



The Benefit of Using Minimal Pairs in Learning the Geminate/Singleton Contrast by French Learners

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Abstract

The Minimal Pair Technique (MPT) is based on the use of the minimal pairs for improving learners' pronunciation as it focuses on the sounds playing a linguistic function in a target language. For instance, in Italian the consonant duration is linguistically relevant as words differ in their meaning if a singleton (e.g., sete - thirst) or a geminate (e.g., sette - seven) consonant appears. On the contrary, gemination does not exist in French. Thus, the production of geminates may be difficult for French learners of Italian as L2 who tend to reduce the geminates to singletons. The use of minimal pair in production can help learners to increase their awareness and sensitivity in identifying the consonant length contrasts. As a consequence, a more accurate pronunciation leads to a more intelligible and understandable speech. A perceptual test is here presented based on the production of the singletons and geminates in isolation and in minimal pair (production task as factor) by 4 beginners and 4 advanced French learners of Italian as L2 (proficiency level as factor) – and 3 Italian natives as control. 11 Italian listeners judged the French learners' and natives' productions as for: 1) intelligibility; 2) speakers' effort in producing the singletons and geminates 3) interpretability and 4) comprehensibility. Results show that the advanced learners' productions are more intelligible and comprehensible as their pronunciation is more accurate; on the contrary, beginners' productions are less intelligible due to their lower degree of accuracy in production. Further, the minimal pair leads to a greater intelligibility and comprehensibility than isolation in the advanced learners' productions. The beginners find very difficult to keep a clear distinction between the two terms and, indeed, the geminates are perceived to be realized with a greater difficulty (word/syllable repetitions, hesitation, pause, etc). However, these cues, related to their production effort, help listeners to interpret correctly the intended target words even if the pronunciation accuracy is low. This means that the minimal pairs are useful to help learners raise awareness and sensitivity in distinguishing geminates from singletons.

Keywords: *minimal pairs, geminates, Italian-L2, French-L1.*

1. Introduction

The success of a communication depends on the abilities and efforts of both speaker and listener [1] being the communication a mutual relationship in which a speaker produces an utterance, by eliciting a listening action, and the listener has to perceive and understand the meaning of speech [2, 3]. It is not enough for learners to know words or grammatical rules if their pronunciation is not correct and if they are not able to produce comprehensible utterances to native speakers [4, 5]. Thus, having an accurate pronunciation or knowing how to pronounce correctly the L2 sounds can make the learners avoid misunderstanding in communication because wrong pronunciation can lead to different meaning of words [6, 7].

One technique used to teach and to improve the learners' pronunciation is the so-called Minimal Pair Technique (MPT). It is based on the use of the minimal pairs which are words which differ by only one phoneme and they allow to focus on those sounds which cause difficulties to the learners [7]. This technique was used, for instance, by [6] to improve the pronunciation of voiced and voiceless English sounds such as /s/-/z/ and /j/-/ʒ/ contrasts of the Indonesian students. In order to observe the effectiveness of the MPT, teachers used this technique with the experimental group while the control group received the conventional teaching. Comparing results between the pre-test and the post-test, authors found that the experimental group improves the pronunciation in producing the two voicing contrasts and that the technique was effective in teaching pronunciation. The same results were achieved by [7] and [8] who used the MPT to help students distinguish between long and short English vowels and the English contrast /p/-/f/ respectively. Finally, [9] provided an online tool called "*Minimal Pair Finder*" which support teachers, researchers, students to look for pairs of words. They used minimal pairs to raise awareness about the opposition of singleton-geminate in Chinese learners of Italian as L2 [10] using different activities. The results show that the minimal pairs are important for the phonological awareness, as target phonological opposition create differences in meaning, as well for



the improvement of the learners' pronunciation. Thus, these studies show that, when properly used, minimal pairs can effectively contribute to improve the pronunciation of the non-native sounds. Further, this technique increases the learners' awareness and sensitivity toward a more accurate pronunciation which also lead to an improvement of their ability of speaking in terms of intelligibility and comprehensibility [11]. The important dimensions of the non-native speech are: 1) intelligibility: recognition of the word or utterance; 2) the comprehensibility: the recognition of the word/utterance meaning and 3) the interpretability: the recognition of the speaker's intention [12].

The study presented here focuses on perception and it is based on a previous acoustic study [13] in which French learners (advanced and beginner learners) of Italian as L2 produced target words, included a singleton (native sounds) or a geminate (non-native sounds), in both isolation and in minimal pair. Minimal pair was introduced to help learners distinguish the consonant length contrast in order to keep the opposition between the two terms as for their meaning. Then, the French learners' productions were perceptually judged by the Italian listeners in terms of intelligibility, comprehensibility, interpretability and learners' effort in producing the native/non-native sounds.

2. Goals and hypotheses

In this perceptual study, the production of singletons (native sound) and geminates (non-native sound) produced by French learners (and by Italian natives as control) was judged by the Italian natives as for intelligibility, interpretability, listeners' effort in comprehending and speakers' effort in producing the native/non-native contrast considering a different proficiency level, that is advanced and beginner learners, and two different production tasks, that is word in isolation and in minimal pair. As for the proficiency level, it is expected a greater intelligibility and comprehensibility for the advanced learners' productions being more accurate in producing the singleton/geminate contrast than the beginners who, in turn, may show more difficulties. As for the production task, it is expected a greater degree of accuracy in minimal pairs than in isolation which leads to a better intelligibility and ease of comprehensibility and interpretability.

3. Method

3.1 Acoustic experiment

Acoustic data concerning the production of the singleton (native sound) and the geminate (non-native sound) by 8 French learners of Italian as L2 (and by 3 Italian natives as control) were previously collected. The French learners were recruited among the Erasmus students at University of Salento (Lecce) and they were divided into two groups as for their proficiency level and L2 experience: 1) 4 beginners (females, mean age 21, 3 from Nantes and 1 from Paris; A1-B1 level) who studied Italian up to two years, they were recorded after 3-4 months from their arrival in Lecce and they used to speak in English or in French; and 2) 4 advanced learners (females, mean age 22, 2 from Nancy and 2 from Paris; B2-C1 level) who studied Italian from 5 to 7 years, they were exposed to Italian variety spoken in Lecce for 5-6 months and they used Italian most of the time during their stay. In addition, a control group of Italian L1 students was also included (3 females from Maglie, Lecce; mean age 23.6). The phonemes of interest were /d, l, n, r, s, t/ and for each phoneme two minimal pairs were found among frequent and real words (with the exception of /d/ which only show one frequent minimal pair). Target words included a singleton or a geminate were produced in isolation (e.g., *sete* - thirst; *sette* - seven) and in minimal pair (e.g., *sete-sette* – thirst-seven). Then the acoustic data were segmented in Praat and a perceptual check was performed in order to observe the realization of the native and non-native sound and the acoustic results were presented in [13].

3.2 Perceptual experiment

As for the perceptual experiment, 11 Italian listeners were recruited at the University of Salento (10 females mean age 27.6; 1 male, age 28). The perceptual test was performed online using Google Forms and the stimuli were selected from the acoustic experiment described in 3.1 (Table 1). Listeners were asked to judge target words included the singleton or the geminate in order to: 1) transcribe orthographically the target word heard paying attention on pronunciation (intelligibility); 2) indicate the intended word, choosing one answer among three alternatives: a) geminate, b) singleton, c) I do not know (interpretability); and to judge on a 7-point scale (1= not difficult at all; 7= very difficult) 3) the learners' effort in producing the singleton/geminate contrast and 4) listeners' effort in comprehension. Results will be presented and discussed for the frequency distribution in percentage.



Production tasks	Example
Isolation	sete (<i>thirst</i>) sette (<i>seven</i>)
Minimal pair	sete, sette (<i>thirst - seven</i>)

Table 1: An example of the corpus for the acoustic data and for the perceptual stimuli.

4. Results

Hereafter, the results concerning the perceptual test in terms of the frequency distribution are described. Specifically, the results for the judgments of the target words heard in isolation are reported in section 4.1, while the results for the minimal pair are described in section 4.2.

4.1 Isolation

Figure 1 below shows the frequency distribution for the intelligibility task, that is how Italian listeners perceived and transcribed the target words in isolation, included a singleton or a geminate, produced by the French learners and by the natives as control. The singleton consonant is perceived to be produced as such with a percentage of 78% and 68% in the advanced and beginner learners' productions respectively. The orthographic transcriptions of the Italian native listeners also report some gemination cases as they perceive and transcribe the singleton as a geminate with a percentage of 22% and 32% in the advanced and beginner learners' productions respectively. The percentage of the accuracy for the transcription the geminates is lower as the listeners perceive and transcribe correctly a geminate for the 62% and 45% in the advanced and beginner learners' productions respectively. Some stimuli are perceived to be produced as singletons (degemination cases) above all for the beginners' productions (55%). Finally, the singletons and the geminates produced by the Italian natives as control are 100% intelligible to all native listeners.

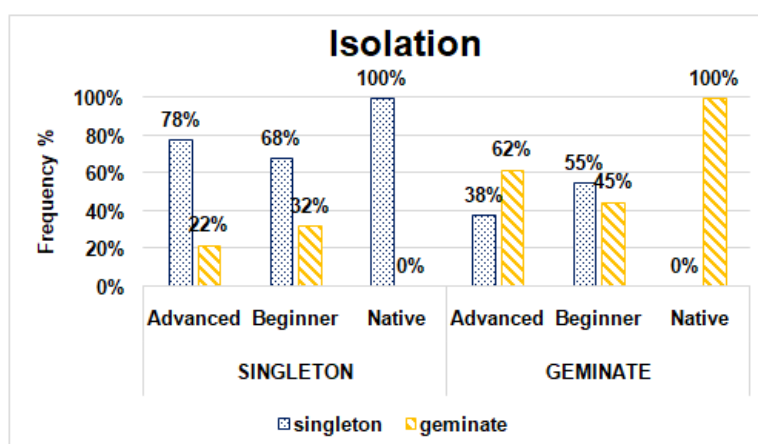


Figure 1: Bar graph for the intelligibility for singleton (left) and geminate (right) in isolation for the advanced, beginner and native speakers.

The singletons are perceived to be produced without difficulties by both learning groups and they are easily interpreted as singletons and comprehended. Let's see how Italian listeners judge the gemination cases, that is those cases in which the singletons were perceived and transcribed as geminates. These stimuli are perceived to be produced with a low degree of difficulty (over 75%) even if they report some difficulties for beginners (25% for the category 5). The advanced learners' productions are, generally, interpreted as a geminate (and not as a singleton) with a percentage of 67%, while the beginners' productions are interpreted as follows: 21% as a singleton, 36% as a geminate and 43% as "I don't know". As for the comprehensibility, the listeners comprehend the target words produced by the advanced learners without difficulties (97% for categories 1-3), while the beginners' productions are comprehended without difficulties with a percentage of 64% and with some difficulties with a percentage of 36%.

As for the geminates, the productions are generally perceived to be produced without difficulties with a percentage of 97% and 76% for the advanced and beginner learners respectively, even if listeners find



that some stimuli are produced by the beginners with a greater difficulty (20% for the category 5). As for the interpretability, in the majority of cases, the target words heard are interpreted as a geminate (81% and 75% for the advanced and beginner learners respectively) and they are easily comprehended. Finally, let's observe how the Italian listeners assess the degemination cases in which a geminate has been perceived and transcribed as a singleton. As for the learners' effort in production, the most of the listeners' ratings are in categories 1, 2 or 3 which indicates a low degree of difficulty; only some beginners' productions are perceived to be produced with a greater difficulty (25% for the category 6). As for the interpretability, listeners are successful at recognizing the geminate only at the 13% and 25% for the advanced and beginner learners' productions. Half of the stimuli heard are interpreted as including a singleton. As for the perceived comprehensibility, the stimuli are rated with a low degree of difficulty (over, 70% for categories 1-3) but some stimuli produced by the beginners are rated as "very difficult to understand" (25% for the category 7).

4.2 Minimal pair

The minimal pair proposed to speakers was formed by a word with a singleton followed by a word which included a geminate (e.g., sete-sette). Figure 2 below shows the frequency distribution for the intelligibility task for the target words perceived and transcribed in minimal pair. As shown, the orthographic transcriptions for the advanced learners' productions indicate correctly a sequence singleton-geminate at 90%. On the contrary, the sequence produced by the beginners is transcribed as follows: singleton-geminate (35%), singleton-singleton (28%) and geminate-geminate (31%). The sequence singleton-geminate produced by the Italian natives as control are always intelligible (100%).

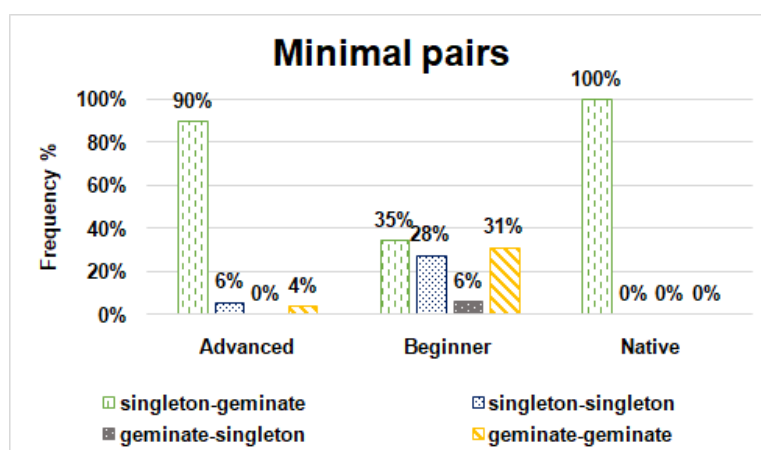


Figure 2: Bar graph for the intelligibility for singleton (left) and geminate (right) in minimal pair for the advanced, beginner and native speakers.

The sequences singleton-geminate are perceived to be produced by the advanced learners without difficulty and, as a consequence, they are easily interpreted and comprehended. Listeners' ratings for the beginners' effort in production are distributed across the scale; the majority of ratings fell among the first three categories (about 70%) but the second term which includes the geminate (non-native sound) is rated as "difficult to produced" (28%). Beginners' productions are interpreted as sequences formed by a singleton followed by a geminate and they are easily comprehended.

The orthographic transcriptions revealed that the sequences produced by the beginners were also reported as singleton-singleton and geminate-geminate. In both cases, listeners perceive a greater difficulty when the beginners produce the second term of the sequence (including the geminate) with a percentage at 23%. As for the interpretability, the sequence singleton-singleton is interpreted as singleton-singleton at 37% and correctly as singleton-geminate at 41%. The listeners report a lower degree of difficulty as for the comprehension. Finally, the sequence perceived as geminate-geminate is intended as geminate-geminate at 42% and correctly as a sequence singleton-geminate at 58%. As for the comprehensibility, the listeners' ratings are distributed across the scale indicating both a lower (62%) and a higher (31%) degree of difficulty.



5. Discussion and conclusion

In this study, Italian listeners judged the singletons (native sound) and the geminates (non-native sounds) produced by the French learners of Italian as L2 as well by the Italian natives as control. Specifically, they assessed speakers' speech in terms of: 1) intelligibility: orthographic transcription of the target words heard; 2) interpretability: recognition of the speakers' intended words; 3) comprehensibility: how ease or difficult it is to understand the word meaning and 4) speakers' effort in producing the singleton/geminate consonants. The proficiency level (advanced vs beginner learners) and the production task (isolation vs minimal pair) were considered as important factors.

The hypotheses are confirmed as for the factors considered. The results, indeed, show that advanced learners' productions are more intelligible being more accurate in producing the singleton/geminate consonants and listeners do not have difficulties in interpreting and comprehending the target words. On the contrary, beginners' productions are perceived to be produced with a greater difficulty, above all the realization of the geminates. In case of low pronunciation accuracy, that is for the degemination and gemination cases, listeners find some difficulties in understanding correctly the learners' intended word which are, generally, interpreted according to their pronunciation. As for the production task, it is evident that the advanced learners' productions are more intelligible and understandable in minimal pair than in isolation in which the singletons and the geminates are more misunderstood. The beginners' productions in minimal pair seem to be less intelligible as they find very difficult to keep the distinction between the singletons and the geminates. However, listeners seem to be sensitive to those cues that are related to beginners' efforts and difficulties (repetitions, hesitation, self-corrections, etc.) which are realized in correspondence of the target word which includes the geminate (non-native sound). This allows listeners to interpret correctly their intended sequence.

To conclude, the minimal pair gives an effectively contribution in production as well in perception. It allows learners' to improve their pronunciation by developing a phonological awareness and sensitivity toward the singleton/geminate opposition. As a consequence, a more accurate pronunciation leads to a more intelligible and comprehensible speech.

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