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Two Factors of L2 Listening

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Menu

Abstract

This study investigated an underlying structure of second language (L2) listening abilities. Four hundred fifty English language learners in Korea took a listening test, and their scores were factor-analyzed in an exploratory manner. This study used thirteen listening ability variables and successfully distinguished two separate factors underlying them. Based on statistical factor patterns and language theories, the two underlying factors were conceptualized as a linguistic factor and a cognitive factor of L2 listening. The two factors accounted for about 50% of the total variance. The result provided an empirical ground to support a multi-componential model of L2 listening. This study discussed various implications to listening instructions.

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Introduction

Second language listening is a complex cognitive and social/psychological process involving a variety of knowledge sources such as linguistic knowledge, knowledge of the co-text, knowledge about the context of situation, and general world knowledge (Buck, 2001). Different knowledge sources are involved in the process of listening to varying degrees, depending on the context and purpose of listening. Listening in testing is different from general listening, due to the influence of test formats and other physio-psychological constraints. Test structures inherently constraint certain aspects of listening tasks. This structural constraint makes listening in testing possibly different from listening for other purposes.

However, studies that connect teaching and testing are rare. In earlier studies, a range of theoretical taxonomies of listening skills described various listening activities (Richards, 1983; Rost, 1994). They were useful for curriculum designs, but not used for test development. Widely used proficiency tests such as the Test of English as a Foreign Language (TOEFL) and the Michigan English Language Assessment Battery (MELAB) are based on theoretical frameworks of language ability that are independent of any classroom teaching. Theoretical models of language ability have limited applications to teaching practices and render a gap between teaching and testing.

On the other hand, research concerning listening tests does not provide practical implications for teaching. Some empirical studies identified the features that affect item difficulties (Freedle & Kostin, 1999; Kostin, 2004). These studies identified the textual elements involved in listening tests and examined predictive associations of those elements with item difficulty. Although the item difficulty index could serve as an indicator of learners' listening abilities, the structural sources of item difficulty were not practical to define the nature of L2 listening abilities. These studies provided useful information for test developers to control their item difficulty levels. Nonetheless, the predictive variables did not infer learners' listening abilities nor provided implications for teaching listening.

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Aim of the Study

This study hypothesized that L2 listening abilities consisted of multiple components. The nature of underlying factors were not defined a prior and would be conceptualized based on the statistical patterns between underlying factors and listening abilities. The listening abilities of this study were defined based on listening taxonomies proposed by Rost (1994) and Richards (1983) with consideration of test structures such as text lengths.

Methods

Instrument

This study used the listening comprehension section of a paper based version of the TOEFL. The PBT listening section was comprised of fifty multiple-choice items with four alternatives across three parts (ETS, 1995). The first part consisted of thirty short dialogue texts that lasted approximately six to ten seconds. Each short text was followed by a single question. The second part consisted of two long dialogue texts that lasted approximately one and a half minutes apiece. Each dialogue was followed by four to five questions. The last part was comprised of three long monologue texts, each followed by four to five questions. All the input texts were spoken only once.

Participants

Four hundred fifty English learners in Korea took the test in 2006 for this study (N = 450). The participants were secondary school students who were enrolled in TOEFL preparation courses in private English institutions as well as adult learners including university students who wanted to study English for admissions to higher education and employment or promotion.

Variables

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This study developed the thirteen ability variables based on listening taxonomies (Richards, 1983; Rost, 1994) with consideration of the test structure. The test items were coded to these listening abilities by two coders. After independent coding, the coding results were compared. For the disagreed items, the coders met in person and reached agreements after discussion. The total score reliability (Cronbach's Alpha) was 0.89.

The following two variables were related to vocabulary knowledge. Comprehending word meanings in aural input requires phonological processes in addition to knowing word meanings.

- V1: Recognizing word boundaries (6 items, M = .682);
- V2: Recognizing homonyms in alternatives (2 items, M = .706).

Next two variables were related to prosodic knowledge. Usually, function words (conjunctions, prepositions, and pronouns) are unstressed in utterances while content words (nouns, main verbs, adjectives and adverbs) are stressed. Speakers convey marked meaning by assigning stress on function words and use various intonations to express their intentions.

- V3: Processing marked stress patterns of function words (3 items, M = .658); and
- V4: Processing marked intonation patterns for attitudinal messages (4 items, M = .765).

The following variables characterized illocutionary ability in L2 listening. The communicative aspect of listening is closely related to illocutionary knowledge, which enables listeners to construe speakers' intents.

- V5: Interpreting speakers' indirect speech about their feelings, opinions, and status (3 items, M = .809).
- V6: Interpreting what speakers want listeners to do (4 items, M = .697).

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Four variables were related to inference. Inference engages non-linguistic factors of comprehension and is not merely a guess, but a process of hypothesis formations and modifications (Rost, 2005).

- V7: Making a selective text-based inference in low propositional density contexts (4 items, M = .594).
- V8: Making a conversation-based inference (4 items, M = .567).
- V9: Making a selective text-based inference in high propositional density contexts (3 items, M = .601).
- V10: Making a text-based inference concerning repeated information in high propositional density contexts (3 items, M = .516).

Recalling details is a cognitive process which governs language input to be decoded, translated to meanings, and stored in long term memory. The following abilities affected participants' ability to recall the details.

- V11: Processing selective details in high propositional density contexts (5 items, M = .726).
- V12: Processing repeated details in high propositional density contexts (4 items, M = .642).

One variable represented synthesizing a gist of information.

- V13: Processing main ideas in high propositional density contexts (5 items, M = .700).

Data Analysis

This study used an exploratory factor analysis to identify underlying factors of listening abilities. Factor analysis identifies underlying factors (latent variables) of observed (manifest) variables based on the covariations of the observed variables (Hatcher, 1994). Unlike regression analysis, factor analysis entails causality relations between observed and underlying variables.

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An exploratory factor analysis does not require a pre-specified relationship of underlying factors or determine the number of latent factors a priori. This study used the Maximum Likelihood (ML) solution. Factor analysis is a large sample data analysis, and the sample size of this study (N=450) satisfied this requirement.

Results

Factor Extraction: Two Factors

In order to determine the number of factors, this study employed two criteria. First, the eigenvalue-one criterion maintains that the number of factors is equal to the number of eigenvalues greater than or equal to 1.00. The analysis resulted in two eigenvalues greater than 1.00 (see Table 1) and indicated the presence of two factors underlying thirteen listening abilities. These two factors explained approximately 49.5% of the total variance.

Table 1 *Results of Factor Extraction*

	Factor 1	Factor 2
Eigenvalues	5.43	1.00
% of variance	41.74	7.72

In addition, the chi-square (χ^2) test of the Maximum Likelihood approach is used to determine the number of factors (Hatcher, 1994). The null hypothesis is "H_0: One factor is sufficient." The alternative hypothesis is "H_A: More factors are needed." The listening variables rejected the null hypothesis, χ^2 (53) = 86.23, p = .003 and supported the presence of multiple underlying factors. Both the results confirmed the two factor structure.

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With the thirteen listening abilities, this study succeeded in extracting two underlying latent factors of L2 listening. Next, the extracted factors were rotated to maximize the difference between two factors.

Rotated Factor Patterns

The rotated factors would clearly distinguish the second factor with respect to the first factor. Based on this distinguished pattern, the factor concepts can be defined. Following the assumption that underlying factors were correlated under the unidimensionality of construct, the PROMAX rotation was conducted. In the rotated solution showed a clear contrast between F1 and F2's loading coefficients (see Table 2). The variables from V1 to V8 had high factor loadings on F1, whereas the variables from V9 to V13 had high loadings on F2. V11 exhibited relatively similar magnitudes of loadings in both F1 and F2. The contrastive factor loading pattern indicated the natures of latent factors were distinctive and allowed the researcher to made theoretical interpretations of the factors.

Table 1 *Rotated Factor Patterns of Listening Abilities*

Variables	Factor Loading	
	F1	F2
V1: Recognizing word boundaries	.613	
V2: Recognizing homonyms in alternatives	.493	
V3: Processing marked stress patterns of function words	.518	
V4: Processing marked intonation patterns for attitudinal messages	.668	
V5: Interpreting indirect speech about their feelings, opinions, and status	.448	
V6: Interpreting what a speaker wants listeners to do	.724	
V7: Making a selective text-based inference in low propositional density	.474	
V8: Making a conversation-based inference	.431	
V9: Making a text-based inference on selective information in high propositional density contexts		.577
V10: Making a text-based inference on repeated information in high		.588

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propositional density contexts		
V11: Processing selective details in high propositional density contexts	.342	.370
V12: Processing repeated details in high propositional density contexts		.591
V13: Processing main ideas in high propositional density contexts		.773

Note: The factor loadings less than 0.40 were omitted to improve clarity of the contrast between two factors except for V11.

Defining Factors

The definitions of factors were not predetermined, and the researcher was expected to conceptualize the factors based on the factor-loading patterns. Based on the statistical results and language theories, F1 was defined as a linguistic factor and F2, a cognitive factor. The listening abilities (V1-V8) that had high factor loadings on F1 employed various aspects of linguistic knowledge. They included vocabulary knowledge (V1, V2), phonological knowledge (V3, V4), and illocutionary knowledge (V5, V6). Thus, it was reasonable to rationalize that F1 represented linguistic knowledge of L2 listening.

However, two variables, V7 and V8, seemed to need more explications for their factor associations. First, V7, "making a selective text-based inference in low propositional density contexts," and V8, "Making a conversation-based inference" did not show explicit involvements of linguistic knowledge but had high loadings on the linguistic factor (F1): V7 = .474 and V8= .431. The lack of explicit linguistic aspects in these abilities can be explained with respect to the contextual structure. Low propositional density contexts indicated a small number of propositions for listeners to process. For short texts that lasted about six to ten seconds, listeners had to parse linguistic input accurately and process specific information. Accurate processing of limited propositions relied more on linguistic processing than on cognitive processing. Thus, V7 and V8 were related more to the linguistic aspect of listening and supported that F1 signified the linguistic aspect in L2 listening.

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On the other hand, F2 showed high factor loadings of four variables (V9, V10, V12, and V13) that were related to inference (V9-10), recalling details (V12), and understanding the main idea (V13). These variables characterized cognitive comprehension processes (Rost, 2005). Therefore, this study concluded that F2 represented the cognitive aspect in L2 listening.

In the case of V11, "to process selective details in high propositional density contexts," it involved an accurate processing of selective details as well as comprehension processing in high propositional density contexts. Recalling certain target details out of numerous propositions could be cognitively challenging and engage cognitive processing. Thus, V9 had associations with both linguistic knowledge and cognitive processes in L2 listening.

Discussion and Implication

This study successfully extracted two factors of L2 listening with meaningful factor patterns. These two factors accounted for 50% of the total variance. It was a reasonable proportion of variance, considering that listening comprehension requires listeners to simultaneously juggle and process numerous resources (Buck, 2001). The result suggested that two of several sources of listening accounted for half of listening variances, while the other sources accounted for the rest.

The two-factor structure of L2 listening empirically supports the Communicative Language Ability model proposed by Bachman & Palmer (1996). Their model consists of multiple components including language knowledge, strategic competence, topical knowledge, and affective mechanism. The linguistic factor (F1) represents the language knowledge component, while the cognitive factor (F2) corresponds to the strategic competence component of the model.

In terms of teaching, the linguistic factor and the cognitive factor are associated with bottom-up and top-down processing, respectively. Bottom up processing involves close attention to input details, while top down processing requires listeners to make predictions and inferences. Hulstijne (2003) encourages the bottom up processing of word segmentations. After listening to the input,

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students evaluate what they have heard and refer to the written texts to see what they were supposed to hear. With repeated replaying, students eventually understand the input completely. This practice facilitates the acquisition of phonological features, such as reduced forms, elisions, and contractions.

On the other hand, the top down approach includes developing students' meta-cognitive knowledge and encouraging them to access prior knowledge (Vandergrift, 2007). Exercises concerning prediction, monitoring, evaluating, and problem solving can help learners develop meta-cognitive knowledge. Advanced organizers are a useful tool to help students activate prior knowledge and develop a conceptual framework for inference. Teacher can use pictures, video clips, key vocabulary, and cultural information to help learners organize the concepts.

The text length is another important aspect that affects listening. The linguistic factor engages listening activities using short texts, whereas the cognitive factor is more associated with long texts. This suggests that L2 listening instructions utilize various text types

In sum, for effective teaching, two underlying factors of L2 listening underscore both linguistic and comprehension aspects of listening and encourage the use of a broad range of linguistic activities as well as cognitive and inferential tasks.

Finally, it is worthy of note that the finding is constrained to the research method of this study. When different factor analysis methods and different test formats are used, results will vary. What is important is to provide logical and theoretical explanations to the statistical findings. The numbers without theories and rationales are meaningless. In future research, the author suggests the use of various different factor analysis methods and test formats to compare other patterns of underlying structure of L2 listening. That can provide empirical grounds for a generalizable model of L2 listening.

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