

Interpreting Studies and psycholinguistics: A possible synergy effect

Agnieszka Chmiel

Adam Mickiewicz University Poznań, Poland

Abstract

Cognitive information processing has long been an area of interest for Interpreting Studies scholars. This paper discusses the interdisciplinary relation between Interpreting Studies (IS) and psycholinguistics as a source of a possible synergy effect and explains why Interpreting Studies matters not only to interpreters and interpreting researchers, but also to psycholinguists. First, the most significant contributions of psycholinguistics to interpreting research are identified, including in particular theoretical memory models and experimental methodology in mental lexicon studies. This is followed by an overview of the potential contribution of IS to psycholinguistics and bilingual studies. Conference interpreting is a unique case of bilingual/multilingual use of languages with more frequent code switching and greater inhibitory demands as compared to the non-interpreting use of language. Therefore, ‘bidirectional’ (A into B and B into A) and ‘unidirectional’ (C into A) interpreters and trainee interpreters are interesting experimental populations for mental lexicon studies and other cognitive studies. Finally, a progress report on COGSIMO, a research project aiming at leveraging the synergy of psycholinguistics and IS, will be presented. The project seeks to examine psycholinguistic processes and the skills of conference interpreting to establish efficient aptitude testing procedures for interpreter trainees based on cognitive predictors of success.

Keywords: psycholinguistics, interpreting studies, mental lexicon, cognitive studies, cognates, verbal fluency, bilingualism, directionality

Introduction

Cognitive information processing has long been an area of interest for Interpreting Studies scholars. Research by Gerver (1976); Moser-Mercer et al. (2000); Gile (1995) and others has shed more light on the intricacies of cognitive processes in interpreting and led to new models (focusing on skills and efforts). This paper discusses the interdisciplinary relation between IS and psycholinguistics in terms of possible synergy. The theme of the 2007 EST Congress, “Why Translation Studies matters”, will thus be answered by showing that cognitive research within IS can be beneficial not only to interpreting researchers, but also to psycholinguistics. This will be followed by the analysis of possible benefits and a review of the latest research results in the area. Finally, a progress report on an ongoing longitudinal cognitive study of interpreters and trainees will be presented.

In this paper, I argue that IS matters to interpreters, interpreting trainees and Interpreting Studies scholars – both “pure” researchers and practisearchers, i.e. practicing interpreters *cum* researchers (Gile 1994: 156), but also that, as a scholarly discipline, it has a lot to offer to researchers specialising in memory, mental lexicon and bilingualism. Interpreters are an interesting population to study because they represent a special case of bilingualism. In this paper, we are not simply trying to reiterate Gile’s call for interdisciplinary research in IS and a contribution by experts in psycholinguistics (as reviewed in Pöchhacker 2004: 72). By engaging in interpreting research, psycholinguists can not only contribute, but also benefit, and it will be shown how.

1 How psycholinguistics contributes to IS

It is beyond the scope of the present paper to present an overview of all psycholinguistic research trends in IS. Suffice it to say that even early pioneers in Interpreting Studies considered it important to examine the process of interpreting from a cognitive point of view (cf. Gerver 1976; Seleskovitch 1978). The sections below will focus on benefits of selected psycholinguistic studies in IS. The most valuable contributions of psycholinguistics to IS include its theoretical approaches and methodology for cognition-oriented empirical studies. We shall focus on memory and the mental lexicon since these two areas of psycholinguistic research seem to be especially dear to the interpreting researchers’ hearts.

1.1 Theoretical approaches – memory models

The most influential memory model in Interpreting Studies is the multi-component working memory model developed by Baddeley and Logie (1999) and the long-term memory model by Squire and Zola (1996). Working memory can be further subdivided into components specialising in separate types and modes of cognitive processing: the phonological loop, the visuo-spatial sketchpad and the central executive. Long-term memory handles declarative and procedural knowledge. The former is further divided into episodic memory (recollection of personal experiences) and semantic memory (encyclopaedic knowledge about the world). The latter is unconscious and responsible for skills and habits (procedural memory) (Squire and Zola 1996).

Chmiel applied these theoretical memory models to review experimental cognitive studies featuring interpreters as subjects and to explain the complex activity of conference interpreting (2004). She concluded that the parallel involvement of multiple memory systems is a success factor in interpreting. For instance, auditory memory supports the interpreter in consecutive interpreting since the speaker's input can be 'played back' while providing a target language rendition. In general, declarative memory is used as a source of background knowledge. Semantic memory related to text structures, current political events, or facts learned at a conference the previous day etc. is tapped into when decoding the input. With a familiar speaker, interpreters will fall back on their episodic memory and past experiences with that speaker.

The intermodal nature of interpreting entails the activation of separate neurocognitive resources (temporal lobe areas for linguistic processing and occipital lobe areas for visual processing). Paradoxically, some concurrently performed tasks may also share neuronal modules in the brain and thus require less attentional resources than the sum of resources engaged by those tasks individually. Obviously, one has to remember that parallel processing requires good management and coordination mechanisms which tax working memory. Nevertheless, parallel processing remains more powerful than serial processing of a single system with no specialised modules.

The intermodal nature of interpreting (audio and visual input, oral and visual output) also entails the involvement of various processing modules, such as imagery, which proves an extremely powerful mnemonic. The use of well-established symbols in note-taking may involve the visuo-spatial sketchpad (VSSP) only and leave the phonological loop processing capacity for other tasks. Notes serve not only as a memory prompt. Because symbols tend to be alingual, source-language interference is attenuated (Gernsbacher and Shlesinger 1997). The multimodal nature of interpreting forces interpreters to rely on channels which handle different physical signals (spoken words vs. written notes), which, according to Cowan (1999) is easier than attending to channels of the same modality.

Other studies on intermodal aspects of interpreting brought equally interesting results. Agrifoglio (2004) conducted an error analysis in sight translation and compared it to consecutive interpreting (CI) and simultaneous interpreting (SI). Sight translation brought more errors of expression, while CI/SI led to more errors of meaning, which suggests that visual interference is stronger than audio interference (Agrifoglio 2004: 61). Lambert (2004) conducted a similar study with sight translation, simultaneous interpretation and simultaneous interpretation with text. She evaluated only performance rates without differentiating between types of errors and found that the text available through the visual modality lifts the burden off the Memory Effort as defined in Gile's Effort Models (1995: 91).

Interpreters have various strategies at their disposal to perform the same task. Usually, they use the less cognitively demanding strategy and only resort to the less economical ones when encountering problems. The phonological loop is involved only in more demanding processing, e.g. in off-line analysis of linguistically complex sentences or difficult lexical items. Additionally, the subvocal rehearsal process is at the interpreter's disposal when putting down more difficult words and non-contextual information with a high risk of errors (e.g. in proper names) in the listening phase of CI. Phonological information is not necessary for semantic access, therefore the loop may actually be bypassed in sight translation to save cognitive resources. Similarly, while reading, interpreters may use a simpler direct strategy (no phonological processing) or a more effortful grapheme-phoneme conversion when reading unfamiliar words. This more demanding strategy does not overburden the phonological loop since it is assumed not to involve deriving phonology from print via the prelexical route (Baddeley and Gathercole 1993).

Paradoxically, limitations of cognitive resources may sometimes be beneficial to interpreters. For instance, it seems plausible that in the second stage of CI (involving note-reading and target-language production) articulatory suppression stemming from the interpreter's own output inhibits source-language interference by channelling the processing through visual stimuli (symbols) that are less likely to lead to interference than verbal source-language stimuli. Similarly, in SI the interpreter's oral output may serve as an inhibitor of source-language interference. The limitations of attentional and memory resources seem to make the interpreter focus on the most relevant information to convey. In fast delivery, such a 'summary' strategy is communicatively the best and the most effective.

As the above overview shows, working memory and long-term memory models from cognitive psychology help explain various phenomena and shed more light on cognitive processing performed by conference interpreters.

1.2 Experimental methodology – memory and the mental lexicon

Apart from these theoretical models, one of the most relevant contributions of psycholinguistics to cognitive IS is its methodology. An array of experimental tasks (including digit span, reading span and list recall tasks for working memory research and lexical decision tasks, verbal fluency, word completion and priming procedures for mental lexicon studies) offers data comparable across populations. Results are measurable, reliable and devoid of subjective bias characteristic of some other IS research methods such as introspection-based interviews or field observation. Despite some limitations, this experimental methodology enables identification and manipulation of variables and lends itself easily to statistical analysis. Although not all these tasks are directly part of interpreting per se, they may serve to measure specific relevant subskills. The following section is an overview of empirical studies focusing on the mental lexicon of interpreters. Benefits of psycholinguistically oriented experimental research to Interpreting Studies will be highlighted.

Moser-Mercer is one of the greatest proponents of cognitive studies in IS. She applied psycholinguistics to IS as early as in the late 1970s (Moser 1978) and has frequently stressed

the importance of interdisciplinary research in IS (Moser-Mercer 1997: 195). Gile, another psycholinguistically oriented researcher, claims that psycholinguists work “with more precision, logic and depth than practisearchers” (1994: 156). Indeed, the methodology of cognitive studies involves an impressive range of experimental methods with well defined, isolated and controlled variables.

One of the latest psycholinguistic contributions to IS is a series of experiments conducted by Christoffels in cooperation with De Groot and Kroll (2004, 2005, 2006). All three authors are cognitive scientists with a strong background in psycholinguistics and notice differences between terminology used in IS and “the standard terminology in psycholinguistic studies on bilingual control” (De Groot and Christoffels 2006: 199). However, terminological differences are by no means a hindrance to interdisciplinary research efforts.

In her 2004 study, Christoffels concentrated on lexical retrieval and working memory, understood as “two possible subskills of SI” (2004: 60). Her subjects were twenty four students with no background in interpreting. Christoffels hypothesised that if these two subskills were important for natural interpreting, there should be intra-subject correlations between their performance in lexical retrieval and working memory tasks and their performance in simultaneous interpreting (Christoffels 2004: 60). To test lexical retrieval efficiency, a word translation task and a picture naming task were administered to the subjects. Students were asked to give translation equivalents of words and name objects appearing on the screen as quickly as possible. The stimuli were controlled for word frequency and cognate status to avoid skewed results. Reaction times were measured by a sound-activated switch. Such a setting allowed for the collection of precise data.

Working memory was examined by means of a reading-span task and a digit span task. Both methods are well established in memory studies. In the former, subjects are requested to remember last words of sentences presented in series. In the latter, they have to repeat increasingly longer digit sequences. The average digit span is “the magical number seven, plus or minus two” (Miller 1956). Again, words used in the reading-span task were controlled for length and frequency.

The simultaneous interpreting task was a traditional experimental task in IS and did not include any methodology specific to cognitive studies. Christoffels conducted a statistical analysis, including a correlational analysis, to examine correlations between lexical retrieval and memory tasks and the interpreting task. She found that faster reaction times in a word retrieval task and reading span were associated with better interpreting performance, while digit span and picture naming were not good predictors of the natural ability to interpret simultaneously (Christoffels 2004: 68). This study could lead to recommendations for aptitude testing in conference interpreting schools.

To uncover the intricacies of skilled linguistic control performed by professional interpreters, Christoffels, De Groot and Kroll (2006) administered a battery of tasks similar to the above-described study (picture naming, word translation, reading span, speaking span, word span) to three populations of bilinguals: ordinary bilinguals without interpreting experience, professional interpreters and language teachers. The hypothesis was as follows: “If interpreting is a specific skill that does not affect the more basic components of language processing, then all of the participants should perform similarly on simple language processing tasks in their first and second languages” (Christoffels et al. 2006: 326). Whereas interpreters differed significantly on all measured subskills from non-interpreting bilinguals, the nature of discrepancies between interpreters and language teachers viewed as proficient users of both of their languages varied. Interpreters did not outperform teachers in word retrieval, but they turned out to have a better working memory. The authors concluded that word retrieval was not uniquely related to SI and was not enhanced by conference interpreting experience (2006: 341). These results are at a variance with findings by Bajo et al. (2000), who discovered that interpreters outperformed other non-interpreting professionals with high second language competence in such tasks as comprehension, lexical decision, categorization and suppression, thus suggesting that interpreters, due to their training and experience, show more efficient lexical and semantic access alongside better working memory. However, these discrepancies might be due to a different research methodology involving different tasks (production vs. comprehension), different control groups (teachers vs. other non-interpreting professionals) and different sample sizes. It would be interesting to see if similar differences in lexical processing and memory tasks could be found when comparing interpreters and translators.

The studies by Christoffels and her associates focused, among other things, on word retrieval as a function of the mental lexicon. How the mental lexicon of bilinguals and polyglots is organized is one key research question in psycholinguistics. Interpreters could be an extremely valuable group of subjects for studies in this area. More specific benefits will be discussed in the next section.

2 How Interpreting Studies may contribute to psycholinguistics

Synergy between psycholinguistics and Interpreting Studies is possible since both disciplines can contribute to and benefit from interdisciplinary research involving both. This section will focus on potential contributions of interpreting research to psycholinguistics, in particular to studies on bilingualism and the mental lexicon. The first and foremost advantage is obviously related to the specificity of interpreters as subjects in studies. They represent a special case of bilingualism since the way they use their working languages is exceptional. Non-interpreting bilinguals usually operate in either monolingual or bilingual mode (Grosjean 2001) depending on their interlocutors. Interpreters use a specific bilingual mode with either active or inactive input and output mechanisms in each language (Grosjean 2001: 18). Some researchers have even posited the existence of a distinct ‘interpreting mode’ (Heltai, personal communication). The fact that interpreters constantly ‘juggle’ with words from their working languages should have some specific influence on the organisation of languages, and mental lexicons in particular, in their mind.

The approach to the mental lexicon advocated in this paper is a connectionist one. The mental lexicon is seen as a giant web with nodes linked by connections of varying weights. Long-term interpreting experience may restructure the mental lexicon in a specific way. As De Groot and Christoffels claimed:

[...] any translation act will become reflected in a memory trace that connects the two terms of the translation; the more often the same two terms (words or longer phrases) co-occur in a translation act, the stronger the memory connection between them will be (De Groot and Christoffels 2006: 198).

Therefore, interpreters may prove extremely useful in studies on the structure and flexibility of the mental lexicon. Longitudinal research involving interpreting trainees and professionals from the outset of their career, could monitor changes in interlingual connections occurring over time and with practice. Intervals between checkpoints could be as short as two or three years because this is normally the duration of an interpreting course at university. During that time, students are exposed to many hours of intensive practice, which does not leave their bilingual processing unchanged. Additionally, it is possible to create a fairly homogenous group of experimental subjects including interpreters with the same working languages, a similar number of years in the profession, similar second-language acquisition histories, etc. Thus, unlike other interesting subjects such as aphasics, interpreters give researchers the possibility of experimenting with groups as opposed to case studies.

As mentioned above, interpreters are interesting because they offer a special case of bilingualism. Interpreters working in a single direction from one or several source languages into a single target language ('unidirectional interpreters') might be even more interesting because they represent a special case of interpreting. According to established practice in some countries (e.g. Switzerland) and professional standards in various international institutions (the European Commission, the European Parliament), interpreters are usually allowed to work into their native language only (with the exception of some having languages from New Member States, such as Slovene or Polish, where retour is possible in the EU institutions). Thus, interpreters with one A language and four or five C languages are not uncommon. This professional standard is a very specific setup of bilingual, or rather multilingual functioning. In terms of Grosjean's model (2001), the output mechanism will be permanently activated in language A only, while the input mechanism will be active in languages A and C. In the connectionist perspective adopted here, it might be posited that interlingual lexical links in the unidirectional interpreter's lexicon will be asymmetrical – which makes for an interesting object for psycholinguistic studies. (Trainee interpreters can also be examined in a longitudinal study to see the asymmetry creation process at work.)

Other potential contributions of IS to psycholinguistics include experimental tasks, error analysis and skill development. Interpreting offers an array of techniques that can be used in bilingual and polyglot research. These include simultaneous interpreting (used by Christoffels in her 2004 study), sight translation and shadowing. These experimental tasks, as performed

by non-interpreting bilinguals, can help shed more light on language processing. Error analysis in interpreting-related tasks is also beneficial, especially as regards various aspects of language processing under cognitive load (code-switching, inhibition, self-monitoring, inflectional errors, interference). Due to the cognitive complexity of interpreting, it is easy to elicit various errors for analysis of language processing under saturation conditions. Finally, the development of interpreting skills can be easily observed in longitudinal studies of trainees. Therefore, the effects of intensive experience under specific cognitive conditions on language processing and the structure of the mental lexicon can be observed.

2.1 COGSIMO – objectives and work-in-progress report

COGSIMO is the author's post-doctoral research project that aims at leveraging the synergy of psycholinguistics and Interpreting Studies. The project is to explore psycholinguistic processing and conference interpreting skills with a view to establishing efficient aptitude testing procedures for interpreter trainees on the basis of cognitive predictors of success. The project offers an interdisciplinary approach to the investigation of simultaneous interpreting skills since it applies advanced psycholinguistic experimental methodology to examine language processing in three populations – 'unidirectional' and bidirectional professional conference interpreters and interpreting trainees. The latter group will be examined longitudinally – at the beginning and at the end of their training – to identify the effects of practice on their cognitive/linguistic makeup and bilingual mental lexicon and see which cognitive variables predict their success in training and which linguistic skills develop considerably as a result of their activities during training. It is also important to use 'unidirectional' interpreters (such as staff interpreters employed by DG Interpretation in Brussels) and 'bidirectional' interpreters (active on the Polish market) as subjects. Many directionality studies compare the performance of the same interpreters in both directions. Just as 'bidirectional' conference interpreters are a special case of bilinguals (since they actively use both of their working languages in the same context), EU staff interpreters are a special case of conference interpreters (due to their unidirectionality). Their mental lexicons might be structured differently. COGSIMO will hopefully offer some insight into the interlingual links between the interpreter's working languages.

The experimental design includes processing of cognates (management of lexical links, inhibition of true and false cognates) following visual (sight translation) and verbal input (CI), masked semantic priming, lexical retrieval, word translation tasks and aptitude tests (digit span, word span, recall after suppression and semantic verbal fluency). COGSIMO will contribute both to psycholinguistics (data on interlingual links and lexical processing of unique subjects) and to Interpreting Studies (revision of existing information-processing models, training recommendations). Through identifying predictors of success in interpreter training, the project will also offer streamlined aptitude testing tasks and online self-assessment tools for candidates to interpreting programmes.

Two pilot studies have been conducted so far. One of them focused on the processing of cognates in various modalities (Chmiel 2007a). The other examined semantic verbal fluency of interpreter trainees (Chmiel 2007b).

2.1.1 Processing of cognates

The study included a group of 10 professional interpreters and 25 interpreting trainees who were asked to perform sight translation (visual input) and simultaneous interpreting (audio input) of texts with true and false cognates into their A and B language. It was assumed that true cognates would be beneficial to interpreters as phonological similarity facilitates word retrieval in the production stage of interpreting, whereas false friends would be troublesome as they require extra mental effort for inhibition of their false cognate equivalents (Sanchez-Casas and Garcia-Albea 2005). The organisation of the mental lexicon was taken to be based on a connectionist principle, which assumes that relevant interlingual lexical links get activated while irrelevant links get suppressed. It was hypothesised that professional interpreters would manage cognates more efficiently than students and that visual input would generate more interference due to the lack of deverbalisation. Additionally, it was postulated that for true cognates professionals would use non-cognate TL counterparts more frequently than students, which would be due to increased inhibition to avoid transfer and conscious resistance to linguistic interference (Seleskovitch 1978). These hypotheses were partially corroborated in the study. We confirmed better management of cognates by professionals, including more successful inhibition of false cognates. Professionals did not use non-cognate TL counterparts for true cognates more frequently than students. Thus, they did not avoid positive transfer for acceptable words or phrases. There was no pronounced difference

between audio and visual processing except for true cognates in sight translation, which shows good cognate management skills and resistance to visual interference. De Groot and Christoffels stated that “bilingualism may turn bilinguals into experts in inhibitory control” (2006: 194). This study showed that interpreters might be even better at inhibitory control due to the specific linguistic setup of interpreting. The study also revealed possible reasons for inefficient processing of false cognates by interpreting trainees. Due to insufficiently strong interlingual links between translation equivalents wrong links between false cognates were not sufficiently suppressed. Moreover, inhibition was less effective due to the lack of attentional resources (saturation with other efforts, spillover effects – Gile 1995). Sometimes, unsuccessful interpreting resulted from the students’ insufficient language proficiency.

The experiment confirms the idea that interpreters and interpreting trainees are an interesting population in bilingual research. By comparing experienced professionals to novices, it is possible to observe the process by which connections in the mental lexicon are built and strengthened. Interlingual connections between true and false cognates are a unique type of lexical links in the interpreters’ mental lexicons. Due to their specific nature they can offer additional insight into the organisation of the bilingual’s mental lexicon and open further possibilities for psycholinguistic investigation.

2.1.2 Semantic verbal fluency

The other pilot study was a longitudinal experiment with students of conference interpreting as subjects (Chmiel 2007b). Semantic verbal fluency was understood as lexical accessibility for production as measured by the quantity of words produced within a certain time and usually within a restricted semantic category. It indicates how fast and easily words and sentences are generated (Moser-Mercer et al. 2000: 123). Moser-Mercer and her team conducted a similar study comparing the performance of professional interpreters and trainees. They discovered no major differences in verbal fluency performance between the two groups. In the study by Chmiel, interpreter trainees of the Conference Interpreting Programme at the Adam Mickiewicz University in Poznań participated in two experimental trials. The winter trial was held after 40 weeks of training (approx. 870 hrs). Students were retested after an additional 20 weeks of training (480 hrs). The average results for the summer trial were better than the winter trial results and the difference was statistically significant

($t=2.19$, $p<.02$). However, when analyzed separately for each subject, the results were inconclusive because there were students with lower fluency scores in the second trial.

The study showed that the acquisition of conference interpreting skills involves more than development of subtasks and efficient use of memory subsystems. What comes into play is the rewiring of the mental lexicon. Interlingual connections between equivalent words or phrases are strengthened or created anew. Interpreting involves “having the contents of one's declarative memory structured in a way that supports fast retrieval” (Moser-Mercer 2000: 90). In the same vein, De Groot claims that trainers should concentrate on target-language words that are difficult to retrieve because of non-straightforward mappings between SL and TL (2000: 58), and Setton advocates exercises for “maintenance and cultivation of the lexicon” (2003: 164).

3 Conclusions

It goes without saying that generations of IS scholars, interpreters and students have benefited from the psycholinguistic component in Interpreting Studies. Theoretical models of memory help explain the complexity of the interpreting task. Experimental methodology enables collection of reliable data and leads to empirically documented conclusions. The results of psycholinguistic studies focusing on working memory and the mental lexicon with professional interpreters and trainees as subjects can provide more insights into cognitive skills and processes in interpreting and can have pedagogical applications. If such factors as verbal fluency, digit span and reading span serve as predictors of better interpreting performance, they could be included in aptitude tests. Additionally, more precise information on the development and use of lexical and conceptual links in the mental lexicon of an interpreter could lead to better course design with increased contrastive vocabulary components in later stages of training.

However, psycholinguists who focus on bilingualism and multilingualism can also benefit from IS. Interpreting Studies offers very interesting subjects for psycholinguistic experiments. Conference interpreting is a unique case of bilingual/multilingual use of languages with more frequent code-switching and greater inhibitory demands as compared to non-interpreting use

of language. Additionally, interpreting trainees are interpreters in the making, which means that specific cognitive skills can be observed as they gradually develop. Psycholinguistics can also reveal information on effective activation and inhibition of languages by multilingual experts, which is applicable both to aphasia studies and to second language acquisition. The study of ‘bidirectional’ and ‘unidirectional’ interpreters can also shed more light on the strength of links in the mental lexicon with directionality as a factor.

It is hoped that the interdisciplinary research project COGSIMO will be able to leverage the synergy of psycholinguistics and IS. It is hoped that more psycholinguists will become more interested in IS and will use interpreters to test models of bilingual word processing such as the Bilingual Interactive Activation Model, the Inhibitory Control Model or distributed models of bilingual memory (as reviewed by Van Hell 2005: 2298). Interpreting Studies is an interdisciplinary research field with a lot to offer not only to interpreters, interpreting trainers and trainees, but also to scholars from other disciplines, such as psycholinguistics.

References

- Agrifoglio, M. 2004. “Sight translation and interpreting: A comparative analysis of constraints and failures.” *Interpreting* 6 (1): 43-67.
- Baddeley, A.D. and Logie, R.H. 1999. “Working memory: The multiple-component model.” In *Models of Working Memory: Mechanisms of Active Maintenance and Executive Control*, A. Miyake and P. Shah (eds), 28-61. Cambridge: Cambridge University Press.
- Bajo, M.T., Padilla, F. and Padilla, P. 2000. “Comprehension processes in simultaneous interpreting.” In *Translation in Context*. A. Chesterman, N.G. San Salvador and Y. Gambier (eds), 127-142. Amsterdam/Philadelphia: John Benjamins.
- Chmiel, A. (as Molska, A.). 2004. *Neurocognitive Plausibility of Conference Interpreting: Applications of Cognitive Neuroscience to Interpreting Research*. Unpublished Ph.D. thesis.
- Chmiel, A. 2007a. “How conference interpreters process cognates.” Paper presented at the Multidimensional Translation MuTra Conference, Vienna, April 30 to May 4, 2007. (manuscript in preparation)

- Chmiel, A. 2007b. "Focusing on sense or developing interlingual lexical links? Verbal fluency development in interpreting trainees." In *Translationsqualität [Leipziger Studien zur angewandten Linguistik und Translatologie 5]*. P.A. Schmitt and H.E. Jüngst (eds), 66-78. Frankfurt am Main: Peter Lang Verlag.
- Christoffels, I.K. 2004. *Cognitive Studies in Simultaneous Interpreting*. Unpublished Ph.D. thesis.
- Christoffels, I.K. and De Groot, A.M.B. 2005. "Simultaneous interpreting. A cognitive perspective." In *Handbook of Bilingualism*, J.F. Kroll and A.M.B. De Groot (eds), 454-479. Oxford: Oxford University Press.
- Christoffels, I.K., De Groot, A.M.B. and Kroll, J.F. 2006. "Memory and language skills in simultaneous interpreters: The role of expertise and language proficiency." *Journal of Memory and Language* 54 (3): 324-345.
- Cowan, N. 1999. "An embedded-processes model of working memory." In *Models of Working Memory. Mechanisms of Active Maintenance and Executive Control*, A. Miyake and P. Shah (eds), 62-101. Cambridge: Cambridge University Press.
- De Groot, A.M.B. 2000. "A complex-skill approach to translation and interpreting." In *Tapping and Mapping the Processes of Translation and Interpreting. Outlooks on Empirical Research*. S. Tirkkonen-Condit and R. Jääskeläinen (eds), 53-68. Amsterdam/Philadelphia: John Benjamins.
- De Groot, A.M.B. and Christoffels, I.K. 2006. "Language control in bilinguals: Monolingual tasks and simultaneous interpreting." *Bilingualism: Language and Cognition* 9 (2): 189-201.
- Gernsbacher, M. A. and Shlesinger, M. 1997. "The proposed role of suppression in simultaneous interpretation." *Interpreting 2*: 119-140.
- Gerver, D. 1976. "Empirical studies of simultaneous interpretation: A review and a model." In *Translation: Applications and Research*, R.W. Brislin (ed.), 165-207. New York: Gardner Press.
- Gile, D. 1994. "Opening up in Interpretation Studies." In *Translation Studies – An Interdiscipline*, M. Snell-Hornby, F. Pöchhacker and K. Kaindl (eds), 149-158. Amsterdam/Philadelphia: John Benjamins.
- Gile, D. 1995. *Basic Concepts and Models for Interpreter and Translator Training*. Amsterdam/Philadelphia: John Benjamins.

- Grosjean, J. 2001. "The bilingual's language modes." In *One Mind, Two Languages*, J. Nicol (ed.), 1-22. Oxford: Blackwell.
- Lambert, S. 2004. "Shared attention during sight translation, sight interpretation and simultaneous interpretation." *Meta* 49 (2): 294-306.
- Miller, G. A. 1956. "The magical number seven, plus or minus two." *The Psychological Review* 63: 81-97.
- Moser, B. 1978. "Simultaneous interpretation: A hypothetical model and its practical application." In *Language Interpretation and Communication*, D. Gerver and H.W. Sinaiko (eds), 353-368. New York/London: Plenum Press.
- Moser-Mercer, B. 1997. "Beyond curiosity. Can Interpreting Research meet the challenge?" In *Cognitive Processes in Translation and Interpretation*, J.H. Danks, G.M. Shreve, S.B. Fountain and M. McBeath (eds), 176-195. Thousand Oaks, London and New Delhi: Sage.
- Moser-Mercer, B. 2000. "Simultaneous interpreting. Cognitive potential and limitations." *Interpreting* 5 (2): 83-94.
- Moser-Mercer, B., Frauenfelder, U.H., Casado, B. and Künzli, A. 2000. "Searching to define expertise in interpreting." In *Language Processing and Simultaneous Interpreting*, B. Englund Dimitrova and K. Hyltenstam (eds), 107-132. Amsterdam/Philadelphia: John Benjamins.
- Pöschhacker, F. 2004. *Introducing Interpreting Studies*. Amsterdam/Philadelphia: John Benjamins.
- Sanchez-Casas, R. and Garcia-Albea, J.E. 2005. "The representation of cognate and noncognate words in bilingual memory." In *Handbook of Bilingualism*, J.F. Kroll and A.M.B. De Groot, (eds), 226-249. Oxford: Oxford University Press.
- Seleskovitch, D. 1978. *Interpreting for International Conferences*. Washington: Pen and Booth.
- Setton, R. 2003. "Words and sense: Revisiting lexical processes in interpreting." *Forum* 1, 139-168.
- Squire, L. R. and Zola, S. M. 1996. "Structure and function of declarative and nondeclarative memory systems." *Proceedings of the National Academy of Sciences USA* 93: 13515-13522.
- Van Hell, J.G. 2005. "The influence of sentence context constraint on cognate effects in lexical decision and translation." In *ISB4: Proceedings of the 4th International*

This is an Author's Accepted Manuscript of a chapter in Daniel Gile, Gyde Hansen and Nike K., Pokorn (eds.) *Why Translation Studies Matters*. Amsterdam: Benjamins, 223–236, available at: <http://benjamins.nl/#catalog/books/btl.88.19sch/details>

The publisher should be contacted for permission to re-use or reprint the material in any form.

Symposium on Bilingualism, J. Cohen, K.T. McAlister, K. Rolstad and J. MacSwan (eds), 2297-2309. Somerville: Cascadilla Press.