



# Two levels of information packaging and cognitive operations during simultaneous interpreting: An analysis via additional demonstratives

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## ARTICLE INFO

**Keywords:**

Simultaneous interpreting  
Discourse processing  
Cognitive process  
Demonstrative  
Conceptual operation

## ABSTRACT

This study aims to describe cognitive processes during simultaneous interpreting from English to Japanese. Simultaneous interpreting is unique because of its online discourse processing: the interpreter starts producing target language expressions progressively before s/he hears the end of a sentence in the source language. This study analyses the authentic interpreting performance from the Interpreting Database, which comprises recorded simultaneous interpreting performed for a press conference. Particular attention is paid to additional demonstratives that do not have corresponding expressions in the source text as clues to focus on the interpreter's information packaging at two levels: the construction of a conceptual unit (CU) and a translation unit (TU). The two processes are inseparable and progress in parallel. This study analyses cognitive operations beyond transcoding from four perspectives: incorporation of a CU into a TU, construal of relations between TUs, reformulation in the TU, and the construction of an empty CU.

## 1. Introduction

This paper presents a corpus-based descriptive investigation into the cognitive processes of simultaneous interpreting between English and Japanese. Cognitive research in translation and interpreting has predominantly focused on the quantitative aspects such as cognitive load and working memory (for a comprehensive overview, see [Seeber, 2013](#); [Hodzik & Williams, 2022](#)). Focusing on interpreting, Gile's ([1995/2009, 2008](#)) effort model and its tightrope hypothesis are widely recognised as an approach that seeks to understand the cognitive aspects of interpreting through the resource management of mental effort, dissecting mental operations into listening/analysis, memory, production, and coordination. [Mizuno \(2005, 2015\)](#) leverages advancements in working memory research to illuminate certain cognitive constraints associated with simultaneous interpreting and describes how interpreters employ strategies to reduce cognitive load within the limits of working memory. This research distinguishes itself by pursuing an alternative aspect of the cognitive process, aligning with [Setton \(1999\)](#) and Funayama (e.g., [2002, 2004, 2007, 2008](#)). Instead of assessing the mental exertion or capacity entailed by the task, this study delves into the types of operations carried out within the interpreter's mind.

A meticulous examination of both source texts (STs) and target texts (TTs) unveils apparent linguistic divergences at the textual level (such as additions, omissions, and lexical/syntactic shifts), even when the

interpreter effectively conveys the speaker's intended message. Some of these variations point to facets of cognitive processing extending beyond lexical and syntactic code conversion or transcoding.

Instances of cognitive processing transcending code conversion are commonly observed in written translation and oral interpreting. However, in translation between written languages, there is much room for deliberate correspondence between the ST and TT or deviation from the ST. Translators can produce translations that achieve lexical/syntactic correspondence to a significant degree. On the other hand, they may deliberately create gaps between the ST and TT through conscious manipulation using tactics and strategies. In contrast, the target expression of oral interpreting reflects the reality of online discourse processing more directly than written translation because the control of intentional correspondence or deviation is limited and cannot be undone once uttered. Simultaneous interpreting, being a form of online discourse processing, is suitable for observing these cognitive processing features. This is salient in English-Japanese simultaneous interpreting, where the marked syntactic disparities between the languages yield numerous instances that illustrate cognitive processes transcending mere code conversion between two linguistic systems.

This study focuses on information packaging, dissected through authentic data extracted from an authentic simultaneous interpreting session. The research capitalises on reprocessed data from the Interpreting Database, the Japan National Press Club (JNPC) Corpus

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(Matsushita et al., 2020). By examining additional demonstratives present in the TT but devoid of corresponding linguistic elements in the ST, this paper sheds light on interpreters' twofold levels of information packaging: the construction of conceptual units (CUs) and translation units (TUs). This investigation scrutinises these phenomena from four points: incorporation of a CU into a TU, construal of the relation between TUs, reformulation in a TU, and the construction of an empty CU.

## 2. Theoretical background

### 2.1. Additional demonstratives in English-Japanese interpreting

This section aims to clarify the rationale behind the emphasis on additional demonstratives in this study. Discrepancies in information between the ST and the TT are evident, where interpreters may either omit or add extra information. The challenges arise in comprehending omissions, as deciphering the interpreter's thought process proves intricate—whether influenced by judgments on relevance, time constraints, comprehension difficulties, or lapses in attention. Conversely, instances of additional information in the TT signify the interpreter's acquisition of extra information, shedding light on their cognitive engagement. Recognizing the TT as a reflection of the interpreter's mental state during discourse processing, the inclusion of additional information becomes a valuable tool for exploring the intricacies of the mental processes involved in interpreting. This study's specific focus on demonstratives is justified through an exploration of four facets: searchability, frequency of occurrence, linguistic nature, and referential function.

**Searchability:** Focusing on linguistically accessible forms is crucial in corpus-based research. Demonstratives, limited in type and easily searchable, facilitate systematic observation. This approach ensures the potential validation of our observations in this paper through corpora in other language pairs. This allows for the examination of instances without resorting to arbitrary selection.

**Frequency:** When examining records of simultaneous interpreting from English into Japanese, frequent occurrences arise where additional demonstratives are introduced in the TT without any corresponding elements in the ST. These instances suggest that the interpreter's output in the TT entails the creation of a distinct textual structure rather than transcoding from the ST.

**Linguistic nature:** Diessel (2006) points out that demonstratives have distinct features that do not fall into the categorisation of content and functional words, which depends on semantic content: content words have rich meaning corresponding to entities, events, and property, and function words have only schematic meaning. Although demonstratives have only schematic meanings, their referent is retained in the interpreter's mind when he/she uses them: The meaning of demonstratives is conceptual content contextualised in their use. Hence, the meaning of a demonstrative is always a representation of a representation. That is, when a demonstrative is produced without any corresponding information in the ST, the interpreter constructs a meta-representation of the referent in his/her mind independently from the linguistic information of the ST, indicating that the interpreter has understood the referent as packaged information. Unlike meaningless fillers or habitual verbal tics, demonstratives refer to the content of discourse, or extra-textual information, making them apt for observing the actual flow of information in the cognitive environment of simultaneous interpreters. By scrutinising the referent of each case of demonstratives, the interpreter's information packaging can be described.

**Referential Function:** This study looks at the information packaging as a universal function of demonstratives in any language. While the English language has two types of demonstratives (proximal this and distal that), Japanese has three (the proximal *ko-*, medial *so-*, and distal *a-*). This grammatical asymmetry between two languages attracts researchers' interest. Japanese demonstratives have been investigated in terms of referential functions of the three types (e.g. Kuno, 1973;

Niimura and Hayashi, 1994). However, this study does not delve into the difference of those types or (non-) correspondence between two languages. This study pays close attention to the use of demonstratives in the TT. The use of additional demonstratives in the TT indicates that interpreters have gathered information about the referent from outside the corresponding part of the ST. When additional demonstratives refer to extratextual information, analysis enables an understanding of what information interpreters have assimilated from outside the text. This paper focuses on the information encapsulated by demonstratives and how that information is utilised. This study contemplates how interpreters synthesise information, aiming to elucidate their information management.

Prior investigations into English-to-Japanese simultaneous interpreting, drawing on authentic interpreting records, encompass works by Funayama (2000), Minamitsu (2002), and Ishizuka (2016). In Funayama's (2000) work, patterns showcasing shifts in perspective between the speaker and the interpreter are categorised. One such pattern involves the interpreter establishing unique referential relationships. This analysis gives rise to the notion of "conceptual re-packaging" within the interpreter's cognitive realm, which subsequently evolved into the model of conceptual complexes (e.g., Funayama, 2007, 2008). Building on Funayama (2000), Minamitsu (2002) directs attention to the linguistic form "*sou-iu*" (like that) in the TT, mainly focusing on cases where this corresponding information is absent in the ST. This study adopts Relevance Theory (Sperber and Wilson, 1986/1995) as its analytical framework and mentions meta-representation. However, Minamitsu (2002) primary emphasis lies in exploring the textual effects of additional expressions in the TT, rather than delving into interpreters' cognitive processing. Ishizuka (2016) revisits the phenomena addressed in Funayama (2000) and Minamitsu (2002), seeking to integrate aspects into a cognitive process model of simultaneous interpreting. This involves examining the role of mental representations as information units, discerning implicit logic in discourse through mental representation, and identifying functions that contribute to conserving working memory. Ishizuka (2016) underscores the importance of these factors in comprehending the ST and producing the TT.

### 2.2. Intermediate representations during interpreting

Numerous models for interpreting and translation have been proposed, each serving diverse methods and purposes. Lörtscher (1989) critically reviewed five classical models of the translation process, contending that they were oversimplified and idealised, failing to capture the dynamic mental reality of translation. Focusing on interpreting processes, Setton (2013) categorised interpreting models into internal and external perspectives, where external models explore social communication and general theories of action, while internal or cognitive process models focus on the mental activity of interpreters.

The purpose of this study is to describe the mental process of human interpreting, particularly within the realm of internal or cognitive models. While the contentious issue of intermediate representations arises, rooted in the concept of "deverbalization" (Seleskovitch, 1978/1998; Seleskovitch and Lederer, 1995), Carl and Schaeffer (2017: 52) note the absence of general-purpose machine translation systems based on language-independent interlingual representations. However, advances in these systems do not necessarily validate the human interpreting process. Setton (1999: 68) asserts the necessity of some form of intermediate representation in the mind for processing spoken language.

By incorporating an intermediate representation into interpreting and translation models, as a workbench to process both linguistic and non-linguistic information, it becomes possible to address issues traditionally covered by pragmatics and psychology, explaining phenomena observed in interpreting and translation output. To describe the reality of discourse processing by human simultaneous interpreters, Setton (1999) integrates theories from pragmatics and cognitive psychology, such as illocutionary force (Austin, 1955/1962; Searle, 1969), a set of

participants, their roles and underlying institutions (Fillmore, 1982/2006), selection and incorporation of contextual information at the different levels of inference stage (Sperber and Wilson, 1986/1995), and the nature and roles of non-propositional representations (Johnson-Laird, 1983).

Differences in the nature of concepts impact the explanatory power of various phenomena in translation and interpreting. In describing the production process from thought to language, Chafe (2018) breaks down the thought stage before obtaining semantic structure into four stages: selection, categorisation, orientation and combination. The initial stage of selection is the process through which elements of thought are formed to associate with symbols. The nature of entities associated with certain properties and relations (epr) differs in views. Setton (1999) leans towards a “language of thought” or LOT (Fodor, 1975) as a pre-existing or virtual store of concepts. Setton (1999) likely views epr as elements of thought, considering them irreducible and as the smallest elements. In this view, epr is included in thoughts as ready-made elements. On the other hand, Funayama (e.g., 2007, 2008) emphasises the flexible and fluid nature of non-linguistic representations. He believes that epr is generated from more primitive thoughts, assuming thoughts before epr and considering the acquisition of epr itself as part of conceptual construction.

This paper adopts Funayama’s (e.g., 2007, 2008) term “concept” to refer to the mental representations constructed in the intermediate domain. The keys of Funayama’s (e.g., 2007, 2008) conceptual representation model are summarised into three points:

**Resources:** Drawing on the inference models of communication (Grice, 1975; Sperber and Wilson, 1986/1995), discourse processing requires not only linguistic information but also various types of contextual information.

**Status:** Mental representations constructed for discourse processing are not an accumulation of coded signs that comprise fixed form and meaning but have a fluid, conceptual nature. Mental models (Johnson-Laird, 1983, 2008) and situation models (van Dijk and Kintsch, 1983; Kintsch, 1998) are considered examples of such non-linguistic concepts.

**Development:** Mental representations evolve incrementally during the online operations of discourse processing, integrating information from the preceding segment and extra-textual sources into the ongoing one.

Chafe (1994) discusses the activation and semi-activation of information in discourse processing, positing a continuous conscious field behind the processing of discrete signs. Chafe (2018) distinguishes between thought and language, categorising the transition from thought to language into stages such as thought, semantic structure, syntactic structure, and sound. Assuming a mental field behind ST and TT, the concept of intermediate representations aligns theoretically and descriptively with these models.

This paper, however, does not delve into the content of concepts. In describing discourse processing enabling progressive translation during simultaneous interpreting, the focus lies on the packaging of information—specifically, on containers and their relationships, rather than the content of concepts. This research aims to identify the manner in which interpreters package information, highlighting the specific junctures and approaches they employ. This will be achieved through qualitative observations of interpreting data. Furthermore, the study seeks to elucidate how interpreters establish connections and relationships among each packaged piece of information.

### 2.3. Information packaging at two levels

In the task of simultaneous interpreting, which involves the transferring a message from speech to speech, determining the alignment between the ST and TT is not a straightforward process. A qualitative analysis of interpretation corpora led Setton (1999: 271) to conclude that “no processing unit which might be tracked from input to output

can, therefore, be viably defined for SI in terms of syntactic or semantic chunks.” However, for the interpreter to successfully produce a segment in the TT, they must secure the source of information from the discourse and its context. This paper proposes an approach to address this challenge through an elaborate description. The aim is to describe the information processing in progressive translation by introducing the idea of two-stage information packaging, namely Conceptual Units (CUs) and Translation Units (TUs). This approach provides a framework for understanding the intricacies of information handling during simultaneous interpreting.

Linguistic symbols themselves are information packages as a set of meanings and forms, and syntactic units such as words, phrases, and clauses are fundamental units in the coding and decoding of thought. If interpreting and translating is transcoding, interpreters do not need to package information independently but replace existing packages constructed in the source language with those in the target language. However, actual interpreting records frequently reveal discrepancies in the correspondence of linguistic units between the source and target languages. Although the human cognitive mechanism is imperceptible and access to it is limited, the interpreters’ production of the TT can be analysed as a direct reflection of their cognitive environment. This study views linguistic disparities between the ST and TT as traces of the interpreter’s information repackaging.

Before examining the types of information packaging in simultaneous interpreting, an aspect of conceptual construction, as part of online discourse processing, should be modelled from two points. First, this study distinguishes conceptual representations from linguistic expressions. Discourse processing entails non-linguistic representations, including but not limited to situation models (van Dijk and Kintsch, 1983; Kintsch, 1998) or mental models (Johnson-Laird, 1983, 2008). These theories suggest the existence of a mental level where non-linguistic representations are constructed and separable from the linguistic level. This study refers to what is constructed in the area during discourse processing as concepts. Resources to construct concepts are not restricted to linguistic expressions. Introducing the inference model of communication, Relevance Theory (Sperber and Wilson, 1986/1995; Carston, 2002) theorised explicatures and implicatures, whose sources encompass not only the linguistic information in an utterance but also any contextual information available for the hearer’s cognitive environment. This claim indicates that speech understanding is not merely the accumulation of linguistic meanings but that the construction of mental representations that incorporate non-verbal and background information plays an essential role. Fig. 1 illustrates the resources of concepts and their separable status from linguistic expressions.

Within the rectangle in Fig. 1 illustrates the interpreter’s cognitive environment. There are two types of information coming from the outside: linguistic information from the ST and non-linguistic information. Needless to say, linguistic information from the ST is one of the essential sources of information. Non-linguistic information includes the speaker’s non-verbal expressions, the role of participants, time, place, weather and any sort of information available to the interpreter. On the

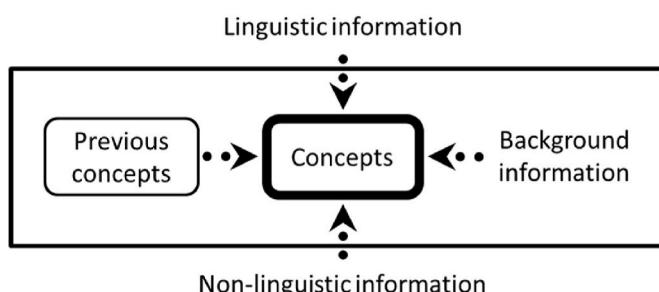


Fig. 1. Types of resources to construct concepts.

other side, there are two types of information inside the cognitive environment: background information and previous concepts. The former includes encyclopaedic knowledge, expert knowledge about the topic, and any forms of structured cognitive resources. Also, the latter is significant for discussing the online nature of discourse processing required for simultaneous interpreting. As a hearer in a general conversation setting uses the concepts constructed from the previous part of a discourse to process the ongoing part, the interpreter exploits the history of concepts accumulated until the previous part.

For example, when an interpreter understands a concept of an event, all the components about an event, its participants, time, location, purpose and so on, must be conceptualised too. This paper refers to the components as a conceptual unit (CU). If some are implicit in the ongoing part of the ST, the interpreter must gain the necessary information somewhere outside the source segment and package it in a CU. In this process, the previous information may be retained to process the following part of the ST and some of it is sometimes verbalised considerably later than it is captured initially from the ST. Also, some elements in the previous concepts can be a source of additional demonstratives in the TT. As long as the interpreter's production is the result of his/her understanding, any expressions in the TT can be analysed as a result of his/her understanding, and any expressions in the TT can be analysed as products, the sources of which are concepts. If they resemble a substitution of corresponding words, we have no clues to analyse cognitive operations beyond transcoding. However, additional demonstratives are analysed as clear evidence of the interpreter's information packaging to construct concepts without corresponding information from the ongoing part of the discourse. Because the construction of concepts is a crucial part of discourse processing in general, it is not an exclusive process for translation or interpreting.

To examine the cognitive process of interpreting, or translation in general, we have to consider another level of information packaging that is specific to translation and interpreting. Translation is not a word-for-word task. Both the interpreter and the translator segment a series of words from the ST to compile the information necessary for their rendition task. The packet of information from this segmentation process is referred to in this study as the translation unit (TU). What is the nature of a TU? The definition of TU may differ based on the methodology and objectives of the study. Malmkær (2006: 92) classified the definitions of the TU into two types depending on whether they pertain to the translation product or process. While the former posits the TU as a pair of segments from the ST and target text (TT), the latter assumes it to be a mental representation ("a stretch of the source text that the translator keeps in mind"). Vinay and Darbneret (1995: 21) posit a "unit of translation" as the "smallest segment of utterance" and as the equivalent of a "thought unit" or a "lexicological unit." A TU here is a simple collection of linguistic information. In the field of cognitive studies on translation, numerous research endeavours focus on measuring translators' cognitive processes by analysing physical information such as key logging and eye-tracking, which assess the reception of the ST and the production of the TT through translators' physical or physiological data. In an attempt to assess the translator's typing pauses observed with key-logging and/or eye-tracking as extra-linguistic clues to analyse the translation process, Alves and Vale (2009) observed a TU based on segments of the TT. For them, TUs are ST segments that attract the translator's focus of attention, the nature of which is basically linguistic rather than conceptual. Carl and Kay (2011) introduced the idea of an alignment unit (AU), representing a pair of aligned ST and TT segments, and their TU captures units of cognitive activity signifying the translator's focus of attention. Their study involved a unique approach, distinguishing between textual units and physical activities. They measured reading time (input) through eye-tracking and writing time (output) via key-logging to estimate the translator's cognitive load. However, there is no clear distinction between linguistic and conceptual levels.

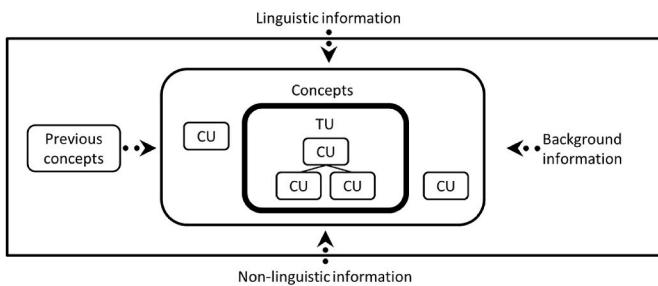
In contrast, Lederer (1978/2002) refers to TU as a "unit of meaning"

constructed by the fusion of linguistic input in short-term memory with cognitive resources. Funayama (e.g., 2002, 2004, 2007, 2008) also demonstrates the advantages of analysing the interpreting process by separating conceptual and linguistic levels. Drawing on the model illustrated in Fig. 1, this study distinguishes linguistic and conceptual levels, assuming a TU as a form of a conceptual representation constructed to produce a segment of the TT. However, it is essential to note that this research approach does not contradict the methodology employed in the study measuring physical data. Despite differences in the definition of TU and variations in the translation mode, the model presented in this study can be compatible with physical-data approach. This study differentiates between CUs and TUs to explore the mental operations between input and output, assuming intermediate representations during interpretation. This mental process bridges between the perception of the ST and the production of the TT. Both the physical response approach and the mental representation approach address imperceptible cognitive aspects of interpreting and translation. However, they delve into different facets of the cognitive process, making them complementary to each other.

Researchers exploring simultaneous interpreting often discuss the processing units called "chunks." Meanwhile, research on working memory, originating from Miller (1956), focuses on the number of "chunks" of information that can be held in short-term memory, a critical concern in studies by researchers such as Baddeley (1982/2004) and Cowan (2005). While Mizuno (2005, 2015) describes the cognitive aspects of simultaneous interpreting from the perspective of working memory constraints, defining "chunks" as "groups of interrelated words," the distinction between linguistic expressions and intermediate representations is not acknowledged. In Mizuno's (2005, 2015) framework, there is no differentiation between linguistic representation and conceptual representation, and the debate on whether the "chunks" in working memory research are the same as those in the interpretation process is absent. Consequently, the handling of information brought in from sources other than fragments of the ST remains unclear. This paper addresses this gap by distinguishing between linguistic segments and concepts. This differentiation not only explicitly describes the source of information brought in by interpreters from outside the ST but also, through the distinction between CUs and TUs, structures the mental operations in the intermediate representations. This approach allows for a detailed description of the intricacies of information processing in short-term memory during online discourse processing.

While a CU is constructed for comprehension, a TU is tailored for production. To produce a target segment, an interpreter must construct a TU based on CUs. A CU is a product of the natural process of utterance comprehension. Since comprehension is an essential part of translation and interpreting, this constitutes a fundamental aspect of the translation and interpreting process. A TU is a product constructed to plan target expressions during interpreting. This is a specific process for translation and interpreting. If it is not necessary to translate, people do not have to construct TUs. This constitutes a technical aspect of translation and interpreting. If the production of the TT is not required, a hearer's concepts might endlessly accumulate and pointlessly expand or mostly fade away unless it is highly intriguing. Also, the TT is not produced all at once, but generated step by step based on a segment from the ST. This process demands the construction of a TU through the segmentation of concepts and information packaging. Exploration of TUs demonstrates how interpreting is implemented. To illustrate the relation between a TU and CUs, Fig. 1 develops into Fig. 2.

An additional demonstrative in the TT does not derive from the corresponding segment in the ST. It suggests that the interpreter grasped the referent from somewhere outside the ongoing linguistic segment, whether it was included in previous concepts or non-linguistic information, and the relevant information was packaged in a CU in the interpreter's mind. Although a single CU may serve as a TU from time to time, one CU does not constitute a TU in general. Separation of a TU from the source segment will help describe two levels of information



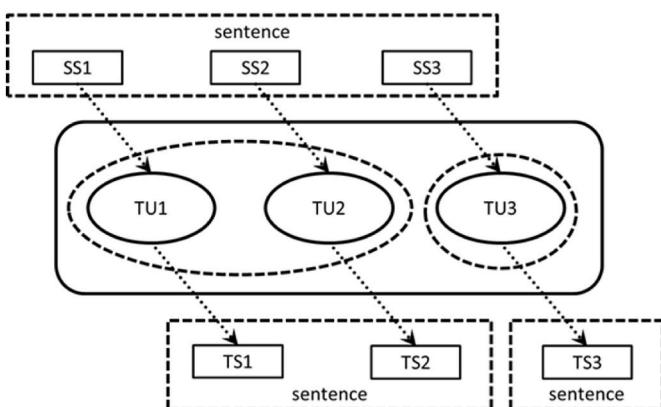
**Fig. 2.** Relation between a TU and CUs.

packaging as part of the cognitive process of simultaneous interpreting. In other words, this study describes the reality of information packaging during simultaneous interpreting from two aspects, comprehension and planning, through close analyses of actual interpreting records. This will help us understand aspects of mental operations beyond transcoding, such as segmentation, retention, and reformulation (See [Ishizuka, 2018](#)).

#### 2.4. Online processing during simultaneous interpreting

Simultaneous interpreting is characterised by its progressive operation. In written translation, target expressions derived from TUs do not necessarily have to maintain order in the ST. Securing the TU immediately while reading the ST is also unnecessary. It is possible to go backwards after reading some lines ahead or to edit the order of the target segments once they have been drafted. By contrast, simultaneous interpreting is basically an online forward process. The interpreter stores information while listening to the ST and verbalises it as soon as it is coherent enough to start producing the TT. This process is the same for any language pair.

The fundamental idea of the model employed in this paper has been previously proposed in the field of interpreting research (e.g., [Setton, 1999](#); [Funayama, 2007](#)) and is not particularly novel. From a pragmatic and cognitive psychology perspective, the explanation of utilising contextual information and inference of the speaker's message remains similar to [Setton's work \(1999\)](#). This paper describes the cognitive processing in simultaneous interpreting through incremental conceptual development, and in assuming the flexible and fluid nature of concepts, this endeavour is directly influenced by the model of conceptual complexes proposed by Funayama (e.g., [2007, 2008](#)). The correlation model proposed by [Funayama \(2020\)](#) can be considered as incorporating the external model, as described by [Setton \(2013\)](#), into an internal model while still emphasizing the separation of intermediate representation and language representation.



**Fig. 3.** Cognitive process model of simultaneous interpreting ([Ishizuka, 2023b](#)).

**Fig. 3,** from [Ishizuka \(2023b\)](#), illustrates the cognitive process of simultaneous interpreting based on the aforementioned information packaging. The top part of the diagram shows the input information from the ST, segmented as source segments (SSs), which develops into TUs enriched with other resources as part of the interpreter's concepts represented in the central area. TUs are consecutively produced as target segments (TSs), that are illustrated at the bottom. The model distinguishes between the SS and the TU: the former is a linguistic representation gained from splitting the input from the ST, and the latter is a conceptual representation constructed from the SS as a resource. The vertical direction of the diagram shows the flow of processing from top to bottom. The horizontal direction shows the flow of time from left to right. The dotted shapes represent how the interpreter processed the sentence unit; in this diagram, one sentence in the ST and two sentences in the TT are split in the interpreter's mind. Information packaging of a TU is judged by the syntactic unit of the TT, not by that of the ST, because a syntactic unit also requires information packaging and it is the TT that reflects the interpreter's cognitive operations.

In **Fig. 3**, the construction of TU1, TU2, and TU3 is a conceptual process that supports this interpreting performance. In some cases, information in a TU may be retained to construct a CU for the following TU. In other cases, the content of a TU may be retained as a whole to be incorporated as a CU for the following TU. To simply highlight the relation between linguistic and conceptual representations, operations at the CU level is not depicted in **Fig. 3**. A detailed description of the relationship between CUs and TUs will be provided in Section 4 of this paper.

In reality, progressive operation does not mean word order in a SS should be preserved in the TS nor any elements are not retained once the TU is processed. [Ishizuka \(2023a\)](#) summarises the features of the progressive operations as four points below.

- The ST is segmented into SSs that are larger units than words.
- The order between SSs is preserved in the TT.
- The word order within an SS is not preserved in the TS.
- Some information is retained and expressed in the TT later.

An interpreter may produce some elements that are included in the previous TU. That means the interpreter retained the concepts while he/she processes the ongoing part of the ST. Or an interpreter may reverse the order of listed items. That means all the items are included in a single package of information that is accommodated in the interpreter's working memory. This study also analyses these features through the authentic interpreting performance.

**Fig. 3** depicts the production of TS1, where the interpreter has already engaged in the comprehension of SS2 and initiated the construction of TU2 while completing TU1. In other words, understanding the relationship between TU1 and TU2 is crucial for the packaging of TU1. This study will explore how the relationship is captured during the packaging of TUs.

#### 2.5. Determination of TUs and CUs

This paper proposes estimating TUs from the syntactic units (phrases and clauses) of the TT, not of the ST, and treating additional demonstratives as one manifestation of CUs. This is because the TT reflects the interpreter's conceptual operations, and the ST is one of the sources for the interpreter to construct concepts. These proposals serve as clues to describe the dual-layered information packaging during simultaneous interpreting.

TUs reflect the interpreter's cognitive operations during interpreting. Intonation units ([Chafe, 1994](#)) and pauses during a phrase or clause may also serve as objective criteria for determining TUs. However, this study adopts the syntactic units (phrases and clauses) of the TT as criteria for TU determination. When a TU is a clause, it might be divided into phrases aligned between the ST and TT. However, for simplicity, it is left

unseparated into phrases unless it interferes with the analysis. Phrases and clauses constitute at least one CU, if not a minimum. Interpreters may search for appropriate terms within a phrase. For instance, when an interpreter searches for a predicative verb as a phrase constituent, s/he may prepare a package in advance and attempt to fulfil its content. While TUs in this paper may not be the minimum production unit in interpreting, they are effective for observing the multi-layered packaging of information addressed here.

CUs are products of interpreters' utterance comprehension and constitute the elements of TUs, but their content is diverse. For example, constituents of propositions (entities, events, properties) can each become CUs, as the propositions themselves, and a set of propositions may form a single CU. Thus, CUs can have nested structures. The resources of CUs are diverse, and each expression of the ST may be linked to the interpreter's cognitive resources to become a CU. The fusion of non-linguistic information and existing knowledge may also become a CU. It is challenging to trace the entirety of CU reality. This paper focuses on information processing that cannot be explained by the correspondence between ST and TT, highlighting additional demonstratives as one manifestation of CU construction beyond transcoding. Since not all aspects of interpreters' constructed CUs are necessarily verbalised, the actuality of CUs cannot always be traced from the linguistic forms in discourse. However, additional demonstratives prove that interpreters held the referent as an information package. While this is just one aspect of interpreter-built CUs, it provides a clue for objectively analysing the cognitive process beyond transcoding.

This paper intends to identify observable phenomena from authentic interpreting records and, using them as clues, elucidate one aspect of cognitive processing in simultaneous interpreting. Observed TUs and CUs represent only a facet of interpreters' information packaging. Still, it is possible to glean insights into the dual-layered information packaging from the sketches presented in this paper.

### 3. Data profile

#### 3.1. JNPC corpus

This study analyses the data<sup>1</sup> from the JNPC Corpus (Matsushita et al., 2020). Simultaneous interpreting at the JNPC press conference is provided by top-level interpreters dispatched from one of the leading interpreting agencies in Japan. This study examines a stable interpreting performance by experienced interpreters. The data is from authentic interpreting recordings, which frequently contain halting, rephrased, and somewhat unnatural expressions in STs and TTs. However, this is the reality of spoken language communication, and the data in this study does not exclude these elements and proceeds with analysis where possible.

In the press conference from which this study sourced the data, the speaker delivered his speech by using a prepared manuscript, and the interpreters probably had access to the manuscript in advance. To observe the reality of pure online speech comprehension by simultaneous interpreters, this study only covers interpreting into the interpreters' first language without prior preparation based on a manuscript. Therefore, only the English-to-Japanese interpreting part of the Q&A session of the press conference (40 min 12 s) will be analysed. The data in this corpus is viewed in ELAN, a speech annotation tool, with which the temporal correspondence between source and target languages is expressed. In this study, data extracted from ELAN was reprocessed to increase visibility for analysis.

**Table 1**  
Frequency of additional demonstratives

	<i>kore</i>	<i>kono</i>	<i>kou</i>	<i>koko</i>	<i>sore</i>	<i>sono</i>	<i>sou</i>	<i>soko</i>	<i>are</i>	<i>ano</i>	<i>aa</i>	<i>asoko</i>	Total
Frequency	14	5	1	1	22	11	0	2	0	0	0	0	56

### 3.2. Frequency of demonstratives

Table 1 shows the distribution of demonstratives in the data used for this study. Twelve types of Japanese demonstratives (*kore*, *kono*, *kou*, *koko*, *sore*, *sono*, *sou*, *soko*, *are*, *ano*, *aa*, *asoko*) were searched in the data transcription, and 170 cases were found. Because not all of them were used in the TT, cases in the ST were excluded. Thus, the number decreased to 148. Notably, the number includes non-demonstratives, such as parts of idiomatic phrases of other expressions. After excluding non-demonstrative cases, the number of demonstrative cases in the TT decreased to 129. Of those cases, to focus on purely additional cases, this study excluded four types of demonstratives that have a corresponding expression in any form in the ST<sup>2</sup>. After excluding all the aforementioned cases, in the data of the 40 min 12 s Q&A session in the press conference, 56 cases of purely additional demonstratives in the TT were identified. Thus, two interpreters on the day produced additional demonstratives more than once per minute during their performance. Table 1 summarises the frequency of additional demonstratives across twelve types.

The results show that the additional demonstratives appear with considerable frequency. Katori (2016), examining written translation, found that the use of demonstratives in the *ko-* and *so-*series increases in the translated documents from English to Japanese compared with texts originally written in Japanese. This result is consistent with those of this study on simultaneous interpreting<sup>3</sup>. In this study, the data demonstrate that additional demonstratives in simultaneous interpreting are ubiquitous.

### 4. Aspects of information packaging

This section describes the interpreters' cognitive processing by focusing on two types of information packaging. On the basis of the aforementioned perspective (see Section 2), this study distinguishes between lexical items (as types), linguistic expressions from data (as tokens), and their concepts constructed in the context. Italics mark linguistic items, and double quotation marks are used for expressions quoted from data. Single quotation marks specify the semantic content of each expression. The concepts triggered by an expression in this study includes both the linguistically coded meaning and its conceptually enriched contents. For example, when a person hears "dog" in the discourse, he/she constructs the concept of the animal categorised as *dog* as 'dog,' which includes the feature of the dog such as its size, weight, and colour in the context.

#### 4.1. Incorporation of a CU into a TU

For the analysis in this study, ELAN-format data from the JNPC Corpus was exported as an interlinear document, which was then processed into a parallel format so that the timing of both Japanese and English productions can be visualised. The first line is for English as the source language, the second is for Japanese as the target language, and the third is the simplified linguistic gloss for Japanese. The horizontal direction of the data represents the flow of time, and the expressions of the two languages at the same position in the vertical direction show the approximate correspondence of the utterance time.

Commencing begin with the most typical case, “これ *kore*” (this) (J184) in (1) is a case of an additional demonstrative. For the analysis of online discourse processing, paying attention to the timing of production in the ST and TT and their correspondence is important. The ST contains the expression “three of them” (E183), the specific content of which is

listed in “the US, UK and France” (E183). While listening to those names, the interpreter rendered “3つ mitsu” (three) (J184) into “three of them” (E183) but did not yet entirely hear the specific content of “three” (J184).

“Them” (E183) corresponds to five permanent members of the UNSC in the horizontal referential relations in the ST. “Three” (E183) and “これ kore” (this) (J184) are in the vertical relations between the ST and TT, corresponding to ‘UK, France and US.’ Moreover, the order in which the three countries are listed differs between the ST and the TT, with US mentioned first in the ST and last in the TT. This is evidence that US was retained in the interpreter’s working memory while translating UK and France. Therefore, the three country names are contained in a single package of a CU. Table 2 shows the correspondence and their back translation. The number in the left column specifies the name of the SS, TS, and TU, although the TU is not listed in the table.

In the SS in Table 2, “The US, UK and France” (E184) is separated from the previous clause, consisting of an independent noun phrase. By contrast, “イギリス、フランス、アメリカは igirisu, furansu, amerika wa” (J184) (the UK, France, the US are) is re-stated as “これ kore wa” (this is) (J184) and incorporated into a clause that states the member of UNSC in the TS. Because the names of three nations are marked as the topic with a particle “は wa” (J184), the repetition of “これ kore wa” (this is) (J184) seems somewhat redundant. However, the performance assessment is not within this paper’s scope. More importantly, this performance means the interpreter accommodated the CU into a TU from the previous part of the ST. Fig. 4 illustrates how the interpreter incorporates the CU into the TU.

After TS1, the interpreter produced TS2 into “5つのうちの3つ itsutsu no uchi no mitsu” (three of five) (J184). “5つ itsutsu” (five) (J184) is the retrained element from the TU1. Fig. 4 shows this as a straight line from TU1 to TU1. A black point in TU2 illustrates a CU incorporated into the TU. Once TU3 is verbalised into TS3, this is retained as another CU and incorporated into TU4. “加盟国 kameikoku” (members of the ally) (J184) demonstrates that the interpreter introduced information from SS2, which means a concept constructed from SS2 retained and developed to construct TU4. This performance suggests the inseparable operation between two levels of information packaging—the construction of a CU and a TU—and these processes are inseparable. Any linguistic processing is a linear operation because language is a sequence of symbols arranged along the flow of time. However, the cognitive process behind it is not linear operations with complex conceptual operations running parallel. This case also reveals the complexity of the cognitive processes in simultaneous interpreting: segmentation, retention, and reformulation. Moreover, these are not all the interpreter’s operations in this part of the performance. Although SS1 starts from “four,” this part in Table 2 includes only three country names. The fourth country name, Russia, is handled in the following part of the ST and the TT. To clarify the

**Table 2**  
SS/TS correspondence and back translation for (1).

	SS	TS	BT
1	Four out of the five permanent members of the United Nations Security Council	この5つの安全保障の国のうちの3つ	Among these five UNSC members
2	Because three of them are allies	イギリス、フランス、アメリカは	Three of five
3	The US, UK and France	これはいわば加盟国であります	The UK, France and the US
4			These <sup>4</sup> are members of the ally

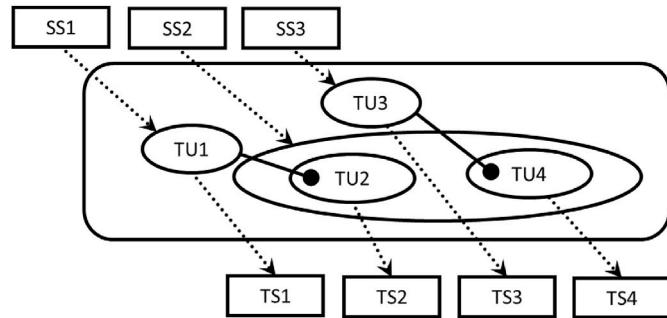


Fig. 4. Incorporation of a CU into a TU

argument, this paper does not examine this topic.

#### 4.2. Construal of the relation between TUs

The construction of a TU is not a one-off task. For online discourse processing, the interpreter must consecutively construct TUs. In parallel, the interpreter must render the content of each TU into TSs in the same order in the ST, producing a coherent TT. In performing this task, the difference in syntactic structures between the two languages is a barrier. For example, a relative clause in English is placed after a noun to modify it, whereas the Japanese language does not have relative clauses. For producing the TSs in the same order, the relation between TUs needs to be reformulated beyond the syntactic information in the ST. Therefore, information packaging is inseparable from the construal of the relation between TUs. This section examines how the interpreter construed inter-TU relations.

(1)

E 183	four	out of the five permanent members	of the United Nations Security Council because three of them
J 183	動いております ので	この 5つの安全保障	の
G 183	.....	this 5-CLF security	-GEN
E 184	are allies.	The US UK and France.	And with the fourth
J 184	国のうちの 5つのうちの 3つ	イギリス フランス アメリカは	Russia we have a special
G 184	country among-GEN 5-CLF among-GEN 3-CLF	UK	France America-TOP <b>kore</b> -TOP so-to-say member
E 185	partnership	rooted in	the NATO Russia council.
J 185	あります。そしてまたロシアとは特別の同盟 関	同盟関係を持っておりましたからしたがって	
G 184	COP-PRE	.....	

#### 4.2.1. Theme/rhema

“これ *kore*” (this) (J346) in (2) is a typical case of an additional demonstrative used for progressive translation during SI. This additional demonstrative is produced to handle “that” (underlined in E346), a relative pronoun in the ST.

Table 3 shows the correspondence between SSs and TSs with their back translation. In the TT, “これ *kore*” (this) (J346) refers to the content of TS3. It serves as the topic of TS4; thus, the interpreter packaged TU3 and established the theme/rhema relation between TU3 and TU4, reflecting the conceptual reformulation beyond transcoding.

Because TS2 serves as a topic with a particle, “は *wa*” (J345), establishing implicit theme/rhema relation is also recognisable between TS2 and TS3, although information packaging cannot be explicitly observed without an additional demonstrative. This is also a case of reformulation. Mizuno (2023) explains this mechanism in detail from the perspective of the information structure. However, this study examines cases that require more conceptual operations that cannot be explained from the textual structure.

#### 4.2.2. Means/purpose

Simultaneous interpreting (or any form of translation) requires the construction of a TU. To render TUs consecutively and to produce a coherent text as a target, the interpreter (or any translators) need to associate TUs with each other. The information packaging involved in the construction of TUs overlaps with the issue of how to view the relationship between TUs. As observed in this paper, even after a TU is produced in the ST, interpreters retain the information as a CU to understand the following part of the discourse. However, how the interpreter construes the relation between two TUs depends on the context. This section draws attention to two cases that starkly contrast that issue.

“それ *sore*” (that) (J425) in (3) is a case of additional demonstratives, which was produced to enable progressive translation.

In the correspondence between SSs and TSs, the segmentation of this progressive translation is not implemented at a relative clause as a marker but at a *to*-infinitive phrase, “to protect” (E424) (See Table 4).

“それによって *sore ni yotte*” (by that) (J425) indicates that the interpreter construed the relation between TU1 and TU2 as “means and purpose.” By contrast, in (4), when the interpreter processed a *to*-infinitive phrase, “to deploy” (E443), progressively, he produced “これは *kore wa*” (this is) (J445) and “合意によって *gou ni yotte*” (with) (J445). Because this part is translated as “this is with the agreement” in the back translation, this performance signifies that the interpreter construed the relation of TU2 and TU3 as “purpose and measure.”

In terms of the construal of the relation between the preceding TU (a

**Table 3**  
SS/TS correspondence and back translation for (2).

	SS	TS	BT
1	In our strategic concept	この戦略的概念 の中で	In this strategic concept
2	We clearly state	我々がはっきり と述べているの は	What we clearly state is
3	That we subscribe to the goal that was stated in the non-proliferation treaty	我々はNPT核不 拡散条約の目標 を守りたいとい うこと	That we want to adhere to the goals of the NPT (Non- Proliferation Treaty)
4	That was ratified in 1970	これは1970年に 批准されました	This was ratified in 1970

**Table 4**  
SS/TS correspondence and back translation for (3).

	SS	TS	BT
1	We implemented fully the United Nations mandate	我々国連の安全保 障理事会の決議を 十分実行いたしま して	We have fully implemented the resolutions of the UN Security Council
2	To protect the Libyan population against attack	それによってリビ アの国民を守りま したし	And by that, we protected the Libyan people
3	We prevented a massacre on the Libyan population	そしてリビアの國 民に対する虐殺を 事前に防ぐことが できました	And prevented the massacres against the Libyan people before they happened

package) and the following TU as “means and purpose,” “それ *sore*” (J425) and “これ *kore*” (J445) share the same operation, but their construal between two TUs is reversed in terms of which TU, preceding or following, is the purpose and which is the means.

(5)    *sore* (J425): [TU1: means], [TU2: purpose]  
*kore* (J445): [TU2: purpose], [TU3: means]

Because a *to*-infinitive phrase can be grammatically used to express the purpose of the precedent verb, it is more naturally understood why the interpreter produced “それによって *sore ni yotte*” (by that) (J425). However, using a *to*-infinitive phrase for means is not uncommon. In this

(2)

E 345	In our strategic concept	we	clearly state that we subscribe	to the goal	that was stated in
J 345	2010 年の 11 月に採択されました。この戦略的概念の中で我々	がはっきりと述べているのは	我々は		
G 345	.....	this strategic concept-GEN inside we SUB clearly say-PROG-NOM-TOP we			
E 346	the nonproliferation treaty <u>that</u> was		ratified in	1970.	In this non-
J 346		NPT 核不拡散条約	の目標を守りたいとい	くことでこれは 1970 年	
G 346	NPT NPT	GEN goal OBJ keep-want-NOM and <b>kore</b> -TOP 1970-year			
E 347	proliferation treaty treaty almost all countries in the world subscribe to the principal				
J 347	に	批准されました。	この NPT	の条約において世界のほとんど	
G 347	LOC	ratify-PSS-PST	.....		

(3)

E 424	We implemented fully the United Nations mandate to protect	the Libyan population
J 424	ありました。 我々	国連の安全保障理事会 の決議を十分 実行
G 424	..... We	UNSC -GEN resolution-OBJ enough implement
E 425	against attack.	We prevented a massacre on the Libyan population
J 425	いたしまして それによってリビアの国民 を守りましたし そして リビア の 国民に	
G 425	-PRE sore -by Libya-GEN people-OBJ protect-PST and Libya -GEN people	
E 426	so no doubt that the Libya operation was a	
J 426	対する虐殺を事前に防ぐことができました。 従いまして疑いなく リビアの作戦は	
G 426	-OBJ massacre-OBJ in-advance prevent-possible-PST .....	

(4)

E 442	is a neighbor of of Syria.	And this is the reason
J 442	守る。例えば トルコですね。例えば トルコは隣国シリアの隣国でありますから	
G 442	.....	
E 443	why we have decided to deploy a Patriot missiles in Turkey to	
J 443	これは少し事情が違います。したがって我々は パトリオットミサイルを トルコに に	
G 443	Therefore we-TOP Patriot-missile -OBJ use -NOM-OBJ decide-PRF Turkey-LOC	
E 444	ensure effective defence and protection of the Turkish people and Turkey's	
J 444	配備してある パトリオットミサイル を使う ということを 決定しております。	
G 444	deploy-PRF Patriot-missile -OBJ use -NOM-OBJ decide-PRF	
E 445	Territory. That's a core task of a NATO but we have no intention to interfere militarily	
J 445	これはトルコの領土内 トルコの国民の合意によってということであります。 しかし	
G 445	kore-TOP Turkey-GEN territory-inside Turkey-GEN people-GEN agreement by NOM-COP-PRE .....	

**Table 5**  
SS/TS correspondence and back translation for (4).

SS	TS	BT
1 And this is the reason why	したがって	Therefore
2 We have decided to deploy Patriot missiles in Turkey	我々はパトリオットミサイルをトルコに配備してあるパトリオットミサイルを使うということを決定しております	We have decided to use Patriot missiles, which are deployed in Turkey
3 To ensure effective defence and protection of the Turkish people and Turkey's Territory.	これはトルコの領土内トルコの国民の合意によってということであります	This is with the agreement of the Turkish people on Turkey's territory.

respect, the construal analysed by “これ *kore*” (J445) in which the preceding TU is viewed as the purpose of the following TU is a more extreme deviation from transcoding (see Table 5).

Explaining this part of the interpreter’s performance requires a

**Table 6**  
List of means and purposes in (4).

SS	Patriot missile	Defence and protection	People's agreement
	Means	Purpose	Means
TS	Purpose		

detailed analysis of the lexical shifts between the SS and the TS. Although “effective defence and protection” (E444) is found in the SS, the correspondence expression is not viewed in the TS. By contrast, although the interpreter produced “合意 *goui*” (agreement) (J445) in the TS, the source expression is not found in the SS. Before this part, “Patriot missile” (E443) was rendered as “パトリオット・ミサイル *patorotto misairu*” (patriot missile) (J443, J444). This situation is summarised in Table 6.

Integrating the information in the SS and the TS, a bigger picture can be depicted as a whole. Because of its nature, any concept is beyond description, but (6) seems more explicitly verbalised.

**Table 7**  
SS/TS correspondence and back translation for (7)<sup>5</sup>.

	SS	TS	BT
1	And also there are some reports by the Syrian government	シリアの政府によりますと	According to the Syrian government
2	Saying that the NATO is helping the rebels against the Syrian government	NATOが言わばシリアのですね、反乱軍を支持しているといふことで	NATO is said to be, in Syria, supporting rebels
3	And there are a lot of controversy about the NATO coming in or coming out	そしてNATOが今後どういう介入していくかということに関しましていろんな議論がありますけど	And when it comes to how NATO will intervene in the future, there are a lot of discussions
4	To do something in Syria What is exactly your policy about this?	このシリアに対してはどのような政策ですか。	What is your policy towards this Syria?

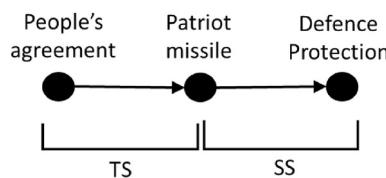


Fig. 5. The causal chain of three participants.

(6) Patriot missiles are deployed because of a public agreement that the missiles will provide effective defence and protection for the people.

Because the speaker and the interpreter share the concept verbally expressed in (6), the superficial difference between the SS and the TS is explained without contradiction. Fig. 5 illustrates the causal chain of three items verbally expressed in (6). The three black points are participants of this event, which are conceptualised in the speaker's and interpreter's minds. The two arrows represent causal relations between the participants: the participant at the start is the cause, and the participant at the end is the result.

In this part of the discourse, the series of events is intended to be conveyed. And this is the same in the SS and the TS. Nonetheless, there are differences in which elements of the concept are metonymically selected for verbalisation. The source speaker chose 'Patriot missile' and 'Defence protection,' but the interpreter chose 'People's agreement' and 'Patriot missile' to communicate the same event as a whole. Obviously, the construction of this whole concept significantly depends on the interpreter's background knowledge.

#### 4.3. Reformulation in a TU

##### 4.3.1. Packaging beyond syntactic units

Even if a demonstrative in the TT is classified into a corresponding expression, some still reflect the interpreter's conceptual operation.

Because information packaging is beyond word-for-word transcribing, information to be packaged is not necessarily collected from one part of the ST. “この *kono*” (J422) in (7) is not a purely additional demonstrative because “this” (underlined in E422) appears to correspond to it. However, this is not just a case of transcribing but a trace of the interpreter's conceptual operations.

The correspondence between the SS, the TS, and its back translation is in (8).

- (8) SS: What is exactly your policy about this? (E422)  
TS: このシリアに対してはどのような政策ですか? (J422)  
BT: What is your policy towards **this** Syria?

In the SS in (8), the source speaker did not express “Syria.” Nonetheless, the interpreter produced “このシリア *kono shiria*” (this Syria) (J422). Because ‘Syria’ is the topic of this part, the source speaker repeatedly produced “Syria” three times in this part of the ST (underlined in E419, E420 and E421), and the interpreter produced the corresponding expression three times (underlined in J419, J420 and J422). “シリア *shiria*” (Syria) (J422) in the question is the third. The interpreter retained ‘Syria’ as a topic, and its contents were enriched in accordance with the development of the discourse. However, why did the interpreter produce “シリア *shiria*” (Syria) (J422) at this juncture? In order to observe the interpreter's mental work more clearly, the correspondence between SSs and TSs is re-examined in Table 7. A TU mediates between

(7)

- E 419 mission in Libya? And also there are some reports by the Syrian government saying that the  
 J 419 NATO の リビアへのミッションをどう評価されますか?  
 G 419 ..... Syria-GEN
- E 420 NATO is helping the rebels against the Syrian government and there are a lot of  
 J 420 政府によりますと NATO が言わば シリア のですね 反乱軍 を  
 G 420 government-according-to NATO-SUB so-to-say Syria -GEN COP-CONF rebels -OBJ
- E 421 controversy about the NATO coming in or coming out to do something in Syria. What is exactly your  
 J 421 支持しているということで そして NATO が 今後どういう介入していくか  
 G 420 support-PROG-NOM and and NATO-SUB hereafter how intervene-come-Q
- E 422 policy about this? Thank you.  
 J 422 ということに関しましていろんな議論がありますけど この シリアに対してはどのような政策ですか?  
 G 422 -NOM about various argument-SUB exist but **kono** Syria-OBJ toward-TOP what policy COP-Q

each SS and TS but is excluded from the table.

More significantly, as observed from the speaker's side, SS4 includes two segments. Judging from the interpreter's side, however, the syntactically separated two pieces of information are integrated into one TU, demonstrating that packaging information goes beyond linguistic conversion based on the ready-made syntactic unit. Moreover, when the interpreter produced “このシリア *kono shiria*” (this Syria) (J422), information from two noun phrases is combined in one package to construct a CU. This process allows the observation of two levels of information packaging in parallel: the construction of the CU and the TU. “この *kono*” (J422) involves all three stages, suggesting to what extent information in a TU can be free from the linguistic structure in the ST. The next case is another example of reformulation in the TU.

#### 4.3.2. Reformulation in rhetorical strategy

Segmentation is not necessarily the process of making a small package from a long sentence. If the interpreting process is constrained by the limit of working memory (Mizuno, 2005, 2015), as long as the capacity allows, a single package can accommodate information from two or more sentences.

In (9), the source speaker talked about how NATO was organised, reviewing its history and diplomatic situation in Europe and North America at that time. In the ST, “this” (E313) refers to that content. Judging by its referent, “これ *kore*” (this) (J313) is not an additional demonstrative but a corresponding translation of “this” (E313). In the statistics data in Table 1, this case is excluded from additional demonstratives because this is a ready-made package, considering its content. However, the structure of the segment in TS completely differs from that in SS.

- (10) SS: Why couldn't all this take place in Asia? Of course, it can. (E313)  
 TS: これはアジアでも十分可能だと思うんです。 (J313)  
 BT: I believe **this** is quite possible in Asia too.

The interpreter packaged information from a pair of clauses to produce this target segment. Moreover, although largely the same message was conveyed in the ST and TT, their rhetorical strategy differs. The two clauses in the ST consist of a pair: a question and an answer. The TS of that part comprises a proposition and an attitude toward it. This is not just a syntactic reformulation but a reformulation of the rhetorical strategy in delivering the segment in the discourse. The segmentation, retention, and reformulation in the process are summarised as follows:

**Segmentation:** Information was packaged from two sentences into one TU.

**Retention:** The prior part of the discourse about the history of NATO was packaged, and a CU was constructed and used to process the subsequent part of the discourse.

**Reformulation:** The content of the TU was intended to be conveyed in the TT using a different rhetorical strategy than the one used in the ST.

On the basis of the aforementioned three aspects, the production of a

(9)

E 313	Why couldn't all <u>this</u> take place in Asia? Of course <u>it</u> can.	It's a question of a
J 313	そして 軍備管理 を進めることができたのです。これは アジアでも十分	
G 313	.....	<b>kore</b> -TOP Asia-LOC-ADD sufficient
E 314	political will. And I think actually that Asia needs more and stronger multilateral	
J 314	可能 だと思うんです。 政治的な意思さえ 十分 あれば。 そしたらアジアは実際 より	
G 314	possible-COMP think-PRE .....	

target sentence in (10) is described. This process has two levels of packaging. Among these conceptual operational steps, retention is also required for ordinary discourse processing. However, segmentation and reformulation are specifically required for simultaneous interpreting tasks. If translation were unnecessary, this level of processing would be unnecessary. This analysis allows the breaking down of conceptual operations during the interpreting into smaller steps.

The aforementioned cases show significant flexibility in the interpreters' performance. Notably, the conditions or elements that allow flexibility remain unclear. Because constructing a CU is a conceptual operation, integrating a CU into a TU as an extra element may cause the interpreters' flexibility in their performance. However, this study leaves the topic for further research.

#### 4.4. Construction of an empty CU

All the observed additional demonstratives thus far are examples of anaphora. Here, examples are examined where additional demonstratives are used as cataphora to complete progressive translation. “これ *kore*” (J438) in (11) is a case of an additional demonstrative used as a cataphora.

In our analysis, we examine the correspondence between the SS and TS: the interpreter produced the additional demonstratives and the back translation.

- (12) SS: And I can state in very clear terms (E438)  
 TS: したがって私は非常にこれはもうはっきりとした言葉でいうことができるわけですが (J438)  
 BT: Therefore, I can say **this** in very clear terms

In (12), the additional demonstrative is used to express the entity corresponding to the object of the verb “state” (E438), the contents of the speaker's utterance, which is yet to be stated in the ST. Regarding the production timing, the interpreter did not know what the speaker would say. In everyday speech, the speaker may retain the content of the anaphoric demonstrative and may choose to speak in this manner as rhetoric or a strategy of speech construction. In the case of “これ *kore*” (J438), the referent of an anaphoric demonstrative is an empty concept. This blank slot is constructed during the interpreter's online discourse processing. In line with the purpose of this paper, an anaphoric demonstrative is a CU whose content is empty. Nevertheless, even if it is such a concept, it has a specific role and serves as a component of the structured concept. In other words, in constructing a CU, the conceptual framework in which the unit should fit is constructed first, rather than the source information to fill the slot. The empty slot's content may be supplemented top-down, depending on the context or background knowledge about the topic. Because transcoding is basically performed in a bottom-up process, an important feature of conceptual processing can also be observed in anaphoric demonstratives.

(11)

E 438	And	I can state in very	very clear terms	that
J 438	という懸念が強いわけであります。	したがって私としては非常にこれはもうはつきりとした		
G 438	.....	therefore I-TOP	very <b>kore</b> -TOP	clear
E 439	NATO	is	not in any way	helping
J 439	言葉で言うことができるわけで あります	NATO はどんな形においてすら		
G 439	word-by say-NOM-SUB possible-NOM COP-PRE but	NATO-TOP in-any-form	even	
E 440	in	the Syrian conflict.	We we are not	engaged
J 440	いかなるシリア の	闘争	の関係	グループを
G 440	any	Syria-GEN	conflict-GEN	relation group-OBJ
E 441		to protect our allies.	And one of them	Turkey
J 441	支持することはないということであります。	もちろん我々の同	盟	国の 国民は
G 441	Support-NOM-TOP-NEG-NOM COP-PRE		.....	

## 5. Discussion

### 5.1. Roles of information packaging

Our analysis unveiled a dual-layered approach to information packaging during simultaneous interpreting. While constructing a CU forms a fundamental aspect of online discourse processing, essential for general utterance comprehension, the construction of a TU becomes imperative for simultaneous interpreting. The simultaneous parallel processing of these two levels emerged as evident. This phenomenon is inherently intertwined with the three cognitive stages of simultaneous interpreting: segmentation, retention, and reformulation.

Not all CUs construction can be deduced from the observation of the interpreting records. Nonetheless, due to their schematic nature, additional demonstratives in the TT serve as evidence of interpreters' CU construction. By dissecting the referents of demonstratives, it becomes feasible to scrutinize the included information within the packaging. The data from this research highlighted instances where information from the preceding part of the discourse is retained and subsequently employed as a CU in the later part. This process involves encapsulating various types of information and employing slots to accommodate antecedent and subsequent elements. This approach implies that a packaged unit of information is retained to comprehend the interplay between prior and ensuing segments, ultimately contributing to sustaining the overall coherence of the discourse. While antecedent TUs can sometimes function directly as CUs, instances also occur where multiple TUs are amalgamated into one CU or where independent information becomes a CU. It is worth noting that, even though demonstratives can serve a deictic function, an aspect not addressed in this paper, a significant portion of CU content can be constituted by information extrinsic to the text.

The process of generating a TT by interpreters is significantly intertwined with the cognitive steps involved in transforming thoughts into verbal expression within everyday speech. Chafe (2018) explicitly acknowledges the gap between thought and language, organizing the flow from thought to language into four stages: thought, semantic structure, syntactic structure, and sound. Preceding the semantic structure in this model, Chafe (*ibid.*) postulates operations within thought, encompassing selection, categorisation, orientation, and combination. As language cannot fully represent the entirety of cognitive content, selection

involves determining which aspects of a speaker's thoughts are linguistically expressed. This operation aligns with information packaging discussed in this paper. It substantiates the existence of intermediary representations in the interpreting process and is consistent with the works of Funayama (e.g., 2002, 2004, 2007, 2008) and Ishizuka (e.g., 2012, 2013, 2017). Given interpreters' task of collecting and packaging information from both the source and surrounding context, they must first unpack information from the source text before repackaging it. In this sense, interpreters' information packaging mirrors the flip side of information unpackaging. Consequently, the interpreters' comprehension process can be bifurcated into two phases: information unpackaging and repackaging. To explore this notion further, the contents of both CUs and TUs warrant investigation. However, this avenue remains unexplored for subsequent studies.

Addressing the limitations of working memory capacity, Mizuno (2015: 162) perceives the nature of "chunks" in natural languages to encompass only the source and target languages, dismissing the role of intermediary non-linguistic representations (*ibid.*: 154). This paper does not explore the relationship between a TU and Mizuno's (*ibid.*) "chunk." Nevertheless, Mizuno's (*ibid.*) perspective results in a conceptualization of a TU as a natural language bundle. Although elements from both languages might occupy space in interpreters' working memory, it does not necessarily entail exclusion of non-linguistic cognitive representations. Moreover, analysis of this study suggest a TU may serve as a CU in the next TU, which means extra information is required to process an SS. If the previous TU can be encapsulated into a CU as a chunk, the CU must be counted as a chunk that occupies a space in the interpreter's working memory. If this is the case, analysing the number of SSs/TSs is insufficient for considering the constraints imposed by the working memory. How does the inclusion of CUs in a TU impact the short-term memory of the interpreter? Gile (2008) introduces the concept of imported load, where the cognitive load on a simultaneous interpreter processing a sentence is influenced not only by the processing of the sentence itself but also by the processing of the preceding sentence. In the present study, incorporating CUs may act as an imported load, increasing the interpreter's effort. Citing Setton (1999), Gile (2008) addresses this issue, stating that the processing of any part of a speech is generally facilitated considerably by the upstream processing of the previous parts. This upstream processing provides context, making comprehension easier and faster through gradually constructing a mental model. It

is uncertain whether the additional load is incurred on the interpreter if a TU is imported as a CU in the following segment. This issue should be also further examined in future research.

### 5.2. Other clues to explore information packaging

Demonstratives have only schematically coded meanings. Their substantial meanings depend on their context of use. Thus, analysing additional demonstratives helps observe the interpreters' conceptual processing.

Similar but necessary observations can be implemented in linguistic forms other than additional demonstratives. In principle, focusing on pronouns might be possible, but the grammatical category of Japanese pronouns has been developed by the translation of Western languages (Yanabu, 2004). However, many other linguistic forms serve as clues. The conceptual shell (Schmid, 2000) is studied in the English language, but equivalent items are found in Japanese. Shell nouns such as 意見 *iken* (opinion), 発言 *hatsugen* (statement), 見方 *mikata* (perspective), and 話 *hanashi* (story) can be clues to analyse the packaging of the CU.

### 5.3. Further topics analysed through additional demonstratives

The referent of a demonstrative is not necessarily expressed in a word or a phrase in the discourse. Sometimes, it might be expressed in a larger unit than a sentence. In other cases, the whole discourse might refer to more abstract information. This case is the same for additional demonstratives in interpreting and translating. The referent for a demonstrative must be determined by examining both the horizontal (co-reference in the TT) and vertical (correspondence with an element in the ST) relations. Moreover, in the case of deixis, the referent is outside the text. The interpreter's conceptual operations can be traced by observing the referent and the source.

Diessel (2006) argues that demonstratives serve a particular communicative function and play an important role in the internal organisation of discourse and the diachronic evolution of grammar, pointing out many properties that characterise demonstratives as a particular class: a close tie to the gestures, early emergence in language acquisition, universality in languages, and the impossibility of exploring their etymological origin (i.e., they are historically very old, primary, and original). The communicative function of demonstratives can provide insights into analysing interpreters' interpersonal cognition because the use of demonstratives entails joint attention with participants in communication settings. This study, however, does not argue communicative aspects, leaving the topic for further research.

## 6. Conclusion

Qualitative analysis of additional demonstratives in the data from the authentic interpreting corpus demonstrates that simultaneous interpreters are packaging information at a different level from the lexical/syntactic units of the ST. While the construction of CUs is considered to be a part of general discourse processing, the construction of TUs is a unique process required in interpreting. Specifically, the investigation of simultaneous interpreting allows us to depict the online process of information packaging from four perspectives as below.

- **Incorporation of a CU into a TU:** The construction of CUs and TUs is inseparable during online discourse processing. During the development of conceptual representation, a previous TU can be incorporated into the following TU as a CU.
- **Construal of relations between TUs:** The construction of a TU is not an independent process of segmenting the ST and enriching it, separated from other TUs. Interpreters establish relations between TUs, such as theme/rhema and means/purpose, inferring implicit information at the textual level.

● **Reformulation in the TU:** Because interpreters package information beyond the syntactic boundaries of the ST, when the content of a TU is rendered in the TT, linguistic structures are reformulated. This reformulation occurs not only at the syntactic level (e.g. syntactic category, construction), but also in terms of rhetorical strategy.

● **Construction of an empty CU:** The content of a CU does not necessarily proceed its container. As part of a strategic operation required for online discourse processing, interpreters may construct an empty CU, which is a slot to be filled with information from the subsequent part of the ST.

Whether or not a demonstrative appears in the TT is not necessarily controlled by the interpreter's conscious decision making. However, the demonstratives that happen to appear allow us to trace the cognitive processing that underpins the reliable performance of experienced interpreters. Interpreters do not necessarily have to produce demonstratives, and whether or not a demonstrative is used is not critical to the quality of interpreting performance. Nonetheless, a detailed description of the cognitive processes of experienced interpreters provides an important empirical basis for interpreting theory, practice, and education. While this study deals with the only English-Japanese language pair, the findings here seem universal. To test this hypothesis, further analysis in other language pairs is expected.

## Notes

1. The video used in this study is a recorded press conference with simultaneous interpreting, held at the JNPC on April 15, 2013, when a joint political declaration between NATO and Japan was signed. The main speaker of the conference was Anders Fogh Rasmussen, then Secretary General of NATO, who was accompanied by two simultaneous interpreters whose first language was Japanese. The conference was held just before the joint declaration, with the then-Japanese prime minister signing on the same day. The length of the video was 1 h 0 min 15 s.
2. To extract purely additional demonstratives, four types of demonstratives below were excluded. The frequency of each type, including purely additional demonstratives presented as Tables 1, is summarised in Table 8.

CD: demonstratives that have a literally corresponding demonstrative in the ST.

SD: demonstratives that have a corresponding demonstrative in the ST, but the type (e.g., distal/proximal) is shifted.

DD: demonstratives that have a corresponding definite article (the) in the ST.

RD: demonstratives reduced into abstract expression from a concrete one.

**Table 8**  
Distribution of demonstratives.

	Total	In TT	Ds in TT	CD	SD	DD	RD	AD
<i>kore</i>	29	23	22	8	0	0	0	14
<i>kono</i>	30	28	28	11	6	6	0	5
<i>kou</i>	9	8	6	3	2	0	0	1
<i>koko</i>	1	1	1	0	0	0	0	1
<i>sore</i>	57	51	41	16	0	0	3	22
<i>sono</i>	34	30	27	13	0	3	0	11
<i>sou</i>	3	2	2	1	1	0	0	0
<i>soko</i>	4	4	2	0	0	0	0	2
<i>are</i>	2	1	0	0	0	0	0	0
<i>ano</i>	1	0	0	0	0	0	0	0
<i>aa</i>	0	0	0	0	0	0	0	0
<i>asoko</i>	0	0	0	0	0	0	0	0
Total	170	148	129	52	9	9	3	56

3. Katori (2016) attempts to explain the cause of this phenomenon in terms of differences in syntactic properties of the two languages and differences in discourse structure due to cultural background. Furthermore, Katori (2017) discusses how to reduce directives in translation from English to Japanese from the normative perspective of ‘translation in natural Japanese.’ This paper does not discuss the causes of additional directives in simultaneous translation or their impact on interpreting quality.
4. A single form is used in the Japanese TT.
5. Segmentation of SS and TS can be differently described depending on the granularity of the study. In Table 7, TS2 can be divided into two parts because the Japanese particle used in “シリアのですね *shiria no desu ne*” (in Syria) (J420) clearly shows the interpreter segmented the TT at this point. Moreover, SS3 and TS3 appear too large. Nonetheless, because “controversy” (E421) is uttered in the first half of SS3, and the “議論 *giron*” (discussions) (J422) is in the latter part of TS3, this case can be understood as SS being divided into two parts, and the first was retained. In Table 7, however, this is expressed as the interpreter constructing the large package.

#### CRediT authorship contribution statement

**Hiroyuki Ishizuka:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

#### Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author used Grammarly, DeepL and Chat GPT in order to improve language and readability. After using this tool/service, the author reviewed and edited the content as needed and take full responsibility for the content of the publication.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Acknowledgment

This study was supported by the Japan Society for the Promotion of Science under its grants-in-aid for scientific research program for “Visualizing human translator’s translation process for establishing research base shared among language researchers” (Grant-in-Aid for Scientific Research, Category B, 20H04486).

#### List of Japanese glossing labels

ADD	additive
CLF	classifier
CONF	confirmation
COP	copula
GEN	genitive
OBJ	object
NEG	negation
NOM	nominaliser
PRE	present
PRF	perfect
PROG	progressive
PSS	passive
PST	past
Q	question
SUB	subject
TOP	topic

#### Abbreviations

CU	conceptual unit
SS	source segment
ST	source text
TS	target segment
TT	target text
TU	translation unit

#### References

- Alves, F., Vale, D.C., 2009. Probing the unit of translation in time: aspects of the design and development of a web application for storing, annotating, and querying translation process data. *Across Lang. Cult.* 10 (2), 251–273.
- Austin, J., 1955/1962. *How to Do Things with Words*. Clarendon, Oxford.
- Baddeley, A., 1982/2004. *Your Memory: A User’s Guide*: New, illustrated edition. Firefly Books, NY.
- Carl, M., Kay, M., 2011. Gazing and typing activities during translation: a comparative study of translation units of professional and student translators. *Meta* 56 (4), 952–975.
- Carl, M., Schaeffer, M.J., 2017. Models of the translation process. In: Schwieder, J.W., Ferreira, A. (Eds.), *The Handbook of Translation and Cognition*. Wiley-Blackwell, NJ, pp. 50–70.
- Carston, R., 2002. *Thoughts and Utterances: the Pragmatics of Explicit Communication*. Blackwell, Oxford.
- Chafe, W., 1994. Discourse, Consciousness, and Time: the Flow and Displacement of Conscious Experience in Speaking and Writing. University of Chicago Press, Chicago.
- Chafe, W., 2018. Thought-based Linguistics: How Languages Turn Thoughts into Sounds. Cambridge University Press.
- Cowan, N., 2005. *Working Memory Capacity*. Psychology Press, NY.
- Diessel, H., 2006. Demonstratives, joint attention, and the emergence of grammar. *Cognit. Ling.* 17, 463–489.
- Fillmore, C.J., 1982/2006. Frame semantics, originally in linguistic Society of Korea. reprinted in. In: Geeraerts, D. (Ed.), *Linguistics in the Morning Calm*, 111–137, Hanshin Publishing Company, Seoul. Cognitive Linguistics: Basic Readings, Berlins/New York, pp. 373–399. Mouton de Gruyter.
- Fodor, J., 1975. *The Language of Thought*. Harvard University Press, Cambridge, Mass.
- Funayama, C., 2000. Douji tsuyaku no ninchi-teki sokumen wo kousei suru youso nit suite [The components of the cognitive aspects of simultaneous interpreting. In: Miyahara, K. (Ed.), *Douji tsuyaku Ni Okeru Jouhou Furou No Ninchi-Gengogaku-Teki Kensyu* [Cognitive-Linguistic Examination of Information Flow in Simultaneous Interpreting]. (Research report of Grant Aid for Scientific Research, Category C, (2) 10610518), pp. 3–26 (In Japanese).]
- Funayama, C., 2002. Cognitive tags in simultaneous interpretation. *Interpretation studies* 2, 15–27.
- Funayama, C., 2004. Conceptualization processes in simultaneous interpretation. *Interpretation studies* 4, 1–13.
- Funayama, C., 2007. Enhancing mental processes in simultaneous interpreting training. *Interpreter Transl. Train.* (ITT) 1, 97–116.
- Funayama, C., 2008. Concept-based representation of simultaneous interpreting. In: Funayama, C., et al. (Eds.), *Douji-tsuyaku Ni Okeru Gainen-Ka No Kensyo* [Examination of Conceptualisation during Simultaneous Interpreting]. (Research report of Grant Aid for Scientific Research, Category C, (2) 17520272), pp. 1–13.
- Funayama, C., 2020. *Shizengengo wo Meguru Chitsujō: Gengo-Ka to Gainen-Ka* [Order over Natural Language: Verbalisation and Conceptualisation]. Kaitakusya, Tokyo (In Japanese).
- Gile, D., 2008. Local cognitive load in simultaneous interpreting and its implications for empirical research. *Forum* 6 (2), 59–77.
- Gile, D., 1995/2009. *Basic Concepts and Models for Interpreter and Translator Training*, revised edition. John Benjamins, Amsterdam/Philadelphia.
- Grice, H.P., 1975. Logic and conversation. In: Cole, P., Morgan, J.L. (Eds.), *Syntax and Semantics 3: Speech Acts*. Academic Press, New York, pp. 41–58.
- Hodzik, E., Williams, J.N., 2022. Working memory and cognitive processing in conference interpreting. In: Albl-Mikasa, M., Tisellius, E. (Eds.), *The Routledge Handbook of Conference Interpreting*. Routledge, NY, pp. 357–370.
- Ishizuka, H., 2012. Repetitive translation and conceptual processing in SI. *Interpreting and Translation Studies* 12, 83–103.
- Ishizuka, H., 2013. Conceptual Processing in English-Japanese Simultaneous Interpreting. PhD Dissertation. Kobe City University of Foreign Studies.
- Ishizuka, H., 2016. Douji-tsuyau ni okeru jouhou yunitto toshite no shinteki-hyouji [Mental representation as information units during simultaneous interpreting]. *Studies in the humanities and sciences* 108 (2), 31–48 (In Japanese).
- Ishizuka, H., 2017. Douji-tsuyaku ni okeru gainen kokkaku: shinteki-hyouji no jizokusei to ryuudousei ni tsuite [Conceptual skeletons in simultaneous interpreting: Consistency and liquidity of mental representations]. *Interpreting and translation studies* 16, 86–105 (In Japanese).
- Ishizuka, H., 2018. Saitora ni okeru ninch purosesu: Bunkatsu, hoji, kumikae [Cognitive processing in sight-translation: segmentation, retention, reorganisation]. *Invitation to Interpreting and Translation Studies* 19, 69–89 (In Japanese).
- Ishizuka, H., 2023a. Honyaku ni okeru tendousetsu to chidosetsu [Heliocentric and Geocentric theories in Translation] (in Japanese). In: Ishizuka, H. (Ed.), *Einichi tsuyaku Honyaku Ni Okeru Gojunshori: Junokuryaku no Rekishi, Riron, Jissen* [Word Order in English-Japanese Interpreting and Translation: the History, Theory and Practice of Progressive Translation]. Hitsuji Shobo, Tokyo, pp. 1–19 (In Japanese).

- Ishizuka, H., 2023b. Junokuri no tame no gainen sousa: Kankeis no syori to shijihyogen no tsuika [Conceptual operations for progressive translation: processing relative clauses and addition of demonstratives] (in Japanese). In: Ishizuka, H. (Ed.), *Einichi tsuyaku Honyaku Ni Okeru Gojunshori: Junokuriyaku no Rekishi, Riron, Jissen* [Word Order in English-Japanese Interpreting and Translation: the History, Theory and Practice of Progressive Translation]. Hitsuj Shobo, Tokyo, pp. 111–139 (In Japanese).
- Johnson-Laird, P.N., 1983. Mental Models. Harvard University Press, MA.
- Johnson-Liard, P.N., 2008. How We Reason. Oxford University Press, NY.
- Katori, Y., 2016. Kono to Sono no kijutsu-teki honyaku kenkyu: einichi honyaku ni arawareru ko-kei, so-kei sijishi ni kansuru ichikousatsu [A descriptive study of Japanese demonstratives in texts translated from English]. *Invitation to Interpreting and Translation Studies* 15, 65–83 (In Japanese).
- Katori, Y., 2017. Kono sono no kijutsu-teki kenkyu kara no Teigen: einichi honyaku tekusuto no ko-kei, so-kei sijishi wa donna baai ni dono teido heraseru ka [A suggestion based on “a descriptive study of Japanese demonstratives in texts translated from English: where, and to what extent, can the use of demonstratives in translated texts be reduced, if at all?]. *Invitation to Interpreting and Translation Studies* 16, 27–46 (In Japanese).
- Kintsch, W., 1998. Comprehension: A Paradigm for Cognition. Cambridge University Press, Cambridge.
- Kuno, S., 1973. The Structure of the Japanese Language. MIT Press, Cambridge, MA.
- Lederer, M., 1978/2002. Simultaneous interpretation: units of meaning and other features. In: Pöchhacker, F., Shlesinger, M. (Eds.), *The Interpreting Studies Reader*. Routledge, London/New York, pp. 130–140.
- Lörscher, W., 1989. Models of the translation process: claim and reality. *Target* 1 (1), 43–68.
- Malmkær, K., 2006. Translation units. In: Brown, K. (Ed.), *The Encyclopedia of Languages and Linguistics*. Elsevier, Amsterdam, pp. 92–93.
- Matsushita, K., Yamada, M., Ishizuka, H., 2020. An overview of the Japan National Press Club (JNPC) interpreting corpus. *Invitation to Interpreting and Translation Studies* 22, 87–94.
- Miller, G., 1956. The magical number seven, plus or minus two: some limits on our capacity for processing information. *Psychol. Rev.* 63, 81–97.
- Minamitsu, Y., 2002. *Douji-tsuyaku ni okeru shouou kankei no kouchiku : shiji hyougen souiu wo tegakari ni – ninchi goyouron-teki kanten kara no touitsu-teki setsumei* [A cognitive-pragmatic account of demonstratives in simultaneous interpreting - the case of souiu]. *Interpretation Studies* 2, 43–62 (In Japanese).
- Mizuno, A., 2005. Process model for simultaneous interpreting and working memory. *Meta* 50 (2), 739–752.
- Mizuno, A., 2015. *Douji-tsuyaku No Riron: Ninchiteki seiyaku to Yakusyuu Houraku* [A Theory for Simultaneous Interpreting: Cognitive Constraints and Translation Strategies]. Asahi Press, Tokyo (In Japanese).
- Mizuno, A., 2023. Junokuri no yaku to jouhou kouzou [Progressive translation and information structure] (In Japanese). In: Ishizuka, H. (Ed.), *Einichi tsuyaku Honyaku Ni Okeru Gojunshori: Junokuriyaku no Rekishi, Riron, Jissen* [Word Order in English-Japanese Interpreting and Translation: the History, Theory and Practice of Progressive Translation]. Hitsuj Shobo, Tokyo, pp. 141–186 (In Japanese).
- Niimura, T., Hayashi, B., 1994. English and Japanese demonstratives: a contrastive analysis of second language acquisition. *Issues Appl. Ling.* 5 (2), 327–351.
- Schmid, H.J., 2000. *English Abstract Nouns as Conceptual Shells*. From Corpus to Cognition. Mouton De Gruyter, Berlin.
- Searle, J., 1969. Speech Acts. Cambridge University Press, Cambridge.
- Seeber, K.G., 2013. Cognitive load in simultaneous interpreting: Measures and methods. *Target* 25 (1), 18–32.
- Seleskovitch, D., 1978/1998. Interpreting for International Conferences, Third Revised Edition. Pen and Booth, Washington, D.C.
- Seleskovitch, D., Lederer, M., 1995. A systematic approach to teaching interpretation. Silver Spring, MD: Registry of Interpreters for the Deaf. trans. by Jacolyn Harmer from French original (1989) *Pédagogie raisonnée de l'interprétation*. Luxemburg & Paris: OPOCE & Didier Erudition, Washington D.D.:RID.
- Setton, R., 1999. Simultaneous Interpretation: A Cognitive-Pragmatic Analysis. John Benjamins, Amsterdam/Philadelphia.
- Setton, R., 2013. Models of the interpreting process. In: Chapelle, C.A. (Ed.), *The Encyclopedia of Applied Linguistics*. Wiley-Blackwell, Oxford, UK, pp. 3722–3730.
- Sperber, D., Wilson, D., 1986/1995. Relevance: Communication and Cognition, second ed. Blackwell, Oxford.
- van Dijk, T.A., Kintsch, W., 1983. Strategies of Discourse Comprehension. Academic Press, New York.
- Vinay, J.-P., Darbernet, J., 1995. Comparative stylistics of French and English: a methodology for translation. In: Juan C. Sager & M. J. Hamel). John Benjamins, Amsterdam/Philadelphia translated and.
- Yanabu, A., 2004. *Kindai nihongo No Shisou: Honyau buntai Seiritsu Jijou* [Thoughts of Modern Japanese Language: How the Linguistic Style in Translation Was Made]. Housei University Press, Tokyo (In Japanese).