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Mediating the Scientific Text.
A Cultural Approach to the Discourse of Science in some English and French Publications and TV Documentaries.

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ABSTRACT
The discourse of science in our increasingly global world has remained highly cultural, but there has not been a great deal of research into what constitutes the cultural components of such discourse. A contrastive reading of some English and French scientific publications and documentaries, some translated from English, suggests that cultural markers are not simply related to structural organisation or terminology, but that cognitive processes are also involved, with French scientists being still largely rationalist, personal and deductive while American or English ones tend to be more empirical and collective-minded. Viewed in this way, the discourse of science requires mediation rather than translation from one language into the other, and the translator's contribution to scientific discourse in the target language could be considered as highly influential.

RESUME
L'analyse du discours de la science tel qu'il apparaît dans un certain nombre de publications et documentaires télévisés anglophones et francophones permet de déterminer à quel point celui-ci est culturel. Si certains chercheurs le reconnaissent aujourd'hui, ils le font souvent du bout des lèvres, sans aller plus loin que l'organisation structurelle du discours. Or, une lecture attentive de telles publications laisse très vite apparaître à quel point la manière de concevoir la science et, par conséquent, son discours varie profondément d'une langue à l'autre. Les chercheurs francophones, par exemple, fonctionnent selon un mode de pensée rationaliste, déductif et personnel alors que les anglophones tendent à partir de faits concrets pour remonter éventuellement vers une généralisation plus abstraite. Dans un tel contexte, l'action du traducteur ou de la traductrice comme médiateur/médiatrice prend tout son sens dans la mesure où celui-ci/celle-ci, lorsqu'il ou elle traduit, tend à modifier, parfois profondément, le discours de la science dans la langue vers laquelle il ou elle travaille.

KEYWORDS
cultural markers, cognitive processes, mediator, mediate, the discourse of science.

Introduction

Reading contrastively a journal such as *Scientific American* and its French counterpart *Pour la Science*, which is partly translated, is often a source of cultural bewilderment. In an article devoted to the expansion of the Universe and the size of galaxies, J. Peebles (1994:30) compares the opening up of space with a rising loaf of raisin bread, the dough being analogous to space, and the raisins to clusters of galaxies. In the French issue published a few months later (1994:54) the loaf of raisin bread had became a kougelhopf, which to the average French-speaking reader who hasn't had a chance to taste this delicious cake from the French Alsace sounds totally foreign.

The problem at stake here is obviously not a problem of equivalence, in particular not how to select the optimal equivalent from diverse potential equivalents. Indeed choosing another regional equivalent such as the Belgian 'cramique' would not have helped the translator touch a wider readership. Using 'un pain aux raisins' as a possible generic alternative may have been equally unacceptable as French speakers would have understood the term, but would not have been able to associate it with any specific kind of bread because there is no such thing available at any baker's under that name in either France or Belgium.
Behind all this may be the suggestion firstly that the translator is alone with his choices and choices are arbitrary, and secondly, giving that the discourse of science is cultural rather than universal [i]. The constitution of the components of such discourse has not been extensively researched and its importance has hitherto been underestimated.

1. Cultural Markers and Cognitive Processes

For J-L Cordonnier, cultural markers may be present in the scientific text, but they are so to a lesser extent than in other types of texts:

> les paramètres culturels sont à même de jouer par conséquent un grand rôle dans la traduction en général, y compris dans ce qu'on appelle traditionnellement la traduction scientifique et technique, même si ce type de traduction n'est pas le lieu où les enjeux culturels se manifestent avec le plus d'acuité. (2002:39)

In a very interesting article devoted to the translation of scientific texts based on a corpus analysis from *Scientific American*, *La Recherche* and *Mundo Cientifico*, Joëlle Rey also acknowledges cultural differences in the discourse of science between English, French and Spanish, but locates most difficulties in textual structures and sequencing:

> Il me semble donc important de souligner que l'opération de transfert culturel qui est à la base de toute activité traduisante ne se réalise pas seulement au niveau des « mots pleins » (substantifs, adjectifs, verbes), mais aussi au niveau de la structure textuelle et de l 'agencement des séquences qui correspondent aux différentes actions du discours. (2000 :78)

Assuming that cognitive processes behind scientific communication are universal, Rey concludes that awkwardness in the translated text is mostly due to different textual organisation and missing linguistic equivalents in the target culture.

> En fait, les processus cognitifs sur lesquels se fonde la communication scientifique étant semblables dans les différentes cultures, si la langue d'arrivée ne dispose pas d'un terme connecteur équivalent, c'est tout

> simplement parce que son organisation textuelle est différente. Lors de la traduction, l'impossibilité de changer totalement la structure textuelle d'un article de vulgarisation scientifique – qui est conçu non pas comme un texte isolé mais comme un texte interactif étroitement lié à tout un ensemble paratextuel par le biais de notes et de systèmes de renvois – oblige souvent à employer certaines expressions qui semblent peu naturelles dans le texte cible. (2000:79)

Now what if the cultural components of an image in the opening lines of a scientific text in English were not so much a matter of referential content as a matter of the cognitive process behind it? As the raisin bread example shows, referential metaphors such as those which appear in *Scientific American* raise specific translation problems and reveal very different underlying processes. So a paper entitled 'The Cellular Chamber of Doom', starts with a comparison between a protein and Indiana Jones trying to escape from a so-called chamber of doom where he is supposedly being 'fed through a series of enzymatic knives that deliver the Death of a Thousand Cuts' (Goldberg 2001: 56). The French version of the article gives a quasi-literal-translation of the image as if Indiana Jones had now become part of some kind of international referential background (2001:58), which, as with any cultural reference, is likely to be outdated soon. Logically enough, in an untranslated article on the discovery of a Neanderthal flute, there is a reference to Julie Andrews, who 'made the DO-RE-MI scale famous by cleverly teaching it to her spoiled young charges' (Wong 1997:17) whereas the reference to this article could never have been maintained in French, perhaps on the grounds that very few French speakers nowadays can claim to have seen The Sound of Music. In many cases, however, the decision to 'transcode' [ii] an image does not seem to depend on any cultural, let alone referential, logic but rather only on the translator's personal decision. So the French version of the paper on proteins mentioned above leaves out a comparison between the activated degradation of a critical protein and the flowing of water out of a bathtub 'when you remove the stopper' (Goldberg 2001:58). But the French translation of another paper on volcanoes keeps a comparison between the activity of the mantle and 'a pot of thick soup about to boil' (Gurnis 2001: 36), which is suggested in French as something 'qui mijote comme une soupe épaisse sur le point de bouillir'. (2001:46)

The Translator as Mediator: A tentative description of some differences between scientific discourse in French and English

Assuming that the use of concrete images in English scientific papers is cultural because no French writer would have used these images in any French-speaking scientific journal, enables us to view the translator of such texts as a 'mediator', likely to interpose between parties in order to interpret them to each other, thus playing a much more important role than expected in scientific exchanges, something already perceived by J-L Cordonnier:

> Le traducteur joue un rôle essentiel dans la constitution de sa propre culture. Autrement dit, il déstructure, façonne, restructure l'identité de sa propre culture, et à travers les textes traduits, celle de la culture étrangère. (2002:41)

On the other hand, the translator's assessment of his own translation, as well as that of the original text, depends on both his linguistic background and his sociolinguistic analysis, as Jean Peeters suggests:

> En effet, si l'original est soumis au capital linguistique du traducteur, la reproduction-traduction également. L'analyse que fait le traducteur de sa traduction, comme du premier texte, est déterminée par son capital linguistique et par son analyse sociolinguistique, et le sens qu'il y investit est d'abord celui qu'il lui donne hic et nunc. Comme l'écrit George Steiner, « il est inévitable que le faisceau de connotations soit celui de son siècle et de son lieu d'origine ; » le traducteur est ancré historiquement, géographiquement et socialement. Ses usages sont d'abord son histoire – c'est-à-dire l'Autre qu'il s'est construit et les Personnages de ses interactions verbales – et c'est dans celle-ci que s'intègre la reproduction-traduction et son original. (1999:201,202)

Seeing the translator as a mediator whose socio-cultural background may be influential opens up wider perspectives. *Scientific American*, just like *Nature* or *Astronomy*, include articles written by experts for a well-informed yet non-expert readership. Translating papers from such publications involves a number of recurrent cultural difficulties, either textual or cognitive. Understanding the scientific content of the article in order to form a first 'map' or 'mental conception of the original text' remains of course a most difficult first step before any other moves can be made.

> A fundamental fact about texts, however, is that they are both serial and structural – that after one has read a text in time, one retains an array of data about it in an instantaneous form. On these grounds, it has more recently been suggested (though nowhere, as far as I know, clearly set out in model form) that the translation of texts (or at least of extensive texts, or at least of complex texts) takes place on two planes: a serial plane, where one translates sentence by sentence, and a structural plane, on which one abstracts a 'mental conception' of the original text, then uses that mental conception as a kind of general criterion against which to test each sentence during the formulation of the new, translated text. (Holmes 1988:82-83)

As mentioned above, translating difficulties associated with English scientific papers involves textual differences with similar French reports, such as the scarcity of connectives and repetition of key-words, the numerous passive forms, the large number of be-verbs and have-verbs, or the non-coincidence of tenses and aspects in the two languages. More examples are the concrete images and comparisons in the opening lines or core of papers, the numerous references to experts, specific article headings and of course, the polysemic or newly-coined terms, which often have no equivalents yet in French because English has become the language in which science is mostly reported.

To everything that doesn't concern images, personal references and headings, the overall response of French-speaking translators today is approximately the same. Actually, we appear to have all been brought up and educated in a kind of Flaubertian word-saving mood, which Roland Barthes once denounced as 19th century bourgeois writing

> Flaubert, avec le plus d'ordre, a fondé cette écriture artisanale. Avant lui, le fait bourgeois était de l'ordre du pittoresque ou de l'exotique ; (…) Flaubert a fondé une écriture normative qui contient – paradoxe – les règles techniques d'un pathos. (….) la forme travaillée, située sans doute hors du pragmatisme de l'activité bourgeoise, et pourtant insérée dans un ordre de travaux familiers, contrôlée par une société qui reconnaissait en elle, non ses rêves mais ses méthodes. (1972:47-48)

For Roland Barthes, this type of writing soon became standard and a reference in schools:

> Cette écriture conventionnelle a toujours été un lieu de prédilection pour la critique scolaire qui mesure le prix du texte à l'évidence du travail qu'il a coûté. Or rien n'est plus spectaculaire que d'essayer des combinaisons de compléments, comme un ouvrier qui met en place une pièce délicate (….) Entre un prolétariat exclu de toute culture et une intelligentsia qui a déjà commencé à mettre en question la Littérature elle-même, la clientèle moyenne des écoles primaires et secondaires, c'est–à-dire en gros la petite bourgeoisie, va donc trouver dans l'écriture artistico-réaliste – dont seront faits une bonne part des romans commerciaux –l'image privilégiée d'une Littérature qui a tous les signes éclatants et intelligibles de son identité. (1972:50-51)

What Roland Barthes suggested over 30 years ago obviously still holds today as French-speaking translators do share a number of standard reactions, perceptible in the use they make of their own language. Actually, they all tend to use more specific words where English resorts to more common terms (the word scientist may become anything from paléontologue to biochimiste through astrophysicien); they have all been taught to introduce connectives and avoid the French être and avoir verbs; they have been trained

to turn passive forms into active structures, and to refuse repetitions and redundant statements, using synonyms (rare in science) or pronouns instead. In other words, they all tend to have the same translatory reactions towards the superficial linguistic structure of texts whilst, as I suggested above, their response to images and down-to-earth comparisons is much more awkward.

So too is their attitude to expert references. In English papers every single person associated with some research work is mentioned with the university or research centre where they work. Strategies for dealing with such problems, as well as for dealing with concrete images vary widely. Some translators mention all personal names and university centres. Others mention only one or two members of a full team, still others leave out the references to research centres. The long series of

> My colleagues Clement G. Chase of the University of Arizona, Walter C. Pitman III of Lamont-Doherty Geological (Earth) Observatory, Thomas W.C. Hilde of Texas A&M University and I had first considered the problem in the 1970s. (Larson 1995:66)

has simply become

> Nous avions étudié ce problème depuis les années 1970". (Larson 1995:90).

where the first person plural pronoun is ambiguous as it may both refer to several persons or, as a *nous majestatif*, to one only in French. Also interesting in this respect is that in both Belgian and French laboratories or research centres, the organisation is still highly hierarchical so that references are rather to 'le laboratoire du professeur X' or 'l'équipe du Professeur Y' than to any collective body or team.

What becomes of headings in French is also interesting. Scanning the various issues of *Scientific American* and *Pour la Science* since July 2000 has provided me with some more satisfactory and some less pleasant translations. So the following adaptations 'Une sélection naturelle de la culture' for 'The Power of Memes' (Blackmore: 2000) or 'Le recyclage des protéines' for 'The Cellular Chamber of Doom' (Goldberg: 2001), all giving in the heading a tentative answer based on some aspects of the content of the article appeared much 'clearer' adaptations than the more literal '0ù sont-ils?' ('Where are they?') (Crawford:2000) introducing an article on extraterrestrials. Reflecting on this and why I considered some titles 'clearer' than others, I came to realise that for a French speaker like me, 'clear' meant something rather 'abstract', which related to my mind rather than to my eyes or senses with the conclusion again that cognitive processes rather than textual differences were involved here.

A close look at a recent American TV programme on the German-French cultural channel ARTE entitled What's up with the Weather (Pour quelques degrés de plus) opens up new perspectives. Discussing global warming, the programme provides baffling images commented on by an anonymous hidden speaker. Sometimes an expert will come up, succeeding another, with their names and professional qualifications briefly mentioned at the bottom of the image, their personal details being obviously less important than their expertise. Viewers themselves are slowly and imperceptibly made aware of the international community's failure to take significant measures after the complex process of global warming has been explained to them step by step. Similar programmes on either French or Belgian French-speaking channels are very different. Experts are usually invited to comment on and debate the images before and after they are shown, and details of their personal biographies are generally provided. How the increasing number of British and American documentaries on French-speaking channels are commented on is also significant. In Belgium, a TV programme entitled *Le jardin extraordinaire*, which is not on gardening but rather on wild life, often features BBC reports, in particular those by David Attenborough. Instead of having one speaker dubbing David Attenborough, you systematically have two, commenting on the images but also debating them, sometimes even underlying the expertise of the film director, doing, in other words, what E. Franco has named 'voice-over commentaries'[iii].

Beyond words and syntax, the discourse of science in such publications as *Scientific American* or *Nature*, is always structured along the same lines. As shown above, articles usually start with a striking image or a significant little story before facts are displayed and conclusions can be drawn. Conversely, French articles from similar monolingual journals like *La Recherche* or *Sciences et Avenir* usually begin with an opening statement, defining often abstract premises, making them as simple as possible, so preparing the reader for whatever complex conclusions the article aims to report. The French reader is indeed provided from the first with a mental framework into which he can enter the data and facts he will be told in the core of the article. Of fundamental importance is, as Descartes once suggested, that 'I should accept nothing as true which I do not know to be such clearly', knowing that what is clear is 'present and manifest to an attentive mind'.[iv]

While cultural differences are present in journals and documentaries written or designed by experts for a well-informed public, they are equally evident in publications for experts written by experts.[v] A close look at some medical papers shows that the discourse of the kind you find in expert publications written for experts no longer

resorts to images, but still works along empirical collective lines in English whilst it is organised in a rather rational, abstract, personal way in French. Reading contrastively such similar publications as *The Lancet* or the *New England Journal of Medicine*, and the French-speaking publication *Médecine et Hygiène*, leads to similar conclusions. The three weeklies have approximately the same number of pages, same format and same kind of reading public (GPs and more specialised clinicians). All of them are carefully written but the way information is considered and handled in the core articles is totally different.

Original articles in both *The Lancet* and *The New England Journal of Medicine* all have the same surface structure. They start with an abstract and are made up of four major parts entitled Introduction, Subjects and Methods, Results and Discussion. There follows a bibliography and usually a long list of authors, colleagues, co-workers and scientists involved in the same or same type of research as that which is discussed in the article
.
Articles in *Médecine et Hygiène* have a much more flexible individual pattern. Actually no two articles look the same and subtitles seem to depend exclusively on the authors' personal choice. A brief comparison between two articles, one from *The New England Journal of Medicine* entitled 'Vaccinations and the Risk of Relapse in Multiple Sclerosis' (Confavreux:2001), dealing with a topic that has been amply discussed in medical circles, and another, from *Médecine et Hygiène*, entitled 'Lamivudine et hépatite chronique B: quelles indications?' ('Lamivudine and Chronic Hepatitis. Indications') (Malè:2001) may help show my point here.

In the American article the question of the safety of vaccinations in patients with multiple sclerosis is raised from the outset, but left unanswered until the end. The *Methods* include a description of the source population and where the study subjects were chosen before the whole process of exposure to vaccines is developed. Only then, after five pages, is it suggested that 'vaccinations do not increase the risk of relapse in patients with multiple sclerosis' (2001:323).

The corresponding French article is completely different. Keywords, including the various forms of chronic hepatitis, are defined before both the benefits and the limits of the drug known as lamivudine are suggested. Study trials carried out in many countries are summarised rather than developed. The benefits and limits of lamivudine are this time described in detail before the treatment particulars are discussed. Finally, conclusions summarise what was made clear from the start, namely that lamivudine is a treatment of choice in active chronic hepatitis B at least.

Conclusions

A range of conclusions can be drawn from this research. These include the belief that the discourse of science in our global world is still highly cultural both in its textual structures or sequencing as in its cognitive processes. French scientists are largely rationalist, personal and deductive whilst English and American ones appear to be more empirical and collective-minded. Viewed in this way the outward structure of a French article may be more flexible because it depends on the person who writes it whilst it is much more rigid in English as if to provide everybody with equal structures. The English discourse appeals to the senses, resorting to images and working from facts to possible general conclusions. Experts are all equally important for their expertise rather their personalities. In French, the conclusion is unveiled from the first as a 'hypothesis'; what is known is stated and defined as a 'thesis', which is there to make it possible for conclusions to be 'demonstrated'. The mathematical method devised by Aristotle, which was the method Descartes tried to apply to all sciences, is obviously still at the core of French scientific discourse.

Translators of scientific texts may therefore be seen as likely to contribute to creating new ways of communicating science in the target language. They are the ones who unveil differences both in the responses they share with fellow-translators from their own sociolinguistic background and in dealing with idiosyncratic awkwardness, as they face elements in the text they are culturally not acquainted with. Those are also the instances where their role as mediators can best express itself. Whenever they manage to have both linguistic parties come to terms with each other, their influence on the scientific discourse in the target language may be perceptible.

I have not yet mentioned all those papers written in either French or English where differences have become unmarked or those produced by non-native speakers building up new discourses, obviously made up of their own and that of the language of their contributions. For these reasons, and possibly others, the overall discourse of science might shortly change and become more global than it is today. Or, as the latest issues of *Pour la Science* suggest, where the number of original articles in French has increased at the expense of translated articles from the English, the discourse of science may remain cultural as it has always been, with some cultures trying to supersede others until further changes occur.

Notes

[i] Curiously enough, the myth of a universal discourse for science is still alive as shows a recent article entitled 'Translation and Science' in which S. Sarukkai suggests that all scientific texts are structured along the same lines: 'Most, if not all, scientific texts are structurally similar to prose texts. The text is bifurcated into chapters sections, paragraphs and sentences. There is an apparent linearity to the text beginning with simple ideas and equations and proceeding to more complex physical (and mathematical, if required) problems and solutions.' (2001:652)

[ii] In the sense given to the term by A. Jammal: "Si dans la phase du décodage, la première question que se posait le traducteur était 'de quoi s'agit-il?', dans la phase de transcodage, les deux questions primordiales seront: 1) à qui le texte est-il destiné? et 2) à quel type discursif appartient-il? " (1999:229)

[iii] "In the specific case of factual films and programmes, however, [Kozloff] claims that voice-over is not used to narrate, but to persuade, demonstrate, instruct and explain. Due to this functional distinction, instead of 'voice-over *narration*', descriptions and/or orientations within factual audio-visual products, and especially documentaries, have been referred by most documentarists as 'voice-over commentaries" (2001:291)

[iv] The following assertions by R. Descartes connecting 'truth', 'knowledge' and 'clarity' still have great influence on French speakers and writers:

> Dès aussitôt que je comprends quelque chose fort clairement et fort distinctement, je ne puis m'empêcher de la croire vraie. (1950:140)
> Mais je sais déjà que je ne puis me tromper dans les jugements dont je connais clairement les raisons. (1950:141)
> Toutefois (les idées) ne sont peut-être pas entièrement telles que nous les apercevons par les sens, car il y a bien des choses qui rendent cette perception fort obscure et confuse ; mais au moins faut-il avouer que toutes les choses que j'y conçois clairement et distinctement, c'est-à-dire toutes les choses généralement parlant, qui sont comprises dans l'objet de la géométrie spéculative, s'y rencontrent véritablement. (1950:152)

[v] Unsurprisingly, Janet Fraser's 'Mapping the process of translation' starts with a concrete image, something a French-speaking critic would have probably replaced by a more abstract assessment: 'If you wish to make a journey by car, there are two possible ways of deciding on a route. One is to ask a motoring organisation for a route for the proposed journey which will set out the quickest and most direct way of reaching your destination (...) That way is destination-oriented. The alternative is to pore over maps and weigh up the alternatives in terms of whether you prefer driving on motorways or along scenic routes (....) That way is journey-oriented. The aim of this article is to consider whether student translators are best served by a destination-oriented approach to learning to translate or by a journey-oriented one.' (1996:84)

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