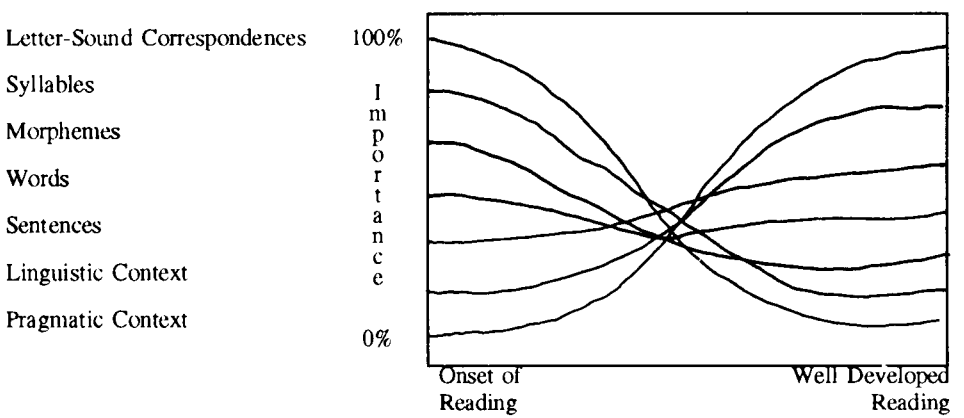
INTERACTION BETWEEN TRANSLATION AND COMPREHENSION IN SCIENTIFIC AND TECHNICAL TEXTS

NATIVIDAD CARPINTERO SANTAMARÍA Y
ANA LUZ RUBIO MOREDA

Universidad Politécnica de Madrid

Before proceeding to the major section of this paper, which deals with the interaction between grammar and context in the comprehension of scientific and technical English, it is important to understand how language, in general, relates to the process of translation and learning to translate.

One of the best illustrations of the role of language «accesses» to reading and, consequently, to understand, that we have found is presented by Shuy.[1]



This diagram, though not intended as a description based on research, illustrates the role of various levels of language at the onset of learning to read and at the level of the fluent reader. We always assume that reading is equivalent to understanding so fluent readers depend on high-level clues involving the linguistic and pragmatic context. Ideally, someone that comprehends a text uses all the language systems in order to construct the meaning of the given text.

[1] R. W. Shuy: *Linguistic Theory: What can it say about reading?*, Newark, International Reading Association, 1981.

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For students trying to read and translate English as a second language, the lower level structural aspects of the text, probably occupy their attention as they struggle with the language, thus preventing them from accessing much information from the more meaning-driven access to reading.

We have noticed that many of our students are effective readers in their native language, but experience shows that the simple transfer of skills from native language to target language rarely occurs. Learners all too frequently read a foreign language text with a painstaking dedication to deciphering every word in a linear fashion, frequently spending more time looking in a dictionary than reading the text. The result is at best a highly imperfect translation, at worst frustation and incomprehension.

A common difficulty about the translation of scientific and technical English is that although books, materials, reports, writings in general, are normally sentenced-orientated, they normally all too frequently show important relationships to usage and content. It is true that «sentenced-orientated grammar» provides enough explanations of grammatical choices in terms of syntax and semantics, whereas by «grammatical choice» we mean a decision to express a meaning in one linguistic form rather than in another, based on the judgement that one linguistic form of expression is more acceptable than the other.

Choices for translating written information placed on the basis of syntax or semantics can be made exclusively in terms of a single sentence. On the other hand, choices made on the basis of rethorical considerations, must refer to elements beyond the bounds of a single sentence. In technical English, we understand by «rethorical» considerations:

— those elements concerning the order of the presentation of information, within the paragraph and within the total piece of which the paragraph is a part, and also

— those elements based on clarity and precision of the exposition.

The following three sentences illustrate how a rethorical judgement on clarity of exposition can affect grammatical choices:

1. The horizontal top surface of the burner emits a uniform flux of fuel gas at velocity U.

In a paragraph, sentence 1 may be followed by either sentence 2 or sentence 3.

2. Its temperature is maintained near ambient...
3. The temperature of this surface is maintained near ambient...

In sentence 2 «temperature» may be that of the surface or of the gas, so when attempting to translate it, we find that the pronoun «its» is ambiguous. Sentence 3 is not ambiguous, since it specifies the element whose temperature is being maintained. A good translation of sentence 2 and 3 is based neither on syntactic nor semantic elements, since neither 2 nor 3 are anomalous neither alone nor in the context of sentence 1.

Nevertheless, rethorical considerations of clarity and precision cause us to choose 3 to 2, as 2 is ambiguous and 3 is not. In this case, rethorical considerations go beyond the simple grammar and good syntax and facilitate a more precise translation,

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precision that, in the case of technical English, becomes a must since it could affect the whole result of an experiment, research or simple information.

The effect that rethorical considerations have on translations may not always be as direct as in the foregoing example. But rethorical considerations are often determining the semantic structure of a given sentence, and the semantic structure thus required will in turn determine the grammatical choices giving place to a good translation.

We can see, then, that a sentence-orientated approach to grammar describes grammatical choices only in syntactic and semantic terms, without contextual references —a critical omission because it condemns the student to work with isolated sentences divorced from context and, very often, from content as well. This situation has probably developed from the American preoccupation with language teaching for oral communication. But, whatever the cause, the crucial roles of subject matter and rethoric in the grammatical organization of sentences can never be neglected, specially in a scientific or technical context.

In the translating process, participants bring necessarily their knowledge of the world to the text as they construct a meaningful representation of it. A major factor when translating, which has been documented in recent years, is the background knowledge or «schemata» of the reader, being crucial in the particular case of scientific and technical readers. Prior knowledge can influence an interpretation of a text by providing an overall context for the information being encoded, comprehended and recalled. Background knowledge consists of several components including conceptual knowledge, social knowledge, and story knowledge. The less familiar readers are with the concepts of content of the text, the more they will struggle to construct a meaning. Thus, specific content area material can be specially difficult to translate for non-experts if they have to struggle with the content in addition to the language. The more world knowledge readers gain, the better access they will have to the information in the text, for the comprehensibility of the text is elated to «the goodness of the match between the knowledge the author has presumed of the reader and that actually possessed by the reader».[2]

Teachers should exploit the knowledge of the subject the students have, in order to illustrate, exemplify and explain the new information they have to convey by means of using the linguistic structure in which the new information is presented, stressing those particular grammatical elements that help construct a meaning such as the use of specific syntactical patterns:

— use of the passive voice for the exposition of experiments, findings, etc.,

— use of the conditional for hypothesing,

— use of the past tense to claim no generality for the facts given in support of a core idea,

— use of the present tense form if the author may wish to convey to the reader the notion that, while the information given in support of the core idea is a good generalization about past events, he does not wish to commit himself with respect to

[2] Adams & Bruce: «Background Knowledge and Reading Comprehension», in J. A. Langer & M. T. Smith-Burke (eds.), 1982.

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future events,

— use of the simple present if the author wishes to make an even more general claim about the information he is presenting in the form of supporting facts.

Together with the language, a general technical knowledge —layman's technology, e.g. the working of a car, the use of electricity and water in the home, domestic appliances, etc.— and a school level knowledge of general science is required to be able to understand some basic scientific processes.

As a conclusion, we could say that translating scientific and technical English is a multileveled, interactive and hypothesis-generating process in which readers construct a meaningful representation of the text by using their knowledge of the world and of language. Translating involves the use of various levels of language that provide access to the meaningful process.

Our students and, moreover, scientists or experts in particular fields of the science, would like to translate English texts accurately into their own language. This is an art which requires a sophisticated knowledge of the native language as well as of English. Translation for scientific and industrial purposes requires a more than superficial acquaintanceship with many fields and much experience with the many dictionaries available for the specialized vocabularies of physics, engineering, chemistry, electronics, business, and so on. The use of good dictionaries should ease the task of technicians, scientists or translators since they must include the latest terms resulting from the most important advances in the field of science and technology. They also may supply direct, accurate and thorough solutions to the problems related to bilingual technology. Likewise, it reduces the need to refer to other sources to obtain the precise information.

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