

What Is Required for Successful Syntactic Parsing in Reading Comprehension of Intermediate-Proficiency EFL Learners: A Qualitative Data Analysis

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Introduction

Previous studies on reading have investigated the cognitive processes involved in reading comprehension, which consist of lower- and higher-level processing. Learners struggle with the syntactic parsing involved in lower-level process when reading. In syntactic parsing, learners recognize chunks and integrate them with syntactic representation. Many psycholinguistics studies have investigated the process of syntactic parsing; however, these studies have not paid significant attention to the actual behaviors involved in chunk processing. Improving learners' reading comprehension skills requires deep understanding of their reading behavior based on a thorough examination, such as identifying the kinds of sentence structures they have difficulty analyzing and how they process them. Such studies are necessary for teachers to provide learners instructions on how to accurately interpret English.

Based on the above background, the current study aims to achieve a deep understanding of learners' reading processes. The study therefore used a qualitative approach, adopting a case study method, which is suitable for elucidating learners' reading behavior. It uses interviews and questionnaires to gain insight into their reading process and examines the kinds of sentence structures that they find difficult to understand, how they process them, and the factors that cause such processing difficulties.

Literature review

Reading Process

Sentence processing involves lower- and higher-level processing. Lower-level

processing progresses from lexical access to syntactic parsing and then to semantic proposition formation. Higher-level processing involves the building of text models and situation models (Grabe, 2009). First, readers recognize each word and activate its meaning. The next process requires syntactic parsing, in which they group individual words into phrases or clauses, that is, to place words into meaningful linguistic units, or chunks. Afterwards, they build clause-level meaning by linking the meaning of words to a syntactic structure. This meaning is formed by combining a set of already formed chunks into a large unit (Garrod & Pickering, 1999) in a process called “chunking,” named after the consecutive combining of chunks (Tanaka, 2006). Since semantic representation can only be formed once the subject, verb, object, and other elements of clauses and sentences have been identified, if readers cannot parse a text, they will not be able to form a semantic representation (Grabe, 2009; Kintsch, 1995; Perfetti & Britt, 1995). Knowledge of syntactic structures is thus essential for reading comprehension, as reading requires not only the skill to recognize chunks, but also an understanding of each chunk’s function in the sentence in order to integrate it into the text presentation. Even among native English speakers, it has been found that adults who are not proficient readers take longer to perform syntactic analysis (McMillion & Shaw, 2009), revealing that these skills play a crucial role in the reading process (Snow, 1982).

As readers process each sentence in the text individually in lower-level processing, a semantic representation of the text as a whole—a text model—is formed in higher-level processing. Finally, a situation model is formed based on the text model.

Sentence Processing

In the context of reading comprehension, many learners struggle with lower-level processing (Fujita, 2005; Ono et al., 2001) and find syntactic parsing difficult. Although syntactic parsing is an essential skill for reading accuracy and fluency (Gass, 2013; Juffs & Harrington, 1995; vanPatten, 2015), this process may not be automatic for learners (Nakanishi & Yokokawa, 2011), and they may not be aware of deviation from the rules of sentence formation (Narumi et al., 2013). Clahsen and Felser (2006) proposed the Shallow Structure Hypothesis (SSH) to describe these characteristics of syntactic processing in L2 learners. According to this hypothesis, L2 learners of English may have incomplete syntactic processing skills, and they may not be able to build complex sentence structures like native speakers; therefore, they rely more on lexical and contextual information to process texts.

Sentence processing studies have focused on examining when and how lexical, syntactic, and contextual information is involved in processing (van Gompel, 2013). However, even though how learners process sentences has been investigated, such generalized models cannot explain how individual learners actually read and parse English text, what types of sentences present processing difficulties and hinder parsing, or how they process the sentence and comprehend its meaning in such situations. It is essential to better understand the individual learner's sentence processing behavior in detail. Teachers must identify which sentence structures pose difficulty to student and how they cope with such difficulties in order to improve students' reading skills. There is no other method to know how learners process complex syntactic sentences and form syntactic representations, other than that we use learners' protocol. This study will offer a detailed explanation of how intermediate learners process syntactic parsing, through a qualitative analysis of interview data and analyze their reading performance. Accordingly, the study proposed the following research questions:

Research Question 1: How do intermediate readers process syntactic parsing?

Research Question 2: What kinds of sentence structures do intermediate readers find difficult to parse, and how do they process them?

Procedure

Participants

Given the study aims, the selected participants were those who possessed basic reading proficiency but were assumed to be sometimes unable to process complex sentence structures. Participants were third-year female university students whose major was not English and who had never studied abroad. Participant A's TOEIC score was 650, Participant B's was 530, and Participant C's was 640. The designation of learners with these scores as intermediate was based on Ishikawa and Ishikawa (2008), which categorized scores between 500 and 695 as intermediate. The participants were enrolled in the author's elective TOEIC English class; however, they were not enrolled in any other English-related classes at or outside the university. They were selected because their English level matched the level required by the study, and because the author was already in contact with them in the class, it was thought that they would feel comfortable sharing their thoughts in the interview.

Data Collection

The data for this study were obtained from two sources, namely interviews of the three participants and a questionnaire. The participants answered a questionnaire. After their responses to the questionnaire were collected, they were asked to read four reading passages. They then participated in a semi-structured post-reading interview. Prior to this, I explained the objective of the study to the participants and obtained informed consent for the use of the data (test results, questionnaire responses, and interview responses).

I had the participants read four passages to examine their reading process for English texts. The passages were from the Society for Testing English Proficiency's Eiken Tests (Grades Pre-1, 2, Pre-2, and 3 texts). Participants read each passage and answered multiple choice comprehension questions to confirm their understanding. There were 18 questions in total. A 40-minute time limit was set. Out of a perfect score of 18, Participant A scored 16 points, Participant B scored 15, and Participant C scored 15.

The main items of the questionnaire were as follows:

- Describe your past and current experiences with reading comprehension, both in and outside of class, in middle school, high school, and university.
- What do you find difficult when reading English texts?
- When reading English texts, do you divide sentences into chunks, or do you read until the end of the sentence and then comprehend its meaning?
- Are you conscious of sentence structure as you read?
- What do you do when you cannot process the structure of a sentence in an English text?

The interview questions mainly pertained to the following items. The interviews also involved questions about some of the questionnaire responses:

- How did you process sentences?
- What kind of sentences were difficult to understand?
- How did you deal with that difficulty?
- Did you get stuck because you couldn't understand the structure of a sentence?
- How did you deal with sentences whose structure you couldn't understand?

Data Analysis

The analysis was performed with a specific focus on the interview data. Questionnaire data were also incorporated to allow triangulation of data sources and provide further insight and credibility into the analysis (Flick, 2004). The recorded audio from the interviews was transcribed and examined repeatedly taking the research questions into consideration. Following this, the portions of the data relevant to the research questions were divided into meaningful fragments. Code names were then assigned to those fragments based on the interpretation. Table 1 shows an example of how the interview data were coded.

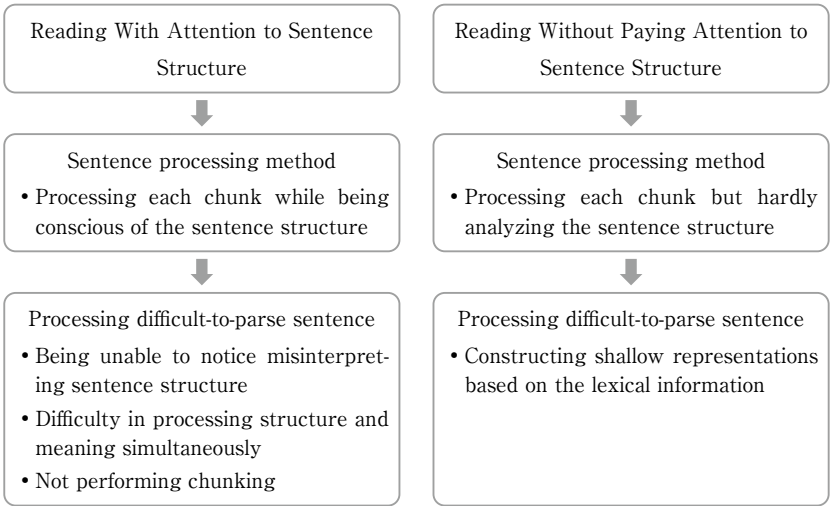
Table 1
Code examples

Transcribed interview excerpt (Participant B)	Code
From this point, I couldn't really understand it,	Difficult-to-understand part
and (couldn't) figure out where to divide the sentence.	Being unable to recognize chunks
So first of all, I just read all the way to the end and re-read the sentence.	Method of dealing with difficult-to-understand part
I didn't understand <i>makes them</i> ,	Being unable to understand sentence structure
then "victim of exploitation"—"loggers or businesspeople"—"wish to purchase land to improve it."	Understanding the meaning of chunks without performing chunking
I couldn't make sense of it the second time either,	Difficult-to-understand part
like, "someone can't read something, and can't get a hold of somebody, which has led to some kind of serious problem." That's all I was able to gather.	Incomplete understanding

Next, the relationships between the generated codes were examined, and similar groups of codes were combined into categories. Through the process of the analysis, relationships between the codes from the data and between the categories were continually compared. While reviewing the relationships between codes in the process of categorization, the participants' sentence processing methods could be broadly divided into the following: performing a careful analysis of sentence structure and hardly performing an analysis, which influenced how participants processed complex sentence structures. The categories created are shown in Figure 1 such that it presents the relationship between the two methods.

Figure 1

Categorization of Codes of Sentence Processing Methods Used in Three Learners



The categorization has several implications that are relevant the research questions.

To preserve the validity of the analysis, approximately 10% of the data from each generated category was extracted and submitted to a researcher engaging in qualitative research for analysis, as suggested by Loewen and Philip (2006). The researcher’s analysis and the author’s analysis were 88% consistent.

Results

Reading With Attention to Sentence Structure

Sentence processing method: Processing each chunk while being conscious of the sentence structure. Both participants A and B were conscious of the sentence structure to some extent as they processed the text, although not to the same extent. As the following excerpt indicates, they tried to analyze more accurately the structures of sentences with layered structures or many modifiers.

When *who*⁽¹⁾ comes up like this, it makes me think a little bit. I put the parts of the sentence in parentheses. I probably translate it into Japanese in my mind, because otherwise, it is complicated and hard to understand. (Participant A)

I construct sentence structures such as SVO. I find the verb, and then I make sure what the verb's object is before going ahead. If there's a word or phrase that I think could go in parentheses—like, it could be treated like an adverb—then I put it in parentheses. If a sentence is really complicated, with a bunch of complement or subordinate clauses, then I read it thoroughly, and go over it again. (Participant B)

The intermediate-level learners were conscious of the complex sentence structures like relative clauses or complement structures. They divided them into chunks and interpreted the meaning of each chunk to understand the sentences. In the case of complex sentences, Participant A divided them into chunks to grasp the sentence structure and quickly translated each chunk into Japanese, as she describes below:

No one is certain / what the future holds for the nomads, / but RLEK hopes its efforts / will open doors for them / and provide them with a broader perspective / to make the best decisions for themselves / and future generations.

She split the sentence at a structural unit to understand the meaning of the chunk, after which she progressed to the next chunk. With structures such as SVC or SVO, or in cases where a modifying phrase had a strong connection to the phrase or clause directly preceding it, she processed them as a single semantic grouping without splitting the sentence. For example, in the chunk *and provide them with a broader perspective*, the phrase *with a broader perspective* has a strong connection to the verb *provide*. When readers read *provide*, they expect it to entail a prepositional phrase that indicates something being mentioned. As a result, she did not split the chunk further. Thus, as long as she could build the meaning, she processed the syntactic structure in large chunks. However, there was an error in the way she chunked this sentence. She should have placed a slash after *hopes* and not *efforts*.

Processing difficult-to-parse sentences: Being unable to notice misinterpreting sentence structure. Participants A and B occasionally failed to parse complex syntactic sentences such as relative clauses, layered clauses, or complement clauses, which occurred when they did not notice their misinterpretation of the syntactic structure. As an example of the participants' mistaken parses in such cases, let us examine Participant A's interpretation of the complex structure included in the filler-gap sentence mentioned above. Filler-gap sentences are con-

sidered to be comparatively difficult to process because those structures contain long-distance dependencies where the words are relocated from their usual order. The excerpt below indicates how Participant A comprehended the clause *what the future holds for the nomads* in the above sentence:

“No one is certain—in the future, *holds* nomads, free them, hold them.”⁽²⁾
how should I translate this? “No one is certain that they will free the nomads in the future.”

In this clause, *future* is a subject and *holds* is a transitive verb, but the object required by *holds* (here, *what*) precedes the verb instead of directly following it. Participant A interpreted the noun phrase *the future* in this clause as an adverb, which may be reflected in the frequency of syntactic frame because it is often used adverbially in the prepositional phrase *in the future*. She then interpreted *holds for the nomads* as “free the nomads.” Without discussing presently that she misunderstood the meaning of *holds*, let us focus instead on how she parsed the structure. She interpreted *holds for* as a phrasal verb and guessed that *the nomads* were its object; she did not comprehend that the object of *holds* was *what*. As object nouns are typically placed directly after transitive verbs, it is conceivable why she thought of this to be a similar case and interpreted *the nomads* as the object of *holds*. However, she did not realize that the preposition *for* makes this interpretation structurally impossible. As already mentioned, *what* is the object of *holds*, and she did not notice that this sentence is a filler-gap sentence, causing her to parse it incorrectly.

Processing difficult-to-parse sentences: Difficulty in processing structure and meaning simultaneously. The participants processed the current chunk, while understanding the meaning of the complete sentence simultaneously. However, when the sentences became structurally complex, it became difficult at times for them to do the same. The following excerpt illustrates how Participant B processed a sentence.

Hoping to change that, one NGO, the Rural Litigation and Entitlement Kendra (RLEK), has, in cooperation with the Indian government, been attempting to reach these nomads and teach them to read.

I thought I had come to the verb here [points to *has*],⁽³⁾ so I split the sentence here and went to here [until *government*]. Then there’s some other

verb-looking thing [*been attempting*], so I split the sentence there and tried to translate it into Japanese. “Hoping for something to change, there are some NGOs, which is this [*RLEK*]. Then *cooperation*—so the NGO does something *in cooperation with* this [*the Indian government*].” Then there’s an *and*, so I split the sentence there. Basically, someone’s teaching someone to read or something. I guessed it’s an educational organization or something. When I read a three- or four-line sentence, I go word-by-word thinking about what this is, what it modifies, what it is trying to say. Somehow, I translate chunk by chunk like this all the way to the end, but sometimes, those chunks are not semantically integrated, so I have to read the sentence over and then I understand what the sentence means when those chunks are put together.

In reading this sentence, Participant B was unable to perform multi-processing. She failed to update her interpretation of the sentence while processing the meaning of the current chunk, by adding the meaning of the chunk to the content she had already read. Language processing is increment (Pickering, 1999). The increment process was difficult for her. In order to understand the entire sentence, she had to re-read the sentence and integrate the meaning of each chunk.

Processing difficult-to-parse sentences: Not performing chunking. The below excerpt includes an EIKEN Pre-1 grade passage and Participant B’s interpretation of it. Unfamiliar words in Pre-1 grade passage are annotated by the author. The annotated words in the sentence below were *vulnerable*, *exploitation*, and *loggers*.

This has become a serious problem, as their inability to read documents or contracts makes them vulnerable to exploitation by loggers or businesspeople wishing to purchase land for development.

I didn’t really understand this sentence. “Something has become a serious problem.” Then there’s this *as*, which is, I don’t know... Then “can’t read, so they can’t do something.” “Can’t read documents” or I don’t know. From this point, I couldn’t really understand it, and figure out where to divide the sentence. So first of all, I just read all the way to the end and re-read the sentence. I didn’t understand *makes them*, then “victim of exploitation”—“loggers or businesspeople”—“wish to purchase land to improve it.” I couldn’t make sense of it the second time either, like, “someone can’t read something, and

can't get a hold of somebody, which has led to some kind of serious problem." That's all I was able to gather.

Participant B did not understand that the subordinate clause was SVOC—that is, subject (*their inability to read documents or contracts*), verb (*makes*), object (*them*), and complement (*vulnerable*). She parsed *as their inability to read documents or contracts* as one chunk, after which she was not able to chunk the sentence the first time. When rereading it, she divided the sentence into *vulnerable to exploitation / by loggers or businesspeople / wishing to purchase land for development* and processed the meaning of those chunks. However, as she did not interpret *vulnerable* as the complement of the SVOC structure, she was unable to comprehend the meaning of this word based on its function in the structure. She omitted grasping the meaning of *by* in the following phrase *by loggers or businesspeople*, and therefore was unable to update the meaning of the sentence by adding the information of this chunk to that of the previous one. The same occurred in the next chunk, where she interpreted *wishing* as “wish,” overlooking its function as a present participle that modifies *businesspeople* in the previous chunk. As a result, she was unable to combine the information in this chunk with the previous one. The sentence with many modifiers seems to be difficult to process. Although she interpreted the meaning of the words within each chunk, she did not always perform adequate chunking to combine chunks with each other.

Reading Without Paying Attention to Sentence Structure

Sentence processing method: Processing each chunk, but hardly analyzing the sentence structure. In contrast to Participants A and B, Participant C hardly paid attention to the sentence structure as she processed sentences. The following excerpt is taken from the interview with Participant C:

Just as they do in the creature's body, the enzymes in the powder react if they come into contact with bacteria, which would show that the instrument is not safe to use.

I find a subject in a sentence, but sometimes I cannot find a verb. Basically, I start interpreting a sentence based on the words I know and link them together.

Q: For example, *creature's body*, you know that this is the body of some organism, but what function is this phrase performing in this sentence.

No, I don't think about things like that. Maybe I don't really think about sentence structure. I studied grammar, but I didn't understand it, and it was definitely a case of in through one ear and out the other. I don't like studying grammar such as SVOC and stuff like that at all.

She did not process the sentence structure, but she constructed meaning in chunks, as indicated below.

The horseshoe crab / is one of the oldest species of animal / still alive in the world today.

I didn't really translate "horseshoe crab" into Japanese. "Oldest" and "still alive" is pretty much all that I translated in my mind. I might have understood the sentence, relying on the meaning of the words. At first, it was like, horseshoe crab, okay, what about it? It's old. It's still alive. I think I hardly translated this sentence. I divided the sentence as I read it, first after horseshoe crab, then I got to this point after animal, so I understood the horseshoe crab is old. Finally, I got to the end, and I understood the horseshoe crab is still alive. Like that.

In sentence processing, once readers recognize chunks, they must then perform chunking based on the function of those chunks in the sentence. If they focus only on individual chunks, they are not likely to grasp the overall sentence structure and might miss the larger meaning. Participant C analyzed *one of the oldest species of animal* as a single chunk, processed its meaning, and continued on to the next chunk. However, since she processed the next chunk's meaning on its own without thinking about its syntactic relationship to the previous chunk, she did not realize that *still alive* modified *animal* rather than *horseshoe crab* and did not therefore reach an accurate interpretation.

Processing difficult-to-parse sentences: Constructing shallow representations based on the lexical information. Below is an excerpt of how Participant C processed a sentence.

Just as they do in the creature's body, the enzymes in the powder react if they come into contact with bacteria, which would show that the instrument is not safe to use.

I probably divided the sentence after *just as*. Next was *they do in the creature's body*. Here I only interpreted "creature's body," because I didn't think I'd get the meaning of the rest. I just end up taking only the words I know and putting them together in my mind. I probably didn't really understand the meaning of this part very well, like, what about the creature's body? I got to *the enzymes in the powder react* and divided the sentence again before *if*. I didn't understand this part, and understood bacteria enters somewhere. That's basically what I did to understand the sentence. As for the following part, I really didn't understand the meaning.

Although Participant C processed the sentence chunk-by-chunk, she relied more on the meanings of the words that she knew for sentence interpretation, without parsing its syntactic structure thoroughly. However, since semantic proposition formation is based on syntactic parsing, constructing the meaning of a sentence requires an accurate parsing of its structure.

Discussion

With regard to Research Question 1. *How do intermediate readers process syntactic parsing*, two methods, namely, being conscious of the sentence structure and hardly analyzing the sentence structure have been observed. Based on these two identified methods, this study addressed Research Question 2. *What kinds of sentence structures do intermediate readers find difficult to parse, and how do they process them?* This study also investigated the factors that hinder syntactic parsing.

Participants did not construct a full syntactic analysis of the sentences whose structure was not particularly complex, while they attempted to parse more complex sentences with layered structures, many modifiers, relative clauses, complement structures, or filler-gap structure.

First, for the "structure-conscious" method, the findings identified three characteristics to Research Question 2. These are 1) being unable to notice misinterpreting sentence structure, 2) difficulty in processing structure and meaning simultaneously, and 3) not performing chunking. Participants A and B were sometimes unable to parse sentences with complex structures. In the first case, the participant A parsed the sentence but did not realize that her analysis deviated from its structure. In the filler-gap sentence, *No one is certain what the future holds for the nomads*, she analyzed the subject noun phrase *the future* as an adverb and misinterpreted *the nomads* as the object of the transitive verb *holds*,

rather than *what*.

Why do readers parse sentences incorrectly? Japanese learners of English have been found to not be particularly aware of grammatical mistakes (Narumi, Nagai, Matsumoto, Hayashi and Yokokawa, 2013), and the results obtained in this study also indicate that Participant A could not recognize that her interpretation violated rules of syntactic structure. She analyzed the structure of this sentence as subject-verb-object, which is a frequent syntactic frame for Japanese EFL learners. However, it was a filler-gap sentence with a long-distance dependency, where the gap related to the filler comes later in the sentence. This means that it is necessary to take the structure of the entire sentence into consideration. Participant A was not able to do so but concentrated on the current phrase. This can be considered one reason for why Participant A was unable to notice that her analysis violated the rules of syntactic structure of the entire sentence. This indicates that it is important to construct the entire structure of a sentence.

In the second case, complex sentence structure made it difficult to perform multi-processing of structure and meaning simultaneously. Parsing complex syntactic structures forces intermediate readers to focus only on the current chunk to comprehend its meaning. This might prevent readers from grasping the function of the current chunk in the sentence while processing its meaning. Processing chunks with complex structures was cognitively costly for readers, which made it even more difficult for them to perform chunking simultaneously. Accordingly, they fail to update their interpretation of the sentence by adding the information they just read to the meaning that they had comprehended from the sentence up until that point.

In the third case, chunking was not performed thoroughly. The sentence excerpted, *This has become a serious problem, as their inability to read documents or contracts makes them vulnerable to exploitation by loggers or businesspeople wishing to purchase land for development*, contains multiple modifiers and was a very challenging for all of the participants to process. Participant B missed accurately comprehending the rest of the sentence after *makes* on the first reading, and re-read it while interpreting about the words that the modifiers modify. Despite this, she failed to process the sentence by combining the meanings of the modifying phrase chunks into sentence representation.

Participant B stated that "If I proceed chunk by chunk deliberately and slowly, I can comprehend the meaning of the chunks, but the meaning of the sentence doesn't come together well." This might be caused by the participant's lack of knowledge of syntactic structure. Moreover, this indicates that participants did not necessarily lack knowledge of syntactic structure, but rather lacked sufficient

experience in using that knowledge to apply it in real time, as a practical skill. These may be the reasons for incorrect syntactic parsing. Intermediate learners attempted to parse complex sentences accurately. However, they had not acquired the practical skill of parsing as well as sufficient knowledge about complex syntactic structures. Although they processed the meanings of individual chunks, they did not integrate the chunks into sentence representation. It was difficult for them to perform full chunking, such as identifying words modified by prepositional phrase chunks or function of infinitive. This meant that the meanings of the chunks they processed remained syntactically disconnected, and their sentence representation remained incomplete or ambiguous. Since chunk recognition and chunking, which are comprised in syntactic parsing, are absolutely crucial to semantic proposition formation, incomplete or ambiguous parsing does not lead to semantically accurate proposition formation. This indicates that chunking is quite important for successful reading.

The “hardly analyzing the sentence structure” method can be discussed in the context of Research Question 2. Participant C used a different method than Participants A and B to process complex structures. Regarding the complex sentence, she attempted to comprehend it by drawing the meanings of only the words she knew and integrated them instead of performing syntactic parsing.

According to the SSH, Clahsen and Felser (2006) claimed that the syntactic structures that L2 learners build when processing sentences are not as complete as those of a native speaker. In cases where learners cannot perform syntactic processing completely, their processing depends on non-syntactic information such as lexical and contextual information. Participant C also relied on those resources of information in her processing and attempted to supplement her incomplete processing of the syntactic structure with lexical and contextual information. However, her understanding of sentence in question was ambiguous and incorrect, which meant that the contextual information on which she based her interpretation could not help her comprehension. More importantly, for the current study, it is notable that even when she was not able to build a syntactic structure, she did not attempt to analyze the structure at all. Moreover, she did not proactively attempt to perform syntactic parsing to comprehend the sentence. At times, Participant C formed ambiguous text representations, in which the meanings of phrases and clauses were not semantically integrated because of unperformed syntactic analysis. This is another case where although chunk processing of meaning was performed, chunking was not performed. The meanings of sentences interpreted thus are not accurate. This reinstates the importance of chunking.

Conclusion

This study offers insight into how intermediate-level learners process sentences and described the kinds of sentence structures that are difficult for them to process and how they process such sentences using a qualitative approach.

The findings of the current study have pedagogical implications. Chunk reading is one of the reading strategies that has been widely used by EFL learners and teachers. However, problems with accuracy can occur when performing chunking; they fail to or do not try to add just-read information to the total accumulated meaning to update the comprehension of the sentence. As this study has shown, insufficient chunking may be one cause of this problem. Chunk reading is a two-stage process, which progresses from recognizing a chunk to then determining how it functions in the structure of the sentence. It is this latter step—that is, chunking—that is likely to be neglected. This has two reasons. One is the inability to construct the syntactic structure of the sentence. The other is not attempting to do so, meaning not performing chunking. Although chunk reading is considered to be an effective reading method, readers cannot comprehend a sentence accurately if they stop processing the sentence immediately after interpreting the meaning of each chunk without constructing the structure of the overall sentence. Chunk reading requires the reader to have sufficient knowledge of syntactic structure, parse the function of chunks in a given sentence, and perform chunking accurately. Instruction and training on chunking are recommended to help learners with their reading skills.

One limitation of this study was that it was a qualitative study with only three participants, whose results cannot be generalized. Therefore, quantitative research in the future should attempt to reveal how instruction and training on chunking affect a learner's reading comprehension skills.

Examining individual learners' performance on a detailed level is necessary for teachers to understand the learners' reading processes in order to improve their knowledge while teaching, and future studies can contribute to such an examination.

Notes

The below pertain to the interview excerpts and portions of interview excerpts used in the Results section.

- (1) Italics indicate English words read by the participants.
- (2) Quotation marks indicate Japanese translation by the participants.

- (3) Phrases in square brackets indicate places in the text that the participants pointed out.

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