Translation, metaphor and cognition

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18.1 Introduction

In characterizing translation as socially contexted behaviour, Toury (1995) differentiated between the translation act and the translation event. The act of translation refers to the cognitive aspects of translating as a decision-making process, and the translation event is the situational, socio-cultural, historical and ideological context in which the act is embedded. In other words, the translator’s decision making is influenced by the concrete situation, assignment, environment, purpose, etc. After an initial focus on translation as a linguistic process in the 1960s/1970s, in which decision making was described as a choice between various target-language options (e.g. Levý, 1967/2000), cultural as well as cognitive aspects received more attention. In respect of cognition, the question was asked: what happens in a translator’s mind in the act of translating?

The development from a linguistics-based translation theory to functionalist, cultural, socio-logical and cognitive approaches is reflected in changing definitions of translation and changing research methods. For investigating cognitive processes of translation, cognitive linguistics has been seen as beneficial. Cognitive linguistics (CL) studies the relationships between language structures and elements of conceptualization. The basic premises of CL include the following: language is an integral part of cognition and grounded in human conceptualization; natural language structures reflect cognitive features and mechanisms influenced by our bodily, physical, social and cultural experience, i.e. language is embodied; and meaning construction is a complex, dynamic and situated process; thus, meaning can be said to be emergent (for overviews of CL see e.g. Croft & Cruse, 2004; Lee, 2001).

CL can make a significant contribution to the description and explanation of translation phenomena (see e.g. Rojo & Ibarretxe-Antuñano, 2013: Schwieter & Ferreira, 2017). Cognitive Translation Studies, or cognitive translatology (Muñoz Martín, 2013a), has in fact already entered the discipline of Translation Studies (TS), under the influence of both cognitive linguistics and cognitive science (CS) more generally. Cognition was initially thought of as an information processing activity, with the mind viewed as a computer-like machine. In what is now labelled second-generation CS, “language and behaviour are […] seen as being deeply rooted in sensorimotor or bodily processes that condition the way we perceive and construct the world” (Muñoz Martín, 2013b, p. 241). This approach emphasizes the situated, embodied and emergent nature
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of human cognition. Investigation of the situated and embedded nature of translation takes into account that translators use a variety of tools, including dictionaries, glossaries and computer-assisted translation tools (CAT). From the perspective of CS, translation is thus understood as a form of distributed cognition (e.g. Teixeira & O’Brien, 2017), in which the processes in a translator’s mind (internal representations) interact with external representations provided by the tools.

A development similar to that outlined earlier for TS, that is, a development from a linguistic to a socio-cultural perspective, can be seen clearly in one strand of CL that is of particular interest to TS—the investigation of the phenomenon of metaphor. In classical rhetoric, metaphor tended to be thought of as a persuasive device, in literary studies as an ornamental or emotive device, and in structural linguistics as a deviation from a more literal meaning. With the emergence of CL, however, conceptual metaphor theory (CMT), initially developed by Lakoff and Johnson (1980/2003), introduced a new perspective. CMT explains metaphor as a mapping across conceptual domains. Metaphors are not the preserve of orators or poets but a pervasive and fundamental aspect of cognition that serves to organize and structure the way we think about and act in and on the world around us. CMT thus belongs to the second generation of CS. Metaphorical expressions in a particular language are manifestations of underlying mappings that are not linguistic but cognitive (Lakoff, 1993, pp. 202–203). Here, “mapping” is used in the logico-mathematical sense (moving one element of a set to another): in metaphor, an element already known in one conceptual domain is transferred to a more abstract, less well-understood conceptual domain. For example, the expression “I’m at a crossroads in my life” is a linguistic realization of the conceptual metaphor life is a journey.

It is important to note that metaphor is not the only concern of CL, and certainly not the only aspect of language that concerns TS and the practice of translation itself. All linguistic communications involve non-linguistic brain activity; there is no isolated language module generating meanings without being integrated with knowledge and experience. This is the case at the levels of syntax, lexis and morphology (taking phonetics and phonology as separate systems). Thus, TS and translators need to consider not only whether the different grammatical patterns of different languages may carry different mental representations (e.g. via the different word order of different languages) but also, in the process of practical translation, whether, for example, a passive sentence in the source text (ST) should or can be rendered by an active sentence in the target text (TT), since the mental representations (i.e. meanings) could very well be different. The same question arises, even more obviously, in the case of lexical structures. There are no one-to-one correspondences; the vocabulary structure of one language is not the same as that of another. This means not only that the lexical networks of languages differ but also that the individual lexemes from those networks are meaningfully different, i.e. are involved in different mental representations. One example is spatial prepositions, which differ conceptually across languages. English speakers use the same preposition, on, for location on horizontal and vertical surfaces, while German speakers use different ones: an for a vertical surface and auf for a horizontal one. In particular phrases, two languages may refer to the same type of object, but the choice of preposition may reflect different conceptualizations. For example, French has dans le train as a translation equivalent for English “on the train”, French thus conceptualizing trains as containers and English as platforms.

Lakoff and Johnson (1980/2003) identify three fundamental types of metaphor: orientational, ontological and structural. Orientational metaphors organize “a whole system of concepts with respect to one another [and] most of them have to do with spatial orientation” (Lakoff & Johnson, 1980/2003, p. 14), as in happy is up. Ontological metaphors (e.g. the body is a container) are “ways of viewing events, activities, emotions, ideas, etc., as entities and substances”
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(ibid., p. 25) derived from bodily interactions with physical objects. Structural metaphors relate experience of different kinds of things in such a way that one concept, usually an abstract one, is metaphorically structured in terms of another, more concrete one, e.g. **ARGUMENT IS WAR**. Incidentally, translation itself has served as both source domain (e.g. **DREAM ANALYSIS IS TRANSLATION**) and target domain (e.g. **TRANSLATION IS BRIDGE BUILDING**; see also St André, 2010; Guldin, 2016).

This chapter focuses on how metaphor has been analysed in TS. After presenting some key arguments of CMT in respect of cognition, language and culture, we summarize some relevant research in TS, in particular process research.

### 18.2 Core issues

#### 18.2.1 Core issues for metaphor studies

Core issues for metaphor research concern aspects such as the differentiation between linguistic and conceptual metaphors, universality or culture specificity of metaphor, cross-cultural variation, conceptualization in metaphor production versus comprehension, pragmatic and discursive functions of metaphors, and the value of Lakoff and Johnson’s conceptual metaphor theory in comparison to other cognitive theories, e.g. blending theory (Turner & Fauconnier, 2002). Chilton (2019) notes that conceptual blending theory builds on and is compatible with CMT, though different from it in the following respects. It is essentially a model of online cognitive processes, rather than a model of relatively stable input conceptual frames and mappings. Its input spaces can be multiple, the mappings may flow both ways. In addition to a minimum of two input spaces, the theory postulates a generic space that contains the abstract conceptual commonality of the inputs, and, crucially, a blend space in which conceptual structure emerges selectively from the inputs.

For CMT, metaphor is first and foremost a matter of cognition, with metaphor in language being secondary. As Semino and Demjén (2017a) argue, Lakoff and Johnson “did not regard the different linguistic forms metaphor can take and the different functions it can perform in discourse as worthy of attention in their own right” (p. 3). Conceptual metaphors are manifested linguistically, and metaphor can thus be observed most directly in language, i.e. in texts. It is these linguistic manifestations (the metaphorical expressions) that discourse participants (as well as translators) encounter (on recent developments in metaphor research in relation to language, see Semino & Demjén, 2017b). More recent research that has considered the textual or discursive manifestations of metaphors has revealed how metaphors shape a text, thus giving insights into the strategic use of language. It has also been observed that metaphor varies across registers and genres (e.g. Semino, 2008, and particularly for political discourse Charteris-Black, 2004; Chilton, 1996; Musolff, 2016).

Metaphor research also asks whether conceptual metaphors are universal or culture specific. Lakoff and Johnson’s location of the roots of metaphorical cross-domain mappings in bodily experience suggests a fundamentally universalist view. However, in the Afterword to the 2003 edition of their book, they make a distinction between primary metaphors, which are “grounded in the everyday experience that links our sensory-motor experience to the domain of our subjective judgements” (Lakoff & Johnson, 2003, p. 255), and complex metaphors, which are “composed of primary metaphors and […] make use of culturally based conceptual frames”
Primary metaphors thus seem to be universal, whereas complex metaphors may differ between cultures.

A significant amount of research into cross-cultural variation of metaphor has been conducted by Kövecses (e.g. 2005, 2014). Kövecses (2005) argues that “complex metaphors are more important to cultural situations”, since it is complex metaphors “with which people actually engage in their thought in real cultural contexts” (p. 11). He investigated, for example, cultural differences in the conceptualization of emotionally and cognitively central body parts (as seats of emotional and/or cognitive activity). He, too, argues for investigating metaphor in language, since the study of linguistic metaphors “may provide a good clue to finding the systematic conceptual correspondences between domains (i.e. to conceptual metaphors)” (p. 32). Based on a comparison of the linguistic expressions of particular conceptual metaphors in different languages, Kövecses (2014, p. 33) summarizes possibilities for translation as follows:

(i) same literal meaning—same figurative meaning—same conceptual metaphor
(ii) different literal meaning—same figurative meaning—same conceptual metaphor
(iii) different literal meaning—same figurative meaning—different conceptual metaphor

Some of the cross-linguistic comparisons of metaphor were based on translation. However, translations tended to be sentence based and/or elicited in experiments. Such tests made Kövecses (2014) conclude that differences in metaphorical conceptual systems and the context in which they emerge cause problems in metaphor translation. Similarly, Brdar and Brdar-Szabó (2017) tested whether equivalent metaphors are available in the target language and which one test participants would opt for, illustrated with cross-linguistic asymmetries in the use of time metaphors. That is, differences and similarities in metaphors across languages were not established on the basis of authentic source and target texts. These issues concerning metaphor, in particular the differentiation between linguistic and conceptual metaphor and the cross-cultural similarity and variation, make the question of what happens to metaphors in the process of translation a relevant one.

18.2.2 Core issues for Translation Studies

Core issues for TS were initially translatability, that is, whether metaphor can be translated (e.g. Dagut, 1976), and methods for translating metaphors, that is, how metaphors can, or should, be translated. Research was predominantly informed by more traditional views of metaphor as a linguistic phenomenon and mainly devoted to metaphorical expressions, with little consideration of the conceptual level of which the linguistic expressions were representations. Investigations mainly dealt with products; that is, source texts (ST) and target texts (TT) were compared to identify how metaphors in the ST had been dealt with. Such descriptive studies often resulted in the production of lists of translation methods, or translation procedures, that supplemented or replaced similar lists which had been set up earlier with a view to guiding translators in how to translate metaphors (e.g. Newmark, 1981).

In such earlier publications, three translation procedures are recurring: metaphor into same metaphor, metaphor into different metaphor, and metaphor into represented sense. They correspond to van den Broeck’s (1981) three modes of sensu stricto, substitution and paraphrase. From a TT perspective, Toury (1995) added to these complete omission (“metaphor into zero”) as well as “non-metaphor into metaphor” and “zero into metaphor” (pp. 82–83; for an overview, see e.g. Schäffner, 2004, 2017a). It was realized, however, that dealing with metaphor in translation is not
simply a matter of identifying potential linguistic correspondences in source and target languages, but also of reflecting correspondences between their conceptual systems. An increasing number of such product-oriented studies have therefore been based on CMT (e.g. Al-Harrasi, 2001; Shuttleworth, 2011, 2017; Tcaciuc, 2014). For example, based on a descriptive analysis of English translations of Arabic political speeches, Al-Harrasi (2001, pp. 277–288) presented a list of translation procedures that is significantly different from previously produced ones, which were based on linguistic categories. His list includes procedures such as Instantiating the Same Conceptual Metaphor (with sub-procedures such as Concretising an Image Schematic Metaphor, or Same Mapping but a Different Perspective), Using a Different Conceptual Metaphor, and Deletion of the Expression of the Metaphor. Only a few recent publications that are based on CMT will briefly be mentioned in the following section. They share a concern with identifying translation procedures for metaphors by reflecting on the relationship between linguistic expressions and conceptual metaphors. Moreover, all of them are empirical studies working with authentic translations.

18.2.2.1 Metaphor analysis in translations as products

Shuttleworth (2011) uses a multilingual corpus to study the translation of metaphor in original English popular-scientific texts, exploring how metaphorical expressions have been dealt with both at the micro-level (translation procedures for individual metaphorical expressions) and at the macro-level (clusters of mapping) for a variety of target languages. Retention of the metaphorical expression was identified as the default procedure across all languages. Shuttleworth also concludes that what is “lost” in translation is individual metaphorical expressions rather than entire mappings. Such a cross-lingual analysis of scientific metaphors in translation is expanded further in Shuttleworth (2017).

Some other product-oriented research has analysed the treatment of specific types of metaphors in translation. For example, Safarnejad et al. (2014) have studied how metaphors of the emotions happiness and sadness have been rendered from Persian into English. Their corpus, however, was rather small, consisting of a Persian novel and two of its translations into English. They used the metaphor identification procedure (MIP) proposed by the Pragglejaz group (2007), a step-by-step method for identifying metaphor in language, that is, for deciding whether a lexical unit in a text can be marked as metaphorical (for more information on MIP and its more refined and extended variant MIPVU, see Steen, 2017). Their interest was in identifying the emotive metaphorical expressions in the ST and their underlying conceptual metaphors. A comparison revealed differences in the cognitive mappings in Persian and English, reflecting different models of conceptualizing experiences in each culture. They list their identified translation strategies as 1) translation of the source metaphorical expression to the equivalent target-language metaphor, 2) translation of the source metaphorical expression to non-metaphor in the target language, 3) mistranslation and 4) literal translation (Safarnejad et al., 2014, p. 110). It is, however, strange to see that mistranslation is presented as a strategy, in particular since these strategies are suggested to translators as means “to overcome the ordinary barriers while conveying Persian metaphor into English” (p. 110).

Burmakova and Marugina (2014) analysed the anthropomorphous metaphor, in particular the conceptual mapping between MAN and NATURE concepts in a contrastive study of Russian short stories and their translations into English. Their theoretical framework is Mandelblit’s (1995) cognitive translation hypothesis. Mandelblit suggested two possible scenarios in the translation of metaphors. In the case of similar mapping conditions, no conceptual shift occurs between the metaphors in the source and target languages, whereas for different mapping conditions, a conceptual shift does take place from source language (SL) to target language (TL). Their results show that in the majority of cases (more than 50%), the anthropocentric perspective and
the source domain were preserved in the TT. For metaphors with similar mapping conditions, the most commonly used translation procedure was reproducing the same image in the TL. Metaphors with different mapping conditions were paraphrased.

Yan et al. (2010) used larger corpora to investigate how cross-cultural variation in conceptual metaphor affects the translation of metaphorical expressions (i.e. the linguistic level) and how the translation of these metaphorical expressions affects the conceptual metaphors they express, illustrated with fear metaphors in translations from English to Chinese. One of the results of their study is that “expressions of English metaphors are not necessarily translated as expressions of the same metaphors in Chinese even in cases when the metaphor is shared by the two languages” (Yan et al., 2010, p. 49). Their findings reflect that conceptual shifts do not occur only in the case of different mapping conditions, as initially suggested by Mandelblit’s cognitive translation hypothesis.

Most of the research into metaphor in translation is product oriented (e.g. the chapters in Miller & Monti, 2014; Trim & Śliwa, 2019). However, such product-oriented studies can make only a limited contribution to the study of the actual processing of metaphor in translation. Analysing the different translation strategies and linking metaphorical expressions to the conceptual metaphors by which they are sanctioned can only amount to speculating about aspects of cognition and reasoning involved. The (albeit fewer) process-oriented investigations of metaphor in translation are therefore particularly valuable for exploring aspects of translation, metaphor and cognition (see also Schäffner & Shuttleworth, 2013).

18.2.2.2 Metaphor analysis in the translation process

In general, translation process research is concerned with cognitive aspects of task performance (for an overview, see e.g. Ehrensberger-Dow, 2018; Hansen, 2013; also Lacruz & Jääskeläinen, 2018). In respect of metaphor, core issues of process-oriented studies are the processing of metaphor in translation (are metaphors processed differently than non-metaphorical language?), difficulties (are metaphors more difficult to translate than non-metaphorical language?), and cognitive load (does translating metaphors demand more cognitive effort?). Empirical and experimental studies have made use of methods often employed in process research, especially think-aloud protocols (TAPs), keystroke logging and/or eye-tracking methods, sometimes combined with retrospective interviews. In these studies, too, the majority of the researchers have referred to CMT.

Thinking aloud is an introspective method. Translators are asked to verbalize what they are thinking while carrying out a translation task. These verbalizations are recorded and transcribed, with the resulting TAPs serving as input for the researcher’s analysis (for an overview, see e.g. Jääskeläinen, 2009). In respect of metaphors, TAPs have been used by Tirkkonen-Condit (e.g. 2001) to test Mandelblit’s (1995) cognitive translation hypothesis. Mandelblit had hypothesized that “metaphorical expressions take more time and are more difficult to translate if they exploit a different cognitive domain than the target language equivalent expression” (Tirkkonen-Condit, 2001, p. 11). Mandelblit herself (1995, p. 493) had tested her hypothesis with reference to time, and found that metaphorical expressions took more time and were more difficult to translate if they exploited a different cognitive domain, which required the translator to make a conceptual shift. Using TAPs of professional translators in simulated translation tasks, Tirkkonen-Condit (2001) measured time and the length of TAP segments, counted the lines of TT produced, and also asked the translators to comment on their own satisfaction with their translations. The research confirmed Mandelblit’s hypothesis. The translators required more time for translating metaphorical expressions for which they had to search for another conceptual domain. Metaphorical expressions with different domains also resulted in more verbalization in the TAPs and in more translation solutions. The overall conclusion is that delay in the translation process,
and the related uncertainty in the translation of different domain metaphors, is evidence of concept mediation. In other words, “the fact that translation difficulty is increased by domain conflict indicates strongly that translation does not take place primarily through word association but at the conceptual level” (Massey, 2016, p. 70).

TAPs were also employed by Kussmaul (2000) as dialogue protocols for students, and in particular with reference to creativity research. His dialogue protocols, too, support the idea that thought processes are happening at conceptual levels, although they are often triggered by metaphorical expressions and the initial attempt to provide a target-language equivalent for a linguistic metaphor. What remains unclear, however, is when exactly the conceptual level is accessed and what exactly triggers the need to access the conceptual level in real translation events.

Keystroke logging is a non-intrusive technology, which enables the researcher to collect realistic data similar to a genuine translation process. In keystroke logging, the software provides quantitative data about the process, i.e. cursor movements, changes and corrections, and position and length of pauses. It is thus a tool to acquire information about a translator’s real-time decision-making processes. Hansen (2013), however, argues that the log files hardly ‘provide information about the translators’ cognitive processes, i.e. what they are reflecting upon during the pauses and phases, or what resources or aids they refer to’ (p. 91), and it therefore remains impossible to know the full mental processes. Nevertheless, the recorded pauses and revisions are indicators of interruptions to the flow of the translation process and “can be analysed in order to support hypotheses about comprehension, linguistic issues, problem solving, and formulation challenges” (Ehrensberger-Dow, 2018, p. 295). Using the keystroke logging software Translog, Jakobsen, Jensen, & Mees (2007), for example, measured processing time and noticed that idiomatic expressions (which are very often metaphorical) slow down the translation process.

Keystroke logging has also been used in experimental settings to test difficulties and cognitive load in metaphor translation, in particular by Sjørup (2011, 2013), Turkama (2017), and Förster Hegrenæs (2018). Turkama (2017) tested the cognitive translation hypothesis with reference to primary and complex metaphors in translating from English into Finnish. Her general aim was to find out which of these types of metaphor require more cognitive effort and to identify translation strategies. Her initial hypotheses were as follows:

1) primary metaphors are easier to translate than complex metaphors, 2) metaphors with shared mappings are easier to translate than metaphors with different mappings, 3) complex metaphors are easier to translate if primed by the translation of one of their assumed primary components.

Turkama, 2017, p. 50

For investigating the cognitive effort of the translation process, fixation and time as recorded in the files collected by the Translog software were analysed. The notion of “fixation” describes the process of searching for a translation solution in which the original expression is copied literally. This is, however, a different use of “fixation” compared with eye-tracking studies (see later). The results of her experiments (conducted with students of translation) provided strong evidence that metaphorical expressions based on primary metaphors are easier to translate than those based on complex metaphors, thus providing support for the assumption that primary metaphors have a more universal experiential grounding, which facilitates their translation. It was also confirmed that different conceptual domains in the two languages make translation more difficult and increase the cognitive effort. Turkama also argues that “the conceptual domain or mapping used as the basis of the metaphorical expression was found to be a more significant factor in the difficulty and the amount of cognitive effort of translation than the primary vs. complex nature of
metaphor” (p. 89). However, priming the translation of complex metaphors with the translation of primary metaphors did not facilitate the translation, and the third hypothesis was thus not verified.

Sjørup (2011) used keylogging to measure the production time of metaphorical expressions in TTs, relating them to specific translation strategies. Her basic assumption was that “the choice of translation strategy would have an effect on the cognitive effort involved in metaphor translation” (p. 201). However, she distinguished only three strategies: translating a metaphor to the same metaphorical image (M→M), use of another metaphorical phrase (M1→M2) or paraphrasing (M→P). In her study, professional translators translated two texts involving different conceptual domains. She noted a higher cognitive load for the paraphrase strategy and argues that this is due to two shifts involved: a shift from one domain to another, and a shift from metaphorical expressions to literal ones. This finding was slightly revised in her following study (see later).

Cognitive effort in dealing with metaphor is also the main interest of Förster Hegrenæs (2018), addressed from a developmental perspective. Her aim is to explore how cognitive effort is allocated when translating metaphors related to the linguistic and/or conceptual translation strategy chosen. Her investigation is based on experiments with students at different stages of their undergraduate programmes in both Norway and Germany. Production time of translating metaphorical expressions is seen as an indicator of cognitive effort and measured with keystroke logging (Translog II). Her investigation illustrated that translation strategies that involve a conceptual change (different conceptual mappings and different linguistic items; different conceptual mappings with partly similar linguistic items) increased production time. Overall, however, “no clearly definable development in terms of predicted production time” could be identified for the different strategies at different stages of competence development (p. 164). The analysis confirmed Mandelblit’s hypothesis and also Sjørup’s (2013) findings that strategies which require a shift of conceptual mapping are marked by longer production times. In respect of the selection of linguistic and conceptual translation strategies, all participant groups selected metaphorical strategy types more often than non-metaphorical ones. In other respects, however, her results differ from Sjørup’s findings. For example, in respect of production time, Sjørup’s suggestion that translators opt for strategies which require less time was not corroborated.

In some of her studies on cognitive effort in metaphor translation, Sjørup (2008, 2013) combines eye-tracking and keylogging methods. Eye tracking provides information about gaze activity, such as eye fixations, movements of the eye, gaze time, fixation duration and number of refixations. The use of eye tracking is based on the assumption that eye movements are indications of cognitive activity and that there is a correlation between the time readers fixate on a word and the amount of processing that takes place. Researchers try to infer what a translator is attending to at any particular moment of text processing (e.g. a specific word, the ST or the TT). One hypothesis in Sjørup’s study of 2008 was that “translators dwell longer over the processing complexities involved in translating a metaphor than a non-metaphorical concept” (p. 53). Using naturally occurring text, she studied eye fixation time of professional translators and discovered that there was indeed a longer fixation time for metaphors compared with non-metaphorical language, which seemed to confirm her hypothesis.

The question of whether metaphors are processed differently compared with non-figurative language is also addressed in Sjørup (2013). This study combines an investigation of both the comprehension and the production phase. The overriding assumption is that comprehension mainly takes place during reading and is manifested in the eye movements, whereas production (mental and manifested) takes place mainly in the text production process and
can be investigated through keylogging data. She analysed the cognitive effort involved in comprehending metaphors compared with non-metaphors when the text is processed for translation, and the cognitive effort involved in translating metaphorical expressions compared with translating non-metaphors. For investigating comprehension, total fixation time, total fixation number, and first pass fixation time were measured as dependent variables. A main finding in respect of comprehension was that even though “metaphors do not require a greater cognitive effort to read for translation than literal expressions”, the “significant interaction between the variables Type and Task suggests a tendency that metaphors are in fact more cognitively effortful to read for translation than literal expressions, but less cognitively effortful to read for comprehension only” (p. 137). This result also shows that translation is a particular type of text processing and that measures which have been used in monolingual metaphor studies are not equally relevant when it comes to metaphor in translation. The measure chosen for analysing cognitive effort of the production stage is total production time. Sjørup (2013) also asks whether certain translation strategies required more effort than others, as indicated by gaze times and production time. An interesting result is that \( M \rightarrow P \) (Metaphor into Paraphrase) is not more cognitively effortful than the direct translation strategy \( M \rightarrow M \) (used most frequently by the participants of her study). \( M_1 \rightarrow M_2 \) is the least preferred strategy. For her analysis, effects of independent variables, such as the length of the area of interest, its position, the domain, the task, etc., are taken into account. However, the role of individual factors such as textual context and participant background are not considered, since her aim is to “identify commonalities of metaphor translation rather than investigate individual factors such as experience within different translation genres” (p. 9). Sjørup also acknowledges that it is impossible to distinguish exactly the length of the metaphor from the text production task. Although longer fixation times can be interpreted as a greater cognitive processing load, it is impossible to determine how this load is distributed between metaphor interpretation and the choice of a translation strategy and a target-text formulation. Moreover, longer gaze time could also be related to a translator reflecting on the consequences of local decisions for the overall function of the text—a point not problematized in depth by Sjørup.

What process research so far has revealed is that processing and translating metaphors do indeed seem to be linked to greater cognitive load, as reflected in longer pauses, total length of completing the translation task and more uncertainty (verbalized in TAPs and/or noticeable in Translog reports). Although the research illustrated earlier makes use of CMT, the analyses focus on metaphorical expressions. Scholars who used process methods have argued that their data have not been conclusive in arriving at a firm evaluation of whether the translators did indeed access the conceptual level or whether they were guided by the surface structure.

### 18.3 Recent developments

Translation process research has been a growing area in the discipline of TS, with progress in research methods and tools. That is, for data collection, researchers have made increasing use of several methods in combination (triangulation), such as keystroke logging, screen recording, eye tracking and retrospective interviews. In particular, keystroke logging and eye tracking are good indicators of processing effort in translation in real time. The studies devoted to metaphor in translation summarized earlier have signalled where processing effort is predominantly located, despite partly conflicting results. Such issues continue to be the concern of recent developments, although we also see an increase in multi-method approaches and an investigation of processes in different modes of translation as well as translation-related tasks. Some examples of such research will be summarized in the following.
18.3.1 Multi-methods in metaphor analysis

Triangulation is used by Massey (2016) and Massey and Ehrensberger-Dow (2017) in investigating how conceptual metaphor is re-conceptualized or re-mapped in the translation process. In their studies, they combine product-oriented approaches with techniques used to access translators’ cognitive processes. Massey’s exploratory study

triangulates data from screen recordings with eye tracking, retrospective verbal commentaries and target-text products in an attempt to shed light on how translators at various levels of experience, and working in different language pairs, appear to map or remap conceptual metaphorical meanings as they work.

Massey, 2016, p. 71

Screen recordings register all the changes that take place on the computer screen, including the use of resources (the Internet, electronic dictionaries). The data were collected from Bachelor (BA) and Master (MA) students and professional translators, with the translations (from German into English) being done in laboratory experimental settings. Two complex conceptual metaphors, an ontological one (a topographical personification: the German word *Hang*, i.e. “inclination”, used in its psychological sense) and an orientational one (*zugrunde liegen*, literally, “to lie at the bottom of” as an example of causative orientation), were analysed in detail. At first, a product-oriented analysis categorized the translation procedures employed, i.e. metaphor into same metaphor, metaphor into different metaphor, metaphor into non-metaphor (or represented sense) and metaphor into zero. For example, for *zugrunde liegen*, all vertically oriented spatial metaphors in the TTs were treated as metaphor into same metaphor. Then, the retrospective verbal protocols (RVPs), gathered on the basis of the screen recordings overlaid with eye-tracking visualizations, were analysed for problem indicators, that is, for determining the participants’ awareness of the conceptual metaphors. This is based on the assumption that mentioning the selected metaphors in their RVPs indicated the participants’ awareness that the conceptual metaphors represented a translation issue which needed to be addressed. Finally, the “screen-recorded processes were examined for patterns of internal and external resource consultation” (p. 75). The analyses revealed correlative tendencies across experience levels. That is, in respect of both the translation products (i.e. translation procedures) and the process (i.e. problem awareness and resource-use behaviour), the results revealed differences between the three groups, with more similarities between the advanced MA students and the professionals. Massey (2016) argues that one “palpable conclusion to draw is that experience and/or training appears to be a central factor in handling conceptual metaphor” (p. 78).

In a follow-up study, Massey and Ehrensberger-Dow (2017) triangulated data from keystroke logs, RVPs and TTs produced by professionals, advanced MA students and beginner BA students, all translating into their L1 (English or German). The methodology for this study was very similar to the one used by Massey (2016). In a first stage, the translation procedures were identified in the products, followed by the analysis of process data. A pause of five seconds or more in the keystroke logs was taken to be a problem indicator (pauses are considered to indicate internal cognitive resource use). In the third stage, the RVPs were analysed in more detail to ascertain the participants’ comprehension of the metaphors in the text. Aligning the product and process analyses, Massey and Ehrensberger-Dow (2017) noted differences in the behaviour of professional translators working into English (ProE) or into German (ProG). In the products, it was noted that most of the ProE translators...
remapped only partially, but maintained the generic metaphor structure of personification, […] This seems to be accompanied by a very low degree of pausing and few conceptual clarity issues, as well as moderate transfer or formulation difficulties expressed in the RVPs. *Massey & Ehrensberger-Dow, 2017, p. 184–185*

However,

two-thirds of the ProG translators re-mapped directly to the source-language target domain, but […] this was accompanied by high levels of pausing and RVP mentions—which are commonly assumed by process researchers to indicate non-routine problem identification and cognitive processing. *Massey & Ehrensberger-Dow, 2017, p. 185*

This result makes them ask: “So could it be that re-mapping to source-language target domains, rather than cross-domain re-mapping, demands more attention, causes greater transfer and production uncertainty and, therefore, requires increased cognitive effort?” (p. 185). Investigating this question would need to deploy more direct elicitation methods, such as structured retrospective interviews.

### 18.3.2 Metaphor in translation-related tasks

Investigations of metaphor and cognition have also been conducted for different modes of translation and for translation-related activities. Zheng and Zhou (2018) used eye tracking for investigating processing time for metaphorical expressions (ME) during English–Chinese sight translation, with a particular interest in the eye-voice span. The processes in the sight translation task, conducted by students with no experience in professional translation or interpreting, were registered by eye tracker and audio recorder, supplemented by post-task retrospection data. The research focused on the eye movements and fixations during the pauses that preceded metaphorical expressions and during their oral translation time. Their study illustrated that metaphorical expressions increased cognitive effort, as indicated in a slowed-down pace of reading ahead and the existence of reading backwards or re-reading when sight translating. They acknowledge that their method of calculating fixation time “might have ignored the cognitive function of context (or co-text) in processing MEs” and that reading ahead “could also reasonably indicate some essential effort for working out the translation of ongoing ME, by seeking clues from the following co-text” (p. 756). They therefore conclude that there are “some grey zones that eye-tracking technology might not be possible to identify; or to be more precise, there are some intricate human cognitive processes which cannot be accurately investigated by eye-tracking data alone” (p. 756).

Recent developments in the translation industry mean that translators are presented with text already translated to a certain degree (as a result of translation memory systems or machine translation). These tools change the cognitive demands on and processes of translation (see also Jakobsen & Mesa-Lao, 2017). An aspect of technology is also addressed by Koglin (2015), who investigated cognitive effort required to post-edit machine-translated metaphors compared with translating metaphors manually. Her hypothesis was that manual translation is more cognitively demanding than post-editing. To investigate it, an experiment was conducted using eye tracking, keylogging and retrospective TAPs. Professional translators performed the translation task, whereas students post-edited two versions of the same newspaper ST produced by two different machine translation systems. Koglin, however, does not problematize her setup by using
different groups of subjects to perform the two tasks. After each task, two TAPs were recorded. Participants were asked, first, “to think aloud while their full post-editing process was replayed on Translog-II screen”, and for a following guided protocol, “they were asked two questions related to metaphor interpretation and its post-editing decision-making process” (pp. 130–131). In the analysis of cognitive effort, she focused on keylogged data in respect of pauses and on eye-tracking data related to total fixation duration for two specific metaphors selected as areas of interest in both the ST and the TT. She found that on average, more time was spent on manually translating the text compared with post-editing it. There were fewer deletions and insertions for post-editing in comparison to manual translation. For fixation duration, Koglin noticed variation among the participants of both tasks. For example, “participants had longer average fixation durations on the TT area in post-editing and longer average fixation durations on the ST area in manual translation” (p. 135), and the total of pauses was lower in post-editing than in manual translation. Koglin argues that her hypothesis was confirmed, although she found that there “has not been a significant difference between cognitive effort required to post-edit machine translated metaphors in comparison to manually translating them” (p. 137). She acknowledges, however, that due to her small sample size for the translation task and the high variation among the individual participants, her “findings might not be generalizable” (p. 136).

In respect of metaphors, there is much more research into translation than interpreting, another mode which involves decision making. Schäffner (2017b) investigated how interpreters deal with metaphors at international press conferences, looking at interpreting strategies (i.e. how the simultaneous interpreters dealt with metaphorical expressions) and at coping strategies (i.e. strategies that might signal a particular cognitive load, such as lengthening, doubling and hedging). However, since her analysis was based predominantly on the product (i.e. the transcripts of the press conferences) and not on the actual process, her assumptions about cognitive load cannot be empirically verified. Similarly, Saltalamacchia’s (2014) investigation of how time metaphors in plenary speeches in the European Parliament were dealt with by simultaneous interpreters in the English, German, French, Italian and Portuguese booths was also based on the analysis of the official transcripts. Her aim, too, was to understand the cognitive processes involved when conveying highly complex metaphors. Although her analysis was based on transcripts, she also had audio recordings of the interpreters’ performance on which we can hear interpreters breathe heavily, stammer or laugh, which also indicates cognitive effort. She, too, suggests that triangulating the analysis of transcripts with video recordings of the interpreters and eye tracking could be more useful in gaining insights into the cognitive processes. Research into the cognitive load in simultaneous interpreting has recently made increasing use of eye tracking (e.g. Seeber, 2013). In particular, the psycho-physiological method of pupillometry, i.e. a study of the pupil size and pupil dilation when carrying out a task, has emerged as a promising method to measure cognitive load during simultaneous interpreting in real time. Pupillometry is based on the assumption that eye movements and pupil size are indications of cognitive activity. However, it has not yet been employed for studying metaphor in translation and/or in interpreting.

Cognitive processes can also be measured by other objective psycho-physiological techniques, such as measures of brain or heart activity, e.g. usage of electroencephalography (EEG), positron emission tomography (PET) or functional magnetic resonance imaging (fMRI). Due to certain constraints, especially the (at least partly) intrusive nature of these methods, they have only rarely been used for research into cognitive aspects of translation and interpreting (for an evaluation of some such research, see Seeber, 2013). An interesting experiment was conducted by Rojo et al. (2014), who investigated the emotional impact of metaphors by measuring the participants’ heart rate with a heart monitor. Heart rate is related to emotions, and heart rate acceleration or deceleration can be an indicator of the degree of physiological arousal. Rojo et al. (2014)
were interested in finding out whether a metaphorical or a non-metaphorical translation of the same figurative expression would result in differences in the emotional impact. An experiment was carried out which involved two Spanish translations of English short stories, with the final sentence containing either a metaphorical or a non-metaphorical expression of the four basic emotions happiness, sadness, rage, and fear. Their results showed differences in the participants’ heart rate: metaphorical expressions caused an increase in the participants’ mean heart rate, whereas non-metaphorical ones caused a decrease for rage, fear, and happiness expressions, with the opposite pattern for sadness expressions. They argue that “the loss of metaphorical image will most probably result in diminished emotional impact” and suggest that “translators should certainly be more sensitive to the implications of reproducing the meaning at the cost of the image” (p. 38). They acknowledge, however, that “heart rate can also be altered by other factors, such as participants’ stress or tiredness” and plead for further studies, which should combine “heart rate with measurements of other indicators, such as galvanic skin response, subjective feelings or even retrospective interviews” (p. 38). In this study, the emotional impact metaphors had on recipients was measured. Translators, and interpreters too, are in a way recipients of the ST, and it would be interesting to investigate their own emotional reaction and heart rate when engaging with the metaphors in the ST and producing their TTs. By triangulating methods, e.g., heart rate measurement and eye tracking, it could be possible to see whether there are correlations between physiological, emotional, and cognitive factors. Such research could also lend support to investigating translation as an embodied activity.

18.4 Concluding remarks

As illustrated in this chapter, a large amount of research into the relationship between metaphor in translation and cognition has been conducted in experimental settings. Professional translators, however, normally operate in real-life contexts, performing authentic assignments, using a variety of tools and cooperating with other agents. Translation as a socially situated, embodied and enacted activity means that multiple actors and factors influence a translator’s decision-making process in a concrete translation event. As Martín de León (2013) argues, “[r]esearching distributed cognition in translation amounts to studying complex real-life translation projects” (p. 115). There has been a growing amount of research investigating how physical, organizational, environmental, and other relevant ergonomic factors impact on translation practice (e.g. Ehrensberger-Dow & Massey, 2017; Risku, 2010), and on how cognitive and situational levels interact in translation and interpreting (e.g. Ehrensberger-Dow & Englund Dimitrova, 2018).

In respect of metaphor in translation, Massey and Ehrensberger-Dow (2017) point out that “[t]hose addressing translated conceptual metaphor need to bear [the essential situatedness of translation] in mind when collecting and analysing their data and when interpreting results” (p. 175). Although workplace studies have significant benefits, so far, real-life translation projects have not yet been used for investigating cognitive aspects in metaphor translation but should be considered for future research.

In addition, more process studies in experimental settings will also be relevant, since previous research has left a number of open questions as well as findings for which a firm explanation has not yet been found (see also Shuttleworth, 2019, on topics for future research). For example, previous research has provided evidence that thought processes are often triggered by metaphorical expressions and the initial attempt to provide a direct metaphorical equivalent in the target language, which seems to suggest that translating metaphor into the same metaphor is indeed the default procedure. This could be tested further by a closer qualitative analysis of the keylogging data. The log files can show whether translators initially typed the closest
target-language equivalent and changed it at a later stage. Similarly, processes of revision and post-editing, including post-editing of machine translation output, can show which changes were made in respect of metaphors, e.g. whether or not an initially used metaphorical expression was changed into a paraphrase or deleted. Such research could also get us closer to answering the question: What exactly triggers the translator's need to access the conceptual level in real translation events? Another question that needs further exploration is: How can we determine how the cognitive load is distributed between metaphor interpretation, the choice of a translation procedure, and target-text production? For example, pauses in typing, before or after typing and/or corrections, as well as longer gaze times may be due to a translator reflecting on consequences of local decisions for the overall function of the text and may thus not be immediately relatable to a comprehension or production stage. Most scholars have been cautious in making generalizations about processes in metaphor translation, having discovered that subjects tend to differ enormously in their performance. This only confirms that there are several variables in the translation process.

Process-oriented studies of metaphor in translation can also provide insights with which theories of conceptual metaphor and cognitive linguistics can be tested. However, translation scholars who have referred to conceptual metaphor theories have not (yet) problematized them. There is also hardly any engagement with work in CMT beyond that of Lakoff and Johnson, and blending theory has not yet been used to any significant extent. There is thus much scope for TS research, including the study of metaphor in different types of mediated communication. That is, in addition to interpreting, briefly mentioned earlier, one could also investigate how verbal metaphors interact with metaphors in other modes, i.e. focusing on the multimodal nature of the translation and/or interpreting process. This could be studied for the audiovisual mappings as they are relevant in audiovisual translation. Metaphors in signed languages are also worthy of investigation. Roush (2011), for example, asked to what extent a specific metaphor exists in the conceptions of American sign language (ASL) signers, and what procedures a translator might use to handle potential differences between English and ASL. For the translation procedures, he used those suggested by Al-Harrasi (2001). With the increased interest in performance by non-professional translators, one could also investigate how they process metaphors in comparison to professional translators.

Triangulation of research methods will continue to be useful to investigate cognitive aspects of metaphor in translation. Moreover, multi-method approaches can be combined with an interdisciplinary orientation, drawing on different theoretical and methodological frameworks, such as Translation Studies, cognitive linguistics, sociology, network theory or neuropsychology (for an overview of neurocognitive research on translation and interpreting, see Muñoz et al., 2018). Translation Studies can benefit from interdisciplinary projects, since the various disciplines can provide complementary perspectives on understanding the complexity of translating and interpreting.

In respect of metaphor in translation, the process studies illustrated in this chapter tended to focus on cognitive load and the allocation of processing effort during task execution. The position and function of a metaphorical expression in a text, as well as specific linguistic features, deserve more attention too, since language processing is an essential element of cognitive processing in translation. As already indicated, the choice of a translation strategy can also be due to certain constraints on dealing with metaphor (e.g. culture-specific aspects, word form or genre). One such constraint can also be the use of a particular language by a speaker for whom this language is not the first language. Such texts could include metaphorical expressions reflecting cultural variation, which can have an influence on language processing of translators and interpreters. The potential processing problems that texts and speeches with English as a lingua franca (ELF)
cause for translators and interpreters compared with those in standard English, the cognitive load associated with processing ELF, and the coping strategies used by translators and interpreters are being investigated in an interdisciplinary project, which draws on perspectives from translation and interpreting studies, ELF studies and neuroscience (CLINT, n.d.). It will be interesting to see whether linguistic and conceptual metaphors are among the ELF features that have an impact on the performance of translators and interpreters.

In acknowledging the value of multi- and interdisciplinary research, Shlesinger’s argument, although related to interpreting research, is still very pertinent today: “To fully appreciate the merits and drawbacks of the available approaches, we apparently require more research into research; i.e., efforts to validate the relevance of our methodologies and to avoid counterproductive or misleading ones” (Shlesinger, 2000, p. 13).

**Further reading**


Miller, D. R., & Monti, E. (Eds.) (2014). *Tradurre figure / Translating figurative language*. Bologna: Bononia University Press. The contributions in this volume address interlingual translation of figurative language, which often foregrounds the complexities of the translation process as well as cultural variation.


**References**


