Factors Related to Passage Length: Implications for Second Language Listening Comprehension

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Abstract

Despite its importance in the development of second language (L2) proficiency, there is little research on listening comprehension in a second language. Evidence for the role of most factors that may impact second language listening is sparse. One practical factor often mentioned in relation to the difficulty of L2 listening passages is length, but there are several problems with characterizing the amount of information in a passage this way. We summarize available research on the effects of passage length in L2 listening comprehension and describe the relationship between passage length and other important factors and highlight areas in need of more research.

Keywords: listening comprehension; working memory; second language instruction

Introduction

Listening in a second language (L2) is challenging for a number of reasons. Listening involves real-time processing, generally without the option of going back to earlier sections of the passage the listener may have missed (Buck, 2001; Flowerdew, 1994). Further, while most reading involves complete control of the rate at which text is received, control over the speed of delivery for listeners varies much more widely (Osada, 2004). In addition, in comprehending spoken language, word boundaries must be inferred from a variety of lexical and phonological cues (e.g., Cutler, Dahan, & Van Donselaar, 1997).

These above factors are fundamental qualities of listening. However, other factors in listening passages are more variable (e.g., a fast speech rate, presence of infrequent vocabulary, etc.) such that any given passage may contain some or none of these qualities. Unfortunately, most second language (L2) comprehension research has focused on reading rather than listening because the process of reading is more easily observed and manipulated (Osada, 2004). Research findings from reading comprehension often fail to map fully onto the processes involved in listening comprehension (Schmidt-Rinehart, 1994) and many factors relevant for listening comprehension have no analogue in reading comprehension. For instance, speech may contain irregular pauses, false starts, disfluencies such as *um*, and intonation patterns that can affect comprehension (Shohamy & Inbar, 1991). The pronunciation of words may also differ greatly from the way they appear in print and may be affected by the words with which they are presented: assimilation results in *ten* being pronounced *tem* in the phrase *ten bikes* (Crystal, 2003); reductions result in the phrase *I'm gonna go* instead of *I am going to go* (Ito, 2001). These reductions lessen the amount of lexical information available and make listening particularly challenging for L2 learners (Ito, 2001).

There remains a great deal that is not known about what makes listening materials difficult for L2 learners. The lack of research is particularly problematic for language instructors who select and create classroom listening materials and language test developers who must predict the difficulty of listening materials. Further, readily available or intuitively appealing factors may not provide the best characterization of passage difficulty. This paper focuses on one of these factors in particular: passage length. Because listening involves real-time processing, the amount of information presented is often a factor of concern (Alderson, et al., 2006; Bejar, Douglas, Jamieson, Nissan, & Turner, 2000; Carroll, 1977; Dunkel, 1991; Rost, 2006). Passage length is described as one aspect of passage complexity (Rost, 2006). However, there is evidence that passage length may not be the best way to characterize amount of information, both in that it is often confounded with other factors, and because other factors provide a more precise depiction of information amount. Below, we summarize the

empirical evidence regarding passage length and related factors and argue that amount of information, as a factor predicting difficulty in L2 listening comprehension, should be examined using different measures.

Characterizing amount of information

There are several reasons why an increased amount of information in a passage may hurt L2 listening comprehension. First, L2 learners often fixate on information they have failed to comprehend, investing additional effort in trying to understand what they missed (Goh, 2000; O'Malley, Chamot, & Kupper, 1989). Because listening occurs in real time, listeners may then miss information that follows. In addition, even if listeners avoid fixating, they may be unable to comprehend later information because it relies on the understanding of earlier information (Goh, 2000). The more information in a passage, the more likely it is that the listener will miss some of the information and the greater the amount of information that relies on the understanding of earlier material. Length of the passage is also cited by L2 listeners as increasing their comprehension difficulty (Thompson & Rubin, 1996). Despite these potential challenges, however, there is motivation for increasing the length of the passages presented to L2 learners: for example, shorter passages may be too short to include important linguistic features, such as discourse markers (Buck, 2001) and tasks using shorter passages may fail to represent the type of real-world tasks with which an L2 learner might be faced, such as listening to an academic lecture (Carrell, Dunkel, & Mollaun, 2002).

Passage Length

Surprisingly, empirical work in L2 listening comprehension suggests only a minor role for passage length (measured as duration or word count). Several studies have failed to find a significant relationship between length and test item difficulty or other measures of comprehension (Freedle & Kostin, 1996; Kostin, 2004; Moyer, 2006; Nissan, DeVincenzi, & Tang, 1996). A few studies have found a significant role for length, such that longer passages were associated with more difficult comprehension items. However, these studies did not examine the role of length separately reading and listening (Rupp, Garcia, & Jamieson, 2001), confounded length with the number of comprehension items (Henning, 1991), or found the effect only for learners with a higher level of proficiency (Carrell, et al., 2002). Overall, the evidence that passage length affects L2 listening material difficulty is underwhelming.

There are several possible reasons for the mixed results in the literature. The first is that many studies investigating its role do not directly manipulate length in the listening materials (Freedle & Kostin, 1996; Kostin, 2004; Moyer, 2006; Nissan, et al., 1996). Rather, these studies use existing test materials which are coded for particular factors, with these factors included in regression models predicting the difficulty of test items. This leaves open the strong possibility that passages that differed in length also differed in other important ways that affected L2 listening comprehension. Other studies involve confounds in the design of the experiment that make it difficult to interpret their findings: in Moyer (2006), all short passages were formal news reports while all longer passages were informal dialogues. The formality of the language in the news reports may have made these passages more difficult for the L2 listeners (Shohamy & Inbar, 1991), counteracting any benefits of their shorter length. In addition, many studies examining passage length explore a very limited range of lengths (e.g., the passages included in Kostin, 2004 were all 20 seconds or shorter in duration), possibly not varying length enough to uncover an effect. These issues indicate a need to explore passage length in future research with experimentally manipulated materials in which a broad range of lengths is presented with other factors (e.g., language formality) held constant.

Another reason for the mismatch between research findings and intuition is that length, in and of itself, may not the best factor for capturing the amount of information in a passage. Length can be confounded with speech rate (if measured in terms of duration) or redundancy (if measured in terms of word count, or duration if speech rate is held constant). It is important to consider these factors because their effects on L2 listening comprehension run counter to the predicted effect of length: a faster speech rate (which results in a shorter length) should make listening more difficult; more redundancy of information, which should increase length, should decrease listening comprehension difficulty. In addition, other measures of amount of information may do a better job both of controlling for these confounds and of pinpointing the portion of the passage that is information. Below, we briefly summarize the empirical support for factors related to passage length.

Redundancy

Redundancy can be defined as the extent to which words or ideas are repeated within a passage. This repetition can be exact (e.g., *Bread is on sale today. Bread is on sale and cabbage is, too.*), or it may involve more complex, less salient presentations, such as paraphrasing or elaborating on previously-stated ideas (Chaudron, 1983). One study found that more transparent repetition is more consistently beneficial for L2 listening comprehension across proficiency groups (Chaudron, 1983). Other studies have found similar benefits of simple forms of redundancy for L2 listeners of different proficiency levels (Gainer, 1997) and differing degrees of benefit of less transparent redundancy for higher and lower proficiency listeners (i.e., elaborations like *The food of the Pennsylvania Dutch Country is very hearty and delicious. Hearty and delicious food is nourishing and tasty*, Chiang & Dunkel, 1992, p. 354).

Redundancy is necessarily related to passage length as defined by word count because increasing redundancy in a passage will naturally increase the word count of the passage and will also increase duration if speech rate is held constant. Because increased redundancy is predicted to have

an opposite effect on L2 listening comprehension than does increased length, the two must be considered in conjunction when estimating the difficulty of a given passage for an L2 listener. However, as mentioned above, less transparent forms of redundancy (e.g., elaboration or paraphrase) may not be as facilitative of L2 listening comprehension, so type of redundancy should also be considered.

Speech rate

A second factor strongly related to passage length, as measured by duration, is speech rate. Speech rate is a very salient aspect of listening materials and its role in L2 listening comprehension is relatively well-studied with largely consistent results. In general, faster speech rates hurt L2 listeners (Griffiths, 1990; 1992; Rosenhouse, Haik, & Kishon-Rabin, 2006) though a slowed speech rate does not necessarily help (Derwing & Munro, 2001; Griffiths, 1990). However, it is important to note that listeners may attribute comprehension difficulties arising from other sources to a fast speech rate: Moore, Adams, Dagenais, and Caffee (2007) found that native listeners judged reverberated speech to be faster than filtered or unfiltered speech despite a constant speech rate; other studies have found that both native (Anderson-Hsieh & Koehler, 1998) and L2 listeners (Cheung [1994] and Dahl [1981] as cited by Tauroza, 2001, p. 146) perceive heavily accented speech as faster than less accented speech. These results suggest that professionals selecting listening materials should take care to rely on objective measures of speech rate rather than their impressions of the speech rate in passages.

Passages of equal length in terms of duration may contain very different amounts of information depending on the speech rate of the speaker(s). Nor is this the only consideration: long silent pauses will increase the duration of a passage without necessarily increasing the content. In determining the amount of information presented by a passage, duration may be a poor measure without some consideration of speech rate and some method of determining how much of the passage is actually information rather than pauses. Some measures of speech rate do take into account pauses. For example, *articulatory rate* excludes silent intervals over a given threshold (Robb, Maclagan, & Chen, 2004). Other measures, such as syllables per second, control for variation in word length (e.g., Derwing & Munro, 2001; Kang, Rubin, & Pickering, 2010). Some combination of these measures may be more desirable than any one alone.

Information density

The last factor to discuss relative to the underlying features of passage length is not confounded with length, but rather offers a more specific characterization of information than word count or duration alone. Information density describes the proportion of the passage that contains content or information relative to the total duration or word count of the passage. The largest amount of variation in this measure comes from differences in how *information* is defined. For instance, Nissan, DeVincenzi, and Tang (1996) defined information as content words (nouns, verbs, adjectives, and adverbs), similar to Gilmore's (2004) description of words with "independent meaning" (e.g., *mother* versus *a*). Propositions, defined as the smallest unit of knowledge that can stand alone as a separate true-false statement (Dunkel, Henning, & Chaudron, 1993), have also be used in measures of information density (Rupp et al., 2001).

Some measures of density also control directly for redundancy, counting only those words or ideas that have not previously been presented in the passage in the calculation of density (e.g., type/token ratio, used by Rupp et al., 2001). This alternative method of measuring density may be desirable so long as the type of redundancy is taken into account: redundant information is only redundant if it is recognized as such by the listener, so the experimenter may choose to exclude transparent forms of redundancy from the calculation of information density but include less transparent forms. Alternatively, separate measures of density and redundancy might be included: Bejar, Douglas, Jamieson, Nissan, & Turner (2000) suggest including both the ratio of propositions to passage duration and the ratio of unique propositions to total propositions.

There is considerable evidence that information density impacts L1 reading comprehension (e.g., Kintsch & Keenan, 1973; Sonnleitner, 2008). However, information density has not been widely examined in the L2 listening comprehension literature. In addition, the variation in how this factor is defined (in terms of content words, propositions, unique propositions, etc.) makes generalization across what studies do exist challenging. Rupp et al. (2001) found propositional density in L2 listening and reading passages to be a significant predictor of comprehension item difficulty but they did not operationalize this factor continuously (i.e., they used *high-medium-low* categorization for describing density across passages) and they did not examine the relationship separately for listening and reading materials, so it is possible that density was a predictor for difficulty in one skill but not the other. Buck and Tatsuoka (1998) found that the proportion of content words to all words surrounding the information necessary for answering an item correctly significantly predicted item difficulty for L2 listening passages. This finding does not necessarily indicate that proportion of content words to all words in an entire passage will significantly affect comprehension, however.

While there is only a small amount of empirical evidence indicating that information density impacts L2 listening comprehension, information density is a theoretically appealing measure of amount of information compared with passage length because it describes the proportion of the passage that contains actual content. Further, measures that focus on propositions distinguish between a wordy passage that contains few ideas and one that contains many ideas, perhaps even expressed with fewer words. For instance, *the fluffy cat ate the meat* contains two propositions, while *the*

meat was eaten by the cat contains only one proposition expressed with a higher total number of words. Further, unlike measures of length, measures of information density may account for redundancy, although care must be taken in determining what information is redundant for a given listener.

However, more research is needed to explore the effects of density on L2 listening comprehension. Methods of operationalizing *information* in informal aural passages which may contain disfluencies, incomplete sentences, false starts or other irregularities must be devised to make this measure usable. The Computerized Propositional Idea Density Rater (CPIDR, Brown, Snodgrass, Kemper, Herman, & Covington, 2008), automatically calculates the number of propositions in English text based on a set of rules and has a *speech mode* for addressing transcripts of spoken English. However, the additional rules implemented in this mode were made with L1 listening in mind. For example, the calculation of density excludes *like* and *you know* in those contexts where they are likely to be lexical fillers. These fillers may not be comprehended as such by L2 listeners (Voss, 1984; Watanabe, Hirose, Den, & Minematsu, 2008), and so perhaps should be included in the calculation of density for these listeners. In addition, the program is designed to analyze "minimally edited" transcripts (Brown, et al., 2008, p. 542). Although precisely what editing is necessary to prepare a transcript for the program is not specified by Brown et al. (2008), if it removes filled pauses like *um* and *ah*, it may actually exclude information that is treated as lexical by some L2 listeners who are not familiar with the fillers used in the L2 (Watanabe, et al., 2008). In addition to standardizing the definition of *information* in natural L2 speech, methods for defining information segments in languages other than English, particularly those with very different syntax or morphology (e.g., Arabic) need to be described and tested.[1] Not only is extending research on the effects of information density into other languages of practical use for language instructors and test developers, but it provides an opportunity for examining cross-language differences that may exist for this factor.

A final area in need of further research is to the extent to which each of the underlying factors involved in calculating information density interact. Density can remain the same while the absolute number of ideas increases, so long as a constant rate of speech is maintained. Conversely, density can change by altering speech rate, with the number of ideas held constant. Investigating the relative contributions of the components of information density will provide a clearer picture of how this factor affects comprehension.

Amount of information and working memory

Beyond the increased chances for missing information presented by a passage containing more information overall, there is reason to believe that greater amounts of information may put a strain working memory. Although most research examining the role of working memory differences in L2 comprehension has focused on reading rather than listening (e.g., Harrington & Sawyer, 1992), there are strong theoretical reasons for believing that working memory plays a critical role in listening (Engle, 2002). As in reading, listeners must both hold previous information in working memory while processing incoming information and integrating the incoming information with existing knowledge from long-term memory (Payne & Whitney, 2002). However, listening has the added complication of requiring real-time processing without the option of returning to earlier material, which may impose an additional load on working memory. Further, listening for L2 learners is unlikely to be fully automatic (Tyler, 2001) which will create an even greater demand on working memory (Baddeley, 2007).

Those studies that have investigated the relationship between individual differences in working memory capacity and L2 listening comprehension directly have failed to find significant results (Carrell, et al., 2002; Henning, 1991). However, one potential issue with these investigations is that they used a measure of working memory designed to measure storage capacity (i.e., digit span) rather than combined storage and processing capacity. This distinction is important because a meta-analysis over 77 studies found that the relationship between storage-plus-processing measures of working memory, such as reading span, and L1 comprehension was considerably stronger than the relationship between storage-only measures and L1 comprehension (Daneman & Merikle, 1996).

While there are strong theoretical reasons to believe that an increased amount of information will increase the strain on working memory for L2 listeners, this is again a situation where passage length in and of itself may not be the best measure of information amount. This is particularly true because of the factors confounded with length and their likely relationship with working memory load. Redundancy may be beneficial from a working memory load standpoint for two reasons: first, re-presenting information will refresh this information in the listener's working memory; second, new information that is fully interchangeable with information already being stored in working memory will not need to be stored separately and so should not increase the storage load. However, the ease with which redundant information will be recognized as such will depend on the type of redundancy: more transparent forms, like the exact repetition of words, will be more likely to ease or at least not increase the strain on working memory than do less transparent forms like paraphrase, which may not be seen as redundant and so will both fail to refresh the earlier information and will be stored separately.

Speech rate also affects the strain on working memory: a faster rate provides less time for the L2 listener to process the input, leading to a greater cognitive load (Rost, 2006). Because a faster speech rate results in a passage shorter in

[1] A program for calculating information density in French, modeled after CPIDR, is under development (Covington, 2011).

duration, predictions for working memory load based on the overall duration of a passage may not accurately represent strain imposed on the listener. The manner in which speech rate is calculated is of concern here, too, because pauses in a listening passage are believed to provide more processing time to the listener (Blau, 1990), which should decrease working memory load. Measures of speech rate that control for differences in pausing (e.g., articulatory rate, Robb, Maclagan, & Chen, 2004) may be more predictive of the load imposed on working memory than are other measures.

Coping with large amounts of information

As mentioned above, there are motivations for presenting passages with more content to L2 learners so that they may experience key aspects of the target language (Buck, 2001) or be prepared for the tasks they will need to perform in the L2 (Carrell, et al., 2002). There is also an ongoing push to use authentic materials in teaching second-language listening skills (Gilmore, 2007). Authentic materials, among other things, introduce listeners to a more realistic speech rate than created classroom materials often offer (Rings, 1986). It is important to note, however, that while many factors such as speech rate suggest that authentic materials will be more difficult for L2 listeners than created materials, a study examining differences between authentic and created dialogues found higher density and less redundancy in created materials, implying that authentic materials may actually be easier in certain circumstances (Gilmore, 2004).

There are options available to the language instructor to ease their students' comprehension of passages containing larger amounts of information. First, the passages may be presented multiple times, providing several opportunities for the listeners to process the information therein (Field, 2008). In a sense, playing a passage multiple times is a simple way of increasing redundancy of information without altering the actual passage (Cervantes & Gainer, 1992), which may be desirable particularly when presenting authentic materials. Playing a passage multiple times can also help overcome unexpected difficulties in a testing environment, like noise in the room (Buck, 2001). Research also shows that playing a passage more than once for L2 listeners improves comprehension (Berne, 1995; Cervantes & Gainer, 1992; Gainer, 1997; Lund, 1990; Sakai, 2009), though it may be more beneficial to higher-proficiency listeners (A. Chang & Read, 2006; C. S. Chang, 1999). This latter finding makes sense if the passage contains other complexity-increasing factors like infrequent vocabulary: hearing an unfamiliar word more than once will not necessarily lead to its being understood, and higher-proficiency listeners will have more extensive L2 vocabularies.

Another method of helping L2 listeners overcome the demands of a large amount of information is to allow them to take notes while listening. Unlike playing a passage multiple times for the listeners, however, notetaking has a less consistently positive impact on comprehension. Notetaking is itself a cognitively demanding task (Piolat, Olive, & Kellogg, 2005) that is even more difficult for L2 listeners (Barbier & Piolat, 2005). Although notetaking can promote comprehension through providing an available record of the passage that the listener may consult after the passage is over, it may interfere with comprehension by overloading working memory during listening. In line with these conflicting predictions for the effect of notetaking on L2 listening comprehension, some studies have found that notetaking hurts comprehension (Hale & Courtney, 1994) while others have found that it helps (Carrell, et al., 2002). One potential determining factor for whether notetaking helps or hinders comprehension is whether the listener can make good choices about when to take notes and when to focus on listening (Lin, 2006).

Conclusion

A lack of empirical research on the factors that impact L2 listening comprehension may lead to a reliance on intuitive or easily measured qualities of passages like length. We have described the issues with using passage length to predict the difficulty of the passage for L2 learners, including that the evidence for its role in comprehension difficulty is not strong and that it is confounded with other factors. We also suggest that information density provides a more precise picture of amount of information, though this measure and its components need to be further explored with regard to L2 listening.

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References

Alderson, J. C., Figueras, N., Kuijper, H., Nold, G., Takala, S., & Tardieu, C. (2006). Analysing tests of reading and listening in relation to the common European framework of reference: The experience of the Dutch CEFR Construct Project. *Language Assessment Quarterly, 3*(1), 3 - 30.

Baddeley, A. (2007). *Working memory, thought, and action*. Oxford: Oxford University Press.

Barbier, M., & Piolat, A. (2005). L1 and L2 cognitive effort of notetaking and writing. In L. Allal & B. Schneuwly (Eds.), *Proceedings of the Special Interest Group on Writing*. Geneva, Switzerland.

Bejar, I., Douglas, D., Jamieson, J., Nissan, S., & Turner, J. (2000). *TOEFL 2000 listening framework: A working paper*. Princeton, NJ: Educational Testing Service.

Berne, J. (1995). How does varying pre-listening activities affect second language listening comprehension? *Hispania*, 316-329.

Blau, E. (1990). The effect of syntax, speed, and pauses on listening comprehension. *TESOL Quarterly, 24*(4), 746-753.

Brown, C., Snodgrass, T., Kemper, S., Herman, R., & Covington, M. (2008). Automatic measurement of propositional idea density from part-of-speech tagging. *Behavior research methods, 40*(2), 540.

Buck, G. (2001). *Assessing listening*. Cambridge: Cambridge Univ Pr.

Carrell, P., Dunkel, P., & Mollaun, P. (2002). *The effects of notetaking, lecture length and topic on the listening component of the TOEFL 2000*. Princeton, NJ: Educational Testing Service.

Carroll, J. B. (1977). On learning from being told. In M. C. Wittrock (Ed.), *Learning & Instruction* (2nd ed., pp. 496-512). Berkeley, CA: McCutchan.

Cervantes, R., & Gainer, G. (1992). The effects of syntactic simplification and repetition on listening comprehension. *TESOL Quarterly, 26*(4), 767-770.

Chang, A., & Read, J. (2006). The effects of listening support on the listening performance of EFL learners. *TESOL Quarterly, 40*(2), 375-397.

Chang, C. S. (1999). *The effect of repeated listening on different levels of ESL learners.* Paper presented at the *The 1st Conference on Applied English Teaching* Taoyuan, Republic of China.

Covington, M. (2011). Computer Analysis of Speech for Psychological Research Retrieved January 10, 2011

Crystal, D. (2003). *A dictionary of linguistics & phonetics* (5th ed.). Malden, MA: Wiley-Blackwell.

Cutler, A., Dahan, D., & Van Donselaar, W. (1997). Prosody in the comprehension of spoken language: A literature review. *Language and speech, 40*(2), 141-201.

Daneman, M., & Merikle, P. (1996). Working memory and language comprehension: A meta-analysis. *Psychonomic Bulletin and Review, 3*(4), 422-433.

Dunkel, P. (1991). Listening in the native and second/foreign language: Toward an integration of research and practice. *TESOL Quarterly, 25*(3), 431-457.

Field, J. (2008). *Listening in the Language Classroom*. Cambridge: Cambridge University Press.

Flowerdew, J. (1994). *Academic Listening: Research Perspectives*. New York: Cambridge University Press.

Freedle, R., & Kostin, I. (1996). *The prediction of TOEFL listening comprehension item difficulty for minitalk passages: Implications for construct validity*. Princeton, NJ: Educational Testing Service.

Gainer, G. (1997). *A comparison of the effects of pure repetition and embedded elaboration on the listening comprehension of EFL students*.

Gilmore, A. (2004). A comparison of textbook and authentic interactions. *ELT Journal, 58*(4), 363-374.

Gilmore, A. (2007). Authentic materials and authenticity in foreign language learning. *Language Teaching, 40*(2), 97-118.

Goh, C. (2000). A cognitive perspective on language learners' listening comprehension problems. *System, 28*(1), 55-75.

Hale, G., & Courtney, R. (1994). The effects of note-taking on listening comprehension in the Test of English as a Foreign Language. *Language Testing, 11*(1), 29-47.

Harrington, M., & Sawyer, M. (1992). L2 working memory capacity and L2 reading skill. *Studies in Second Language Acquisition, 14*(1), 25-38.

Henning, G. (1991). *A study of the effects of variation of short-term memory load, reading response length, and processing hierarchy on TOEFL listening comprehension item performance*. Princeton, NJ: Educational Testing Service.

Ito, Y. (2001). Effect of reduced forms on ESL learners' input-intake process. *Second language studies, 20*(1), 99-124.

Kintsch, W., & Keenan, J. (1973). Reading rate and retention as a function of the number of propositions in the base structure of sentences* 1. *Cognitive psychology, 5*(3), 257-274.

Kostin, I. (2004). *Exploring item characteristics that are related to the difficulty of TOEFL dialogue items*. Princeton, NJ: Educational Testing Service.

Lin, M. (2006). *The effects of note-taking, memory, and rate of presentation on EFL learners' listening comprehension.* Unpublished doctoral dissertation, La Sierra University, Riverside, CA.

Lund, R. (1990). A taxonomy for teaching second language listening. *Foreign Language Annals, 23*(2), 105-115.

Moyer, A. (2006). Language contact and confidence in second language listening comprehension: A pilot study of advanced learners of German. *Foreign Language Annals, 39*(2), 255-275.

Nissan, S., DeVincenzi, F., & Tang, K. L. (1996). *An Analysis of Factors Affecting the Difficulty of Dialogue Items in TOEFL Listening Comprehension.* . Princeton, NJ: Educational Testing Service.

O'Malley, J., Chamot, A., & Kupper, L. (1989). Listening comprehension strategies in second language acquisition. *Applied Linguistics, 10*(4), 418-437.

Osada, N. (2004). Listening comprehension research: A brief review of the past thirty years. *Dialogue, 3*, 53-66.

Payne, J., & Whitney, P. (2002). Developing L2 oral proficiency through synchronous CMC: Output, working memory, and interlanguage development. *Calico Journal, 20*(1), 7-32.

Piolat, A., Olive, T., & Kellogg, R. (2005). Cognitive effort during note taking. *Applied Cognitive Psychology, 19*(3), 291-312.

Rings, L. (1986). Authentic language and authentic conversational texts. *Foreign Language Annals, 19*(3), 203-208.

Robb, M., Maclagan, M., & Chen, Y. (2004). Speaking rates of American and New Zealand varieties of English. *Clinical linguistics & phonetics, 18*(1), 1-15.

Rost, M. (2006). Areas of research that influence L2 listening instruction. In E. Uso-Juan & A. Martinez-Flor (Eds.), *Current Trends in the Development and Teaching of the Four Language Skills* (pp. 47-74). New York: Mouton de Gruyter.

Rupp, A., Garcia, P., & Jamieson, J. (2001). Combining multiple regression and CART to understand difficulty in second language reading and listening comprehension test items. *International Journal of Testing, 1*(3), 185-216.

Sakai, H. (2009). Effect of repetition of exposure and proficiency level in L2 listening tests. *TESOL Quarterly, 43*(2), 360-371.

Schmidt-Rinehart, B. (1994). The effects of topic familiarity on second language listening comprehension. *Modern Language Journal, 78*(2), 179-189.

Shohamy, E., & Inbar, O. (1991). Validation of listening comprehension tests: The effect of text and question type. *Language Testing, 8*(1), 23-40.

Sonnleitner, P. (2008). Using the LLTM to evaluate an item-generating system for reading comprehension. *Psychology Science Quarterly, 50*, 345-362.

Thompson, I., & Rubin, J. (1996). Can strategy instruction improve listening comprehension? *Foreign Language Annals, 29*(3), 331-342.

Tyler, M. (2001). Resource consumption as a function of topic knowledge in nonnative and native comprehension. *Language Learning, 51*(2), 257-280.

Voss, B. (1984). *Slips of the ear*. Tübingen, Germany: Gunter Narr Verlag.

Watanabe, M., Hirose, K., Den, Y., & Minematsu, N. (2008). Filled pauses as cues to the complexity of upcoming phrases for native and non-native listeners. *Speech Communication, 50*(2), 81-94.