



## TOP-DOWN AND BOTTOM-UP PROCESSING IN L2 LISTENING COMPREHENSION

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1. Introduction. The present study aims to investigate the effects of discourse markers on L2 learners' listening comprehension. Discourse markers (i.e. macro- and micro-markers) are signaling devices for the information structure of discourse. Macro-markers are markers of higher-level information, signaling the relationship between the major propositions or marking the important transition points in the discourse (e.g. 'What I'm going to talk about today', 'Let me give you an example', 'It is defined as X', etc.). Micro-markers are markers of lower-level information, which mark intersentential relations or function as pause fillers such as 'and', 'so', 'but', 'now', 'ok'.

Studies in L1 and L2 reading (Kintsch and van Dijk 1978, Meyer et al. 1980, Carrell and Eisterhold 1983, Carrell 1984, Carroll 1986) have shown that the rhetorical signaling cues in the text help the readers efficiently follow the organization of the text and perceive the main points, as well as to make predictions about what is to come next. Furthermore, these devices are found to elevate potentially excessive processing demands on readers, resulting in superior comprehension of the text.

Hron et al. (1985) also pointed out the importance of presenting texts with text accentuation devices (discourse markers) for better L1 comprehension. In their study, native speakers of German were presented with 'accentuated' (discourse markers included) and 'non-accentuated' (discourse markers deleted) versions of science texts. Measures included recall protocols and nine open-ended factual questions. Subjects receiving the accentuated version reproduced significantly more main ideas immediately after exposure than those receiving the non-accentuated version. Moreover, on a retention test one week later, the positive effects of the text accentuation devices also remained for the performance of those who read the accentuated text version.

Additional support for the importance of various signaling cues comes from Kintsch and Yarbrough (1982). They found that subjects were better able to answer questions concerning the main ideas and topic points of the texts after reading the version with explicit cues than the version without them. It was found that such signaling devices facilitate macro-processing by initiating the readers' appropriate formal schemata and that these cues help them comprehend the incoming information.

Positive effects of discourse markers on comprehension have been observed in listening research, although in the limited number of studies. Chaudron and Richards (1986) investigated the effect of discourse markers on L2 learners' listening comprehension at two institutional levels on four different versions of the same text: (a) a 'base-line' version, which contained neither of macro- and micro-markers, (b) a 'micro' version containing low-level markers, which link

between sentences in the lecture or function as pause fillers, (c) a 'macro' version, which contained high-level markers for signaling the relationship between the major propositions or important transitional points in the lecture, and (d) a 'micro-macro' version, a combination of the 'micro' and 'macro' versions described above. They employed cloze, true-false, and multiple-choice tests as comprehension measures and found that macro-markers were more conducive to successful recall of the lecture than micro-markers.

A study by Flowerdew and Tauroza (1995), a follow-up to the research by Chaudron and Richards (1986), specifically investigated the effect of micro-markers in L2 learners' listening comprehension, using an authentic video-recorded science lecture. They found that the presence of naturally-occurring micro-markers did aid L2 learners' listening comprehension, which was measured by a self-assessment, short answers and true/false tests, and written protocols. With all three measures, the subjects who viewed the original lecture version scored higher than those who viewed the deleted version. Significant differences were found in the scores of the two objective tests, although the difference between the self-assessment scores among these groups was found to be marginally below statistical significance.

In comparison with reading research, however, there clearly needs to be more extensive research on the role of discourse markers in L2 listening area. The present study attempts to explore further the relationship between discourse markers in oral discourse and their effects on L2 listeners' comprehension of information conveyed.

## 2. Present Study

2.1. Research Questions. The present study was intended to investigate the effects of discourse markers in lectures on L2 learners' listening comprehension. More specifically, the study addressed the following questions:

1. What is the effect of discourse markers on L2 learners' perceived comprehension of the lecture?

2. What is the effect of discourse markers on their recall of idea units in the lecture?

2.2. Hypotheses. Based on findings on the role of discourse markers in general, the following hypotheses were made with respect to each research question:

H1: L2 learners listening to the lecture with discourse markers (evident form lecture) would do better than those listening to the lecture without them (non-evident form lecture) on the self-assessment test of their comprehension.

H2: L2 learners listening to the evident form lecture would recall more idea units in the lecture than those listening to the non-evident form lecture.

2.3. Subjects. The subjects were 16 Korean students who were enrolled in High Intermediate and Advanced ESL classes in at an American university. The subjects had studied English in Korea for nine years and had stayed in English-speaking countries less than a year on average. Care was taken to make both treatment groups homogeneous in terms of their language abilities as well as their listening comprehension abilities. Prior to being assigned to the current ESL classes, these

participants took the English Placement Test administered by the university, which consists of three components: listening, structure, and vocabulary. Only those who achieved minimum scores of 72 on the listening test participated in the present study, and the subjects in the two different treatment groups were carefully matched according to their listening test scores.

2.4. Materials. Each group of subjects listened to a pre-recorded lecture, which was adapted from 'Attitudes and Behavior' in Rost's Social Psychology lecture series (1994) (see Appendix). Two versions of the lectures were audio-taped by a native speaker of English at a language laboratory at the present university. The researcher ensured that the subjects did not know about this lecture content before the implementation of the present study. Eight subjects listened to the ten minute-lecture with 1180 words, containing discourse markers (the evident form lecture). The evident text included macro-markers such as summarizers (e.g. 'My point is that in a ritual the steps must be there, and must be there in a certain order'), metastatements (e.g. 'I am going to talk briefly about more complex norms such as rituals'), defining words (e.g. 'What I mean by universal norms is norms that all societies have in common'), exemplifiers (e.g. 'Let me give you an example of a norm in different cultures'), and conclusions (e.g. 'That's all we'll talk about today'), and micro-markers such as 'ok', 'now', 'then', 'and', 'so'. The other eight subjects listened to the eight minute-lecture with 788 words, excluding discourse markers (the non-evident form lecture). The content remained the same for both forms.

2.5. Procedures. The two versions of the lecture (i.e., evident and non-evident form lectures) were randomly assigned to the respective subject groups. Each group was tested at a language laboratory on a different day. First, the researcher briefly explained the purpose and procedures of the study in Korean. After the brief instruction was given, subjects were asked to fill in information on the demographic questionnaire, such as how long they had studied English in Korea and have stayed in English-speaking countries. Then each group listened to the lecture using headphones in individual booths. The subjects were allowed to take notes while listening to the lecture. They were informed that they could take notes in either Korean or English, or a mixture of both. After listening to the lecture, the subjects were asked to estimate how much they understood of the lecture in percentage terms by circling the value on the assessment scale. The assessment scale goes from 0% (understand nothing) to 100% (understand everything) in 10% increments. Lastly, the subjects were given fifteen minutes to write down what they thought was important in the lecture in either Korean or English or a mixture of both, in which they were allowed to refer to their notes. Then the subjects gave their notes, summary papers, and handouts (demographic questionnaires and self-assessment scales) to the researcher.

2.6. Scoring and Data Analysis. The written recall protocols were scored for the presence of each of seventeen idea units in the lecture, which were previously designated by the researcher based on Rost (1994). Idea units are defined as "units [that] correspond either to individual sentences, basic semantic propositions, or phrases" (Bransford and Johnson 1973: 393, cited in Lee 1983). The subjects did not need to repeat the exact words in their protocols. That is, words or phrases with equivalent meanings in English or Korean (paraphrasing) were accepted if they represented relevant idea units. In scoring, spelling errors were ignored.

Statistical analyses were performed with the Statistical Package for Social Sciences (SPSS)

programs, in which the dependent measures (i.e. self-assessment scores of comprehension and recall protocols of idea units) were analyzed separately by means of t-tests with the independent variable, the two versions of the audio-taped lecture (i.e. evident vs. non-evident forms).

2.7. Results and Discussion. Analysis of the self-assessment scores between these two groups showed that these groups were not significantly different in terms of their perceived comprehension (evident form group mean scores 71.25% vs. non-evident form group mean scores 56.25%,  $t(14)=1.33$ , n.s.). On the other hand, analysis of the subjects' recall protocols of idea units in the lecture indicated that discourse markers play a significant role in listeners' comprehension of the lecture information. Subjects who listened to the evident form lecture recalled almost twice as much information as did those who listened to the non-evident form lecture (evident form group mean scores 47.06% vs. non-evident form group mean scores 27.24%). The difference between these two groups was statistically significant ( $t(14)=2.58$ ,  $p < .05$ ).

Furthermore, half of the subjects listening to the evident form recalled more than 50% of the seventeen idea units. Conversely, none of the subjects who listened to the non-evident form scored more than 50% of them. In regard to the self-assessment scores, six subjects in the evident form group scored more than 50%, while four of the non-evident form group did.

A closer examination of the groups' written protocols revealed that subjects listening to a text without discourse markers, unlike those in the evident form group, tended to misinterpret some of the main ideas or become confused among topic points, as in example 1 and example 2:

(1) Universal norms are standards of people's behavior.

(The subject seems to be confused with definitions of 'universal norm' and 'norms'. Norms were defined as standard behaviors of people in a group).

(2) This norm makes skill for greeting neighbors and accepting society.

(A correct interpretation of the lecture would be learning this kind of norm (i.e., ritual) is a part of learning to be an acceptable member of our society).

In addition, subjects listening to the non-evident form tended to confuse sequences of actions and relationships between events, as in example 3:

(3) (English translation of Korean written recall protocol)

The old neighbor invites the new neighbor, and there is a greeting at the door. The visitor is invited into the house, and the hostess serves tea. After they exchange information about what their husbands do, the visitor looked around the house.

(In neighbor ritual, the order of actions is particularly important. According to the lecture, the visitor should look around the house before the hostess serves the tea to the new neighbor.)

Furthermore, subjects listening to the non-evident form tended to mix details of the information, as in example 4:

(4) Norms are standard of individuals' behavior. For example, we can observe different norms in food items in different societies. Africans eat fish, but don't eat pork. Egyptians eat pork, but don't eat beef. Russians eat beef, but don't eat snake. Also, we can know universal norms.

(The correct information about people from different countries is: 'The Zulu in Africa eat locusts, but they don't eat fish,' 'The Egyptians eat fish, but they don't eat pork.')

In summary, subjects who listened to the evident lecture form performed significantly better than those who listened to the non-evident form on their recall of idea units although the difference between the evident versus non-evident scores was not statistically significant for their perceived comprehension.

The present findings showed that devices explicitly signaling macro-and micro-structures helped the evident form group comprehend better, especially with their top-down processing of information in the text, whose processing is interactive with bottom-up information. Top-down processing allowed subjects who listened to the lecture with discourse markers to use prior knowledge as part of the process of comprehension. Through top-down processing, they were able to make reference to various types of frames and schemas, which helped them to predict and infer what would follow in the discourse. At the same time, bottom-up processing, which is triggered by the incoming data, helped these listeners to assign grammatical status to words on the basis of syntactic and morphological cues and the meanings of lexical items used in the message.

A number of studies (Lebauer 1984, Chaudron and Richards 1986, DeCarrico and Nattinger, 1988, Tauroza and Allison 1994, Young 1994) have shown that many foreign students studying in the United States, even with high scores on standardized tests, have difficulty comprehending academic lectures and fail to understand the main points of the lectures because they lack familiarity of use of various discourse markers.

The important role of discourse markers in listening was also observed in studies investigating native speakers of English comprehension of the nonnative speakers' oral discourse. Natives were found to have difficulty following lectures given by nonnatives mainly because these signaling devices were either missing or used inappropriately in nonnatives' text (Rounds 1987, Tyler 1992, Tyler and Bro 1992, William 1992).

3. Conclusion. The present findings seem to support the claim that L2 listeners benefit from the presence of signaling devices in texts. The pedagogical implications of the present study can be discussed in several ways. Lecturers should realize the value of discourse markers for making their organizations and elaborations of meanings clearer while delivering lectures. This would help both L1 and L2 learners comprehend the lectures better. Teachers of listening also need to be

aware of the role of signaling devices in comprehension; they should help students to recognize diverse types of discourse markers with different functions used in lectures such as metastatements, definitions, exemplifications, and pointer words. Furthermore, curriculum and materials developers should take into account such signaling devices as a relevant focus for classroom activities and instructional materials.

Further research is clearly needed in order to see whether the present findings will be supported and in order to gain a better understanding of the role of discourse markers in L2 listening comprehension.

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## APPENDIX

### Scripts of the Lectures

#### Evident Form

Hello, everyone. Today, I would like to continue our discussions of social psychology by talking about some of the major influences on our attitudes and on our behaviors. Now, I would like to start this lecture by first introducing the concept of a norm. Then, I would like to mention that every culture has norms for basic survival elements, and I would like to spend some time talking about how each culture has different norms about basic elements such as food. Thirdly, I will talk about universal norms, norms that all societies share. And, lastly, I'm going to talk briefly about more complex norms such as rituals. Let me ask you, what is a norm? Some of you may have heard this before. We define a norm as an accepted or expected standard of behavior or standard thinking in a given group of people. All groups of people have norms for an array of things, for basic things like the food they eat, the clothes they wear, and so forth. Let me give you an example of a norm in different cultures. Ok, first, I'm going to give you some names of some food items. See if you've heard of these or have eaten these before. Here are the food items: oysters, snails, locusts, fish, pork, beef, snake.... Ok, now, all of these are food items that are part

of the norm within given society. Take this as an example, Americans eat oysters, but they don't eat snails, right? French eat snails, but they don't eat locusts. The Zulu in Africa eat locusts, but they don't eat fish. The Egyptians eat fish, but they don't eat pork. Indians will eat pork, but they won't eat beef. Russians will eat beef, but they won't eat snakes. The Chinese will eat snakes, but they don't eat oysters, for instance. Do you see what I mean? We have seen that different types of food are part of one group's norm, but not another group's norm. So, each group has norms for things like food, but they might differ from each other in some aspects. We do have standards for these kinds of things that relate to the very basic elements of survival such as food and our basic habits such as the way that we get dressed, the way that we talk to people in different situations. And cultures adopt different norms for these basic survival elements.

Now, turning to our second point, not all norms in each society are different from each other. Some people claim that there are universal norms. What I mean by universal norms is that norms that all societies have in common. Let me give you an example of a universal norm. The hierarchies of address are such an example. As you might remember from the previous lecture, an American Psychologist named Roger Brown has also talked about the hierarchies of address. The hierarchies of address are defined as the standards we use for addressing different people in our society. For example, Recently, I was in a taxi in Tokyo, or actually, I believe it was Nagoya. And, I hadn't been to this place and neither had the taxi driver apparently. So, as we got in the neighborhood, we had to stop the car and ask in turn several different people if they had ever heard of this particular building. And the taxi driver stopped and asked about four or five different people, a house wife in maybe in her early thirties, an elderly woman maybe in her seventies, a businessman maybe in his forties, and a group of schoolchildren, say around ten or twelve years old. What is really interesting about is the different way that he addressed these people. The way that he approached them, the way he opened the conversation was very different because the people were of different ages, different sexes, different social positions. So, this is an example of a hierarchy of address, which is a type of norm, and it is claimed to be a universal norm. Ok, so far, I have talked about two important aspects of norms. I mentioned how each culture has different norms about basic survival elements such as food, and I also mentioned the universal norms.

You've heard some norms for things like talking, things like eating, and these are rather simple. Now, let us turn to our third point, more complex norms. What do I mean by complex norms? Complex norms are known as rituals, which are a set or series of actions which take place in a certain order. A British psychologist named Michael Argyle had studied the rituals in various societies, including British society, and he has identified a number of steps that take place in different rituals. One example of the ritual, I am going to give you is, what he calls the neighbor ritual. All right, in the new neighbor ritual, as he calls it, we have a typical set of, set of behaviors. When a new family moves into a new neighborhood, shortly after that, the housewives in the immediate area will come over to the house, and through a series of actions they will introduce themselves to the new housewife in the neighborhood. And according to Argyle, these are several major steps, Ok, these are the steps in this particular ritual. First, there is an invitation, and old neighbor invites the new neighbor to come over. The second step is that there is the greeting at the door. 'Hello, how are you? Please come in'. The visitor is invited into the house, this is the third step. The fourth step is that the visitor has to admire the house. 'Gee, that's lovely furniture you have here'. Next, the hostess will serve tea and biscuits, then they will sit down. They will exchange essential information. They must exchange information about their husbands, what their husbands do, where their husbands work, and what their husbands like to do in their free time.



And finally, after a fixed period of time, maybe fifteen minutes or so. Remember, the new neighbor must take the initiative and say it's time to go. Gets up, says farewell, 'We'll have to see each other again'. Ok, now these steps together form what we call a ritual, or a ritualized norm. Ok, not only in a ritual must all the steps be there, but they must be there in a certain order. For instance, in the new neighbor ritual, the hostess won't immediately serve tea and biscuits without giving a tour of house. Nor will the person who comes to the house immediately start talking about her husband. Ok, my point is that in a ritual the steps must be there, and must be there in a certain order. Argyle the British psychologist and others claim that it is knowledge of rituals that makes us skillful. That makes us socially skillful in a given society. So learning the rituals is part of learning to be an acceptable member of our society. And, that's all we'll talk about today.

### Non-evident Form

Hello, everyone. Today, I would like to continue our discussions of social psychology by talking about some of the major influences on our attitudes and on our behaviors. A norm is an accepted or expected standard of behavior or standard thinking in a given group of people. All groups of people have norms for basic survival elements, like an array of things, for basic things like the food they eat, the clothes they wear, and so forth. Oysters, snails, locusts, fish, pork, beef, snake....are some names of some food items. All of these are food items that are part of the norm within a given society. Americans eat oysters, but they don't eat snails. French eat snails, but they don't eat locusts. The Zulu in Africa eat locusts, but they don't eat fish. The Egyptians eat fish, but they don't eat pork. Indians will eat pork, but they won't eat beef. Russians will eat beef, but they won't eat snakes. The Chinese will eat snakes, but they don't eat oysters. Each group has norms for things like food, but they might differ from each other in some aspects. We do have standards for these kinds of things that relate to the very basic elements of survival such as food and our basic habits such as the way that we get dressed, and the way that we talk to people in different situations. And cultures adopt different norms for these basic survival elements.

Some people claim that there are universal norms. Universal norms are norms that all societies have in common such as hierarchies of address. An American Psychologist named Roger Brown has also talked about the hierarchies of address, which are the standards we use for addressing different people in our society. Recently, I was in a taxi in Tokyo, or actually, I believe it was Nagoya. I hadn't been to this place and neither had the taxi driver apparently. As we got in the neighborhood, we had to stop the car and ask in turn several different people if they had ever heard of this particular building. The taxi driver stopped and asked about four or five different people, a house wife in maybe in her early thirties, an elderly woman maybe in her seventies, a businessman maybe in his forties, and a group of schoolchildren, say around ten or twelve years old. The way that he addressed these people are quite different. The way that he approached them, the way he opened the conversation was very different because the people were of different ages, different sexes, different social positions.

You've heard some norms for things like talking, things like eating, and these are rather simple. There are also more complex norms. Complex norms are known as rituals, which are a set or series of actions which take place in a certain order. A British psychologist named Michael Argyle had studied the rituals in various societies, including British society, and he has identified a number of steps that take place in different rituals. One example of the ritual is the neighbor ritual. In the new neighbor ritual, we have a typical set of, set of behaviors. When a new family moves

into a new neighborhood, shortly after that, the housewives in the immediate area will come over to the house, and through a series of actions they will introduce themselves to the new housewife in the neighborhood. According to Argyle, these are several steps. There is an invitation, and old neighbor invites the new neighbor to come over. There is the greeting at the door. 'Hello, how are you? Please come in'. The visitor is invited into the house. The visitor has to admire the house. 'Gee, that's lovely furniture you have here'. The hostess will serve tea and biscuits, then they will sit down. They will exchange essential information. They must exchange information about their husbands, what *their* husbands do, where their husbands work, and what their husbands like to do in their free time. After a fixed period of time, maybe fifteen minutes or so. The new neighbor must take the initiative and say it's time to go. Gets up, says farewell, 'We'll have to see each other again'. All the steps must be there in a certain order. In the new neighbor ritual, the hostess won't immediately serve tea and biscuits without giving a tour of house. Nor will the person who comes to the house immediately start talking about her husband. Argyle the British psychologist and others claim that it is knowledge of rituals that make us skillful. That makes us socially skillful in a given society. Learning the rituals is part of learning to be an acceptable member of our society.