

講義ノートと講義内容（英語）の理解度に関する一考察

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The Effect of Notetaking with Review and Non-Notetaking with Protocol in Lecture Comprehension: A Pilot Study

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要 旨 英語を母語としない学生が、講義を英語で受け講義ノートを取る事は必ずしも安易な事ではない。講義中にノートを取る事が、講義の理解度を高めるか否かについては、いろいろな研究報告があり一致した意見に達していない。理解度を高めるか否かは、受講生自身がすでに身に付けている英語能力、学習スタイル、学習方法、およびその講義の基礎知識等が、複雑に関連し合っているように推察されている。本研究では、日本人大学生が英語で講義を聴き理解する際、ノートを取りながら講義を受ける方法と、ノートを取らずに講義を聴くのに集中するのとは、理解度にどのような差異が生ずるかを試験的に調査した。この調査では、日本人の学生に馴染みの薄い講義テーマを使用し、聴講後、ノートを取ったグループの学生はそのノートを読み講義の内容を再確認し、ノートを取らなかったグループの学生は覚えていた事を書き出す作業をした。その直後の講義内容理解度テストで、英語能力別では講義の理解度に差位が見られたが、上記のグループ別での差位はなかった。本稿ではこの結果を生み出した要因について分析し考察した。

Empirical research on lecture notetaking has been characterized as very scarce (see Chaudron, Loschky & Cook, 1994; Dunkel, 1988a, 1988b; King, 1994). Yet, notetaking has been traditionally thought of as an important skill in the academic setting both in a first language (L1) and in a second language (L2) by professors and students (see for example Dunkel & Davy, 1989; Dunkel, Mishra & Berliner, 1989; Flowerdew, 1994). Through notetaking, it is believed, notetakers encode the information which can become a beneficial source for later use in their studies. The encoding processing is thought to help learning and retention by engaging the learner's cognitive process of listening comprehension (Dunkel 1988b; Chaudron, Loschky & Cook, 1994). The external storage function of notetaking is also seen as important because the notetaker is able to refer back to the notes to review or stimulate information recall (see Dunkel, 1998a; DiVesta & Gray cited in Dunkel, 1988b: 14). However, lecture notetaking seems to require a tremendous cognitive energy from L2 learners since they have a disadvantage in a second language. It has been pointed out that there exists very little empirical research on the utility of notetaking in L2, and what has been done shows that researchers have reported mixed results, positive effects or no effect of notetaking (see Chaudron, Loschky & Cook, 1994; Chiang & Dunkel, 1992; Dunkel, 1988a; Dunkel, Mishra & Berliner, 1989; Hale & Courtney, 1993; King, 1994; Young, 1994). While some studies found that notetaking en-

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hanced the process of learning and retaining lecture material, other studies discovered that taking notes did not guarantee benefits. There seem to be many variables that may have influenced those results in complex ways, and it is not simple to pinpoint them clearly. However, one of the variables which can affect notetaking is L2 learners' listening ability.

As for L2 learners' ability in listening comprehension, it is vital to look at their cognitive processing capacity when they are listening and taking notes concurrently. Several questions related to their listening capacity arise. How is their listening comprehension affected by notetaking while listening to a lecture? In other words, will their cognitive processing capacity be overloaded if they take notes at the same time? There have been a few studies on taking notes and using notes. For example, Fisher and Harris (cited in Chaudron 1994: 79) found that subjects who did not take notes but reviewed external notes performed better in a test than those who took their own notes but also reviewed external notes. Similarly Rickards and Friedman (cited in Chaudron, 1994: 79) found that subjects who used external notes performed better in recalling "higher-level information" than subjects who took their own notes. These two studies appear to indicate that it is more effective to review external notes than actually write and review own notes. This present pilot study seeks to examine which lecture comprehension strategy, notetaking with review (NT_R) or non-notetaking with protocol (NNT_P) is more effective for L2 learners.

Background

Before embarking on a literature review on notetaking in an academic setting, it is essential to discuss what listening comprehension is since it is necessary for lecture attendees to comprehend the lecture before they endeavor to take notes on the lecture. It has been pointed out that there exists no universal definition of listening comprehension (Dunkel, 1991; Glen, 1980; Rost, 1990).¹⁾ Listening comprehension is real-time processing, so listeners do not have the same degree of control over the text as readers have (see Buck, 1992). In terms of a listening construct, it is assumed that listening is a "general construct" and that the principles of reading comprehension also apply to listening (O'Malley, Chamot & Kupper, 1989). However, Buck (1992) examined whether listening comprehension is a separate and separable trait in second-language ability. Buck's study found no clear evidence that listening comprehension differs from the reading comprehension trait. Since there is no convincing evidence to suggest that listening comprehension is an independent construct, Buck concludes that "in formal terms, we must reject the null hypothesis that second-language listening comprehension does not exist as separate trait" (p. 352). Even though listening comprehension has not yet been shown to be a separate trait, this researcher believes that for L2 learners it is a unique trait which requires various skills and strategies which are different from those of reading since listeners need to decode the information from invisible sounds.

The argument as to whether listening comprehension is a separate construct or not may be one of the reasons why there still does not exist an unequivocal definition of listening comprehension. For example, Hansen and Jensen (1994) look at listening comprehension from the perspective of what listeners do, ". . . listening comprehension is not a process but the result of a series of processes.

These processes include, but are not limited to, phoneme recognition, morpheme chunking, lexical selection, and creation of a referential meaning for words” (p. 242). According to Glenn (1989), who discussed and analyzed fifty definitions of listening, “Perceiving and interpreting are clearly central to a definition of listening. Attending and responding are also important, but some listening may occur that does not include either, at least so the definitions suggest” (p. 28). The study indicates that a universal definition of listening is not easily operationalized. However, for the purposes of the present study, the researcher will define listening comprehension in terms of how much the content of an audio-taped lecture was understood. As for “understanding”, Rost (1990) has pointed out that to understand in verbal communication, we must be concerned with to what extent the interlocutors “comprehend” through the words that an interlocutor uses and to what extent they “interpret” the ideas that are related to the words that an interlocutor uses. Concerning “understanding”, Rost asks also whether there is a mental phenomenon recoverable through probing the mind of the hearer or whether there is a social phenomenon recoverable through examination of subsequent behavior by the listener. This issue raises further questions about how we can define academic listening comprehension. For example, does it differ from listening in general?

As for the traits of lecture comprehension, Flowerdew (1994) notes that just as listening comprehension has its own distinctive features compared with reading, so lecture comprehension has its own distinctive features, with regard to listening in general (see Chaudron & Richards, 1986).²⁾ Flowerdew further explains that some of the differences between conversational listening and academic listening differ in degree and in kind. As for differences of degree, lecture attendees are more likely to need a knowledge of the particular subject matter, while in conversation necessary background knowledge will be more general. Moreover, the ability to distinguish between what is relevant and what is not relevant or less relevant is important in lectures but less important in conversation.

As for differences of kind, a number of particular skills are associated with academic listening and one, according to Flowerdew, is “the ability to concentrate on and understand long stretches of talk without asking for repetition, negotiating meaning or using repair strategies” (p. 11). These lectures are usually given to a large audience. In the case of a smaller audience, a lecture could be more flexible providing the possibility for the lecturer and audience to interact, for example, by asking questions or making sure ambiguity is cleared up etc. A second kind is notetaking ability. James (cited in Flowerdew, 1994: 11) sees lecture comprehension as a five-stage process: requiring decoding, comprehending, identifying main points, deciding when to record these, when to write quickly and clearly. In all likelihood, this process proves very demanding and challenging especially for L2 learners, but it is an important traditional ingredient for lecture comprehension.

In order to understand lectures, in general, it appears that lecture attendees need to have and use different skills and strategies from those skills they need and use during conversation. For the student’s lecture comprehension of L2, a number of researchers have tried to discover and advertise effective ways of facilitating lecture comprehension in L2. For example, Young (1994) investi-

gated how macro-structure of lecture and micro features or skills affect L2 lecture attendees' lecture comprehension. She found that only an accurate representation of macro-structure will facilitate students' processing of information. The author suggests that "if language teachers can equip students with an appreciation of macro-structure that accurately reflects what goes on in university lecture discourse, their comprehension of the information will be made easier" (p. 174).

Another component of listening comprehension examined by researchers is how different discourse patterns used by individual lecturers differ. L2 learners are usually not familiar with the different individual patterns of discourse such as an information-driven pattern, problem-solution pattern, point-driven approach etc., used by native speakers of English lecturers. Dudley-Evans (1994) points out that "the key to the understanding of lectures is an appreciation of lecturers' individual styles" (p. 148). The author divides these into three broad categories: (a) the *reading* style, (b) the *conversational* style and (c) the *rhetorical* style. Dudley-Evans also points out that discourse patterns can vary across subject areas. For example the discourse pattern of a history course might differ from that of a statistics course.

As stated briefly above, in order to comprehend lectures, different kinds and degrees of factors derived from both lecturers and lecture attendees seem to influence one another in a complex manner. One of these factors which researchers have been exploring is notetaking. As for investigations concerning whether notetaking facilitates lecture comprehension, Dunkel (1988a) explored what was the relationship between the content of L1 and L2 students' lecture notes and their retention of concepts and details presented by native English lecturers. Dunkel found that "L1/L2 notetakers who scored high on the recognition measure compacted a large amount of the lecture material into propositional pieces of the information and detected and recorded the information that subsequently appeared on the post lecture quiz" (p. 259). Since the subjects were not allowed to review their notes, it was thought that their encoding processing was being examined, but the external storage function of notetaking was not.

Further research concerning the effect of notetaking was conducted by Dunkel, Mishra and Berliner (1989), but they found a nonsignificant effect for notetaking on the immediate recall of lecture information. The purposes of their study were the following: "(a) to determine the effect of concurrent notetaking on the immediate recognition of lecture information by both native and nonnative speakers of English, (b) to examine the influence of short-term memory span on the encoding by both groups of lecture attendees of lecture material in English, and (c) to assess the effect of English proficiency on learning lecture material in English" (p. 543). Subjects (136 native speakers of English and 123 nonnative speakers) with high short-term memory and low short-term memory were randomly assigned to groups, one of which was to apply a "listening only" strategy and the other of which was to apply a "listening and notetaking" strategy during an about 23-minute video taped lecture.

The results of the analysis indicated the following: "(a) those who took notes and those who did not did equally well in recognizing lecture concept, and detail information; (b) subjects who had

high short-term memory ability correctly recognized significantly more concept information and detail information than did subjects who had low short-term memory ability; and (c) native speakers of English recognized significantly more of the lecture concepts and detail information than did non-native speakers of English” (p. 545).

Dunkel et al. point out that the finding of a nonsignificant effect for notetaking on the immediate recall does not support the “encoding hypothesis”, which stated that notetaking facilitates lecture learning. They note that failure to find a significant simple effect for notetaking suggests that notetaking without review may not facilitate effective lecture encoding for either native and nonnative speakers of English. “There appears, in other words, to be a need to rehearse the information noted down rather than just to take notes on the information imparted via lecture format” (p. 547).

One of the other important findings of their study was the importance of English language proficiency. The results showed that compared with native speakers, the nonnative speakers of English were at a distinct linguistic disadvantage in the English-speaking lecture environment. Concerning the subjects’ recall performance, the authors explain that “the fact that the native speakers recalled significantly more of the concept and detail information presented in the lecture than did the nonnative speakers provide some support for the notion that cognitive competition among languages (the international students’ first and second languages) interferes with academic discourse processing for nonnative speakers of English” (p. 547–548). One can suppose that if the students’ language proficiency were as high as that of their counterparts, their first and second language interference would be smaller. In other words, English language proficiency is one of the key elements to lecture comprehension in L2.

In order to determine the relationship between L2 language proficiency and lecture comprehension, Dunkel and Chiang (1992) examined the listening comprehension of Chinese students of English as a foreign language. The students listened to a lecture, the discourse of which was “(a) familiar-unmodified, (b) familiar-modified (c) unfamiliar-unmodified, or (d) unfamiliar-modified. They found a significant interaction between speech modification (redundant vs. non redundant speech) and listening proficiency (high-intermediate listening proficiency (HILP) vs. low-intermediate listening proficiency (LILP)). The study also revealed a significant interaction between prior knowledge (familiar vs. unfamiliar topic) and test type (passage-independent vs. passage-dependent items)” (p. 345). Furthermore, they found that language proficiency played a key role in the comprehension of the lecture information. The HILP subjects performed higher than the LILP subjects on the post lecture comprehension test whether they listened to the modified or unmodified lecture.

The above two studies by Dunkel et al. and Dunkel and Chiang indicate that lecture comprehension was not affected by notetaking, but by language proficiency. As they mentioned, the reason why they could not find a significant effect for notetaking may be due to the fact that the subjects did not review the notes. Concerning reviewing notes, Chaudron, Loschky and Cook (1994) looked at the relationship between second language learners’ notes taken while listening to pre-recorded

lectures, about six to seven minutes long and the learners' success on two different types of comprehension measures (multiple-choice and cloze listening comprehension). The authors began their study with two assumptions. The first assumption, that notetaking aids in organizing lecture content while listening, was viewed as an effect of notetaking on encoding processes. The second, that notetaking is a useful record for later recall and reconstruction of lecture content when studying, was viewed as an effect of notes as an external storage stimulus for recall.

The effect on comprehension tests when the subjects were allowed to use their own notes, and the quality of L2 learners' notes were studied. The results indicated no favorable role for retaining or not retaining notes on short-term recall success. The authors posited that this was due to the short-term delay between listening and testing, in which case the L2 learners' memory for the information was sufficient to neutralize the value of retaining notes. The study also examined the effect of quantity and quality of the notes. No strong or consistent relationship in these two categories were observed. However, they recognized the importance of including more content-based measures of note quality in an assessment of degree of comprehension.

In another listening comprehension genre, the Test of English as a foreign Language (TOEFL), Hale and Courtney (1991) examined the effects of taking notes in the listening section of TOEFL: they used mini-talks which required no prior knowledge in the subject-matter area. They found that allowing the students to take notes had little effect on their performance and urging the students to take notes significantly impaired their performance. They point out that the lack of notetaking effect may have been due to the short mini-talks, which lasted between 1 minute and 15 seconds and 1 minute and 45 seconds, compared with 10 to 30 minutes for the studies that have found a positive notetaking effect (see Barnett, DiVesta & Rogozinski; DiVesta & Gray; Einstein et al. cited in Hale & Courtney, 1991: 2). Contrary to the non-significant effect of notetaking, fully three-fourths of the students in the study believed notetaking helped them remember the information in the talks. The researchers were unable to explain this discrepancy between the students' perceptions (see Dunkel and Davy 1989) and the reality of the results.

This perception gap seems very familiar. In general both professors and students tend to believe that notetaking is a beneficial skill in the academic setting, but they do not seem to really know how effective it is. Since much of the research on notetaking has been conducted in limited laboratory settings, that is, not using authentic lectures but "scripts" of audio-recorded or video-taped lectures, researchers have been encouraged to explore comprehension of authentic lectures in order to examine what is really happening in the real world of lectures.

King's (1994) ethnographic study is one of a few studies which examined students' "authentic" lecture notes (for other examples see Benson, 1994; Mason, 1994). The research had a dual focus to examine: (a) the relationship between the visual and verbal aspects of the lecture; and (b) the notes made by overseas students with reference to the visual-verbal distinction which referred to how the visual and verbal aspects of lecture affected the notes. King found that there was a complementary relationship between the visuals and the accompanying speech. Student notes captured

at least some of the lecturer's comments, in addition to most of the visuals displayed. According to King, better students—the author did not operationalize what “better students” were—appeared to have captured more of the verbal message. Unfortunately, his subjects were only four and their degree of English language proficiency was not assessed; consequently, few generalizations could be drawn, but the study still indicates the important relationship between lecture comprehension and language proficiency (see (a) and (b) on page 6). King implied that students with high language proficiency were able to take more notes. The author assured that being able to take more notes is a positive factor in lecture comprehension.

However, the two studies mentioned in the introduction (p. 2) do not support King's argument. Rickards and Friedman (cited in Chaudron et al. 1994) showed that “subjects with external notes performed better in recalling higher-level information than subjects who took their own notes” (p. 79). Chaudron and his colleagues attributed this result to be the poor quality of one which was due to inadequate training of the notetaking group. They also argue that “this supports a ‘reconstruction’ view of the value of external storage, in that any set of prompts to the learner's memory aids in the reconstruction of the main points” (p. 79). However, Rickards and Friedman's study poses that being able to take more notes is not necessarily an assured positive factor for lecture comprehension.

In terms of whether notetaking without concerning the factor of quality nor quantity is a positive factor, Fisher and Harris (cited in Chaudron et.al 1994) found that “subjects who did not take notes, but reviewed external notes, were superior in test performance to subjects who took their own notes, but also reviewed external notes” (p. 79). Chaudron et al. analyzed the result in the following manner: “Such a result supports either the possibility that listening without the cognitive load of note-taking is simply a superior learning condition, or that conflict between having ones' own notes but then reviewing other notes results in difficulty for the latter group” (p. 79). The authors favor this second interpretation. However, based on personal experience (this is, being an international student at an American university who benefited from checking lecture notes against model notes written by teacher assistants), it all seems to depend how the notetaker uses his own notes and external notes.

As the studies reviewed above, the relationship between notetaking and lecture comprehension is deep and extremely complex since myriad intangible factors seem to be interwoven and affect the relationship between notetaking and lecture comprehension. Due to this unique trait of the relationship, a number of research questions will be raised. Among them the researcher decided to examine Fisher and Harris's finding in terms of L2 notetakers, that is, she sought to examine whether listening without the cognitive load of note-taking is a superior learning condition for L2 learners to taking notes in parallel listening during lecture presentation. The researcher assumed that unless notetakers are somewhat skilled in listening and writing at the same time, they may miss some of the essential information of the lecture while noting down. In other words, for novice notetakers, notetaking will not always enhance lecture comprehension, but it is possible that notetaking inter-

feres listening comprehension. The present study examined the following research question: which lecture comprehension strategy is more effective for L2 learners, notetaking with review (NT_R) or non-notetaking with protocol (NNT_P).

Three hypotheses were generated:

1. There will be no difference in achievement on a post lecture listening comprehension test according to language proficiency, (high vs. low).
2. There will be no difference in achievement on a post lecture listening comprehension test as a result of the two different lecture comprehension strategies, (NT_R vs. NNT_P).
3. There will be no effect for the interaction between strategy and language proficiency.

Method

Subjects

Thirty six juniors at Bunka Women's University participated in the study. All took a required lecture course, a preparation class for their overseas studies in English in the first term of their junior year. Some handouts were available during the lectures, and their American lecturer used the blackboard often to write down what he was lecturing on. The subjects were novice notetakers in English whose TOEIC scores were quite varied, from 190 to 645 points and meant the subjects fall into beginning to intermediate-level categories. These students were divided by the researcher into three groups based on their TOEIC scores: high, mid and low. Then, each group was sub-divided into two groups: (NT_R) and (NNT_P).

Materials

An audio-taped lecture, the *Titanic* and the *Andrea Doria* from the lecture used in Dunkel and Davis (1994) Intermediate Listening Comprehension by Dunkel and Lim (1986) was used (see Appendix A). The topic of the material was assumed to be relatively unfamiliar to the subjects, and this was proved by the responses of the retrospective questionnaire (see Appendix B). According to their responses on a scale of 1 = unfamiliar to 10 = familiar, over 60% of the subjects marked 1 and 25% of the subjects answered 2 to 4, which meant about 85% of the students knew very little about the topic.

The structure of the material consists of three sections: (1) initial listening, (2) mental rehearsal and review of the talk and (3) consolidation. The first part is read by a male narrator at the speed of about 130 to 150 words per minute, and then a female narrator read thirty-six important statements of the story at relatively slow speed, much slower than the first narrator with relaxing quiet background music. Lastly, the male who read the first section talks about the story in a lecture-like manner, using discourse markers, verbal features etc. (see Chaudron and Richards, 1986). The length of the first narration is about 7 minutes and the last talk is about 10 minutes. A Sony stereo CFS-W 308 was used for this audio-taped material.

Measures of proficiency

Thirty-item comprehension questions were prepared in three categories: 10 multiple-choice, 10

true or false or uncertain and 10 cloze questions (see Appendix C). The multiple-choice and true or false or uncertain questions were taken from Intermediate Listening Comprehension by Dunkel and Lim (1986), but a written form of the questions was used instead of the audio-taped questions. This is because the listening abilities of the subjects were so diversified that the speed of the audio-taped questions seemed too fast for some of the subjects to follow and comprehend. The cloze questions on the lecture were made by the researcher trying to avoid any overlap in the information asked by the questions of the two other categories, the multiple-choice and the true or false or uncertain questions.

Procedures

The purpose of the study was explained, and instructions were given orally in Japanese. They were randomly assigned to one of the experimental conditions (strategies=simultaneous notetaking vs. postlecture notetaking). They were informed that a listening comprehension test was going to be given at the end of this activity, but that would not be a “real” test for their grades. The students were told to look at the title, the *Titanic* and the *Andrea Doria* on the blackboard in a classroom which could hold at least 100 to 150 students in, and that they were going to listen to a talk on those two ships. First, they listened to the narrative part, then the review of the important aspects of the lecture and then the last talk.

Immediately after listening to the last part of the tape, the subjects who did not take notes had 10 minutes to write down anything they remembered of what they heard in Japanese or English whichever they felt comfortable with. The subjects who took notes were allowed to review their notes for 10 minutes. After that all the lecture notes and written protocols were collected. Then they answered the thirty questions in 20 minutes.

Statistical Analysis

A .05 p value was set for all statistical tests. The data were analyzed by a 2×2 Factorial ANOVA.³ There were two levels of proficiency (high vs. low) and two levels of strategy (NT_R) and (NNT_P).

Results

The statistical data analysis is shown in Table 1 on page 10. The obtained F ratio for proficiency, $F(1, 23) = 9.05$ $p < .05$ uncovered a significant main effect to reject hypothesis 1, which means proficiency had a main effect on the lecture comprehension. The strength of ω^2 was calculated for proficiency, yielding .27, which indicates that the strength of that relationship between proficiency and achievement of the listening comprehension was mild, only 27%. As for the F ratio for strategy use, $F(1, 23) = .002$ $p < .05$ does not allow one to reject hypothesis 2, which concluded that there is no difference between the two strategies, NT_R and NNT_P in achievement of the listening comprehension. Since the F ratio for the interaction is not significant, there was no interaction between proficiency and strategy. The reliability of the comprehension test was calculated by using Kuder-Richardson formula 21 and there was .76.

Table 1 Summary of 2 × 2 Factorial Analysis of Variance

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Between Groups				
Proficiency	1	192.67	192.67	9.05*
Strategy	1	.04	.04	.002
Proficiency x Strategy	1	.17	.17	.01
Within Groups	20	426.08	21.30	
Total	23	618.96		

**p* < .05

Discussion

The finding of a significant relationship between the proficiency and the results of the post listening comprehension test has confirmed that the previous research findings which indicated a positive relationship between language proficiency and listening comprehension (for example Chiang & Dunkel, 1992; Dunkel, 1988a; King, 1994). This finding is encouraging for L2 language teachers because it suggests that if the teachers help L2 learners improve their language proficiency, the improved proficiency will make the learners be able to comprehend lectures also. On the other hand, the finding of no significant difference between the two lecture comprehension strategies used by 12 high language proficiency subjects and 12 low language proficiency subjects suggests that there are some other factors which might have affected the subjects' listening comprehension. The factors that need to be examined are the following: (1) the length of the lecture, (2) individual students' learning styles, (3) the material and (4) the preclusion of review of the notes before the test.

The lecture, 10 minutes in length, might be a crucial factor in hampering the result. In their responses to the retrospective questionnaire, about half of the non-notetakers expressed the concern that they tried to remember the content as much as they could since they were not allowed to take notes, but it was hard for them to remember everything they heard in a 10-minute talk. They mentioned that they tried to remember at least some words they were able to hear or some of the date and figures in the lecture. Unfortunately, this listening strategy made some of them somewhat more confused and less effective in comprehending the lecture. Their responses suggest that those students' cognitive function was overloaded because they tried hard to remember the facts in the lecture; consequently, they failed to be effective in understanding the lecture.

This concern of the subjects was unexpected because the researcher assumed that listening and taking notes concurrently would be quite demanding for the novice notetakers; therefore, listening without taking notes would be less demanding in comprehending lectures. According to Hale and Courtney's study (1993) taking notes for mini-talks (one to less than two minutes) was not beneficial because the short-term memory (see Dunkel, Mishra & Berliner, 1989)⁴ seemed to be able to hold the information for that time period; therefore, notetaking appeared to be unnecessary for an-

swering the questions in the mini-talks. Their finding could explain that if the lecture got longer than the short-term memory could manage taking in the information and if listeners tried to remember the information under the pressure of not being able to take notes, their cognitive function could be overloaded.

Another factor which might have affected the result was that without considering the individual students' leaning styles, that is, which student prefers notetaking or not, the researcher grouped them into those NT_R and NNT_P groups according to their TOEIC scores. Several subjects expressed that since they were not allowed to take notes, they thought they had to remember the content of the lecture but eventually forgot quite a lot of what they tried to remember toward the end. This concern of the subjects implies that if they themselves could have decided to take notes or not, their cognitive loading might have been different, possibly less stressful or less loaded; consequently, the test results might have been different. In other words, if research is to find out which is a better strategy for lecture listening comprehension, there is necessary to assess also subjects' familiar or preferable lecture listening strategies. Otherwise, researchers might force the use of a particular strategy which might create a stressful, less effective listening environment for listeners.

As for appropriateness of the material, which was an audio-taped, 10-minute lecture for L2 intermediate students, it seemed too difficult for those students who scored below 300 in the TOEIC test. Even though the reliability of the comprehension test was 76%, most of the students in the low proficiency group mentioned that they hardly understood the content but guessed the answers. According to their responses in the retrospective questionnaire, they used both top-down and bottom-up strategies trying to understand the lecture. The form of the lecture was a familiar one for the subjects, a comparison of two ships; consequently, they might have been able to use their world knowledge to guess and answer the questions. Another helpful factor to their comprehension was that the audio-taped questions of the test were changed to written form. It is not sure, but this change may have given some clues to those subjects who could hardly understand the content of the lecture because they somehow managed to answer the questions. Their scores were the lowest but still they got 6 to 10 points out of 30 points (20% to 30%).

A forth factor is that the lecture notes and written protocols were collected before the test, which means only the subjects' encoding processing was assessed but not the storage function of their lecture notes and written protocols. Although they had 10 minutes to review the notes or to write their recalls, it might have produced different results if they had been able to keep the written materials while answering the test questions. One of the notetakers mentioned that when she reviewed her notes, she was able to remember writing down the information from the lecture, but she could not remember what she heard by reviewing her notes. However, she was able to connect bits and pieces of the information to recall what she heard. Probably, this is a special case, but if this particular student had been able to keep her notes to recall the information while answering the questions, her post lecture test score would be different. There could be many more factors which might have affected the results of the present study. For instance, (a) the test was not considered to be a "real"

one; (b) their language proficiency also included reading scores; and (c) the lecture was not authentic, which means no visual aids nor the lecturer's further explanation to make the content of the lecture clearer etc.

Pedagogical implications

This pilot study suggests the following:

1. It is essential for L2 teachers to be aware that a non-stop lecture, even a short one like the one used in the present study, requires a tremendous cognitive effort on the part of L2 learners.
2. It seems true that L2 language proficiency has an effect on lecture comprehension; therefore, parallel instruction, that is, general listening practice and lecture listening practice in EFL/ESL programs could be ideal to facilitate the student lecture listening ability.
3. Individual students' learning styles and preferences of learning need to be respected in lecture comprehension also since some of their learning habits could have been already fossilized; therefore, it is possible that L2 learners possess own unique ways to comprehend and recall the lecture.

Limitations

1. The size of the subjects was definitely too small to generalize the findings.
2. Since the research design did not separate the variables into four: non-notetakers from notetakers and review from protocol, it was impossible to pinpoint the following: (a) whether notetaking or non-notetaking affected the post lecture comprehension test scores; and (b) whether review or protocol affected the scores.
3. The measurement was only one 30-item comprehension test, which could not probe the subjects' comprehension in other than those 30 questions.
4. There was no comparison between the quality and quantity of the lecture notes and the written protocols, which might have given more clues to uncover the relationship between: (a) lecture listening comprehension and notetaking and (b) lecture listening comprehension and written protocols.

Conclusion

The present study examined the encoding processing of lecture comprehension of L2 learners by using different strategies: notetaking with review and non-notetaking with protocol. The finding of a significant relationship between the proficiency and the achievement in the post listening comprehension test has confirmed the previous research findings which indicated a positive relationship between language proficiency and listening comprehension. On the other hand, the finding of no significant difference between the two strategies suggests that more controlled and thorough research is called for in order to probe the encoding processing in lecture comprehension under different conditions. Furthermore, it appears to be very crucial to assess L2 students' various learning styles so that these can be matched with the most appropriate and effective skills and strategies for lecture comprehension.

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Footnotes

- 1) Dunkel (1991) examined problems of definition and operationalization of listening discussing the definitions given by previous communication scholars and researchers. Glen (1989) analyzed 34 definitions of listening in addition to 16 definitions given by speech communication scholars from 1925 to 1985. Glen concluded that there appears to be no universally accepted definition of the construct of native language listening.
- 2) Chaudron and Richards, having dealt with lectures in the reading style, pointed out that “a lecture read

from a written text will usually lack the kinds of macro-markers found in the more conversation of teaching” (p. 24).

- 3) A Factorial ANOVA was the appropriate statistical analysis for this study since the mean (15.76) and the standard deviation (5.28) indicate that the scores were normally distributed (the range of the comprehension test was 6 to 27 out of 30 points).
- 4) Dunkel, Mishra and Berliner found L2 students’ poor performance due to their low short-term memory.

Appendix A

The *Titanic* and the *Andrea Doria* script

On the morning of April 10, 1912 the luxury liner the *Titanic* left England on a voyage to New York. Four days later she lay at the bottom of the Atlantic Ocean. On Wednesday July 18, 1956, the Ocean liner the *Andrea Doria* left Italy. The *Andrea Doria* was also traveling to New York. Eight days later this great ship also lay at the bottom of the Atlantic.

The sinking of these two huge ships, these two very, very large ships, shocked the world. Reports of these two tragedies filled the newspapers for days. When the *Andrea Doria* went down, people compared her sinking with the sinking of the *Titanic*. There were similarities between the two events; however, there were also important differences.

What were some of these similarities? First of all, both ships were transatlantic ocean liners. In addition they were both luxury liners. They carried many of the world’s famous and rich people. In fact, ten American millionaires lost their lives when the *Titanic* went down. Today millions of gold, silver, and cash may still remain locked inside these two sunken ships.

Another similarity was that as each ship was sinking, there were acts of heroism and acts of villainy. Some people acted very bravely, even heroically. Some people even gave up their lives so that others could live. There were also some people who acted like cowards. For example, one man on the *Titanic* dressed up as a woman so that he could get into a lifeboat and save his own life. One last similarity was that both of these ships were considered “unsinkable.” People believed that they would never sink.

I’d like to shift my attention now to the differences between these great ship disasters. To begin with, the *Titanic* was on her maiden voyage; that is, she was on her very first voyage across the Atlantic. The *Andrea Doria*, on the other hand was on her 101st transatlantic crossing. Another difference was that the ships sank for different reasons. The *Titanic* struck an iceberg while the *Andrea Doria* collided with another ship. Another contrast was that the *Andrea Doria* had radar to warn of the approach of another ship, but the *Titanic* was not equipped with radar. The *Titanic* had only a lookout. The lookout was able to see the iceberg only moments before the ship struck it. But, of course, the greatest difference between the two terrible accidents was the number of lives lost when the *Titanic* sank more than 1,500 people died. They drowned or froze to death in the icy North Atlantic water, over 700 people survived the sinking of the *Titanic*. In the *Andrea Doria* accident 60 people lost their lives, and about 1,650 lives were saved. One of the reasons that so many people died on the *Titanic* was that the ship was considered to be unsinkable and so there were about half the number of lifeboats needed to rescue all the people aboard the ship. The *Andrea Doria* had more than enough lifeboats to rescue every person on the ship; however, they were able to use only about half of the lifeboats they had because of a mechanical problem. The passengers and crew of the *Andrea Doria* were very lucky that another ship was able to rescue most of them. The passengers on the *Titanic* were not so fortunate. It is interesting that the wreck of the *Titanic* was only found in September of 1985.

Whenever there are large numbers of people traveling together on a boat, ship, or plane, the possibility of disaster is always present. Most people arrive safely at their destination, but accidents like shipwrecks and plane crashes do happen, and these accidents remind us that no matter how safe we feel, accidents can happen suddenly and unexpectedly.

Appendix B

Retrospective Questionnaire

For the notetakers

- (1) Were you able to hear the lecture while taking notes?
5 4 3 2 1 0
yes no
- (2) Were you able to comprehend what the speaker was saying while taking notes?
5 4 3 2 1 0
yes no
- (3) Do you think taking notes has helped you answer the comprehension questions better?
5 4 3 2 1 0
yes no
- (4) Do you think reviewing your notes for 10 minutes has helped you answer the comprehension questions better?
5 4 3 2 1 0
yes no
- (5) Do you take notes when you listen to listening comprehension exercises in your listening class(es)?
5 4 3 2 1 0
yes no
- (6) Do you take notes when you listen to lectures in English?
5 4 3 2 1 0
yes no
- (7) On a scale of 1–10, how confident are you that you understood of the lecture?
10 9 8 7 6 5 4 3 2 1
- (8) On a scale of 1–10, how confident are you that you take good notes?
10 9 8 7 6 5 4 3 2 1
- (9) On a scale of 1–10, how much did you already know the topic of the lecture?
10 9 8 7 6 5 4 3 2 1
- (10) When you were not taking notes, what were you actually doing?
(write in Japanese.)

For the non-notetakers

- (1) When you were not taking notes during the lecture, did you take notes mentally?
5 4 3 2 1 0
yes no
- (2) Do you think writing a summary of the *Titanic* and the *Andrea Doria* immediately after the listening has helped you answer the comprehension questions better?
5 4 3 2 1 0
yes no

- (3) Do you take notes when you listen to listening comprehension exercises in your listening class(es)?
- | | | | | | |
|-----|---|---|---|---|----|
| 5 | 4 | 3 | 2 | 1 | 0 |
| yes | | | | | no |
- (4) Do you take notes when you listen to lectures in English?
- | | | | | | |
|-----|---|---|---|---|----|
| 5 | 4 | 3 | 2 | 1 | 0 |
| yes | | | | | no |
- (5) On a scale of 1–10, how confident are you that you understood of the lecture?
- | | | | | | | | | | |
|----|---|---|---|---|---|---|---|---|---|
| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|----|---|---|---|---|---|---|---|---|---|
- (6) On a scale of 1–10, how confident are you that you take good notes?
- | | | | | | | | | | |
|----|---|---|---|---|---|---|---|---|---|
| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|----|---|---|---|---|---|---|---|---|---|
- (7) On a scale of 1–10, how much did you already know the topic of the lecture?
- | | | | | | | | | | |
|----|---|---|---|---|---|---|---|---|---|
| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|----|---|---|---|---|---|---|---|---|---|
- (8) When you were not taking notes, what were you actually doing?
(write in Japanese.)

Appendix C

The Comprehension Test (the *Titanic* and the *Andrea Doria*)

A. Multiple-choice Quiz

Directions: The following 10 questions are about the sinking of the *Titanic* and the *Andrea Doria*. Read each question and then decide whether (a), (b), (c), or (d) is the correct answer to the question. **Circle the answer.**

1. What was the destination of the *Titanic*?
 - (a) Italy
 - (b) England
 - (c) New York
 - (d) None of the above
2. How many years after the *Titanic* sank did the *Andrea Doria* go down at sea?
 - (a) 44
 - (b) 60
 - (c) 1912
 - (d) 1956
3. How were the *Titanic* and the *Andrea Doria* similar?
 - (a) They were both luxury liners.
 - (b) They were both crossing the Atlantic when they sank.
 - (c) People believed that both ships were unsinkable.
 - (d) All of the above.
4. How were the *Titanic* and the *Andrea Doria* different?
 - (a) The *Andrea Doria* sank, but the *Titanic* did not.
 - (b) The *Andrea Doria* carried enough lifeboats for all the people on the ships, but the *Titanic* did not.
 - (c) The *Titanic* had radar; however, the *Andrea Doria* did not have radar.
 - (d) The *Andrea Doria* carried passengers, but the *Titanic* did not.

5. Dressing up as a woman to save your life is an example of which of the following? An act of _____.
 - (a) bravery
 - (b) heroism
 - (c) villainy
 - (d) all of the above

6. Which of the following statements is true?
 - (a) The majority of people on the *Titanic* were rescued.
 - (b) Everybody on the *Andrea Doria* was able to get into a lifeboat.
 - (c) The *Titanic* went down on her first voyage across the Atlantic.
 - (d) The lookout on the *Titanic* saw the iceberg about an hour before the accident.

7. What was different about the sinking of the *Andrea Doria* from the sinking of the *Titanic*?
 - (a) More people died on the *Andrea Doria*.
 - (b) Fewer people died on the *Andrea Doria*.
 - (c) About the same number of people died on both ships.
 - (d) None of the above.

8. Which of the following statements is not true?
 - (a) Seven hundred people were rescued from the *Titanic*.
 - (b) The *Titanic* and the *Andrea Doria* truly unsinkable ships.
 - (c) The *Titanic* did not have enough lifeboats for all the people aboard.
 - (d) There is still money, silver, and gold in the *Titanic* and the *Andrea Doria* at the bottom of the sea.

9. Why do you think the *Titanic* did not have radar?
 - (a) Radar had not been invented in 1912.
 - (b) A lookout was considered to be better than radar.
 - (c) The people who owned the ships were trying to save money.
 - (d) Radar doesn't work well in parts of the world where there are the icebergs.

10. Why were there so few lifeboats on the *Titanic*?
 - (a) Lifeboats are very expensive.
 - (b) Nobody thought that they would be needed.
 - (c) The *Titanic* was a small ship, and there wasn't enough room for them.
 - (d) All of the above.

B. True-False Quiz

Directions: Read each statement below and if the statement is true, place a **T** in the blank space. If it is false, place an **F** in the blank. If the truth cannot be determined from the information given in the talk, place a “?”.

1. ____ The *Andrea Doria* was on its way to New York when it sank.
2. ____ The *Andrea Doria* sank 44 years before the *Titanic*.
3. ____ The *Titanic* was a larger ship than the *Andrea Doria*.
4. ____ The *Titanic* had crossed the Atlantic many times.
5. ____ The radar system on the *Andrea Doria* was not working when the two ships collided.

6. ___ The lookout on the *Titanic* was asleep at the the time the ship struck the iceberg.
7. ___ All of the passengers died when the *Titanic* sunk.
8. ___ The *Andrea Doria* collided with the *Titanic*.
9. ___ Fewer people died on the *Andrea Doria* than the *Titanic*.
10. ___ The *Andrea Doria* sank about 60 miles from New York City.

C. Recall the talk on the two ships and fill in the blanks to make the statements true.

1. The sinking of these two ships _____ the world.
2. People _____ the *Andrea Doria* with *Titanic*.
3. The ships sank for _____ reasons.
4. They carried many of world's _____ and rich people.
5. Both ships are considered _____.
6. The *Titanic* was on her _____ voyage.
7. The greatest difference between these two terrible accidents was the number of _____ lost.
8. The *Andrea Doria* had enough _____.
9. Another ship rescued most of the passengers and crew of _____.
10. Whenever people travel, there is the _____ of disaster.