Pronunciation Accuracy in L2 Speech across Different Production Tasks

Sonia d'Apolito[1], Barbara Gili Fivela[2]

University of Salento - Lecce, Italy[1,2]

Abstract

This study focuses on the realization of geminates in Italian as L2 by French learners of two different competence levels (low vs. high proficiency) and across different production tasks in which the amount of information available to speakers varies. The aim is to observe: 1) how the L1 and the competence level affect the production of geminates; and 2) if the pronunciation accuracy varies across different production tasks. The hypotheses are that:1) both L1 and proficiency affect accuracy, as it is expected a lower accuracy by learners than by natives, above all by beginners; 2) accuracy varies across tasks, as a lower accuracy is expected when the context is rich of information, since other elements can help to disambiguate the target word, and in case there is no specific need to foresee possible meaning ambiguities. Nine subjects participated in the experiment: six French learners (three beginners and three advanced learners) and three Italian speakers as control. L2 target sounds (/t,d,s,n,l,r/ both as singletons and as geminates) inserted in words were read: a) in isolation; b) in minimal pairs; and c) in two interactional contexts, that is i) poor context – a carrier phrase which does not facilitate meaning disambiguation; ii) rich context – an appropriate phrase which does help disambiguate the meaning of target words. Target consonant segments were segmented in PRAAT and their duration was measured. Results show that French learners' productions are influenced by L1 phonetics and phonology as well by the competence level: advanced learners distinguish geminates from singletons as control speakers do, while beginners show a lower degree of accuracy. In all cases, accurately produced geminates are longer than singletons. In line with our expectations, speakers produce more accurately geminates when the context is poor of information and in minimal pairs.

Keywords: *L2 pronunciation, Italian L2, geminates.*

1. Introduction and goals

The accuracy in L2 pronunciation is greatly affected by the phonetic and phonological characteristics of the mother tongue (L1) and above all by the interaction between L1 and L2 phonetic-phonological systems [1, 2]. In particular, this study aims at observing the production of Italian geminates by French learners. In Italian, the singleton/geminate contrast is distinctive, since the meaning of the words changes according to presence of a singleton or a geminate consonant, which mainly corresponds to a difference in consonantal length duration [3]; the duration of the preceding vowel also allows to distinguish singletons and geminates, as the vowel is shorter when followed by a geminate and longer when followed by a singleton consonant [4]. On the contrary, in French gemination does not exist, with the exception of the uvular approximant which distinguishes the imperfect tense from the conditional mood (e.g. *pourait vs pourrait*) [5]. Besides the impact of the L1 and L2 systems, even the competence level in L2 affects accuracy in speech production. Further, according to Lindblom's H&H theory [6] speakers adapt their speech to the richness/poorness of the context in which they communicate. Therefore, two other important factors have been considered: 1) the learners' competence level (e.g. beginners vs advanced learners) as the influence of the mother tongue may differ and, as a consequence, their accuracy in production may differ too since mother tongue influence may be more evident in beginners' production rather than in advanced learners' production; and 2) different production tasks in which the amount of information varies from rich context (appropriate phrases according to the meaning of the word) to poor context (words in isolation and in unvaried carrier phrase) to minimal pairs (in which the presence of both members of a pair may induce to more clearly differentiate the target words).

Thus, the aim of this work is twofold: 1) to observe the interaction between L1 and L2 phonetic-phonological systems as for the production of geminates by French learners of Italian, taking into account two different competence levels (beginners vs. advanced learners); and 2) to observe the accuracy in L2 speech according to the information available in the context. The hypotheses are: 1) the influence of the mother tongue may lead French learners to reduce or substitute the nonnative sounds to/with native sounds and, as regards the competence level, a lower accuracy is expected by

beginners; and 2) a higher accuracy is expected when the context is poor and a greater effort is needed in order to avoid possible ambiguities.

2. Method

L2 Italian sounds studied were /t, d, s, n, l, r/ within words and sentences, both as singleton (C) and geminate (CC) - see Table 1 which shows a sample of the corpus. Target sounds inserted in words were realized: in isolation (A.), in minimal pairs (B.) and in two interactional contexts in which the target words were inserted in initial and in final position: poor context which does not facilitate disambiguation (C.) and rich context which does help to disambiguate words (D.).

A. Isolation	**Sera** (*evening*)	**Serra** (*greenhouse*)
B. Minimal pair	**Sera** – **serra** (evening - greenhouse)	
C. Interaction poor context	Cosa hai detto? – Maria ha detto **sera**/**serra** di nuovo *What did you say? – Mary said evening/greenhouse again*	
D. Interaction rich context	Cosa ti va di fare? – Questa **sera** vorrei andare al cinema *What would you like to do? – This evening I would like to go to the cinema* A cosa serve? – Questa **serra** serve per la piante nuove *What is it for? – This greenhouse is for the new plants*	

Table 1: Examples of words/sentence in the corpus.

Nine subjects participated in the experiment. Six French learners were Erasmus students at the University of Salento (female, mean age 21.5) and they came from Paris (2), Nantes (3) and Nancy (1). They were gathered into two groups at their arrival, according to the Erasmus test results: 3 beginners (L1, L2 and L3) and 3 advanced learners (H1, H2 and H3). Three native speakers were recruited for control; they were Italian students at the University of Salento (female, mean age 23.6) and they came from Maglie (Lecce, Salento, South Italy). All the subjects read the corpus three times. Acoustic data were segmented in Praat [7] in order to label boundaries of phrases, words and target segments (target word structure: C1V1C2V2, where C2=C/CC) and to measure the normalized duration of C2 as well as that of the preceding vowel (target duration/ word duration). Statistical t-tests were run separately for each speaker ($p < 0.05$) in order to observe any individual difference. Here, only the results concerning the C2 duration are presented.

3. Results

Table 2 shows how all speakers realize singletons and geminates in all production tasks. It is evident that advanced learners realize singletons and geminates as control speakers do, with the exception of few cases of reduction (geminates reduced to singleton) and of overgeneralization (singletons realized as geminate) for the learner H1, above all for the interaction-poor context (24 cases of overgeneralization). On the contrary, beginners' productions show a greater variability. The learner L1 generally reduces geminates to singletons in all the production tasks. In the first three production tasks, the learner L2 realizes the geminates appropriately while the singletons are realized as geminates more frequently; further, it's worth noting that in the interaction-poor task her realization of geminates is more accurate than that of the interaction-rich context. The learner L3 is the beginner who realizes geminates accurately in all the production tasks, though she clearly overgeneralizes: singletons are produced as geminates in both poor- and rich-interaction tasks (60.6% and 30.3% respectively).

Spk	Isolation					Minimal pairs					Interaction poor					Interaction rich				
	G	S	R	O	Tot	G	S	R	O	Tot	G	S	R	O	Tot	G	S	R	O	Tot
C1	33	33	-	-	66	33	33	-	-	66	66	66	-	-	132	66	66	-	-	132
C2	33	33	-	-	66	33	33	-	-	66	66	66	-	-	132	66	66	-	-	132
C3	33	33	-	-	66	33	33	-	-	66	66	66	-	-	132	66	66	-	-	132
H1	30	28	3	5	66	26	30	7	3	66	65	42	1	24	132	60	60	6	6	132
H2	33	33	-	-	66	33	33	-	-	66	66	66	-	-	132	66	66	-	-	132
H3	33	33	-	-	66	33	33	-	-	66	61	66	5	-	132	62	66	4	-	132
L1	13	30	20	3	66	9	31	24	2	66	5	63	61	3	132	30	63	36	3	132
L2	28	14	5	19	66	23	20	10	13	66	53	31	13	35	132	31	55	35	11	132
L3	32	27	1	6	66	33	33	-	-	66	63	26	3	40	132	57	46	9	20	132

Table 2: An overview of the target consonant realization by all speaker (G = geminate; S= singleton; R= reduction - geminate -> singleton; O=overgeneralization – singleton -> geminate).

3.1 Consonant duration

As shown in Table 3 and Figure 1 below, geminates are always produced by control speakers with a significantly longer duration in comparison to singletons, for all phonemes and production tasks. The learners H2 and H3 show similar results to native speakers, realizing geminates with a longer duration in all the production tasks and for all phonemes (with the exception of /d/ in rich interaction for H2). The learner H1 shows a higher degree of accuracy in both rich- and poor-interaction - CCs have a longer duration than Cs for all phonemes – and a lower degree of accuracy in isolation and minimal pairs – CCs show a significantly longer duration for /l, n, s/ and /l, n, s, t/ respectively. On the contrary, beginners show a lower degree of accuracy than advanced and control speakers: i) L1 does never differentiate geminates from singletons except for the phonemes /l, t/ in minimal pairs; ii) L2 differentiates CCs from Cs for /s/ in all the production tasks and also /r/ in minimal pairs and /l/ in rich-interaction context; iii) L3 shows the highest degree of accuracy since she differentiates CCs from Cs for all the phonemes in minimal pairs and also /d, l, n/ in both isolation and rich-interaction context and /l, n, t/ in poor-interaction context.

Spk	t-test	Production tasks				Durat.
		Isolation	Minimal pairs	Interaction		
				Poor	Rich	
C1	p<0.05	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	+CC
C2	p<0.05	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	+CC
C3	p<0.05	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	+CC
H1	p<0.05	/l, n, s/	/l, n, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	+CC
H2	p<0.05	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	+CC
H3	p<0.05	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/d, l, n, r, s, t/	/l, n, r, s, t/	+CC
L1	p<0.05	never	/l, t/	Never	never	+CC
L2	p<0.05	/s/	/r, s/	/s/	/l, s/	+CC
L3	p<0.05	/d, l, n, s/	/d, l, n, r, s, t/	/l, n, s, t/	/d, l, n s/	+CC

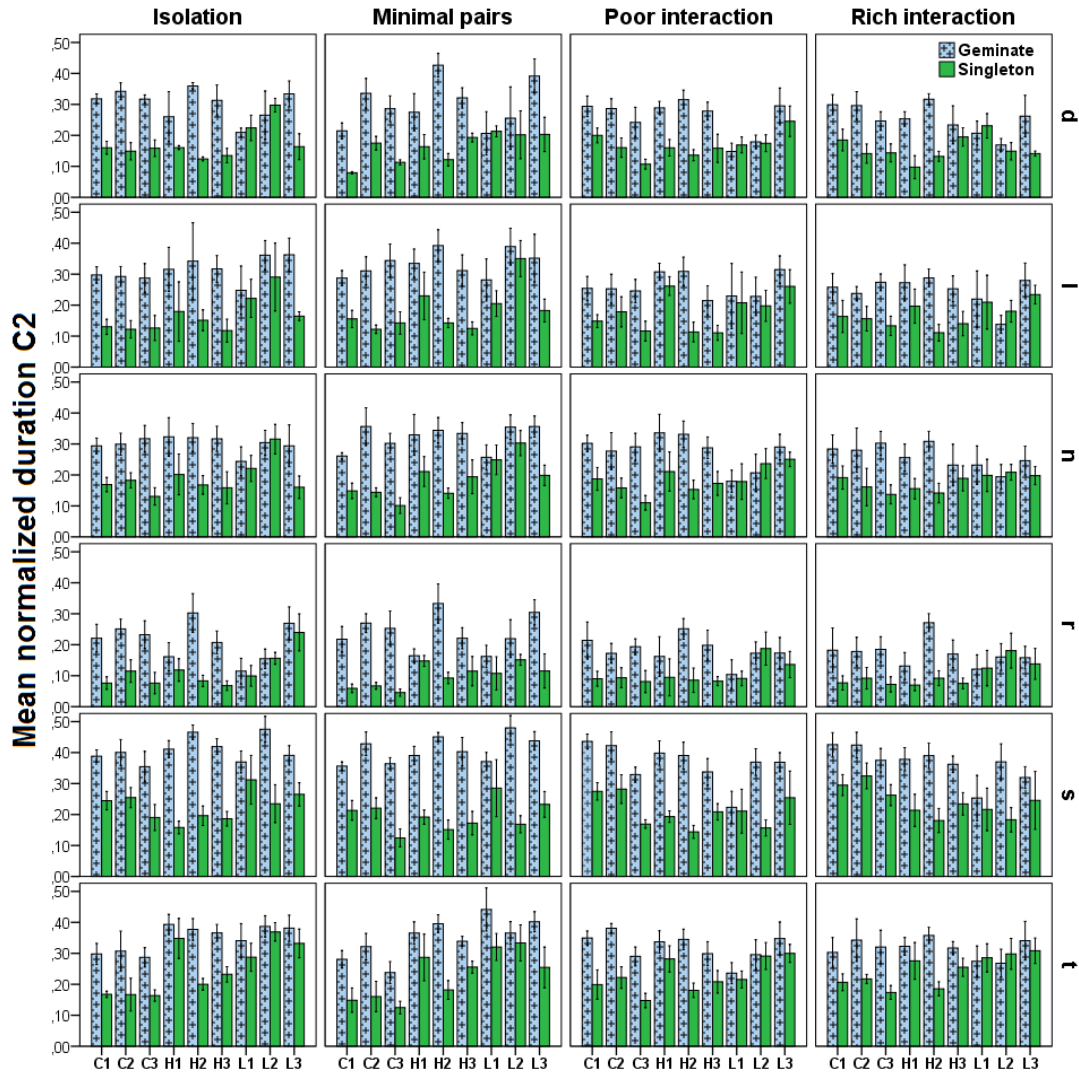Table 3: T-test results for C2 duration for all speakers and production tasks.

Figure 1: Bar graph for the C/CC normalized duration.

An ANOVA test was performed to observe if CCs are produced with the same accuracy across production tasks. Due to space limits, here only results concerning the phoneme /t/ will be described. The ANOVA shows that for all speakers CC duration differs significantly across tasks. The Tukey post-hoc test shows that for all learners, there are two distinct groups: consonant duration in isolation and minimal pairs is longer than that in poor and rich interaction. For control speakers C1 and C2 geminates have a longer duration in poor-interaction context, which differs from all other tasks; for C3 geminates show longer duration in rich-interaction, which is only different from minimal pairs. Results are reported in Figure 2 below.
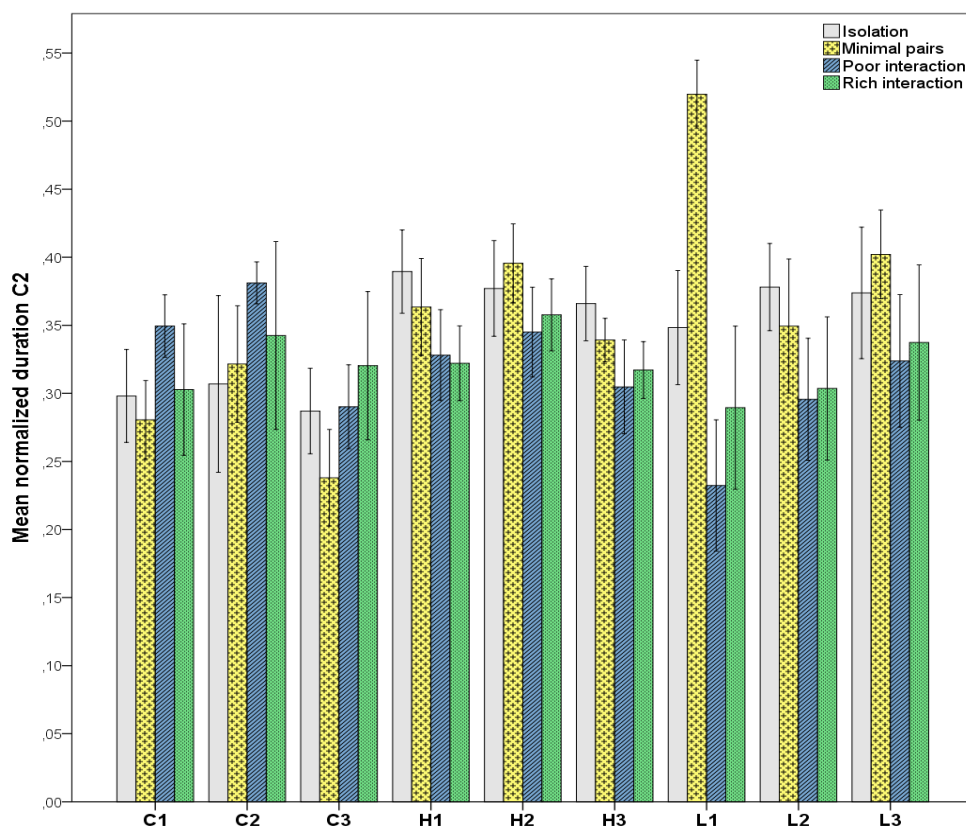
Figure 2: Bar graph for the CC normalized duration for /t/.

3. Discussion and conclusions

The production of the consonant length contrast shows, as expected, an influence of the mother tongue and an interaction with the target language features, as well as differences depending on the competence level. Indeed, in comparison to the advance learner and the control group, the beginner group shows a lower degree of accuracy in differentiating geminates from singletons in all the production tasks, producing geminates as singletons or viceversa. On the contrary, the advanced learners show the same degree of accuracy of native speakers, realizing geminates with a longer duration than singletons. However, geminates are not produced with the same accuracy across the production tasks Confirming that higher accuracy is reserved to the need of disambiguation (which is greater in isolation, poor interaction and, though for different reasons, to minimal pairs). French learners produce geminates more accurately in both isolation and minimal pairs than in poor- and rich-interaction context showing higher variation than natives in relation to changes in context information. Two out of three natives produce longer geminates in poor contexts (isolation and poor-interaction) as they pay more attention to disambiguate words.

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