7. Mission Impossible? Understanding English with French Ears

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Abstract

Pour comprendre le flux sonore de l'anglais, l'auditeur francophone doit traiter des rythmes et des sons inhabituels. Or le traitement de la parole implique des automatismes acquis depuis la petite enfance et fondés sur le système de la langue maternelle. Après avoir passé en revue les travaux de recherche sur l'acquisition du langage, la perception de la parole et les différences fondamentales entre les langues française et anglaise, je présente une expérimentation confrontant deux méthodes : une consacrée à la rééducation des processus attentionnels et l'autre à des processus automatiques.

Pour cette expérimentation, un groupe travaille dans des conditions d'apprentissage explicite s'engageant dans un processus actif et intentionnel où les sujets essayent de distinguer les caractéristiques clairement définies de la phonologie anglaise. A l'autre groupe, nous proposons un travail inspiré de la méthode sémiophonique visant à une modification des processus ascendants d'identification des mots par opposition à une rééducation du fonctionnement cognitif du sujet.

In order to understand the English spoken word, a French listener must process unfamiliar sounds and rhythms. This is extremely difficult because word recognition implies an automatic process acquired from early childhood and based on the native language speech sound system. This study reviews what is currently known about language acquisition, auditory word recognition, and the fundamental differences between the French and English phonological systems. It then presents an experiment exploring automatic and controlled processing in second language learning.

In this experiment one group worked under explicit learning conditions, actively and intentionally trying to distinguish different characteristics of the English language phonological system. The other group, following the semiophonic method, received no specific instruction, but repeated English words and phrases in a relaxed atmosphere. The semiophonic method, originally developed for dyslexic children, targets a modification of the bottom-up processes used to identify words, rather than proposing a cognitive approach. The principle is to intervene directly at the automatic level of language as opposed to attempting to deal with attentional processes. The application of this method to the acquisition of the English phonological system implies that French learners repeat English sounds and rhythms.

Introduction

Understanding what is said around us seems quite simple until we try to listen to a foreign language. We then realize that we are totally unaware of the processes involved both in comprehending our native language and in our failure to comprehend a foreign language. This article attempts to explain how we become such successful native language listeners and why it is so difficult to succeed a second time especially for French speakers who try to understand English.

First In – Last Out: Language Acquisition

As native language acquisition evolves from birth to the end of childhood, linguistic perception becomes more and more firmly established until it begins to have the characteristics of an automatic processing system. To learn a language, a child must identify and construct relationships between numerous cues of different types (intonation, phonological contrasts, word order, etc.). Because the importance of these varied cues differs according to the language, listeners cannot apply the principles of their native language linguistic system to the comprehension of another language. It is important to outline the different stages of first language acquisition in order to propose a system of reeducation that takes into account the relationship between the anteriority of learning and the depth of its influence.

Prototype formation

P. Kuhl (1994, 1992, 1984,) has proposed a theory of speech development called the Native Language Magnet Theory (NLM). From birth babies fine tune their perception of native language vowels by storing prototype representations of these sounds in their memories thereby eliminating the flexibility to perceive foreign language sounds. By three months babies are capable of retaining vowel sounds which means that their memory for sounds is taking shape (Jusczyk, 1995). By six months babies begin to form vowel prototypes for their native language. For example Boysson-Bardies et al. (1992) studied the babbling of 6 to 8 month infants and found that for English babies 21% of their productions were "ha". An amazing 11% of the production of French babies was "ha" too. However, when infants were at the 15-word phase of production, French babies no longer produce "h" and English babies produced the same quantity of "h" sounds as an adult would. By the age of nine months, prototypes are forming and

babies are beginning to ignore sounds that do not belong to their native language and focus their attention on native language vowels.

Prosody

The same prototype formation is working for prosody but it begins even earlier. Before birth babies have been sensitized to the sounds of the language spoken by their mother when they were in her womb. At birth babies are capable of distinguishing foreign vowel sounds but they prefer the sounds of the language spoken by their mother (Kuhl, 1994). By six months American infants are producing 2-syllable babbles with an accent on the first syllable. At the same age, French infants do not accentuate syllables. However, French infants are lengthening the final syllable but American infants are not (Levitt et Wang, 1991).

As we have seen, infants are sensitive to the prosodic aspect of language first. This is further enhanced because "motherese", the language they most often hear, is also based on prosody. Mothers rarely use words in isolation (less than 2% of the time) but speak with their children in exaggerated rhythmic patterns (Morgan, 1996).

Because of these observations and others, Cutler and Mehler (1993) and Otake et al. (1993) use the term *prosodic bootstrapping* to describe the way infants rely on prosodic structure to segment speech input into words and to establish a framework for the lexicon-building process.

In my opinion, ESL language teachers do not take this all-important concept into consideration enough in their programs. This early development of the prosodic system has a profound impact on adult linguistic perception and production. The importance of prosodic information can be seen in observations of adults speaking their native language. For example, in a tip-of-the-tongue or a slip-of-the-tongue phenomenon perfectly normal adults have trouble finding the correct word but have no trouble maintaining the correct prosody (e.g. *"lowing the morn" "mowing the lawn" "holed and sealed" "soled and heeled"*). Another example is with brain damaged patients who often reproduce set phrases with perfect intonation (e.g. "How are you?" "So nice to see you.") with absolutely no comprehension of what they are saying.

This is where the "first in, last out" principle can be seen. Our native language prosodic system is a part of our automatic processing system that we are totally unaware of.

Speech Perception

Listeners, whether they are English or French, must be able to go from a fast, variable, continuous and ambiguous sensory input to a meaningful interpretation. Explaining how this is done raises many essential questions. Which elements of the sensory input are important for word recognition (temporally defined spectral templates, phonemes, syllables, etc.)? How important is the influence of higher-order contextual information (lexical, syntactic, semantic and pragmatic)? In other words, how important are bottom up operations compared to top down information? How much does language comprehension depend on both automatic and/or voluntary processes? Recent research has led to insights on how listeners understand fluent speech seemingly efficiently and effortlessly but at the present time no one theory has the consensus of all of the scientific community.

Strain the brain: Automatic Processing

As we have seen, no one knows exactly which physical aspects of the speech signal allow us to understand a language but we do know that word recognition is immediate, seemingly effortless, unconscious and automatic or mandatory. In other words it is an automatic processing system. The main features of this system are that it is:

- **immediate:** We do not have the time to think about or analyze what we are doing.
- **effortless:** It does not use up the analytical part of our brain (unless it is a foreign language).
- **unconscious:** We are not aware of how we listen.
- **irrepressible:** We cannot stop ourselves from understanding.
- **unintentional:** Will power does not help.
- **automatic:** Attention is not paid. For example when we are tired we still understand.

When learning a second language, listeners do not notice phonological regularities in the target language because they are using their native language automatic processing system. Therefore second language listeners have a deficient

phonological representation of the second language. Compensating for this deficient phonological representation puts a strain on working memory. French listeners, not having developed their capacity to encode and store English phonological representations, will have more difficulty understanding fluent speech in that language.

Obviously everyone has had the experience of being able to distinguish foreign language sound characteristics in a language laboratory. In this situation the listener is concentrating and analyzing the sound input; something that is quite impossible to do in real time. For example, Japanese listeners can easily hear the difference between English phonemes in a laboratory situation. However, during a recent study using ERP (event-related brain potential) tests, no brain activity was observed for Japanese listeners with an "r" or "l" sound stimulus. Of course the same tests, when give to English speaking listeners, showed an automatic reaction (Locke, 1997).

This does not mean that foreign listeners cannot understand at all. It just means that since they are using native language categories to perceive foreign sounds, they must rely on other linguistic representations (syntactic, semantic, and pragmatic) to understand. Listening in a foreign language is not an automatic process.

Two Different Systems: the English Language as compared to the French Language

Which linguistic characteristics influence spoken word recognition of English and French? Some aspects seem more important to automatic spoken word processing than others that are traditionally taught in second language courses. Recent research highlights the importance of temporal patterns in forming the framework which structures comprehension of spoken discourse. As we have seen, even before birth, children begin developing sensitivity to prosody. This early development followed by that of other linguistic capacities such as grammatical capability and the use of phonotactic contrasts leads to establishing a network of specific connections in memory.

The origin of the difficulty for French people in perceiving spoken English is found in these characteristics deeply buried in the early stages of linguistic

development. Not being aware of the linguistic cues used for understanding their own language, French people cannot voluntarily modify these cues to master another language.

It is not possible to list all of the characteristics of the French and English languages which are the source of these differences. However some of them are indispensable for understanding why it is so difficult for a French person to understand English.

The prosodic system of the two languages is essential for dividing fluent speech into word segments. Basically the French automatic processing system is constantly monitoring for syllable segments. The English system is searching for the stressed syllable. In a fascinating study by Cutler et al (1983) the conclusion was:

> "We conclude, therefore that the syllabification strategy is characteristic of listeners rather than of stimulus language. We suggest that listeners who have acquired French as their native language have developed the syllabification procedure, natural to the human language processing system, into an efficient comprehension strategy. On the other hand, listeners whose native language is English, where this strategy would not necessarily achieve greater comprehension efficiency, have not included syllabification in their repertoire of processing strategies." In later studies they showed that French listeners continue to use syllabification strategies "even when listening to English words" (1986) and native English speakers use a stress-based segmentation system even when listening to French words.

The French language is characterized by a regular rhythm with the vowel in the last syllable in a group being longer (e.g. "probabilité" ["- - - - -"]). In English the accentuated syllable can be anywhere and the rhythm is irregular (e.g. "°° * °°": probability). Besides, when a syllable is accentuated, the phonemes around this syllable are modified becoming schwas (e.g. "Where did you go?" "Where ja go?"). Phonemes are not deformed by the rhythm in French. Of perhaps even greater importance for the automatic processing system are the characteristics of accentuation in the two languages. French accentuation depends on length alone

with the last syllable being longer. English stress does not depend only on length but also on intensity and change.

Besides the prosodic system, basic differences in phonemic structure influence the automatic processing system. English phonemes are characterized by movement whereas French phonemes are stable. In 1990 Drach filmed an American saying the word "know" and a French person saying "nos" in French. The resulting films show that that the jaws, tongue and lips of the American are constantly moving but that in French all of these organs are relatively stable. A second important difference in the phonemic structure of the two languages is that both length and reduction are significant in English whereas French vowels are considered "pure".

Finally the automatic processing system does not depend on the sound system alone, but on other linguistic strategies. Since English usually follows a strict word order (Subject-Verb-Object), English speakers rely heavily on word order to interpret a sentence (MacWhinney et al [1984]). Especially when speaking spontaneously, French people rarely follow the Subject-Verb-Object pattern. Trévise (1986) gives twenty-four examples of how the sentence *"Jean aime les pommes"* might be said (e.g.*"Il aime les pommes Jean" "Jean les pommes il aime ça"* etc.)

The above description barely touches on the complexity of the differences between French and English. Understanding spontaneous speech depends on very diverse elements many of which are buried deep in our earliest linguistic acquisition. We are totally unaware of most of these elements and therefore cannot easily modify our listening strategy.

Experiment

Taken together, the above findings led to the hypothesis that the problems of listening comprehension could better be addressed through a method that would access the automatic processing system of the subject. This method would have to take into account the fundamental differences between the French and English languages but would not explicitly teach them.

To test this hypothesis, an experiment comparing two methods was conducted

during normal university second language classes over three school years (1995-1996, 1996-1997, and 1997-1998). The experiment was first started in 1990 with students working in the language laboratory under the explicit learning conditions of the first method. This involved work with cassettes and a book published by Ellipse in 1992 (*Entendre l'anglais pour préparer l'oral*). The second method attempted to reeducate automatic processing systems under implicit learning conditions. The subjects worked with an adaptation of the semiophonic method developed by Dr. Beller and used with dyslexic children for over 20 years. This involved repeating words or phrases while carrying out a secondary task.

This study was carried out with first year students at the Institut Universitaire de Technologie of Cachan (near Paris). They were divided into two or three groups, Group E working with the book and Groups R and L repeating words and phrases.

Figure 1: Number of participants

	Group E	Group R	Group L
March 1996	**80**	**51**	**10**
March 1997	**49**	**62**	
March 1998	**73**	**48**	

Upon their arrival in September, subjects took an English oral comprehension test. Six months later, after participating in approximately twenty half-hour sessions in a language laboratory, they took the same test. This test, based on the Cambridge First Certificate and the Cambridge Advanced English Tests, evaluated their capacity for understanding normal spoken English.

At the beginning of each session, Group E subjects would take their books and go to one of the language laboratory booths where *Entendre l'anglais pour préparer l'oral* was pre-recorded. They were able to work at their own speed and look at the answer key whenever they desired. Group R and L subjects would take a game, a picture book, or drawing paper and go to a language laboratory booth where they would repeat the words and phrases they heard.

Group E

The method used by this group was based on a systematic study of the aspects of the English phonological system that are difficult for a French speaker. For example, French people have difficulty in hearing the difference between "nineteen" and "ninety". In the experiment, the subjects had to discriminate between /I/ and /i:/ in the very first exercises.

Entendre l'anglais pour préparer l'oral is divided into modules, each one made up of five parts:

- **Sounds:** The difference between two phonemes is explained and then the subjects complete a series of exercises. For example they must circle "*meat*" or "*mitt*" according to whether they heard "*She threw in the meat*" or "*She threw in the mitt*". The explicit explanations of the differences are very brief and subjects do not learn how to produce these sounds. Learning takes place only through listening.
- **Rhythm:** This part includes the problems of prosody, intonation, weak syllables, etc. For example, while looking at a list of words in their books, subjects circle the stressed syllable. Again the explanations are very brief and do not include any rules that would be useful for production.
- **Global Comprehension:** This part attempts to help subjects develop a listening strategy exercising their top down reasoning. For example, subjects learn how to listen for key words using the English language stress system. In some exercises they are asked to ignore all the unstressed words in order to only listen for key words.
- **Listening for Detail:** The difficulty of understanding spoken numbers and the letters of the alphabet is much more than a lexical obstacle. Using radio programs and advertisements, this part is made up of number and alphabet listening exercises.
- **Answer key:** At the end of each part, students are asked to work from the answer key to better understand their mistakes.

Groups R and L

The semiophonic method never goes into explanations of the underlying

rule-structure, but attempts to have students avoid the use of the top down reasoning that would imply explicit knowledge. The sequence of the cassettes used by Groups R and L was based both on the principles of universal language acquisition and on a progression taking into account the difficulty of the English prosodic system. Their content depended on the rhythm of the English language rather than on semantic or syntactic considerations. During the first sessions, subjects were asked to repeat single words. They then progressed from double words to more and more complex prosodic sequences, recreating in this way the normal evolution of first language acquisition. The sequence of the cassettes depended directly on the fundamental differences between the English and French languages indispensable for spoken word recognition.

Groups R and L used identical cassettes, based on the principles of the semiophonic method developed for dyslexic children. For material reasons, the other essential element of this method, the lexiphone, was only used with a limited number of subjects (Group L). The lexiphone produces a so-called parametric sound to enhance the auditivo-verbal re-education of language disorders. Because only two of these devices were available for only one year, Group L was made up of only 10 subjects compared to almost 200 for Group R.

The semiophonic method is based on repetition using an audiophonatory loop. Repetition both reveals the perceptive capacities of the subjects and initiates a modification of these capacities. Numerous studies confirm the correlation between the capacity of repeating a language and its acquisition both for first and second language learning. Memory span of phonological elements determines vocabulary acquisition of four-year olds learning their native language and of older children learning a second language (studies mentioned by Ellis, 1996). As an application of Anderson's theory on the importance of training for automaticity acquisition (Perruchet, 1988), the repetition of regular phonological sequences should facilitate the formation of a framework or a structure that would permit the development of memory span. As the capacity for imitation of longer and longer phrases develops, second language learners have available more raw material from which they can construct a linguistic system. Automatic processing cannot develop unless working memory can retain units of sufficient length (Spiedel, 1989).

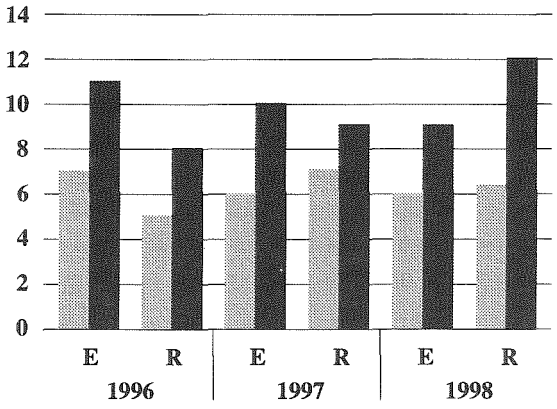
Group R and L subjects used headphones with built-in microphones enabling them to hear both their own voices and the words and phrases recorded on the cassettes. The use of this system allowed subjects to work under audio-phonatory feedback conditions, which is indispensable for the method. By listening to this feedback, subjects automatically modified their production to make it better correspond to the model.

Results

Substantial Improvement

The overall level of all of the subjects improved substantially. Even though these subjects had been studying English since the age of eleven, attending an average of eight years of English classes, a large portion (between 20 and 30 %) understood almost no spoken English. At the end of the study, the percentage of those who understood very little went down to less than 10%.

Figure 2: Results



Progress made (improvement in the mark out of 20)

The subjects with a more advanced English level also showed marked improvement. The percentage of those who understood almost everything (a test mark of 15/20 or above) went up by more than 10% each year.

Group L subjects, who worked with the lexiphone, showed the most improvement with a gain of 3.5 points (figure 3). It would seem that the lexiphone could be a useful tool for improving perception but further studies are needed.

Improvement in different ways

The performance of the three groups (figure 3), practically identical over the three years, does not show the means the subjects used to understand spoken English and does not reflect individual differences. Because of the large number of subjects, an average does not show individual personalities and origins and does not take into account the source of improvement of each group.

Figure 3:
Performance of each group: number of points gained (marks out of 20)

	1996	1997	1998
Group E	**3.1**	**2.6**	**2.3**
Group R	**3.1**	**2.6**	**2.9**
Group L	**3.5**		

Both methods led to improved listening comprehension but we feel that the improvement is based on totally different processing strategies. The implicit learning groups (Groups R and L) enhanced their comprehension through a more efficient bottom up processing of phonetic and temporal cues. They also seemed to extend their short-term memory capacity for English words and phrases. When these subjects repeated a list of words, their syllable accentuation and phonemic production were superior to their usual performance.

However, many subjects remained very aware of the semantic context especially when this context did not seem to correspond to the target word. For example, they would often transform a sentence in order to make it significant (e.g. "*That's the first thing you've said right*" would become "*That's the first thing last night*" or "*That's all you have to do*" could become "*Perhaps to do.*"). Observations of individual subjects showed that the context effect was inversely related to performance for the implicit learning groups.

On the other hand, Group E was explicitly taught to use the context to better understand spoken discourse. This group learned to use systems other than phonological processing and to compensate for deficient sensory input perception through cognitive and linguistic means.

It is impossible to know how a subject managed to understand spoken discourse, but we have the impression that the processes used by Group E were intentional and inferential. This interpretation was confirmed by the reaction of the subjects who said that the global comprehension work was very profitable but that the exercises on the sounds were not very interesting. At the end of the study they claimed to have benefited from being taught how to look for key words but said that they had not progressed in discriminating individual phonemes. They enjoyed learning about suprasegmentals and the English system of accentuation but did not believe that this knowledge would improve their listening comprehension in real time.

For all the groups, individual results are far from homogeneous. Some subjects did not progress at all whereas others doubled their score, going from 7/20 to 14/20 for example. This could easily be explained by analyzing the listening strategy used. Subjects in Group E who enjoyed studying the differences between English and French, using the top down reasoning method proposed, benefited from the method. On the other hand, subjects in the implicit learning groups who repeated with pleasure, allowing themselves to follow the music of the language profited from a bottom up approach.

During this study those who did not progress used the method that was in contradiction with their personality. For example those students who were very communicative and self-assured did well in Group R. Those who were introverts or who were afraid of being judged by others did well in Group E. Some students who were opposed to traditional learning methods made a lot of progress in Group R whereas some people felt insecure with this new method, and did better in Group E. The most striking difference, however, concerned the students who had been raised as Arabic, Portuguese or an African language bilinguals. These students, who had learned this other language with very little contact with reading and writing, were very receptive to the methods of Group R.

Conclusion

These results show an overall improvement in listening comprehension. However, they do not take into account the reasons for this improvement. Group E subjects progressed through the use of explicit learning processes whereas Group R and L subjects improved through their implicit learning processes.

On a long-term basis, it would seem that these two processes would not lead to the same results. The ideal situation would be to reeducate the automatic processing system. Having to compensate for a deficiency in this system by using attentional processes inevitably leads to a slower and often erroneous interpretation of oral discourse. In spoken word recognition, it is necessary to differentiate between representations computed from the sensory input and those constructed from the context using higher order sources of knowledge. Every listener uses context in the later stages of interpretation, but the dependency and the efficiency of this use hinge on the first stage of processing. Impaired phonological encoding increases the risk of error because the listener has only a partial representation of the sensory input to confront with higher order contextual information.

Even if listeners are able to use explicit knowledge of the phonetic characteristics of the language, allowing them a better interpretation of the representation computed from the sensory input, without automatisation performance will still deteriorate. By requiring attention, processes that should have been carried out automatically, will slow down the system and overload working memory. During this study, Groups R and L improved their memory spans. At the beginning of the experiment, these subjects were incapable of repeating English phonological sequences, indicating that their short-term memories were operating in a French phonological system. For most of the subjects, the repetition of double words and of standard English rhythms that was difficult at the beginning was effortless at the end. By the final weeks of the experiment, quite a few subjects could remember long sentences without any difficulty. It would seem that the more the cognitive resources are overloaded, the more use is made of contextual cues and the less the phonological aspects are taken into consideration. Observations of the performances of Group R and L subjects indicate that it is possible to obtain an evolution in the opposite direction.

Any activity that could help to lighten memory load by favorising automatic

processing should be developed and integrated into academic programs. We feel that because of the complexity of both the phonological system and the cognitive and linguistic resources necessary for oral comprehension, explicitly teaching difficult points will lead to failure. It is not sufficient to work on the symptoms or the apparent difficulties of second language acquisition because this does not access the source of the problem. We are convinced that certain phonological information is only accessible through progressively introducing English temporal patterns. Procedures that lead to avoiding the use of higher order reasoning and explicit learning strategies, allowing more receptivity to a novel phonological system, should be developed. This is what we have attempted to do in this study.

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