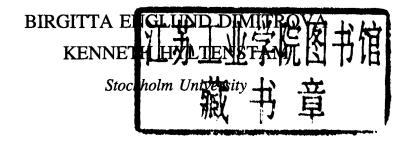# Language Processing and Simultaneous Interpreting

EDITED BY

Birgitta Englund Dimitrova
and Kenneth Hyltenstam

LANGUAGE PROCESSING AND SIMULTANEOUS INTERPRETING

INTERDISCIPLINARY PERSPECTIVES

Edited by

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LANGUAGE PROCESSING
AND SIMULTANEOUS INTERPRETING

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Language Processing and Simultaneous Interpreting
Interdisciplinary perspectives

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Sarah Williams
1962-1996
in memoriam

Preface

The chapters of this volume are based on papers presented at the *International Symposium on Language Processing and Interpreting*, held in Stockholm in February 1997. The focus of the conference was on *simultaneous interpreting*, and its aim was to bring together researchers from the areas of psychology, general linguistics, psycholinguistics and neurolinguistics to discuss how theories and methodology from various disciplines could be fruitfully applied to the study of simultaneous interpreting and, also, to suggest ways in which the study of simultaneous interpreting might contribute to knowledge in these areas. This approach was prompted by the feeling that the area had been given little attention in the relevant disciplines, and conversely, that much research on simultaneous interpreting had not made sufficient use of the wider theoretical frameworks.

The contributions have been written by two categories of investigators, one group being researchers with a central position in their respective fields, but with no specific experience of research on simultaneous interpreting, while the other group are researchers with very extensive experience of such research. In the sequence of chapters, the general topics of memory, language processing in perception and production, bilingual processing, and second language acquisition are presented first, followed by topics specific to simultaneous interpreting. In the first section of general topics, authors reflect on the implications of their arguments for the phenomenon of simultaneous interpreting; in the second section, the specific topics of simultaneous interpreting are related to the wider theoretical frameworks.

The content of each chapter contributes their parts to this agenda. In the first chapter, Alan Baddeley presents a detailed discussion of the development and applications in language learning and language processing of his model of working memory with particular focus on the role of the so called 'phonological loop'. The phonological loop maintains acoustic or speech based information for a short time, thus making it available for comprehension, production and acquisition. The discussion has obvious implications for simultaneous

interpreting since the types of language processing involved put specifically heavy demands on the interpreter's memory and attention.

Michel Paradis, in the second chapter, gives a brief summary of the neuro-linguistic processes involved in simultaneous interpreting within the frame-work of his so called 'subset hypothesis' according to which the bilingual's — and thus the interpreter's — two languages are characterised as subsystems of language competence, which in Paradis's view is part of and different from the larger cognitive system. He details in hypothetical form the complexity of the simultaneous interpreting task, inferring that, at points, four cognitive tasks are processed concurrently.

In the third chapter Michael Sharwood Smith gives a state-of-the-art presentation on second language acquisition research with reference to the relationship between knowledge systems and the various aspects of processing. He focuses particularly on attentional mechanisms, and presents a detailed discussion of various components of attention. Among the issues touched upon, and deemed as presenting specific difficulties in the context of simultaneous interpreting, is the necessity of concurrent attention on both form and meaning.

Robert McAllister then discusses what he calls 'perceptual foreign accent', a phenomenon much less focused upon in second language acquisition research than foreign accent in production. McAllister shows that even highly proficient second language users, who perform perceptually on a par with native speakers in situations with normal acoustic conditions, have significantly greater difficulties when the signal to be perceived is masked with noise. It is claimed that if simultaneous interpreters behave like second language users in general, they must be strongly affected by disturbances in the particular speech situation that simultaneous interpreting represents.

Kees de Bot finds in his discussion of recent models of language production that substantial progress has been made over the last 10 years. The growth of knowledge in this field should be taken advantage of for furthering our under-standing of the production part in simultaneous interpreting. In particular some of the topics often discussed in research on simultaneous interpreting such as anticipation, limited attentional resources, and the effect of language profi-ciency are highlighted in the framework of de Bot's bilingual version of Levelt's familiar 'speaking model'.

Coming now to the chapters written by authors with their background in research on simultaneous interpreting, Daniel Gile gives an overview of the field and an interpretation of its development from a sociology of science perspective. In particular he discusses the requirements for interdisciplinary

interaction in research on simultaneous interpreting and points out reasons why such approaches have been difficult to establish. Among the difficulties he sees are those that relate to the co-operation between practicing interpreters and what he calls practisearchers on the one hand and "professional" researchers on the other. Whereas a partnership between the two groups is necessary, in practice there are many obstacles for such partnership.

In the chapter by Barbara Moser-Mercer, Uli Frauenfelder, Beatriz Casado · and Alexander Künzli experimental investigations on the topic of expertise in interpreting are presented. Novice and expert interpreters were compared on measures of 'reading under delayed auditory feedback condition', 'shadowing' and 'verbal fluency', all of which are aspects essential to language processing in interpreting. Whereas the expected result was that the two groups would differ on all three measures, in actual fact they only did on the first one, but were indistinguishable on the shadowing task and the verbal fluency task. The authors speculate that the reason why expertise interpreters did not outperform the novices in the shadowing task may be that they experience difficulties in "suppressing automated strategies and in adapting to changed processing requirements". The advantage for the expertise interpreters on reading under the delayed auditory feedback condition was tentatively explained by "their being less dependent on monitoring their own output" and their "improved ability to process two inputs simultaneously and consciously allocating attention to one or the other".

William Isham discusses the problem of what implications the interference of phonological memory ("a component of short-term memory [which] is a store that encodes the phonological sequence of incoming speech sounds") has in simultaneous interpreting. In the present contribution, Isham reports on an experimental study with undergraduate students including a listening task, a concurrent articulation task, and a dichotomous listening task. The result showed a disadvantage for the concurrent articulation condition as compared to the other conditions, while there was no difference between these two. The interpretation of this study and its implications for simultaneous interpreting between two oral languages is that it is not the two incoming speech streams *per se* that interfere with phonological memory, but rather the fact when the vocal tract is engaged in articulation, as it is in the concurrent articulation task, there is no room for refreshing the phonological form of the incoming signal through sub-vocal rehearsal, which results in a decay of its trace. As shown in Isham's earlier research, this problem does not surface in interpreting between

ASL and English because the visual and acoustic signals do not interfere in this case.

Finally, in Bernd Meyer's chapter a system for computer-based transcription of simultaneous interpreting is presented. Here the combination of the on-screen editor and the sound-file allows the transcriber to hear and see the digitalized data simultaneously, which makes the synchronization of utterances easy.

In honour of the memory of Sarah Williams

This book is dedicated to the memory of Sarah Williams. Sarah had a decisive impact on the symposium for the simple reason that she was the person who conceptualised, planned an prepared it. She selected all the speakers and in many cases also suggested to the speakers what they might talk about. At her untimely death at the age of 34 in December, 1996, a little more than two months before the symposium was due to take place, the members of the organisation committee were confronted with the question of whether the plans should be carried through or not. The group decided to go ahead with the symposium and make the publication of the papers from it a manifestation of Sarah's scientific achievements and thereby to honour her memory.

Sarah Williams had a remarkably solid academic career for her young age. She had her basic academic degree in French and German from the University of Oxford 1985 and received her Ph.D. from Hamburg University in 1991. She came to Stockholm University in 1990, where she first took up a position as an English Foreign Lecturer at the English Department. In 1993 she was recruited as an Assistant Professor at the Centre for Research on Bilingualism.

Her research covered three areas, bilingual development in children, "third language acquisition", and interpreting. In the first of these her dissertation, published in 1992, is the most important work (Williams 1992). It is a case study of a young (1;04-2;06) French-German bilingual child's first lexicalisations. The analysis covers the occurrences of *da* and its variants in a deictic function in the child's conversation in both languages, or rather with interlocutors of both languages. The tentative conclusion of the dissertation was that the specific phonological form *da* is not derived from the input. Rather, it occurs through the agency of cross-modal transfer, whereby one structure is initially rendered in two modalities. Both in manual pointing and object manipulation, on the one hand, and in the production of alveolar/dental [d] on the other, a highly sensitive part of the body is brought into contact with

a physiologically non-movable surface. Williams suggested that the recurrent co-occurrence of a particular sound with a particular type of object-related activity in this way creates a primitive deictic system, which might be functional in the transition from phonetic practice to referential language.

The second research area where Sarah Williams contributed important work is the area of third language acquisition, where she was working in a project together with Björn Hammarberg. In this work she had a double role, both as a subject and as a researcher, since the project studied Sarah's own initial acqui-sition of Swedish. Specifically, the influence of a learner's previously learned languages on target-language production was studied. It was shown that at the beginning of L3 acquisition, both L1 and L2 play important roles, but are used in different ways by the learner. A study of the occurrences of non-intentional language switches showed that L1 is reserved for meta-linguistic comments and asides, thus having an instrumental role, whereas the L2 supplied material for the L3 lexical attempts, and had the role of what the researchers call a default supplier (Williams and Hammarberg 1998).

In Sarah Williams's research on interpreting there is a clear stance on the necessity of basing investigations on the theoretical knowledge that has been achieved in the fields of bilingualism and second language acquisition over the last decades. Her first published study on interpreting (1994) emphasised the need to take into account the acquisition, storage and use of the interpreter's different languages. She felt that the status of the two languages in the language user was an area which had often been neglected in research on interpreting and argued more specifically that it was necessary to study such factors as shared storage and processing capacity, the differences in the nature and use of the L1 and L2 systems, and the effects that these can have on each other (see also Williams 1995a). All of this was actually chosen as topics for the symposium.

In one of the research projects in which she was engaged in at the time of her death, she focused upon the study of anomalous stress in interpreting, and saw it as a performance error caused by processing overload (Williams 1995b). In an empirical study, she found that instances of anomalous stress in the interpreter's output, which were not directly related to semantic or pragmatic features in the incoming message, were preceded by stressed elements in the input. Two possible mechanisms were tentatively suggested as playing a role in the occurrence of anomalous stress: firstly, the independent storage of salient prosodic patterns from the input, and, secondly, an automatic matching mechanism triggered by salient stress from the input, which might anticipate

forthcoming input prosody or trigger the most recently stored prosodic pattern (Williams 1997).

It should be evident from the preceding notes on Sarah Williams's work that Sarah was a particularly innovative, imaginative and exciting researcher whose untimely death is a great loss for our fields.

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Acknowledgements

References

Williams, S. 1992. *A Study of the Occurrence and Functions of "da" in a Very Young Bilingual Child.* Ammersbek bei Hamburg: Verlag an der Lottbek.

Williams, S. 1994. "The application of SLA research to interpreting. Perspectives". *Studies in Translatology* 1: 19-28.

Williams, S. 1995a. "Research on bilingualism and interpreting". *Hermes* 15: 143-154.

Williams, S. 1995b. "Observations on anomalous stress in interpreting". *The Translator* 1: 47-64.

Williams, S. 1997. "Anomalous stress in simultaneous interpreting". *Proceedings of the Nordic Prosody VII Conference, Joensuu, August 30-31, 1996.*

Williams, S. and Hammarberg, B. 1998. "Language switches in L3 production: Implications for a polyglot speaking model". *Applied Linguistics* 19: 295-333.

Table of contents

Working Memory and Language Processing[*]

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In his classic work *Principals of Psychology*, William James (1890) proposed to distinguish between what he termed *primary* and *secondary* memory. The former was assumed to reflect material held in a temporary form so as to be readily accessible to conscious awareness, while the secondary system was assumed to reflect a much more durable system for the long-term storage of information. Many years later, Donald Hebb (1949) speculated that the temporary system might reflect the electrical activity of the brain, while the more durable seat of long-term memory was probably based on more permanent neurochemical links, a view that has been revived in recent years and implemented in a range of neural network models, for which the term Hebbian's Learning represents one possible representation of the process of acquisition.

At an empirical level, long term learning formed an active area of research throughout this century (Bartlett 1932; McGeoch and Irion 1952; Crowder 1976), whereas the more temporary or short-term system received comparatively little attention until the late 1950's, when Brown (1958) in England and Peterson and Peterson (1959) in the US first reported that even small amounts of information would show marked forgetting over a matter of seconds if the subject were prevented from active rehearsal by a simple task such as counting backwards. They proposed that their results reflected the operation of a short-term memory store (STM) which differed from long-term memory (LTM) in being based on a memory trace that would spontaneously fade within a matter of seconds unless maintained by rehearsal.

The 1960's saw a period of intense controversy, with some arguing that the new results were entirely compatible with existing unitary theories of memory

(e.g. Melton 1963), while others argued for a two component view, while accepting that any given experimental task may well show the simultaneous evidence of both components (Waugh and Norman 1965). By the late 1960s, the evidence seemed to be favouring a dichotomous view; many models were proposed, but the most influential and probably most characteristic was that of Atkinson and Shiffrin (1968), which consequently became known as the *modal model*. This proposed that information passed through a parallel series of sensory memory systems that are essentially part of the processes of perception, before entering a limited capacity *short-term store* from which information faded unless rehearsed. The store was capable of encoding and elaborating the information, and was responsible for feeding it into and out of the *long-term store*. The probability of transferring an item from short to long-term storage was assumed to be a simple function of how long the item stayed in the short-term system.

Probably the strongest evidence for a dichotomous view came from the study of patients with neuropsychological deficits. The classic amnesic syndrome is one in which patients appear to have lost the capacity to lay down new memory traces although they may retain the capacity to recall memories from the time before their amnesia. Such patients however typically have preserved immediate memory span as reflected in their capacity to repeat back a string of numbers such as a telephone number, or, provided they are intellectually otherwise intact, they may well be able to perform normally on the Brown-Peterson Short Term Forgetting Task mentioned earlier (Baddeley and Warrington 1970). They appear in short, to have impaired LTM but preserved STM. The second type of patient was reported by Shallice and Warrington (1970), showing the opposite pattern of memory performance. The patients suffered from what would probably have previously been categorised as *conduction aphasia*, but showed a pattern of behaviour that was consistent with the hypothesis of a very specific STM deficit, with extremely rapid forgetting on the Brown-Peterson task, cou pled with a digit span limited to one or two items, while at the same time showing apparently normal LTM performance.

Although the Atkinson and Shiffrin model initially appeared to give a good account of the data, problems rapidly began to appear. One concerned the assumption that maintaining items in STM was enough to guarantee learning. Evidence failed to support this (e.g. Bjork and Whitten 1972) resulting in an influential paper by Craik and Lockhart (1972) proposing their *levels of processing* hypothesis, whereby the probability of long term retention of an item was a function not of the frequency of rehearsal, but of the depth at which it

was processed. Hence if a word were processed only in terms on its visual appearance, a very short duration trace would result, whereas processing the sound of the visually presented word would lead to somewhat more durable learning, while the deeper process of encoding the meaning and relating it to existing knowledge, would produce an even more durable trace.

A second problem for the modal model was implicit in the data from the patients with an STM deficit. If this limited capacity store played a crucial role in long term learning, then surely a deficit to that store should lead to impaired learning, and indeed to impairment in a wide range of other tasks such as comprehension and reasoning for which the limited capacity STM was assumed to provide a crucial link. This was clearly not the case: not only did such patients show excellent long term learning, but they appeared to have remarkably few problems in their everyday life, one was a successful secretary, while another ran a shop and a family.

In the early 1970's, a colleague, Graham Hitch and I set out to tackle this problem. We did not have access to suitable patients, and so simulated them by providing "functional lesions" for our undergraduate subjects. We did this by requiring our subjects to remember sequences of digits, at the same time as they were performing a range of tasks such as learning, reasoning and comprehending, that were assumed by the modal model to depend upon a limited capacity short-term store. If the model was correct, then the longer the digit sequence the subject was maintaining, the less STM capacity would remain, and the greater the impairment on the reasoning or learning task.

The results were consistent across a range of studies, suggesting that longer digit sequences did indeed cause impairment, but this was by no means as dramatic as the model would predict. When our subjects were maintaining eight digits, the limit of their capacity, they were taking about 50% longer to perform a reasoning task, but were still keeping the error rate constant at well below 10%. On the basis of these data we proposed to abandon the idea of a unitary STM system, postulating instead a multi component system which we labelled *working memory* (Baddeley and Hitch 1974).

The tripartite model we proposed suggested that the system was controlled by a limited capacity attentional system, the *central executive*, aided by two slave systems, the *articulatory* or *phonological loop* which maintained acoustic or speech based information, and the *visuo-spatial scratch pad* or *sketch pad* which performed a similar function for visual and spatially encoded material. The digit-span task was assumed to rely principally upon the phonological loop, the system that was also assumed to be impaired in the STM patients