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A Complex-skill Approach to Translation and Interpreting

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Both text-to-text translation and simultaneous interpreting are complex activities comprising many sub-skills that each has been a separate object of study in cognitive psychology: Perception, listening and speaking, reading and writing, reasoning and decision making, problem solving, memory, and attention, every single one of these central topics of study in cognitive psychology plays a prominent role in translation and interpreting. Both tasks easily qualify as complex, or 'high-performance', skills (for a definition, see Schneider 1985: 286), the study of which constitutes yet another focus of research efforts in cognitive psychology. Consequently, researchers of translation and/or interpreting who gear to cognitive psychology in an attempt to find out how that field of study may inform their own discipline, may find themselves overwhelmed by the large number of possible starting points. The same holds for cognitive psychologists who attempt to apply the achievements of their field to translation studies, or who turn to translation studies to see how the achievements of that field could inform cognitive psychology.

Out of the large number of points of view to take, I have chosen to concentrate on the complex-skill characteristic of translation and interpreting. When choosing this perspective, all of the extensive literature on the nature of complex skills, on how they are acquired and may best be trained, and on expertise becomes pertinent to the study of translation and interpreting. In this article a number of central themes in this vast research field will be highlighted and an attempt will be made to apply them to the study of translation and interpreting. I will only consider text-to-text translation and simultaneous interpretation, often simply referring to these specific forms of translation with the terms 'translation' and 'interpreting', respectively. The discussion will focus on a componential approach to training complex skills and on the relevance of acquiring fluency/automaticity in as many of the task components as possible.

Part-task Training versus Whole-task Training

Many programs for training complex skills are based on the fallacy (Schneider 1985) that a skill can best be trained in a form that is similar to the targeted skill (the 'whole', 'full', 'total', or 'criterion' task). Adherents of this view recommend a training program in which the trainees perform the total task most of the time. Schneider points at a number of problems associated with this approach to training, such as the fact that it will often lead to resource overload and consequent frustration and panic. Another problem concerns the implicit assumption of the whole-task approach that there is little transfer from training isolated components of the targeted task to actual performance on this task. A number of studies have provided data that indicate that this assumption is flawed. Not only has it been shown that component training *does* transfer to performance on the whole task, but also that under some sets of circumstances component training may even be more effective than whole-task training. For instance, there are indications that part-task training is more effective than whole-task training with difficult tasks and with low-aptitude or inexperienced students (Wightman and Lintern 1985). Given the fact that both translation and interpreting are extremely difficult tasks, it is likely that also the acquisition of these skills will be supported by component training.

The Importance of Automaticity: An Example

What then, if part-task training is opted for, are the task components to be included in the training program? Not all components that can be distinguished in a criterion task will need to be trained because a number of them may be mastered already at the onset of training. An example is visual word recognition, in translating written text. In fluent readers this process proceeds to a large extent automatically and effortlessly (although the recognition of low-frequency words may still require mental resources even in these readers; Herdman and LeFevre 1992). On the assumption that the typical trainee selected for participation in the translation training program will be a fluent reader, the inclusion of a visual-word-recognition component in such a program would thus be a waste of time and effort.

However, when the goal of a training program is to improve reading comprehension in poor readers, this same component, visual word recognition, is likely to be one of the most important skill parts to focus on during training. This is suggested by a number of influential current theories on reading

(Daneman and Carpenter 1980, 1983; Perfetti 1985; Stanovich 1980) that all attribute poor reading to deficient, non-automatic, word-recognition skills. Because too many of the limited resources must be directed towards recognizing the printed words, too few remain for higher-level text comprehension processes such as drawing inferences and cross-sentence integration of information, and for the temporary storage of information that is required for these higher-level processes. As a consequence, comprehension breaks down. The solution is to automatize word recognition as much as possible through training. When the stage of maximal automaticity of word recognition is reached, all resources can be directed to those components of the task that defy automatization. This characterization of the development of skilled reading holds a lesson for the acquisition of any skill, including translation and interpreting: Any part of the criterion skill that is amenable to automatization should become automatized as rapidly as possible in order to free resources for task components that will always remain effortful, whatever the level of expertise of the person performing the skill.

Word-recognition practice, but now with auditory input, may also be a significant component in training simultaneous interpreting. The reason to suggest a role for training word recognition in interpreting but not in translation is a difference both in quality and in permanence of speech and writing (see Nickerson 1981 for a detailed analysis of differences and similarities between oral and written language input). Due to the generally good quality of print, the words in printed text are usually easy to recognize. Spoken words, however, are often difficult to identify, either because the speech input is masked by noise from the environment or because the speech input itself is of poor quality (too fast, badly articulated, or too softly spoken). This characteristic of speech is detrimental to performance in interpreting, as shown by a number of early experimental studies on the role of quality of input. These studies (see Gerver 1976 for a review) demonstrate large decrements in performance when noise is added to the speech signal and when input rate increases beyond the optimal level of about 100 to 120 words per minute.

A second critical difference between printed and spoken language is that the former is permanent but the latter transient, dissipating with time. Even though the auditory input will be briefly stored in auditory short-term memory and available for backtracking in case of a word-recognition failure, the opportunities for recovery in speech perception and simultaneous interpreting are much less favorable than in the case of reading and written translation. In interpreting the opportunities for recovery are even worse than in ordinary (within-language) speech perception because, unlike in the latter, there is no

way to negotiate for meaning with the speaker in the former situation. Any attempt to work out what word might have been uttered diminishes the resources available for the remaining task components. An effect in simultaneous interpreting would be that later parts in the input stream would just vanish in the air unnoticed or, at least, unanalyzed, a situation which holds a serious risk of a breakdown. Training auditory word recognition under unfavorable circumstances may help the interpreter to develop appropriate strategies such as fast guessing to compensate for poor input.

To summarize, as exemplified here with word recognition as a component of reading, translation, and interpreting, candidate components for any training program are all the parts of the criterion skill that are not optimally automatized. What these parts are depends on a number of factors, such as the expertise of the learner or specific characteristics of the criterion task.

Training Components of Interpreting and Translation

The description above of how poor auditory input may impact on simultaneous interpreting illustrates the primordial importance of fluency in performing this task. The more of the sub-processes are maximally automatized, the more resources are available for the processes that will always require attention and for temporary storage of information (cf. the above description of skilled reading). In a number of influential theories of working memory (e.g., Baddeley and Hitch 1974; Daneman and Carpenter 1980, 1983), these two, attentional processing and storage, compete for the limited capacity of the system and there is a trade-off between the two: The more capacity is required for processing, the smaller the storage capacity and vice versa. Giving this dual function of working memory, processing and storage, it is easy to see the importance of maximizing automatic processing in simultaneous interpreting, and, to a lesser extent, written translation (where backtracking is always an option). In addition to the capacity required for comprehension of the input, which by itself involves both the temporary storage and processing of information, capacity is needed for memorizing elements of the target language until they can be uttered or put on paper, for the production component, and for coordinating the various activities (Gile 1997). The demands of both tasks are therefore much higher than those required for mere comprehension, of speech or written text, which by itself is already complex enough a skill to tax even the most fluent of language users at times. They are also undoubtedly much

higher than those involved in language production, even though in one respect the production component in translation and interpreting may be less demanding than usual language production, in speaking or in writing: The conceptualization component of common language production can to a large extent be skipped in translation and interpreting because the message to be expressed in the target language is already provided by the author/speaker. Padilla, Bajo, Cañas and Padilla (1995) provided data that suggest that, in order to cope with the high demands of the task, professional interpreters develop a working-memory capacity which exceeds the capacity of normal language users.

What then are the task components to be profitably included in translation and interpreting training programs? A number of recent studies have shown that even among university students large differences exist in the efficiency with which they perform rather basic language-processing tasks such as lexical decision, word naming, and semantic categorization of words (Herdman and LeFevre 1992; Lewellen, Goldinger, Pisoni and Greene 1993). In this text I will assume (mistakenly maybe) that translation and interpreting trainees with exceptional non-fluency in these basic language skills will be identified as such early on in the program and discouraged from continuing the program, and that, therefore, these very basic skills need not be trained in the program. In the next sections I will suggest a number of potentially relevant training exercises, some involving just one of the two languages of the translator/interpreter-to-be and others involving both languages. The general underlying theme in proposing these exercises is the importance of achieving fluency in as many of the sub-components of the criterion skills as possible. Because, for reasons given above, fluency of the sub-processes is considerably more important in interpreting than in translation, the remainder of this text will strongly emphasize interpreting.

Word retrieval: Concept naming

One training component to consider is word retrieval under speed instructions. Carroll (1978) already noted the importance of fast word retrieval for simultaneous interpreting in particular. If a concept to be expressed in the target language does not activate the corresponding word (or string of words) rapidly and automatically, a search of memory for the appropriate name or an attempt to paraphrase will consume precious time and resources, and the interpreter runs a serious risk of a breakdown. Simple tasks that could be used in the training of this skill are timed picture naming (e.g., Snodgrass 1993) and definition naming (e.g., Brown and McNeill 1966; La Heij, Starreveld and

Steehouwer 1993), particularly in the weaker language. The underlying assumption in proposing these tasks as instruments to strengthen the memory connections between *concepts* and words is that pictures and definitions activate the corresponding concepts. The latter, in turn, activate their names. Note that the word-naming task briefly mentioned in the previous paragraph is not a word-retrieval task in the sense intended here, where the appropriate name has to be retrieved for a given (albeit indirectly, via the picture or the definition) concept. In a word-naming task the opposite process is typically studied, with the word given (in its visual form) and the associated concept to be contacted in memory. Exercising word naming is therefore not an appropriate means to increase fluency in word retrieval.

It is as yet unclear whether word-retrieval training will have a general effect of speeding up that process, irrespective of the words involved in the training, or whether the effect is word specific, that is, it only speeds up the retrieval of the words actually included in the program. If the effect of training is not restricted to the trained words themselves but carries over to non-trained words, its beneficial effect for interpreting performance may be considerable. If instead the effect is word specific, the benefit for simultaneous interpreting will be more modest because the training set will necessarily only cover a limited number of the words to be encountered in future professional interpreting sessions. However, in the case of word-specificity of the effect, careful selection of the training words will optimize the chances that actual interpreting performance will benefit from the training. The training could, for instance, focus on the most frequent words of the source and target languages, that guarantee a large coverage in language use (see Nation 1993 for the relation between word frequency and text coverage), and thus increase the hit rate of trained words in professional interpreting settings considerably. Furthermore, the training could concentrate on words that are known to be particularly hard to retrieve in the target language (for instance due to non-straightforward mappings between the source and target languages; see also below). Finally, especially word retrieval in the weaker language should be trained, because that is where word-retrieval dysfluency will most often occur.

Whatever the scope of word-retrieval training, it should be clear that fluency of this skill is crucial for skilled interpreting performance. If for practical reasons it could not be trained adequately in the program (e.g., because achieving the criterion levels of performance would consume too many hours of practice), it will already have to be among the skills of the student entering the interpreting training program (and a quick test for assessing fluency in this skill could serve as an aid in selecting trainees). However, because fluent word-retrieval is less critical in translation, in

selecting trainees for a translation program the requirement of word-retrieval fluency could be relaxed considerably.

Word retrieval: Word-to-word translation

A training component intended to optimize word-retrieval efficiency may also include practice in timed word-to-word translation. The assumption underlying this proposal is that not only written translation but also simultaneous translation to some extent involves 'transcoding', that is, the replacement of source-language linguistic structures of various types (phrases, clauses, but also single words) by the corresponding target language structures. Some researchers of interpreting (Seleskovitch 1976) oppose this view and claim that skilled interpreting performance primarily involves what I have called 'vertical' processing (De Groot 1997), in two steps: The source-language text unit to be interpreted as a single chunk is first fully analyzed up until the stage of pragmatic analysis (Paradis 1994 refers to this stage as linguistic decoding); this comprehension stage is followed by a 'top-down' production stage that results in the target-language output ('linguistic encoding', Paradis 1994). Because of the transient nature of the input in interpreting, the forms of the source-language words are thought to be lost rapidly during comprehension, leaving only the utterance's meaning in memory. With the forms lost, no word-to-word (or higher-level) transcoding can take place. Because transcoding, especially at the level of words, is regarded by many, including Seleskovitch, as an inferior translation technique, associated with the lower proficiency levels of the skill, this process of deverbalization is in fact regarded as beneficial. In written translation transcoding is thought to play a larger role than in interpreting, due to the fact that the source-language input remains available permanently. The permanence of the source language evokes transcoding 'reflexes' (a term that Kussmaul 1995, uses in this context), that should, according to Seleskovitch and like-minded researchers, be suppressed vigorously.

Other researchers, however, assign a much larger role to transcoding ('horizontal' processing; De Groot 1997) in simultaneous interpreting (Gile 1991), or even regard it as the hallmark of professional interpreting (and translation; Paradis 1994). The view that considerable transcoding takes place in both translation and interpreting is consistent with the popular notion of a working memory that holds about one-and-a-half to two seconds of phonologically coded information in the so called 'phonological loop', a component of working memory (Baddeley 1990). Not only auditory input but also visual input is temporarily stored in this memory store. With this duration

of phonologically coded information residing in the phonological loop, by the time the content of a source-language word will have to be expressed in the target language, the critical source-language word will often still be available in phonological form. In interpreting this will be the case whenever the ear-voice-span is shorter than two seconds. But the phonological form may be available much longer than that whenever the interpreter, for whatever reason, consciously memorizes the word. In written translation the phonological (and visual) form may be re-activated over and over again, involuntarily or voluntarily, because the source-language input remains permanently available.

The fact that both in interpreting and in translation the input word forms will often still be available the moment the corresponding output is ventured, may sometimes be beneficial, for instance when the corresponding source- and target-language words are close cognates used in similar contexts in the two languages; but it may also often be detrimental, for instance when the source-language word form sets the interpreter on the wrong track (see for examples De Groot 1997: 40). Whether potentially beneficial or detrimental, the frequent (and unavoidable) availability of a source-language word the moment the corresponding target-language unit is about to be uttered, might as well be exploited in a training program. The goal of such a training component should be to strengthen the long-term-memory connections between the representations of translation-equivalent terms (thereby at the same time weakening the deleterious effects of translation pitfalls). Instruction should focus on (categories of) words that are notoriously difficult to translate. A number of studies using behavioral measures (e.g., De Groot, Dannenburg and Van Hell 1994) and at least one study using a psychophysiological measure (pupil dilation; Hyönä, Tommola and Alaja 1995, Experiment 2) have already revealed many of the variables that affect word-translation performance and thus point out what are the categories of words to be trained. Of course, if a word-translation component is included in the program, the trainees should also be made aware that the translation reflexes thus created may not always be quite appropriate, sometimes even totally inappropriate; that it would be wise always to save some of the mental resources to monitor and, if necessary (and possible), suppress a reflex.

Simultaneity of Comprehension and Production

The most unique feature of simultaneous interpreting as a language skill is that it involves simultaneity of (auditory) comprehension and (oral) production of

language. It is very likely that interweaving these two sides of language use is a skill that does not come naturally but is promoted by training. Current theories on working memory suggest that such training may not only result in the ability to comprehend and produce language at the same time, but that it may also bring about qualitative changes in at least one of the two processes involved, namely, language comprehension. Alternatively, the fact that simultaneous interpreting can become to be mastered by at least some language users may force a modification of current views on the role of working memory in language comprehension. As they stand, these views would in fact regard simultaneous interpreting as an impossible skill.

The ground for these claims is that current working-memory theory holds that comprehension (and many more aspects of language processing; see for a review Gathercole and Baddeley 1993) involves a component of the memory system called the 'phonological' or 'articulatory' loop. This slave system of the 'central executive' temporarily maintains verbally coded information when the central executive becomes overloaded. Studies employing the 'articulatory-suppression' technique, where the articulatory apparatus is kept busy by having the subjects repeatedly articulate irrelevant materials, have indicated that the phonological loop maintains information in some articulation-based form. Articulatory suppression has been found to interfere with the comprehension of syntactically complex sentences (see for references Gathercole and Baddeley 1993), suggesting that the articulatory loop is implicated in the analysis of such sentences. Not only current work on working memory, but also the much older 'motor theory of speech perception', assigns a role of speech in comprehension (Liberman, Cooper, Shankweiler and Studdert-Kennedy 1967; Liberman and Mattingly 1985). But how then, given the fact that the production component of the task occupies the articulatory apparatus most of the time, is (comprehension in) simultaneous interpreting at all possible?

One possible solution is to suggest that the view of phonological-loop involvement in comprehension is flawed. Reminiscent of this solution, Neisser (1967: 218) took the performance of simultaneous interpreters as evidence against the motor theory of speech perception. Another solution is to assume that the phonological loop is indeed normally implicated in comprehension, but that there are ways round it via the deployment of atypical language-processing strategies. This is the way Gathercole and Baddeley (1993) explained the language-comprehension performance of RE, a psychology undergraduate student tested by Butterworth, Campbell, and Howard (1986), who had normal language comprehension skills despite the fact that her phonological memory was clearly impaired. The interesting implication in the present context is that also simultaneous interpreters may develop unusual

language-comprehension skills to cope with the demand of processing language input and producing language output at the same time. Recent data by Padilla et al. (1995) indeed support this idea. They showed that articulatory suppression affects free recall in interpreting students and in a group of control subjects with an academic degree in areas other than translation and interpreting, but not in interpreters who had practiced their profession for a considerable number of years.

Plausibly, these unusual language-comprehension skills as well as the ability to comprehend and produce language simultaneously *per se*, are easier to acquire when the interpreting trainee practices on tasks that also involve the simultaneity of language comprehension and language production, but that we know are nevertheless easier tasks than simultaneous interpreting: shadowing and within-language paraphrasing. In shadowing, presented speech has to be repeated back on line exactly as it was heard. In within-language paraphrasing a spoken message has to be expressed orally in different words in the language of the input, again on line. As simultaneous interpreting, both these tasks – which can be practiced in both of the trainees' languages – require the simultaneous comprehension of input and production of output (see Marslen-Wilson 1973 for evidence that speech shadowing indeed involves semantic analysis of the input rather than merely echoing the input). The implication is that they would also enforce the unusual comprehension strategies that have just been proposed for simultaneous interpreting. But on the other hand, both these tasks are easier than simultaneous interpreting. This can be inferred from a study by Green, Schweda-Nicholson, Vaid, White and Steiner (1990), who had subjects perform a finger-tapping task concurrently with either simultaneous interpreting, shadowing, or paraphrasing. As compared to a control condition where only the finger-tapping task had to be executed, tapping rate decreased more in the dual-task condition involving simultaneous interpreting than in the dual-task conditions with either shadowing or within-language paraphrasing as second task. This finding suggests that simultaneous interpreting is the most demanding of these three tasks. The results of Green et al. (1990) also suggested that shadowing is easier than within-language paraphrasing (see for a discussion De Groot 1997).

For an interpreting training program that aims to approach the complexity of the criterion task gradually, the above findings imply that practice in shadowing should precede practice in paraphrasing. As proposed by Moser (1978), the difficulty of the shadowing task (and, for that matter, the paraphrasing task) could be increased gradually by successively increasing the speech input rate. This author suggests a further interesting modification of the shadowing task, which I will call 'delayed shadowing' here. In it the subjects

are presented with sets of sentences to shadow, but they are only allowed to start shadowing after the first sentence or the first two sentences, etc. has/have been input. This version of the shadowing task combines the demands of actual interpreting to comprehend input, memorize an earlier part of the input, and produce output, all at the same time. But it still is likely to be easier than interpreting in that no language conversion process is required.

Control of Attention

Gile (1995, 1997) decomposes various forms of translation and interpreting in their resource-sharing components. The components he distinguishes for simultaneous interpreting are a listening effort, a memory effort, a production effort, and a coordination effort, where the term 'effort' was chosen to stress the fact that none of these skill components proceeds automatically but that instead they all consume processing resources. Treating the coordination effort as a separate component of simultaneous interpreting concurs with relevant current work on the acquisition of complex skills (Gopher 1992; Gopher, Weil and Siegel 1989), where the coordination component is referred to as 'the control of attention' or 'attention management'.

Gopher et al.'s (1989) study was part of a much larger project, the 'learning strategies' project, in which a number of universities in four countries participated (see for reviews Donchin 1989 and Lintern 1989). The goal of the project was to determine whether the training of particular learning strategies might benefit subjects' performance on a complex task as compared to performance after an equal amount of unsupervised training in the full task. An important feature of the project was that all participating researchers worked with the same, extremely demanding task, a computer game called the 'Space Fortress Game', each choosing one or more training strategies as the object of their study. The project as a whole was to evaluate the then popular view that 'practice makes perfect': that trainees receiving unstructured, unsupervised practice on the full task benefit as much from that training as trainees receiving some sort of guidance during practice. In order to be able to evaluate this idea about unstructured training, eventual full-task performance of all experimental groups in the various laboratories (that is, the groups having received some form of structured training) was compared with performance of a control group that had not received any specific training but that had practiced the criterion task instead.

A number of participants in the project focused on component training as a form of structured training. Frederiksen and White (1989), for instance,

identified 16 components of the full task and trained the experimental subjects on all 16 of them before transferring them to the complete task. The ultimate performance on the criterion task of this experimental group was better than of a control group who had been trained on the complete task from the outset of the training, a finding that clearly belies the assumed superiority of full-task training from the onset.

Equally encouraging were the results of the 'emphasis-change' approach taken by Gopher et al. (1989). Unlike in a standard componential approach, they trained their experimental subjects on the complete task from the outset, but manipulated the amount of attention the subjects devoted to one or another of the task's components. Prior to starting the training, the investigators identified two particularly hard task components. One group of experimental subjects was subsequently encouraged to pay particular attention to one of these components; a second experimental group was stimulated to focus on the second; a third experimental group was encouraged to attend to both of them. But all three of the experimental groups, as the control subjects, were embedded in the complete-task environment all through the training period. Ultimate performance on the criterion task was better for all three experimental groups than for the control group, with the group having focused attention on both of the difficult task components outperforming the remaining two experimental groups. In agreement with Gile's idea (1995, 1997) that the 'coordination effort' is a separate component of simultaneous interpreting, Gopher et al.'s study suggests that attention control is a separate component of a complex skill. Their study furthermore indicates that this skill component can be trained and that such training has a beneficial effect on performing the full task by removing any decrements in performance that are not due to capacity overload, but to failures of attentional control (Gopher 1992).

Equally relevant as identifying attentional control as a separate component of a complex skill is the finding from subsequent work (Gopher 1992) that this component transfers to other tasks that contain the same basic elements, but that physically have little in common with the training task: There was a huge transfer from playing the Space Fortress Game to performance in flight training, with the effect that the chances of completing the flight-training program, with usually very high washout rates, increased by no less than 30 percent (Gopher 1992: 317).

Gopher's work suggests that training the control of attention may be an advantageous component of a training program in simultaneous interpreting. Analogous to Gopher's emphasis-change manipulation, such training might consist of having the trainees exercise the full task (with relatively easy discourse as input) while varying the instructions as to what component to

attend to in particular (comprehension, production, or memory). This way the trainees will get prepared for the fact that in practicing their profession simultaneous interpreters will continuously have to adjust the amount of attention devoted to each of the task's components (e.g., with poor-quality input relatively much attention will have to be directed to the comprehension component). Another application of Gopher's findings would be to train simultaneous interpreting in an environment that superficially has little in common with that skill, but that shares with it its basic components of comprehending some input, producing some output, and keeping some information in memory, and all this intertwined in the same stretch of time and under severe time limitations. Training on a task that satisfies those constraints may even benefit subsequent interpreting more than would prior training in text-to-text translation, a task that obviously has many components in common with interpreting. Such a finding would suggest that not the sheer number of components shared between a training task and the criterion task determines the amount of transfer, but whether or not the two tasks share one or more of the especially critical components (here: attention control over various simultaneous components and under severe time pressure).

Concluding Remarks

In this article simultaneous interpreting has received considerably more attention than written translation. This followed naturally from an emphasis on the importance of fluency, automaticity and speed of the sub-components in performing a complex task skillfully. Whereas fluency, automaticity, and speed are beneficial in translation, but not at all times indispensable, they are permanently of crucial importance in interpreting. This difference between the two tasks is likely to underlie other differences between them, for instance in the comprehension and production processes involved.

The claim that comprehension and production (and other processes) in interpreting differ from the analogous processes in translation is amply supported by the recent discussions of the two skills by Gile (1995) and Kussmaul (1995). Kussmaul provides a cognitive analysis of translation and proposes exercises for training a number of the component processes involved. Gile analyses the cognitive processes involved in both translation and interpreting (and discusses implications for teaching), but with a strong focus on the latter. The overwhelming impression that is left by reading these two books in close succession is that the two tasks involve very different processes and skills. The training exercises proposed by Kussmaul (e.g., pragmatic

analysis; the analysis of linguistic word meaning; the use of dictionaries) nearly all involve very time-consuming activities, that will go on taking up a lot of time when exercising the profession after training. A similar thorough analysis of the input is frustrated in simultaneous interpreting, due to the severe time constraints imposed by that task. Gile's discussion focuses on the heavy mental load in interpreting caused by these time constraints and on how to cope best with this load.

In view of this fact that processing-wise translation and interpreting substantially differ from one another, instead of posing the rather broad question how cognitive psychology could inform translation studies (where the term 'translation' covers both interpreting and written translation), one should more explicitly ask what areas of cognitive psychology are likely to inform the study of interpreting and what (other) areas might inform the study of translation. This more specific question would immediately trigger an awareness that relevant differences between the two tasks may exist and, thereby, guide the search for potentially relevant areas in cognitive psychology.

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