

Received: May 15, 2018

Revision received: July 30, 2018

Accepted: August 30, 2018

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www.estp.com.tr

DOI 10.12738/estp.2018.4.0299 • 2018 • 18(4) • 917–934

Research Article

Modal Markers as Potential Sources of Distortion in Translated Medical Abstracts*

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Abstract

Modal markers, specifically hedges, are frequent in medical discourse. Translation of modal markers is essential for the proper decoding of target language in the medical domain and poses the problem of conferring signals of mitigated claims, as scientific writing conventions differ between languages and cultures. I argue that, in the medical domain, biased translation of modal markers – in particular by more affirmative choices – can distort readers' interpretation of treatment effectiveness and, thus, interfere with the communicative purpose of the text, when these markers are included in specific lexico-grammatical patterns used in the mediation of medical knowledge. This paper explores distortions due to biased translation of modal markers in a corpus of Cochrane Systematic Review Abstracts translated from English into French. The results suggest that modal markers most frequently responsible for distortion in translation are evidential and auxiliary verbs, followed by modal adjectives and adverbs. Moreover, frequent instances of distortion with embedded and overlapping markers (e.g. modal auxiliaries plus change in tense) were observed. It is hoped these findings can benefit the development of domain-specific MT systems and the teaching of specialized translation.

Keywords

Modal markers • Languages for Specific Purposes • Medical discourse • Specialized translation • Distortion

* This paper presents findings from an ongoing PhD project at the Université Paris Diderot (France) which has for English title “Sources of distortion in translated systematic review abstracts. A comparison of conventional human translation and post-edited machine translation.”

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Citation: Martikainen, H. (2018). Modal markers as potential sources of distortion in translated medical abstracts. *Educational Sciences: Theory & Practice*, 18, 917–934. <http://dx.doi.org/10.12738/estp.2018.4.0299>

Cochrane produces large-scale Systematic Reviews (SRs) on the effectiveness of health care interventions. Cochrane SRs summarize available evidence from clinical trials in order to present practitioners with impartial and up-to-date research results. With an impact factor of 6.754 for the Cochrane Database of Systematic Reviews in 2017 (Clarivate Analytics, 2018), Cochrane SRs are influential in medical decision-making. For each SR, a scientific Abstract is available for free on-line that condenses essential information from the SR in a highly standardized and structured form, alongside a Plain Language Summary (PLS) of essential content. Cochrane SR Abstracts and PLS's are translated from English into various languages by regional Cochrane centers in order to make regularly updated, high-quality medical information available to practitioners around the world. My research deals with the French-language translation of Cochrane SR Abstracts. These translations play an important role in the multilingual diffusion of medical knowledge, as suggested by the 200,000 views per month on average in 2017 for the French-language versions (Cochrane, 2018, p. 7).

Accurate interpretation of research results calls for a precise and objective presentation, a requirement that also applies to the translation of such texts. I have previously argued that, due to the nature of translation as a human activity, translated Cochrane SR Abstracts are likely to include elements that have the potential to distort readers' interpretation of essential characteristics of the SR, for instance the effectiveness of the intervention or the authors' level of confidence in their results (Martikainen, 2018). Thus, distortion in translation interferes with the communicative purpose of these texts, which can be defined as accurate and objective presentation of medical research results in order to facilitate their transfer into clinical practice. Besides certain translation errors, which are a rather obvious source of such distortions, biased translation of lexico-grammatical patterns (Gledhill & Kübler, 2016) was also previously determined to be a potential source of distortion in the interpretation of research results. This is particularly the case for structures containing modal markers because of their importance in specialized languages and the high degree of interpretation associated with their translation. This paper focuses on modal markers as a potential source for distortion in specialized translation.

Modality in Languages for Specific Purposes (LSP)

Modal markers are frequent in LSP, as both deal with the mediation of human knowledge (Vihla, 1999, p. 15). The importance of modal markers in constructing the rhetorical strategies of hedging and boosting that allow authors to position themselves in regard of their text has been extensively studied (*see* for instance Hyland, 1998a, 1998b; Vázquez Orta & Giner, 2008, 2009; or the papers included in the present volume). Hedges, specifically, are characteristic of any specialized discourse (Gnutzmann, 2009, pp. 520–521), which for (1998b, p. 445) reflects

“the critical importance of distinguishing fact from opinion in academic writing”. Particularly relevant for the present study is existing research on modal markers in medical language.

Role of modal markers in medical LSP. Hedges are particularly common in medical discourse, as medical writers tend to make claims in a tentative and reserved way (Yang, Zheng, & Ge, 2015). In medical LSP, the presence of epistemic and deontic modals reflects, respectively, the scientific and practical aspects of medicine (Vihla 1999, p. 42). In Cochrane Abstracts, where the purpose is informative and not persuasive, the scientific aspect is more prevalent, and epistemic or possibility modals such as “may” and “can” function as markers of level of proof regarding the effectiveness of the intervention. The practical aspect of the medical discipline is less relevant in Cochrane Abstracts, although recommendations are occasionally formulated using deontic modals (e.g. “the treatment should no longer be used”).

Use of modal markers is determined, among others, by the communicative purpose of the discourse and the level of claim the authors wish to make, and directly influenced by medical text type (Salager-Meyer, 1994, p. 1). As stated above, the communicative purpose of Cochrane Abstracts can be defined as accurate and objective presentation of research results in order to facilitate their transfer into medical practice. In that respect, it can be considered that using hedges to convey authors’ authentic uncertainty regarding the level of proof of their results actually contributes to more precision, instead of the vagueness and tentativeness traditionally associated with hedging (Vold, 2006, p. 81). The level of claim associated with different modal markers is also related to an evidential use of modal markers, in which the source of knowledge and the reasoning process behind the proposition are manifest (Alonso-Almeida & Cruz-Garcia, 2011, p. 61).

The case of “may” vs “can”. To illustrate the difficulties inherent in the interpretation of modal markers in medical LSP, Table 1 below establishes the profile of “may” and “can” in two previous studies, and in Cochrane Abstracts. Salager-Meyer (1992) discusses medical research article and review article abstracts, while Vihla (1999) reports on medical research articles. The data on Cochrane Abstracts is based on the corpus sample used for this study (*see* Methods section for details).

It has been established that “may” is the modal of highest frequency in scientific writing, and much more frequent than “can” in medical discourse (Salager-Meyer, 1992; Vihla, 1999). Views differ, however, on the level of certainty attached to these markers. In the case of “may”, they range from a high degree of probability (Salager-Meyer, 1992, p. 105) to possibility (Vihla, 1999, p. 19). Similarly, “can” is considered either as expressing uncertainty (Salager-Meyer, 1992, p. 105) or an inherent ability (Vihla, 1999, p. 27). The function of modal markers appears to be closely related to the rhetorical move or text section (Salager-Meyer, 1992).

Table 1
 MAY vs CAN in Medical LSP

	MAY	CAN	Source
Relative Frequency (1,000 words)	3.2	2	Salager-Meyer (1992)
	1.9	0.6	Vihla (1999)
	1.3	0.6	Cochrane Abstracts
Level of proof	Probability	Possibility / Uncertainty	Salager-Meyer (1992)
	Possibility / Doubt	Ability / Potency	Vihla (1999)
	<i>Evidence suggests that lifestyle interventions <u>can</u> benefit cognitive function and school achievement in children of normal weight. Similar beneficial effects <u>may</u> be seen in overweight or obese children and adolescents.</i>		Cochrane Abstracts
Move / Section	Conclusion (12.5)	Data synthesis (7.1)	Salager-Meyer (1992)
	Purpose (9.5)	Conclusion (4.2)	
	Background (50%)	Background (65%)	Cochrane Abstracts
	Conclusions (30%)	Conclusions (25%)	
Collocations	result in / lead to / help / reduce / improve / be associated with...	result in / cause / help / reduce / benefit / produce / affect...	Cochrane Abstracts

In Cochrane Abstracts, the relative frequencies of “may” and “can” are similar to what has been previously observed in medical discourse (respectively, 1.3 versus 0.6. per 1,000 words). The example included in Table 1 shows that their functions in Cochrane Abstracts appear close to Vihla’s (1999) interpretation: while “can” establishes the ability of the intervention to achieve a desired effect, as observed in previous studies, “may” is used to evoke a potential capacity, i.e. the hypothesis under study or the review question. In Cochrane Abstracts, both markers are mainly used in the Background section, as in the example above, as well as the Conclusions section. The comparable collocational profiles of “may” and “can” in Cochrane Abstracts show both are used in a similar epistemic sense, i.e. in evaluating the likelihood of the proposition being true. Usage choices might reflect slight differences in preferential readings received by the two markers: while both can typically receive an epistemic reading, “may” could be characterized by an overlapping evidential reading (Alonso-Almeida & Cruz-Garcia, 2011, p.70), while “can” will more often combine a dynamic reading (Vihla, 1999, p. 47). Also, it seems plausible that “may” would be chosen more often for its lower level of certainty and greater hedging possibilities (Salager-Meyer, 1992, p. 105), so as to avoid any idea of actual ability attached to “can”.

Modal Markers as Sources of Distortion in Translation

In light of this complexity, modal markers can be considered essential in the proper decoding of the target language in medical translation (Pilegaard, 1997, p. 178). Because of inter-linguistic and intercultural differences in the expression of modality - indeed, modality is often expressed differently from one language to another (Guillemin-Flescher, 1984, p. 462), modal structures are also a frequent source of uncertainty for students in medical translation (Popineau, 2016, p. 78). In addition, as explained

for instance by Akbas and Hardman (2018), “academic practices vary based on the genre and the norms of discourse community being contributed to” (p. 834). Previous research has indeed shown that French-language scientific texts are less hedged and more authoritative than English texts (Salager-Meyer, Ariza, & Zambrano, 2003, p. 10). In the medical domain, Vold (2006) establishes the relative frequency of hedges at 3.3 and 2.3 per 1,000 words respectively in English and French. This is mainly because English tends to make modality more explicit through the use of auxiliary verbs and imperative forms, while French will prefer infinitive or assertive forms, specifically in the hypothetical domain (Chuquet & Paillard, 1987, pp. 128–129).

Returning to the example of the modal auxiliary “may”, it is most often translated by the verb *pouvoir* in the indicative mood, followed by the same verb in the conditional mood. Figure 1 illustrates the correspondences of these forms between English and French, an interpretation in accordance with Popineau (2016), for instance. If the degree of certainty of the markers “might”, “may”, and “can” is thought as a continuum, the conditional mood *pourrait(en)t* would be somewhere between the first two, and the indicative form *peu(ven)t* between the last two. Thus, translating “may” by the more affirmative indicative form can be considered a typical manifestation of the lesser degree of modality in French.

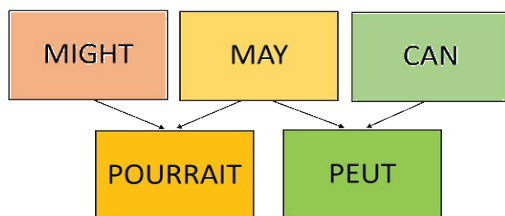


Figure 1. Level of certainty associated with modal markers respectively in English and French.

In some instances, however, these shifts on the continuum of uncertainty can distort readers’ interpretation of the degree of certainty of the presented results. For instance, when the modal auxiliary “may” is used within a lexico-grammatical pattern evaluating treatment effectiveness such as:

“[treatment/intervention] + MAY + reduce + [negative outcome]”,

then the more affirmative translation can positively impact readers’ interpretation of treatment effectiveness, as can be seen in example 1 (b).²

(1) (a) (...) carotid patch angioplasty may reduce the risk of perioperative arterial occlusion and restenosis.

(...) *l’angioplastie par patch carotidien pourrait réduire le risque d’occlusion artérielle péri-opératoire et de re-sténose.*

2 All examples are from the Cochrane Abstracts corpus sample used for the study (see Methods section for details).

[= carotid patch angioplasty MIGHT/MAY reduce the risk of perioperative arterial occlusion and restenosis.]

VS

(b) Carotid patch angioplasty (...) may reduce the risk of carotid artery restenosis and subsequent ischaemic stroke.

L'angioplastie par patch carotidien (...) peut réduire le risque de re-sténose de l'artère carotide et l'AVC ischémique ultérieur.

[= Carotid patch angioplasty (...) MAY/CAN reduce the risk of carotid artery restenosis and subsequent ischaemic stroke.]

The more affirmative translation solution has its origins in the French-language scientific culture and linguistic tradition. Indeed, as stressed by Akbas and Hardman (2018), “this involves orientating their own writing to the norms of a targeted discourse community” (p. 834). This is why I consider these translations to be biased, in the sense of a systematic distortion in the presentation of results (Higgins, Altman, & Sterne, 2011), contrarily to translation errors, which represent random instances of distortion. Assessment of such instances of distortion is complex and context-dependent, and needs to balance target language LSP writing conventions with the lexico-grammatical co-text. Indeed, although French-language scientific writing conventions would most often command use of the more affirmative indicative mood, when “may” appears within positive lexico-grammatical patterns related to treatment effectiveness, the conditional mood should be preferred for accuracy in the expression of authors’ genuine uncertainty.

Method

Corpus of the Study

In order to establish the frequency and distribution of distortions in translated Cochrane SR Abstracts, a corpus sample was manually annotated for instances of distortion. As one of the larger objectives of the project is the comparison of different translation processes in terms of distortion, the corpus sample is representative of the different processes used for the translation of Cochrane evidence into French, i.e. conventional human translation or machine translation post-edited by professional translators or medical volunteers. Since the focus of this paper is on modal sources of distortion in general, corpus data is here presented globally without the existing subdivisions by production process. The corpus sample consists of 150 Cochrane Abstracts randomly selected from a larger pool, for a total of 85,425 words in the English originals and 107,271 words in their French translations.

Table 2
Characteristics of Corpus Sample

Cochrane Abstracts (CABS) Corpus Sample	
Production process	Mixed (Conventional human translation, MT post-edited by professional translators, MT post-edited by medical professionals)
Number of texts	150
Text selection	Randomized
Text type	Abstract
Production period	2008-2015
Word count	English: 85,425 – French : 107,271
Medium length (words/text)	English: 569.5 – French: 715.14
Translation coefficient	1.26
File format	XML

Annotation typology

The annotation typology was specifically designed for this purpose and a description of its development as well as a first version can be found in Martikainen, 2018. The typology distinguishes lexical and grammatical translation errors from biased translations of lexico-grammatical structures. Among the latter, patterns containing modal markers are further divided into sub-categories by type of marker responsible for the distortion in translation (i.e. auxiliary verbs, evidential verbs, adjectives and adverbs, modal clusters). The focus here is on distortions falling into these four categories. The annotation typology also allows for marking the impact (positive or negative) of observed instances of distortion.

Level of analysis	Type of distortion
SENTENCE	LEXIS-GRAMMAR [LG]
	MODALITY [LG_MOD]
	AUXILIARY VERBS [LG_MOD_AV]
	EVIDENTIAL VERBS [LG_MOD_EV]
	ADJECTIVES & ADVERBS [LG_MOD_AA]
	MODAL CLUSTERS [LG_MOD_CL]
	TENSE [LG_TNS]
	NEGATION [LG_NEG]
PHRASE	GRAMMAR [GR]
	SYNTAX [GR_STX]
	PHRASEOLOGY [PH]
	LEXIS [LX]
WORD	OMISSION [LX_OMS]
	ADDING [LX_ADD]
	GRAMMAR [GR]
	SYNTAX [GR_STX]
	LEXIS [LX]
	OMISSION [LX_OMS]
	ADDING [LX_ADD]
	GRAMMAR [GR]
NUMBERS [NUM]	

Figure 2. Typology of sources of distortion in translation.

Tools

Files were randomly selected for the corpus sample from a larger pool using the RAND-function in Microsoft Excel. Figure 3 below illustrates how the annotation task was carried out on the online platform BRAT.

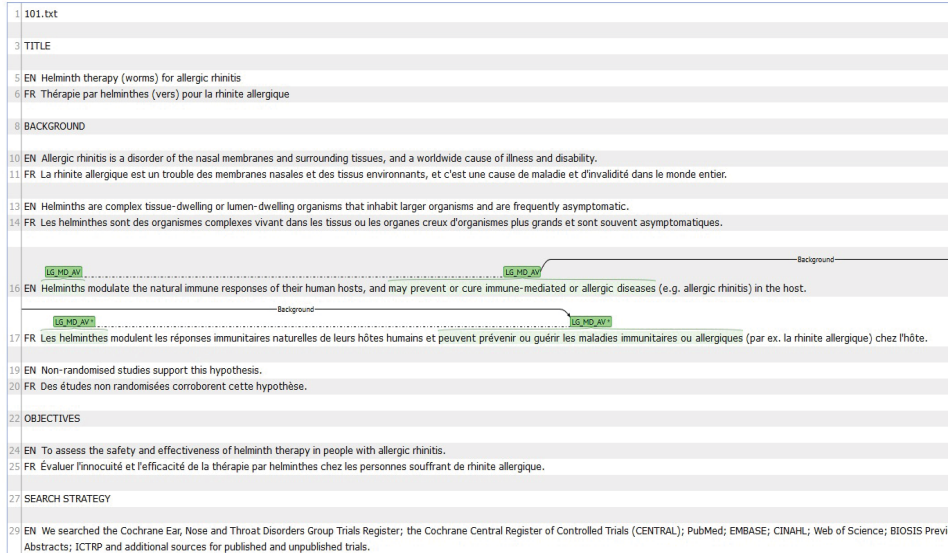


Figure 3. Online platform BRAT used for annotating the corpus sample.

Findings

Table 3 below presents an overview of the different sources of distortion observed in the corpus, broken down by subcategories, as well as relative frequencies by 1,000 words for the main categories of distortion in the annotation typology (i.e. lexis, grammar, and lexico-grammatical patterns). As previously stated, the focus of this paper is on lexico-grammatical distortions specifically due to biased translation of modal markers.

Biased translation of lexico-grammatical patterns involving modal markers represents approximately 18% of all observed instances of distortion in the Cochrane Abstracts corpus sample (65/355). In most of these cases (40/65), the distortion is specifically due to the translation of a modal marker, while in roughly a third of them (25/65), the distortion in translation combines issues of modality with other elements of the lexico-grammatical pattern, such as negation for instance (in Table 3, the latter are included within the meta-category of lexis-grammar).

Table 3
Sources of Distortion in CABS Corpus Sample

	Occurrences	Rel. freq. (1,000 words)
Lexis	150	1.4
· Omission	(60)	
· Adding	(4)	
Grammar	61	0.6
· Syntax	(53)	
Negation	4	
Numbers	16	
Phraseology	11	
Lexis-Grammar	113	1
· Modality	(40)	
- Auxiliary verbs	((17))	
- Evidential verbs	((16))	
- Adjectives & Adverbs	((4))	
- Modal Clusters	((2))	
· Tense	(6)	
· Negation	(37)	
TOTAL	355	3.3

CABS - MODAL DISTORTIONS BY TYPE

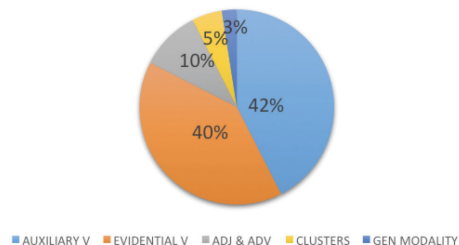


Figure 4. Modal distortions observed in CABS corpus sample by subcategory.

In cases where the distortion is directly imputable to biased translation of a modal marker, main categories responsible for distortion are modal auxiliaries and evidential verbs. The results suggest a tendency towards positively biased translation of modal markers, with approximately 78% (31/40) of observed strictly modal sources of distortion having a positive impact, although the picture is somewhat more nuanced for distortions resulting from biased translation of different types of elements within lexico-grammatical patterns (see below).

Discussion

The different categories of modal markers responsible for distortions in the Cochrane Abstracts corpus sample are discussed below. For each category of markers, typical lexico-grammatical patterns of appearance and their associated communicative functions are presented.

Modal auxiliaries

Auxiliary verbs are involved in roughly 29% (19/65) of lexico-grammatical distortions involving modality, and “may” is the first among them, with 17 occurrences of biased translation in the Cochrane Abstracts corpus sample. Although the auxiliary “may” is mainly translated in the corpus sample by the more affirmative indicative mood of the verb *pouvoir* or other affirmative periphrases (in approximately 2/3 of occurrences), distortion is observed in only 15% of the total occurrences of “may” in the corpus sample (17/111). The typical lexico-grammatical pattern where “may” receives a biased translation with a positive impact is:

“[intervention] + MAY + [have a beneficial effect]”.

Within this pattern, almost half of the occurrences of “may” (17/37) receive positively biased translations, shifting readers’ interpretation towards more certainty regarding the potential beneficial effects of treatments. In the corpus sample, other modal auxiliaries in epistemic use within the same pattern have unbiased translations that do not distort readers’ interpretation of treatment effectiveness: all occurrences of “can” (14) within the pattern are translated by the verb “*pouvoir*” in the indicative mood (see figure 1), while all occurrences of conditional auxiliaries “could” (4) and “might” (4) within the same pattern are translated by the same verb in the conditional mood. These patterns are often incorporated into larger phraseological structures, as in example 2, where the pattern appears in conjunction with the existential structure “There is evidence that”, another indicator of level of claim. Here the positively biased translation of “may” is further reinforced by the adding of an evidential verb related to empirical demonstration of proof (*démontrer*, see below for further discussion).

(2) There is evidence that preoperative smoking interventions including NRT (...) may reduce postoperative morbidity.

Il existe des preuves démontrant que les interventions préopératoires ciblant le tabagisme (...) peuvent réduire la morbidité postopératoire.

[= There is evidence demonstrating that preoperative interventions against smoking (...) MAY/CAN reduce postoperative morbidity.]

In some instances, modal auxiliaries are partially or totally eliminated in the translation, which could be attributed to the tendency to less explicit modality and preference for infinitive or assertive forms in French, as discussed in the introduction. In example 3, although the subjunctive form used in the translation (*soient*) refers to the hypothetical domain, its presence is quite simply required by the previous structure (*il est plausible que*), and the higher degree of uncertainty expressed by the marker “may” is absent from the translation, which is therefore also considered positively biased.

(3) (...) it is biologically plausible they may be efficacious in the treatment of AD and VaD.

(...) il est biologiquement plausible qu'elles soient efficaces dans le traitement de la MA et de la DVa.

[= it is biologically plausible that they be efficacious in the treatment of AD and VaD.]

In clinically-oriented medical discourse, deontic or necessity modals are used prescriptively (Vihla, 1999, p. 18). Such use is rarely encountered in Cochrane Abstracts, which are not prescriptive in nature. Only a few occurrences of deontic “must” were observed (6), which are always translated by a non-biased choice, the verb *devoir* in the indicative mood. The only biased translation of the deontic modal auxiliary “should” observed in the Cochrane Abstracts corpus sample (example 4) occurs in a highly atypical prescriptive context.

(4) (...) *early ERCP should be considered in patients with co-existing cholangitis or biliary obstruction.

(...) la CPRE doit être envisagée chez les patients présentant une cholangite ou une obstruction biliaire coexistante.

[= ERCP MUST be considered in patients with co-existing cholangitis or biliary obstruction.]

In Cochrane Abstracts, the modal auxiliary “should” typically appears in deontic use in the Conclusions section, within two kinds of patterns. The first pattern:

“[results] + SHOULD + BE + [interpreted cautiously/viewed with caution]”

is an internal disclaimer (Abdi, 2012, p. 362) regarding the results of the SR, while the second concerns recommendations for further studies:

“[future studies/trials] + SHOULD + [fulfill certain requirements]”.

Almost half of the occurrences of deontic “should” in the corpus sample are translated by the verb *devoir* in the indicative mood, which is the equivalent of “must” in English, or by other affirmative periphrases (18/41). These more affirmative translations are characteristic of the less hedged scientific writing tradition in French, and do not distort interpretation within their typical patterns of appearance. Nonetheless, the Cochrane Abstracts corpus sample suggests an interesting tendency to politeness in the translation of the auxiliary “should”. Indeed, while all occurrences of “should” within the internal disclaimer pattern (6/6) are translated by the command-like choice of the verb *devoir* in the indicative mood (example 5 a), most occurrences of “should” within the external recommendation pattern (7/8) are translated by the more nuanced and polite choice of the same verb in the conditional mood (example 5 b).

- (5) (a) These results should be interpreted cautiously.

Ces résultats doivent être interprétés avec précaution.

[= These results MUST be interpreted cautiously.]

VS

- (b) Future studies should focus on patient-important outcome measures (...)

Les futures études devraient se concentrer sur des mesures de résultats importants pour le patient (...)

[= Future studies SHOULD focus on patient-important outcome measures (...)]

Evidential Verbs

Evidential verbs, which bring to focus the source of knowledge (Vihla, 1999, p. 23), are the most frequent modal source of distortion observed in the corpus sample and partake in 49% (32/65) of lexico-grammatical distortions involving modal markers. On the basis of the evidence involved, evidentials can be considered sensory (e.g. “this observation shows”) or quotative (e.g. reporting verbs) (Vihla, 1999, p. 23). One such verb to frequently receive a more affirmative translation in the Cochrane Abstracts corpus sample is “show”, which is then likely to positively distort interpretation when it is included in lexico-grammatical patterns such as:

“[intervention] + SHOW + [positive effects]”.

In example 6, the positive distortion is due to the translation of “show” by the verb *s’avérer*³, which could be paraphrased as “turn out to be true”.

- (6) Caffeine has shown effectiveness for treating PDPH (...)

La caféine s’est avérée efficace pour traiter la CPPD (...)

[= Caffeine has proven to be effective for treating PDPH (...)]

Another frequently encountered more affirmative translation for “show” is *démontrer*⁴, which is in the biomedical domain concerned with empirical demonstrations of evidence (Gledhill, 1999, p. 16). Again, when used within a pattern related to positive treatment effects, i.e.:

“[intervention] + SHOW (passive voice) + [to be effective]”,

this more affirmative translation is likely to distort readers’ interpretation of

3 The root is Latin *verus*, for ‘true’. Thus, ‘*un fait avéré*’ is an established fact.

4 ‘*Démontrer*’ concerns a logical demonstration, as in the expression ‘*démontrer par A plus B*’, which could be translated as ‘to prove something through simple logic’.

treatment effectiveness. In example 7, the impact of the lexical choice is reinforced by the choice of tense in the translation, which uses the present perfect of general truth instead of the past perfect.

(7) Parenting programmes have been shown to have an impact on the emotional and behavioural adjustment of children (...)

Il est démontré que les programmes de soutien à la parentalité ont un impact sur l'ajustement émotionnel et comportemental des enfants (...)

[= It is proven that parental support programmes have an impact on the emotional and behavioural adjustment of children (...)]

Out of the 19 occurrences of “show” within this type of patterns, 11 (58%) are translated by more affirmative choices than its closest equivalent, the verb *montrer*, which is considered to have a similar role in reporting results as “show” in the biomedical domain (Gledhill, 1999, p. 17). In comparison, neutral translation choices (e.g. *montrer*, *indiquer*) are observed in the Cochrane Abstracts corpus sample for all occurrences of “show” within another typical lexico-grammatical pattern (25), where the source of knowledge is directly indicated, i.e.:

“[comparison/study/data] + SHOW + [positive effects]”.

Example 8 illustrates an example of such neutral translation choices.

(8) Pooled data from 2 studies showed the total effectiveness rate in the CHM group was higher (...)

Les données regroupées de 2 études ont montré que le taux d'efficacité global dans le groupe des PMC était plus élevé (...)

[= Pooled data from 2 studies showed that the global effectiveness rate in the CHM group was higher (...)]

In some instances, the elimination of modal markers altogether can again be observed. Although such practices are common in translating from English into French – whether because of the preference of the latter for assertive forms or the less nuanced scientific writing tradition of the target culture – the resulting translations, by eliminating the distance between the authors and the observed results, have the potential to distort readers’ interpretation in certain contexts (example 9).

(9) (...) L-epinephrine showed significant reduction compared with racemic epinephrine (...)

(...) la L-épinéphrine entraînait une réduction significative par rapport à l'épinéphrine racémique (...)

[= L-epinephrine led to a significant reduction compared with racemic epinephrine (...)]

Adjectives and Adverbs

Adjectives and adverbs represent the third category of modal sources of distortion and are involved in approximately 22% (14/65) of lexico-grammatical distortions involving modal markers in the Cochrane Abstracts corpus. A typical lexico-grammatical pattern where biased translation of modal adjectives is encountered is:

“[There was] + no + CLEAR/CONSISTENT + evidence + [of a difference / treatment effect]”.

Such patterns are frequently observed in the corpus sample in contexts where some evidence suggests a treatment effect, but the level of proof is not considered strong enough, for instance because of statistically non-significant results, large confidence intervals or study limitations. In example 10, although there is a notable mean difference (MD), the confidence intervals (95% CI) are large enough to include both an important reduction and a notable increase, and the results are based on a single study.

(10) (...) there was no clear evidence of any effect on the amount of time spent awake after sleep onset (MD -20.41, 95% CI -60.4 to 19.6, one study).

(...) *il n'y avait aucune preuve probante d'effet sur le temps passé éveillé après l'endormissement (DM -20,41, IC à 95 % -60,4 à 19,6, une étude).*

[= there was no compelling evidence of effect on the time spent awake after sleep onset (...)]

For this specific pattern, biased translations typically have a negative impact, due to the choice of an adjective such as *probant*, which refers to compelling, probative evidence and therefore downgrades the level of evidence when used within this structure. Comparatively, in instances considered non-biased, the adjective chosen in the translation is most often the closest equivalent *clair*.

Like auxiliaries and evidentials, adjectives and adverbs are also frequently included in larger phraseological structures, where all trace of modality is in some instances eliminated in the translation (example 11).

(11) The results of the best evidence synthesis shows that there is strong evidence for the efficacy of “instruction on joint protection” (...)

Les résultats de la synthèse des meilleures preuves ont montré que « l'instruction sur la protection des articulations » est efficace (...)

[= The results of the best evidence synthesis have shown that “instruction on joint protection” is effective (...)]

Modal Clusters and Distortions Combining Different Elements

The last category of modal markers in the annotation typology concerns modal clusters, or structures involving several modal markers. Modal clusters are frequently encountered in Cochrane Abstracts, for instance in patterns such as:

“[results/data] + SUGGEST + that + [intervention/treatment] + MAY + [be effective]”.

Such structures are, however, not frequent sources of distortion in the Cochrane Abstracts corpus, since biased translation typically occurs on only one marker within the cluster. What is frequently observed in the corpus sample are instances where different kinds of markers contribute to the distortion in translation, for instance when the distortion due to the translation of modal auxiliaries is reinforced with the adding of an evidential verb (see example 2) or a change of tense in the translation (see example 7). Such lexico-grammatical structures with multiple and embedded sources of distortion are highly likely to impact readers' interpretation, as in example 12, where the choice of evidential verb and tense in the translation both contribute to giving a more positive picture of the effectiveness of the treatment than in the source text.

(12) Statins have been claimed to be effective (...)

On considère que les statines sont efficaces (...)

[= Statins are considered to be effective (...)]

Although the examples presented here mainly concern positive lexico-grammatical patterns (the only exception being example 10), sources of distortion combining different elements more frequently involve negatively oriented lexico-grammatical patterns related to lack of effectiveness of treatments. Therefore, while the more affirmative biased translations have an overwhelmingly positive impact in the case of strictly modal sources of distortion, for these combined sources of distortion, the impact of biased translation is more often negative (20/25).

Conclusion

I have argued that biased translation of modal markers within specific lexico-grammatical patterns has the potential to distort readers' interpretation of essential characteristics of texts in medical LSP. The results show that the cultural and linguistic conventions of scientific writing in French, which is more affirmative and less hedged than English scientific writing, are also visible in translations into French, for instance through the elimination of modality in translation observed in the Cochrane Abstracts corpus sample. In specific contexts related to treatment effectiveness, such more affirmative translation strategies frequently result in positive bias. Main modal

markers found to be responsible for distortions in the present study were evidential and auxiliary verbs, specifically “show” and “may”, as well as adjectives such as “clear”. Biased translations of modal markers were in the Cochrane Abstracts corpus sample frequently associated with other sources of translational distortion, for instance changes in tense.

While categorizing and counting occurrences in corpus are necessary first steps in defining and establishing the potential for distortion in translated texts, it must be stressed that the individual instances of potential distortion observed in corpus are naturally not expected to mechanically distort readers’ interpretation in any quantifiable manner. This is particularly the case for modal sources of distortion, given the complexity involved in their interpretation. I hypothesize, however, that the presence of several embedded sources of distortion specifically in essential sections of the Abstract (i.e. results or conclusions) does indeed have the potential to shift readers’ interpretation on the continuum of (un)certainty. While the actual impact of translational distortion in Cochrane SR Abstracts remains yet to be confirmed, first results from a survey currently underway suggest that potential readers are indeed receptive of such subtle differences in expression: on average, approximately 70% of respondents rated the biased translations as being more affirmative than the corresponding neutral versions from which sources of distortion had been removed. Finally, it is hoped these findings can ultimately benefit the teaching of medical translation and post-editing, as well as contribute to the development of specialized machine translation solutions in the medical domain.

Implications

These results could be further exploited for instance in the development of domain-specific MT systems. Preferred translations could be specified for given markers in certain contexts: i.e., when translating from English into French in the medical domain, the preferred translation for the modal adjective “clear” when it occurs in conjunction with the noun “evidence” would be *clair(e)*. Such specifications could be obtained either through the implementation of rules or simply by training the engine with controlled corpora of translated texts. Of course, post-editors and other reviewers working on the machine-translated output would then need to be made aware of such fine-tuning of translation solutions, so as to avoid further preferential changes to the translation of these markers during the editing process.

Moreover, the issues raised in this research are specifically relevant for teaching specialized translation. Indeed, the results support the need to raise students’ awareness of the essential role of modal markers in the communication of scientific knowledge as well as their relevance for specialized translation. It is most notably through the use of these markers that the basic functions of LSP texts are achieved,

and as such, they are tangible manifestations of the communicative purpose of the translated text. For instance, for SRs as a subgenre of medical texts, the purpose can be defined as accurate and objective communication of medical research results in order to facilitate their transfer into clinical practice. Thus, the text type here is purely informative and, as such, calls for “translation according to the sense and meaning” (Reiss, 2004, p. 175). Modal markers are directly involved in fulfilling the purpose of these texts, the communication on specialized knowledge, specifically to mark authors’ confidence in the results of the SR regarding treatment effectiveness (Glenton et al., 2010, p. 572).

As a first step, it is important to get translation students to reflect on idiomatic use according to text function in their own language, much in the way that Popineau (2016) does for the translation of patient information leaflets. Students should, however, also be made aware of the necessity to carefully balance such language-specific idiomatic use with text genre conventions, taking into account the potentially diverging functions of these markers in specialized contexts. As an example, when translating from English into French, idiomatic use would dictate less hedging and more affirmative choices for modal markers, such as using the indicative form for translating the auxiliary “may” as previously discussed. However, given the possible use of hedges in medical LSP for conveying actual uncertainty, such an affirmative translation solution may not actually be an accurate reflection of the original authors’ level of certainty regarding their results. Since precision is the first guiding principle of medical translation according to text function, the purpose of the text might therefore require a more hedged translation than what the conventions of idiomatic language use in French-language scientific writing would suggest.

References

- Abdi, R. (2012). Smoothing the rough edges. *Pragmatics*, 22(3), 355–369.
- Akbas E., & Hardman J. (2018). Strengthening or weakening claims in academic knowledge construction: A comparative study of hedges and boosters in postgraduate academic writing. *Educational Sciences: Theory & Practice*, 18, 831–859. <http://dx.doi.org/10.12738/estp.2018.4.0260>
- Alonso-Almeida, F., & Cruz-García, L. (2011). The value of *may* as an evidential and epistemic marker in English medical abstracts. *Studia Anglica Posnaniensia*, 46(3), 59–73.
- Chuquet, H., & Paillard, M. (1987). *Approche linguistique des problèmes de traduction anglais-français*. Editions Ophrys.
- Clarivate Analytics. (2018). *2017 Journal Citation Report (JCR)*.
- Cochrane. (2017). *Translation Annual Report 2017*.
- Gledhill, C. (1999). Towards a description of English and French phraseology. In C. Beedham (Ed.), *Langue and parole in synchronic and diachronic perspective* (pp. 221–237). Oxford: Pergamon.
- Gledhill, C., & Kübler, N. (2016). What can linguistic approaches bring to English for Specific Purposes? *ASp. la revue du GERAS*, 69, 65–95.

- Glenton, C., Santesso, N., Rosenbaum, S., Nilsen, E. S., Rader, T., Ciapponi, A., & Dilkes, H. (2010). Presenting the results of Cochrane Systematic Reviews to a consumer audience: A qualitative study. *Medical Decision Making*, 30(5), 566–577.
- Gnutzmann, C. (2009). Chapter 19. Language for specific purposes vs. general language. In K. Knapp, B. Seidlhofer, & H. Widdowson (Eds.), *Handbook of foreign language communication and learning* (pp. 517–544). New York, NY: Mouton de Gruyter.
- Guillemin-Flescher, J. (1981). *Syntaxe comparée du français et de l'anglais : Problèmes de traduction*. Editions Ophrys.
- Higgins, J. P. T., Altman, D. G., Sterne, J. A. C. (Eds.) (2011). Chapter 8: Assessing risk of bias in included studies. In J. P. T. Higgins & S. Green (Eds.), *Cochrane handbook for systematic reviews of interventions version 5.1.0 (updated March 2011)*. The Cochrane Collaboration. Retrieved from www.handbook.cochrane.org
- Hyland, K. (1998a). Boosting, hedging and the negotiation of academic knowledge. *Text-Interdisciplinary Journal for the Study of Discourse*, 18(3), 349–382.
- Hyland, K. (1998b). Persuasion and context: The pragmatics of academic metadiscourse. *Journal of Pragmatics*, 30(4), 437–455.
- Martikainen, H. (2018). A functional approach to translation quality assessment: Categorizing sources of translational distortion in medical abstracts. *Linguistica Antverpiensia, New Series—Themes in Translation Studies*, 16, 104–119.
- Pilegaard, M. (1997). Translation of medical research articles. In A. Trosborg (Ed.), *Text typology and translation* (Vol. 26, pp. 159–184). John Benjamins Publishing.
- Popineau, J. (2016). (Re) penser l'enseignement de la traduction professionnelle dans un master français: l'exemple des zones d'incertitudes en traduction médicale. *Meta: Journal des traducteurs/Meta: Translators' Journal*, 61(1), 78–103.
- Reiss, K. (2004). Type, kind and individuality of text: Decision making in translation. In L. Venuti (Ed.), *The translation studies reader* (pp. 168–179). Routledge.
- Salager-Meyer, F. (1992). A text-type and move analysis study of verb tense and modality distribution in medical English abstracts. *English for Specific Purposes*, 11(2), 93–113.
- Salager-Meyer, F. (1994). Hedges and textual communicative function in medical English written discourse. *English for Specific Purposes*, 13(2), 149–170.
- Salager-Meyer, F., Ariza, M. Á. A., & Zambrano, N. (2003). The scimitar, the dagger and the glove: Intercultural differences in the rhetoric of criticism in Spanish, French and English medical discourse (1930–1995). *English for Specific Purposes*, 22(3), 223–247.
- Vázquez Orta, I., & Giner, D. (2008). Beyond mood and modality: Epistemic modality markers as hedges in research articles. A cross-disciplinary study. *Revista Alicantina de Estudios Ingleses*, 21, 171–190.
- Vázquez Orta, I., & Giner, D. (2009). Writing with conviction: The use of boosters in modelling persuasion in academic discourses. *Revista Alicantina de Estudios Ingleses*, 22, 219–237.
- Vihla, M. (1999). *Medical writing: Modality in focus* (Vol. 28). Rodopi.
- Vold, E. T. (2006). Epistemic modality markers in research articles: A cross-linguistic and cross-disciplinary study. *International Journal of Applied Linguistics*, 16(1), 61–87.
- Yang, A., Zheng, S. Y., & Ge, G. C. (2015). Epistemic modality in English-medium medical research articles: A systemic functional perspective. *English for Specific Purposes*, 38, 1–10.