Academic listening: is there a place for bottom-up processing?

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Abstract

This article deals with top-down processing and bottom-up processing of a piece of information in academic listening. It is equally important to activate background knowledge and expectations through lexical access (top-down) as well as to piece together linguistic data until a contextual meaning of an utterance is arrived at (bottom-up) in order to make language learners effective listeners to natural speech in a communicative competence framework. Therefore, contemporary teaching strategies or techniques adopted for developing the listening skill involve a synthesis of the two processes. However, adopting a top-down approach to academic listening and neglecting a bottom-up one can seem more realistic for certain teaching aims, particularly in an English for Specific Purposes (ESP) course. In the course specifically designed for 4th-year students, at the School of World Economy and International Affairs, top-down processing guides the listening process and provides connection with higher level reasoning.

Keywords: top-down processing, bottom-up processing, academic listening, communicative competence

Introduction

The aims of a language teaching course often relate to the kind of activity which the learners are to perform, such as listening, speaking, reading and writing. In the era of *communicative competence framework* applied to the teaching of any skill, and to listening in particular, it is correct and appropriate to differentiate between listening and hearing, and between conversational and academic listening.

Listening as part of second language (L2) acquisition has been regarded as the most widely used language skill in day-to-day life (Morley, 2001; Rost, 2001). Most scholars agree on the assumption that it is a complex process which involves a variety of sources – phonetic, phonological, prosodic, lexical, semantic, etc. – enabling listeners to understand and to interpret spoken messages in real time (Lynch, 1998). The complexity that underlies the process of listening legitimates the transition made over time from listening regarded as a passive skill unworthy of attention in L2 teaching, to the primacy of listening as an independent skill important on its own (Mendelsohn, 1998; Morley, 2001; Vandergrift, 2004).

With reference to teaching listening, developments in general communicative language learning methodologies as well as advances in technologies have driven the evolution in the

teaching of listening, and now we speak of key areas in which research has provided insights into the teaching of L2 listening. Accordingly, two types of processing language – top-down and bottom-up – are of special importance according to our research objectives.

The present work aims first to review some general theoretical findings on listening as a skill and its place within CCF. It will then describe the two processes – top-down and bottom-up – underlying listening, and dwell on the nature of academic listening. Finally, it will consider the place both processes take in the teaching of academic listening with illustrations from the English for Specific Purposes (ESP) course designed specifically for 4th-year students, at School of World Economy and International Affairs, National Research University, Higher School of Economics, in Moscow, Russia.

Listening within the communicative competence framework (CCF)

Saying that we understand a piece of spoken language implies one of the following: either that we understand it as usage, that is, how it is used in an utterance; or that we understand it as use, in other words, the purpose for which a speaker employs it. When recognition involves the phonological and grammatical system of a language, we can speak of "hearing" as a recognition of the signification of sentences (Widdowson, 1978). To understand language as use, we have to identify the communicative function of the sentences uttered; that is, what acts of communication they realize. Listening, thus, is an activity aimed at recognizing the function of sentences in an interaction, and their communicative value as instances of use. Hence, listening to what is said necessarily involves hearing, while hearing does not include listening. It is worth pointing out that in teaching practice it has already been commonly accepted that what learners ultimately need to acquire is an awareness of how the language being learned is used for communication. It is obvious that in some circumstances a language course may involve the teaching of hearing which comes before moving on to the higher level of the communicative skill of talking, but it is critical that such a move be explicitly made at a certain moment of time to ensure that learners are able to use the language in its spoken mode (Widdowson, 1978).

Subsequent work on the place of listening in effective interaction has brought about a great deal of pedagogical research aimed at highlighting the key role this skill plays in language learning and teaching. Advances in language learning over the past decades have led to significant changes in how listening is viewed. The transition from environmentalist through innatist to interactionist language learning approaches (Usó-Juan and Martínez-Flor, 2006) has made listening a primary vehicle for language learning, achieving a status of significant and central importance in both language learning and language teaching fields (Morley, 2001; Rost, 2001). Thus, listening is a complex, social and interactive process in which "the listener is actively engaged in constructing meaning from a variety of contexts and input sources" (Vandergrift, 1999, cited in Carrier, 2003, p. 384).

Defining listening as a communicative event, it is crucial to focus on the communicative competence framework proposed by Usó-Juan and Martínez-Flor (2006), in which they describe how the different components influence development of the listening skill in order to increase learners' communicative competence in the L2. The term *communicative competence* was introduced by Hymes in the 1970s (Hymes, 1971, 1972) with the purpose to regard language use in

its social context, together with sociolinguistic norms of appropriateness. Considering these aspects, the construct of communicative competence has become the core of different models which have evolved over the last two decades in order to increase the effectiveness of the L2 teaching process (Canale and Swain, 1980; Canale, 1983; Savignon, 1983; Bachman, 1987, 1990; Celce-Murcia *et al.,* 1995; Alcón, 2000; Usó-Juan and Martínez-Flor, 2006).

Following these models, listening is positioned at the core of the CCF made up of five components: 1) discourse competence; 2) linguistic competence; 3) pragmatic competence; 4) intercultural competence, and 5) strategic competence. The first of these, discourse competence, is the highest form of communication, and development of the listening skill, which is an integral part of it, is influenced by the four other components.

To get a better idea of the processes underlying listening as a communication skill, it seems compelling to design briefly the whole of the CCF. To begin with, *discourse competence* is considered to be the core of the framework as it implies understanding of how language operates at a level beyond the sentence. It involves knowledge of discourse features, such as markers, coherence and cohesion, as well as formal schemata, or cognitive concepts, in relation to the particular purpose and situational context of the spoken text. *Linguistic competence* includes all the elements of the linguistic system, such as aspects concerning grammar, phonology and vocabulary (Celce-Murcia and Olshtain, 2000). Knowledge of these features is set at the bottom level of the listening process and can be included into what was called "hearing" by Widdowson (1978). *Pragmatic competence* involves an understanding of the function of a spoken utterance in a given situation, as well as the socio-pragmatic factors necessary to recognize the meaning of the utterance in addition to linguistic knowledge. *Intercultural competence* is aimed at appropriate interpretation of a given text taking into consideration both cultural and non-verbal communicative factors and thus increasing listeners' overall communicative competence. The last component, *strategic competence*, has been marked as one of the most important competencies for developing the listening skill (Scarcella and Oxford, 1992) as it involves the mastery of both communication and learning strategies that will allow listeners to construct meaning from oral input. This competence is related to teaching strategies, the positive role of which is advocated by Rost, Mendelsohn, Lynch and White (2006), who regard them as means of achieving successful listening comprehension. Building on this assumption, making learners strategically competent in their ability to comprehend oral input will foster their overall communicative competence in L2 (Carrier, 2003).

Top-down and bottom-up processing in listening comprehension

The idea of achieving overall communicative competence, or rather segmenting it into the five components described above, is reflected in another research area concerning the levels of decoding information presented in a given spoken text. These levels for interpretation include phonetic, phonological, prosodic, lexical, syntactic, semantic and pragmatic, and contain internal and external resources available to the listener. To group them all, the terms *bottom-up* and *top-down* processes were introduced (Lynch, 2006). Broadly speaking, bottom-up processing would involve decoding based on the segmenting of the individual words out of the stream of speech. It is retrospective in that it requires identification of words and activation of lexical knowledge linked to the words that have been recognized. It is prospective in that it allows the listener to locate the onset of the

immediately following word and enables "proactive processing", indicating syntactic and semantic constraints of the utterance it is part of (Field, 2001; Rost, 2006). It is true that bottom-up processing can positively influence L2 listeners' ability to better understand a given spoken text, particularly when characteristic patterns of L1 and L2 do not coincide.

Teaching word recognition as well as metrical segmentation of the spoken text was regarded, not by chance, as an adequate description of successful listening under the influence of Information Theory and its later computational variants. There is increasing evidence that L2 listeners' ability to cope at the linguistic end of processing may be a key to success. Tsui and Fullilove (1998) sampled 150,000 item performances by Chinese learners of English to investigate whether skill in bottom-up processing makes some listeners more successful than others and came to the conclusion that it does. Similarly, Wu (1998) explored listeners' use of linguistic and non-linguistic processing of L2 speech and concluded that for L2 listeners linguistic processing is basic. Pedagogic suggestions to follow these investigations turned out to be numerous. They may differ in detail, but they have one thing in common: a concern that we should establish a principled way of tackling processing problems at local and at text level.

Top-down is broadly the converse of bottom-up, emphasizing the listener's use of their existing knowledge of a topic and the relevant context in forming hypotheses as to the speaker's meaning and, when appropriate, in modifying them to match new incoming information. In top-down processing we proceed from what we already know on the subject and from the lexical knowledge we possess. Consequently, one can speak of activating existing schemata, the relevant packages of prior knowledge and experience that we have in our memories and can call on in the process of comprehension through lexical access, or word recognition. The known schemata are of three types: *content schemata*, the knowledge gained on different topics; *formal schemata*, the knowledge of the structure of discourse genres; and *cultural schemata*, the knowledge of culturally specific references.

Speaking of the first constituent of top-down processing, knowledge of a topic, content schemata help to process spoken communication quickly, even if they sometimes lead to erroneous conclusions about what a speaker said or meant. When we hear someone talking about a topic and in a discourse that we are able to link to the familiar to us content and formal schemata, then we find comprehension very much easier. Shared concepts and shared ways of reacting to the world – cultural schemata – increase our understanding of what a speaker says. Besides, alteration of schematic organization of memory, in order to include novel interpretations that are needed in learning an L2, makes it possible that the L2 listener can come to "share common activation spaces in memory" with the speaker (Churchland, 1999). This process allows the speaker and listener to experience "mutual meanings," even if they have different sources of background knowledge and experiences (Lustig and Koester, 1998).

As for the second component constituting top-down processing, lexical access, it is nowadays hypothesized that, for most kinds of texts, lexical knowledge and lexical access primarily predict the degree of proficiency in listening (Segalowitz *et al.,* 1998; Laufer and Hulstijn, 2001). Word knowledge includes recognition of a word's spoken form, its written form, and grammatical

functions, together with its collocations, frequency in the language, constraints on use, etc. (Rost 2006) Context is also a powerful source, providing understanding in top-down processing.

Clearly, a key issue for the teaching and testing of L2 listening skills is the relationship between top and bottom. Many practitioners stand for the integration of top and bottom information the listener receives. Buck and Tatsuoka, for example, on examining TOEFL candidates' listening performances concluded that the "second-language listening ability is not the point on one linear continuum, but a point in a multi-dimensional space" (Buck and Tatsuoka, 1998, p. 146). However, we believe that precise differentiation between conversational and academic listening seems appropriate for a number of reasons, and results in a varying of the teaching methods applied. When teaching is aimed at conversational listening, and given that the students' general level of L2 is between elementary and upper-intermediate, it is true that the synthesis of both decoding of information (bottom-up processing) and activating background knowledge (top-down processing) is essential for successful listening comprehension. However, the ratio of both processes in academic listening seems different from the one in conversational listening.

Developing academic listening comprehension proficiency

Another issue vital for our research is the nature of academic listening as opposed to conversational listening and what constitutes and fosters proficiency in academic listening.

Worldwide, the number of university students has soared, leading to a rise in popularity of academic skills competence as well as a spread in the lecture method of instruction, experienced by learners across the globe. As Flowerdew (1994) observes, a major part of the university experience, of both domestic and international students, involves listening to lectures and developing academic listening skills. "Academic listening skills are thus an essential component of communicative competence in a university setting" (Flowerdew, 1994, p. 7). The author identifies the most distinctive features of academic listening, pointing up that what distinguishes academic from conversational listening is the lack of (or relatively rare use of) turn-taking in academic listening. Thus the listener must develop the ability "to concentrate on and understand over long stretches of time without the opportunity of engaging in the facilitating functions of interactive discourse, such as asking for repetition, negotiating meaning, …" (Flowerdew, 1994, p. 7). This kind of task is ensured by the fact that the general level of L2 academic listeners is normally advanced and higher, which provides for the students' mastery of the L2 system. In other words, by the time they begin studying a language academically learners are supposed to have command of all the five components of communicative competence, namely: linguistic, pragmatic, intercultural, strategic and discourse.

Furthermore, Flowerdew claims that it would be incorrect to regard advanced L2 learners just as "information sponges". In addition to obtaining and absorbing information and knowledge, they also function as users and creators of information and knowledge. Advanced listeners react to information obtained, often discussing the issues with their peers. Besides, during their university days, students are expected to give oral reports in class and to participate in study groups (Flowerdew, 1994), with further evaluation of and reaction to the information presented.

To summarize, the fact that advanced listeners not only grasp, comprehend and store information they have received, but also construct and share information through speaking and writing, accounts for the highest level of this type of listening. A methodological implication might run as follows: academic learners, and listeners in particular, should be helped both to activate background knowledge and expectations through lexical access, and to alter their habitual schemata to include other ways of experiencing the world.

Academic listening: is there a place for bottom-up processing?

In this section an example of the practical application of the above-mentioned ideas will be illustrated. The proposed development of academic listening comprehension proficiency is based on an approach commonly accepted at a particular teaching institution.

The National Research University – Higher School of Economics, Moscow is among the leading higher education institutions of Russia, the graduates of which work for large financial corporations and affiliates of transnational enterprises both in Russia and overseas. Being one of the few internationally oriented divisions, the School of World Economy and International Affairs attracts a large number of highly motivated students, which in its turn accounts for the prominent role language learning plays here. Students are normally taught two foreign languages during the course of their four years of studies. The English course is designed in such a way that learners get command of all the five competencies constituting overall communicative competence, starting with linguistic competence as dominating in the first year through intercultural and pragmatic in the following two years to strategic and discourse in the final year.

The English for Specific Purposes (ESP) course is aimed at giving 4th-year students a mastery of academic skills in L2, proceeding on the basis of knowledge acquired from their main subjects of study over the preceding years. Thus, the course is based on L2 students' background knowledge of Finance, Economics and International Affairs in L1 as well as language knowledge obtained in previous courses. The areas of students' professional interests include Globalization, Global Financial System, Foreign Direct Investment and Multinational Enterprises, International Trade and International Organizations. Additionally, a research project conducted in the framework of a Qualification Paper and linked to work carried out in the students' major in L1, crowns the ESP course, and highlights the skills and competencies the learners have acquired.

Building on these general objectives, we argue that developing proficiency in top-down processing is most important in academic listening, in order to activate students' background knowledge of the topic under discussion and to facilitate the listeners' mastery of speaking and writing skills. Developing academic listening proficiency is an integral part of the ESP course, with its own peculiarities. Unlike most English for Academic Purposes (EAP) lecture courses, the course under consideration does not cover many topics in various fields of investigation. Instead, it focuses on diverse topics within two specific spheres – financial/economic and political – to perfect the students' knowledge of their main subjects. In a typical ESP class, therefore, students are offered an excerpt from an authentic speech made by some politician or economist (10-20 minutes) or a news item related to the topic under discussion, which is further debated in pairs, small groups or as a class. Depending on the teaching task, students can be asked to make notes while listening in order to improve their note taking skills.

To illustrate the points made above, the following is a part of an ESP class within the topic of globalization, devoted to Noam Chomsky's notion of free trade.

Students are offered an extract from a lecture by Chomsky on globalization (Discussion on Globalization, at http://www.youtube.com/watch?v=AHJPSLgHemM), with focus on his idea of free trade. They are asked to take notes to be able to respond to the following questions:

1. Who, according to the speaker, appropriated the term 'globalization,' and to what purpose was it done?
2. What historic events does the speaker consider significant in free trade development?
3. Fill in the table with brief notes on Chomsky's 'measures' of globalization

	Nature of the measurement	Trend (growth or decline)	Time frame
1			
2			
3			

4. What does the example of Mexico illustrate?
5. How does Noam Chomsky employ Adam Smith's classical economic theory in his notion of free trade?
6. Comment on Chomsky's understanding of truly free trade.

Discussion is followed by a number of language (writing) activities to develop learners' linguistic competence.

We assume that this way (top-down) of processing oral information in an academic environment engenders the active participation of students in the learning process.

Conclusion

To sum it all up, efficient listening does not obligatorily involve integration of top and bottom information received by the listener. The scale of the task defines the ratio of both processes in teaching practice. The objectives of an individually taken ESP course highlight the need to listen strategically by employing as much top-level schematic information as possible.

Top-down processing thus plays an important role in academic listening, because, on the one hand, it enables listeners to interpret and enrich the speaker's meaning, and serves as a basis for developing their active position in language learning, on the other.

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