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ABSTRACT

This is the layout specification and template definition for the papers of ICPhS XX (the 20th International Congress of Phonetic Sciences, which will be held in Prague, Czech Republic, August 7-11, 2023). This template is a revised version of the one used for Melbourne ICPhS XIX in 2019, originally generated from the template for Speech Prosody 2006 in Dresden.

The abstract may consist of more than one paragraph but must be kept within a 150-word limit. This abstract will be printed in the abstract booklet to be given out at the conference.

Keywords: There is space for up to five self-selected keywords (maximally two lines).

1. INTRODUCTION

Write something here

2. BACKGROUND LITERATURE

2.1. The production of the alveolar fricative in Catalan and Spanish

Both Catalan and Peninsular Spanish sound inventories have an phoneme /s/, which can be classified as a voiceless alveolar fricative [1]. In addition, most of the Catalan varieties have a voiced alveolar phoneme in intervocalic contexts **(Lloret, 2011; Recasens Vives, 1996, p. 279)**. In onset position, /s/ and /z/ contrast phonemically, which leads to minimal pairs like *cel* [sɛl] - *zel* [zɛl] and *fossa* [fósa] - *fosa* [fóza] **(Carrera-Sabaté & Prieto, 2012-2019)**. Conversely, at the end of the word, this contrast is neutralized, being the voicing or devoicing of the alveolar fricative dependent on the following sound **(Institut d'Estudis Catalans, 2022)**. For example, if it is followed by a vowel, the alveolar fricative is voiced: *torres* [tórəs] and *torres antigues* [torəzəntiɣəs].

Interestingly, Medieval Spanish, similarly to Modern Catalan, distinguished between /s/ and /z/ in intervocalic position within a word, although these sounds merged through a devoicing process [1]. Nevertheless, in those modern varieties where the /s/ in coda position is produced, such as in Peninsular Spanish, this voiceless phoneme might assimilate to the following sound, especially if it is a voiced consonant (*mismo*, [mízmo]), rather than a vowel (*las alas*, [lasálas]) **(Hualde & Colina, 2015; Hualde et al., 2020)**. Hence, Spanish inventory does not have the phoneme /z/, but [z] may occur as an allophone of /s/, due to a voice assimilation process. It is important to mention, though, that it has been claimed that this voicing is generally not complete, but partial **(Benet et al., 2012; Hualde & Colina, 2015; Hualde et al., 2020)**.

There is some evidence of the influence of Spanish on the production of the Catalan alveolar fricative, in contexts where, according to prescriptivist rules **(Institut d'Estudis Catalans, 2022)**, the [z] should be produced, but [s] is produced instead. This phenomenon has mainly been attested in those areas where there has been an extended contact between Catalan and Spanish, such asthe so-called "franja de Aragón" (borderland between Catalonia and Aragon), some areas of the Valencian Community, and Barcelona and other urban areas **(Benet et al., 2012; Davidson, 2020; Recasens Vives, 1996, p. 268)**. The opposite pattern has also been observed - that is, the voicing of the alveolar fricative in the Spanish spoken in Barcelona and Valencia. Interestingly, although in both Barcelona and Valencia Catalan and Spanish coexist and influence each other, it seems that Catalan has a greater influence on Spanish in Barcelona, but Spanish has a greater influence on Catalan in Valencia **(Davidson, 2020)**.

In summary, both Catalan and Spanish have a voiceless alveolar fricative in their inventories. Catalan also has a voiced variant, which is produced when this sound is followed by a voiced consonant or a vowel. Spanish might produced this sound only when it is followed by a voiced consonant, although /s/ might be "partially voiced" (Hualde & Colina, 2015). Thus, these phonemes, although they have the same allophones, their contextual distribution is different (Llisterri, 2023). Moreover, some studies

have shown that there is a bidirectional influence between both languages in the production of the voiced vs the voiceless alveolar fricative, and that such influence might be different based on the context. These divergent patterns might be explained by the different sociopolitic and linguistic realities of each city, and might have an effect on speakers' attitudes towards the devoicing of the alveolar fricative /z/ in Catalan.

2.2. Language attitudes towards the alveolar fricative in Catalan and Spanish

The social meaning and the perception of intervocalic [z] in Spanish has been studied in a variety of contexts, including both monolingual **(Chappell, 2016, 2017, 2021; Chappell et al., 2023; Chappell & García, 2017; García, 2015, 2019; Silverstein, 2003)** and bilingual contexts **(Davidson, 2014, 2015, 2019; Sinner, 2002)**, despite having been categorized as a low-salient variant **(Chappell, 2017, 2021; Chappell et al., 2023; García, 2015)**. With respect to the former, it has been found that for listeners from San José, Costa Rica, the covert attitudes associated with intervocalic [z] vary significantly by speaker gender. Consequently, male speakers who use [z] tend to be positively evaluated, and generally perceived as nice, local, confident, and masculine. Conversely, female speakers who use [z] are only afforded negative associations of lower education and social class **(Chappell, 2016; Chappell et al., 2023; Silverstein, 2003)**.

Similarly, **García (2019)** shows that, in Ecuador, intervocalic /s/ is evaluated differently in male and female speakers. Accordingly, women who produce intervocalic [z] are viewed as significantly lower status, less pleasant, and older. Contrary, men who produce intervocalic [z] do not receive these negative evaluations. Additionally, this variable has been found to serve as a marker of regional identity, with voicing being associated with neighboring Highland Ecuadorian dialects (Cuenca and Quito) that exhibit systematic voicing. **García (2020)** hypothesizes that young men are the leaders of this change, essentially due to the fact that they are in greater contact with these highland varieties. Interestingly, the mean voicing rates of females are roughly two age groups behind those of males. Consequently, it is believed that it is not necessarily the case that women in Ecuador are avoiding voicing like San José women due to its negative evaluations, but rather that they are further behind in the adoption of the incoming variant.

With respect to the social meaning and the perception of intervocalic [z] in bilingual contexts, this phenomenon has been mainly studied in Catalan-Spanish contact situations, given its robust usage by Catalan-Spanish bilinguals and, in particular, by those with greatest exposure to and usage of Catalan **(Davidson, 2014, 2015)**. According to **Sinner (2002)**, intervocalic [z] can be considered a possible linguistic marker of Catalonian Spanish, despite its relative lack of social awareness **(Davidson, 2019; Sinner, 2002)**. In their study, Sinner (2002) interviewed 12 speakers of Barcelonan Spanish and monolingual Spanish-speakers from Madrid aged 27 to 41 regarding their awareness of linguistic features of Catalanized Spanish. Results showed that only select Barcelona speakers perceived intervocalic [z] as a linguistic marker of Catalonian Spanish, whereas monolingual Spanish-speakers from Madrid did not. Additionally, Davidson (2019) found that, in Barcelona, the indexical field of intervocalic [z] features exclusively positive associations with bilingualism and local solidarity, which warrants its gradual adoption in the speech community, unlike other phonetic markers of Catalonian Spanish that are the topic of overt social ridicule, such as lateral velarization. These results are in line with previous findings on intervocalic [z] in Catalonian Spanish. For instance, **Silverstein (2003)** found that intervocalic [z] indexes a local Barcelona identity, and the variant then acquires positive associations with bilingualism and cultural pride. Overall, these findings suggest that intervocalic [z] likely functions as a sociolinguistic indicator of Catalonian Spanish within the Catalonian speech community, indexing Catalan-Spanish bilingual membership while lacking any considerable degree of generalized conscious awareness **(Davidson, 2019)**.

2.3. The present study

INTRO. Accordingly, the research questions and hypotheses are as follows: 1. What covert attitudes are linked to the perception Catalan intervocalic /s/ as either [s] or [z]? 2. What is the relationship between individual social factors (mother tongue, province of origin) and covert attitudes towards Catalan intervocalic /s/?

3. METHODS

3.1. Materials

Data were collected using an online survey hosted on Qualtrics that consisted of two parts. The first part, a demographic questionnaire, collected information regarding participant age, gender, place of origin, place of residence, mother tongue, family

income, and level of studies. The second portion of the survey consisted of a perception task where participants were presented with a series of stimuli containing the target phoneme contrast (intervocalic voiced and voiceless alveolar fricative) followed by 11 evaluative statements related to social characteristics such as level of studies, friendliness, social class, and ethnic origin. These evaluative statements were then followed by a 100-point draggable sliding scale with which participants indicated their level of agreement or disagreement with the content of the statement, where 0 was "totally disagree" and 100 was "totally agree".

The target stimuli were recorded by a 28-year-old female native speaker of Catalan in a whisper room 6084 E sound booth using a personal communication device. The stimuli were between 3 and 4 seconds long and were controlled for utterance length (5 words), syllable count (2 syllables for the target word and 3 for the following adjective), and lexical stress (target sound in unstressed position). A total of 12 target stimuli containing intervocalic voiced /s/ were recorded, as well as different samples of the voiceless /s/. The target sentences were manipulated in Praat by splicing the voiced /s/ and pasting the voiceless /s/ in order to create 2 conditions: 12 stimuli containing intervocalic voiced /s/ and 12 stimuli containing intervocalic voiceless /s/, for a total of 24 experimental sentences. These sentences were combined with 32 fillers targeting other phonemic contrasts, for a total of 56 sentences randomly distributed in two different versions. Each included 12 experimental stimuli (6 x 2 conditions) and 16 fillers (8 x 2 conditions).

3.2. Procedure

Participants self-identified for this study. Recruitment materials in Catalan with information about the study, the requirements to participate and a link to the survey were posted on different social networks and online communication channels, such as WhatsApp and Instagram. Participants who were interested and wanted to participate clicked on the link and read the study description. Those who decided to participate completed the survey on their own electronic devices and at their own pace without being observed. On average, the survey took approximately 15 minutes to be completed. The survey followed a between-subjects design. Therefore, participants were randomly assigned to one of the two versions.

3.3. Participants

A total of 78 responses to the questionnaire were collected. Of these, 56 responses were incomplete and were therefore discarded. Data are drawn from a total of 22 participants (13 females) aged between 18 and 72 years old (mean = 38) from Barcelona and Girona. In order to be eligible to take part in the study, participants had to meet the following three requirements: to be over 18 years of age, to be from Catalonia, and to be proficient in both Catalan and Spanish.

3.4. Data analysis

Data were analyzed in R (R Core Team, 2023). First, we performed a descriptive analysis that consisted of creating a series of plots and tables to summarize and describe the features of the dataset and to identify potential trends. After that, we performed inferential statistical analysis. For each of the 11 evaluative statements, we created a series of hierarchically nested linear regression models using the lme4 package (Bates et al., 2015) with attitudinal sliding scale responses as the dependent variable, and phoneme, mother tongue, and province as potential predictors. To determine the best fit model for each statement, we used the anova() function (Fox & Weisberg, 2019).

4. RESULTS

The statistical analysis did not reveal a significant effect of phoneme on the evaluation of the speaker ($p > .05$) for any of the 11 evaluative statements. However, the model output did show a significant association between mother tongue and province for some of the statements. In what follows, we will explore the results for those statements.

Participant responses to the statements *Parla bé català* 'S/he speaks proper Catalan' and *És d'origen català* 'S/he is of Catalan origin' showed similar results, as illustrated in Figures 1 and {fig:oc}. Those who have both Catalan and Spanish as their L1 rated the speaker more positively regardless of phoneme, compared to those whose L1 is either Catalan or Spanish.

Participant responses to the statements *És simpàtic* 'S/he is nice' and *És de fiar* 'S/he is trustworthy' showed similar results, as illustrated in Figures 3 and {fig:fiar}. Those who are from and live in the province of Barcelona give higher ratings to the speaker, compared to those who are from and live in Girona.

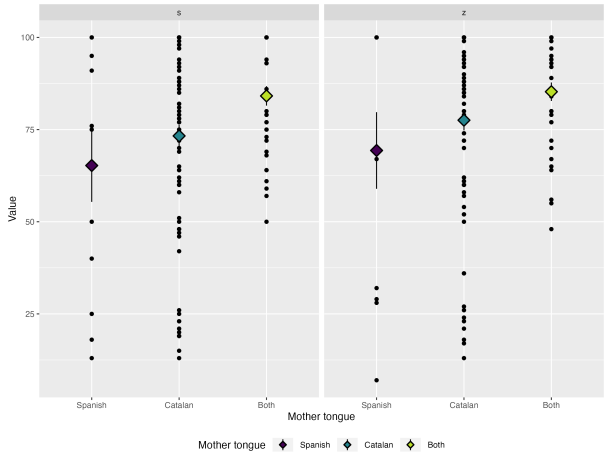

Figure 1: Ratings of "Parla bé català" as a function of mother tongue

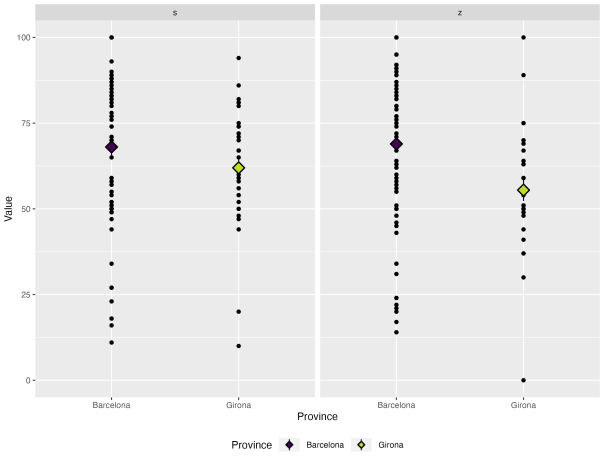

Figure 3: Ratings of "És simpàtic" as a function of mother tongue

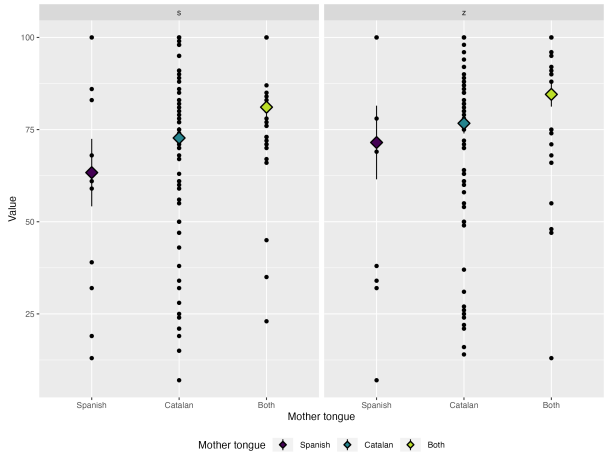

Figure 2: Ratings of "És d'origen català" as a function of mother tongue

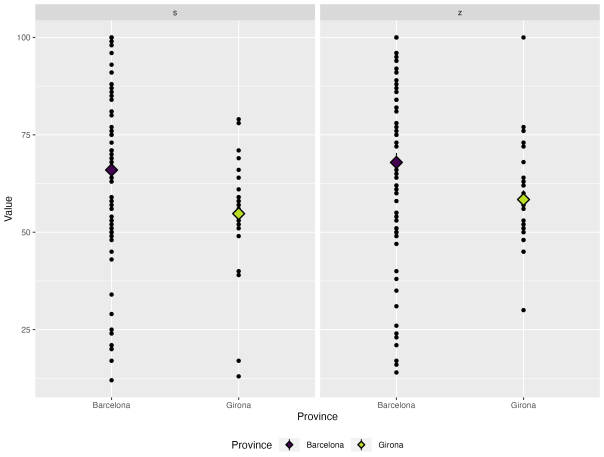

Figure 4: Ratings of "És de fiar" as a function of mother tongue

5. DISCUSSION AND CONCLUSIONS

The aim of this exploration study was to investigate whether phoneme production ([s] vs [z]), mother tongue (Catalan vs Spanish vs both), and province of origin (Girona vs Barcelona) influenced the attitudes of the participants towards a Catalan native speaker. The results suggest that these predictors have a different effect on the ratings of the speaker depending on the social characteristic under evaluation.

Contrary to what we expected, phoneme was not a significant predictor. One explanation for this divergent pattern could be that either participants could not distinguish between [s] and [z] or, if they could, this difference in production was not changing their attitudes towards the speaker. This finding is interesting considering that, in our stimuli, the production of the voiceless alveolar fricative in intervocalic position has been considered a result of Catalan in contact with Spanish **(Benet et al., 2012; Davidson, 2020; Recasens Vives, 1996, p. 268)**, and, from a prescriptivist point of view, it should be avoided **(Institut d'Estudis Catalans, 2022)**. Despite the lack of significance of this predictor, it should be mentioned that the speaker received more positive ratings when the [z] was being produced. Although at this point we can only hypothesize, it could be that the combination of the phoneme /s/ with the precedent vowel, might give the listener more cues and have a stronger social meaning. Future studies

should address this issue in order to explore if the combination of vowel + /s/ carries other social connotations. **REVISAR**

5.0.1. Headings

Section headings are centered in boldface with capitalized letters. Sub-headings start at the left margin in the column with the first letter capitalized and the rest of the heading in lower case. Sub-sub-headings appear like sub-headings, except that they are in italics and not boldface. See examples in this file. No more than 3 levels of headings should be used. Empty lines should be left above and below each section heading.

5.1. Text font

Times or Times New Roman font is used for the main text. Recommended font size is 11 points. Other font types may be used if needed for special purposes. If using any non-Unicode fonts, these must be embedded in the final PDF file.

The LaTeX template can be used either with plain LaTeX or XeLaTeX.

5.2. Figures

All figures should be centered on the column (or page, if the figure spans both columns). Figure captions should follow each figure and have the format given in Fig. 5.

Figures should preferably be line drawings. If they contain grey shades or colours, it should be checked that they print well on a high-quality noncolour laser printer.

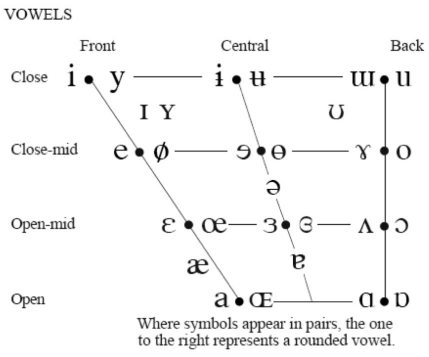

Figure 5: The vowel chart used in the International Phonetic Alphabet (IPA).

5.3. Tables

An example of a table is shown as Table~1. Somewhat different styles are allowed according to the type and purpose of the table. Colour should not be used, but grey shading is allowed. There should be a margin of 6~points (pt) above and below the table.

The caption text may be above or below the table, but this should be consistent throughout the submission. Left and right indentation of the caption should be 0.5~cm.

ratio	Decibels
$1/1$	0
$2/1$	6
3.16	10
$1/10$	-20
$10/1$	20
$100/1$	40
$1000/1$	60

Table 1: This is an example of a table showing Decibel (dB) ratios.

5.4. Equations

Equations should be placed on separate lines and numbered. An example of an equation is

$$T_0 = \frac{1}{f_0}. \tag{1}$$

Numbers of equations can be on the right or on the left margin of the text column.

5.5. Examples

Examples from other languages can either be presented in the body text, or, if referred to elsewhere or particularly long and complex, can be put on a separate, numbered line, as should be done for equations.

5.6. Phonetic fonts

We recommend that you use the TIPA package for IPA phonetic symbols. For information about how to access Unicode fonts in the Word template, see [2] or [3]. The font you use must be embedded. Please remember to check this, e.g. by inspecting the "Document Properties — Fonts' ' in Acrobat Reader.

5.7. Page numbering

Page numbers will be added electronically to the document later. *Please do not add page numbers*

and please do not insert any footers or headers!

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Please use just the reference number in square brackets. Formulations with author names like "... as Ladefoged [4] showed that ..." are acceptable but not "as shown in [Ladefoged, 3]" or "as shown in (Ladefoged [3])".

References are to be numbered in alphabetical order. Please double-check the final version of your paper with regard to the correct correspondence of references to their numbers.

5.9. Hyperlinks

Links to URLs or email addresses should be formatted as normal text, *not* as hyperlinks and not blue or underlined etc. Usually hyperlinks to web pages are listed in the references section. If required, line breaks can be placed within URLs after slashes or dashes (cf.~[2, 3]), but doublecheck that no hyphens are inserted.

5.10. Footnotes and endnotes

If footnotes cannot be avoided they should appear as endnotes.[1]

6. MULTIMEDIA FILES

Multimedia data that are part of the paper are to be embedded in the submitted PDF; they cannot be submitted as supplementary data. Any images are to be included in the paper as Figures (see Section 2.3 above). It is the authors' responsibility to check image quality ahead of submission. Audio examples are to be embedded within the PDF. To do this, authors can generate the PDF, and then embed the audio files using Adobe Acrobat Professional, or other software that offers the same outcome, so that the audio is included in the PDF. The presence of audio data should be identified in the text.

We encourage authors to illustrate video data using still photographs from the video, and to include them as figures in the PDF. We cannot accept embedded video files, but authors are welcome to refer readers to a URL on the internet where these can be viewed.

7. PDF DETAILS

PDF files submitted must comply with the following requirements:

1. all special fonts and symbols must be embedded in the PDF file so that correct rendering of the PDF does not depend on the fonts installed on the viewer's computer
2. there must be no password protection on the PDF file, i.e. PDF files must not be protected by PDF security in any way, i.e. content extraction, document assembly, high resolution printing etc. must not be forbidden
3. PDF files should not contain any colours, hyperlinks, multimedia or 3D content, and no JavaScript or forms
4. PDF files should be no larger than 5 MB.

8. ANONYMITY

In ICPhS 2023 submissions, an anonymous reviewing process will be used. This means that for the first submission the name(s) of the author(s) and their affiliation(s) *must not* be mentioned. In addition, please refrain from using acknowledgements. Please also try to make your own previous research as anonymous as possible. As an example: do not write "In our previous study [5] we could show..." but "As shown in [5]...". Or refer to your own published or otherwise widely known work, and to that of the other authors, in the "Julius Caesar style", i.e. in the third person (for example: his work, her work, their work). Reference as "anonymous" only work that you or the other authors have submitted for publication, but which has not yet been published, e.g. [6].

Please make sure that no author details appear in the Document Properties of the PDF file. *For the revised paper submission author details are of course needed.* Acknowledgements and references to one's own work are possible as usual.

9. FORMAT OF REFERENCES

References are formatted using the IEEE standard (available in various reference management systems like Zotero or Mendeley). If you do not use a reference management system, please use the examples provided for monographs [**?**], contributions to volumes [5], journal articles [7], articles in conference proceedings [4]. Abbreviations of well-known conferences and journals are possible [8]. Software tools [9] are referenced according to authors' instructions.

10. R SCRIPTS

You can use knitr code chunks like in any .Rmd document:

```
2 + 2
```

```
## [1] 4
```

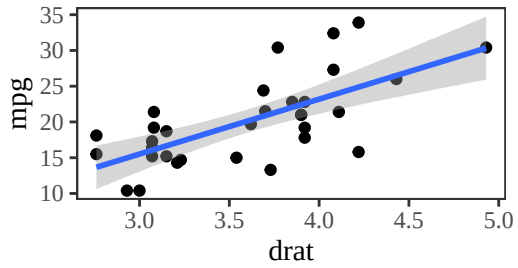
This includes inline code: 2 + 2 = 4.
R scripts can be loaded as well:

```
source("./includes/scripts/analysis.R")
```

Which means you have access to any objects assigned in the script, like Figure 6:

```
cars_plot
```

Figure 6: This is a figure caption.



11. REFERENCES

[1] J. I. Hualde and S. Colina, *Los sonidos del español*. Cambridge University Press, 2015.

[2] "IPA transcription with SIL fonts," https://scripts.sil.org/cms/scripts/page.php?item_id=IPAhome.

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[1] This footnote appears here as an endnote.