

Exploring the Relationship Between Listening Comprehension and Word Recognition According to Second Language Proficiency: Top-down and Bottom-up Perspectives

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Abstract : The present study seeks to explore the relationship between listening comprehension and word recognition according to second language proficiency from top-down and bottom-up perspectives. Previous research has shown that listening comprehension processes differ according to second language proficiency under conditions that control top-down and bottom-up processes. Based on the results, the present study further investigates the differences, examining how listening comprehension under these two conditions is associated with word recognition. To examine this relationship, experiments including two tasks (listening comprehension and dictation) were conducted. In the experiments, background knowledge and vocabulary knowledge were operationalized as activating top-down and bottom-up processes. Three proficiency levels of learners were classified using TOEIC[®] scores: 18 lower intermediate (535–620), 19 upper intermediate (730–795), and 23 advanced (905–990) learners participated in the experiments. In listening comprehension tasks, participants listened to materials under two conditions: (a) vocabulary knowledge, no background knowledge, and (b) no vocabulary knowledge, background knowledge. For the dictation tasks, they listened to materials and dictated each word they listened to. Results obtained from correlational analyses between listening comprehension and word recognition showed differences between advanced and lower and upper intermediate learners. A positive correlation was found between listening comprehension under conditions (a) and (b) and word recognition for advanced learners. However, positive correlations were only observed between listening comprehension under condition (a) and word recognition for lower and upper intermediate learners. Based on these findings, the present study provides pedagogical implications for second language learners and teachers.

Keywords : listening comprehension, word recognition, second language proficiency, top-down and bottom-up processes

1. Introduction

Listening comprehension is affected by diverse factors, which can be explained from two perspectives: inside the learner (internal) and outside the learner (external). Internal factors include sound recognition skills (Goh, 2000), word/vocabulary knowledge (e.g., Stæhr, 2009; van Zeeland & Schmitt, 2013), first language (L1) vocabulary knowledge (Vandergrift & Baker, 2015), grammar (syntax) (Blau, 1990), background knowledge (Long, 1989/1990; Tyler, 2001), working memory (Baddeley, 2003), speaker characteristics such as gender and accents (Abeywickrama, 2013), and listening strategies (e.g., Vandergrift & Tafaghodtari, 2010). External

factors include speed (speech rates) (Blau, 1990; Zhao, 1997) and task characteristics (Brundaut & Révész, 2015). In listening comprehension research, these factors can be commonly addressed into two types of processes: top-down and bottom-up processes. For instance, background knowledge is related to top-down processes whereas vocabulary knowledge is associated with bottom-up processes. Although it is widely acknowledged that listening comprehension involves these processes (Brown, 2011; Vandergrift & Baker, 2015), there is a dearth of research on how these processes differ according to second language proficiency. To explore this research question, Furuya (2019) attempted to examine the differences in listening comprehension processes among three levels of language learners. Based on the results obtained from Furuya, the present study aims to further investigate the differences, focusing on the relationship between listening comprehension and word recognition according to second language proficiency.

2. Literature Review

2.1 Defining Top-down and Bottom-up Processes in Listening Comprehension

The top-down and bottom-up processes are necessary to understand texts for listening comprehension (Brown, 2011; Vandergrift & Baker, 2015; Vandergrift & Goh, 2012). Nation and Newton (2009) defined top-down processes as processes in which the whole has an influence over the way parts, such as background knowledge, content knowledge, and rhetorical schemata. Regarding the bottom-up processes, Nation and Newton (2009) defined them as processes where parts shape the whole. In bottom-up processes, listeners collect individual parts of the message from the stream of speech beginning with deciphering auditory-phonetic parts and gradually encompassing phonemic, syllabic, lexical, syntactic, semantic, propositional, pragmatic, and interpretative parts. These processes are explained to represent directions that converge on the communicated information.

2.2 Lack of Bottom-up Processes and Compensation for the Lack for Lower-Level Second Language Learners

Previous research has indicated that lower-level second language learners find listening comprehension challenging, which is due to the lack of bottom-up processes (Goh, 2000) and reliance on top-down processes to compensate for the lack (Tsui & Fullilove, 1998). Goh (2000) investigated the challenges regarding listening comprehension and classified three cognitive processing phases (perception, parsing, and utilization) through learners' diaries, small group interviews, and immediate retrospective verbalization for a group of foreign tertiary-level students from China. She revealed that listeners with low-ability struggled more with perception problems than listeners with high-ability. The listeners reported that they were unable to recognize words they knew, neglected the next part when focusing on the meanings, were unable to understand chunks of a speech, missed the beginning of a speech, and either concentrated too much or were unable to concentrate at all. Tsui and Fullilove (1998) implied that less skilled listeners' lack of bottom-up processes is compensated using top-down processes. They investigated two variables: two schema types of the aural text (matching and non-matching) and two question types (global and local) for candidates taking the Hong Kong public examination. The results demonstrated that candidates gained significantly higher mean criterion scores of non-matching schema types than those of matching schema types without being influenced by question types, indicating bottom-up processes distinguishing the skill level of listeners.

2.3 Interactive Compensation for Top-down and Bottom-up Processes

Following Tsui and Fullilove's (1998) implication, Field (2004) proposed an insightful view of top-down and bottom-up processes, suggesting learners' interactive compensation for each process in listening comprehension. The view was derived from an interactive-compensatory mechanism proposed in L1 reading research, which compensates for gaps in comprehension (Stanovich, 1980). Based on the proposed mechanism, Field (2004) investigated the extent of the reliance on top-down information to compensate for bottom-up information for students from lower intermediate and high elementary classes at a British English as a Foreign Language (EFL) school by conducting three experiments including different items. The results showed different degrees of success in the experiments to verify this view. A recent study also supported this view by revealing the interactive strategies of both processes (Nix, 2016). The finding was that bottom-up strategies mediated by top-down strategies were effective in listening comprehension. On the other hand, bottom-up strategies alone were ineffective.

Given this interactive view of top-down and bottom-up processes, it could be hypothesized that learners rely on each process to compensate for their lack of processes, and as language proficiency develops, compensation will not be necessary, resulting in no reliance on either process (i.e., balanced processes). To verify this hypothesis, Furuya (2019) attempted to explore how listening comprehension processes differed by second language proficiency from the top-down and bottom-up perspectives. In Furuya's (2019) study, top-down processes were operationalized as activating background knowledge whereas bottom-up processes were used as activating vocabulary knowledge. Experiments were conducted, followed by survey questionnaires, and semi-structured interviews for three levels of language learners (lower intermediate, upper intermediate, and advanced learners). Participants listened to materials under two conditions: (a) vocabulary knowledge, no background knowledge, and (b) no vocabulary knowledge, background knowledge. The results showed differences in listening comprehension processes based on second language proficiency. The lower intermediate learners performed better in condition (a) whereas upper intermediate learners comprehended better in condition (b). No significant difference in listening comprehension was observed between conditions (a) and (b) for advanced learners. The semi-structured interviews also yielded consistent results from the experiments. These results from advanced learners supported the hypothesis that there is no reliance on either process. Those from the upper and lower intermediate learners showed reliance on either process. In the experiments, since Furuya limited the bottom-up processes to vocabulary knowledge, investigating word recognition in relation to listening comprehension under conditions that control top-down and bottom-up processes could help understand the further differences.

2.4 Vocabulary Knowledge Operationalized as Activating Bottom-up Processes

Vocabulary knowledge, considered as a typical example of activating the bottom-up processes (Vandergrift & Goh, 2012), plays a significant role in listening comprehension and has received considerable attention in listening comprehension research. A number of researchers have examined the relationship between vocabulary knowledge and listening comprehension in terms of lexical familiarity (Bonk, 2000), lexical coverage (Stæhr, 2009; van Zeeland & Schmitt, 2013), word recognition (Matthews & Cheng, 2015), aural vocabulary knowledge (AVK) (Bian et al., 2019; Matthews, 2018; Siegel, 2016), types of vocabulary knowledge (general and specific) (Mehrpour & Rahimi, 2010), vocabulary preparation (Chang, 2007), and learner variables (Nejad & Farvardin, 2019; Vandergrift & Baker, 2015; Wang & Treffers-Daller, 2017; Wolfgamm et al., 2016). As these previous studies have highlighted the importance of vocabulary knowledge in listening comprehension,

the present study also examines this factor to activate bottom-up processes.

2.5 Background Knowledge Operationalized as Activating Top-down Processes

In addition to vocabulary knowledge, background knowledge, regarded as a typical example of activating the top-down processes (Vandergrift & Goh, 2012), plays a crucial role in listening comprehension. Researchers have examined the role of background knowledge (Long, 1989/1990), topic knowledge (Tyler, 2001), topic familiarity (Leeser, 2004), and topics under pre-listening conditions (Alavi & Janbaz, 2014; Barjesteh & Ghasemina, 2019; Madani & Kheirzadeh, 2018) in listening comprehension. As these previous studies demonstrated the importance of background knowledge, the present study considers this factor to activate top-down processes.

2.6 Word Recognition Regarded as Activating Bottom-up Processes and Dictation

2.6.1 Word Recognition

Word recognition is also regarded as activating bottom-up processes and is closely related to vocabulary knowledge. Word recognition is also interpreted as “intelligibility” (Furuya, 2020) and is commonly measured through dictation. Furuya scrutinized the term “intelligibility” in 31 papers from 31 journals ranging from three fields (applied linguistics, phonetics, and psycholinguistics) (2000–2020) to examine how the term had been used in these fields and suggested a definition of the term. In her study, three aspects were analyzed: (1) the definition of the term, (2) the identity of those measuring intelligibility and those whose intelligibility was being measured, and (3) the method of measurement used. As a result, intelligibility could be defined as “word recognition,” and dictation was the most used approach to measure intelligibility.

2.6.2 Dictation

Nation and Newton (2009) defined dictation as a technique in which learners receive some spoken input, retain the input in their memory for a short period, and then write what they heard. Dictation successfully measures word recognition, as previous studies have demonstrated. Nation and Newton (2009) stated that dictation evaluates learners’ skill in listening, their ability of the language, and their ability to retain what they have heard in their memory. Buck (2001) further explained the learners’ skill in listening that dictation may measure. He explains that there are a number of ways in which dictation works and it is depended on the length of segments and the number of challenges a test-taker faces. For example, in the case of short segments and few challenges, the test-taker writes down a few words of spoken test and it is little more than a simple transcription exercise, the learners’ skill in listening can be understood through their ability to recognize words.

Originally, dictation has been used as a testing tool to measure learners’ general proficiency because it includes normal contextual constraints on language, which requires comprehension and construction of meaningful sequences of language associated with an extralinguistic context (Oller, 1979). For instance, adapting this tool, Fountain and Nation (2000) developed a placement test. However, in addition to a testing tool, dictation has also gradually been used as a teaching tool. Dictogloss (Wajnryb, 1990) is one example that gained popularity in which first individual learners listen to the text and subsequently work in groups to reconstruct the text. Because dictation obligates learners to pay careful attention to all the words, it is regarded as a tool for improving bottom-up listening skills (Vandergrift & Goh, 2012).

As explained earlier, dictation has been widely used for both testing and teaching listening. Furthermore, as

Buck (2001) demonstrated, it was possible that dictation evaluates word recognition. Therefore, the present study used dictation to investigate word recognition as another bottom-up process.

3. The Present Study

Based on the results obtained from Furuya (2019), the present study aims to investigate the relationship between listening comprehension and word recognition according to second language proficiency. The objective of the present study is to further explore the differences in listening comprehension processes through proficiency levels. In the present study, top-down processes are operationalized as activating background knowledge, and bottom-up processes are operationalized as activating vocabulary knowledge since they have been considered to play crucial roles in listening comprehension.

4. Method

4.1 Participants

The participants in the present study were the same learners who participated in the study by Furuya (2019). The total number of participants was 60. Most of them were from Japan ($n = 56$), some were from China ($n = 2$), Indonesia ($n = 1$), and Korea ($n = 1$). Their first language was Japanese, Chinese, Indonesian, and Korean. Since participants from countries other than Japan had been living in Japan, they could participate in the study without any language problems. The participants were categorized into three groups: (i) lower intermediate, (ii) upper intermediate, and (iii) advanced. The participants were aged 18–50 years, and they were tertiary-level EFL learners and English teachers (17 males, 43 females). The proficiency levels were classified using the Test of English for International Communication (TOEIC[®]) Listening and Reading (L & R) Test scores and their equivalent Test of English as a Foreign Language (TOEFL iBT[®]) scores. The number of participants in each classification was (i) 18 of the lower intermediate level (TOEIC[®] 535–620) ($M = 567.22$, $SD = 20.31$), (ii) 19 of the upper intermediate level (TOEIC[®] 730–795) ($M = 756.58$, $SD = 21.48$), and (iii) 23 of the advanced level (TOEIC[®] 905–990) ($M = 938.26$, $SD = 26.66$). One participant with a score of 85 on (TOEFL iBT[®]) was included in (ii). The participants' ages and gender in each level were (i) 18–23 (3 males; 5 females); (ii) 18–50 (6 males; 13 females); and (iii) 18–50 (8 males; 15 females).

The participants were recruited through a flyer distributed on campus and through friends who received the flyer. They were paid for their participation. They agreed to participate through oral consent or written consent forms.

4.2 TOEIC[®]

The TOEIC[®] L & R Test includes listening and reading sections. Each section has scores ranging from 5 to 495. TOEFL[®] test grades were compatible with TOEIC[®] scores based on ETS (2005). The standard error of measurement (SEM) for each of the TOEIC L & R sections is about 25 scaled score points (ETS, 2019). Therefore, it can be assumed that differences clearly exist between TOEIC[®] 535–620, 730–795, and 905–990, implying that the participants in each level had different language proficiency levels.

4.3 Materials

To assess listening comprehension under two conditions that controlled the top-down and bottom-up

processes and word recognition, specific listening materials were developed. The development of these materials was conducted in terms of the following external factors: readability, speech rate (wpm) and time, number of words, paragraphs, unknown words, topics and speaker, and the gender and accent of the speaker. To avoid topic biases, three different topics were provided under each condition and for each language proficiency level. To ensure that participants did not require any specialized knowledge to understand and dictate the materials, the topics were nonspecific. Tables 1 (listening comprehension tasks) and 2 (dictation

Table 1

The Listening Materials for (i) Lower Intermediate; (ii) Upper Intermediate; (iii) Advanced Learners (Listening Comprehension Tasks)

Levels	(i) Lower intermediate	(ii) Upper intermediate	(iii) Advanced
Materials	2nd	Pre-1st	1st
(Adapted from EIKEN: Grade)			
Readability			
(Flesch-Kincaid Grade Level)	6	8-9	11-12
Speech rate (wpm)	130-138	139-151	136-143
Speech time	0 : 24-0 : 32	0 : 56-1 : 06	1 : 17-1 : 27
The number of	words	53-71	141-156
	paragraphs	1	2
Vocabulary lists (JACET 8000: Level)	3, 4	5, 6	7, 8
Unknown words			
(1) Noises inserted	(1) 3 words (5% of the texts)	(1) 8 words (5-6%)	(1) 10 words (5%)
(2) More difficult words than JACET 8000(Level)	(2) 3, 4	(2) 5, 6	(2) 7, 8
(3) Content words located with intervals between noise			
The number of topics		(a) × 3, (b) × 3	
Topics (Titles)	(a) Rainbow Jeans; Polar Bears; Curling (b) Wind Farms; Ghost Towns; Sheffield	(a) Argentine Beekeepers Face Changes; The Last Frontier; Voyage of the Modern-Day Vikings (b) Sweet Dreams?; U.K. Shopping in the Spotlight; Dinosaur Cinemas	(a) Electricity from Underground; Mosquitoes Under the Microscope; New Developments in Chernobyl (b) Flags of Convenience; Urban Commuter Troubles; Asian Fast Food in America
The number of speakers		1	
The gender of the speaker		Male	
The accent of the speaker		American English	

Note. EIKEN is an abbreviation of Test in Practical English Proficiency held in Japan. Readability indicates the levels on which readers can easily read texts. It consists of grammar and style in the present study. Flesch-Kincaid-Grade Level represents the levels of students' grades in America. JACET 8000 is a list of 8000 basic words classifying levels in groups of 1000 words. van Zeeland and Schmitt (2013) reported that learners were able to comprehend listening texts with 90% understanding of vocabulary in texts. The listening materials are available from the author upon request.

Table 2

The Listening Materials for (i) Lower Intermediate; (ii) Upper Intermediate; (iii) Advanced Learners (Dictation Tasks)

Levels	(i) Lower intermediate	(ii) Upper intermediate	(iii) Advanced
Materials			
(Adapted from EIKEN Grade)	2nd	Pre-1st	1st
Readability			
(Flesch-Kincaid Grade Level)	5	7	10
Speech rate (wpm)	137	152	138
Speech time	0 : 14	0 : 19	0 : 23
words	30 (32)	47 (48)	51 (53)
The number of sentences	3 (4 parts)	4	2 (4 parts)
paragraphs		1	
The number of topics		1	
Topic (Title)	The Greenville Aquarium	Scientists Test Baby Theory	Free Speech Online
The number of speakers		1	
The gender of the speaker		Male	
The accent of the speaker		American English	

Note. Numbers in brackets represent the original numbers of words. Proper nouns and more difficult words than JACET 8000 displayed as Unknown words (2) in Table 1 were excluded when evaluating scores.

tasks) represent detailed information on the listening materials used in the experiments.

4.4 Listening Conditions

To explore the differences among different levels of learners, listening materials were provided under the following two conditions:

Condition (a) vocabulary knowledge, no background knowledge

Condition (b) no vocabulary knowledge, background knowledge

In the following, these two conditions are explained in more detail.

Condition (a) vocabulary knowledge, no background knowledge

To ensure that participants possessed the required vocabulary knowledge for the listening comprehension task, a vocabulary list was provided to the participants. For each item on the list, the information on parts of speech (e.g., noun, verb, adjective, etc.) was presented. The list was provided prior to the listening comprehension task. The list contained two types of words: (1) those at the level of words referred from the JACET 8000 Level word list (JACET List of 8000 Basic Words Committee, 2003) and (2) those classified at the same levels but not included in the listening materials. All words were shuffled and compiled in the list.

To ensure that participants already knew the meanings of the words presented, they were asked to write the meanings in Japanese referring to parts of speech as clues and then read the words and their meanings aloud. The participants, who had unknown words, they were directed to memorize them. Subsequently, to ensure that

participants successfully memorized the words, they were asked to answer the meanings in Japanese followed by the examiner reading the words aloud.

To confirm that participants could not activate any background knowledge prior to listening to the text, they were not provided what the text was going to be about (the condition of no background knowledge).

Condition (b) no vocabulary knowledge, background knowledge

To create the condition of no vocabulary knowledge, the materials included noises representing unknown words. Before listening to the text, participants were informed that some words or phrases had been replaced by noise. To familiarize participants with this condition, they listened to some sample noises, including a different text from a listening text in the experiments. The details of the noises are presented in Table 1.

To create the condition where participants had background knowledge, they were offered with what the text was going to be about (for example, Now, you are going to listen to material on smells. How do smells influence things?) (background knowledge).

4.5 Procedure

Step 1 (Experiments: Listening Comprehension Tasks): Participants listened to the materials under conditions (a) and (b) and described the contents of the materials in as much detail as possible in Japanese rather than simply providing a short summary. They could take notes in a designated space on the upper part of the answer sheets while listening to the materials and were directed to write contents on the lower part. They were also allowed to use *Katakana*, which is one of the Japanese writing systems and is used when transcribing loanwords and foreign-language words phonetically, when they did not know a word. The instructions were provided orally. Printed instructions were also present on the answer sheets. To counterbalance the order of texts, participants listened to three texts from (a) and (b) interchangeably.

Step 2 (Questionnaires): At the end of each listening comprehension task, participants answered a questionnaire about their pre-knowledge of the text. Participants responded on a 6-point Likert scale (0% was excluded from the analysis) from totally unknown to well known: 0%, 20%, 40%, 60%, 80%, and 100%. The instructions were both given orally and written on the questionnaires.

Questionnaires:

Did you know this content before listening?

Rank how much you knew/understood the content as per the six levels shown.

Circle the appropriate percentage.



Step 3 (Experiments: Dictation Tasks): Participants listened to the materials in accordance with the respective levels, which is displayed in Table 2, three times for all levels and dictated all the words they heard on answer sheets for evaluation on word recognition. The instructions were both given orally and written on the answer sheets.

Dictation Tasks:

Dictate all English words and phrases you hear.

5. Results

5.1 Experiments

Listening comprehension and word recognition of the participants were assessed by an examiner and an additional rater, who had identified the key points before the evaluation. The additional rater holds a master's degree in Foreign Language Education and Research and studied in a Ph.D. program in the field. She currently has classes to teach English at the university level. To assess inter-rater reliability, the additional rater evaluated 10% of the data of listening comprehension tasks under conditions (a) and (b) and dictation tasks for (i) lower intermediate, (ii) upper intermediate, and (iii) advanced learners. Mackey and Gass's (2016) guidelines stated that 10% was a sufficient sample for reliability analysis. Inter-rater reliability for listening comprehension and dictation tasks for each language level of learners was .62 and .93 for (i), .88 and .95 for (ii), and .81 and 1.00 for (iii). Koo and Li (2016) stated that values between 0.5 and 0.75 and between 0.75 and 0.9 are indicative of moderate and good reliability. Therefore, the inter-rater reliability in the present study was acceptable. After assessing inter-rater reliability, the examiner discussed any disagreements about ratings with the additional rater, reaching consensus for all parts. The tasks of the raters were to identify the key points in each listening comprehension text and check the words successfully dictated in each dictation text provided during the experiments. There were four key points in (i), five in (ii), and six in (iii) for each text. (e.g., in (ii) (1) According to a study, smells can influence dreams; (2) (subjects reported) bad dreams when they were exposed to the smell of rotten eggs (bad smells), and the scent of roses (good smells) stimulated positive dreams; (3) (the subjects) said they never smelled the odors in their dreams; (4) there is a well-known connection between our sense of smell and the brain's (limbic) system, which controls emotions; and (5) they would do the same (smells play a significant role in our emotions) while we are asleep.) The sums of the key points gained from the three different texts under the two conditions and scores from the dictation tasks were calculated for analyses.

To assess the relationship between listening comprehension under conditions (a) and (b) and word recognition, a correlation analysis was performed. Tables 3–5 represent the descriptive statistics (the means and standard deviations) of listening comprehension under conditions (a) and (b) and word recognition for (i), (ii), and (iii), respectively and correlations between listening comprehension and word recognition for each level.

Table 3

Descriptive Statistics and Correlations Between Listening Comprehension Under Conditions (a) and (b), and Word Recognition for (i) Lower Intermediate Learners (N = 18)

Variable	<i>M</i>	<i>SD</i>	Word recognition
(a)	5.06	2.49	.57*
(b)	3.61	1.79	.24
Word recognition	23.50	2.50	—

Note. * $p < .05$. (a) vocabulary knowledge, no background knowledge; (b) no vocabulary knowledge, background knowledge.

Table 4

Descriptive Statistics and Correlations Between Listening Comprehension Under Conditions (a) and (b), and Word Recognition for (ii) Upper Intermediate Learners (N = 19)

Variable	<i>M</i>	<i>SD</i>	Word recognition
(a)	2.11	1.63	.54*
(b)	4.11	2.64	.10
Word recognition	24.84	6.89	—

Note. * $p < .05$. (a) vocabulary knowledge, no background knowledge; (b) no vocabulary knowledge, background knowledge.

Table 5

Descriptive Statistics and Correlations Between Listening Comprehension Under Conditions (a) and (b), and Word Recognition for (iii) Advanced Learners (N = 23)

Variable	<i>M</i>	<i>SD</i>	Word recognition
(a)	6.44	2.98	.48*
(b)	5.78	3.28	.40
Word recognition	37.83	7.16	—

Note. $p < .05$. (a) vocabulary knowledge, no background knowledge; (b) no vocabulary knowledge, background knowledge.

The results of correlation analyses of the lower intermediate learners indicated that there was a positive correlation between listening comprehension under condition (a) and word recognition ($r = .57$) whereas no correlation was found between condition (b) and word recognition ($r = .24$). Similarly, upper intermediate learners showed that there was a positive correlation between condition (a) and word recognition ($r = .54$) whereas no correlation was observed between condition (b) and word recognition ($r = .10$). The advanced learners demonstrated that there was a positive correlation between condition (a) and word recognition ($r = .48$) as well as that for lower and upper intermediate learners. However, unlike lower and upper intermediate learners, there was a slight positive correlation between condition (b) and word recognition ($r = .40$) for advanced learners.

5.2 Questionnaires

The pre-knowledge of the participants was measured on 6-point Likert scales with questionnaires. To ensure that pre-knowledge did not influence their listening comprehension, the correlation between pre-knowledge and listening comprehension was investigated through a correlation analysis. No correlation was observed between pre-knowledge and listening comprehension among all levels of learners: (i) lower intermediate ($r = .18$); (ii) upper intermediate ($r = .13$); (iii) advanced learners ($r = .10$). Therefore, it was confirmed that pre-knowledge did not affect the listening comprehension of participants.

6. Discussion

The results obtained from the correlation analyses showed differences in second language proficiency, distinguishing between lower and upper intermediate learners from advanced learners. For lower and upper

intermediate learners, word recognition was only associated with condition (a) vocabulary knowledge, no background knowledge. However, for advanced learners, word recognition was related to both conditions (a) and (b) no vocabulary knowledge, background knowledge, although condition (b) showed a slightly small correlation.

It was readily expected that there were some correlations between vocabulary knowledge and word recognition among the three levels of learners because they both covered vocabulary (words). However, it was interesting to note that for advanced learners, word recognition was slightly associated with activating background knowledge as well as vocabulary knowledge. This indicates that advanced learners may be able to use word recognition to activate background knowledge. In other words, it was likely that they were able to understand the content using background knowledge linked with word recognition.

Concerning the interactive compensation for top-down and bottom-up processes, since advanced learners did not need to compensate for each process (Furuya, 2019), it seems possible to reinforce the other process. Namely, word recognition (bottom-up processes) supports background knowledge (top-down processes).

7. Conclusion

The present study explored the relationship between listening comprehension under two conditions, controlling top-down and bottom-up processes and word recognition, according to three levels of language proficiency. Background knowledge and vocabulary knowledge were operationalized as activating top-down and bottom-up processes since they were considered important factors in listening comprehension. Correlation analyses were performed to examine the relationship, resulting in the differences between lower and upper intermediate and advanced learners.

However, there are limitations that should be noted. First, dictation tasks need to be provided to participants only once to strictly measure word recognition. In the present study, participants listened to materials three times and dictated what they heard. Even though the fact that dictation tasks have conventionally been presented three times (Nation & Newton, 2009), which was the same number of presentations in the present study, listening to materials once may yield different results. Second, introductions to background knowledge need to be varied. In the present study, introductions to background knowledge were only performed orally, but the visual introduction to background knowledge may have a different influence on listening comprehension. Third, although difficulties occurred in collecting data for (ii) and (iii) because of their high levels of language proficiency, the age differences between (i) (18–23) and (ii) and (iii) (18–50) may influence the results. Fourth, presentations of unknown words replaced by noise may hinder participants' listening comprehension even though participants listened to some sample noises prior to listening.

Despite these limitations, which should be considered in further research, the present study makes a further contribution to understanding language proficiency differences in listening comprehension processes in terms of the relationship between listening comprehension and word recognition. Understanding such differences in listening comprehension could help learners and teachers have clearer learning and teaching practices to enhance listening comprehension.

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第二言語能力の違いによるリスニング理解と 語彙認識の関係を探る

— トップダウン・ボトムアップの観点から —

古屋 あい子

要旨：本研究はトップダウン・ボトムアップ処理の観点から第二言語能力の違いにおけるリスニング理解と語彙認識との関係を調査したものである。先行研究から、リスニング理解の処理はトップダウン・ボトムアップ処理を統制した条件では第二言語能力により異なる、という結果が得られている。この研究結果に基づき、本研究では第二言語能力による違いをさらに追究するため、先行研究同様の2つの条件におけるリスニング理解がどのように語彙認識と関係しているかを調査することとした。本調査では、2つの課題（リスニング理解・書き取り）を含む実験が実施された。本実験では、トップダウン処理とボトムアップ処理を活性化するため、背景知識と語彙知識が操作された。学習者の言語能力はTOEIC[®]スコアによって3段階に分類された。18名の中級下位学習者（535-620）、19名の中級上位学習者（730-795）、23名の上級学習者（905-990）が実験に参加した。リスニング理解の課題では、参加者は（a）語彙知識あり・背景知識なし、（b）語彙知識なし・背景知識あり、の2つの条件のリスニング教材を聴いた。書き取りの課題では、参加者はリスニング教材を聴き、聴いた語彙を書き取った。リスニング理解と語彙認識における相関分析の結果、上級学習者と中級下位・上位学習者との間に違いが見られた。上級学習者においては、（a）と（b）の条件におけるリスニング理解と語彙認識との関係に中程度の正の相関が見られた。しかし、中級下位・上位学習者においては、（a）の条件にのみリスニング理解と語彙認識との関係に正の相関が見られた。本研究はこれらの結果に基づき、第二言語学習者および教師に向けて、教育的示唆を提示する。