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► To cite this version:

Clémence Guieu-Grandsire, Naomi Yamaguchi, Shigeko Shinohara. Acquiring two rhotics / / and / /: complexity enlightened by French-Greek bilingualism. Rencontres du réseau Français de Phonologie (RFP), Jun 2023, Lille, France. halshs-04466308

HAL Id: halshs-04466308

<https://shs.hal.science/halshs-04466308>

Submitted on 19 Feb 2024

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Acquiring two rhotics /r/ and /ʀ/: complexity enlightened by French-Greek bilingualism

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Introduction. Rhotic sounds are segments that are difficult for children to master, typically acquired last in several languages such as Greek, where the rhotic is an alveolar tap /r/ (Rizopoulou, 2021) or French, which has the uvular fricative /ʀ/ as its rhotic (MacLeod et al., 2011). This late acquisition can be explained by considering the acquisition of a phonological system as the addition of contrasts gradually enriching the internal structure of a phoneme (Rice, 1996), which may have different specifications: an unspecified feature (absence of feature), or specified as [+] or [-]. Thus, the most specified segments, such as rhotics, will be acquired last. However, according to Goad & Rose (2004), rhotics are universally unspecified, meaning that the phonological representations of these segments are empty. In the context of French-Greek bilingualism, this raises a major question: how will bilingual children acquire rhotics in each language if their phonological representations are not specified? Furthermore, the group of rhotics is the only one for which the uvular is acquired before the alveolar in production among French-Portuguese bilinguals (Almeida, 2012) and German-Spanish bilinguals (Kehoe, 2018). How can this acquisition order be explained?

Participants. Twenty-seven children aged 2;8 to 6;2 years old were divided into four groups: eight monolingual French-speaking children, six French-Greek bilinguals living in France, five living in Greece and seven monolingual Greek-speaking children were recorded over three sessions every six months. All bilingual children were exposed to simultaneous language input from one parent speaking Greek and the other speaking French.

Method. The corpus (Bernhardt et al., 2017) used in an image naming task contained rhotics in simple onset positions (word-initial or syllable-initial). The French rhotic was produced 341 times, and the Greek rhotic 498 times. All sessions were phonetically transcribed using PHON (Hedlung & Rose, 2022), and the results were categorized into three age groups: 2;8-3;11 years (Group 1; mean=3;3 years), 4;0-4;11 years (Group 2; mean=4;4 years), and 5;0-6;2 years (Group 3; mean=5;4 years).

Results. In Figure 1, when the target was the alveolar rhotic /r/, we observed that accurate realisation by bilinguals in Greece followed that of monolingual Greek speakers, unlike the low proportion observed in bilinguals in France (up to 2.68%). When the target was the uvular rhotic, bilinguals in France in Group 1 produced it systematically as expected, while those in Greece in the same group produced it less often (83.33%). The uvular rhotic is therefore mastered much earlier by all children and is generally substituted with velar stops and affricates such as [gʀ] or [kʀ] for Groups 1 and 2. Bilinguals in Greece replace it with the Greek velar fricatives [ɣ] and [x] in 9.52% of cases from 3;8 years onwards. Substitutions of the alveolar rhotic are much more variable, particularly for bilinguals in France in Group 2, who also delete it in 17.39% of cases. /r/ is mainly substituted with the lateral [l], but also with alveolar stops, labial, alveolar, or post-alveolar fricatives, the nasal [n], the approximants [w] or [j], and finally [ʀ], particularly among bilinguals in France with a proportion of 18.12% of cases between 4;0 and 4;11 years and 19.05% between 5;0 and 6;2 years.

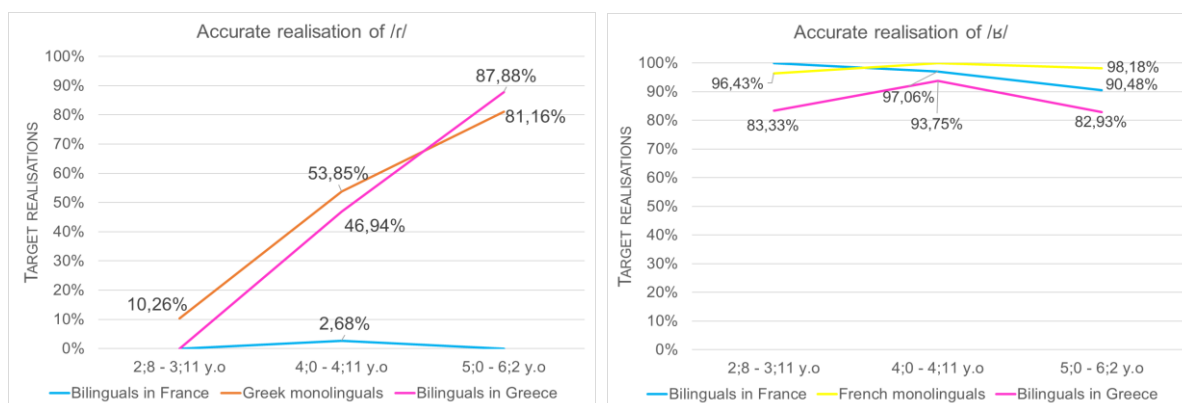


Figure 1: Percentages of accurate realisations of the target /r/ (left) and /ʁ/ (right).

Discussion and conclusion. Although language dominance influences the accurate realisation of rhotics in each language, it seems that monolinguals and bilinguals behave similarly regarding the inherent structural complexity of the rhotic type. To explain these results, it is necessary to specify rhotics in French and Greek (Table 1), which differs from the proposal of Goad and Rose (2004) but aligns with Almeida (2012). In French, the rhotic would be specified as [DORSAL][+continuant] as well as [+sonorant], a feature particularly difficult for bilinguals in Greece who substitute it with velar fricatives. In Greek, /r/ is specified as [+sonorant], explaining the substitutions with approximants and nasals. Its ambiguous manner of articulation, [+/-continuant], explains substitutions with stops. Finally, [-lateral], distinguishing it from /l/, is acquired later. The nonspecification of place [CORONAL] explains substitutions with other places. The difficulty of /r/ thus lies in the combination of these feature values which can render certain phonological structures more complex than others according to Calabrese (1995). The specification of /ʁ/ in French is therefore simpler (Webb, 2009), which would explain the earlier mastery of /ʁ/ by all French-speaking children and its transfer into Greek by French-dominant bilinguals.

	/ʁ/	/ɣ/	/d/	/l/	/r/
[sonorant]	+	-	-	+	+
[continuant]	+	+	-	+/-	+/-
[lateral]				+	-
PLACE	[DORSAL]	[DORSAL]	[CORONAL]	[CORONAL]	[CORONAL]

Table 1: Proposal of necessary specification in French and Greek, based on Clements & Hume's features (1995).

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