A pilot case study on sentence pattern perception of Spanish

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ABSTRACT

This study aims to observe which part of a sentence has more influence on the recognition of its pattern. A list consisting 27 sentences, each containing 4 intonation patterns (declarative, rising interrogative, falling interrogative and suspended), was recorded by a male native speaker of European Spanish. In this pilot study, 9 sentences were chosen from this list and were modulated by a computer software. A subject, another male native speaker of Peninsular Spanish, listened to a list of 108 sentences (=9 sentences x 4 intonation patterns x 3 different modified parts) recorded on a cassette tape. The results indicate a possibility that (i) the subject can perceive with high accuracy declarative or rising interrogative intonation, but (ii) he needs more prosodic information in the identification of falling interrogative or suspension.

1. INTRODUCTION

In order to form interrogative sentences, it is not necessarily required in Spanish to apply some particular structural rules like, for example, inversion between subject and verb/ auxiliary verb in English. This means that intonation can be the most important cue to identify which types of sentences, declarative, interrogative or other types, the sentence belongs to. Especially in case of Yes-No questions, supra-segmental features can play a more important role in distinguishing them from declarative sentences, because such questions basically contain the same lexical elements and word order as their corresponding affirmative sentences, contrasted only by intonation, and, at the same time, there is no lexical interrogative marker like wh-pronouns which can help the hearer to judge the sentences as interrogative.

In many languages, declarative sentences are believed to have descending intonation and Yes-No questions, on the other hand, show an ascending contour. Geluykens, however, questioned this assumption and emphasized that pragmatic cues have more influence on perception of sentence patterns than phonetic cues such as intonation through experimental studies on British English [1], [2], [3]. On the contrary, Batliner and Oppenrieder supported the importance of rising intonation in perception of interrogative sentences [4]. There are also other studies which indicate distinctive roles of intonation in perception of sentence patterns, for example, Thorsen on Danish [5] and Szmidt on Quebecois French [6].

In regard to Spanish, Sensui presented an experimental study using filtered sentences in which only prosodic information was left intact [7]. The results supported the second point of view in that the subjects could identify four intonation patterns (declarative, rising interrogative, falling interrogative and suspended) significantly without any syntactic, semantic, or pragmatic-contextual cues.

At the same time, however, Sensui's study presents another point of view, that is, rising intonation alone does not always guarantee sentence status as an interrogative. If this were the case, falling interrogatives should not have been heard as a question by the subjects, although the percentage of correct identification was lower than that for rising interrogative. The same thing can be said to suspended stimuli, which have a slight ascending movement, because these sentences could be perceived correctly as suspended in many cases, not as interrogative. Related to this point, Smidt suggests the influence of higher pitch of voice in interrogative sentences.

We will now consider what part is crucial for recognition of sentence patterns; rising or falling in final part of the sentence? Higher or lower pitch? Contrast between body and tail of the sentence? This case study suggests one way to observe which part of a sentence has more influence on the recognition of its pattern.

2. METHOD

2.1 MATERIALS

A list consisting of 27 sentences, each containing 4 intonation patterns (declarative, rising interrogative, falling interrogative and suspended), was recorded with a DAT recorder in the Phonetics Laboratory of Sophia University, Tokyo, by a male native speaker of European Spanish, from Ciudad Real. Their grammaticality was checked by the informant before the recording. The informant read entire sentences including the phrases in parentheses as seen in APPENDIX only when suspended intonation was recorded. This part in parentheses was eliminated later with a computer software, leaving only the first part of the sentences that contains the target contour.

In this pilot study, 9 sentences (indicated in the APPENDIX) were chosen from the list and were modulated by a computer software *Onsei Rokubunken* (developed by Imagawa and Kiritani [8], [9] and now distributed by DATEL KK [8]), masking one of three parts of the sentences (head, body or tail) by white noise. The boundaries

between the head and body or between the body and tail are indicated by |. After this modification, 108 sentences in total (=9 sentences x 4 intonation patterns x 3 different modified parts) were reordered at random and recorded onto a cassette tape.

2.2 SUBJECT

The cassette tape prepared as described in 2.1 was used in a perception experiment, with another male native speaker of Peninsular Spanish, from La Rioja as the subject.

2.3 PROCEDURE

The subject listened to the cassette tape through head-phones in the studio of the Phonetics Laboratory of Sophia University. He was asked to mark one of three choices, declarative / interrogative / suspended, without leaving any stimulus unanswered.

3. RESULTS

The results of the experiment are as indicated below. Shaded cells in the Tables 1-4 correspond to presented intonation patterns to the subject, which means that the numbers in the cells indicate the frequency of correct identification of stimuli.

3.1 DECLARATIVE

It was observed that the subject responded correctly to almost all of the stimuli, without influence of masking.

perceived masked	head	body	tail
declarative	9	9	8
interrogative	0	0	1
suspended	0	0	0

Table 1: Responses toward declarative sentences

3.2 RISING INTERROGATIVE

The subject could identify correctly most of the stimuli, in the same way as in the case of declaratives.

perceived masked	head	body	tail
declarative	0	0	2
interrogative	9	9	7
suspended	0	0	0

Table 2: Responses toward rising interrogative sentences

3.3 FALLING INTERROGATIVE

In contrast to declaratives and rising interrogatives, it was observed that the subject responded to seven of the stimuli as declarative when head or body was covered by white noise, and four cases also as declarative when the tail was masked.

perceived masked	head	body	tail
declarative	7	7	4
interrogative	2	2	5
suspended	0	0	0

Table 3: Responses toward falling interrogative sentences

3.4 SUSPENDED

In this case, the result is somewhat peculiar. When the head or body was masked, four cases were judged as interrogative and the same number was indicated as suspended. No correct identification was made when the tail was not left intact.

perceived masked	head	body	tail
declarative	1	1	8
interrogative	4	4	1
suspended	4	4	0

Table 4: Responses toward suspended sentences

4. DISCUSSION

In regard to declarative and rising interrogative, the subject could identify the patterns correctly if the final part is not modified. One error in declarative and two in rising inter-rogative are observed when the tail was covered, so a change in this part may cause some influence on the iden-tification, though it is difficult to ascertain this tendency because of the small number of total samples, and further investigation is necessary to explain this phenomenon.

In contrast, the falling interrogative pattern caused more difficulties in identification. It is interesting that more errors are observed in cases where the final part, which shows "typical" circumflex contour, is unmasked than in those where this portion was masked. This means that the falling movement is perceived by the subject as declarative and this form has more influence than a larger range of frequency change, which could have extracted responses as being interrogative.

The suspended pattern also seemed to be difficult for the subject to respond. In case the tail is not modified, the subject tends to mark interrogative when error occurs. Probably this is because of the slight ascending contour of the final part of the sentences. When the tail is masked, on the other hand, the subject thought 8 of 9 stimuli as declara-tive. It is possible to deduce from this that this response comes from lack of cues to identify the sentence as inter-rogative, without rising movement nor high pitch of voice.

As observed in the last two cases, masking the tail can cause difficulties in identification of sentence patterns. And at least for this subject the first cue to determine sentence pattern is given by the form of the tail. If this part is not

available, high / low pitch of the head / body is used in recognition of falling interrogative and suspended intonation.

5. CONCLUSION

The results described above are summarized as follows.

(i)   The subject can perceive with high accuracy declarative or rising interrogative intonation even if a part cannot be heard.

(ii)   He needs more prosodic information, i.e., contrast between head / body and tail, in the recognition of falling interrogative or suspension than declarative or rising interrogative.

As this is a pilot study, further quantitative investigations are required to see if the observation presented here can be generalized also to other cases.

ACKNOWLEDGEMENTS

APPENDIX

Sentence list

1. Quiere | comprar | la sal [, pero el azúcar, no].

2. El tren para Madrid | sale | de este andén [, pero no ha llegado todavía].

3. Juan | quiere | un billete de ida [, pero María, no].

4. Esta camisa | es | de algodón [, pero ésa es de poliéster].

5. Hay | algunas manzanas | en la nevera [, pero no hay ninguna pera].

6. Vamos a ir | de excursión | este sábado [, pero Carmen no puede venir].

7. No dura | mucho tiempo | la felicidad [, pero nos salva la esperanza].

8. Este coche | gasta | mucha gasolina [, pero ése, menos].

9. Le duele | mucho | el estómago [, pero la cabeza, no].

-     Phrases in brackets were eliminated with a computer software before editing the cassette tape for experiment to get suspended intonation, but the informant read this part too at the recording.

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