

Shadowing

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Résumé de l'article

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SHADOWING

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Résumé

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Abstract

This article attempts to bridge the gap between the vocational aspects of simultaneous interpretation and the theoretical and empirical components of simultaneous interpretation by describing the benefits and the versatility of the shadowing technique when used as a pre-simultaneous training tool. Aspects of cognitive psychology and neuropsychological applications are incorporated in a variety of applied exercises.

On Wednesday October 31, 1990, David Suzuki's *Nature of Things* aired an episode entitled *You Must Have Been a Bilingual Baby*, written, directed, and produced by Heather Cook. The one hour programme explored some of the ways in which Canadians, young and not so young, learn a second language; examined the pros of bilingualism through immersion; presented examples of immersion programmes for adults; and included a segment on the training of simultaneous interpreters. Stephen Godfrey reviewed the programme with the following comment:

One of the fascinating side trips in the show (...) is a visit to a school for interpreters at the University of Ottawa to show how language is dissected and put together again. The process of hearing a sentence and then repeating it with a slight delay — known as shadowing — is followed by paraphrasing, and finally simultaneous interpretation. But simultaneous translation is an infinitely more sophisticated skill than simply speaking another language; even the most experienced interpreters are given a break after less than half an hour.

Globe and Mail, October 31, 1990

For a country with its healthy share of interpreters, and where the media erroneously refer to them as "translators" and even as "translation devices", this was certainly a first for simultaneous interpreters in that they finally received some long overdue and well deserved coverage, no matter how succinct. What the audience may not have been aware of was that Heather Cook and the camera crew spent an entire day in July, 1989 filming us at the University of Ottawa under unbearably hot conditions in a language laboratory where the air-conditioning had been shut off due to ongoing construction. Furthermore, much of the taping ended up on the cutting room floor. What may have appeared as a minimal segment on interpreters was, in the context, a fair introduction for a one hour show given the advertisement time which considerably erodes such programmes. In any case, I was genuinely delighted with the show and proceeded to call my interpreter friends in Ottawa to find out their reactions to the show.

Basically, some interpreters wondered what interpretation had to do with the bilingualism issue, even though they were grateful that their profession had finally been

acknowledged by the media. Others felt that I had granted too much importance to the shadowing component of the training of interpreters and that this may have only reinforced the erroneous notion of some who think that all interpreters ever do is merely shadow or “parrot” what the speaker is saying, simply putting it into another language.

So I turn to my computer, in order to, once again, try to bridge the ever-yawning gap between the vocational aspects of simultaneous interpretation and the theoretical and empirical components of the interpretation process that fascinate cognitive psychologists, the same process in fact that also dazzles and leaves the general population completely dumbfounded.

In an article that appeared in *Meta* (Lambert 1989), I describe an introductory course on simultaneous interpretation offered at the University of Ottawa. This course attempts to put into application some of the theories in cognitive and neurological psychology relevant to the formation of conference interpreters.

But first, a bit of background may be in order. I began working as a research assistant for Patricia E. Longley at the Polytechnic of Central London, England, between 1976 and 1979, while completing my graduate training in cognitive psychology under the supervision of the late David Gerver, a pioneer in empirical research on simultaneous interpretation. I was then invited to teach translation and conference interpretation at the Monterey Institute of International Studies in Monterey, California, between 1979 and 1984. Since then, I have been at Ottawa University's School of Translators and Interpreters.

Given this background, I have been able to put into practice certain components of human information processing, and structure my introduction course around twelve pedagogical techniques that stem from the technical literature: listening and recall; shadowing; dual-task training or parallel processing; paraphrasing; abstracting or telescoping; clozing; sight translating; sight interpreting; lagging; anticipating; processing digits, names, acronyms; ear preference and hemispheric processing. The meaning of some of these terms should be made clear in what follows. Furthermore, they are described in more detail elsewhere (Lambert 1989).

Before discussing some of the relevant components, I should first give my perspective on interpreters. Although it would certainly help, there is no such thing as a “born interpreter”, and by the same token, I do not believe that in order to learn how to swim, a child should be thrown into the water. Maybe a more concrete analogy would be to picture someone wishing to learn how to drive a car with a standard shift. Whether the individual took drivers' education courses or whether he was taught by a friend or relative, one thing is certain: he was not thrown into the driver's seat of a vehicle travelling down the freeway at 70 miles an hour. He probably began by turning on the ignition, letting the car idle, and learning to master the brakes, clutch and gears before actually taking the car out for a ride.

The analogy indicates how I think interpreter-trainees should be introduced to simultaneous interpretation. Although some interpreters were literally born overnight during the Nuremberg Trials, the training of interpreters today has become a responsible profession calling for careful planning and staging, as well as a research component, all of which aim to optimize chances for growth of both the students and the profession itself.

Furthermore, the actual exercises I propose can also serve as eliminatory tests in that trainee-interpreters may be discouraged from moving on to the next stage if they are unable to master graded skills, in the same way that a person wishing to drive a car could not make it to fourth gear or drive on the open road until the basics have been mastered. In fact, some of the exercises are currently used as selection tests in interpretation

programmes in Europe as well as North America in order to help determine which candidates are most likely to become successful interpreters once they enroll in the training programme. These selection tests are described elsewhere (Gerver, Longley, Long and Lambert 1984; Lambert and Meyer 1988; Lambert 1989; Lambert, in press.)

USEFUL INSIGHTS FROM COGNITIVE PSYCHOLOGY

From a cognitive psychological point of view, simultaneous interpretation is a complex human information processing activity composed of a series of interdependent skills. The interpreter receives and attends to part of a sentence, referred to as a propositional phrase, a chunk, or a meaning unit. S/he begins translating and conveying meaning unit 1. At the same time, meaning unit 2 arrives aurally while the interpreter is still involved with the vocalization of meaning unit 1. Thus the interpreter must be able to hold unit 2 in some type of echoic memory or short term memory before interpretation can begin (Gerver 1971). Furthermore, while conveying unit 1, the interpreter is also verifying and monitoring the correct delivery of that meaning unit. In more technical terms, as Gerver (1971) might put it, the interpreter has to learn to monitor, store, retrieve, and translate source language input while simultaneously transforming a message into target language output at the same time as s/he monitors some form of feedback of his/her interpretation. We know this because interpreters typically correct themselves as they interpret.

There are, in fact, so many ongoing activities involved during simultaneous interpretation that, in order for them to be effectively assimilated, not to mention understood, by prospective interpreters, any pedagogically sound approach should tease these ongoing activities apart, differentiate the component skills, and where possible, provide training experiences in each one.

LISTENING AND MEMORY EXERCISES

Beginning interpretation students are simply asked to **listen** to a spoken passage, the rationale being that listening represents the basic skill in any form of interpretation. Students are instructed to listen to a passage without taking notes. They are also told that they will later be asked to recall the main points of the passage they have just heard.

It should be pointed out at this stage that the instructor is not attempting to simply test the ability to repeat the information heard, since interpreters are hardly ever asked to recall information after the fact in their professional lives. Rather, we highlight as important components the students' ability to listen, remember, identify the salient arguments in a given speech, without distorting the original meaning of the speaker.

Furthermore, introducing a language variable to the listening task by asking the student to practice the listening and memory exercises in both languages may also serve as a tool to measure a student's competence in the second language. In other words, the listening test can be introduced both in the student's dominant language (henceforth referred to as one's *A* language) to recall it in the same language (*A* to *A*, no code-switching condition), as well as in his/her second or passive language (*B* language). Then the recall can involve both languages, *e.g.* into one's dominant language (*B* to *A*, code-switching condition).

If we were to take a hypothetical example of a student successfully completing the first task (listening in *A* and recalling in *A*), and performing poorly on the second task (listening in *B* and recalling in *A*), we could safely deduce that the student seems to have a good memory but that s/he needs to strengthen the second language. Moreover, if a student were to perform poorly under both conditions, such as by distorting the meaning

in his/her A language as well as from his/her B language, then we would also conclude that this particular candidate should be discouraged from entering the interpretation programme altogether or from going any further. It is for this reason that listening and recall are prominent components not only of the selection tests at the University of Ottawa but of the course content as well. Students successfully completing all four listening and recall conditions as listed below can comfortably go onto a more difficult phase: listening in A and recall in A; listening in B and recall in B; listening in B and recall in A; and listening in A and recall in B.

Some of the memory tests used to select candidates for admission into our programme were borrowed from Weschler (1945). Others were devised by Patricia E. Longley at the Polytechnic of Central London and John Long (Gerger *et al.*, 1984) where length of text, difficulty of material presented and gradual increments in complexity of information were carefully devised.

SHADOWING

Technically speaking, shadowing is a paced, auditory tracking task which involves the immediate vocalization of auditorily presented stimuli, *i.e.* word-for-word repetition, *in the same language*, parrot-style, of a message presented through headphones. This technique has often been used by cognitive psychologists and neuropsychologists as a means of studying selective attention in humans. But more germane to conference interpretation, and as controversial as it may be, shadowing is usually part of the training method employed with beginner interpreters, who first need to learn how to listen and speak simultaneously (first, from one language into the **same** language), before attempting to interpret (from **one language into another**).

It is assumed that individuals vary not only in terms of their cognitive information, but also in the speed and facility with which they can store, retrieve, and manipulate elements of information (Carroll 1977). Speech shadowing with a competing message has been extensively used in various studies of speech perception and selective listening (Cherry 1953). While shadowing appears to be a fairly easy task for most speakers, there are apparently individual differences in the ability to shadow at very short latencies. Marslen-Wilson (1973, 1975) was able to identify people who could shadow continuous speech, in the absence of a competing message, at a distance or lag of only a quarter of a second. Tests of ability to shadow at short distances, with increasing speed and complexity of the input message, could be valuable to us because they might well be predictive of a person's ability to become an efficient simultaneous interpreter, even though the average time between input in a given language and output in another, in simultaneous interpretation, is much longer than one quarter of a second (Carroll 1977).

The lag time in shadowing experiments seems to have an effect on the depth to which a shadowed message is processed. Subjects can be asked to shadow with minimal lag or, on the contrary, shadow with a lag similar to the lag the interpreter would favour when interpreting from one language into another. Norman (1976) differentiates between what he calls "**phrase**" shadowing and "**phonemic**" shadowing. When phrase shadowing, the words are slightly delayed behind those of the input but not so long as to impose a memory burden on the shadower. In phonemic shadowing, however, the subject is asked to repeat each sound as s/he hears it, without waiting for the completion of the input phrase, or, in some cases, even for the completion of a word. Thus the lag involved in phrase shadowing implies that there is grammatical analysis of the material processed which may be reflected in the amount of recall of the messages shadowed one way (phrase shadowing), or the other (phonemic shadowing).

In another experiment, when a subject shadowed without understanding (Chistovitch, Aliakrinskii and Abilian 1960), shadowing was then labeled as mere repetition and not active rehearsal or deeper forms of processing. In their experiment, Chistovitch *et al.* found that when subjects chose to shadow without understanding, they gave accurate phonemic reproductions of speech sounds at very short latencies (ranging from 150 to 250 milliseconds), but could not subsequently recall the material they had just processed. This form of shadowing represents "shallow" human information processing (Lambert 1988). Those who shadowed with understanding, on the other hand, repeated the speech at longer latencies (250 milliseconds and up).

Other studies have shown sophisticated correction by shadowers of errors made during shadowing (Marslen-Wilson, 1973, 1975). In the first experiment, Marslen-Wilson (1973) asked subjects to shadow prose as quickly as they heard it. Some individuals were able to shadow the speech at extremely close delays, *i.e.* with lags of 250 milliseconds, which is about the duration of one syllable. When subjects made errors in shadowing, the errors were syntactically and semantically appropriate given the preceding context. For example, given the phrase "He had heard at the Brigade...", some subjects repeated "He had heard that the Brigade...". In this particular case, *that* shares acoustic information with *at* and is also syntactically and semantically appropriate in the same position in the sentence.

In the second experiment, Marslen-Wilson (1975) asked subjects to shadow sentences that had one of the syllables mispronounced in a three-syllable word. Subjects never restored the word, that is to say, never repeated back what should have been said when the mispronunciations occurred in the **first** syllable. However, with mispronunciations in the **second** and **third** syllables, a significant proportion of restorations were made. If the mispronounced word was syntactically and semantically anomalous, restorations did not occur for any mispronounced syllable. These results indicate that restorations will not occur if the shadower does not have sufficient acoustic information and syntactic or semantic context to make the appropriate restoration. If context were the exclusive and overriding factor, one might expect subjects to replace the syntactically-semantically anomalous word with the appropriate word. This did not occur, however, indicating that both **context** and **acoustic** information influenced speech processing (Massaro 1977).

What effect does shadowing have on comprehension and recall of input material? Carey (1971) found that shadowing did not hinder understanding in an experiment in which subjects either **listened** to or **shadowed** prose. The passages were recorded at 1, 2 or 3 words per second, and after the experimental task, subjects were given tests of word and syntax recognition as well as semantic retention. Shadowers' word recognition and semantic recognition scores were somewhat higher than those for listeners at the slowest rates, but these differences disappeared at faster rates. Simultaneous listening and speaking did not preclude understanding and recall in a relatively simple shadowing task. Carey even went on to propose the "shadowing facilitation hypothesis", which predicts that the extra psycholinguistic processes required in **successful** shadowing result in higher retention scores than simple listening. Insofar as shadowing is successful, and the shadowing response that a subject monitors is identical to the input, Carey claims that shadowing will have a **facilitating** effect on retention.

In a similar follow-up experiment, Gerver (1974) asked conference interpreter-trainee subjects to a) listen to, b) shadow, and c) interpret simultaneously, three French prose passages into English. Subsequent tests of comprehension and recall showed that higher scores were obtained after listening than after simultaneous interpretation, which in turn, yielded significantly higher scores than after shadowing. Since the test scores were higher after passive listening than after either simultaneous interpretation or

shadowing, it would appear that the simultaneity of listening and speaking present during shadowing may have impaired comprehension.

Gerver's results demonstrate that simultaneous listening and speaking can impair recall of the material listened to while speaking. They also show that such recall is better when complex information processing is an integral part of the simultaneous listening and speaking than when a relatively simple form of processing is involved (Gerver 1974). Although, as Carey (1971) demonstrated, analysis of meaning can occur while shadowing, simultaneous interpretation involves a compulsory analysis of the deep structure of the source language. Shadowing, on the other hand, involves a less complex transformation of the message from the auditory to the vocal mode in which analysis of meaning may be incidental rather than an integral part of the process.

It could be objected that the difference in recall between shadowing and interpreting might be due simply to the different demands placed on speech output by the two tasks; almost continuous speaking being required in shadowing but only intermittent speaking in simultaneous. In other words, recall after shadowing might be poorer because the shadower spends more time in simultaneous listening and speaking than the interpreter.

(Gerver 1974: 340)

Both Gerver (1974) and Barik (1973) claim that interpreters try and minimize the amount of time they listen and speak simultaneously. This can be done by waiting for a pause in the source language delivery, at which time the interpreter tries to convey as much information as possible (Goldman-Eisler 1968; Barik 1973). If this is true, then the delivery of the simultaneous interpreter is usually highly uneven and difficult for an audience to process. The interpreter has no control over the situation and is left completely at the mercy of the pace of the speaker. Beginning interpreters who have not learned to listen and speak simultaneously during the shadowing exercises often develop this unpleasant habit of waiting for the speaker to pause before they begin to interpret and have great difficulty breaking it. Whether the interpreter develops this habit because s/he feels that s/he can grasp the incoming message more clearly without the interference from his or her own voice, or whether the interpreter feels that s/he can monitor his/her own output better during these silent pauses is a moot point; the fact remains that the interpreter who opts for this type of interpreting has simply not learned to share his/her attention between listening and speaking and may have never been introduced to the shadowing exercise early in his/her training.

SHARED ATTENTION AND SKILLED PERFORMANCE

Listening and speaking simultaneously is an acquired skill. Shadowing imposes a certain load on the cognitive capacities of the shadower. It is more than listening and speaking. As Miller (1963) pointed out, a speaker usually waits until the other speaker pauses before answering. Simultaneous interpretation imposes a different load on the cognitive capacities of the interpreter. Neisser (1967) mentions simultaneous interpretation in comparison to shadowing as evidence against a "motor theory" of speech perception:

In a sense, simultaneous interpretation is a form of 'shadowing'. However, it is not words, or articulatory movements that are shadowed. The translator (*sic*), who is obviously attending to, and understanding the incoming stream of speech, cannot possibly be imitating the speaker's vocalizations. His own vocal tract is occupied with an entirely different output.

(Neisser 1967: 218)

In fact simultaneous interpretation could be roughly described as shadowing, only into another language. However, interpretation is infinitely more complex and more

demanding on the cognitive capacity of the individual, given the added transformation of information presented to the interpreter in one language who then has to convey the same message into another language.

One of the most interesting questions regarding human information processing is whether a number of sensory inputs can be processed at the same time or whether the only way of coping with more than one input is to switch rapidly from one input to the other. In normal conversation, the vocalization of one speaker usually precludes that of another and therefore, people rarely talk at the same time. Miller (1963) suggests that this phenomenon may be a universal of language behaviour but that the reciprocity between talking and listening...

...is not a necessary consequence of an auditory or physiological inability to speak and hear simultaneously; ...perhaps there is some limit imposed by agility and attention, perhaps some critical component of the speech apparatus must be actively involved in the process of understanding speech.

(Miller 1963: 417-418)

Many talented people have wrestled with these basic issues. Neisser (1967), for example, proposed that attention behaves very much like a filter in that some signals are "passed" for additional processing while others are rejected. The filter theory was originally proposed by Broadbent (1957; 1958) who argued that cognitive mechanisms have a finite informational capacity and that filtering mechanisms were necessary in order to avoid overloading their capacity. Succinctly, Broadbent's filter theory proposed that two simultaneous inputs could be processed in the sensory registration system but that beyond the filter, one input is processed first, and the second input is retrieved serially by the filter. Deutsch and Deutsch (1963) and Norman (1968) argued that two simultaneous inputs could be processed in a parallel fashion at all levels of perceptual analysis, but that a "bottleneck" controlled the entry to awareness and response selection. Treisman (1960) proposed a modification to the filter theory in that the rejected message was merely attenuated and not eradicated. Later, Treisman (1969) concluded that divided attention and parallel processing were possible for two simultaneous inputs as long as they did not reach the same analyzers but that serial processing became mandatory whenever a single analyzer had to deal with two inputs.

In early studies on attention, it appeared that consciousness could only be directed to a single activity at a time. Conscious attention to two simultaneously performed tasks was possible only if they were coordinated into a single higher-order activity (James 1890) (for example: a simultaneous interpreter devoting more attention to the quality of his/her output than to the meaning of the incoming message); or attended to in rapid alternation (Paulhan 1887; Jaffe, Feldstein and Cassota 1967) (for example, an interpreter alternating between listening and speaking); or that at least one of the two tasks was being carried out automatically, without conscious control (Solomons and Stein 1897; Hirst, Spelke, Reaves, Caharack and Neisser 1980) (for example, an interpreter who devotes his/her entire attention to deciphering the meaning of the incoming message, completely oblivious to his/her delivery, the way a speed typist learns to ignore the position of the keys on the keyboard, and focuses only on the text to be typed).

In most experiments on selective listening where shadowing was involved, subjects were usually asked to attend to one of the verbal messages by shadowing it, and to ignore the other message being presented to the other ear. In most studies carried out to test the single-channel hypothesis, the experimental designs called for simultaneous attention directed to two closely similar if not identical tasks, usually presented through two

headphones and externally generated. In other words, subjects heard one language in one ear and another language in the other ear, but remained silent during the listening task.

Only a handful of studies have required subjects to perform two simultaneous tasks (Allport, Antonis and Reynolds 1972; Shaffer 1975; Welford 1968). Allport *et al.* (1972) reported experiments in which subjects performed two tasks concurrently without any reduction in performance in either task. Their subjects were asked to attend to and repeat back continuous speech at the same time as taking in complex, unrelated visual scenes, or even while sight reading piano music. Allport suggests that when the messages or tasks to be performed are highly **dissimilar**, both tasks should be able to be performed simultaneously. The main difference between Allport's study and other experimental paradigms (*e.g.* Moray 1969) is that shadowing was one of the concurrent tasks: in other words, one verbal input was externally generated.

Welford (1968) analyzed the simultaneous interpreter's performance within the context of a discussion of the single-channel hypothesis and concluded that simultaneous interpreters can, after long practice, acquire the ability to speak and listen concurrently:

Simultaneous interpreters seem to acquire the ability to do this (speak and listen simultaneously) after long practice... ignoring the feedback from their own voices. In consequence, their speaking voices are often strange, and they report that they have very little idea of what they are saying or confidence that it is correct.

(Welford 1968; cited in Gerver 1976: 187)

Broadbent (1952) suggested that simultaneity of listening and speaking imposes a severe strain on human channel capacity. To avoid the strain of continuous processing in this fashion, it has been suggested that simultaneous interpreters, even with years of experience, try to make good use of the brief silence in the source language's input. To this effect, Goldman-Eisler (1968) suggested that:

The intermittent silence between chunks of speech in the speaker's utterance is a very valuable commodity for the simultaneous interpreter: for the more of his own output he can crowd into his source's pause, the more time he has to listen without interference from his own output.

(Goldman-Eisler 1968: 128)

Poulton (1955) compared simultaneous with alternate listening and speaking and found that a significantly greater percentage of words was omitted or incorrectly repeated in the simultaneous condition than in the alternate condition. Barik (1973) investigated Goldman-Eisler's suggestion by analyzing the temporal relationship between the source language speakers and the interpreter. Barik concluded that simultaneous interpreters do, in fact, make greater use of source language pauses than would be expected on the assumption that the interpreter's delivery is independent of intervals of speaking and pausing in the source language speaker's delivery. However, Barik also noted that source language pauses occur between units of meaning, and given that interpreters are concerned with translating units of meaning as opposed to words, they might be more likely to begin interpreting during such pauses. Since interpreters make greater use of source language pauses, they also reduce the extent to which they have to speak and listen concurrently, clearly a very complex processing requirement.

It is apparent that in order to achieve any kind of performance level, the T (interpreter) has to consider units of meaning rather than perform on the basis of a more mechanical word-by-word process. It is thus more appropriate for the T to listen while the meaning unit is being formulated by S (source or speaker), and undertake to translate it once it is completed.

(Barik 1973: 263)

Cognitively speaking, simultaneous listening and speaking represent processing behaviour so complex that interpreters understandably opt to avoid it wherever possible by trying to make good use of the brief silences in the source language's input.

Although no systematic studies have examined other coping methods, David Gerver and I carried out an unpublished study between 1976 and 1979 which involved a field-study and interview comprising approximately 20 professional interpreters in the Greater London area. We found that interpreters certainly did make good use of the brief pauses in the speaker's delivery, but not necessarily to cram in as much information as possible, as suggested by Barik (1973) and Goldman-Eisler (1968), but rather to "catch up" with the speaker by finishing off their own sentences thus "bracing" themselves for the beginning of the next chunk of information which they hope to be able to listen to without having to speak.

But more important were the other coping methods that came to light during this pilot study: in order to handle the taxing simultaneity of listening and speaking, some interpreters claimed that they simply increased the volume of the incoming message as a technique to mask the sound of their own voice. (Interpreters need to monitor what they are saying.) Others claimed that by removing one headphone slightly off one ear, they could attend to the incoming message with one ear and monitor the sound of their own voice with the other, partially released ear.

NEUROLOGICAL INTERPRETATION RESEARCH

This partially released ear behaviour led to further questions. To explain these proclivities, some interpreters claimed that the headphone set felt too tight if both ears remained covered; others felt that releasing one ear in this fashion enabled them to monitor their output for both content and volume while interpreting; others simply stated that they "felt better" or "heard better" under such circumstances.

Be that as it may, we wanted to know whether it was the same ear which was released; whether this ear was the same ear as their "telephone ear"; whether right-handed interpreters always released the left or the right ear; whether left-handed interpreters did the opposite; whether interpreters released one ear when interpreting from A to B and the opposite ear from B to A; whether "born bilingual" interpreters developed a certain ear preference pattern as opposed to interpreters who had acquired their second and third languages after lateralization (usually around the age of 6), etc.

Although these fascinating issues go beyond the scope of our paper, suffice it to say that several studies have resulted from such field observations. One study examined shadowing behaviour among interpreters when shadowing with the left ear, vs. the right ear, vs. both ears (Kraushaar and Lambert 1987). A similar experiment was carried out on simultaneous interpretation and earedness (Lambert 1989; Lambert in press), not to mention the booming research presently being carried out on the subject at the University of Trieste's School of Interpretation by a dynamic group of researchers including Laura Gran, Francisco Fabbro and Valeria Daro, to name but a few (Gran and Fabbro 1987, 1988).

In conclusion, there is a mutual collaboration suggested by the research so far, *i.e.* that the *practical* interests and preoccupations of the professional simultaneous interpreter can be addressed through the research findings of the more analytic and *theoretical* orientations of the cognitive psychologist, in the same way that the latter can learn and advance because of the former.

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