

A Study of Translation Process Based on the Cognitive Psychology

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Abstract

The research trend of translation process is to describe the internal psychological mechanism of the translator. Some cognitive psychology concepts are often used in the study of translation process. Therefore, it is important to explain the concepts related to the study and explain how these concepts are applied to the study of translation psychology. Cognitive psychology is a discipline that studies how people learn, store and use knowledge. Its research scope includes attention, perception, memory, thinking, problem solving, speech and cognitive development. Some people think that translation is just a process of reproducing the original text in another language while preserving the original meaning as much as possible, but the cognitive psychology method helps eliminate this misunderstanding for every experienced translator knows that translation is more than reproducing the original text. This paper focuses on the information processing theory in the comprehension process of translation: top-down and bottom-up information processing models; short-term and long-term memory; decision-making and problem solving to make more translators understand the translation psychology of translators in the translation process, so as to better improve the translation quality.

Key words: Translation process; Information processing theory; Short-term and long-term memory; Decision-making; Problem solving

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INTRODUCTION

The focus of translation activity is the transformation process, but this process is not a simple language activity, but a thinking activity. Therefore, translators must grasp the law of thinking activities. In the translation process, the translator compares the information received from the original work with the “similar” information deposited in his or her own information base. The old and new information form “similar blocks” and give feedback to each other. The translator uses all kinds of information related to the new information in his or her mind to transform, correct, supplement and enrich it, until the new and old information is fused and similar to the extreme, and then the translator uses the target language to turn this similar product into the translation version.

This process mentioned above is the cognitive psychological process of bilingual conversion. Therefore, the study of cognitive psychological process of translation is based on the theory of the cognitive psychology. Concepts and models of the cognitive psychology play an important role in explaining the process of translation. This paper focuses on discussing the cognitive mode of Information Processing Theory in the process of translation comprehension: top-down and bottom-up information processing mode; short-term and long-term memory; decision making and problem solving.

1. TOP-DOWN AND BOTTOM-UP INFORMATION PROCESSING MODES

The Information Processing Theory has many wonderful explanations for the cognitive process. For example, for the pattern recognition, Information Processing Theory puts forward two processing forms: bottom-up processing and top-down processing. Bottom-up processing refers to the information processing that is stimulated, guided and determined by external stimulus information. It starts

from the low-level analysis of the characteristics of the stimulus and finally comes to the final interpretation. Top-down processing means that the existing knowledge and experience control the process of information processing. According to Wills (1988), it starts from high level expectations and assumptions and finally determines the meaning of the object of information processing. These two processing methods can interact.

In the translation process, there are two processes in understanding the original text: the bottom-up process, that is, we understand the word as a unit, and the top-down process is the process we need to find the relevance and understand the text, and these two processes are necessary in the process of translation and understanding. As far as the translation process is concerned, the bottom-up model requires the translator to know each letter, then form those letters into words, phrases and sentences. It is through this low-level process that the meaning of a word or sentence can be acquired, so the translator processes the letters before the meaning of a word can be learned. Similarly, the translator must process each word before obtaining the meaning of the phrase and sentence. In short, the processing of linguistic information begins with the smallest unit of meaning and ends with the largest unit of meaning.

In the actual translation process, instead of reading every word carefully, the translator skimps through the original text, makes assumptions about the words he will encounter, and skimps through the text again to confirm his predictions. The translator needs to read the original text in order to guess the meaning of words and phrases. For example, when reading the last word of a previous sentence, the translator may already guess that the word is likely to be a "phrase", so he does not need to process all the letters because the first two or three letters of the word are enough for the translator to confirm his guess.

2. SHORT-TERM MEMORY AND LONG-TERM MEMORY

The Cognitive Psychology holds that memory is a system composed of both structural and procedural components. The structure of memory consists of three different subsystems. Sensory system (instantaneous memory), short-term memory and long-term memory.

2.1 Short-Term Memory

Short-term memory, also known as working memory, is considered as the intermediate link or transitional stage between information and long-term memory, and is one of the cores of information processing by memory. After sensory registration, encoded stimulus information can be processed further in the short-term memory, then transferred from short-term memory to long-term memory and at the same time the information is stored in long-

term memory. Therefore, cognitive psychology interprets short-term memory as the processing and encoding of information in the human brain in about one minute.

Short-term memory, also known as working memory, is regarded as the intermediate link or transitional stage between information and long-term memory, and is one of the cores of information processing by memory. After sensory registration, encoded stimulus information will be processed further in the short-term memory, and then it is transferred from the short-term memory to the long-term memory, where information is stored in the long-term memory. Therefore, the cognitive psychology interprets short-term memory as the processing and encoding of information in the human brain in about one minute. Short-term memory is an independent memory structure which is different from the reason of information forgetting in long-term memory. The information forgotten in the process of the short-term memory is caused by the fading of memory traces. This difference leads to the distinction between the long-term and the short-term memory.

The short-term memory involves its characteristics of information capacity in the process of processing stimulus information, encoding information, and retrieving and forgetting the stored information. These states of information processing play a very important role in a person's psychological activities. Firstly, the short-term memory enables individuals to know what stimulus information they are receiving and processing, which makes the short-term memory plays the role of human consciousness. Secondly, the short-term memory enables information from various sensory channels to be integrated and then constitute a complete information image. Thirdly, the short-term memory plays an important role as a temporary register for the stimulus information processed. Finally, the short-term memory maintains the individual's strategies and willingness to process the stimulus information currently, enabling the individual to take a variety of more complex behaviors to process the information until the ultimate goal is reached.

According to the Cognitive Psychology, the long-term memory is a huge information library, which can store an infinite amount of information. Even the sensory memory has an image memory capacity of about 20 items or more. However, the short-term memory can only process a few information items during a period of time, and the amount of information stored in the short-term memory can not be compared with that in the long-term memory, or even less than that in the image memory. The limited information capacity is a very prominent feature of the short-term memory.

In 1956, Miller conducted a series of fruitful experiments from The perspective of information processing theory, publishing "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity

for Processing Information”, a famous paper, suggested that the number of items of stimulus information maintained in the short-term memory is about seven, that is, seven plus or minus two. Miller refers to the unit of capacity in short-term memory as the concept of “chunks”.

In other words, the span of short-term memory is 7 ± 2 chunks. The capacity of each “chunk” has great flexibility, which can be a number, a word, a phrase, or even a sentence or a paragraph of a text (Liang, 2006:127). If the stimulus is a bunch of unrelated letters or words, the person will probably only remember about seven of them. If those letters or words are meaningfully linked, the amount of information in the short-term memory can be greatly expanded. Therefore, Miller believes that the information in the short-term memory is not in chunks. When presented with a list of unrelated letters, people remembered only $7 + 2$ letters, regardless of their English level. However, because people’s knowledge and experience are different, the chunks of the same material may also be different. “Psychology”, for example, consists of more than seven letters to someone who knows English, but can be grouped into meaningful chunks, while to someone who doesn’t know about English, it can be grouped into 10 chunks of 10 letters. Thus, the information capacity of the short-term memory, namely 7 ± 2 blocks, is affected by a person’s previous knowledge and experience.

The translation process also goes through the process of the short-term memory. The short-term memory is the process by which the translator registers information when he or she comes into contact with the original text at the beginning of translation. In this process, the translator will constantly repeat the information to be processed, that is, the information may be words, phrases or clauses because the information in the short-term memory is kept for a very short time and only stores about seven blocks, namely words.

Ericsson & Simon (1984) points out that the short-term memory is very important in the translation process, especially in Thinking Aloud data collection, because Thinking Aloud is to infer the mental state of the cognitive process based on the original information presented in the subjects’ short-term memory. Information in the short-term memory activates relevant information in the long-term memory to some extent, and the long-term memory adds some of the information to the short-term memory. They believe that the short-term memory is consciousness and one of its functions is to control the flow of information (Shao, 2006). Therefore, the short-term memory or the working memory is an important link in the translation process.

2.2 Long-Term Memory

Long-term memory, instantaneous memory and short-term memory constitute a complete human memory system. Long-term memory constitutes a person’s “psychological

past”. It contains information about what was seen and heard in the past. Long-term memory is a true repository of information. It has a huge capacity to keep information for a long time. Information in short-term memory is transferred to long-term memory through retelling or elaborate retelling. The information processed by the memory system is ultimately stored in long-term memory. Long-term memory stores everything we know about the world, providing the knowledge base necessary for all our activities, enabling us to recognize patterns, learn, use language, reason, solve problems, and so on. Short-term memory deals directly with current information coming in from the sensory system. Long-term memory holds present information for future use, or uses information stored in the past for the present. It connects the past, present and future of human activities into a whole, and occupies a particularly important position in the whole psychological activities of human beings.

In information processing psychology, long-term memory is relative to short-term memory in terms of how long information is stored. Long-term memory refers to information stored in the brain for more than a minute, days, months, years, or even a lifetime. Stimulus information stored in long-term memory is the individuals’ past experience and knowledge, which provides the necessary information basis for the individual’s psychological activities and behaviors. If short-term memory enables us to deal with current events or events, long-term memory is the representation of current events or events with the knowledge and experience stored in the past. In a sense, long-term memory allows a person to live in both the past and the present world. Most of the stimulus information stored in long-term memory comes from the delicate retelling and processing of the information content in short-term memory, while a small part is stored at one time due to the deep impression. The stimulus information stored in long-term memory is a system of organization, the knowledge and experience system which is the one with the organization’s knowledge and experience to the person’s learning and behavior decision-making. It can make people to encode new information effectively, so as to better memorization and storage, and it can also make a person quickly and effectively extract the stimulation of useful information from memory in order to solve the current problems. Knowledge and experience systems are organized to different degrees, and the speed of information extraction is different, so is the speed of perception, language understanding and problem solving.

Long-term memory is the most important link in the process of translation. The stimulus information stored in it comes from the retelling of short-term memory. The information, knowledge and skills originally stored in long-term memory are activated and extracted. As far as the problem solving of translation strategy in the process of translation is concerned, it is all carried out in

this stage. In recent years, the computer and its software technology have been widely used in the fields of implicit memory, instantaneous memory, short-term memory, long-term memory, problem solving, etc. Computer and its software technology have become an important means of memory research.

3. DECISION MAKING

Simon, the founder of modern decision theory, believes that decision making is the whole process of exploration, judgment, evaluation and final selection of action goals and means. This is the psychological definition of decision making. Decision making is characterized by three aspects: it has a clear purpose. People are the main body of decision-making. In decision-making activities, people make efforts for specific objects to achieve the expected goals of the decision-maker. Decision-making is a highly comprehensive and top-level activity form of human psychological activities. When people make decisions, especially when making major decisions, it involves many aspects of psychological activities. It can be said that decision-making is the crystallization of the highest wisdom of people. Decision-making is the final result of high processing and processing of relevant information by thinking activities. In the decision-making process, thinking plays a key role. All information related to decision-making should be processed and processed by thinking, and then classified to form several alternative options (Liu, 2005).

The same is true of the translation process, which is the process of information processing. After analyzing, integrating and judging the text and the details in the text, the translator finally makes the decision of the definition of words, phrases and sentences and the decision of language conversion, so as to find the optimal answer in translation.

4. PROBLEM SOLVING

Problem solving is an important thinking activity, and it is a basic way for human beings to adapt to the environment and solve various problems in survival and development. Because it contains concept, judgment, reasoning, and outstanding performance of the wisdom and creativity of people's psychological activities.

Problem solving refers to the process in which problems are solved by applying certain cognitive operations or skill activities caused by certain situations and according to certain goals (Liang, 2006). Problem solving is a cognitive process in which a given situation is transformed into a target situation without an obvious solution. Problem solving is an active process of cognitive activity. The process of problem solving can be divided into two basic sub-processes: understanding and searching.

Problem solving is a cognitive search in the problem space to find a path from the initial state of the problem to the target state. According to contemporary cognitive psychology, problem solving is a process of analyzing the existing means and goals according to the strategy of problem solving, so as to achieve the goals. The specific psychological process of problem solving can be roughly divided into four stages: the stage of problem discovery, the stage of problem analysis, the stage of putting forward the hypothesis to solve the problem and the stage of testing the hypothesis. The stage of problem discovery is when a person recognizes the existence or emergence of a problem and produces the need and motivation to solve it. It is mainly influenced by a person's attitude, thirst for knowledge and knowledge experience.

Analyzing the problem stage is to analyze the requirements and conditions in the problem, find out the connection and relationship between them, and grasp the essence of the problem. Deciding the direction of solving the problem is the key stage in the process of solving the problem, that is, the process of making the problem clear or concrete. Putting forward the hypothesis to solve the problem is to put forward the plan, strategy or way to solve the problem, that is, to find out the key to solve the problem. Hypothesis verification is to verify whether the proposed hypothesis can really solve the problem and achieve the ultimate goal through actual activities or thinking operations.

The four stages of problem solving constitute the problem solving cycle, which includes problem identification, problem definition, strategy conception, resource allocation, monitoring and evaluation. Once the problem has been effectively defined, a strategy to solve the problem has to be found and determined. When a problem solving strategy has been constructed, it is necessary to continuously organize and reorganize the available information that enables individuals to implement the problem solving strategy, thus enabling the problem to be solved quickly.

The translation process is a series of problem-solving activities. In long-term memory of information processing, problems are identified and defined, and solutions are sought during this period. For example, the reconstruction of sentences and even phrases by using linguistic knowledge and non-verbal knowledge in the long term memory is the problem solving of the translation process. All translation activities are problem solving activities. Translation is a complex process, which includes both linguistic and non-linguistic factors, which have a certain impact on the translator's decision making and problem solving in the translation process. The theory proposed by Newell and Simon suggests that problem solving is influenced by the effectiveness of strategies and the ability to process information, which, of course, is determined by long-term and short-term memory.

CONCLUSION

In the translation process, the translator should adopt a top-down or bottom-up mode to browse or read the original text. By comparing the newly received information in short-term memory with the original information stored in long-term memory, the translator can solve problems, search for its similarity, and then make decisions, so as to reach the translation results. Translation is a special case of human information processing. Therefore, cognitive mental mode is essential in the process of translation.

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