance frequent co-occurrence of two words within a pre-determined span.” Since collocates of a word contribute to its meaning and function, collocations can highlight different meanings of the same word form, its dominant phraseology and its own semantic field (Hunston 2002). A concept closely related to collocation is that of semantic prosody, through which the co-text of a word can reveal information about the connotation(s) it carries in the analysed texts (Stubbs 1996; Sinclair 2004).

Rank	Word	Relative Frequency	Keyness	Collocates
1	<i>vaccine</i>	0.98%	9636.35	<i>tdap, pentavalent, hesitancy, attributed, inactivated, attenuated</i>
2	<i>flu</i>	0.68%	6739.88	<i>swine, bird, seasonal, beat, unpleasant, season</i>
3	<i>risk</i>	0.64%	4984.27	<i>perception, minimise, poses, contracting, increased, posed</i>
4	<i>vaccination</i>	0.44%	4351.09	<i>Kingston, movement, mass, clinic, rates, programs</i>
5	<i>vaccines</i>	0.36%	3572.14	<i>clumping, improperly, expired, ineffective, stored, Novartis</i>
6	<i>health</i>	0.57%	3194.84	<i>institutes, organization, digest, chief, organisation, cabinet</i>
7	<i>date</i>	0.03%	2573.06	<i>immunisations, up, vaccinations, their, with, to</i>
8	<i>vaccinated</i>	0.23%	2277.8	<i>fully, against, getting, get, start, mothers</i>
9	<i>said</i>	0.51%	2228.53	<i>Byrne, Sheppard, Lauzon, Perrett, spokeswoman, ms.</i>
10	<i>disease</i>	0.28%	2172.75	<i>obstructive, pulmonary, kidney, emphysema, centers, neurological</i>

Table 5
English keyword list with collocations.

Both *VACCINE/VACCINO*⁴ (mostly indicating the substance) and *VACCINATION/VACCINAZIONE* (mostly indicating the treatment) are among the core items in the analysed corpora (cf. Tables 5 and 6). Collocations suggest that in English, the information provided about vaccines is mainly classificatory, i.e. identifying different types of vaccines – often pre-modifiers such as *tdap*,⁵ *pentavalent*, *inactivated*, *attenuated*, *bcg*.⁶ In English, *vaccines* also collocates with *link* and *autism*. Concordance inspection revealed that mentions of the vaccine-autism link is often preceded by negations or verbs such as *debunk*, in line with the scientific consensus about the safety and importance of vaccines. Groups of people who reject such consensus are referred to as *anti-vaccination movement*, as emerges from the collocates of *vaccination*. Synonyms found in the corpus are *anti-vaccine*, *anti-vax*, and *anti vaxxers*. Corresponding actors in Italian do not strongly collocate with *VACCINO/VACCINAZIONE*; they were nevertheless identified as *anti-vaccino/i*, *anti-vaccinazione/i*, *anti-vaccinatori*, *no vax*.

Classificatory information also appears in the collocates of the Italian *vaccino* (*coniugato*, *tetraivalente*, *antipneumococco*), and, in part, *vaccinazione* (*antipneumococcica*); the ‘public service’ dimension is stronger than in English, and spreads across all word forms. This dimension includes:

- instructions for those who need to be vaccinated, as in *Chiunque può acquistare il vaccino in farmacia* (‘anyone can purchase the vaccine at the pharmacy’);
- public recommendations, as in *La vaccinazione viene raccomandata anche per categorie di soggetti che [...]* (‘vaccination is as well recommended to groups of people who [...]’); and
- legislative aspects, as in *Quali sono le vaccinazioni obbligatorie?* (Which vaccinations are compulsory?).

As emerges from the analysis, vaccination is not only to do with scientific facts, but also with political decisions and with people’s everyday life. Particularly in the Italian corpus, vaccines are represented as a service that can be obtained in various ways by citizens who need it. In some cases it is even explicitly referred to as something legally mandatory. This might reflect a tendency of the Italian culture to deal more explicitly with power, rules and authority, and to nominally attribute them greater relevance than in the UK and other English speaking countries (De Mooij 2004).

⁴ Here, ‘word form’ (as equivalent to wordform and word-form) is used to indicate the different forms subsumed under the same lemma (see Sinclair 1991, p. 41).

⁵ Tetanus, diphtheria and pertussis.

⁶ Bacillus Calmette-Guérin, primarily used against tuberculosis.

Italian				
Rank	Word	Rel. Freq.	Keyness	Collocates
1	<i>vaccino</i>	0.36%	3348.01	<i>coniugato, tetravalente, antipneumococco, acquistare, adiuvato, offerto</i>
2	<i>vaccini</i>	0.34%	3120.42	<i>obbligatori, antinfluenzali, somministrati, sicuri, blocco, disponibili</i>
3	<i>vaccinazione</i>	0.31%	2865.49	<i>antipneumococcica, consigliata, raccomandata, gratuita, straordinaria, obbligatoria</i>
4	<i>rischio</i>	0.38%	2720.72	<i>Reye, appartenenti, categorie, considerate, fattore, rientrano</i>
5	<i>vaccinazioni</i>	0.21%	1896.71	<i>eseguite, obbligatorie, effettuate, crollo, raccomandate, calo</i>
6	<i>influenza</i>	0.21%	1734.84	<i>stagionale, complicanze, arrivo, prevenire, vera, sue</i>
7	<i>medici</i>	0.22%	1672.63	<i>infermieri, federazione, famiglia, fimmg, sindacato, pediatri</i>
8	<i>malattie</i>	0.20%	1565.04	<i>emopoietici, metaboliche, renali, malassorbimento, dismetaboliche, trasmissibili</i>
9	<i>virus</i>	0.17%	1486.67	<i>papilloma, costituire, umani, influenzali, batteri, fonte</i>
10	<i>asl</i>	0.13%	1086.03	<i>Brescia, ambulatori, igiene, Milano, Toscana, dipartimento</i>

Table 6
Italian keyword list with collocations.

Risk is another major concept in both corpora. The English form *risk*, which most contributes to the frequency of the lemma *RISK*, is predominantly a noun.⁷ Concordances and collocates of *risk* and *risks* suggest an association to general health problems rather than vaccines (e.g. [...] *to minimise the risk of contracting the virus; The unvaccinated child poses no risk to vaccinated children; Every child would be at risk of contracting a preventable disease*), which is coherent with the previously observed negation of the vaccine-autism link. Accordingly, the strong collocation between *risk* and *perception* indicates that *risk perception* (perhaps as opposed to real risk) is mostly discussed in relation to misinformed concerns and reservations about vaccines. A similar view is expressed through the collocates *outweigh* and *benefits*, realising the proposition that the benefits of vaccines outweigh its risks. On the other hand, collocates such as *increased* and *greater* are used to inform about factors which may enhance particular health risks (e.g. *Pregnant women with influenza have an increased risk of complications*). All these observed patterns of use may partly perform persuasive functions, which are particularly important in the argumentation that is typical of scientific controversies. Collocations of the Italian *rischio* were instead affected by recurrent strings of texts identifying at-risk categories for

⁷ *Risk* concordance lines were tagged using the CLAWS online POS tagger. Out of 2607 occurrences, 2026 (77.7% of the total occurrences) were tagged as nouns and 217 (8.3%) were tagged as adjectives as part of pre-modifying forms such as *high-risk areas*. The remaining forms (14.0%) were either tagged as verbal forms or remained untagged.

seasonal flu, with the purpose of advising them on vaccine availability and procedures, as in the following examples: *La vaccinazione è gratuita [...] per le seguenti categorie: [...] bambini e adolescenti in trattamento a lungo termine con acido acetilsalicilico, a rischio di Sindrome di Reye in caso di infezione influenzale* ('Vaccination is free of charge [...] for the following categories: [...] children and young people under long-term treatment with acetylsalicylic acid, who risk developing Reye syndrome in case of flu infection'); *Nelle categorie a rischio rientrano [...]* ('At-risk categories include [...]').

Among keywords, influenza (*flu, influenza*) is the single vaccine-preventable disease that stands out in both languages, due to the widespread annual flu vaccination campaigns reported in newspapers. In general, diseases (*disease/malattia*) are also central in both corpora for their semantic relation to vaccines: they tend to collocate with classificatory modifiers, and can be medical terms. English terms are sometimes partly defined or exemplified, as in: *chronic respiratory disease, including chronic obstructive pulmonary disease, bronchitis or emphysema*, or in *people with [...] neurological disease, such as Parkinson's or Motor Neuron Disease*. Often, they are left undefined, as part of lists of conditions that may cause severe complications in case of flu, e.g. *those with chronic respiratory disease; chronic heart disease; chronic kidney disease; chronic liver disease; chronic neurological disease; diabetes and immuno-suppression*. In Italian, where the plural form *malattie* ('diseases') is predominant, term collocates are mostly included in similar lists, and are left undefined, e.g. *malattie croniche a carico dell'apparato respiratorio, circolatorio, renale, malattie degli organi emopoietici, diabete* ('chronic respiratory, cardiovascular or kidney diseases, hematopoietic organ diseases, diabetes'). Overall, concordances reveal that Italian texts tend to provide less explanatory and definitional material, maybe taking that knowledge for granted for readers included in at-risk groups. This confirms that Italy is a high-context culture where much information remains implicit, as opposed to English-speaking countries, which are lower-context cultures where information is made explicit (Katan 2003, p. 183) and provides useful guidelines for translation for the English-Italian language pair.

Reference to experts' statements and opinion is key in science communication, even more so during scientific controversies. Here, the role of experts/mediators between scientific notions and the public is attributed to health care professionals and, less frequently, to scientists. There is a range of noun phrases to identify actors in the medical professions; some of them have been compared between the two corpora. It was observed that Italian texts emphasise the centrality of GPs (*medico/plural medici*), usually further specified by post-modifiers *di base, di famiglia, curante, di medicina*

generale, which all converge towards the figure of ‘family doctor’/GP. *Dottore* (‘doctor’) and *pediatra* (‘paediatrician’) are used with a similar meaning. Collocations of *medico* and *medici*, and the high keyness of *medici*, point to their role as health care – including vaccination – providers, but also as trusted people who can be consulted for useful information and advice. An example is “*i soggetti appartenenti alle categorie a rischio potranno rivolgersi al proprio medico di famiglia*” (‘people in at-risk categories can consult/visit their family doctors’). Moreover, collocates of the plural form identify doctors as a homogeneous category through reference to several associations and by sometimes including them among at-risk categories. English has corresponding forms, mainly *GP/general practitioner*. The local and personal element can partly be found in the use of *doctor* and *physician* – especially when preceded by possessive determiners and/or the noun pre-modifier *family*. However, this shade of meaning is less frequent in English and was not found among key items. The importance of health care services and their workers with respect to this controversy somehow moves representatives of the scientific community to a more peripheral role. Researchers and scientists are less frequent than doctors in both languages, although in the English corpus they are almost three times as frequent as in the Italian one, perhaps reflecting a slightly higher reliance on their statements and opinions in these texts.

The occurrences of *health care worker(s)/practitioner(s)/professional(s)*, etc. contributed to the overall frequency of the lemma *HEALTH*, at the top of the English frequency list. However, most of its strongest collocates – *chiefs, institutes, organisations, cabinet, ministry* – indicate that it is mostly intended as part of institutional organisations and procedures. The fact that there is no direct, equally frequent item in Italian may be due to a more lexically fragmented way to refer to health care institutions; but it could also indicate a slightly lower level of trust and consideration towards public institutions in general.

3.2 Parallel corpora

The core themes emerging in the comparable corpora are largely confirmed in the English component of the parallel corpus (Table 7). Albeit with different frequencies, probably due to different preferences in creating cohesion,⁸ Italian translations appear to be quite close to the English source texts, at least for the five most frequent items. The higher number of tokens (10,948) of the Italian component compared to the English one (10,391) is in line with the general rule that translations are longer than their originals. This

⁸ Unlike English, Italian shows a preference for cohesion created with devices other than lexical repetition wherever possible.

also indicates that changes in translation include a lower number of deletions. Another element that signals the translation ‘status’ of the Italian articles and marks their deviation from English articles is sentence length: at an average of 25.25 words, it is not only higher than the English source texts (22.01 words) but also reflects the current standard sentence length in the Italian press (Bonomi 2002).

English			Italian	
Rank	Keyword	Relative Frequency %	Keyword	Relative Frequency %
1	VACCINE	1.35%	VACCINO	1.30%
2	CHILD	0.68%	POTERE	0.58%
3	VACCINATION	0.64%	BAMBINO	0.49%
4	PARENT	0.56%	VACCINAZIONE	0.47%
5	SAY	0.55%	GENITORE	0.43%
6	CAN	0.49%	ANNO	0.35%
7	GOVERNMENT	0.38%	MALATTIA	0.34%
8	HEALTH	0.38%	VACCINARE	0.34%
9	INJURY	0.35%	CASO	0.31%
10	ONE	0.34%	SE	0.29%

Table 7

Frequency lists in the English and Italian parallel corpora showing top-ranking concepts.

Calculation of keyness using the Lexinexis comparable corpora as reference corpora indicates that English source texts are more argumentative/persuasive as evidenced by the comparatively high frequency of words such as *say*, *opposition*, *advocates*, *militants* and *persuasion*. Negative keyness concerns words such as *safe*, *risk* and *vaccine*, which suggest a discursive strategy attempting to avoid controversial points. Keyness of the Italian parallel component exhibits higher frequency of the concepts relating to society and government – *comunità*, *governo/i*, *programme*, *sanità* – or to argumentation – *prove* and *autismo*. Keyness of words referring to government and society can again point to the fact that the Italian texts are translations as relationship with power and authority in Italy is culturally different from what that of English-speaking countries. Moreover, the lower frequency of the Italian equivalents of health, *salute* and *sanità*, can partly be explained with the change of name of the corresponding services and ministry, once referred to as *sanità* and now termed *salute*. The keyness of *sanità* in the Italian texts could lend support to the idea of conservatism in the language of translations (Baker 1996).

Based on the analysis of collocations in the comparable corpora, the same keywords were investigated in the parallel corpus to establish to what extent they reflected the general trends in the representation of controversies over vaccines. As Table 8 below indicates, given the size of the parallel corpus, collocations are more restricted in number and the most frequent ones

are not equally key in comparable corpora. Italian equivalents are shown to highlight translation strategies.

English	Italian
flu/measles/MMR/tetanus vaccine	vaccino antinfluenzale/contro il morbillo/trivalente/antitetanico
childhood vaccines/value of vaccines	vaccinazione infantile/valore dei vaccini
at risk/autism risk	a rischio/rischio di autismo
polio vaccination/vaccination rates/rates of vaccination/vaccination programs	vaccinazione antipolio/tasso di immunizzazione/programmi/campagne di vaccinazione
World Health Organisation//Minister of Health//public health	Organizzazione Mondiale della Sanità//ministro della salute/sanità//salute/sanità pubblica
vaccinated against	vaccinato/a/i/e contro/immunizzato/a/i/e da
Centers for Disease Control	centri per la prevenzione e il controllo di malattie

Table 8

English and Italian keyword list from our parallel corpus with collocations.

As in the comparable corpora, collocations with vaccine(s) and vaccination concern information that is mainly classificatory. For collocations that are actually terms, Italian reflects the tendency to use medical terms of Greek or Latin origin where English draws on general language: *MMR vaccine* → vaccino trivalente, *vaccinated against* → vaccinato contro but also immunizzato da. *Risk* is present in concordances that downplay the association with vaccines.

Disease is mostly used in two collocations, *infectious diseases* and *Center(s) for Disease Control and Prevention (CDC)*. The variety of diseases found in the comparable corpora is not present here, while doctors are referred to in general terms and family doctor has only one occurrence. Physician(s) is even more infrequent and all occurrences of scientists are found in the main *Science* article and in “An advocacy of Dunces”, which in the source texts aim to help scientists understand how they can best convince people that vaccines are safe and that it is important to immunise people. Both *doctor(s)* and *physician(s)* are translated as *medico/i*. Like scientist(s), researchers is used – though less frequently – in the same two texts and rendered literally as *scienziati* or *ricercatori*. This does not consider that in Italian there is a tendency to avoid these general references and replace them with the corresponding abstract concepts, namely science and research.

The consistently lower frequency of key words or terms in Italian translations also suggests an attempt to avoid lexical repetition to create cohesion and rely on strategies such as the use of synonyms or relative clauses that are standard practice in Italian writing. Together with the qualitative analysis that follows, it contributes to creating a full picture of translation features. Contrasting information gathered from the comparable and the parallel corpora gives a clearer idea of what can be regarded as more or less standard in the source language, English, and in the target one, Italian.

This allows translators not only to draw guidelines for translation, but also to gain insights for translation revision and quality assessment.

4. Qualitative analysis: Results and Discussion

4.1 Comparable corpora

The qualitative analysis was performed on texts concerning the debate on the MMR-ASD association, as shown in the frequency lists in Table 9.

Rank	English		Italian	
	Keyword	Relative frequency %	Keyword	Relative frequency %
1	VACCINE	2.13%	VACCINO	1.27%
2	CHILD	1.69%	VACCINAZIONE	0.67%
3	AUTISM	1.11%	ANNO	0.65%
4	STUDY	0.99%	OBBLIGATORIO	0.57%
5	MMR	0.76%	BAMBINO	0.52%
6	RISK	0.76%	DECRETO	0.46%
7	ASD	0.70%	SCUOLA	0.46%
8	FIND	0.61%	AUTISMO	0.44%
9	PEOPLE	0.58%	SANZIONE	0.44%
10	VACCINATE	0.50%	SALUTE	0.36%

Table 9
Frequency lists of texts used for the qualitative analysis.

In particular, four of the collected texts (two in English and two in Italian) report on a 2015 study published in the *Journal of the American Medical Association*, stating that there is no causal link between the MMR vaccine and ASDs in children.

Overall, the analysed corpora helped highlight some linguistic differences, which might be grounded in culture. For example, the frequency of reference to norms and laws in Italian words such as *decreto* (decree), *obbligatorio* (mandatory) and *sanzione* (sanction, penalty, punishment) may point to cultural difference in power relationships. These, together with recurring patterns highlighted by concordances, should be taken into consideration when approaching translation. On the other hand, there are similarities between the two languages: most importantly, they shared many core themes; moreover, they used some linguistic devices – lexical and contextual – to perform more of a persuasive and argumentative function rather than an informational one.

4.2 Parallel corpora

For the qualitative analysis of the parallel corpora, the three main categories identified – rewriting transediting and transcreation – were divided in components and a count of occurrences was taken for both the *Project Syndicate* and the *Science* article translations. As transcreation can take many different forms, instances of transcreation were detected and then labelled as components. What emerged from analysis was that transcreation was mainly used for headlines and standfirsts, though *Science* translations in *Internazionale* also have an added box (see below). Categories and instances are summarised in Table 10. To provide a better picture of the translations, ‘unsuccessful’ instances – i.e. attempts at rewriting, transediting or transcreation that resulted in non-standard collocations, unnatural word order, unsuitable adaptations to the target culture etc. – are also listed, preceded by minus signs.

Category and components	<i>Project Syndicate</i> article translations		<i>Science</i> article translations	
	REWRITING	36	-37	47
Additions	+5	-2	+2	-1
Deletions	+6	-6	+11	-2
Substitutions	+6	-16	+11	-11
Rearrangements	+14	-13	+20	-5
Elaborations	+5	-9	+3	none
TRANSEDITING	36	-47	46	-27
Linguistic transediting	+9	-26	+4	-14
Situational transediting	+19	-13	+30	-8
Cultural transediting	+8	-8	+12	-5
TRANSCREATION	5	0	16	0
Headlines and paragraph titles	+1	-	+12	-
Standfirsts	+4	-	+3	-
Boxes	none	-	+1	-
Overall totals	77	-84	109	-46

Table 10

Successful (+) and unsuccessful (-) instances of rewriting, transediting and transcreation in *Project Syndicate* and *Science* article translations.

As can be seen, the instances of rewriting, transediting and transcreation are higher overall in the *Project Syndicate* article translations (161) compared to the *Science* ones (155) and the number is even greater in relative terms as the former articles are shorter than the latter. Yet, the number of positive cases of rewriting, transediting and transcreation is much higher in the *Science* translations (109) than in the *Project Syndicate* ones (77). In two categories out of three, unsuccessful attempts in *Science* translations published by *Internazionale* are consistently lower in number than in *Project Syndicate* ones. In both sets of translations, the most frequent successful adaptations concern rearrangements as forms of rewriting – typically use of ‘natural’

phrase and clause order in the target language – and situational transediting, while the highest number of failed attempts is found in substitutions as forms of rewriting and in linguistic transediting. Though overall *Project Syndicate* translations into Italian are closer to their source texts because no change in readership is implied, results suggest that translators are not completely aware of modes of argumentation in the debate over vaccines in Italy and their linguistic implications.

In the following example from *Project Syndicate*, the successful word order rearrangement (*la possibilità di eliminare malattie*) and addition of *negli ultimi tempi* at the beginning of the sentence is partly offset by the literal translation of *popular resistance* (opposizione popolare instead of ‘opposizione diffusa’) as a failed case of linguistic transediting and of *governments* (governi) in the last sentence, where cultural transediting would suggest the use of *stato* (state) as the personified institution in charge of educating citizens.

No medical or technical obstacles are blocking us from eradicating preventable infectious diseases such as measles or polio. Rather, the biggest hurdle has been popular resistance to vaccination. By allowing parents to make uninformed decisions about the health of not just their own children, but their entire community, the Syriza government is only adding to the problem. Governments should be educating the public to improve overall coverage, not validating unfounded fears about vaccine safety. (WPCK)

Negli ultimi tempi, la possibilità di eliminare malattie infettive prevenibili non è stata inficiata da ostacoli di natura medica o tecnica quanto da un'opposizione popolare ai vaccini. Permettendo ai genitori di prendere decisioni poco circostanziate sulla salute non solo dei propri figli ma anche della propria comunità, il governo di Syriza non fa che aggravare il problema. I governi dovrebbero educare i cittadini a migliorare la copertura generale, non avallare timori infondati sulla sicurezza dei vaccini.

In *Science* translations additions as forms of rewriting are used to guide readers in understanding the authoritativeness of the opinions reported and in making sense of the controversy over vaccines. In the following extract from the “False” articles, a specification is provided of what kind of publication *The Lancet* is, *medical license* undergoes cultural transediting and becomes *albo dei medici* with the added gloss “autorizzati ad esercitare la professione”. Rearrangement as rewriting is found in the different Italian paragraphing, in phrase order in sentence three and in syntax, which involves joining of sentences and use of standard Italian punctuation such as the replacement of a full stop with a colon in Italian. Situational transediting is clear both in the translation of *the claim began to unravel* and the deletion of *Citing further concerns about ethics and misrepresentation*, which reflect the source text interest in following standard procedures in publication, retraction and the ethics of scientific research, but are not all that relevant to the general

public. Finally, term formation, frequency of use and term transparency for a lay audience are at play in the choice of using *vaccino trivalente* for *MMR vaccine*.

In 1998, UK doctor Andrew Wakefield published a study in *The Lancet* suggesting that the measles, mumps, and rubella (MMR) vaccine could trigger autism. In the years after, MMR vaccination rates in England dropped below 80%. But the claim began to unravel in 2004 after journalist Brian Deer reported undisclosed conflicts of interest. Wakefield had applied for a patent on his own measles vaccine and had received money from a lawyer trying to sue companies making the MMR vaccine. Citing further concerns about ethics and misrepresentation, *The Lancet* retracted the paper in 2010. Shortly after, the United Kingdom's General Medical Council permanently pulled Wakefield's medical license. (F)

Nel 1998 il medico britannico Andrew Wakefield pubblicò sulla rivista *The Lancet* uno studio in cui affermava che il vaccino contro il morbillo, la parotite e la rosolia (Mpr) poteva provocare l'autismo. Negli anni successivi nel Regno Unito la copertura del vaccino trivalente tra i bambini di due anni scese sotto l'80 per cento. Le affermazioni di Wakefield furono messe in discussione nel 2004, quando il giornalista Brian Deer rivelò che dietro c'erano segreti conflitti d'interesse: Wakefield aveva chiesto di brevettare un suo vaccino per il morbillo e aveva ricevuto soldi da un avvocato che stava cercando di fare causa alle aziende che producevano il vaccino trivalente.

The Lancet ritirò l'articolo nel 2010 e poco dopo il General medical council britannico radiò Wakefield dall'albo dei medici autorizzati ad esercitare la professione.

Failure to provide necessary additions as part of rewriting can adversely affect translations. In the sentence below, *fraudulent* rendered as *tendenzioso* downplays the extent to which the population was deceived as the extract above suggests. An addition such as *articolo tendenzioso poi ritrattato* or *articolo falso e tendenzioso* would have been required to relay the argument, while the different ways of creating cohesion in English and Italian are recognised in the linguistic transediting of the initial *and* as *inoltre*:

And many high-income countries have experienced measles outbreaks in recent years, owing to fears about vaccinations that began with the publication of a fraudulent paper in the British medical journal *The Lancet* in 1998. (WPKK)

Inoltre, negli ultimi anni molti paesi ad alto reddito hanno avuto a che fare con epidemie di morbillo a causa dei timori suscitati da un articolo tendenzioso sui vaccini che uscì sulla rivista medica Britannica *The Lancet* nel 1998.

Elaborations, situational and cultural transediting are present in the following paragraph, where relevance of some phrases in the argumentation is clearly recognised. *Of course* is translated pragmatically as *inutile dirlo* – an instance of cultural transediting, which is also the chosen strategy to render the

relative clause *what those advocate believe* with a noun phrase (*sulla base delle loro convinzioni*). Two clauses are elaborated on to translate the rhetoric of the argument effectively – *Though the evidence is clear that > Sebbene sia dimostrato che* and *that its opponents stubbornly claim it does > che i loro oppositori si ostinano a denunciare*, while the standard collocation *dangerous territory (terreno pericoloso)* appears a faulty case of linguistic transediting as *terreno minato* is much more frequent in Italian in similar contexts.

This is, of course, dangerous territory. Though the evidence is clear that vaccination does not cause the harms that its opponents stubbornly claim it does, any effort by a government to restrict speech is worrying. No free society should permit its government to decide which advocacy groups can say what, based on what those advocates believe. (AD)

Qui siamo, inutile dirlo, su un terreno pericoloso. Sebbene sia dimostrato che i vaccini non provocano i danni che i loro oppositori si ostinano a denunciare, qualsiasi tentativo da parte di un governo di limitare la libertà di espressione è preoccupante. Nessuna società libera dovrebbe consentire al proprio governo di decidere quali gruppi di pressione possano parlare, e cosa debbano dire, sulla base delle loro convinzioni.

Situational transediting requires translators to identify the role phrases or clauses play in context with a view to finding good functional equivalents in the target language. In the following example, the functions of informal language – *only the evidence showed/and that by spreading their fears/– and you* – and direct questions are recognised and suitably relayed into Italian:

Imagine that a group of advocates tried to alert the public to a danger that they perceived, only the evidence showed that the danger was not real, and that by spreading their fears, this group was causing people to behave in ways that put the wider public – and *you* – at risk. What would you do? What should the government do? (AD)

Immaginate se un gruppo di attivisti tentasse di mettere in guardia la gente da un pericolo da loro percepito, e poi venisse fuori che non solo tale pericolo non era reale, ma che dando voce alle proprie paure questo gruppo ha spinto altre persone verso comportamenti potenzialmente dannosi per l'intera comunità, di cui voi stessi fate parte. Cosa fareste? E cosa dovrebbe fare il governo?

Strategies are also used to replace informal references to medical concepts in English with the corresponding term in Italian as in *after that tetanus shot* → dopo l'incidente con l'antitetanica, *vaccination effort* → la campagna di vaccinazione, *long-term neurodevelopmental damage* → disturbi dello sviluppo neurologico a lungo termine. In some cases, substitutions are not equally effective, as in the following example, where the most frequent equivalent of *eradication* is *eradicazione* while it is the verb *eradicate* whose most frequent equivalent is *sradicare*. The example also includes a case of informal language – *What is standing in the way* – which is replaced by a

bureaucratic phrase (*elementi ostativi*) instead of a more formal equivalent:

What is standing in the way of the virus's eradication is not medical or technical constraints, but political resistance to the vaccination effort. (WPCK)
 Gli elementi ostativi allo sradicamento del virus non sono i vincoli medici o tecnici, bensì le resistenze politiche rispetto a una campagna di vaccinazione.

In *Internazionale* translations from *Science* situational transediting is most evident where the academic setting familiar to the readers of the *Science* articles has to be evoked for the lay public of the *Internazionale* target texts. In the following example, *Plos One* is quite familiar to the readers of the source text, but needs to be glossed in translation. Similarly, the typical way of arguing in science by highlighting method and data – ‘a strong predictor of antivaccine sentiments’, ‘little evidence of a link’ – requires situational transediting to make it easily understandable for the target readers. Adaptation to the intended function is sometimes achieved at the expense of target text fluency, as is clear in the sentence starting with ‘Mentre, nonostante (...)’ below, which is a clear example of failed rearrangement, though the sentence was not left in brackets as in the source text to avoid introducing punctuation that is still non-standard in Italian. Finally, a substitution that makes it more difficult to follow the argument in Italian is the translation of *libertarian parents* as *sostenitori del libero mercato* where it is clear that in the source text reference is made to parents who believe in freedom as a core principle, which may or may not have something to do with a free market.

In a study published in *PLOS ONE*, Lewandowsky reported that free-market ideology is a strong predictor of antivaccine sentiments; many libertarian parents oppose vaccinations, seeing them as infringing on parents' rights. (Despite popular perceptions, Lewandowsky found little evidence of a link between vaccine resistance and left-wing political views.) (SP)

In uno studio pubblicato sulla rivista scientifica PlosOne, Lewandowsky osserva che negli Stati Uniti spesso c'è un legame tra l'ideologia liberista e il rifiuto dei vaccini. Molti sostenitori del libero mercato si oppongono ai vaccini perché li considerano un'imposizione dello stato che viola i loro diritti. Mentre, nonostante la percezione diffusa del contrario, Lewandowsky non ha trovato conferma di un legame tra la resistenza ai vaccini e le opinioni di sinistra.

Cultural transediting can further be achieved through omission or implicitation of parts of text that in Italian – a high context culture – would be regarded as superfluous. In the example below from *Project Syndicate*, “for their children's non-attendance” remains implicit in the target text as a different form of cohesion is created through possessive adjective reference – “i loro genitori” – instead of lexical repetition:

Under a new law, unvaccinated children are not permitted to attend school, and parents of unvaccinated children can be fined for their children's non-attendance. (WPCK)

In base alla nuova legge, i bambini non vaccinati non potranno frequentare la scuola, e per questo i loro genitori saranno passibili di multa.

In *Internazionale* translations, cultural transediting is particularly frequent in the “Vaccines on trial” article, where the translator needs to consider differences in the US and Italian legal systems and adapt the target text accordingly. This process is helped by the fact that its focus in Italian is on the evidence of the safety of vaccines, not on legal procedures in the US courts. Petitioner(s), for example, is rendered as ‘ricorrente’ or ‘querelante’ or glossed as in the excerpt below:

Since its first case in 1988, the vaccine court has adjudicated more than 16,000 petitions and dismissed two-thirds of them. To the successful petitioners, and their lawyers, it has awarded about \$3.6 billion. (VT)

Da quando è entrato in funzione nel 1988, il tribunale dei vaccini ha giudicato più di 16mila richieste e ne ha respinte due terzi. Le persone che sono riuscite a ottenere l'indennizzo, e i loro avvocati, hanno incassato nel complesso 3,6 miliardi di dollari.

The *Project Syndicate* translations include two types of transcreation. One is the translation of the allusive headline “An advocacy of Dunces” with “Quando attivismo fa rima con egoismo”, where the idiom *fare rima con* collocates with two words, *attivismo* and *egoism* that actually rhyme with each other and thus reinforce the idea. The other one is the decision not to translate the standfirsts of the articles into Italian – presumably an editorial choice that applies to all of them. By contrast, the *Science* article translations – as texts from an interspecialist journal translated for the lay public – are definitely the ones that present more instances of transcreation. Transcreation is found in the box “Da sapere. Come funzionano i vaccini” written by the Italian Health Research Institute (Istituto superiore di sanità) to provide readers with essential background information on vaccines from an authoritative source. Transcreation can also be seen at work in the title and standfirst of the articles. In *Internazionale* the overall purpose is to highlight that vaccines are necessary and safe by citing scientists as authoritative sources of information. The main article, “The Science of Persuasion”, promotes information relating to the section in *Science* (News Features) to the title of the article, “La guerra dei vaccini”, thus drawing on the war metaphor. The standfirst is much more extended as it provides an explication of the main points in the controversy over vaccines. The argument of interest to scientists, that is what they can do to persuade parents

that vaccines are safe, is turned into a general reference to fighting misinformation and a statement on the authoritativeness of the journal the article comes from. In terms of cultural differences, this reflects the relevance of hierarchy in power relations in an Italian context:

<i>Science</i>	<i>Internazionale</i>
NEWS FEATURES Vaccine wars	In copertina Kai Kupferschmidt, Science, Stati Uniti
Vaccines save lives. But what is the most effective way to convince worried parents? <i>By Kai Kuperschmidt</i>	Proteggono dalle malattie e salvano milioni di vite, ma suscitano paura e diffidenza. Combattere la disinformazione è difficile: quali sono davvero i rischi dei vaccini? L'inchiesta di una delle più importanti riviste scientifiche del mondo
The science of persuasion	La guerra dei vaccini

Table 11

Transcreation of the title and standfirst of the main article from *Science* into Italian.

Similar strategies emerge in the translation of the *Science* article explaining the work of the US vaccine court. In Italian the bluntness of the title is mitigated by referring to trials indirectly through intertextuality as “Parola ai giudici” reminds readers of the standard phrase “la parola alla giuria” or of plays and films on trials such as “La parola ai giurati”. Here, however, stress is laid again on authority and the last word is that of judges, not of lay people as in a jury. In Italian the standfirst is adapted in that the explicit English wording is replaced by a general description of what the US court does. This is another example of cultural mediation combining transcreation with cultural transediting, where the direct style typical of English is replaced with the required indirectness in Italian. In line with the overall purpose of these articles in Italian translation, a sentence is added to stress that in most cases, harm to people is not caused by vaccines, but by the way they are given the shots.

<i>Science</i>	<i>Internazionale</i>
Vaccines on trial	Parola ai giudici
The U.S. vaccine court weighs real versus bogus risks <i>By Meredith Wadman</i>	Meredith Wadman, Science, Stati Uniti Negli Stati Uniti esiste un tribunale che valuta le richieste di risarcimento per i danni delle vaccinazioni. Ma nella maggior parte dei casi si tratta di lesioni articolari provocate dall’ago.

Table 12

Transcreation of the title and standfirst of the “Vaccines on trial” article from *Science*.

In *Science* the third article is spread out over a number of pages in the form of boxes entitled “False” and followed by the myth in question. In *Internazionale* the boxes are turned into a single article, and a standfirst is added to stress once again that myths have no scientific ground. The titles of the individual boxes are used to introduce sections on the different myths. In this article, reference to the alleged harm caused by vaccines is again indirect, in line with the conventions of the target culture.

<i>Science</i>	<i>Internazionale</i>
Vaccine Myths False: Vaccination can cause autism False: Mercury in vaccines acts as a neurotoxin False: Countering mercury from vaccines can make children better False: Spreading out vaccines can be safer for kids Lindzi Wessel	I miti da sfatare Negli anni si sono diffuse delle false credenze che non hanno fondamento scientifico. Per esempio la relazione dei vaccini con alcuni disturbi neurocomportamentali. Il legame con l'autismo Danni da mercurio La tesi di Mark Geier Distanziare le dosi

Table 13
Transcreation of the false myth *Science* boxes in *Internazionale*.

As can be seen, each “False” headline is turned into a section title that can be easily understandable for the lay public. Consequently, the chemical process whereby mercury acts as a neurotoxin is simply translated as “Danni da mercurio” (mercury damage) whereas “Countering mercury...” is rendered with a reference to the doctor who promoted the theory dealt with in the article. Finally, the last “False” headline is shortened and much information is left implicit in Italian in a process that is adequate in the translation from a low-context to a high-context culture.

5. Conclusions

Public trust in immunization is quite high in English-speaking countries. By contrast, the attitude towards vaccine safety is particularly negative in Italy. Translation of articles on the controversy over vaccines needs to take account of culture-specific differences in sentiment. Analysis of corpora provided background information on how the debate over the controversial issue of vaccines and vaccine safety is framed in two culturally different contexts, the English-speaking countries and Italy. Information retrieved from comparison and contrast of modes of topic presentation in English and Italian was used as benchmark to identify translation strategies, assign them to the category of rewriting, transediting or transcreation and assess translation quality.

Instances of the main procedures for each category were detected and assigned a positive or negative score depending on the degree of success in rendering the feature(s) identified in the source text.

Results suggest that translations into Italian are mainly rewritten and transedited even when there is a major change in readership as in the *Science* articles published by *Internazionale*. Within the two categories, the most frequent procedures in both sets of translated articles are rearrangements – rewriting in the form of changes in phrase and clause order to achieve fluent prose – and situational transediting to suit the intended function(s) of the target text. Major instances of transcreation are only found in the *Science* articles translated by *Internazionale*. They are meant to recast the source texts to meet the requirements of a different readership.

Though the *Project Syndicate* articles in Italian translation feature the highest number of rewriting and transediting instances, many cases of adaptation are either unsuccessful or unnecessary. Albeit longer overall, *Science* articles in *Internazionale* translation show a comparatively sparing use of rewriting and transediting, which is altogether much more effective in realizing the intended function(s) of the target texts. In other words, *Science* articles in translation exhibit greater awareness of the advisability of recasting texts through rewriting, transediting and transcreation when a change in readership is involved – as regards both culture and expertise. In terms of quality assessment, *Internazionale* translations can be said to be better than *Project Syndicate* ones. However, further research is needed to establish why that is the case, especially as *Project Syndicate* does not provide information about its translation service other than the available languages.

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