PRESERVATION OF MEANING AND POLYSEMY IN TRANSLATION LINGUISTICS: MACHINE TRANSLATION AND COMMUNICATIVE APPROACHES

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ABSTRACT

The text outlines linguistic foundations of translation, focusing on meaning preservation and ambiguity (lexical and grammatical). It argues that machine translation requires contextual and world knowledge and that word-for-word algorithms are intrinsically limited. The Leipzig School's translation linguistics—code/re-coding, equivalence, and a bias toward pragmatic texts—is contrasted with E. A. Nida's receptor-oriented framework distinguishing formal vs. dynamic equivalence. The discussion highlights three layers of analysis (semantic/content, stylistic, and pragmatic) and differences between literary and pragmatic genres, stressing that some ambiguities are resolved by co-text, others by situational factors and background knowledge.

Keywords: Translation linguistics; ambiguity; lexical ambiguity; grammatical/syntactic ambiguity; machine translation; context; world knowledge; equivalence; formal equivalence; dynamic equivalence; Leipzig School; E. A. Nida.

INTRODUCTION

Core Linguistic Problems: Preserving Meaning and Polysemy

In exploring the capabilities and limits of machine translation (MT), the linguistic problems of translation become very clear and well-defined. For MT the task is posed as follows: sentences/texts in L1 must be processed so that semantically corresponding sentences/texts are produced in L2. It should be noted that such a formulation does not fully capture the overall complexity of translation—its dependence on numerous factors—yet it expresses a fundamental aspect for any translation theory. It can hardly be called a complete "linguistic definition of translation"—or if it can, then only in a narrow sense: it is limited to the semantic aspect. A truly linguistic definition of translation should be broader if it also takes into account socio-, text-, pragma-linguistic and communicative dimensions.

In Example 1, the German and (partly) English sentences are not fully equivalent in meaning: English knob does not match German Klinke, and to call someone by his/her first name is not exactly the same as duzen. Nevertheless, there is a translation relation between them.

Example 1

a. **dt.** hängten den Zettel ‚Bitte nicht stören' draußen an die Klinke → **engl.** hung a 'Please do not disturb' card on the outer knob

b. **dt.** Er hatte sie also doch geduzt. → **engl.** He had called her by her first name.

Moreover, the linguistic problems of machine translation do not always coincide with those faced by a human translator.

Automatic language analysis and translation proceed by first identifying the forms of source-language (AS – Ausgangssprache) units. A given form—e.g., the letter sequence V-a-t-e-r—must be associated with a specific meaning, in this case "the male parent of one or more children." A target-language (ZS – Zielsprache) form with the same meaning is then to be selected: in French p-è-r-e, in English f-a-t-h-e-r.

If every AS form had exactly one lexically and grammatically identical counterpart in ZS in every usage, problems would be minimal: word-form-to-word-form translation would be possible.

By lexical meaning we understand the link between a linguistic sign and extralinguistic objects or concepts (the content of consciousness). Grammatical (structural) meanings include the meanings of parts of speech (noun, adverb, verb), grammatical categories (number, person, mood, tense, voice), and meanings arising from dependency and hierarchical relations within the sentence. A clause or phrase meaning is produced by the sum of lexical and grammatical meanings.

Neither within a single language (intralingual) nor across languages (interlingual) is there a one-to-one correspondence between form and content. Therefore, automatic translation methods based on a word-for-word principle are insufficient and produce qualitatively unsatisfactory results. The key problem of automatic analysis is that linguistic forms often have multiple/complex meanings, wide and sometimes vague or illogical denotational ranges; this becomes especially clear when languages are compared (in one's native language Bratwurst and Bratpfanne look structurally parallel and unproblematic, but the semantic relations differ—only sausage is fried; the frying pan is not something "fried").

Example 2

a. Er hat den Schlüssel ins Schloss gesteckt.

b. Kommst du mit ins Schloss?

A human translator intuitively senses that Schloss means one thing in (a) and another in (b), rendering the first as French serrure or English lock, and the second as French château or English castle.

Example 3

c. **frz.** Il a mis la clé dans la serrure. **engl.** He has put the key in the lock.

d. **frz.** Viens-tu au château avec moi ? **engl.** Will you come to the castle with me?

For high-quality MT, the program must not only know that Schloss maps to two different forms in English or French; it must choose the correct one for the specific sentence. Thus, to resolve polysemy the machine needs additional knowledge—the sort of knowledge a human draws effortlessly from sentential context. In some cases, the decision is possible only by analyzing co-text beyond the sentence boundary or the speech situation. In other words, the machine must be able to process information, draw inferences, and be "intelligent."

Below we discuss the two basic types of polysemy—lexical and grammatical—and the possibilities and limits of resolving them.

A. Lexical Polysemy

Taken in isolation, the word heiß is polysemous, i.e., it has several sense variants. When comparing languages, the nature of this polysemy often turns out to be language-specific. You cannot simply substitute French chaud or English hot for heiß in every German context:

dt.	frz.	engl.
heißer Kaffee	un café chaud	hot coffee
heiße Diskussion	une discussion âpre	a heated discussion
heiße Musik	une musique terrible	hot music
heißer Kopf	une tête brûlante	a burning head

Some phraseologisms:
• heiße Zone – zone tropicale – tropical zone
• (das ist) ein heißes Eisen – (c'est) un problème difficile – (that's) a delicate problem / a hot potato
• heißer Krieg – la guerre chaude – hot war

Heiß is disambiguated only in combination with other lexical items—the surrounding units are called context (here: co-text, the immediate textual environment). In the co-text of Kaffee, heiß means "very warm/hot"; in the co-text of Diskussion it means "heated/intense." Co-text span may vary: word, phrase, clause, or passage.

Sometimes the co-text is insufficient; then the situation itself (situational context) resolves polysemy. For example, in Geben Sie mir die Unterlagen! (Unterlagen) can mean "documents" or "supporting/base components," depending on the situation. Uttered while drinking coffee, Heiß! (fr. C'est chaud ! / Ça brûle !; engl. It's hot!) differs from Heiß! about music (fr. Terrible !; engl. It's hot stuff!).

B. Grammatical Polysemy

Three cases are distinguished:
1.   **Morphological polysemy:** forms like denken can realize various syntactic meanings within a paradigm.

Example — denken

Infinitive: Er liebt es zu denken.

1st/3rd person plural, Present Indicative: Wir denken. / Die Leute denken zu wenig.

1st/3rd person plural, Subjunctive I: Er sagt, wir/sie denken zu viel.

Imperative: Denken Sie nicht so viel!

2.   **Part-of-speech polysemy:** e.g., während belongs to different word classes.

Example — während

Temporal subjunction: Während wir schliefen, wurde bei uns eingebrochen.

Adversative subjunction: Karl gefiel es gut in Heidelberg, während sich seine Frau überhaupt nicht wohlfühlte.

Preposition: Während der Vorlesung spielte ich Schach.

(This type of ambiguity is normally removed by the co-text.)

3. **Syntactic polysemy:** multiple readings arise from relations among units. In des Vaters (genitive) the phrase der Hut des Vaters / le chapeau du père / the father's hat expresses possession (genitivus possessivus). But ein Mann mittleren Alters / un homme d'âge moyen / a middle-aged man is a qualitative genitive (genitivus qualitatis); die Hälfte meines Vermögens / la moitié de ma fortune / half of my fortune expresses a part-whole relation (genitivus partitivus).

Possession can be expressed by other means as well: a dative NP or a prepositional phrase: Er schneidet die Fingernägel seines Sohnes. / Er schneidet seinem Sohn die Fingernägel. / Er schneidet die Fingernägel von seinem Sohn.

Humans resolve such ambiguities almost automatically based on linguistic knowledge and world knowledge. For example, die Bilder des Bankiers X usually means "pictures owned by the banker" (possession), whereas die Bilder des Malers X means "pictures painted by the artist" (genitivus auctoris); yet there are exceptions.

In French, les tableaux de Winston Churchill preserves a three-way ambiguity; in English one typically distinguishes:

a) the pictures by Churchill (authorship),

b) the pictures of Churchill's (possession),

c) the pictures/portraits of Churchill (who is depicted).

Even trickier are genitivus subiectivus / obiectivus: die Liebe der Kinder—does it mean a) the love **the children feel** or b) the love **toward** the children? Authors sometimes deliberately create such double meanings.

Syntactic ambiguity often stems from uncertain hierarchical attachment and can be exploited for humorous effect: das rote Kleid im Schaufenster anprobieren allows two parses:

a) [(das rote Kleid) (im Schaufenster)] (anprobieren)

b) [(das rote Kleid) (anprobieren)] (im Schaufenster)

Our everyday knowledge favors (a) (you try on clothes in a fitting room, not in the shop window). Corresponding translations:

• **Reading a:**

engl. Can I try the red dress in the window on?

frz. Puis-je essayer la robe rouge qui est dans la vitrine ?

• **Reading b:**

engl. Can I try the red dress on in the window?

frz. Puis-je essayer dans la vitrine la robe rouge ?

Thus, in some cases co-text is insufficient and world knowledge is required. With a similar structure, Könnte ich das rote Kleid im Schaufenster ausstellen? both parses are plausible, but (b) (displaying it in the window) is more likely.

Two ways syntactic ambiguity is resolved:

• **Case 1:** Co-text suffices and leads to a single analysis.

• **Case 2:** Only situational/world knowledge can decide (or it cannot be resolved at all).

Relevant factors include social conventions, semantic selectional fit, distance of dependency, etc. Sometimes the text must be rephrased for clarity.

There are also many cases that demand specialized knowledge: e.g., Der Bodenimpfstoff besteht aus Wasser und Luftstickstoff bindenden Bakterien.—here bindenden modifies only Luftstickstoff.

Sometimes the translator must decide without co-text and accept some risk (e.g., whether "uzun devor gobelenlari" means "long wall tapestries" or "to display wall tapestries for a long time"). In drama, intonation can influence meaning selection.

In short, many scholars note that at this point we reach the practical limits of automatic analysis and translation: a machine capable of handling such cases must possess a store of world, domain, and experiential knowledge.

Even more complex are situational meanings: Rauchen Sie? means one thing in a doctor's office and another at a party (an offer of a cigarette). Therefore, we must distinguish "sentence meaning" from "utterance (speaker) meaning."

Lexical and grammatical polysemy and the conditions for resolving them describe only the initial stage of the translation process—the analysis of the AS text. Once the "precise meaning of the text" has been established, stylistic and pragmatic analysis must follow: which linguistic means were chosen to express the content? Where do they fit within the language's expressive resources? Who is the intended recipient of the AS text, and who should be the addressee of the ZS text? These aspects are crucial for differentiating types of equivalence.

We should not forget that, although many scientific and technical texts strive for unambiguous meaning, in other genres polysemy can be constitutive (literature, advertising, political speech, etc.). This naturally creates special translation problems. For instance, a German joke may transfer easily into English, whereas in French structural differences can make it hard to preserve the "punch line" without changing the construction.

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