RICCARDO ORRICO, RENATA SAVY, MARIAPAOLA D'IMPERIO Salerno Italian: Intonational phonology and dimensions of variation

Despite the large number of studies on the intonation of Italian varieties, research on Salerno Italian has been rather scarce and a detailed account of the main phonological patterns is still missing. The intonation analysis we report in this paper is framed within the Autosegmental-Metrical theory and the types of utterances we analyzed are taken from a corpus of both read and semi-spontaneous speech. The study adds to the literature on Italian intonation not only in dealing with an under-described variety, but also by going beyond the common consideration of tunes as stable expressions of pragmatic meanings within a linguistic community. Considerable emphasis is here placed on variety-internal variation with data showing that individual variability in the use of intonation cannot be simply dismissed, but needs to be properly addressed.

Key words: Intonation, Salerno Italian, Individual Variability, AM theory.

1. Introduction

In the last few decades, research on intonation in Italian varieties has received an increasing amount of interest and some of the varieties spoken in the peninsula have been extensively investigated, especially within the Autosegmental-Metrical (AM) theory of intonation (Pierrehumbert, 1980; Ladd, 2008).

Nevertheless, the existing studies have been limited to a small number of varieties, while very little work is, to date, available for others. Much research has been conducted, for example, on Neapolitan Italian (among others, D'Imperio, 2000; 2002), which deeply investigates the interface between the phonology and phonetics of intonation and the role of intonational events in the production and perception of speech acts. The variety spoken in Bari has also been extensively investigated (Grice, Savino, 1997; Savino, Grice, 2011), focusing on the intonation realization of different types of yes-no questions (information-seeking, confirmation-seeking, counter-expectational). In addition, Palermo Italian has been under close examination, first by Grice (1995) and Grice, D'Imperio, Savino & Avesani (2005), who provide a description of the basic tunes used for statements and questions and, more recently, by Gili Fivela, Iraci (2017), in which a detailed description of the realization of a wider range of pragmatic conditions is reported.

Furthermore, a large number of studies have been published also for the varieties spoken in Tuscany (among others, Marotta, Sorianello, 2001; Avesani, Vayra, 2003; Gili Fivela, 2008). Among these, of particular interest is the investigation of Pisa Italian reported in Gili Fivela (2008), in which the author initiates the discussion around variety-internal variation and provides some important insights about the relationship between phonology and phonetics of intonation and the expression of pragmatic meanings.

The issue of variation across and within regional varieties of a language is of paramount importance when dealing with Italian and, in no way, the intonational systems of the few varieties investigated in the past should be taken as representative samples of the variation within this language. Italy is characterized by a complex linguistic system, in which vernaculars and regional-accented Italians coexist. The analysis of segmental phonology has allowed a dialectological classification that puts Italian vernaculars into a spatial continuum, characterized by a chain of inter-comprehension of adjacent vernaculars, moving from the extreme south to the north of the peninsula. On the other hand, it has allowed the definition of three macro dialectological areas, northern, central, and southern, with the boundaries being, on one side, the La Spezia-Rimini line, separating the northern from the central vernaculars (see Loporcaro, 2009 for a detailed account).



Figure 1 - Map of Italy (left) and a detail of Campania, the region where Salerno is located (right)

However, the case of Italian intonation is far more complex than the segmental phonology facts. As pointed out by intonational studies adopting an inter-variety perspective (Grice et al., 2005; Savino, 2012; Crocco, 2013; Gili Fivela, Avesani, Barone, Bocci, Crocco, D'Imperio, Giordano, Marotta, Savino, & Sorianello, 2015), the picture of Italian varieties is much more fragmented when it comes to intonation. In addition, comparative studies are scarce, therefore it is not possible to draw a clear and comprehensive map of the intonational systems of Italian.

1.1 Comparative studies in Italian intonation

Within the AM approach to Italian intonation, the first attempt to specifically deal with variation across different varieties is Grice et al. (2005). The study analyzes a wide range of intonational phenomena, such as distribution and combination of

pitch accents and boundary tones, the way they are used to express different speech acts, levels of phrasing, downstep, and tonal truncation for four different Italian varieties, *i.e.* Naples, Florence, Bari, and Palermo. The issue of variation is addressed with the goal of trying to find commonalities across the varieties and to propose a common labelling system.

The study does in fact show the existence of commonalities in the varieties analyzed. Statement intonation, for example, appears to be extremely stable across varieties, especially for broad focus utterances, in which a falling tune, analyzed as a H+L* L-L%, is generally employed. Additionally, the way those varieties signal narrow focus in statements is also similar, despite some differences in the way different labelers analyze the phenomenon. Specifically, the study reports the use of a L+H* pitch accent in Naples, a H*+L in Bari and Palermo, and a H* in Florence, despite a very similar rise-fall shape. In fact, looking at the phonetic characteristics of the three accents, it is possible to notice that they are very similar and that the different analyses are often the results of variety-specific choices. For example, the rising analysis for Neapolitan comes from D'Imperio (1999), who provides evidence that it is the rising portion of the configuration the one that characterizes the accent, after looking at its realization in multi-words focused constituents in which the sequence of accents is realized with an f0 medial fall. The first evidence derives from the fact that the f0 target scaling of the medial low tone stays the same when increasing the number of words within the constituent, which proves that it is an actual L target. Moreover, both slope and timing of such L target, with respect to the following peak, stay the same across conditions (while the slope of its interpolation with the preceding peak becomes shallower when number of words increases within the focused constituent), proving that the L target is actually the leading tone of a rising L+H* accent. Grice et al. (2005) argue that there are no reasons to believe that the same would not apply to the other varieties and that the same kind of inspection would probably yield similar arguments in favor of labeling the accent as a L+H*. However, experimental evidence for Bari Italian, in which L target timing is stable relative to the following H peak regardless of the number of syllables following the pitch accent, points towards a justified H*+L falling analysis (Gili Fivela, Savino, 2003).

Another common feature reported in Grice et al. (2015) is the way southern varieties signal questionhood. Specifically, while Florence Italian (central variety) makes use of both pitch accent and boundary tone as a cue for questionhood (H* L-H% for questions vs. H+L* L-L% for statements), southern varieties only use nuclear pitch accent type¹. The strength of this claim, however, has been challenged in Savino (2012), arguing that a rising accent and a terminal fall is a typical way to signal a yes-no question throughout Italy.

Additionally, we can notice from Grice et al. (2005) that in the three southern varieties analyzed, the accent used for questions is a later peak variant, as opposed to

¹ Though, as then shown by Petrone, D'Imperio (2008), the shape of the interpolation line between the prenuclear and the nuclear accent in late narrow focus utterances also has a role in discriminating the two speech modalities in Neapolitan Italian.

the accent used in statements in the same variety. Again, the differences in the way the accents are labelled across varieties, *i.e.* L*+H in Naples and Palermo, and L+H* in Bari, derive from variety-specific choices, often necessary to signal phonological opposition with early peak accents in the same variety and hence not motivated by (phonetic) target alignment alone.

A second thorough comparative analysis of the intonation in Italian varieties is Gili Fivela et al. (2015). This study, conducted as a part of a much bigger research project including the investigation of intonation in several Romance languages, collects data from thirteen varieties spoken in Italy with a fairly wide range of pragmatic functions. Moreover, it is based on new spoken data, collected through the same methodology in all the varieties considered, hence allowing for a much simpler and coherent inter-variety comparison.

Some of the claims put forward by Grice et al. (2005) find confirmation when analyzing data from a larger number of varieties and pragmatic situations. For example, the realization of broad focus statements is confirmed to be stable across varieties, with a falling pitch accent and a low boundary (H+L* L-L%). Similarly, the realization of the pitch accent signaling contrastive focus mirrors previous analyses, in that it appears to be realized in a very similar way throughout Italy, with a rising-falling f0 movement, whose peak is aligned with the first half of the accented vowel. This is true despite the fact that differences in the interpolation of the accentual targets, together with variety-specific phonological oppositions, might call for different labels (L+H*, H*+L, or, in some cases, H*).

The picture, however, becomes much more complex for yes-no questions. The analyses presented in Gili Fivela et al. (2015) reveal a strong variation across the varieties and, crucially, no evidence points to the existence of clusters of varieties on the basis of geographical or dialectological areas. This lack of homogeneity appears to be also true, though not as strong, for wh-questions. For example, counter-expectational wh-questions appear to be very consistent across varieties.

In addition, continuing the work on Pisa Italian by Gili Fivela (2008), Gili Fivela et al. (2015) clearly acknowledges the role of intra-variety variability. Variation is not only detectable across varieties, but it is argued to be visible also within the same variety. Quite a wide range of possible combinations of pitch accents and boundary tones are available to speakers, without any clearly predictable pattern. Together with the observation that geographically distant varieties can have the same tonal realization for the same function, such a high level of variability is speculated to be dependent on inter-variety interference, triggered sometimes by a number of political and social factors, such as schooling, urbanization, internal migration, and perceived prestige of some varieties relative to others.

1.2 Objectives of the study

The objectives of this contribution are to **i**) provide a description of an under-described variety, namely Salerno Italian and **ii**) address the issue of variability in questions within the variety reported in previous studies, by providing data helping to unveil the possible sources of such variation.

2. Intonation in Salerno Italian

2.1 Previous research on Salerno Italian

Salerno is a southern variety of Italian which has not received much attention in previous studies on intonation. To the best of our knowledge, some preliminary considerations about the intonation in SI have only been included in few, recent studies, which adopt a contrastive perspective either on several Italian varieties, such as Gili Fivela et al. (2015), or a Second Language Learning perspective (Savy, Luque Moya, 2015; Orrico, Cataldo, Savy & Barone, 2016). Hence, an investigation centered around the intonational system of this variety is still lacking. As for Gili Fivela et al. (2015), in which several varieties and a wide range of pragmatic situations are considered, details about SI are not provided.

An interesting fact on SI, springing from information collected on previous studies, is the difference of some of its intonational phonology traits from the systems of adjacent varieties, specifically from Neapolitan Italian. Salerno and Naples, which are geographically close (about 60 km) are traditionally considered also very close from a linguistic point of view. If we consider segmental phonology traits, the vernaculars spoken in these two cities are both included within two bundles of isoglosses defining a geographical area (central Campania), whose language is hinged on Neapolitan, and are separated from other southern vernaculars spoken in Campania, which, on the other hand, share traits with the vernaculars spoken in Basilicata (Loporcaro, 2009: 142-144).

Nevertheless, the same cannot be argued for intonation. The difference in the two systems appears to be particularly detectable in yes-no questions: Neapolitan follows the "southern trend" described in Grice et al. (2005) in which question-hood is characterized as a rise-fall, with a low terminal, and discrimination relative to statements is mainly conveyed by pitch accent choice. On the contrary, SI, despite also allowing for rise-falls in questions, appear to allow a final rise, which appears in the prototypical question tune in SI (Savy, Luque Moya, 2015). This trend is observed in different varieties throughout Italy. However, while for some Italian varieties this double choice of boundary for question is often argued to be due to speech style (see Savino, 2012), this does not appear to be the case for SI.

2.2 Methods

The following sections present a description of the main intonational patterns used for statements and questions in Salerno Italian (SI).

We used the same corpus employed in Gili Fivela et al. (2015). This is a modified version of the corpus used for the *Interactive Atlas of Romance Languages* (IARI, Prieto, Borràs-Comes & Roseano, 2010), consisting of speech material collected

via a Discourse Completion Task (DCT) and a Reading Task (RT). In the DCT, speakers had to spontaneously react to a written text describing a situation, while in the RT they had to read out loud the target sentence after silently reading a description of the contextual situation. The same contexts were used in both tasks. Gili Fivela et al. (2015) adopted specific criteria of age (20-35 years old) and education (high school or university degree) for speaker selection. For Salerno, speech material was collected from 4 speakers (2 males and 2 females) and for 57 contexts². Two repetitions for both DCT and RT were collected from each speaker.

In the present study we report results from a subset of the 57 situations collected for Salerno. Specifically, we will focus on statements and questions: i) broad (48 items) and narrow (32 items) focus condition for statements; ii) information-seeking (79 items), confirmation-seeking (45 items), counter-expectational (13 items), and echo (30 items) conditions for yes-no questions.

The intonational analysis was conducted within the Autosegmental-Metrical approach and using a ToBI-like annotation system, as described in previous studies about intonation in Italian varieties (see section 1.1 above). The analysis is primarily concerned with the occurrence of tonal events (pitch accents and edge tones) and, in particular, with the realization of nuclear configurations.

2.3 Statements

Consistent with previous investigations, both broad and narrow focus statements are tonally realized in SI similar to the other varieties of Italian and, additionally, without individual variation.

The tune used for broad focus statements is analyzed as a $H+L^*L-L\%$. It is realized as a falling tune, with a falling nuclear pitch accent and a low boundary tone, as shown in the three examples in Fig. 2.

² The pragmatic situations included different conditions for statements (broad focus, narrow focus with different positions of the focalized constituent, left/right dislocations, lists), different conditions for questions (information-seeking, confirmation-seeking, counter-expectational, and echo for yes-no questions, information-seeking, counter-expectational, and echo for wh-questions, alternative questions), imperatives, offers, exclamations, and vocatives. The complete list of contexts and target sentences used to collect the original corpus used in the IARI project can be found at http://prosodia.upf.edu/iari, and a more precise explanation of the Italian adaptation of the corpus can be found in Gili Fivela et al. (2015).

Figure 2 - F0 curve for $H+L^*L-L\%$ in the statements Preferisco i manda<u>RI</u>ni³ '(I) prefer tangerines' (top left) and two renditions of Ma<u>ria</u> sta sbucciando un'a<u>RAN</u>cia 'Maria is peeling an orange' (top right and bottom) uttered as broad focus statements by the same female speaker



The H+L* pitch accent is phonetically realized as a relatively moderate fall on the syllable bearing the accent. As also shown for other varieties (Gili Fivela et al., 2015), despite always showing an L* target or a falling movement aligned with the accented vowel, the H leading tone can have different scaling or, sometimes, be included in a gradual fall.

Additionally, in case a prenuclear accent is present in a broad focus statement, it is analyzed as a H* pitch accent (top left and bottom panel in Fig. 2), whose phonetic realization involves a rising movement from a low pre-tonic region and a peak that can be realized either on the right edge of the accented syllable or even later, in the post-tonic region. Compare, for example, the prenuclear accents in Fig. 2 with the broad focus statement in Fig. 3, uttered by the same speaker, which more clearly shows the rising movement of prenuclear H* pitch accents. The reason behind its phonological analysis as a monotonal high accent instead of a bitonal sequence of LH tones is twofold. On the one hand, there is a variety internal motivation, stemming from the phonological opposition this accent has with the other rising accents found in the system of tones in SI (see following sections). On the other hand, we have not found a clear phonological opposition between these prenuclear accents. The same has been found for other Romance languages and other varieties of Italian by Prieto, D'Imperio & Gili Fivela (2005), where it is argued that the association between a tone and a segment should not be analyzed only by observing their timing, but also considering

³ Throughout the article, underlined upper case letters indicate the placement of nuclear pitch accents, while underlined lower case letters indicate pre-nuclear or post-nuclear pitch accents.

how the native speaker perceives it (see also Arvaniti, Ladd & Mennen, 2000) and explain the differences in alignment in allophonic accents by referring to the notion of secondary association with the prosodic word rather than the syllable.

Figure 3 - F0 curve in the statement Milena lo vuole a<u>MA</u>ro 'Milena takes it (the coffee) black' uttered as a broad focus statement by a female speaker



Nevertheless, the rendition in Fig. 3 might, impressionistically, be related to a non-exhaustive answer and the topic (Milena) realized as a 'Partial Topic' (Buring, 1997), as if the statement represented the answer to a question like 'How do *your friends* take their coffee?', rather than 'How does *Milena* take her coffee?'. The notion of Partial Topic and its tonal realization has been investigated in D'Imperio, Cangemi (2011) and Brunetti, D'Imperio & Cangemi (2010) for Neapolitan Italian. They find that the non-exhaustive answer presented also a mandatory phrase accent at the right edge of the topic (typically, !H-) and a compressed f0 trend following it, therefore the non-exhaustive reading might stem from those cues and not from a different pitch accent. The same could also be speculated for SI. However, such investigation goes beyond the scope of this paper and future work should be dedicated to answering research questions such as the allophonic status of the two prenuclear accents and the primary cues to the non-exhaustive reading.

As for narrow focus statements, they are realized with a rising nuclear pitch accent, which, all else being equal, is the only tonal difference between this and the broad focus condition. This tune is phonologically analyzed as a L+H* HL-L% sequence, with the pitch accent being phonetically realized as a rising movement starting in the pre-tonic region and a peak aligned with the first half of the syllable, as shown in Fig. 4. The difference in the realization of a L+H* pitch accent and the H* prenuclear pitch accent is that, in narrow focus, three targets are clearly identifiable in the rise-fall movement within the accent region: a L leading tone, typically aligned with the right edge of the pre-tonic syllable, a H* tone, aligned within the first half of the accented vowel, and a second L tone, which is typically reached around the offset of the accented syllable or the onset of the post-tonic syllable. The motivations for the rising analysis mirror the acoustic measurements provided for Neapolitan Italian (see section 1.1) for two reasons. The first one has impressionistically perceptual grounds, since the Neapolitan L+H* sounds the same as the narrow focus accent in SI. In addition, the same opposition with a L*+H rising accent has been found in SI (see the following section).

Figure 4 - F0 curve for the utterances Ho chiesto dei li<u>MO</u>ni '(I) asked for lemons' (left) and È Mi<u>LE</u>na che lo vuole a<u>ma</u>ro '(*it*) is Milena that takes it (the coffee) black' (right) uttered as narrow focus statements by the same female speaker



In case the focalized constituent is located early in the sentence, a post-nuclear accent is realized, which is analyzed as a H+L*, though it appears much more compressed than when it is realized as a nuclear accent (Fig. 4, right panel).

2.4 Yes-no questions

Results from Gili Fivela et al. (2015) show the general absence of an exact mapping between tunes and yes-no question sub-functions in all the Italian varieties investigated so far. Here, four different sub-functions were considered: information-seeking, confirmation-seeking, counter-expectational, and echo questions. The present section reports intonational data analysis regardless of the pragmatic function. See section 3 for a discussion.

Globally, four different patterns were found for yes-no questions, *i.e.*, two rise-fall and two rise-fall-rise tunes (see Fig. 5). Two different accents can be used as nuclear pitch accents in yes-no questions in SI. Note that both are rising pitch accents, and their phonological opposition is mainly dependent on the temporal alignment of the tonal targets within the accent with respect to the accented syllable. Specifically, we found an early peak pitch accent, labelled as L+H* (left panels in Fig. 5), which is the same accent used to signal narrow focus in statements. The second accent, labelled as L*+H (right panels in Fig. 5), has a rise-fall movement too, though the alignment of its targets is later than for L+H*. Specifically, the first low target is typically realized at the onset of the accented vowel, the peak is reached at the offset of the same vowel, and the second low target is realized in the post-ton-ic syllable. Both pitch accents can combine with either a low or a high boundary, though distributional data reveal a preference for choosing rising boundaries with a nuclear L+H* and falling ones when a L*+H is chosen.

Figure 5 - F0 curves for the yes-no question Sono le <u>NO</u>ve? 'Is it nine o' clock?' uttered with a $L+H^*HL-H\%$ tune (top left), a L^*+H HL-L% tune (top right), and a $L+H^*HL-L\%$ tune (bottom left), and for the question Vuoi le <u>MAN</u>dorle? 'Do (you) want the almonds?' uttered with a L^*+H HL-H% tune (bottom right)



Fig. 6 shows percentages of occurrence of each of the four tunes in our corpus. $L+H^*$ HL-H% is the most frequent tune in our data set, which alone reaches more than 50% of occurrences. The same accent, conversely, combines with a low boundary in less than 20% of the cases. As for L*+H, it more often combines with a HL-L% boundary and only in 10% (lowest percentage of occurrences) of the cases with a HL-H%.

Figure 6 - Percentages of occurrence of the four yes-no questions tunes within our corpus



The low frequency of occurrence of L*+H HL-H% might depend on tonal crowding, which implies a relative difficulty to produce the tonal gestures associated with the accent and the tonal edge consecutively, over a short time span. Indeed, L*+H HL-H% is more likely to occur in association with proparoxytone words, where an additional syllable is available between the accent and the boundary, or in cases in which the nuclear pitch accent is not realized on the rightmost accentable syllable in the intonational phrase (see Fig. 7)⁴.

Figure 7 - Example of L^* +HL-H% with early nuclear pitch accent in the yes-no question È torNAta Barbara? 'Is Barbara back?'



Compare, for example, the three tunes in Fig. 8. The difference between the alignment of the two peaks in the two renditions of L*+H (bottom vs top-right) is pretty clear, with an earlier timing when in combination with an L-H% boundary. In addition, as a consequence of tonal repulsion, the alignment of the peak in L*+H overlaps with the alignment of L+H* (top-right vs top-left). In these cases, the phonological opposition between the two events might be compensated by cues other than alignment, such as the shape of the rise-fall movement, which is a common strategy for category disambiguation (see for example Niebuhr, D'Imperio, Gili Fivela & Cangemi, 2011). Additionally, when the two rising gestures associated with L*+H HL-H% occur very close in time, strategies of temporal readjustment of targets might be used.

Figure 8 - Alignment of tonal targets in L+H* (top left) and L*+H in combination with either a L-H% (top right) or L-L% (bottom) uttered by the same female speaker



⁴ In the example in Fig. 7, note that the nuclear rise-fall is spread to a constituent longer than one word and the HL- phrase accent is anchored to the last stressed vowel of the constituent. Following D'Imperio (2000), we label the phenomenon as H(*)L-.

In other cases, strategies of gestural overlap might occur, in which the fall leading to the L- phrase accent, overlapping with the H% rise, is not fully realized, as it can be seen in in Fig. 9.

Figure 9 - Gestural overlap in L*+HL-H% in the question Hai dormito <u>BE</u>ne? 'Did (you) sleep well?' uttered by a female speaker

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Here, in order to fully produce the two rising movements, the speaker does not readjust the timing of the H accentual target, but instead the curve stays at a relatively high level even during the L- phrase accent due to lack of time to produce both a fall and a rise.

2.5 Summary of statement and question tunes in SI

Table 1 shows the three pitch accents that can be used in nuclear position and how they combine with the two boundary tones to form nuclear tunes.

Table 1	- 1	Schematic r	representation	of	the nuclea	er tunes	used	in SI	for	statements a	ınd	questions
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Tune	f0 realiz	ation	Utterance type
H+L* L-L%	Pitch Accent	Boundary tone	broad focus statements
L+H* L-L%	Pitch Accent	Boundary tone	narrow focus statements/ yes no questions
L+H* L-H%	Pitch Accent	Boundary tone	yes-no questions
L*+H L-L%	Pitch Accent	Boundary tone	yes-no questions
L*+H L-H%	Pitch Accent	Boundary tone	yes-no questions

3. Dimensions of variation in SI yes-no question tunes

Section 2.4 above reports a description of the tunes used for yes-no questions in SI. However, so far no consideration has been made about: i) the different pragmatic sub-functions, *i.e.*, information-seeking, confirmation-seeking, counter-expectational, and echo questions; ii) the four different speakers; and iii) the two task conditions used to elicit the speech material, *i.e.* Discourse Completion and Reading Task. These three dimensions are potential sources of variation in the use of intonation that are worth investigating. This section provides an attempt to characterize the distribution of tunes by taking into account the role that such dimensions of variation might play (see Fig. 10-13).

Recent work on Italian intonation has shown that pragmatic conditions for yesno questions as those considered here are not a good criterion for tune classification. As reported above, the issue of intra-variety variability has been raised by Gili Fivela (2008) for Pisa Italian and then confirmed for several Italian varieties by Gili Fivela et al. (2015), where they notice that while many varieties share similar tunes for yes-no questions, the same tune can be used for more than one sub-function within the varieties. Fig. 10 shows the distribution of the tunes in SI according to the pragmatic sub-function they were used for. The absence of a one-to-one mapping between tune and function seems to be confirmed also for SI. No specific tune expresses a specific function and, at the same time, no specific function is expressed by a specific tune. The only exception is represented by counter-expectational questions, which are expressed with a L+H* HL-L% tune in almost the 90% of the cases.



Figure 10 - Distribution of tunes according to the pragmatic sub-function in SI

Note that, as for the other pragmatic conditions, different tunes can be used. This situation might be explained by unveiling the other potential dimensions of variability listed above *i.e.* speaker variability and task used for elicitation.

In past studies, it has been argued that speaking style plays an important role in Italian yes-no question intonation. Specifically, the use of H% is argued to be a consequence of a reading effect, since it is not present in spontaneously collected data (Grice, Savino, 1997; Savino, 2012). We tested if this situation applied to our data.

In Fig. 11 we show the distribution of tunes according to the two tasks (Discourse Completion and Reading Task) in a mosaic plot.

Figure 11 - Mosaic plot showing the distribution of tunes according to task (DC = Discourse Completion; R = Reading)



The mosaic plot above was created in R using the package *vcd*, which allows for testing the hypothesis of independence between variables using the residual-based method by Pearson (Zeileis, Meyer & Hornik, 2007). The size of the boxes within the plot indicates the frequency of occurrence of each combination of variables, while the residuals give information about how far is the actual occurrence from the one expected according to the null hypothesis (*i.e.* that the variable are independent). As a rule, a residual ranging between 2 and -2 leads to the confirmation of the null hypothesis. The fact that residuals in Fig. 11 are kept within this interval shows that tune and task do not covariate, therefore we are led to believe that the presence of H% is not an effect of 'reading style', but rather it reflects a specific pragmatic choice.

A completely different picture is yielded when we plot the occurrence of tunes for each of the four individual speakers.





Fig. 12 shows that tune choice is rather dependent on speaker variability. The blue and pink boxes indicate that the occurrence of that specific combination of levels

is, respectively, significantly higher and lower than predicted by the null hypothesis. Regardless of the pragmatic condition, speaker-specific differences are quite evident. Note that, for example, there are speakers that prefer to use rising- rather than falling-terminal tunes (SD) or vice versa (AS). AV, on the contrary, makes an overall greater use of L*+H tunes.

Additionally, it would be interesting to observe how this individual variability interacts with the different pragmatic conditions. Italian intonation research that directly addresses individual variability in the mapping between tunes and pragmatic functions is, to the best of our knowledge, absent. Variation at the individual level for Italian varieties has been investigated concerning the interface between phonology and phonetics (Niebuhr et al., 2011), but not concerning the intonation-meaning relationship, while evidence has been shown for other languages. For example, in German, Grice, Ritter, Niemann, & Roettger (2017) show that different speakers use different strategies to encode focus types in intonation. These studies support the claim that individual variability needs to be taken into account when dealing with intonation and intonational meaning. In Fig. 13 we plotted the relationship between individual variability and pragmatic conditions in questions. Note that we excluded counter-expectational questions from the plot. This choice was made for two reasons. Firstly, we have evidence from Fig. 10 that they are realized quite consistently across speakers (they are produced with a L+H* HL-L% in almost 90% of the cases). Secondly, there were very few counter-expectational questions available in the corpus, therefore their inclusion would have created a loss of power to the calculations. Additionally, we plotted boundaries and pitch accents separately. Fig. 13 shows that some of the inter-individual differences reported in Fig. 12 appear to be unrelated to pragmatic condition. For instance, AS makes a greater use of L% than H% in all the conditions. However, we can note that other speaker-specific strategies are also dependent on the pragmatic condition. For example, the frequent use of L*+H by the speaker AV appears to be restricted to confirmation-seeking questions. Additionally, the greater use of H% by SD is only significant in information-seeking questions.



Figure 13 - Mosaic plot showing the distribution of pitch accents (left) and boundary tones (right) according to pragmatic functions and individual speakers

In general, abstracting away from inter-individual variation, it can be argued that information-seeking questions are typically expressed with either a L+H* accent or a H% boundary. Counter-expectational questions appear to be expressed with the same pitch accent, though always in combination with a low boundary. As for confirmation-seeking and echo questions, no specific tune seems to be used to express either one of them.

4. Discussion

In line with recent research, this study puts SI within the frame of Italian intonational phonology. Despite commonalities within the intonation systems of Italian varieties, most of which are relative to the intonation realization of statements, a great deal of variability is registered, both between SI and other varieties as well as across different speakers.

Gili Fivela et al. (2015) found inter-variety variation for Italian and the absence of specific groupings of intonational traits overlapping with dialectological areas defined on the basis of segmental phonology. In addition, in section 2.1 above we also noted that information about SI intonation available in past studies point towards a systemic difference between the varieties of Italian spoken in Salerno and Naples, despite literature on segmental phonology has shown that they share several features. Nevertheless, looking at the picture drawn here for the intonational system of SI, a number of similarities with Neapolitan Italian can be found. Specifically, the two varieties appear to share the pitch accent inventory: they have, for example, the same opposition between two rising accents, $L+H^*$ and L^*+H , both of which are found to occur only in nuclear position in both varieties. Also, the same pitch accent types (H* and H+L*) seem to occur in pre-nuclear and post-nuclear positions in the two varieties. It therefore appears to be the case that the two varieties have a common basic phonological inventory of intonation primitives. Nevertheless, differences at the level of tune well-formedness and tune-function mapping can be found.

A particularly striking result is the presence of high levels of variability within the data analyzed. We showed that such variability does not depend on the type of task (as shown in Fig. 11) and although a general strategy for expressing information-seeking and counter-expectational questions was detected beyond variability, a uniform pattern is hard to find (Fig. 10; 13).

The absence of a one-to-one correspondence between tunes and functions that has been suggested for different languages. Several studies have shown that a number of factors beyond phonological intonation categories play a role in defining the meaning of a tune. Among these, evidence has been provided for the effect of pragmatic context (among others, Armstrong, Prieto, 2015) and phonetic details (Gili Fivela, 2012; Borras-Comes, Vanrell & Prieto, 2014; Mucke, Grice, 2014). As for the role of phonetic detail, compare, for instance, the realizations of confirmation-seeking and counter-expectational questions produced by the same SI speaker in the two examples reported in Fig. 14.





The two questions are realized with the same pitch accents and boundary tones, however the two pitch accents are compressed in the counter-expectational question, with pitch accent peaks about 50 Hz lower than the confirmation-seeking question. The same can be said for counter-expectational wh-questions, which, as reported in Gili Fivela et al. (2015) are very often, and also very consistently across varieties, produced with the same phonological category as information-seeking wh-questions, but with a much greater excursion within the pitch accent.

Nevertheless, high levels of speaker-specific variation in the use of intonation has been detected (Fig. 12). Such variation appears to be, in some cases, independent from the use of intonation in different pragmatic condition (*e.g.* the use of L% by AS). This strong individual effect is an issue that cannot be readily addressed. One of the main difficulties that arise is to figure out the sources of such speaker-specific variability. Recent work by Kleinschmidt (2019) has tried, for example, to model segmental phonetic variability by looking at how it correlates with socio-indexical features of the speaker, such as age, gender, and dialect spoken, obtaining results confirming his hypothesis. The model also provides evidence of the fact that listeners exploit the covariance of phonetic and social traits to cope with ambiguities in the speech signal, arguing that listeners adapt to variability. However, a lot of unexplained variability at the individual level was still present in Kleinschmidt's (2019) data, suggesting that other factors also come into play.

In a related study (Orrico, Savy & D'Imperio, 2019), for example, we report that socio-indexical features of the speakers can have an effect at the perception level. Specifically, we found that continued exposure (for at least 12 months) to either other varieties of Italian or other languages results in a retuning of intonation categories and their link to specific meanings, which might also have an effect in production. These results are in line with what argued by Gili Fivela et al. (2015), claiming that the main reason for such fragmented picture of Italian intonation might be found in high level of contact across different varieties.

5. Conclusion

The aim of this contribution was to provide a better understanding of intonational phonology of Salerno Italian, one of the varieties that has not received much attention by the linguistic community in past research. In line with recent research on Italian intonation, the study was carried out with the assumption that variation, both across and within varieties, exists and needs to be dealt with by unveiling its possible sources. The analysis reported here shows that variability at the individual speaker level represents the strongest, unavoidable level and should be better accounted for in models in which socio-phonetic and cognitive features of speakers are considered. Only by taking into account these aspects of speech we can get a better understanding of the role of intonation in communication.

Bibliography

ARVANITI, A., LADD, D.R. & MENNEN, I. (2000). What is a starred tone? Evidence from Greek. In *Papers in laboratory phonology V: Acquisition and the lexicon*, 119-131.

AVESANI, C., VAYRA, M. (2003). Broad, narrow and contrastive focus in Florentine Italian. In *Proceedings of the 15th International Congress of Phonetic Sciences*, Vol. 2, 1803-1806.

BORRÀS-COMES, J., DEL MAR VANRELL, M. & PRIETO, P. (2014). The role of pitch range in establishing intonational contrasts. In *Journal of the International Phonetic Association*, 44(1), 1-20.

BRUNETTI, L., D'IMPERIO, M. & CANGEMI, F. (2010). On the prosodic marking of contrast in Romance sentence topic: evidence from Neapolitan Italian. In *International Conference on Speech Prosody*, 1-4.

BÜRING, D. (1997). The Meaning of Topic and Focus – the 59th Street Bridge Accent. London: Routledge.

CROCCO, C. (2013). Is Italian Clitic Right Dislocation grammaticalised? A prosodic analysis of yes/no questions and statements. In *Lingua*, 133, 30-52.

D'IMPERIO, M. (1999). Tonal structure and pitch accent in Italian focus constituents. In *Proceedings of the 14th International Congress of Phonetic Sciences. University of San Francisco, Berkeley*, 101-106.

D'IMPERIO, M. (2000). The role of perception in defining tonal targets and their alignment. PhD dissertation, Ohio State University.

D'IMPERIO, M. (2002). Italian intonation: an overview and some questions. In *Probus*, 14(1), 37-69.

D'IMPERIO, M., CANGEMI, F. (2011). Phrasing, register level downstep and partial topic constructions in Neapolitan Italian. In *Intonational phrasing in Romance and Germanic: Cross-linguistic and bilingual studies*, 10, 75-94.

GILI FIVELA, B. (2008). *Intonation in production and perception: The case of Pisa Italian*. Alessandria: Edizioni dell'Orso.

GILI FIVELA, B. (2012). Meanings, shades of meanings and prototypes of intonational categories. In ELORDIETA, G., PRIETO, P. (Eds.), *Prosody and meaning* (Vol. 25). Berlin–New York: Walter de Gruyter, 197-237.

GILI FIVELA, B., IRACI, M.M. (2017). Variation in intonation across Italy: The case of Palermo Italian. In BERTINI, C., CELATA, C., LENOCI, G., MELUZZI, C. & RICCI, I. (Eds.), *Fattori sociali e biologici nella variazione fonetica. Studi AISV 3.* Milano: Officinaventuno, 167-188.

GILI FIVELA, B., AVESANI, C., BARONE, M., BOCCI, G., CROCCO, C., D'IMPERIO, M., GIORDANO, R., MAROTTA, G., SAVINO, M. & SORIANELLO, P. (2015). Intonational phonology of the regional varieties of Italian. In FROTA, S., PRIETO, P. (Eds.), *Intonation in Romance*. New York: Oxford University Press, 140-197.

GILI FIVELA, B., SAVINO, M. (2003). Segments, syllables and tonal alignment: A study on two varieties of Italian. In *Proceedings of the XVth international congress of phonetic sciences*, 2933-2936.

GRICE, M. (1995). The intonation of interrogation in Palermo Italian. Tubingen: Niemeyer.

GRICE, M., D'IMPERIO, M., SAVINO, M. & AVESANI, C. (2005). Strategies for intonation labelling across varieties of Italian. In JUN, S.A. (Eds.), *Prosodic typology: The phonology of intonation and phrasing*. Oxford: Oxford University Press, 362-389.

GRICE, M., RITTER, S., NIEMANN, H. & ROETTGER, T.B. (2017). Integrating the discreteness and continuity of intonational categories. In *Journal of Phonetics*, 64, 90-107.

GRICE, M., SAVINO, M. (1997). Can pitch accent type convey information status in yesno questions?. In *Proceedings of the ACL Workshop 'Concept-to-Speech Generation Systems*'. Madrid, 14 July 1997, 29-38.

KLEINSCHMIDT, D.F. (2019). Structure in talker variability: How much is there and how much can it help? In *Language, cognition and neuroscience*, 34(1), 43-68.

LADD, D.R. (2008). Intonational phonology. Cambridge: Cambridge University Press.

LOPORCARO, M. (2009). Profilo linguistico dei dialetti italiani. Roma-Bari: Laterza.

MAROTTA, G., SORIANELLO, P. (2001). La teoria autosegmentale nell'analisi dell'intonazione interrogativa in due varietà di italiano toscano (Lucca e Siena). In *Atti del XXXIII Congresso della Società di Linguistica Italiana*. Roma: Bulzoni Editore, 177-204.

MÜCKE, D., GRICE, M. (2014). The effect of focus marking on supralaryngeal articulation Is it mediated by accentuation? In *Journal of Phonetics*, 44, 47-61.

NIEBUHR, O., D'IMPERIO, M., GILI FIVELA, B. & CANGEMI, F. (2011). Are There "Shapers" and "Aligners"? Individual Differences in Signalling Pitch Accent Category. In *ICPhS*, 120-123.

ORRICO, R., CATALDO, V., SAVY, R. & BARONE, L. (2016). Transfer, fossilization and prosodic drift in Foreign Language Learning. In SAVY, R., ALFANO, I. (Eds.), *La fonetica nell'apprendimento delle lingue. Studi AISV 2*. Milano: Officinaventuno, 117-132.

Orrico, R., Savy, R., D'Imperio, M. (2019). The perception of speaker certainty in Salerno Italian intonation. In Calhoun, S., Escudero, P., Tabain, M. & Warren,

P. (Eds.), Proceedings of the 19th International Congress of Phonetic Sciences, Melbourne, Australia 2019, 2946-2950.

PETRONE, C., D'IMPERIO, M. (2008). Tonal structure and constituency in Neapolitan Italian: evidence for the accentual phrase in statements and questions. In *SP-2008*, 301-304.

PIERREHUMBERT, J.B. (1980). The phonology and phonetics of English intonation. PhD dissertation, Massachusetts Institute of Technology.

PRIETO, P., BORRÀS-COMES, J. & ROSEANO, P. (2010). *Interactive atlas of Romance intonation*. Web page: http://prosodia.upf.eduiari.

PRIETO, P., D'IMPERIO, M. & GILI FIVELA, B. (2005). Pitch accent alignment in Romance: primary and secondary associations with metrical structure. In *Language and speech*, 48(4), 359-396.

SAVINO, M. (2012). The intonation of polar questions in Italian: Where is the rise?. In *Journal of the International Phonetic Association*, 42(1), 23-48.

SAVINO, M., GRICE, M. (2011). The perception of negative bias in Bari Italian questions. In FROTA, S., PRIETO, P. & ELORDIETA, G. (Eds.), *Prosodic categories: Production, perception and comprehension*. Dordrecht: Springer, 187-206.

SAVY, R., LUQUE MOYA, J.A. (2015). Aspectos prosódicos de las interrogativas en aprendientes italianos de ELE. In *NORMAS*, 7, 283-296.

ZEILEIS, A., MEYER, D. & HORNIK, K. (2007). Residual-based shadings for visualizing (conditional) independence. In *Journal of Computational and Graphical Statistics*, 16(3), 507-525.