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Note-taking in consecutive interpreting: A review with special focus on Chinese and English literature

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ABSTRACT

Publications on note-taking in consecutive interpreting are reviewed, with special attention being awarded to literature written in Chinese and English. The review identifies two main streams of note-taking literature, a prescriptive stream and a descriptive stream. Prescriptive publications are concerned with the question "How should notes be taken?" They introduce the established note-taking systems and principles, and discuss how to teach them to students. The second stream, consisted of descriptive studies, tackles the question "How are notes taken?" The studies strive to approach the topic with scientific rigor by collecting data from simulated interpreting practices. Fruitful results have been created, but there are several limitations. The prescriptive stream lacks systematic empirical research to support the proposals. The descriptive stream is mostly product-oriented, lacking process research, and no study has designed true experiments to explain the causal relationships behind the observed phenomena. Cognitive load offers a promising perspective to approach the process of note-taking while contributing ample empirical data. It is therefore worthwhile to investigate cognitive load during note-taking in consecutive interpreting.

KEYWORDS

Note-taking, consecutive interpreting, review, cognitive load.

1. Introduction

Note-taking is a distinctive feature of consecutive interpreting (CI), in particular 'classic' consecutive where systematic note-taking is used (Pöchhacker 2004: 19), and scholars' sustained interest in the subject has generated a considerable volume of literature. This review attempts to explore how note-taking literature has evolved for over half a century, and what awaits future research. It is part of a larger project that looks into the process of CI and note-taking. The aim is to identify the most productive avenue of investigation by combing through the prominent and influential studies in the field. The review is interested in the following questions: (1) what are the major topics in note-taking studies, (2) what research methods have been used, (3) what are the findings, controversies, and limitations, and (4) what could be a promising avenue for future research.

The review is written from the perspective of an interpreting researcher and practitioner whose interest lies in interpreting between the Chinese and English language pair, and as a result, the review pays special attention to publications written in Chinese and English¹. The selection of texts to be reviewed followed a number of successive steps. The inclusion criteria might seem overly restrictive, but they were designed to identify

the most relevant and representative literature, not to comprehensively survey all the studies available.

Firstly, the key databases relevant to this review were identified: the Conference Interpreting Research Information Network Bulletin (CIRIN Bulletin), Translation Studies Abstracts Online (TSA Online), and the Chinese Social Sciences Citation Index (CSSCI). The reason why an additional China-based database is necessary for the search of relevant literature is that, according to Zhou *et al.* (2010: 1362), “the Chinese and international communication systems in the social sciences are almost completely uncoupled in terms of the coverage in the databases.”

Secondly, the selected databases were searched for relevant publications. The CIRIN Bulletin did not provide keywords of its collections, so a keyword-based search was not possible. The database was searched for titles that contained any of the following words: ‘note,’ ‘notation’ and ‘note-taking.’ TSA Online and the CSSCI were searched by looking for titles and keywords that contained ‘consecutive interpreting’² and any of the above mentioned words.

Thirdly, the references of the retrieved items were scanned for relevant publications. This was repeated until no more relevant publications came to light.

A further step was to finalise the list using the following criteria: (1) The publication addressed note-taking in CI as a subject in its own right³. (2) The publication was written in Chinese or English. For publications written in other languages, only those that have been most referenced were included in the review. (3) The study was peer-reviewed (published as a book or book chapter; journal article; in refereed conference proceedings)⁴.

The selected publications are grouped according to topic: note-taking systems and principles, didactics, cognitive and linguistic aspects of note-taking, choice of form and language, and the relationship between note-taking and interpreting quality. The boundaries between the groups are by no means clear-cut. The classification has been made on the basis of the most prominent focus of each. Two main streams of literature have been identified: a prescriptive stream and a descriptive stream. Prescriptive publications on note-taking are concerned with the question “How should notes be taken?” Usually starting from the authors’ experience in the profession and/or in teaching, this first stream aims at introducing established note-taking systems and principles, and discusses how to teach them. The second stream, consists of descriptive studies, tackles the question “How are notes taken?” It strives to approach the topic with scientific rigor by collecting data from simulated interpreting practices, using either students or professional interpreters as subjects.

As will be made clear in the review, there is a shift in note-taking literature from prescriptive to descriptive along this continuum.

2. Note-taking systems and principles: a prescriptive starting point

Among the first publications on note-taking are a number of books and articles that introduce the well-known note-taking systems and principles. These publications adopt a prescriptive stance, and propose the ways that notes should be taken. More often than not, the prescriptions made are based on the author's experience as professional interpreters and/or teachers. For example, Rozan (2002: 11) mentioned in the introduction of his book, that "This system is the product of 10 years as a practising interpreter and 4 years teaching the profession." Little if any empirical data has been collected in this stream of literature. Nevertheless, the contributions are obvious: they have offered important experience and knowledge of the profession, and are therefore fundamental to note-taking research.

The earliest note-taking system was proposed by Rozan in 1956. The influence of the work is far-reaching. When it was translated into English and Polish in 2002, the editors commented that "it would be hard to find an interpreter in Western Europe whose note-taking style owes nothing to Rozan" (Rozan 2002: 7). Following Rozan, many books and articles on note-taking systems and principles were published in different languages, each generating a profound influence in its own country and some even reached beyond. Some outstanding examples would be Allioni (1989), Becker (1972), Gillies (2005), Gran (1982), Ilg (1988), Kirchhoff (1979), and Matyssek (1989).

When new systems are introduced, authors usually build on the wealth of the previously-established ones, adapting the existing rules as they see fit. To avoid repetition, this part of the review starts from Rozan's system, uses it as a reference, and discusses some of the best-known principles of note-taking. These principles can be found in most of the existing note-taking systems, and different authors have contributed to them.

The first principle is at the core of almost all note-taking systems: noting the idea and not the word. It has been variously expressed as "comprehension" before note-taking (e.g. Deng 1991: 285; Jia 1995: 77-78) or "analysis" before note-taking (e.g. Alexieva 1994: 206; Chuang 2008: 95; Han 2002: 25-26; Mu and Lei 1998: 82-83). This principle emphasises that what is important in note-taking is the idea or "concept" (Gillies 2005: 53) that lies under the actual words used. When taking notes, interpreters should arrive at the underlying meaning through analysis and comprehension of the source speech.

Rozan's second principle consists of the rules of abbreviation. The most important rule, according to Rozan (2002: 16), is that long words (more than 4 to 5 letters) should not be written in full. It is generally suggested that the first and last letters should be used to abbreviate the word, with the latter written as superscript (Gillies 2005: 130; Matyssek 1989: 115; Rozan 2002: 17; Schweda-Nicholson 1993: 200). Using the first letters to abbreviate is also recommended (Becker 1972: 30). Other rules of abbreviation include: using abbreviations to indicate gender, tense and register (Rozan 2002: 17-18); borrowing commonly known abbreviations from daily life (Matyssek 1989: 113; Wu 2008: 8); using international suffixes such as "-tion" (Gillies 2005: 130; Matyssek 1989: 117); and using phonetic spelling and misspelling (Gillies 2005: 131, 162; Han 2002: 26). It is common to put abbreviations at a prominent place when discussing note-taking in CI between European languages, but the case with Chinese is different. Some of the rules which are largely based on European languages are difficult for native speakers of Chinese, and some rules are even rendered useless because of the differences in languages (Liu 2008: 65f). That being said, part of the rules are still applicable, especially when the task is interpreting from Chinese into English. No matter how abbreviations are used, they have to meet certain conditions: they should be unambiguous (Henderson 1976: 110; Matyssek 1989: 115), easy to write (Alexieva 1994: 204), and should not sacrifice accuracy (Schweda-Nicholson 1990: 140).

The third principle concerns the noting of links. Links are believed to be indispensable in note-taking (Matyssek 1989: 53; Wu 2008: 17) because "an idea can be distorted completely if its relation to the previous idea is not clearly indicated" (Rozan 2002: 18). Many authors (e.g. Gillies 2005; Matyssek 1989; Wu 2008) have identified the main types of linking words and expressions, including additive, adversative, and causal (cause, purpose and consequence) links, and recommended the use of only one abbreviation, short word, or symbol to represent the whole family. Gillies (2005: 147, 149) also points out the importance of adding implicit links and dropping link words that are not links.

Rozan's fourth and fifth principles refer to the noting of negation and emphasis. Negation is usually achieved by crossing out, and emphasis by underlining (Gillies 2005: 106; Matyssek 1989: 107-110; Rozan 2002: 19; Schweda-Nicholson 1993: 201-202). Emphasis could also be achieved by shifting, i.e. moving notes further to the left or right on the notepad (Gillies 2005: 83).

The last two on Rozan's list are the principles of verticality and shift, the "backbone" of his system (Rozan 2002: 20). These two are fundamentally principles on the layout of the notes, and have been given different names by other authors, such as the use of space (Liu 2008: 52) and diagonal layout (Jones 1998: 44; Özben 1993: 42). According to the

principles, notes should be structured in a “vertical, indented and terraced way” (Kohn and Albl-Mikasa 2002: 262), so that the units of meaning are easy to identify when reading back notes. A mind-mapping note-taking technique which starts from the centre of the page is also proposed by Torres Díaz (1997).

Another important part in any existing note-taking system is the use of symbols. Symbols are used because they are easy to write and read, and represent concepts not words, thus avoiding source language influence (Gillies 2005: 99). Distributed towards the two ends of the minimalist-maximalist continuum of symbols are Rozan and Matyssek. The former recommended a total of 20 symbols, of which “only 10 were indispensable” (Rozan 2002: 25), while the latter used a whole book volume to introduce a detailed code of drawings and symbols. Although Matyssek’s system was sometimes criticised as running the risk of becoming an “interpreter’s shorthand” (Ilg and Lambert 1996: 72), he emphasised that the symbols were suggestions rather than obligatory requirements (Matyssek 1989: 233). Moreover, an in-depth analysis into the two systems by Ahrens indicated that they “do not differ at all as far as the basic principles of note-taking are concerned” (2005: 13). Other authors are more or less distributed along the continuum, suggesting more symbols than Rozan, but rejecting the idea of using a symbol-based note-taking system. Generally speaking, symbols are believed to be very helpful when they are simple, unambiguous, and fully mastered by the interpreter. It is also pointed out by many authors that it should be possible to combine symbols to create new symbols (Allioni 1989; Gillies 2005; Matyssek 1989; Wu 2008).

So far, it would seem that the principles of note-taking are well-developed, and once the students are made aware of them and practice accordingly, note-taking should not be a problem at all. However, when it comes to teaching and learning these principles, both the students and teachers find it challenging.

3. Note-taking didactics: the beginning of a shift from prescriptive to descriptive

With effective note-taking principles having been worked out and applied by eminent professionals, two problems now arise: the first is whether these principles and systems can be taught to students; and if so, the second is how note-taking can be taught systematically.

The individuality of any note-taking system is emphasised by all who have written on the topic. This is why some authors do not believe in the systematic teaching of note-taking. The case in France is typical of this attitude. As Ilg and Lambert (1996) pointed out, “The École Supérieure d’Interprètes et de Traducteurs (ESIT, Paris) never thought much of note-

taking as an underpinning of CI”, and the publications “were sketchy as far as the techniques of CI are concerned” (Ilg and Lambert 1996: 71). Thiéry (1981) was an example of this sceptical attitude towards teaching note-taking systematically. He argued that instructions on note-taking should be limited only to essentials, and that systematic note-taking as a creative and individual activity, could not be taught.

Nevertheless, many authors believe note-taking should be taught systematically to students, and they have made great efforts to operationalise their didactic proposals. The discussions target three different student groups: post-graduate level interpreting students, undergraduate language students, and community interpreters.

The discussions begin with note-taking training for potential candidates of the profession, usually at post-graduate levels. In fact most of the above-mentioned literature on note-taking systems and principles fall into this category. Apart from the publications that focus exclusively on note-taking and treating it as a subject in its own right, there are also a large quantity of literature that has addressed note-taking as part of the discussions on interpreter training. Those discussions however, go beyond the scope of this article. Interested readers are referred to such authors as Bowen and Bowen (1980), Ilg and Lambert (1996), Jones (1998), Kunihiro *et al.* (1969), Seleskovitch and Lederer (1989/1995), Schweda-Nicholson (1985), van Hoof (1962) and Zhong (1999).

With interpreting being taught to more and more undergraduate language students as a language reinforcement activity, many teachers have detected the differences in this new group (e.g. no aptitude testing before entering the classes and great student numbers), and discussed how to make adaptations accordingly (e.g. Dai and Xiang 2008; Henderson 1976; Her 2001; Paneth 1984).

Teaching note-taking to community interpreters is uniquely addressed by Schweda-Nicholson (1990), who is interested in those natural bilinguals without much specialised training. The goal was to enable community interpreters to benefit from note-taking by teaching them the basic techniques.

Differences in the type of students lead to differences in the teaching objectives and choice of materials (e.g. Henderson 1976; Her 2001), but the fundamental training rationales are quite similar. Teachers are well aware that note-taking could take away attentional resources from other activities in the interpreting process and cause problems. They usually advise the students against taking notes in the beginning stage of training. Instead, much attention is devoted to a series of other exercises such as speech analysis, summarising exercises, and memory training. Actual note-taking is only introduced after a period of those trainings, and

students begin practice with easy materials so that they are not overwhelmed by the multi-tasking. Gillies (2005) even suggested practising with written materials (transcripts of speeches) rather than spoken ones in the initial stage.

However, despite the awareness of the difficulties and the precautions taken, both the teachers and students still find it challenging to teach/learn note-taking. Studies that describe the difficulties met by students in classes represent the beginning of a shift from prescriptive to descriptive stream in note-taking research.

Gile (1991) divided 14 students evenly into two groups for CI exercises containing proper nouns. One group was instructed to take notes and the other was refrained from doing so except for names and figures. He found that the note-taking group heard the names worse, and explained that it was because note-taking diverted attention from listening and led to a degradation of listening quality.

A longitudinal study by Alexieva showed that the instruction in note-taking systems and principles “brings about a trough in students’ performance, which remains consistently low for a comparatively long period” (1994: 200). The same phenomenon was found by Her (2001: 62). Alexieva (1994: 200) inferred that at this stage, note-taking learning was characterised by “a weaker memory operational capacity,” because most of the students’ energy was spent on deciding what symbols to use, recalling the symbols, and deciding what to put in notes and what to put in memory.

To see how difficulties were perceived by students in note-taking, Xu and Chai (2008) used stimulated recall and post-task interviews to investigate the issue. The major difficulties reported include: insufficient memory, inadequate recall when using notes as cues, improper form of notes, and overdependence on notes without proper processing of source information.

Chmiel (2010) was interested in the effectiveness of note-taking teaching, and put students to a test after a note-taking course. The overall results were “less encouraging than expected” (248), with the techniques taught in the course being applied in only 57% of the cases. She also found that layout and visualisation techniques were more readily transferable than symbols to students’ individual note-taking systems.

Also interested in evaluating learning outcomes, Orlando (2010) made a technological contribution to the didactic advancement. He pointed out the deficit in the product-oriented evaluation method, and suggested the application of digital pens, a technology that allows easy recording of the process of note-taking. The questionnaire results he collected from students showed encouraging potentials of the technology in classes.

The studies reviewed in this section represent an early descriptive stance taken by researchers. Instead of simply prescribing how notes should be taken, the authors set out to observe and describe how notes are actually taken by students. This shift from prescriptive to descriptive research is strengthened by scholars who approach the topic of note-taking from linguistic and cognitive perspectives.

4. Cognitive and linguistic aspects of note-taking: a theoretical drive

Investigations on the cognitive and linguistic aspects of note-taking are mainly motivated by an attempt to theorise note-taking and CI. The two pioneering authors and their investigations (Kirchhoff 1979; Seleskovitch 1975) were certainly ahead of their time.

Seleskovitch (1975) set out to develop a theory to systematise the ESIT's training methods. She conducted an experiment in which she collected and analysed the notes taken by 12 professional interpreters. She found that the notes included few of the words in the source speech and many outside the speech, that the renditions expressed much more than the notes, and that some items appeared in different forms. Based on the findings, she inferred the formal independence of the source speech, notes, and target speech, pointing to an intermediate stage of "deverbalisation." Her cognitive model of interpreting assigned linguistic and cognitive processing to different kinds of memory, and pointed out that notes functioned as minimal memory triggers, rather than "an exhaustive code" (Setton 2002: 119).

Standing in contrast to Seleskovitch's deverbalised view towards note-taking, Kirchhoff (1979) was concerned about the linguistic surface structures of the notes. She saw notes as a kind of physical storage as opposed to the cognitive storage of memory. Note-taking was believed to be a primarily linguistic process, based on the microstructures of the source text. Her view of notes as a type of language was supported and followed by Albl-Mikasa, who looked into the language and discourse dimensions of consecutive notes (Kohn and Albl-Mikasa 2002), the reduction and expansion processes in note-taking and note-reading (Albl-Mikasa 2006), and how interpreters worked closely along micro-propositional lines when processing the source, notation and target texts (Albl-Mikasa 2008). The authors believe that, although the fundamental principle of note-taking is noting the idea and not the word, note-taking usually operates on a micro-level that stays close to the source text.

Despite the difference in stress (in sense or in linguistic surface structure), the scholars have consistently pointed out a concurrent storage of information in memory and in notes, as well as a competition for cognitive

resources between note-taking and other activities in CI, an issue at the core of Gile's (1995/2009) Effort Models of interpreting.

Giles's Effort Model of consecutive interpreting conceptualises the interpreting process in two phases: a comprehension (or listening and note-taking) phase, and a speech production (or reformulation) phase. The model assumes four processing capacity demands, or "Efforts" (1995/2009: 160) in the first phase, each relating to a specific activity in the process: Listening and analysis, Note-taking, Short-term memory operations, and Coordination. In the second phase there are three Efforts: Remembering, Note-reading, and Production. The Efforts are competing and processing capacity is limited. In order for interpreting to proceed smoothly, the total processing capacity demands should not exceed the available capacity, and each Effort should not exceed the available capacity for each activity. Gile believes note-taking is critical for CI in terms of cognitive capacity, and the key lies in "how to reduce processing capacity and time requirements of note-taking while maintaining the efficiency of notes as memory reinforcers" (1995/2009: 178).

Gile's model, though originally developed to inform teaching, is found useful by many scholars in academic research. It is mentioned in various explorations on the prominent features of note-taking.

5. Exploring the key note-taking features: descriptive studies on notes and quality

Unlike the early empirical investigations which have a general interest in what real notes look like, and set out to discover some overall trends, studies reviewed in this section have more specific targets. They usually focus on certain note-taking features, and conduct experiments to closely investigate the features of interest. They have contributed the largest quantity of empirical data on the topic to date. The most important variables explored are: the choice of form, the choice of language, and the relationship between note-taking and interpreting quality.

5.1. The choice of form and language in note-taking

The choice of form in note-taking refers to the choice between language and symbol, and the choice between abbreviation and full word; while the choice of language refers to the choice between source and target language, and the choice between A and B language⁵.

A rare and detailed video documentation of note-taking was compiled by Andres (2002). She recorded the note-taking processes of 14 professionals and 14 students interpreting from French to German. The notes of the two groups were compared, and Andres found that despite a source language preference in both groups, the professional group wrote more target language units than the student group. She also used the

time-coded videos to study time lags in note-taking. According to her findings, the time lag between listening and note-taking was three to six seconds for professionals, while reaching as much as ten seconds for students. Her findings provided abundant evidence of processing overload in students during the first phase of interpreting.

The most comprehensive series of studies to date on note-taking features were conducted by Dam and her colleagues (Dam 2004a, 2004b, 2007; Dam *et al.* 2005). Dam's study (2004a) with notes taken by four students shows that the choice of language in note-taking is largely governed by the A/B language status, rather than the source/target one, with all participants preferring A language regardless of the direction of interpreting. Her study with five professionals (2004b) revealed that the participants' preferences for the form of note-taking were: symbols (41% of all note units), followed by full words (35%) and abbreviations (25%) (Dam 2004b: 254). Again, all participants showed a clear preference for target language, their A language. She also found that more notes were taken in the source language when the source text was more difficult.

Dam's studies were based on CI between Danish and Spanish, and that raises questions about the generalisability of her results to other language pairs. Following Dam, other scholars have experimented with different language pairs. Some representative examples are: Lung (2003), Dai and Xu (2007), Liu (2010), and Wang *et al.* (2010) with Chinese and English; Lim (2006) with Korean and English; Szabó (2006) with Hungarian and English; and González (2012) with Spanish and English.

Lung (2003) studied the notes of 21 students interpreting from English to Chinese, and found that the students made little use of either abbreviations or symbols, and that the notes consisted mainly of source and B language. Dai and Xu (2007) looked at the notes taken by 12 students interpreting from Chinese to English, and found that the notes were source and A language dominated. The 120 students in Liu's (2010) experiment on the whole showed a preference for language over symbol, and full word over abbreviation. Wang *et al.* (2010) experimented with 12 students, and the notes were predominantly source language with few symbols used, and abbreviations were used more than full words. Szabó (2006) looked at the notes taken by eight professionals interpreting between Hungarian and English, and discovered that her subjects showed a clear preference for English, their B language, regardless of the direction of interpreting. The results suggested that the language combination itself played an important role in the choice of language. Abuín González (2012) compared the notes taken by three groups of subjects with varying levels of experience (beginner students, advanced students and interpreters) when interpreting from English to Spanish. The results showed a shift in language preference from source to target with an increasing level of expertise.

The details of the studies are summarised in Table 1. It is easy to see how they vary greatly in terms of the design (e.g. type of participants, language pair, interpreting direction). Moreover, many studies did not specify the details of the tasks used in the experiment, making it even more difficult to compare the results.

Studies	Participants		Tasks					Results	
	Number	Prof/ Stud	Language pair	Direction	Length	Duration	Speed	Form	Language
Andres 2002	28	14 Prof 14 Stud	German A French B	B to A	NS	6'27"	167.9 syllabus per minute	Language>Symbol	Source>Target B>A
Lung 2003	21	Stud	Chinese A English B	B to A		NS		Language>Symbol Full word>Abbreviation	Source>Target B>A
Dam 2004a	4	3 Stud 1 Stud	Danish A Spanish B Spanish A Danish B	Both directions		NS		Language>Symbol	A>B
Dam 2004b	5	Prof	Danish A Spanish B	B to A	1081 words	7'30"	NS	Language>Symbol Full word>Abbreviation	Target>Source A>B
Lim 2006	40	Stud	Korean A English B	A to B		NS		NS	Source>Target A>B
Szabó 2006	8	Prof	Hungarian A English B	Both directions		NS		NS	B>A
Dai & Xu 2007	12	Stud	Chinese A English B	A to B	529 characters		NS	Abbreviation>Full word	Source>Target A>B
Liu 2010	120	Stud	Chinese A English B	A to B	518 characters	NS	200 characters per minute	Language>Symbol Full word>Abbreviation	
Wang et al. 2010	12	Stud	Chinese A English B	Both directions	135 words 163 characters		NS	Language>Symbol Abbreviation>Full word	Source>Target
Abuín González 2012	30	10 Prof 20 Stud	Spanish A English B	B to A	711 words	6'22"	125 words per minute	NS	Prof: A>B Target>Source Stud: B>A Source>Target

Notes: Prof=Professional, Stud=Student, A=A language, B=B language, NS=Not Specified, Source=Source language, Target=Target language

Table 1. A summary of studies on key note-taking features.

Nevertheless the author believes it could be beneficial to try and compare the findings on each note-taking feature (i.e. the choice of form and the choice of language), and see if some general trends could be detected. Results on the choice of form, as presented in Table 2, point to a dominance of language over symbol, and a slight tendency to use more full words than abbreviations. Results on the choice of language, however, yielded much more inconsistent findings.

Studies	Lung 2003	Dam 2004a	Dam 2004b	Dai & Xu 2007	Liu 2010	Wang et al. 2010
Results	Language>Symbol	Language>Symbol	Language>Symbol	Language>Symbol	Language>Symbol	Language>Symbol
	Full word>Abbreviation		Full word>Abbreviation	Abbreviation>Full word	Full word>Abbreviation	Abbreviation>Full word

Table 2. Findings on the choice of form in note-taking.

To reveal the trends in the choice of language in a clearer way, Table 3 organises the studies according to the type of participants and interpreting direction. While the language choices of professionals still appear greatly varied, the choices made by students are obviously source-language dominated. This could be explained using Gile's Effort Model. The skills of students are not fully developed, so note-taking

consumes a considerable amount of processing capacity, leaving less available for producing target-language equivalents during the note-taking phase. As a result, students opt for source language notes to avoid saturation during the first phase. In the second phase, since it is self-paced, the students have extra time and processing capacity to deal with the translation.

Participants: Student								
	Andres 2002	Lung 2003	Dam 2004a	Lim 2006	Dai & Xu 2007	Liu 2010	Wang et al.2010	Abuín González 2012
Language pair	German, French	Chinese, English	Danish, Spanish	Korean, English	Chinese, English	Chinese, English	Chinese, English	Spanish, English
A to B			Source> Target A>B	Source> Target A>B	Source> Target A>B	Source> Target A>B	Source> Target A>B	
Direction								
B to A	Source> Target B>A	Source> Target B>A	Target> Source A>B				Source> Target B>A	Source> Target B>A

Participants: Professional				
	Andres 2002	Dam 2004b	Szabó 2006	Abuín González 2012
Language pair	German, French	Danish, Spanish	Hungarian, English	Spanish, English
A to B			Target> Source B>A	
Direction				
B to A	Source> Target B>A	Target> Source A>B	Source> Target B>A	Target> Source A>B

Notes: A=A language, B=B language, Source=Source language, Target=Target language

Table 3. Findings on the choice of language in note-taking.

What is also made clear in Table 3 is that, despite the efforts to describe how notes are actually taken, there is a lack of research done with professional interpreters. However, in order to observe how notes are actually taken in consecutive interpreting, it is necessary to observe the behaviours of practicing interpreters, rather than students who have not fully mastered the technique. The same weakness could be detected in studies on the relationship between note-taking and interpreting quality.

5.2. The relationship between note-taking and interpreting quality

Having observed the greatly varied features of note-taking, some researchers begin to empirically investigate the relationship between these features and the quality of interpreting performance. Most of the studies use student interpreters as participants, because quality is an issue at the core of the teaching of interpreting.

Dam *et al.* (2005) generated hypotheses about features of efficiency and non-efficiency in notes, based on their proposal to judge the accuracy of the target text through analysing the semantic network. The hypotheses were later tested by Dam (2007) with notes taken by five professionals interpreting from Spanish to Danish. She found evidence for two of the hypotheses: “the more notes, the better the target text – and vice versa,”

and “the more abbreviations/the fewer full words, the better the target text – and vice versa,” but the data failed to support the third hypothesis: “the more notes in the source language/the fewer in the target language, the better the target text” (Dam 2007: 194).

Experimenting on the language pair of Chinese and English, Her (2001) analysed the notes taken by undergraduate students interpreting between Chinese and English. She found that there was a general positive relationship between the quality of notes and the quality of interpreting, although good notes did not necessarily yield good performance. Dai and Xu (2007) were unable to find evidence for Dam’s (2007) hypotheses. Their data showed that an increase in the quantity of notes did not necessarily mean better target text. Similar conclusions were reached by Liu (2010), who found no significant difference in the quantity or language of the notes taken by high- and low-score groups. But he was able to observe that the high-score group used more symbols than the low-score group. Wang *et al.* (2010) also found no significant relationship between interpreting quality and the quantity, form or language of note-taking. The fact that Dam’s findings were not replicated in the above studies might partly be explained by the participants used: Dam used professional interpreters, while the others used students.

Also using students as participants, a study by Cardoen (2013) found relationships that were opposite to Dam’s findings. Three participants interpreted from Spanish to Dutch, and Cardoen found that fluent chunks contained fewer notes, more full words and fewer abbreviations when compared with disfluent chunks.

Studies reviewed in this section are summarised in Table 4. They have used different types of participants and tasks, and they do not always specify the details of their design. Based on what has been collected so far, it would seem that the interactions between note-taking and interpreting quality are more complex than researchers have imagined.

Studies	Participants			Tasks					Results
	Number	Prof/ Stud	Experience/training	Language pair	Direction	Length	Duration	Speed	
Her 2001	16	Stud	8 weeks note-taking training	Chinese A English B	A into B	NS	5'	NS	Better notes, better quality
	11	Stud	4 weeks note-taking training		B into A		3'15"	80 cpm	
Dam <i>et al.</i> 2005	1	Prof	NS	Danish A Spanish B	B into A		NS		More notes, more abbreviations/fewer full words, more source language/fewer target language, better quality
Dam 2007	5	Prof	NS	Danish A Spanish B	B into A	1092 words		NS	More notes, more abbreviations/fewer full words, better quality
Dai & Xu 2007	6	Stud	3 months postgraduate training	Chinese A English B	A into B	529 characters	NS		No significant relationship
	6	Stud	No professional training						
Liu 2010	62	Stud	1 semester undergraduate courses	Chinese A English B	A into B	518 characters	NS	200 cpm	More symbols, better quality
Wang <i>et al.</i> 2010	12	Stud	1 semester undergraduate courses	Chinese A English B	A into B	135 words	NS		No significant relationship
					B into A	163 characters			
Cardoen 2013	3	Stud	1 year undergraduate courses plus 1 year postgraduate training	Dutch A Spanish B	B into A		NS	96 wpm	Fewer words, more full words/fewer abbreviations, better quality

Notes: Prof=Professional, Stud=Student, A=A language, B=B language, NS=Not Specified, cpm=characters per minute, wpm=words per minute.

Table 4 A summary of studies on the relationship between note-taking and interpreting quality.

The empirical studies reviewed in this section vary greatly in terms of their design (as made evident in Table 1 and 4), and are therefore difficult to compare. Although some general trends can be found, such as a source language dominance in the notes taken by students, and more target language in professional interpreters' notes compared with students, there are also vast inconsistencies. These inconsistencies are a great place to start with for future studies.

6. Limitations of previous studies

There is no doubt that fruitful results have been created during the past decades, but it is necessary to point out the limitations in order to inform future research endeavours.

In the prescriptive stream, a common limitation is a lack of systematic and rigorous empirical research to support the proposals. It is therefore gratifying to see a shift from prescriptive to descriptive research, with an increase in the quantity of empirical studies. Also, a variety of research methods have been used, such as simulation, case study, questionnaire survey, stimulated recall, and interview. However, a few limitations still exist. First, most of the descriptive studies are product-oriented, but product analysis only allows speculations about the underlying processes based on data collected afterwards. Besides due to the highly individualised nature of interpreting notes, it is often difficult to observe any uniformity in their surface structures. Second, most of the studies use students instead of professional interpreters as participants, and data is collected under simulated rather than real life contexts. But in order to get a better picture of how notes are taken, it is necessary to observe the behaviours of professionals in field interpreting. Third, no study has pushed the shift forward to an explanatory stream. The researchers usually stop at describing what notes look like, but no one has designed true experiments to explain the causal relationships behind the phenomena observed.

In order to initiate a shift from descriptive to explanatory research, an overarching framework is needed to cohesively pull together all the efforts in note-taking studies. It is the belief of the author that a cognitive load perspective towards note-taking has great potentials in that regard.

7. Cognitive load: a promising avenue for investigation

Interpreting is deemed a cognitively demanding task by different scholars, many of whom have pioneered the investigation of cognitive load in simultaneous interpreting (e.g. Gile 2008; Hyönä *et al.* 1995; Seeber 2011, 2013; Seeber and Kerzel 2012; Tommola and Hyönä 1990).

Compared to that, research on cognitive load in CI and note-taking seems to be scarce. However, as Gile (1995/2009: 178) points out, “note-taking is an area in which the concept of processing capacity can be useful.”

Cognitive load is defined by Seeber (2013: 19) as “the amount of capacity the performance of a cognitive task occupies in an inherently capacity-limited system.” Starting from a cognitive load perspective, all discussions on note-taking boil down to one fundamental question: how to reduce the cognitive load of note-taking while maintaining the efficiency of notes.

If cognitive load can be measured while interpreters take notes and interpret, some fundamental principles underlying the note-taking choices might be unveiled. For example, it is possible that no matter what choices an interpreter makes (e.g. writing notes in the source or target language), the result is always a lower level of cognitive load for that particular interpreter in that particular task. That is to say, the differences observed in the note-taking behaviours in previous studies might not be controversies, but rather converging evidence in proving that interpreters make choices according to their own situations to reduce cognitive load.

However, measuring cognitive load is no easy task. The construct is generally believed to be multi-dimensional and therefore difficult to measure. Scholars working on the Cognitive Load Theory (e.g. Paas *et al.* 2003; Paas and Van Merriënboer 1994) specified two dimensions of cognitive load: a causal dimension reflecting the factors that affect cognitive load, and an assessment dimension corresponding to factors that are affected by cognitive load. The assessment factors, including mental load, mental effort, and performance, are indicative of cognitive load, and are therefore used for its measurement. A detailed discussion into the assessment factors and the related measures goes beyond the scope of this article. Interested readers are referred to such works as Paas *et al.* (2003) and Plass *et al.* (2010) for a starting point.

The measurement of cognitive load is not new to the field of interpreting. Many of the studies are overviewed in Seeber (2013). The pioneering studies have laid the groundwork by reviewing important theories, building useful models, discussing methods of measurement, and providing empirical findings. Although the studies have only investigated simultaneous interpreting, much of what has been discussed is also meaningful for CI and note-taking. Hopefully, note-taking research would be able to build on the wealth of those studies and studies in such fields as Cognitive Load Theory, to overcome the limitations faced by previous studies, and to move forward to an explanatory stream of note-taking research.

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Biography

Sijia Chen is a PhD candidate in the Department of Linguistics at Macquarie University. She is interested in the research across the disciplines of cognitive sciences and interpreting. Her PhD project is titled "Exploring the process of note-taking in consecutive interpreting: An eye-pen-voice approach towards cognitive load". This mixed methods study uses eye tracking, digital pen recording, and retrospection to investigate the process of consecutive interpreting and note-taking, and to assess the associated cognitive load.



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Notes

¹ It has to be admitted that the author does not have the linguistic prerequisites to read all that she has collected, and that what she has collected represents a comprehensive yet not complete list of the relevant publications.

² This is not necessary for the CIRIN Bulletin because the database collects only interpreting studies.

³ Many authors include note-taking as a part of their discussions on interpreter training or education. These publications are not included in this review.

⁴ A number of relevant studies are in the form of unpublished master's and doctoral theses, but the scope of this article does not allow the inclusion of those studies. Interested readers can find the studies reported in various issues of the CIRIN Bulletin at www.cirinandgile.com.

⁵ In this article, A language refers to the native language while B language refers to the foreign language.