Translation-oriented reading of scientific-technical texts vs ordinary reading: psychological and psycholinguistic aspects

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Abstract
Translation-oriented reading makes it possible to identify the differences and similarities of the professional reading and ordinary reading in psychological and psycholinguistic terms. The translator should comprehend both the meaning of the source text and its linguistic form of representation in order to produce an adequate translation. The analysis of translation-oriented reading based on the cognitive approach suggests that the translator arrives at a concept representing the content and meaning to be retrieved from the text. The obtained results may be used for the future research connected with the professional translator's training.
Key words: translation-oriented reading, ordinary reading, scientific-technical texts, cognitive approach, psychological approach, psycholinguistic approach, translation

Introduction

During the professional activity, the translator returns to reading again and again. When he begins working with the text, he analyzes which supplementary materials he will need. Then he starts the process of translation, and he uses the reading again. After creating the text, he verifies his work and again turns to reading. Thus the availability to have perfect skills of reading at the professional level is very important for the translator of specialized texts.

But it is evident that the translator's reading is different from the reading of a usual reader on the one hand. And on the other hand, the translator should comprehend the text to translate as well as any reader that is not a professional has to comprehend the text too. So to find out these differences and similarities is the key question we are planning to solve. Let's analyze the translator's reading from different approaches to find the answers to these questions.

Methods

To find the answers to the questions that were mentioned above, we find it reasonable to analyze the translation-oriented reading and understanding of the scientific and technical texts.

Data, analysis, and results

Translation-oriented reading, like any other speech activity, can be represented on three levels: motivational, analytic-synthetic and executional one.

The levels of the translation-oriented reading

The motivational level is characterized by the translator's readiness to read scientific-technical texts. The translator sets about reading a foreign-language scientific-technical text in order to correctly understand, interpret and translate it into the target language.

Reading as a type of speech activity stimulates overall intellectual human activity, beneficially influencing the formation of world outlook, social behavior, and public activity. However, in the translation work, the subject matter is someone else's idea reconstructed for others on your own behalf.

Translation-oriented reading is aimed at retrieving information but not for the personal benefit of the translator — it is to be adequately rendered into the target language. This information may be of no personal interest to the translator; however, the latter should read and understand the whole content of the foreign text as well as the means used by the author, in order to correctly render not only the content but also the form and style into the target language for a new recipient, in a new communicative situation.

The further translator's work is performed at **the analytic-synthetic** or **forming level**. This level includes the basic work on receiving and decoding information. The translator reads the text and interprets its content.

Translators can receive information from a paper medium or monitor screen. Today, translators usually work with electronic versions of texts, which, according to many researchers, have a number of characteristics that cause difficulties in reading. When reading from the screen, the reading rate slows down due to a number of reasons, i.e., eyestrain, intense attention, limited volume of the perceived text due to the monitor screen parameters, variability of the text quality due to the monitor specifications and settings, variety of image/print/font size etc. (Dillon, 1992).

The presence/absence of intermediaries may cause certain difficulties in working with electronic texts. The intermediaries in electronic texts may be various input devices and controllers, interfaces and reading programs. For example, when turning over a book page in a printed text, a person carries out one physical movement, directly impacting on the medium. However, scrolling through electronic pages activates a whole chain of actions: the reader's hand, an input device (mouse, keyboard, touchpad), special reading programs which display images, promote eye training, expand the range of vision, and improve the perception of the text from the monitor screen.

It should be noted that there are currently a large number of innovative devices based on the so-called electronic ink (e-ink): their screen parameters are ergonomically equal to traditional paper. It is also possible to read texts using e-book readers or tablet PCs. Despite the fact that their screens are often not suited for long-term reading and require additional software, operating systems, and energy costs, they are the most popular devices for reading used by translators since they are very convenient for storing large numbers of books, dictionaries, and reference manuals. They also have powerful capabilities to search for information. In addition, they are usually equipped with the Internet connection to make it possible to use hyperlinks and conduct an additional search for necessary data.

No matter how the perception of text is performed, the majority of psychologists consider it as a heterogeneous multifaceted process comprising the stage of direct sensory cognition and the stage of comprehension, during which semantic links between words are established to make up the meaning of the text (Hirsch, 2003).

At the analytic-synthetical (forming) level, a translational analysis of the received text is carried out: translators examine the situation in which the text was created; correlate, analyze and summarize information contained in the text, using their knowledge and experience. Researchers note that it is knowledge of the subject area to which the source text belongs that is important for translators of scientific-technical texts. It is difficult to translate scientific-technical texts without having previous subject matter knowledge. Understanding in translation-oriented reading should be deeper than that of an ordinary reader, and it requires pre-understanding

(Hirsch, 2003). The more extensive the translator's subject matter knowledge is, the deeper the understanding of the source text and the more adequate its translation will be.

Researchers in cognitive science believe that the experience and knowledge of stereotypical situations are stored in the memory in a summarized form as frames, scenarios, schemes, plans or situational models (Van Dijk, 2000). The frames are understood as cognitive-semantic structures reflecting the specific intelligence structures and cultural realities taking place in real situations. The frame-based approach reflects the cognitive-semantic and cultural diversity of knowledge representation. This approach is essential for the consideration of translation practice since it makes it possible to see the relationship between cultural and cognitive factors in translation. These factors make it possible to build a meaningful representation of an event or object in the process of translation-oriented reading and perform an adequate translation. Translators of scientific-technical texts should have necessary frames in their memory to be able to carry out their professional activities. Without having frames which help to understand the meaning of a statement in order to adequately translate it, a translator can resort to reference information retrieval which is "the process of a translator's searching for necessary reference information on the problem considered in a foreign-language profession-oriented text in order to fully and clearly understand it for a subsequent translation." (Gavrilenko, 2011: 103). This search will require possession of different types of reading. However, in our view, there should be different types of reading not only during the reference information retrieval but at all stages: from scanning up to proofreading of the translated text.

Thus, the scientists believe that translators should be able to use "flexible" reading which implies a smooth change of reading types for searching, acquiring and processing information required to solve a professional problem. "Flexible" reading has its own specifics: involvement of different types of reading, interaction of reading types and sub-types which implies their change and arrangement in a certain sequence; variability of quantities of studied texts, compliance of the chain-sequence of reading types with the task and purpose of reading in terms of the communicative speech situation, smooth change of steps (sub-types) of reading, cyclical repetition of steps, and dynamism of the process. This approach seems to be important when considering the specifics of translation-oriented reading; it determines the usefulness of a detailed analysis of reading types essential for a translator of scientific-technical texts to address the problems to be solved.

The third reading level is **executional (realizing).** At this level, understanding is realized as a result of comprehension of the statement subject matter. According to psychologists, in the process of translation at the executional level, "the intention of the statement in the target language is formed" (Zimnyaya, 2001: 93). In the process of reading, the translator comprehends a scientific-technical text and interprets it. In professional translation-oriented reading, the stage of understanding is crucial: "the core of translation work, its starting point" (Brandes, 1988: 4). Some researchers note that only complete, in-depth and accurate understanding of the source text is a precondition for its adequate translation to the target language (Wills 1996). At this, it should be noted that understanding in translation-oriented reading is a means to carry out this activity but not the goal, as it is in ordinary reading.

The levels of understanding the scientific and technical text

Understanding of the source scientific and technical text begins with its perception when semantic links are established by the translator. The translator's perception in the process of reading a scientific-technical text will differ from that of an ordinary reader. The translator's understanding will also differ because of different levels.

Let us consider these levels in more detail. In psychological studies, the levels of understanding are classified in different ways. For example, V.P. Belyanin notes that the levelized structure may be seen both in the steps of the process itself and in the signal processing sequence (Belyanin, 2004: 88). The step structure is likely to manifest itself in the translator's improved understanding of the text, i.e., its fullness, depth, and accuracy; whereas the sequence will be associated with the language levels from the understanding of single words and sentences to completed statements.

The principle of transition in reading from the understanding of single words to completed statements and finally to the whole text is presented in the classification by Z.I. Klychnikova who identifies seven levels of understanding (Klychnikova, 1983). V.A. Bukhbinder and Ye. D. Rozanov distinguishes four levels of understanding (Bukhbinder, Rozanov, 1975).

S.K. Folomkina believes that accuracy is a qualitative characteristic of understanding, in which the linguistic side of the text is estimated. The depth refers to the understanding of the text. It is associated with the use of background knowledge and appears in the interpretation of information obtained in the process of reading. In this case, we can speak about the understanding of the implied sense, i.e., the author's intention, if it is expressed explicitly enough. The depth characterizes the understanding in qualitative terms and reflects the sense implied in the text.

I.A. Zimnyaya, expanding the interpretation of understanding by A.A. Smirnov, proposes the following levels of understanding:

– recipient's understanding only of what the text is about, i.e., clarification of the basic idea;

– understanding not only of what the text is about but what is said in the text, i.e., the recipient's establishing the conditioned connections (implications) between the basic plans for the deployment of ideas, disclosing the basic and additional ideas of the text;

– deep insight into the subject, the nature of what is studied, i.e., understanding of not only the subject itself but also the means by which the author achieves the communicative goals;

– the highest level of understanding, i.e., not only the understanding of what and by what means is reported by the author but also the ability to identify the main idea and penetrate into the text ((Zimnyaya 2001: 7–8).

However, these levels do not reflect how the recipient recognizes his (or her) own activities; therefore, I.A. Zimnyaya suggests that the levels of understanding should be considered in terms of a two-dimensional approach: depth vs. clearness (see Tab. 1).

Each level is estimated according to a five-point scale, beginning from the highest level of understanding which is characterized by both the highest degree of clearness and the greatest depth of penetration into the main idea of the statement (Zimnyaya 2001: 9–10). While reading a foreign-language scientific-technical text, the translator apparently should achieve the highest level of understanding and the greatest depth and clarity of understanding.

Steps of understanding clarity / Levels of understanding depth	I Pre-understanding	II Dim under-standing	III The subjective experience of understanding	IV Expressed by someone else's words	V One's own expression of thoughts
I What about				1	2
II What			1	2	3
III How/By what means/Why		1	2	3	4
IV What is the author's meaning	1	2	3	4	5

Table 1: Levels of understanding (according to I.A. Zimnyaya)

From the standpoint of cognitive psychology and psychology of memory, researchers note that the perception and understanding in reading may occur in different ways – "bottom-up" and "top-down" (Solso, 2002: 74–76). The theoretical "bottom-up" model is based on the idea of reading as a successively developing process of decoding the information entering "from below": the reader gradually recognizes and processes the information from the level of lexical units to those of words, word combinations, and sentences. In the second case, information processing moves from a higher level (a general idea of the text, hypotheses about the content based on the experience and background knowledge). This model is conditioned by the reader's specific goals and expectations, according to which the hypotheses are either confirmed or rejected when processing the text material.

In ordinary reading, a beginning reader will use the "bottom-up" model. A very experienced reader, who has a high level of linguistic competence, is likely to use the "top-down" model.

But a translator of scientific-technical texts, as opposed to an ordinary reader, will use both of the models. At the "top-down" level, translators first fully understand the text, relying on the experience and background knowledge enclosed in the frames. And then, for the purpose of reflection on how and by what language means to express the idea in the target language, it seems reasonable to use the "bottom-up" model.

There is no intermediate link in the "bottom-up" and "top-down" models, whereas, from the standpoint of **psycholinguistics**, which allowed researchers to engage the recipient's cognitive knowledge to analyze the levels of understanding, the following levels are proposed:

– understanding at the level of language signs (*surface level* in terms of V.V. Krasnykh);

– understanding at the level of the surface meaning as a result of the determination of contextual meanings/notions (*depth level* in terms of V.V. Krasnykh);

– understanding at the level of the deep meaning as a result of the inference and interpretation (*semantic level* in terms of V.V. Krasnykh) (Kubryakova, 2002; Krasnykh, 2001: 244–245).

For the purposes of translation-oriented reading, the classification of the levels of understanding from the perspective of psycholinguistics seems to be fruitful since, when reading a scientific-technical text in order to do a subsequent translation, the translator should achieve a deep understanding, i.e., comprehend the meaning based on the linguistic, subject matter and background knowledge in order to adequately render the content and form of the text into the target language.

The depth of understanding of a foreign-language scientific-technical text in translation-oriented reading also depends on the knowledge acquired by the translator in the course of professional training (Newmark 1988).

On the basis of understanding, the translator's interpretation is formed which represents the depth level of understanding. This level can be achieved by correlating linguistic knowledge with the knowledge of the world, with the structures of representation and storage of knowledge related to the previous experience of the recipient that he (or she) must possess in order to draw conclusions, recognize the author's intention, follow the logic of the presented information and interpret the text based on the acquired information which will indicate that the text has been understood.

The process of understanding of a foreign-language text ends with its interpretation which forms the recipient's **concept**, i.e., a clot of thought, a maximally folded semantic structure representing the objective meaning of the text (Minchenkov 2004). The concept is unfolded in the process of the text creation and reflects the content of acquired knowledge, experience and results of human activity. The concept – a notion of cognitive science – is realized in the **cognitive approach** to translation, according to which translation work is a complex intellectual process characterized by variability and representing the processing of incoming information and its comparison with the accumulated linguistic and extralinguistic knowledge. This view is shared by T.A. Van Dijk, J. Dansette, J. Delille, D. Gile, W. Kintsch, M. Lederer, D. Seleskovitch, U. Eco, N.N. Gavrilenko, L.Meskova, A.G. Minchenkov, T.A. Fesenko, Yu. O. Shvetsova and others. From this, it follows that the translator's skill and knowledge crosscut the incoming information and are "processed" in the translator's mind. This processing results in the concept which remains in the translator's mind.

Thus, the translation-oriented reading and understanding a scientific-technical text will result in its interpretation and formation of the concept. Based on this concept – the comprehended meaning – the translator will create a translation of the text using linguistic and extralinguistic knowledge. The formed concept can also be used by the translator for further perceiving information and forming a new concept.

In terms of psycholinguistics, understanding is determined as "cognitive activity (a kind of speech activity) which results in establishing the meaning of a certain object (usually a text or discourse)" (Kubryakova, Demyankov, Pankrats, Luzina 1996: 124). Understanding in the work of a translator of scientific-technical texts will probably imply an understanding of meanings which will further lead to "reproduction of the recognized information in the target language" (Tatarinov, 2007: 70).

Meaning is one of the crucial concepts in the translator's work. It is the meaning transfer that comes to the fore in the translation of a foreign-language scientific-technical text. This problem of the translation work has been highlighted in studies by Galeeva (Galeeva 2006), Eu. Nida (Nida 1978), L.V. Kushnina (Kushnina 2004), Z.D. Lvovskaya (Lvovskaya 2008), A.G. Minchenkov (Minchenkov 2004) and others.

Some researchers consider the meaning as an extralinguistic concept, remote from the level of observation, having linguistic and non-linguistic expressions and being a reflection of the multilevel structure of understanding and analysis of the text.

L.V. Kushnina believes that the meaning is a dynamic process aimed at creating a harmonious translation of the text by an understanding of the source text and then rendering it into the target language. The researcher points out that "the translator is immersed in search of meanings, and the translation space is woven from shreds of meaning which like a maze reveal the way to create a harmonious translation in the target language" (Kushnina, 2004: 195). In this "space of meanings," translators of scientific-technical texts have to determine their ways by means of reading in order to do a subsequent translation.

Analyzing the concept of translation, Z.D. Lvovskaya considers such characteristics of meaning as communicativeness and subjectiveness. The researcher believes that the meaning in the target language can be expressed through different linguistic meanings due to cognitive-cultural reasons. The text meaning has its own structure consisting of a semantic (linguistic) and pragmatic (extralinguistic) components and a communicative situation. The semantic component is subordinated to the pragmatic one. However, as the author notes, the pragmatic component defies observation, and the semantic component is not an unambiguous manifestation of the author's intention. The communicative situation makes it possible to understand it (Lvovskaya 2008: 54, 60–61). T.M. Dridze also points at the importance of the communicative intention which determines whether or not the meaning of the text will be understood by the recipient. If the recipient has comprehended the author's communicative intention with the help of linguistic and extralinguistic means used in the text, then, consequently, the meaning will be interpreted adequately (Dridze 2009: 48–56). For translators of scientific-technical texts, understanding the meaning will be dominant. Dealing with fictional texts, the meaning may be changed in order to achieve the necessary impression on the reader, but in translating scientific-technical information, distortion of the meaning may lead to serious technical errors, lawsuits, etc. Therefore, it is reading that plays a special role ensuring a correct understanding of the meaning of a foreign scientific/technical text which is subsequently reconstructed in the target language.

In order to perceive, understand and interpret a scientific-technical text at this stage, the translator may again resort to reading, to understand the meaning of the text and the author's intention and develop a strategy for rendering the content into the target language.

Thus the analysis has shown that the translator's oriented reading has got many specific features. And every professional translator should have the formed skills.

Results and conclusions

The conducted analysis permitted to highlight the following important results. Though it may seem that any type of reading is the same and doesn't have any differences, it isn't so. At the table below the similarities and differences are shown.

categories	**translation-oriented reading**	**ordinary reading**
aim	retrieving information for future translation	personal benefit
extra knowledge	-subject knowledge -cultural and cognitive knowledge	optional
types of reading	different	different
understanding	the starting point for the translator	final point for the translator

levels of understanding	different: high and low	different: high and low
depth of understanding	deep	not always deep
concept	the most important slot for the future text's creation	slot to broaden world view and maybe to use in the future life

Table 2: The similarities and differences of reading itself and translation-oriented reading

We can see that the aim of the translation-oriented reading and the ordinary reading is different. The usual reader may not need the extra knowledge of subject, cultural and cognitive knowledge. It is optional for him. Whereas the professional translator has to have this in his professional baggage. The more knowledge he has the most evident is that his translation will be a perfect one.

As for the types of reading that are supposed to be at both translator's and ordinary reader's disposal, they may be different. And this is the similarity. However, the type of reading the translator would use depends on the stage of the translator's work. And the type of reading the ordinary reader would use depends why he began reading this or that text. If he needs to find the information when the exhibition begins, he would never finish reading the text. He will stop after he finds the information.

The understanding of the professional reading is different from the ordinary reading. Actually, it is the starting point for the translator and final point for the usual reader.

It is established that the specifics of translation-oriented reading is in the fact that the translator should understand both the meaning of the source text and its linguistic form of expression in order to create an adequate translation into the target language. And in this case, the levels of understanding will be both low and high. And the levels of the ordinary reader may be different too. But this depends on how well the reader knows the language.

It is clear that without deep understanding, the text would never be translated properly. So it is necessary for the translator to comprehend a tiny detail. But as for the ordinary reader, it is not so necessary. If he doesn't understand anything, it might be not a big problem.

An analysis of translation-oriented reading from the perspective of cognitive science has shown that, as a result of reading a foreign text, the translator should form a concept which represents the content (the meaning) to be retrieved from the text. It is exactly this concept that provides a basis for a subsequent translation. And for the ordinary reader, the concept broadens worldview and maybe to use in the future life.

Bibliographic references

BRANDES, M.P. 1988. Stil i perevod (na materiale nemetskogo yazyika) [Style and translation]. M.: Vyissh.shk.127 ps. ISBN: 5-06-001258-1.

BUHBINDER, V.A. – ROZANOV, E. D. 1975. O tselostnosti i strukture teksta [about the structure of the text] .Voprosyi yazyikoznaniya. № 6. Pp. 73–86. ISSN: 0373-658X.

DILLON, A. 1992. Reading from paper versus screens: a critical review of the empirical literature. Ergonomics. N35 (10). P. 1297–1326. ISSN: 0014-0139.

DRIDZE, T.M. 2009. Language and social psychology. Moscow. 240 p. ISBN 978-5-397-00895-2.

GAVRILENKO, N.N. 2011. Programma-kontseptsiya podgotovki perevodchikov professionalno orientirovannyih tekstov. [Programme of translator's professional training] Book 3. M.: Nauchno-tehnicheskoe obschestvo imeni akademika S.I.Vavilova.122 s. ISBN: 978-5-902189-26-8.
HIRSCH, JR. 2003. Reading Comprehension Requires Knowledge—of Words and the World: Scientific Insights into the Fourth-Grade Slump and the Nation's Stagnant Comprehension Scores. American Educator, *27*(1). Retrieved April 3, 2013, Available online: http://www.aft.org/newspubs/periodicals/ae/spring2003/index.cfm
KLYICHNIKOVA, Z.I. 1973. Psihologicheskie osobennosti obucheniya chteniyu na inostrannom yazyike: posobie dlya uchiteley [Psychological featers of teaching reading using foreign languages]. M.: Prosveschenie. 223 p. ISBN: 5-7695-2969-5.
KRASNYIH, V.V. 2001. Osnovyi psiholingvistiki i teorii kommunikatsii. [Basic concepts of psycholinguistics and theory of communiation] M.: ITDGK «Gnozis». 270 p. ISBN: 5-94244-010-7.
KUBRYAKOVA, E.S. – DEMYANKOV, V.Z. – PANKRATS, YU.G. – LUZINA, L.G. 1996. Kratkiy slovar kognitivnyih terminov. [Terms' short vocabulary] M.: MGU. 197 p. ISBN: 5-89042-018-1.
KUSHNINA, L.V. 2004. Yazyki I kultyra v perevodcheskom prostranstve [Languages and culture in the translator's room]. Perm. 60 p. ISBN: 5-88151-417-3.
LVOVSKAYA, Z.D. 2008. Sovremennye problemy perevoda [Modern problems of translation]. Moscow: LKI Publ. 224 p. ISBN 978-5-382-00125-8.
MESKOVA, L. 2017. Translation of vulgarizm in mass media. In: XLinguae. Volume 10, Issue 3. pp. 101-109. ISSN 1337-8384.
MINCHENKOV A.G. 2004. English particles. Spb.: Antology, 2004. 96 p. ISBN: 5-94962-061-5.
NEWMARK, P.1988.A textbook of translation. Prentice-Hall International (New York). ISBN 978-0139125935
PORSHNEVA, E. – ABDULMIANOVA I. 2015. Assessing the Maturity of General Professional Competencies of Future Interpreters/ Translators: Problems and Solutions. In: XLinguae. Volume 8, Issue 4. pp. 60-65. ISSN 1337-8384.
SOLSO, R.L. 1996. Kognitivnaya psihologiya. [Cognitive psychology]]M.: Trivolta. 608 s. ISBN 5-94723-182-4.
TATARINOV, V.A. 2007. Metodologiya nauchnogo perevoda: K osnovaniyam teorii konvertatsii. [Methodology of scientific translation: the basics of convertation's theory]– M.: Moskovskiy Litsey. 384 s. ISBN 978-5-7611-0456-3
VAN DIJK, T.A. 2000.Yazyik. Poznanie. Kommunikatsiya. [Language.Perception.Communication] 310 p. ISBN 5-7859-0027-0.
ZIMNYAYA, I.A. 2001. Lingvopsihologiya rechevoy deyatelnosti. [Linguopsychology of speech activity] M.: Moskovskiy psihologo-sotsialnyiy institut, Voronezh: NPO «MODEK». 432 p. ISBN 5-89502-253-7.
WILSS, W. 1996. Knowledge and Skills in Translator Behaviour . Amsterdam/ Philadelphia: Benjamins. ISBN 9789027216151

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