PERCEPTION OF METAPHONY: A COMPARISON BETWEEN TWO DIALECTS OF THE LAUSBERG AREA (SOUTHERN ITALY)

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ABSTRACT

In several sound changes, differences in production do not necessarily match those in perception. This study explores this relationship in two varieties (MZ: Mittelzone; MM: Mormanno) spoken in the Lausberg area of Southern Italy that differ in the degree to which inflectional phonetic cues are transferred from a suffix to a phonetically mid stem vowel. In MZ, the transfer can be complete (e.g. [mɛs, mis]; cf. Standard Italian [meze, mezi], month/months), whereas in MM it is more marginal and with suffix preservation. Listeners of both varieties identified in a forced-choice test inflectional information from stems in MM- and MZ-produced stimuli with all suffix information removed. The results showed a perceptual advantage in morphological categorisation when listeners perceived stems of their own variety, and suggest that, compatibly with speech production, MM listeners use a phonetic mode of perception in categorising morphological information, whereas in MZ the perceptual strategy is more phonological.

Keywords: Metaphony, perception, dialect variation, sound change, phonologisation

1. INTRODUCTION

Over the last few years, several studies have investigated the relationship between production and perception in the progression of a sound change [1, 2, 3]. However, this relationship is often complex and cross-linguistically not quite predictable. As several studies [1, 3, 4, 5, 6] have shown, sound change does not necessarily progress at the same rate in production and perception. Whether or not perception leads production can depend both on the type of sound change and whether the sound change has reached (or is near to) completion in a group of speakers instead of another [5, 6, 7]. This study explores the perception-production link in some dialects belonging to the so-called Lausberg area in Southern Italy [8], in which different forms of metaphony (an especially pervasive phenomenon

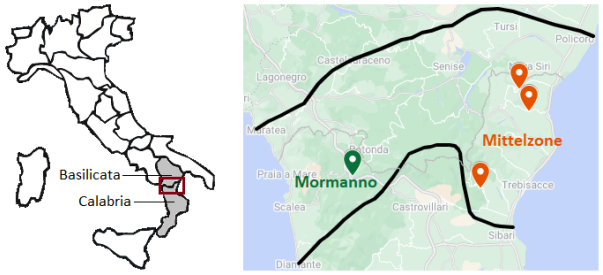

Figure 1: Geographical localisation of the Lausberg area and the dialects in this study (map data ©2022 Google).

No metaphony	Metaphony		Inflectional meaning
	MM	MZ	
[mɛse]	[mesi]	[mis(ə)]	sing./pl.
[bɔna]	[bonu]	[bun(ə)]	fem./masc.

Table 1: Examples of metaphony in MM and MZ

in Italo-Romance varieties [9, 10], which derives originally from V-to-V coarticulation) coexist with different degrees of suffix vowel quality erosion.

In metaphony, the cues to the suffix vowel are manifested in the stem to different degrees. In the Lausberg area, the preferred targets for metaphony are the mid stem vowels /e, o/, while its triggers are the high suffix vowels /i, u/ [8, 11]. These suffixes may indicate a variety of morpho-syntactic categories, such as gender and number in nouns and adjectives. Thus, whereas in Standard Italian the phonetic distinction between e.g. 'month'/'months' [meze, mezi], or between the masculine and the feminine singular form of 'good' [bwɔna, bwɔno] is carried by the final inflectional suffix (and not by the stem), in regions affected by metaphony high-vowel suffixed forms are marked by different degrees of stem vowel raising. Thus, from the examples in Table 1 we can observe that the suffix vowels /i, u/ have caused stem vowel raising in the plural and in the masculine forms in Mormanno (MM). On the east coast of the Lausberg area in the so-called Mittelzone (MZ) region, the degree of metaphony is, however, far more advanced (see Table 1) [8, 11, 12]. The evidence that metaphony has been phonologised [13, 14] to a greater extent in MZ than in MM is

shown by the degree of suffix reduction: whereas in MM the suffix is typically present, in MZ it is usually absent (or at least strongly reduced; see Table 1) [12, 15]. The issue to be considered in the present study is the extent to which perception matches production as far as these different degrees of metaphonic progression are concerned. An initial hypothesis to be tested is that Lausberg listeners can identify morphological inflection in the stem better than chance. This is likely to be so, given that in these regions information about the inflectional suffix is manifested in varying degrees of strength in the stem. Another hypothesis is that MZ listeners should be more sensitive to morphological information in the stem than MM listeners. This follows from studies of sound changes in progress in other languages showing greater listener sensitivity to phonologised than non-phonologised forms [16] and also because MZ listeners are likely to be more reliant on phonetic information in the stem as a cue to morphological inflectional information, given that the suffix is often absent in their variety. Both hypotheses apply within each variety, i.e. when listeners from MZ (MM) are listening to MZ (MM) stimuli. The predictions about cross-variety responses (MZ listening to MM and vice-versa) are, however, less clear. Firstly, given that the direction of sound change in MM is towards that of MZ (in that both show information about morphological inflection in the stem but to different degrees) and taking into account that some MM listeners are likely to have come into contact with MZ speakers, then MM listeners might be able to parse inflectional information from the stem as accurately as MZ listeners when both groups listen to MZ speakers. On the other hand, MZ listeners might not be attuned to the fine, coarticulation-based phonetic differences that signal morphological information in MM stems. This hypothesis is supported by the observation from lexical phonology that these gradient phonetic differences are no longer parsed by speakers at a final stage of sound change, in which categorical boundaries between phonemes have already gained morpho-lexical relevance [14, 17]. In addition, given that MM is a mountainous village whereas MZ is an entire region, MZ listeners are perhaps less likely to have been exposed to the MM variety than the other way round. For these reasons, MZ listeners might be less accurate than MM listeners when listening to the MM variety. These predictions were tested in a lexical decision task in which listeners had to judge morphological information given only the stem without any suffix information in both varieties.

2. METHOD

2.1. Participants

All participants were recruited either from personal contacts or on social media. The specific requirement was that participants spoke either the MM or an MZ variety. Before starting the experiment, participants were asked to fill out a questionnaire asking for some biographic metadata including which specific local dialect they speak (to be sure that they were proficient in one of the target dialects). A total of 73 Lausberg listeners took part in the experiment. However, responses from listeners that either came from one of the very few villages in MZ whose dialect has diphthongising metaphony (based on [8, 11]) and/or completed less than 50% of the experiment (n=39) were excluded from analysis. Therefore, the final analysis was based on 34 participants (mean age 36.7, age range 19–65, 17 females) who completed the experiment either in its entirety (n=31) or responded to more than 50% of the stimuli (n=3). 17 participants were analysed from MM (mean age 33.3, age range 19–54, 12 females) and 17 from MZ (mean age 40.1, age range 21–65, 5 females). Upon completion of the task, participants were rewarded with an Amazon voucher.

2.2. Materials and design

The audio recordings used for the experiments were selected from the production data described in [12] and included 25 speakers (14 for MZ and 11 for MM stimuli). Three of these speakers also took part in the perception experiment. The target words were elicited from these speakers by means of a picture-naming task in which words had to be first produced in isolation and then in an embedded sentence ("I say ... two times"). The selected word pairs (Table 2) were formed from the same lexical stem followed by different inflectional suffixes: either /i, u/ (which cause phonetic raising in the stem vowel) or /e, a/ suffixes (which cause no raising). The auditory stimuli were formed from 7 word pairs for /e/ and 7 for /o/ stems. Each word type (n=14) was repeated 4 times for each region to give 4 (repetitions) $\times$ 14 (word types) $\times$ 2 (stems) $\times$ 2 (regions: MM, MZ) = 224 stimuli. For each audio file used, the suffix vowel was manually excised on the basis of an audiovisual inspection of the sound wave and the spectrogram by using the software Praat (version 6.1.51) [18], so that the suffix vowel quality was no longer audible. In a minority of cases, part of the duration of the consonant preceding the suffix

Figure 2: Screenshot from the experiment interface: the response was logged by clicking on one of the two options.

vowel was also removed if vowel-to-consonant coarticulation still enabled the suffix vowel to be perceived.

2.3. Procedure

The experiment was run on the web by means of the online platform Percy [19]. Participants participated remotely by using either a computer or a mobile device. They were also encouraged to complete the task in a quiet place and preferably using headphones. The experiment was structured so that participants were exposed to stimuli produced by speakers from both regions and in equal measure, without being previously advised that the stimuli were produced in any particular dialect. Having completed the initial questionnaire, the participant could start the task, which consisted first in listening to the audio stimulus and then providing a forced choice response between two morpho-lexical options (singular or plural; masculine or feminine). Participants were not explicitly informed that the last vowel in the audio recording had been intentionally deleted. The order of the two written options was randomised (right and left-hand side of the screen). In order to listen to the stimulus, the participant had to either click on the headphone symbol that appeared on the experiment web page or to press the space bar.

Each audio stimulus was presented only once, and the experiment was programmed so that each participant could listen to each stimulus only twice. Six extra stimuli were added at the beginning of the experiment and were used as a training phase: responses to these stimuli were not analysed. The software was able to register all those cases in which the participants answered without listening to the stimulus: such cases were excluded from further analysis. The audio stimuli used in both the training phase (first six stimuli) and the 'real' experimental phase were presented to participants in random order. The task took approximately 15 to 20 minutes. The total number of responses collected

Stem	Suffixes	Word pairs		Meaning
/e/	/a, u/	bella	bellu	beautiful (f./m.)
		pettsa	pettsu	cloth, piece
		vekkja	vekkju	old (f./m.)
	/e, i/	dente	denti	tooth, teeth
		mese	mesi	month, months
		pede	pedi	foot, feet
		verme	vermi	worm, worms
/o/	/a, u/	bona	bonu	good (f./m.)
		korna	kornu	horns, horn
		kotta	kottu	cooked (f./m.)
		morta	mortu	dead (f./m.)
		ossa	ossu	bones, bone
		ova	ovu	eggs, egg
		tsoppa	tsoppu	lame (f./m.)

Table 2: Word types used in the experiment (phonological transcription) and their meaning.

and used for the analysis (n=7334) included 3670 responses to stimuli taken from words containing /e/ stems and 3664 observations taken from stem-/o/ words.

2.4. Statistical analysis

The statistical analysis tested, by means of a logistic mixed model, whether there were significant differences in the accuracy of participants' answers between regions. The model was computed with the `lme4` package [20] (version 1.1.31), while post-hoc comparison tests and associated Bonferroni corrections were run with the `emmeans` package [21] (version 1.8.2) in R [22]. The dependent variable was binary (two levels: correct or incorrect answer), while the model was fitted with the fixed factors *Suffix vowel* (four levels: /a, e, i, u/), the region of the speaker who produced each stimulus (henceforth *Stimulus region*), the *Listener's region* (two levels, MM and MZ), and all possible interactions. The random factors included the lexical *Stem* (e.g. for word pairs like /bella, bellu/ the lexical stem was /bell/, see Table 2) with slope in *Stimulus region*, the *Speaker* who produced each stimulus with slope in *Suffix vowel*, and the random intercept *Listener*, i.e. each participant in the perception experiment.

3. RESULTS

Fig. 3 shows the proportion with which morphological information was correctly identified in stem-only stimuli. We can observe that identification accuracy was above chance (50%) level except in two cases: MM listeners perceiving MM stimuli spliced from /i/ suffixes, and MZ listeners perceiving MM stimuli spliced from /u/ suffixes. Given that all main effects (p<.05, with the exception of the *Listener's region*) and all interactions (p<.001) were significant, the results

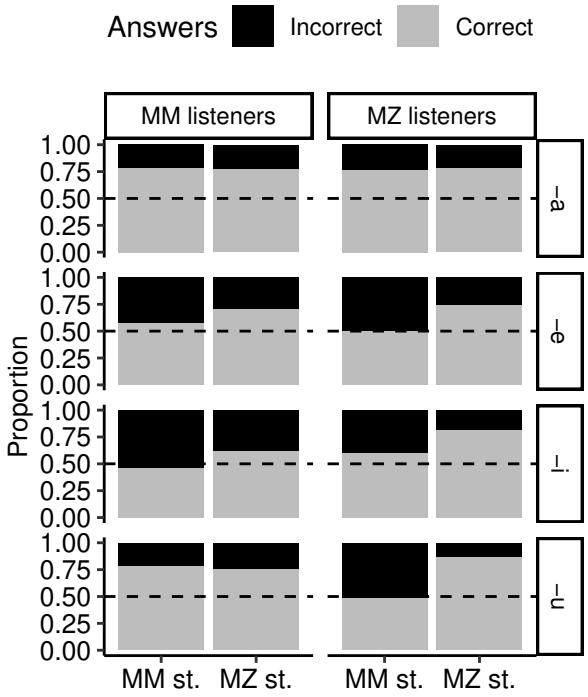

Figure 3: Proportion of correct (grey) and incorrect (black) responses by listener's region, stimulus region, and suffix. The dashed horizontal line shows chance level.

reported below are for Bonferroni-corrected post-hoc tests, which were all significant at $p<.001$ unless otherwise stated. MZ listeners were significantly more accurate in perceiving MZ- than MM-stimuli excised from /u/ suffixes (Fig. 3, row 3: col. 3 vs col. 4) and were also more accurate than MM listeners in perceiving MZ stimuli for both suffix /i/ (row 3: col. 2 vs 4) and /u/ ($p<.01$; row 4: col. 2 vs 4). On the other hand, MM listeners perceiving MM stimuli were more accurate than MZ listeners for suffix /u/ (Fig. 3, row 4: col. 1 vs 3). For MM stimuli only, there were firstly more accurate responses to /a/-suffixed stems perceived by MM listeners than to /i/-suffixed ones (Fig. 3, col. 1: row 1 vs row 3); secondly, there were more /a/-suffixed stems accurately perceived by MZ listeners than /u/-suffixed ones (col. 3: row 1 vs row 4); finally, there were more /u/-suffixed stems accurately perceived by MM listeners than /i/-suffixed ones (col. 4: row 1 vs row 4).

4. DISCUSSION

The study tested listeners' ability to identify inflectional morphological information in the stem for two varieties of the Lausberg area. Recent production [12] and earlier auditory studies [8, 11, 15] suggest that these varieties differ in the extent to which cues have been transferred from the suffix to the stem, being greater for the Mittelzone (MZ) than for Mormanno (MM). A central hypothesis was that MZ listeners should be more sensitive to morphological information in the stem than MM listeners: if cue information from the suffix has been transferred to the stem to a greater extent in MZ, then MZ listeners should be more sensitive to this type of information. This was found to be so when MZ listeners categorised MZ-produced stems spliced from /i, u/ suffixes, but MZ listeners had no such perceptual advantage in categorising MM-produced stems in the same contexts. Perhaps this was because the cues to the suffix in MM-produced stems were too weak to be perceived. However, MM listeners were also more accurate than MZ listeners in categorising MM-produced stems spliced from /u/ suffixes. These region-specific results suggest that MM listeners might be more sensitive to fine phonetic information in the stem as a cue to the suffix, whereas MZ listeners perceive the morphological information in the stem more categorically. However, this interpretation is not entirely compatible with the following finding: when MM listeners categorised MM-produced stems that had been spliced from /i/ suffixes, then their performance was at chance level. MM listeners may have performed poorly in this task because the acoustic phonetic differences relative to the suffix /e/ (vs suffix /i/) competitor is marginal, but acoustically far greater in judging /u/ suffixes (for which the competitor was always suffix /a/, see Table 2). Overall, the results are consistent with different, phonetic and phonological modes of perception for MM and MZ listeners respectively. When perceiving the own variety, perceptual differences between MM and MZ match those from production [12] showing a greater trade-off between coarticulatory source (the suffix) and effect (the stem) for MZ than for MM. However, results relating to cross-variety responses confirm that the progressively greater perceptual trade-off between coarticulatory source and effect as a sound change progresses [7, 23, 16] can be inhibited when the change is completed [5, 6]. Finally, these results lend support to some theories from lexical phonology [17, 24] that sound changes can progress from being under predominantly phonetic control (as in MM) towards a phonological stage (as in MZ) in which the original phonetic factors at the sound change's origin have a negligible influence on categorical judgements.

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