Cognitive studies in simultaneous interpreting
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Introduction

According to Sumerian legend, once all people spoke a single language, but divine intervention of Enki caused ‘confusion of tongues’. The legend of the tower of Babel tells a similar story. Whatever the cause, fact is that there are an estimated 6000 languages worldwide (Crystal, 1997). Speakers of different languages clearly have to find a way to talk to each other. People who master more than one language are indispensable in mediating communication between people facing a foreign language barrier. When these people verbally rephrase a message from one language, the source language, into another, the target language, they are involved in the act of interpreting.

Until relatively recent most interpreting concerned some form of consecutive interpreting in which the interpreter alternates between listening and speaking and only starts to translate after the speaker has finished. In contrast, simultaneous interpreting (SI), or conference interpreting, concerns the immediate, online interpretation of discourse, with a lag of only a few seconds between source and target speech. SI is a relatively recent phenomenon that emerged once audio equipment became available and that only became a real profession after World War II (Crystal, 1997; Darò, 1994). Nowadays, SI is widely known from its importance in international politics. For example, in the European parliament all communication is mediated by simultaneous interpreters. This is quite an endeavor since the European Union now has eleven official languages (Danish, Dutch, English, Finnish, French, German, Greek, Italian, Portuguese, Spanish and Swedish), a number that may well double with future enlargements of the European Union. Also in daily life we may have encountered simultaneous interpretations of live broadcasted statements or interviews on television news channels, such as CNN, and may have been intrigued by this capacity to verbally transform a message from one language into another.

From a cognitive or psycholinguistic perspective, SI is remarkable precisely because it involves speaking and listening in different languages at the same time. It is cognitively a very demanding activity because many processes take place simultaneously. Input in the source language has to be processed and stored in memory until its message is recoded and produced in the target language. Meanwhile, new input continues to arrive. Therefore, in interpreting one has to cope with time pressure since the rate of processing is determined by the source speaker. One has to retain new input and partial processing results, which places enormous demands on working memory. And finally, by definition, one has to use two languages simultaneously; a situation that normally bilinguals will try to avoid (Grosjean,
Chapter 1

1997a). SI can therefore be considered to be one of the most complex language processing activities imaginable (see e.g., De Groot, 2000; Gerver, 1976; Padilla, Bajo, Canas, & Padilla, 1995; Rinne et al., 2000) the study of which can provide important insights in psycholinguistics and cognitive science (e.g., De Groot, 2000; Frauenfelder & Schriefers, 1997; Lonsdale, 1997; MacWhinney, 1997; Setton, 1999).

The goal of this dissertation is to shed some light on the skills and processes involved in simultaneous interpreting. SI has not yet received widespread attention in cognitive psychology. Nevertheless, during the last thirty years, some progress has been made in revealing some of its intricacies. These will be discussed in a general review of the research literature in the second chapter of this dissertation. The remaining chapters concern experimental studies of simultaneous interpreting. As the chapters are based on separate papers they may be read independently of each other. For this reason, there is inevitably some overlap between the chapters.

1.1 Overview of this dissertation

In the Chapter 2 issues and studies concerning SI are reviewed. Briefly, SI is contrasted to written translation. The unique characteristics of this task and comparisons with other similar tasks illustrate the demanding nature of SI. Several factors influence SI performance, including the listening conditions and the language combination involved. Some processing aspects, such as the control of languages and language recoding, are discussed. The question is being posed whether experience in interpreting is related to some special capabilities and possible cognitive subskills of SI, such as exceptional memory skills, are discussed. Finally, the more general implications of language user’s ability to perform SI for theories of language production are considered. Since this review aimed at being comprehensive it should not be regarded as a specific introduction to the subsequent chapters.

In Chapter 3 two components of SI are investigated, which are often considered to be the major sources of complexity in SI: the simultaneity of comprehension and production, and the transformation of the input. Moreover, the distinction that can be made within the transformation component between the reformulation of input and the switch of language is explored. A set of tasks is administered that presumably differ in the involvement of the different components: Repetition of sentences (shadowing), reformulation of sentences in the same language (paraphrasing), and translation of sentences (interpreting). The sentences are presented auditorily in a simultaneous and a delayed condition. Performance in these tasks is assessed in a number of ways: both the quality and the amount of output are examined but also temporal data and retention of stimulus material is taken into account.

In Chapters 4 and 5 the question is whether cognitive subskills can be identified that are important for successful SI. Both chapters focus on basic language skills and working memory.
Chapter 4 considers the relation between individual differences in lexical retrieval, working memory and simultaneous interpreting in bilinguals without any previous SI experience. A reading span task in two languages and a verbal digit span in the native language are administered to assess memory capacity. Picture naming and word translation tasks are administered to tap the retrieval time of lexical items in two languages. The chapter consists of two parts. A correlational analysis is presented first to examine the association between lexical retrieval and working memory on the one hand, and SI on the other hand. In the second part, a graphical models analysis is performed. The obtained model describes the relations between performance on the lexical retrieval and memory tasks and SI.

Chapter 5 examines whether professional interpreters possess certain unique cognitive skills. Again, lexical retrieval tasks are administered. Memory tests now include, in addition to the reading span task, a speech span, and a word span task in two languages. Furthermore, two control tasks are included measuring vocabulary and basic reaction time. In the first experiment, professional interpreters are compared to bilinguals without experience in simultaneous interpreting. In the second experiment the role of language proficiency is assessed by including English teachers and comparing them to the professional interpreters.

In the final two experimental chapters memory for input is examined, starting from the finding that retention of texts tends to be better when listening to the text than when simultaneously interpreting it (Darò & Fabbro, 1994; Gerver, 1974b; Isham, 1994; Lambert, 1988). In both chapters the results are discussed in terms of the working memory account of Baddeley and colleagues (e.g., Baddeley & Logie, 1999) taking a newly introduced component of this model into account: the episodic store (Baddeley, 2000). According to this model concurrent articulation prevents rehearsal in the articulatory loop component of working memory, which, in turn, has a disruptive effect on recall. This is relevant for interpreting since in SI people routinely comprehend and maintain speech while articulating at the same time.

In Chapter 6 it is investigated whether articulatory suppression also affects retention when, as in interpreting, coherent text is to be remembered or meaningful material is articulated. In Experiment 1, three conditions are presented in which participants just listened to a set of stories, or listened while articulating the same sound or different words continuously. In each condition, one story was coherent while another was made incoherent by randomizing the sentences. In Experiment 2, individual differences in retention under conditions of AS are related to simultaneous interpreting performance.

In Chapter 7 retention in listening, shadowing, and interpreting are compared. Previous studies comparing the latter two tasks have obtained inconsistent results. The goal of this study is to compare shadowing and SI in a study that focuses on measuring recall and to gain more insight into which factors contribute to the differential results in previous research. Therefore, two languages are tested and different recall measures are used, concerning recall of gist and exact wording of the input. Moreover, two additional conditions are included, articulatory suppression and random letter generation, which both involve concurrent articulation but are known to differ in the amount of central resources they consume.
Finally, in Chapter 8, the last chapter of this dissertation a short summary is presented, discussing the most important findings.