The role of topic shift and conversation turn in the intonation of Italian wh-questions

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Abstract

The aim of this study is to analyse the intonation patterns of Italian wh-questions in relation to epistemic orientation, topic shift and turn organisation. The research conducted so far has shown that wh-questions have both falling and rising final contours. Linguistic, sociolinguistic, and pragmatic factors are recognised to affect intonation patterns. Nevertheless, the influence of conversational elements on intonation contours remains unclear and requires further research.

This study analyses a corpus of unplanned conversations to evaluate how the retention/change of topic and the maintenance/transfer of dialogic turn affect the intonation of questions. The research revealed two significant findings. Firstly, wh-question categorisation shows that the degree of epistemic certainty has a profound impact on topic shift and floor passing. Secondly, the results suggest that conversational aspects do not significantly affect the final intonation patterns. However, they do have a relevant effect on the initial pitch level of the questions, leading to an increase in the onset and overall pitch range.

1 Introduction

The prosodic patterns of wh-questions are conditioned by specific syntactic and semantic constraints. With reference to syntax, in many languages, including Italian, the wh-word moves from its argumentative position to the beginning of the sentence, followed by the inflected verb, the grammatical subject and any additional complements:

(1) *Che libro stava leggendo Giovanni?*
'What book was John reading?'

At a semantic level, the wh-word represents the new element and the locus of the interrogation; the speaker already knows that John was reading a book, but he does not know which one. The analysis of wh-questions poses several challenges, such as identifying the intonation nucleus, determining the final contour direction and establishing the correlation between intonation contours and pragmatic functions.

With respect to the intonation, studies indicate that, even in the same language, wh-questions exhibit both final falling and rising contours, with a higher incidence for the former (among them, Bolinger 1978; Ladd ^{2}2008; Frota/Prieto 2015). The first part of the question, formed by the fronted wh-word and the auxiliary/verb, is typically associated with a pitch accent and

followed by a falling contour that continues until the end of the sentence. Nevertheless, the wh-word may not always be salient[1] and questions with rising final intonation are also observed. In this regard, different findings point to the existence of a certain intonational variability. Languages vary in their final contour based on geographical and stylistic factors. However, pragmatic conditions, such as politeness, emotional states and dialogue aspects, including the topic of discourse and the management of conversational shifts, also appear to have an influence on intonation structure. In more detail, Bolinger (1978) and Ultan (1978) showed that rising wh-questions are common occurrences across languages. By contrast, in a study focusing on speech samples obtained through *Discourse Completion Tasks* (DCTs) in nine Romance languages, Frota/Prieto (2015) found prevailing falling contours in wh-questions, although final rising contours can also occur. In addition, it is worth noting that in read speech wh-questions tend to display a final rising intonation more frequently than in spontaneous speech (Sosa 2003) and that the presence or absence of prominence of the wh-word can also condition the overall contour of questions (cf. Ladd [2]2008; Chen 2012).

In this regard, the data on the Italian language is quite varied. Wh-questions with a final rising contour are present in many Italian varieties, even if they are more common in speech acquired through controlled methods than in spontaneous production.[2] Nevertheless, despite the adoption of homogeneous criteria, research still highlights some prosodic variability. For instance, Gili Fivela et al. (2015) analysed 13 regional varieties of Italian and discovered that the final contour of the information-seeking wh-questions (ISQs) can be either falling or rising and that some varieties show more than one nuclear configuration accompanied by a low (L%) or high (H%) boundary tone. These results do not enable the identification of specific regional strategies, as each variety showed some differences regarding the possible inventory of nuclear configurations.[3]

2 Other research perspectives

Over the years, the study of intonation has undergone significant changes. Initially, formal approaches were mainly concerned with the relationship between syntax structures and intonation. However, recent studies have focused on spontaneous speech to better understand the relationship between intonation and the informative and pragmatic structure of speech. This change involved not only a transition from controlled to spoken language, but also sometimes a broadening of the perspective of analysis, from target sentences to dialogues. Within this second large area of research, studies have increasingly explored other dimensions, including the communicative functions of speech acts, the epistemic stance of the speaker, emotional

[1] This aspect will not be taken into account here, but cf. Ladd ([2]2008) for discussion.

[2] For further details, refer to Marotta (2001); Gili Fivela et al. (2015); Alfano (2019); Gili Fivela/Iraci (2017); Sorianello (2023a).

[3] By contrast, echo wh-questions showed a greater level of consistency in their intonation, basically L+¡H* H% (cf. Gili Fivela et al. 2015: 181).

involvement, and the degree of politeness.[4] These dimensions have been evaluated from various perspectives with positive results. In line with the purpose of this study, we will consider the epistemic value of questions and their categorisation regarding the discourse topic and the turn transition.

2.1 From the epistemic orientation to the speaker commitment

The epistemic position is a complex dimension which refers to the cognitive perspective of participants during communication and their attitude towards the degree of certainty (epistemicity) and knowledge (evidentiality) of the propositional message, regardless of whether the information is true or false.[5] The epistemic stance is a gradient dimension that is constructed in a dynamic way during the conversation by means of lexical, morpho-syntactic, prosodic and gestural resources. In this respect, questions show an interesting behaviour, since their epistemic orientation can be entrusted to precise strategies of structural order (among which the presence/absence of the syntactic inversion between subject and verb, as in English), or to a different intonation, as it happens, for example, in Italian. Moreover, in the interrogative sentences the epistemic position of speaker and addressee relative to the information contained in the statement is asymmetric: the one asking the question does not have the required information [- knowledge], but believes that the addressee does [+ knowledge] and that he will provide it through an explicit verbal response.

In this regard, questions may have different epistemic orientations. A first group involves sincere information-seeking questions (ISQs) which reveal a lack of knowledge and in which the speaker maintains a neutral stance, with no assumptions about the answer he might receive. In contrast, the second group comprises questions requiring confirmation rather than information, such as echo or tag questions; those are biased and never neutral questions that frequently contain syntactic, lexical, or even prosodic cues, which reveal the speaker's assumptions to the listener. The speaker's epistemic position and commitment are interconnected. The level of commitment increases as the degree of presupposed knowledge decreases, particularly in genuine questions.

In the broader literature on prosody, several studies investigated the role of intonation in conveying the informational structure of utterances. Researchers explored the use of prosodic features in affirmative and interrogative sentences, specifically in the production of polar questions. Studies carried out in many languages found that intonation plays a relevant role in distinguishing between sincere questions and confirmed questions (among all, Vanrell et al. 2013; Roseano et al. 2016; Prieto/Roseano 2021). Essentially, the questions that focus on a

[4] The presence of a rising contour, together with a reduced speech rate, mitigates the sense of questioning by giving the question a more polite meaning; among others, Bartels (2014); Navarro/Cabedo Nebot (2014); Gryllia/Baltazani/Arvaniti (2018).

[5] The debate on these issues is wide-ranging. Epistemicity and evidentiality are often considered dependent dimensions that converge in the broader term of epistemic stance. Heritage (2014) distinguished between questions characterised by the absence of knowledge [-K] and those formulated with an assumption of knowledge [+K]. Other authors proposed more articulated models in which the speaker's degree of confidence or the mode of information retrieval also appear; for a discussion on this topic, we refer to Cornillie (2009).

new information are signalled through a rising intonation contour that may entail the use of boundary tone, nuclear pitch accent or pitch range, as opposed to requests for information which is already known. For instance, in Eastern Catalan both sincere and confirmation questions have the same nuclear PA, which is H+L* when the question pertains shared information, but ¡H+L*, with a different scaling, when seeking new information (Vanrell et al. 2013).

Additional data was obtained from research carried out from a conversational perspective on the moves observed in task-oriented dialogues. Following this approach, and in regard to acts of questioning, sincere questions (queries), and content-oriented questions (checks) are characterised by specific intonation markers. Grice/Savino (2003, 2004) conducted a study on the intonation patterns of polar questions in Query and Check moves for Italian speakers of Bari, detecting constant aspects. The results indicated that the former show a rising pitch accent of the type L+H*, whereas Check questions, that refer back to an accessible topic, tend to have a falling pitch accent (H+L* or H*+L). The boundary tone did not appear to play a direct role in this distinction, displaying a variable behaviour.

In relation to this topic, Prieto/Borràs-Comes (2018) argued that intonation also conveys epistemic markers that help the addressee to interpret the statements. Specifically, following Krifka (2015), the study considered two distinct epistemic operators: the speaker's commitment to the content uttered (assert operator) and the degree of agreement/disagreement with the same (reject operator). The aim of the research was to assess the appropriateness of the intonation contour of Catalan polar questions in different situational contexts using a perceptual acquisition task. The questions were acquired in a controlled way. To this aim, three different scales were used to evaluate the speaker's level of commitment and degree of agreement. The findings suggested that there is not a clear-cut correspondence between the expected situational context and the intonation contour, although there are exceptions. Questions with high speaker commitment, typically of confirmation, followed the pattern H+L*L%, while L*H% represented questions that express low epistemic commitment, in a preferential way. The key concept at the heart of the research carried out by Beyssade/Marandin (2006) and Portes et al. (2014) is that intonation meanings are reliant on the dialogic dynamics inherent in speech, wherein the speaker and addressee maintain an unceasing relationship.[6]

More recently, Orrico/D'Imperio (2020) focused on the relationship between the intonation contour and the speaker's commitment to the content of the question. The results were obtained by analysing a corpus of information-seeking and echo wh-questions produced by four speakers from the Salerno variety of Italian by reading and DCTs. In ISQs, the dominant nuclear pitch accent is H+L*, with a final boundary that falls or rises. The final contour's typology appears to rely on the speaker's pragmatic strategies, rather than being consistently linked to a particular pragmatic meaning. Conversely, echo questions, in their double realisation as counter-expectation and unheard questions, demonstrate the presence of a rising nuclear PA

[6] Portes et al. (2014) examined the correlation between the four typical intonation contours of assertion in French and different epistemic attitudes, ranging from understanding to uncertainty by means of a forced choice test with 80 participants.

(L*+H) and a broader pitch range (particularly in counter–expectation meaning). The two pitch accents (ISQs versus echo questions) show a correlation with the speaker's level of commitment, with ISQs indicating greater involvement than echo questions. This is because the propositional content of echo questions is already within the common ground of the speaker, leading to a lower level of involvement.

2.2 From topic shift to the transition of the conversational turn

In recent years, there has been a growing need to define intonation in the context of conversational dynamics. Many studies explored the potential relationship between the prosodic organisation of speech and the function of topic, as well as the turn construction in dialogue. However, research has approached the interplay between prosody and conversation from a number of angles, including conversational and interactional linguistics (among others, Couper-Kuhlen 2001, 2012; Bergmann 2018), phonological and prosodic perspectives (cf. Pierrehumbert/Hirschberg 1990; Hirschberg/Grosz 1992; Zellers 2013; Riou 2015, 2017).[7]

The concept of discourse topic, central to all models of conversation analysis and interactional linguistics, poses intrinsic problems (among all, Van Dijk 1977; Asher 2004). The topic serves as a thematic core that emerges during a conversation and directs the participants' attention. It may be considered a mutually recognised point of attention. The topic of conversation is not static: during a conversation, speakers may introduce a new topic, abruptly interrupt the current topic, or even return to a previously discussed topic. However, instead of an abrupt change, a gradual transition of the topic occurs more frequently. In a conversational context, the choice and progression of a given topic are dynamic and not predetermined, as they are actively constructed in real-time. Various studies suggested that prosodic cues can be used to indicate a topic change in conversation. When a new topic is introduced during a dialogue, it is usually signalled by a short pause or an increase in the speaker's speech rate and volume at the beginning of the turn. Other variations include adjustments to the intonation contour, which tends to show a final rise or a higher initial pitch, and to the pitch range, which tends to be wider or reset.[8] These prosodic strategies emphasise the newness of the propositional content. Conversely, the conclusion of a discourse topic is marked by a falling intonation contour produced into a compressed pitch range. In this respect, data collected by Riou (2017) pertaining to the analysis of American English conversations, show that the opening of a new topic was marked by an increase of f0max, f0 median and register span.[9] According to these scholars, these phonetic cues could be deemed as good predictors of a topic change.

The study of the prosodic influence on the construction of turn-taking conversation also yielded interesting findings. In this regard, Couper-Kuhlen (2012) analysed informal interac-

[7] In addition, it is worth noting that the material analysed in most of these studies is not uniform, as they considered controlled and spontaneous speech.

[8] There is extensive literature available on this subject; we suggest readers refer to various sources including, among others, Nakajima/Allen (1993); Ayers (1994); Swerts/Bouwhuis/Collier (1994); Zellers/Post (2012); Zellers (2013); Zellers/Odgen (2014); Sicoli et al. (2015).

[9] Frequency variations were evaluated with respect to the median f0 calculated for each participant and reported as percentage; for a more detailed discussion of this aspect refer to Riou (2017).

tions in American English extracted from radio programmes' calls, highlighting how prosody should be examined from an interactional perspective, in which the context and the construction of the turn play a relevant role in the organisation of the intonation contour. In particular, the author found that a high initial intonation at the beginning of a turn suggests that the speaker intends to continue speaking, whereas a low onset in the turn-initial position implies less important information and serves as a kind of introduction. Within the framework of interactional linguistics, Bergmann (2018) examined the interplay between the rise-fall intonation contour, commonly found in declarative sentences in Cologne German, and its role in turn-taking. In a parallel way, perceptual tests proved that speakers used rising intonation to signal the end of turns (cf. Schaffer 1983) or discourse boundaries (cf. Swerts/Geluykens 1994).

Some studies examined the correlation between intonation patterns and the role of questions in discourse. In this vein, Hedberg/Manemi (2010) and Hedberg et al. (2010) investigated whether the realisation of the nuclear intonation contour of wh-questions was conditioned by specific pragmatic dimensions. To this purpose, 200 wh-questions in American-English were categorised into several binary categories. The first group of features assessed the propositional content of questions using five pragmatic dimensions, namely: 1) information-seeking (IS), floor passing (FP), 3) topic changing (TC), 4) interruption of the flow of an active dialogic turn, with or without overlapping (INT), 5) given propositional content (IR). Nine dialogic parameters categorised the questions in the second group of dimensions, addressing both the management of the topic (topic initiator, return to old topic, with or without floor deferring), elaborative detail (ED), and the pragmatic function of the question (rhetorical, clarification, reciprocal or supplementary information questions).

Although multiple factors were considered, the results did not allow for a conclusive interpretation. Regardless of the classification conditions, the wh-questions generally show a falling nuclear contour (81%), displaying primarily high-fall configurations (cf. Hedberg et al. 2010), while rising intonation is more common in questions that require additional information or clarification.

There is still much work to be done in this research area. Most studies focused on the English language, leaving a gap in the comparison of these features. Additionally, language-specific prosodic strategies have not yet been identified. In Italian, there is a lack of exploration of the discussed indices relating to intonation in questions, highlighting the need for further insights.

3 The research

3.1 Aims

This study aims to investigate the relationship between the intonation contours of wh-questions and particular conversational factors. Our preliminary focus is on discourse topic and conversational turn dimensions, which are linked to the epistemic modality of the questioning speech acts. Two research hypotheses are considered. The first suggests that the introduction of a new topic raises the pitch contour of questions by increasing their perceptual salience, in both initial and final levels as well as in the overall pitch range. This contrasts with

what occurs in questions formulated around a previously mentioned topic. As a consequence, we expect reduced pitch values in questions that do not introduce a new topic.

With regard to the dynamics of speaking turns in conversation, the research hypothesis posits that when the speaking turn is passed to someone else, individuals use intonation cues to signal the beginning or the end of their turn. The research intends to examine whether intonation employed in turn taking differs based on the kind of question being asked.

In both conversational dimensions, topic change and turn-taking are expected to be influenced by the epistemic value of the questions being asked.

3.2 Classification criteria

Given the range of forms provided by the epistemic orientation, we categorised questions by examining only two levels: information-seeking questions [+IS], and questions that do not expect genuine information [-IS].

The first group comprises questions aimed at obtaining unknown information; they have an epistemic degree of ignorance [-K] and are formulated in an initial state of unawareness. The range of potential answers is wide, since the addressee has no expectation of the answer he will receive; for instance in the questions:

(2) *When does the train leave?*
→ the speaker is aware that the train will depart but does not know the departure time.

Differently, in the second scenario, the addressee possesses some prior knowledge about the response he will receive. Consequently, these questions are classified as oriented, since they already imply a certain level of expectation towards the answer. Such questions exhibit bias as they begin from a stance of uncertainty rather than ignorance. In this group we included clarifying seeking wh-questions (CSQs) and rhetorical questions (RQs). The former type is identified by an assumption of partial knowledge [+pK], as they do not require new information. Their purpose is rather to request clarification or the repetition of something discussed:

(3) *What time did you say the train was leaving?*

These questions often express surprise (counter-expectation meaning) or indicate a lack of understanding (unheard meaning). Most of the time, they may be interpreted as echo questions. This type of questions can either front the wh- word (4a) or maintain it *in situ* (4b) like in French.

(4a) W*hen does the train leave?*
(4b) *Jean a invité qui?* 'Who did Jean invite?'

On the other hand, rhetorical questions show the lowest epistemic level, since they are based on the assumption of complete knowledge [+K], for instance:

(5) *What time do you want the train to leave?*

These non-prototypical questions feature the surface structure of an interrogative speech act, but express emphatic assertion. Moreover, it should be noted that rhetorical questions do not provide new information, unlike assertions, nor do they aim to elicit a response, unlike inter-

rogatives. Thus, usually no verbal response follows, since the speaker and the addressee already implicitly know what has been said.[10] RQs are indirect speech acts that express an obvious and barely informative meaning (among others, Ilie 1994; Gutiérrez Rexach 1998; Rohde 2006).

As far as the topic is concerned, the questions have been split into two categories: 1) questions that change the topic under discussion and 2) questions that do not. We identified a shift in topic whenever participants introduced a new subject of discussion (Topic Change, [+ TC]); otherwise, we identified the lack of topic change [-TC] when the question extends the topic under discussion or returns to a topic that was previously introduced in the conversation.

Finally, regarding the dialogic turn, we distinguished between questions that allow the listener to respond (Floor Passing, [+FP]) and those that do not [-FP]. The former is common in spontaneous conversation where the speaker expects a reply.

Nevertheless, in certain contexts, questions do not activate a floor passing [-FP]. This happens when the turn is interrupted, as the examples (6) and (7) show; the overlapping part is enclosed in square brackets. In the first of these, the question was asked before the speaker's turn ended, while in the second example, another participant interrupted the turn. These situations were not taken into consideration because the interruption does not allow the intonation of the questions to be analysed.

(6) A: *Devo seguire il corso se voglio* [*prepararmi bene*]
'I need to enrol on the course to be [well- prepared]'
B: [*Ma quando] inizia questo corso?*
'[But when] does this course start?'

(7) A: *Ma cosa devo mettere* [*in valigia?*]
'But what should I [pack?]'
B: [*Non dimenticare*] *le pantofole!*
'[Don't forget] the slippers!'[11]

The second condition [-FP] is usually expressed by rhetorical questions. As mentioned above, they contain minimal epistemic knowledge and are typically not asked with the intent of receiving an explicit response.

It is worth noting that all questions being discussed have distinct characteristics, as evidenced in Table 1.

[10] In certain cases, the RQs are followed by an explicit answer which is, however, not informative but self-evident (cf. Ilie 1994; Rohde 2006).

[11] The examples are taken from the corpus under consideration.

QUESTIONS	Information status	Epistemic stance	Discourse topic	Floor Passing
ISQs	[+IS]	[-K]	[±TC]	[+FP]
CQs	[-IS]	[+pK]	[-TC]	[+FP]
RQs	[-IS]	[+K]	[-TC]	[-FP]

Table 1: Pragmatic features of questions

For instance, rhetorical questions are marked as [-IS], since they do not intend to obtain new information; such questions do not change the argument [-TC] and do not allow for a response [-FP]. Differently, clarification questions exhibit an epistemic position of partial knowledge [+pK] and consistently allow the speaker to reply [+FP]. This is because they seek to confirm already known information, which is essential to move the conversation forward.

3.3 Materials and participants

The study analysed 222 wh-questions (ISQs: 64.3%, CQs: 11.9%, RQs: 23.8%) extracted from a corpus of spontaneous conversations produced by individuals from the city of Bari and its surrounding areas. The conversations covered a range of general topics, including university life, travel and employment experiences, as well as current urban issues. The dialogues were audio recorded in a private setting, during informal gatherings arranged by the participants. They were informed that they were being recorded, but not of the purpose, and all gave their consent. All participants (8 in total), both males and females, were between the ages of 22 and 42 and held either a high school or university degree, or were currently enrolled in a university programme. They were all previously acquainted with one another. Noisy or unintelligible parts of the audio signal were excluded from the analysis. The collection of spontaneous material allowed the analysis of uncontrolled linguistic data. However, it prevented the monitoring of the sample inputs, which revealed inter-variable differences in both the syntactic structure of the questions and the frequency of wh-words.

3.4 Procedure

Questions were annotated for both intonation configurations and pragmatic dimensions. Three groups of questions were considered: 1) information-seeking questions (ISQs), 2) clarification questions (CQs), and 3) rhetorical questions (RQs). Each type of question was annotated with its nuclear intonation contour (pitch accent and boundary tone). The intonation contours were evaluated using PRAAT software after the f0 curve was extracted. Three separate text grids were created: one for transcribing the text of question, and the others for annotating the intonation and the conversation variables. The phonological annotation of the distinct tonal events followed the standardised guidelines of the ToBI model (cf. Beckman/Ayers Elam 1997; Ladd [2]2008). Questions [±IS, ±TC, ±FP] were indexed with the nuclear pitch accent and boundary tone to assess to what extent the distribution of intonation configurations was influenced by the pragmatic dimensions under consideration. For each typology, measurements were taken for the f0 mean ($f0_x$), f0 maximum ($f0_{max}$), f0 minimum ($f0_{min}$), f0 onset ($f0_{onset}$) f0 offset

($f0_{offset}$) and pitch range (PR).[12] The frequency values were converted into semitones (ST) in order to neutralise gender-conditioning. The statistical differences were tested by means of a Mixed-Effects Logistic Regression Model with question types as fixed variable and tonal configurations as factors (SPSS Statistics, ver. 20.0).

4 Results

4.1 General data

Preliminarily, it is helpful to present some information concerning the structure of the corpus. In total, 65.9% of wh-questions are [+IS], whereas the remaining 34.1% consists of [-IS] questions. As for the topic, 41.6% of questions cause a topic change [+TC], among these 89.9% are [+IS]. This means that a significant proportion of the questions are centred on an already active topic that is accessible to the participants, as mentioned in the previous dialogue turns. In this respect, it is worth noting that in the total sample, questions marked as [+IS/+TC] account for 38.2%, while [+IS/-TC] questions account for 27.6%. At the same time, [-IS/+TC] questions cover 4.2%, unlike by [-IS/-TC] questions which cover 29.9%.

Regarding the dynamics of dialogical turns, the most common type involves wh-questions that give the floor to the listener; these questions make up at least 73.7% of cases, with 88.2% of them [+IS]. However, only 5.2% of this category includes interrupting questions.

The findings reproduce the standard pattern of questioning that requires a sincere exchange of knowledge between speaker and the recipient. A verbal response is essential for the questioning process to be carried out effectively. It is interesting to note that, except for two cases, all wh-questions labelled [–FP] are also [–IS]. These are either clarification questions or rhetorical questions. The latter are often characterised by a veil of irony and are usually followed by an implied answer rather than a verbal response (cf. Ilie 1994; Rohde 2006; Sorianello 2022).

4.2 The final intonation contour

The results of the intonation analysis prompt reflection. First, if we look at the questions without categorising them on the basis of dialogue indices, two different patterns emerge, as shown in Figure 1. Clarification questions show a clear preference for rising intonation (CQs/RQs: ß = 1.51, SE = 0.44, z= 19.62, p= 0.00; CQs/ISQs: = 2.02, SE = 0.39, z= 26.24, p= 0.00), whereas rhetorical questions exhibit a high percentage of falling contours, (CQs/RQs: ß = 0.76, SE = 0.51, *z*= 2.25, *p*= 0.039). In particular, clarification questions display an increase in the f0 curve that affects the last unstressed syllables (H%), while in other

[12] The onset pitch has been variably measured. Some studies detected onset level on the first syllable, which is often unstressed, or in the first 30/50 ms of the f0 curve. Following Sicoli et al. (2015), we chose to measure the onset pitch on the first prominent syllable of the question. This allowed us to better standardise the data, as many questions in our sample begin with a stressed syllable rather than an unstressed one.

cases, the fundamental frequency (f0) remains constantly high without relevant variation (LH% or HL%).[13]

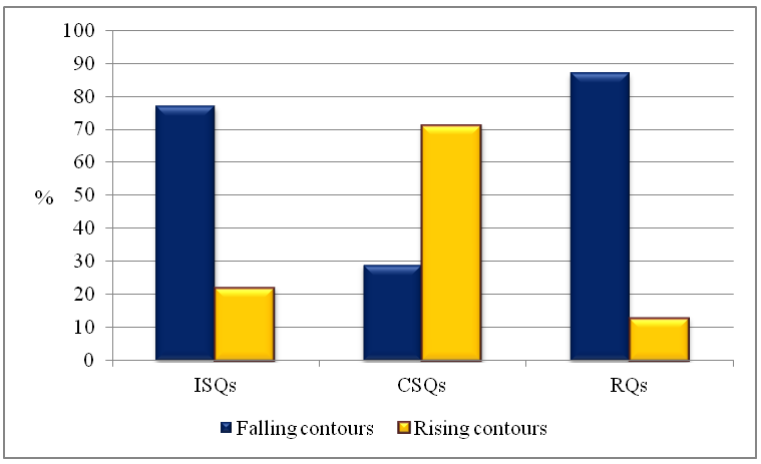

Figure 1: Percentage values of falling and rising final intonation contours

Sometimes, the rise begins from the final stressed syllable and continues on high frequencies throughout the final unstressed syllables. Other times, in rhetorical questions f0 exhibits a falling contour that corresponds to the final unstressed syllables (RQs/ISQs: ß = 0.934, SE = 0.71, *z*= 1.675, *p*= 0.619). The effect of the style on intonation is significant. Previous research on the Italian language spoken in Bari revealed evidence to support this claim. The results indicated that wh-questions tended to have a final rising intonation when read (cf. Gurrado 2021), but a falling contour when uttered spontaneously (cf. Sorianello 2023a). There is no notable change in the intonation pattern when evaluated in relation to the modification or retention of the discourse topic [+ TC/- TC], as can be seen by the values displayed in Figure 2. In both pragmatic dimensions, the falling patterns prevail, with similar rates.

Cross-referencing the data with the category of epistemic degree, reveals that the choice of topic does not significantly affect the final intonation contour for [+IS] questions, regardless or whether the topic is maintained or changed (ß = 0.315, SE = 1.012, *z*= 0.97, *p*= 0.756), which is also indicated by the similar values calculated for the $f0_{offset}/f0_{x}$ ratio [p= 0.885]. Presumably, the evaluation of the intonation contour alone is not enough to capture any potential variation caused by a shift in topic.

The situation differs for [-IS] questions in which a topic change [+TC] leads to a higher percentage of rising patterns. It is worth observing that, due to their pragmatic and informative nature, clarification and rhetorical questions always relate to an open or inferentially accessible topic.

[13] All comparisons are statistically significant, with the exception of the rate of falling contours in ISQs and RQs (ß = 0.93, SE = 0.72, z= 000, p= 0.19).

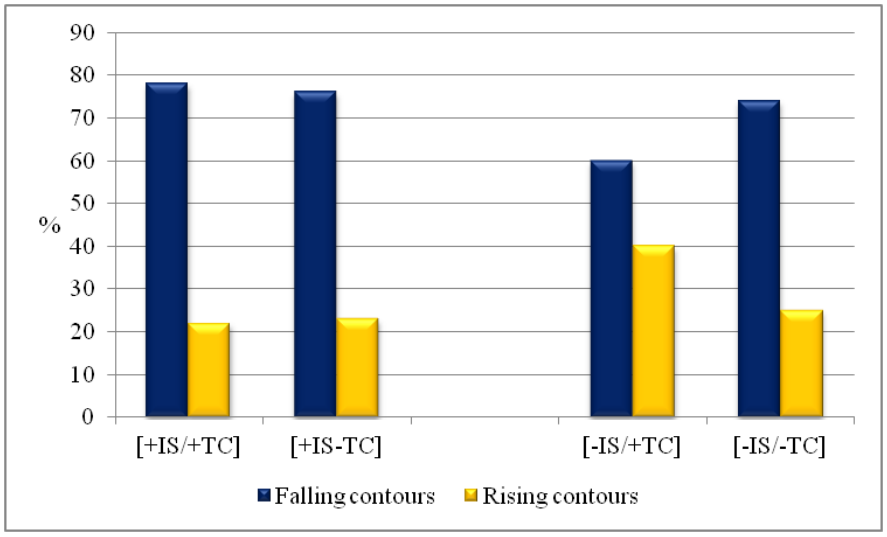

Figure 2: Percentage values of rising and falling final intonation contours with respect to the index [±TC]

On the other hand, the pragmatic dimension associated with the dialogue turn seems to be a critical issue. With specific reference to the final intonation, the comparison between [+FP] questions and [–FP] questions shows some differences. In both subgroups, a falling contour is prevalent, but the percentage rate of rising and falling contours differs (Figure 3). In fact, [+IS/+FP] questions exhibit a lower incidence of falling contours compared to [+IS/-FP] questions. Conversely, [+IS/-FP] questions demonstrate a higher percentage of rising contours. In certain contexts, rising intonation can be utilised as a strategy, albeit not the exclusive one, to encourage a shift in dialogue and amplify the listener's engagement. Such rising patterns perceptually indicate an openness and continuation in the discussion. In parallel, [-FP] questions, in both [+IS] and [-IS] dimensions, show a tendency towards concluding with a falling intonation. The [+IS/-FP] condition only occurs when there is more speech material or another question immediately following a genuine question. It also applies when a speaker interrupts the question, thereby avoiding any space for an answer. Conversely, the [-IS/-FP] condition mainly encompasses rhetorical questions which generally have a falling contour.

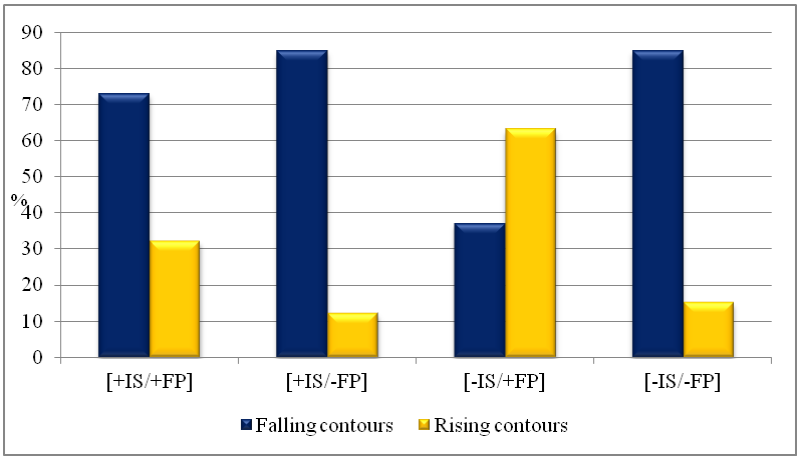

Figure 3: Percentage values of rising and falling final intonation contours with respect to the index [±FP]

These findings should not be viewed in isolation. Upon cross-analysis of the data, a clear correlation between the transfer of the wh-question turn and its epistemic degree was observed. The analysis revealed that almost all questions that did not transfer the turn were oriented questions (96.4%). Few cases of questions with [+IS/–FP] features were found, indicating significant implications for the distribution of the intonation contours. Rhetorical questions, marked as [–FP], generally increase the frequency of falling contours, whilst clarification questions, identified as [+FP], raise the percentage of rising contours within their subset.

4.3 The initial pitch contour

The shift in topic has only a limited impact on the selection of the final intonation contour, while the passing of the dialogic turn has almost no effect. We questioned whether these pragmatic dimensions had a more significant effect on the initial f0 curve.[14] To this end, we examined the potential effect of pragmatic factors on $f0_{onset}$ and $f0_{offset}$ values in relation to the average f0 value. The outcome indicates that a topic change condition leads to a higher $f0_{onset}$, suggesting greater sensitivity of the initial f0 curve to this parameter. However, it was impossible to carry out this validation for all question categories. The optimal situation pertains to ISQs, as they are the only ones that can generally shift the topic and give the floor [±TC/+FP]. Conversely, CQs do not change the topic, but always enable the speaker to reply [-TC/+FP], while RQs neither change the topic nor wait for an answer [-TC/-FP]. According to the values reported in Figure 4, a shift in topic seems to have a greater impact on the initial contour of the ISQs than on the final one ($p = 0.0008$). Furthermore, the $f0_{onset}/f0_x$ ratio, which always has a negative polarity, shows a higher value when the conversation topic changes, demonstrating that the onset of the f0 curve is more prominent in such cases.[15] On the contrary, the $f0_{offset}/f0_x$ ratio shows no relevant differences in the two conditions examined, thereby affirming that the final intonation contour was marginally influenced by a change of topic.[16]

[14] Sicoli et al. (2015) showed that the initial pitch detected on the first prominent stressed syllable of questions extracted by spontaneous conversations in ten languages may distinguish questions with different social actions, i. e. information-seeking versus confirmatory or evaluative questions, although a certain language-specific influence appeared.

[15] The $f0_{onset}/f0_x$ ratio generally yields a positive value, suggesting that the onset value is higher than that of $f0_x$, with few exceptions. On the contrary, the negative value of $f0_{offset}/f0_x$ indicates that the offset is lower than that of $f0_x$.

[16] We only considered questions that give the floor, [+FP], adhering to the typical situation for ISQs.

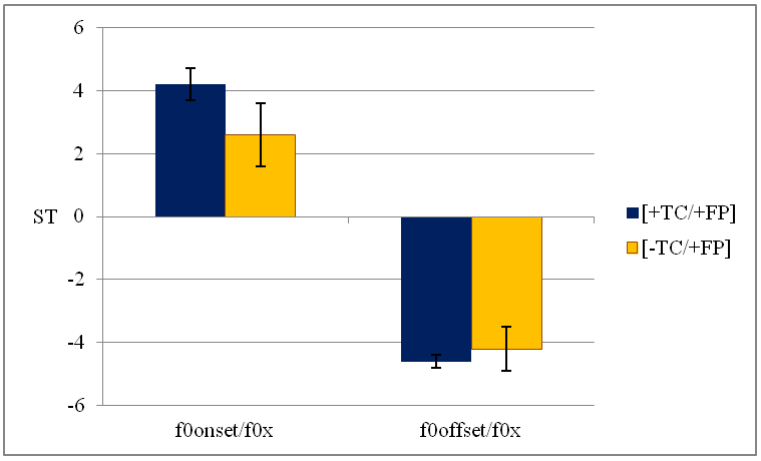

Figure 4: $f0_{onset}/f0_x$ and $f0_{offset}/f0_x$ Ratio (ST) for ISQs. In brackets the standard deviation values

This trend is further supported by the values in the pitch range (Figure 5). As it appears in the data concerning ISQs, the global pitch range increases (+3 ST, sdev 1.2) when the question undergoes a topic transition.[17] This pragmatic dimension affects the overall intonation contour of the utterance, raising the tonal level not only in assertive sentences, as already reported in some studies, but also in questions. It is noteworthy that both CQs (p= 0.022) and RQs (p= 0.016) display a narrower pitch range than ISQs. There are different reasons why this happens: in CQs, the f0 curve is realised at high frequencies and the f0 minimum is not reached at the end of the question, due to a final rising intonation contour. Other phonetic indices, including pitch range, $f0_x$ and intensity contribute to conveying an amplified meaning, commonly indicating disagreement, surprise or misunderstanding, that aligns with the function of the interrogative act and contains a call to address. Conversely, RQs exhibit a compressed pitch range, as they are final falling and frequently show a final flat intonation that restricts the f0 curve's range.

In summary, according to the results of this study, we can assume that topic change has a greater impact on the initial pitch of questions, but it does not significantly affect the choice of final intonation patterns, even when the questions are evaluated from the perspective of epistemic modality. When a new topic is introduced, ISQs exhibit a wider pitch range, a rise at the onset of the intonation curve and an increased prominence of the phrase containing the wh-word, but not in the final contour. This trend is confirmed by the results regarding the ratios measured for the three question groups, as shown in Figure 6.

[17] The comparison with data reported in other studies requires a degree of caution, as different methods were utilised. In this regard, Nakajima/Allen (1993) and Zellers (2013) examined register levels and span values of sentences in which the topic shifted, in comparison with the values measured for previous turns. Differently, Sicoli et al. (2015) and Riou (2017) evaluated the changes in initial pitch, with reference to the median f0 value obtained for each speaker, reporting the frequency variations as percentage.

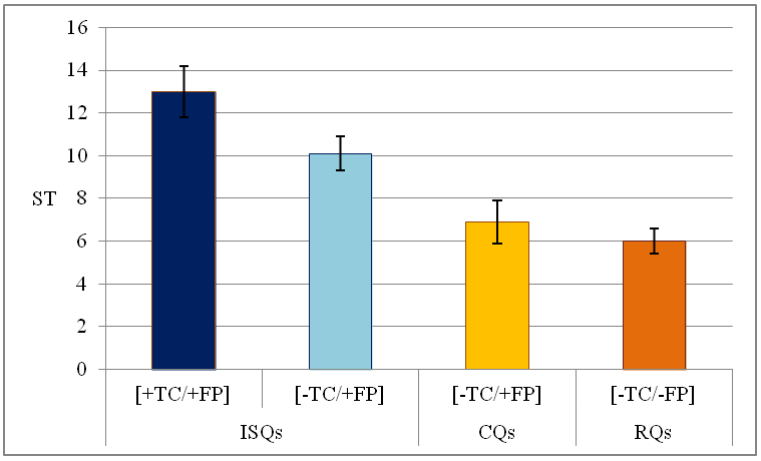

Figure 5: Pitch Range (ST) for ISQs, CQs and RQs in the pragmatic conditions indicated. In brackets the standard deviation values

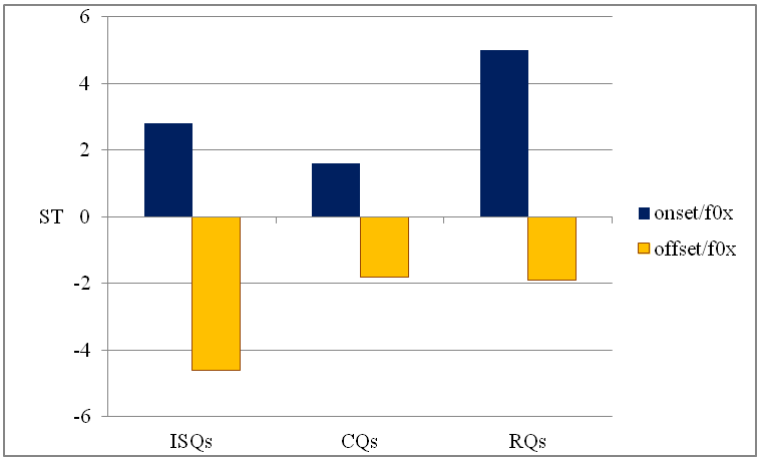

Figure 6: $f0_{onset}/f0_x$ and $f0_{offset}/f0_x$ Ratio (ST) for each question types

Regardless of the pragmatic categorisation of the questions, in CQs both $f0_{onset}/f0_x$ and $f0_{offset}/f0_x$ are low because the intonation curve tends to be produced on a high f0 register, which is why they remain closer to $f0_x$. In RQs, the distance in ST between $f0_{offset}$ and $f0_x$ is reduced, due to the presence of a final falling pattern, while the beginning of questions is generally prominent, as shown by the $f0_{onset}/f0_x$ ratio, an opposite situation with respect to ISQs.

4.4 The nuclear configurations

Let us now examine how these indices align with the nuclear configuration of the questions, specifically the sequence determined by the linear progression of the nuclear pitch accent and boundary tone. The data allows us to understand both the direction of the intonation contour (falling/rising), and the most prevalent nuclear typology. By examining the nuclear contour of questions, recurring patterns can be identified. With regard to ISQs, we considered the intonation contours of the two most common combinations: [+IS/+TC/+FP] and [+IS/-TC/+FP]. They were found in 57.2% and 41.5% of cases, respectively. There is some variation in the results: various nuclear patterns were detected, but numerous contours were below the minimum threshold and therefore exhibited scarce representation (see Figure 7).

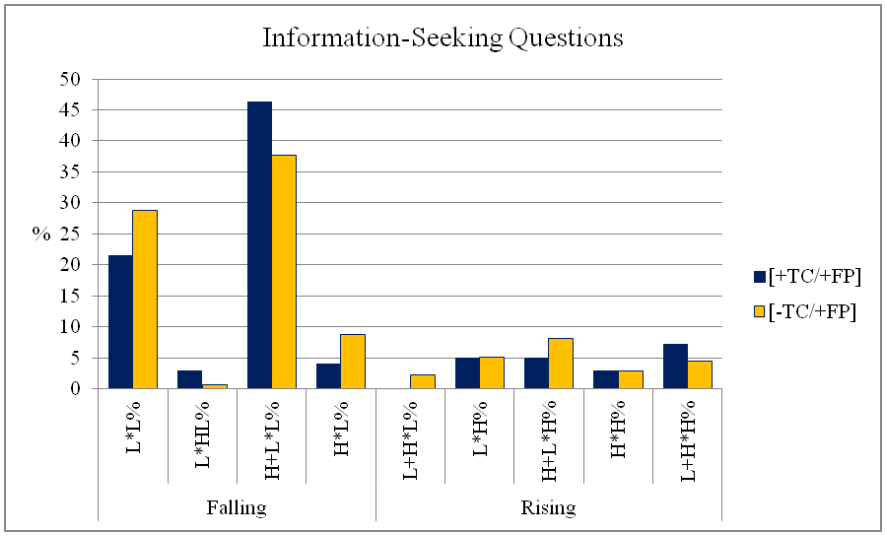

Figure 7: ISQs: percentage values of the nuclear configurations related to [+IS/+TC/+FP] and [+IS/-TC/+FP] questions

No significant differences were found; falling pitch accents are always followed by low boundary tones, irrespective of the conversational dimensions considered. As a result, the shift of turn is nearly neutralised, as all ISQs are produced with the aim of eliciting a response from the addressee, with a few exceptions due to the interruption of the turn. Overall, the rate of falling nuclear patterns is 74% (all types) when questions are annotated as [+TC]. In the [–TC] condition, the rate slightly rises to 77.3%. The two most prevalent nuclear structures are the H+L* L% and the L*+L% patterns. All things being equal, the low contour (L*L%) dominates in [-TC/+FP] questions, while the H+L*L% configuration is common in [+TC/+FP] questions.

In contrast to ISQs, rising nuclear patterns, specifically L+H*H% and H*H%, prevail in CSQs (73%) as shown in Figure 8. Typically, the intonation of these questions, always specified as [-IS/-TC/+FP], involves a f0 rise that starts from the final stressed syllable and extends to the end of the utterance (see Figure 9).

Unlike in CSQs, in RQs, which are classified as [-IS/-TC/-FP], the rising patterns are only occasionally documented (Figure 10). RQs show a consistent intonation pattern, primarily characterised by a falling contour (87.4%). The most common nuclear configuration is H+L*L%, frequently accompanied by the downstepped high accent (!H+L*L%). This contour consists of an f0 peak placed on that spreads over the whole of the nuclear syllable until the end of the question (Figure 11). The L*L% configuration is also present. This is a flat intonation pattern without prominence produced with a narrower pitch range. In our corpus, only a small percentage of RQs receive a verbal response from the addressee. In this case, there appears to be a mismatch because the person asking the question does not expect an answer, but the addressee provides one. So, the RQs cannot be considered proper floor-passing questions. In any case, rhetorical questions that receive a verbal response appear to have a compressed pitch range shifted to high frequency and a more frequent rising intonation pattern. This aspect requires further investigation in the future.

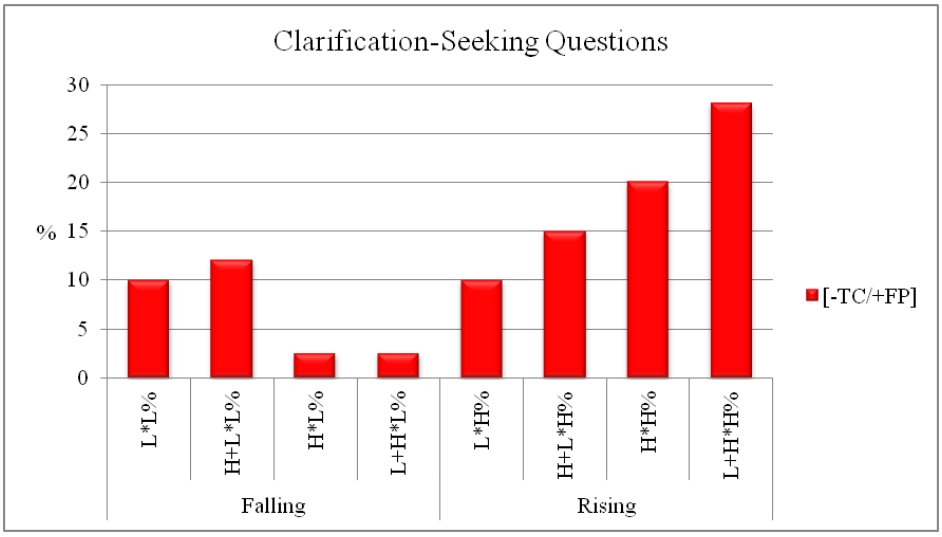

Figure 8: CSQs: percentage values of the nuclear configurations (falling/rising) related to [-IS/-TC/+FP] questions[18]

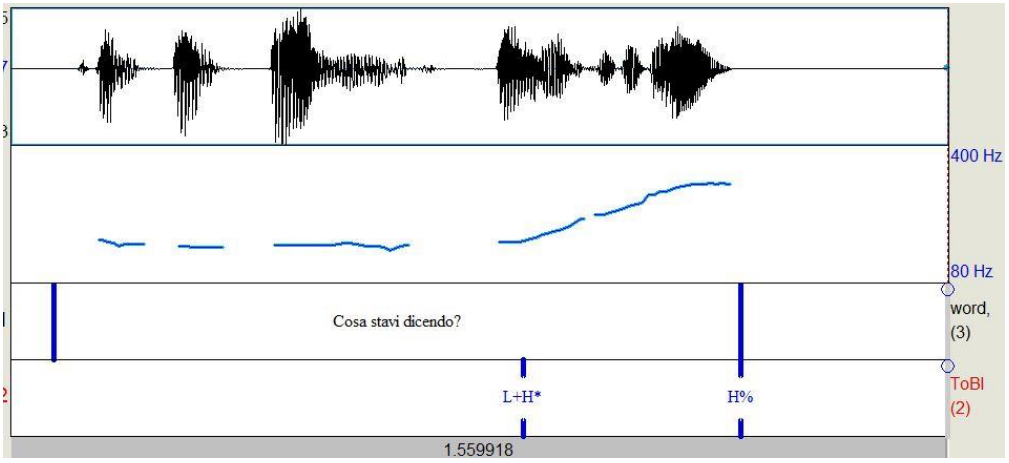

Figure 9: Waveform, f0 curve of the clarification question *Cosa stavi dicendo?* ('What were you saying?') produced by a female speaker

[18] The percentage values were calculated based on the entire sample of questions grouped by type, irrespective of their final contour.

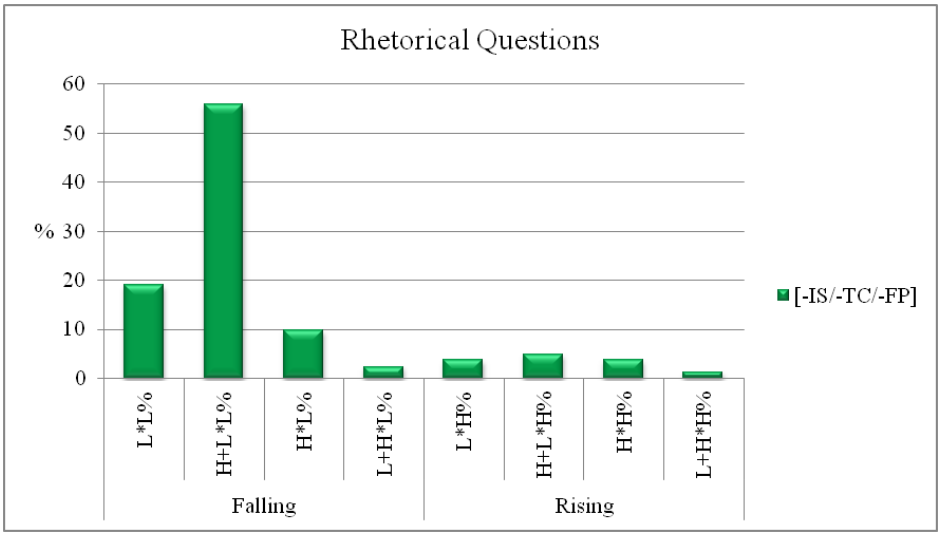

Figure 10. RQs. Percentage values of the nuclear configurations related to [-IS/-TC/-FP] questions

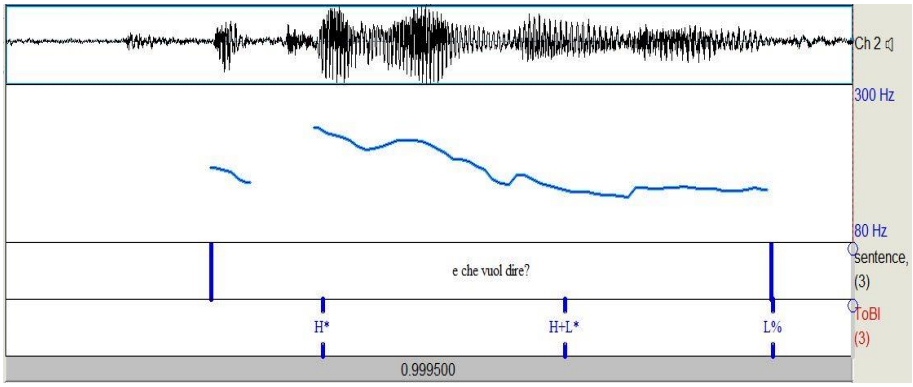

Figure 11. Waveform, f0 curve of the question *E che vuol dire?* ('What does that mean?') produced by a male speaker

5 Discussion

This research provided new insights into the intonation of wh-questions, by analysing a corpus of spontaneous speech. The study aimed to examine whether particular conversational factors, such as the topic [±TC] and management of the dialogic turn [±FP], affect the intonation contour of wh-questions produced in real-life conversations. The study offers valuable insights. First of all, it should be noted that the epistemic degree of the questions had an impact on the choice of the pragmatic dimensions considered: CQs and RQs are all produced on an already mentioned topic, but they differ in the way the floor of dialogue is passed, the former being specified as [+FP], while the latter as [-FP]. Secondly, the research reveals that the selection of the intonation patterns was differently influenced by the two conversational parameters: turn and topic management. Specifically, the change in topic, [+ TC], had little effect on the realisation of the final intonation contour, but it did lead to a higher onset of the contour and a wider pitch range of questions, which supports the first research hypothesis. Thus, based on the findings of this study, we can assume that the prosodic signal of a topic shift is conveyed by the initial syllables in a question; this aspect is noteworthy as wh-questions often display a prominent onset caused by the interrogative word in the first posi-

tion. It is a sound strategy that transmits to the participants in the communicative scene an alert signal about the change of topic that is taking place in the dialogue. The topic change relates to a semantic variation that concentrates on new components of conversation, which cannot be retrieved in the preceding discussion and therefore has great significance. For this reason, the topic shift, which is already significant because it introduces a new cognitive focus, is used to convey relevant or new information. This is reflected in the prosody, by the way of causing an increase in both onset level and pitch range. According to our data and with regards to the questions, only the initial part of the intonation contour shows the effects of a topic change, whereas the final pattern does not exhibit substantial variations in the two conditions analysed [+ TC] and [- TC]. It is reasonable to assume that many meaningful aspects of a communicative act are conveyed at the beginning of an utterance, rather than at its end. To the best of our knowledge, we could not find any Italian language studies for comparison with our data. A falling intonation contour is commonly used to indicate the end of a topic, while an increase in the f0 onset and register span is used to signal the start of a new topic (cf. Zellers/Post 2012 Riou 2017). However, it is important to note that the available studies on this subject often examine the effect of topic change on intonation in assertive sentences rather than in questions.

In our research, the dynamics related to maintaining or transferring the dialogical turn did not lead to a significant polarisation of the intonation contours. Instead, there was only a slight increase in the ISQs of the percentage of rising terminal contours. However, the interrogative typologies cannot be considered equivalent. In their typical function, questions entail transferring the dialogic turn. Thus, it is not necessary, at least in theory, to signal the passing of the floor by selecting the shape of the final intonation contour. This situation is balanced by RQs, fictitious questions with a presupposed content which do not require an explicit verbal answer and, consequently, at least in the speaker's intention, do not give up the turn [-FP], making them the least typical of the interrogative speech acts. RQs form a more homogeneous group in terms of intonation, usually ending with a final falling contour that often sounds rather flat. Their pitch range is compressed (- 4 ST) and the final syllables are clearly lengthened (cf. Sorianello 2023b), a phonetic condition in line with the sense of obviousness of these questions.

Conversely, the parameter concerning the turn-taking [+ FP] only led to a small increase in the percentage of rising contours, without having a significant effect on the value of the initial pitch of the intonation curve or the tonal excursion. Accordingly, the research hypothesis was not confirmed. The typology of the sentences examined may have influenced this result. In questions involving a lack of knowledge, the conversation floor is, in fact, a crucial prerequisite for the effective pragmatic accomplishment of the speech act. As a result, the change of turn does not require any specific prosodic features, in contrast to assertives. Comparison with results from other studies should only be considered as indicative, as they may be based on different languages or methodologies.[19] Nevertheless, it is assumed that speakers use prosodic cues to convey specific intonational meanings, regardless of the language. For example, a rise

[19] Some information on Bergamo Italian questions can be found in Antonioli/Moroni (2018).

in pitch, including both median f0 and span, is a recurring feature that indicates a change of topic within the discourse. This is particularly evident at the beginning of the utterance, as it intentionally emphasises that specific part of the statement. The behaviour of turn-taking appears to be a more complex process. According to the studies cited in 2.2, a rising intonation contour is a reliable indicator of dialogue turn-taking, especially for declaratives. Regarding questions, the speaker's epistemic position influences the dynamics of turn transition. ISQs and CQs always involve a floor passing, while RQs do not. This seems to affect their intonation patterns: clarification questions usually have a final rising contour, whereas rhetorical questions have a falling intonation.[20] Diversely, ISQs do not consistently follow a particular intonation pattern, suggesting that the turn-taking mechanism may not be relevant for these questions.

This research perspective is still underexplored in Italian and deserves further investigation. Additional insights could be gained, for example, by analysing different types of questions or speech acts as well as measuring other prosodic parameters.

References

Alfano, Iolanda (2019): *Methodological and practical issues in studying intonation. The case of requests in Italian and Spanish task-oriented dialogues*. Milano: Officinaventuno. (= Studi AISV 5). aisv.it/StudiAISV/2019/vol_5/AISV_5_Monografie_Alfano.pdf. [21.04.2024].

Antonioli, Giorgio/Moroni, Manuela Caterina (2018): "Intonazione e significato: l'esempio dell'italiano regionale di Bergamo". *Romanistisches Jahrbuch* 69/1: 35–55.

Asher, Nicholas (2004): "Discourse topic". *Theoretical Linguistics* 20: 163–201.

Ayers, Gayle M. (1994): "Discourse functions of pitch range in spontaneous and read speech". *OSU Working Papers in Linguistics* 44: 1–49. kb.osu.edu/server/api/core/bitstreams/0ef6efcb-6954-5f53-8e85-9369c1ae2456/content. [21.04.2024].

Bartels, Christine (2014): *The intonation of English statements and questions: A compositional interpretation*. New York, London: Routledge.

Beckman, Mary E./Ayers, Elam Gayle (1997): *Guidelines for ToBI labelling*, version 3.0. The Ohio State University Research Foundation. ling.ohio-state.edu/research/phonetics/E_ToBI/ [21.04.2024].

Bergmann, Pia (2018): "Prosody in interaction". *Linguistik Online* 88, 1/18: 11–32. doi: 10.13092/lo.88.4188.

Beyssade, Claire/Marandin, Jean-Marie (2006): "The speech act assignment problem revisited: disentangling speaker's commitment from speaker's call on addressee". *Empirical Issues*. *Syntax and Semantics* 6: 37–68. cssp.cnrs.fr/eiss6/beyssade-marandin-eiss6.pdf [21.04.2024].

Bolinger, Dwight L. (1978): Intonation across languages". In: Greenberg, Joseph H./Ferguson, Charles A./Moravcsik, Edith A. (eds.): *Universals of human language.* Vol. 2 *Phonology*. Stanford, Stanford University Press: 471–524.

[20] This trend is supported by other studies (Hedberg et al. 2010; Gili Fivela et al. 2015; Sorianello 2023b).

Chen, Aoju (2012): "Shaping the intonation of WH-questions: information structure and beyond". In: De Ruiter, Jan P. (ed.): *Questions: Formal, functional and interactional perspectives*. Cambridge, Cambridge University Press: 146–164.

Cornillie, Bert (2009): "Evidentiality and epistemic modality: On the close relationship of two different categories". *Functions of Language* 16/1: 44–62.

Couper-Kuhlen, Elizabeth (2001): "Intonation and discourse: Current views from within". In: Schiffrin, Deborah/Tannen, Deborah/Hamilton Heidi E. (eds.): *The handbook of discourse analysis*. Oxford (UK), Blackwell: 13–47.

Couper-Kuhlen, Elizabeth (2012): "Some truths and untruths about final intonation in conversational questions". In: De Ruiter, Jan P. (ed.): *Questions: Formal, functional and interactional perspectives*, Cambridge, Cambridge University Press: 123–145.

Frota, Sonia/Prieto, Pilar (eds.) (2015): *Intonation in Romance*. Oxford: Oxford University Press.

Gili Fivela, Barbara et al. (2015): "Intonational phonology of the regional varieties of Italian". In: Frota, Sonia/Prieto, Pilar (eds.): *Intonation in Romanc*e. Oxford, Oxford University Press: 140–197.

Gili Fivela, Barbara/Iraci, Massimiliano (2017): "Variation in intonation across Italy: The case of Palermo Italian". In: Bertini, Chiara et al. (eds.): *Studi AISV 3, Fattori sociali e biologici nella variazione fonetica*. Milano, Officinaventuno: 167–188.

Grice, Martine/Savino, Michelina (2003): "Map tasks in Italian: Asking questions about given, accessible and new information". *Catalan Journal of Linguistics* 2: 153–180.

Grice, Martine/Savino, Michelina (2004): "Information structure and questions: Evidence from task oriented dialogues in a variety of Italian". In: Gilles, Peter/Peters, Jörg (eds.): *Regional variation in intonation.* Tübingen, Niemeyer: 161–187.

Gryllia, Stella/Baltazani, Mary/Arvaniti, Amalia (2018): "The role of pragmatics and politeness in explaining prosodic variability". In: Klessa, Katarzyna et al. (eds.): *Proceedings of the 9th International Conference on Speech Prosody,* 13–16 June 2018, Poznań (Poland): 158–162.

Gurrado, Glenda (2021): *La prosodia della frase esclamativa italiana. Il ruolo di specifici tratti sintattici e semantici tra produzione e percezione*. PhD Thesis, University of Bari (Italy).

Gutiérrez Rexach, Javier (1998): "Rhetorical question, relevance and scales". *Revista Alicantina de Estudios Ingleses* 11: 139–155.

Hedberg, Nancy/Mameni, Morgan (2010): "The semantic function of rising wh-questions". *Meeting of Semanticists Active in Canada* (MOSAIC 2).1 June 2010, McGill University, Montreal.

Hedberg, Nancy et al. (2010): "The prosody and meaning of wh-questions in American English". *Proceedings of the 5th International Conference on Speech Prosody.* 11–14 May 2010, Chicago. sprosig.org/sp2010/papers/100045.pdf. [21.04.2024].

Heritage, John (2014): "Epistemics in conversation". In: Sidnell, Jack/Stivers, Tanya (eds.): *The Handbook of Conversation Analysis*. Boston, Wiley Blackwell: 370–394.

Hirschberg, Janet/Grosz, Barbara (1992): "Intonational features of local and global discourse structure". *Proceedings of 5th workshop on speech and natural language,* Stroudsburg, PA: Association for Computational Linguistics: 441–446. doi: 10.3115/1075527.1075632.

Ilie, Cornelia (1994): *What else can I tell you? A pragmatic study of English rhetorical questions as discursive and argumentative acts*. Stockholm: Almqvist & Wiksell International. (=*Stockholm Studies in English.* Vol. 72).

Krifka, Manfred (2015): "Bias in commitment space semantics: Declarative questions, negated questions, and question tags". *Semantics and Linguistic Theory* 25: 328–345.

Ladd, D. Robert (^{2}2008): *Intonational phonology*. Cambridge University Press, Cambridge.

Marotta, Giovanna (2001): "I toni accentuali nelle interrogative aperte (wh-) dell'italiano di Lucca". In: Bettoni, Camilla/Zampolli, Antonio/Zorzi, Daniela (eds.): *Atti del II Congresso di studi dell'Associazione Italiana di Linguistica Applicata*. Perugia, Guerra Edizioni: 175–194.

Nakajima, Shin'ya/Allen, James F. (1993): "A study on prosody and discourse structure in cooperative dialogues". *Phonetica* 50: 197–210.

Navarro, Hidalgo A./Cabedo Nepot, Adrián (2014): "On the importance of the prosodic component in the expression of linguistic im/politeness". *Journal of Politeness Research, Special Issue: The prosodic expression of linguistic im/politeness in Romance Languages* 10/1: 5–27.

Orrico, Riccardo/D'Imperio, Mariapaola (2020): "Tonal specification of speaker commitment in Salerno Italian wh-questions". *Proceedings of 10th International Conference on Speech Prosody*: 25–28 May 2020, Tokyo: 361–365.

Pierrehumbert, Janet/Hirschberg, Julia (1990): "The meaning of intonational contours in the interpretation of discourse". In: Cohen, Philip R./Morgan, Jerry/Pollack, Martha E (eds.): *Intentions in communication*. Cambridge, MIT Press: 271–311.

Portes, Cristel et al. (2014): "The dialogical dimension of intonational meaning: Evidence from French". *Journal of Pragmatics* 74: 15–29.

Prieto, Pilar/Borràs-Comes, Joan (2018): "Question intonation contours as dynamic epistemic operators". *Natural Language & Linguistic Theory* 36/2: 563–586.

Prieto, Pilar/Roseano, Paolo (2021): "The encoding of epistemic operations in two Romance languages: The interplay between intonation and discourse markers". *Journal of Pragmatics* 172: 146–163.

Riou, Marine (2015): "A Methodology for the identification of topic transitions in interaction". *Discours* 16. doi: 10.4000/discours.8997.

Riou, Marine (2017): "The prosody of topic transition in interaction: pitch register variations". *Language and Speech* 60/4: 658–678.

Rohde, Hannah (2006): "Rhetorical questions as redundant interrogatives". *San Diego Linguistics Paper* 2: 134–168.

Roseano, Paolo et al. (2016): "Communicating epistemic stance: how speech and gesture patterns reflect epistemicity and evidentiality". *Discourse Processes* 53/3: 135–174.

Schaffer, Deborah (1983): "The role of intonation as a cue to turn taking in conversation". *Journal of Phonetics* 11/3: 243–257.

Sicoli, Mark A. et al. (2015): "Marked initial pitch in questions signals marked communicative function". *Language and Speech* 58/2: 204–223.

Sorianello, Patrizia (2022): "Ovvietà e ridondanza della domanda retorica: dalla risposta implicata alla risposta esplicita". *Studi di Glottodidattica* 7/3: 53–62.

Sorianello, Patrizia (2023a): “Quale intonazione per le domande wh-?”. In: Castagneto, Marina/Ravetto, Miriam (eds.): *Spoken Communication 2021, La Comunicazione Parlata* (GSCP3). Rome, Aracne: 19–46.

Sorianello, Patrizia (2023b): “The intonation of rhetorical questions in Italian”. *Italiano LinguaDue* 15/2: 90–101.

Sosa, Juan M. (2003): “Wh-questions in Spanish: Meanings and configuration variability”. *Catalan Journal of Linguistics* 2: 229–247.

Swerts, Mark/Bouwhuis, Don G./Collier, René (1994): “Melodic cues to the perceived “finality” of utterances”. *Journal of Acoustical Society of America* 96: 2064–2075.

Swerts, Mark/Geluykens, Ronald (1994): “Prosody as a marker of information flow in spoken discourse”. *Language and Speech* 37/1: 21–43.

Ultan, Russel (1978): “Some general characteristics of interrogative systems”. In: Greenberg, Joseph H./Ferguson, Charles A./Moravcsick, Edith A. (eds.): *Universals of human language.* Vol. 4. *Syntax*. Stanford, Stanford University Press: 21–248.

Van Dijk, Teun A. (1977): “Sentence Topic and Discourse Topic”. *Papers in Slavic Philology* 1: 49–61.

Vanrell, Maria del Mar et al. (2013): “Intonation as an encoder of speaker certainty: Information and confirmation yes-no questions in Catalan”. *Language and Speech* 56/2: 163–190.

Zellers, Margaret (2013): “Prosodic variation for topic shift and other functions in local contrasts in conversation”. *Phonetica* 69/4: 231–253.

Zellers, Margaret/Ogden, Richard (2014): “Exploring interactional features with prosodic patterns”. *Language and Speech* 5/3: 285–309.

Zellers, Margaret/Post, Brechtje (2012): “Combining formal and functional approaches to topic structure”. *Language and Speech* 55: 119–139.