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INTONATIONAL ANALYSIS OF
POLAR QUESTIONS:
A COMPARATIVE INVESTIGATION BETWEEN
STANDARD MODERN GREEK AND
STANDARD BRITISH ENGLISH

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Evangelos Argyropoulos Theodoropoulos

Signature

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Symbols and Abbreviations

ABBREVIATION	TERM	SYMBOL
H	High pitch	´
M/l	Middle/Level pitch	- *or* l(evel)
L	Low pitch	`
R	Rise	´
F	Fall	`
	abrupt pitch change (*bitonal*)	+
	final boundary tone	%
	phrasal tone	-
	Downstepping	!
*	Nucleus	●
Ip	intermediate phrase	│ *or*]
IP	Intonational Phrase	‖
SMG	Standard Modern Greek	
StBrE	Standard British English	
F0	Fundamental frequency	
	F0 turning points (*events*)	0
	F0 turning points preceding a prominent point	*>
	F0 turning point following a prominent point	*<

Abstract

There has been a considerable amount of research regarding the importance of suprasegmental phenomena in meaning-making, either on the word or sentence level (Nespor and Vogel 2007; Ladd 2008; Nolan 2022). For the approximation of sentence meaning, intonation is considered the most significant part of phonological analysis, providing all the necessary grammatical and pragmatic information (Baltazani 2003; Levis 2012; Nagy 2015). Drawing on a comparison between two intonationally dissimilar languages, Standard Modern Greek and Standard British English, this study attempts to make a contrastive investigation of the tonal realization of polar questions in the two languages. All intonational choices (tone choice, placement of tone, and type of pausing) are considered tonal, while the basis of the research is the nuclear tone placement and the tonal movement before and at the end of the phrase (*phrasal* and *boundary ending tones*, respectively). Firstly, an extensive presentation of the intonational patterns followed in the production of yes/no questions in Standard Modern Greek, and Standard British English sheds light on the major similarities and differences between the two intonational languages. In addition, the auditory and acoustic analysis of thirty (30) authentic data extracted from online and offline sources provides up-to-date evidence for an accurate description of the intonational patterns of yes/no questions in Standard Modern Greek and Standard British English. The process of data selection, similar for both languages, was based on the style of speech (6 polar questions of instructed speech and 6 polar questions of spontaneous speech per language) to pinpoint any probable alternation of questions' intonational patterns based on style. This form of analysis is focused on the prosodic aspects in accordance with the intonational theory formed by Cruttenden (1997) and Wells (2006), along with the Autosegmental-Metrical Model of Analysis found in Arvaniti & Baltazani (2000) and Arvaniti, Ladd & Mennen (2006). The experimental data processing and analysis were conducted via the *Praat* tool of intonational annotation (Boersma & Weenick 2001), which

is highly esteemed in the corresponding studies. Emphasis is given on the pragmatic analysis of the prosodic features of the two languages found in this research to retrieve further pedagogical implications. Finally, 6 Native Speakers of Standard Modern Greek were recorded producing one English polar question of instructed speech. This way, it is shown whether and to what extent intonational interference plays a catalytic role when native speakers of Standard Modern Greek communicate orally in English. The findings of the study attest to the informed approach of intonation as a means of oral expression that is highly associated with pragmatic interpretation, disregarding an *a priori* set of norms (Papazachariou 2004; Kotsifas 2009; Arvaniti 2022).

Keywords: phonology, intonation, suprasegmental phenomena, pitch, tone, tonicity, tonality, polar questions, Greek vs. English, intonational interference

Περίληψη

Τα υπερτεμαχιακά φαινόμενα έχουν εκτενώς μελετηθεί ως προς τη δημιουργία νοήματος, τόσο σε λεξιλογικό όσο και σε προτασιακό επίπεδο (Nespor and Vogel 2007; Ladd 2008; Nolan 2022). Στη διαδικασία προσέγγισης του νοήματος μιας πρότασης, ο επιτονισμός θεωρείται το ακριβέστερο εργαλείο φωνολογικής ανάλυσης, καθότι παρέχει όλες τις αναγκαίες γραμματικές και πραγματολογικές πληροφορίες μιας πρότασης (Baltazani 2003; Levis 2012; Nagy 2015). Συγκρίνοντας δύο επιτονικά διαφορετικές μεταξύ τους γλώσσες, την Κοινή Νέα Ελληνική και την Κοινή Αγγλική, η παρούσα έρευνα έχει ως στόχο να παρουσιάσει την επιτονική διάσταση των ευθείων πολικών ερωτήσεων στις δύο γλώσσες. Με αυτό εννοούνται όλες οι επιτονικές επιλογές (δηλαδή το είδος και η θέση τόνου μέσα στην ερώτηση, καθώς και το είδος της παύσης εντός της ερώτησης) κατά την παραγωγή πολικών ερωτήσεων, ενώ βάση της παρούσας έρευνας αποτελούν η τοποθέτηση του πυρηνικού τόνου καθώς και το είδος των φραστικών και οριακών τόνων. Μέσω της παρουσίασης των επιτονικών μοτίβων που προτιμώνται κατά την εκφορά αυτού του είδους ερωτήσεων τόσο στην Κοινή Νέα Ελληνική όσο και στην Κοινή Αγγλική, σταχυολογούνται οι κύριες ομοιότητες και διαφορές μεταξύ των δύο γλωσσών. Επιπροσθέτως, η ακροαματική και ακουστική ανάλυση τριάντα (30) αυθεντικών δεδομένων, όπως αυτά επιλέχθηκαν από διαδικτυακές πηγές και από απευθείας ηχητικές καταγραφές, παρέχουν καίριες αποδείξεις για την ακριβή περιγραφή των επιτονικών επιλογών των πολικών ερωτήσεων στην Κοινή Νέα Ελληνική και στην Κοινή Αγγλική. Η επιλογή των δεδομένων, όμοια και για τις δύο γλώσσες, έγινε με βάση το ύφος του λόγου (καταγραφή και ανάλυση 6 πολικών ερωτήσεων προσχεδιασμένου λόγου και 6 πολικών ερωτήσεων αυθόρμητου λόγου ανά γλώσσα), με σκοπό να εντοπιστεί πιθανή διαφοροποίηση του επιτονικού μοτίβου ερωτήσεων σε συνάρτηση με το ύφος εκφοράς. Η συγκεκριμένη ανάλυση επικεντρώνεται σε εκείνα τα προσωδιακά στοιχεία τα οποία αποτέλεσαν κέντρο έρευνας της επιτονικής θεωρίας, όπως αυτή

εκφράστηκε από τον Cruttenden (1997) και τον Wells (2006), ενώ είναι σε πλήρη συνάρτηση με το επιτονικό μοντέλο που εντοπίζεται στην Αυτοτεμαχιακή-Μετρική Ανάλυση όπως αυτή συναντάται στους Arvaniti & Baltazani (2000) και Arvaniti, Ladd & Mennen (2006). Η πειραματική επεξεργασία και ανάλυση των δεδομένων γίνεται με τη χρήση του εργαλείου επιτονικής επισημείωσης *Praat* (Boersma & Weenick 2001), το οποίο χαίρει ευρείας αποδοχής σε αντίστοιχες έρευνες. Τέλος, έμφαση δίνεται επίσης στην πραγματολογική ερμηνεία των προσωδιακών χαρακτηριστικών των αυθεντικών δεδομένων μελέτης των δύο γλωσσών, με στόχο τις παιδαγωγικές προεκτάσεις αυτής της έρευνας. Με αυτόν τον τρόπο, εντοπίζονται περιπτώσεις προσωδιακών παρεμβολών από την Κοινή Νέα Ελληνική στην Κοινή Αγγλική, και αναζητείται η έκταση αυτών των παρεμβολών κατά την παραγωγή προφορικού λόγου στα Αγγλικά από φυσικούς ομιλητές της Κοινής Νέας Ελληνικής (6 πολικές ερωτήσεις προσχεδιασμένου λόγου στα Αγγλικά). Τα αποτελέσματα συντείνουν στην πιο σύγχρονη προσέγγιση του επιτονισμού ως πτυχής της έκφρασης προφορικού λόγου που είναι άρρηκτα δεμένη με την πραγματολογική ερμηνεία, απεγδυόμενη από μια *a priori* ύπαρξη νορμών (Papazachariou 2004; Kotsifas 2009; Arvaniti 2022).

Λέξεις κλειδιά: φωνολογία, επιτονισμός, υπερτεμαχιακά φαινόμενα, τονικό ύψος, τόνος, τονικότητα, πολικές ερωτήσεις, Ελληνικά, Αγγλικά, επιτονική παρεμβολή

Introduction

According to Cruttenden (1997), the phonological aspect of oral communication has been an issue of serious consideration throughout linguistic research that dates back to at least five and a half centuries ago (the most well-known manuals of English pronunciation are Hart's (1551) and Butler's (1634), as cited in Cruttenden ibid.). As early as this, researchers constantly needed to understand the variability of human speech not only content-wise (i.e., in relation to grammar and syntax) but also regarding the sounds of languages and the multiplex modifications of vocal folds in the production of meaningful speech (Prieto 2015).

In the course of the centuries, there was a better realization of the distinction between the study of sounds (which later on was introduced as the study of *phonetics*) and the study of how these sounds are connected in a rather melodic and rhythmical way in continuous speech (part of what later on was proposed as *phonology studies*, along with other suprasegmental features like intensity, length, loudness, etc.) (Crystal 2008). However, both fields are strongly interconnected; one cannot be exhaustively examined without the aid of the other, and this is evident from the research of the last couple of decades (Prieto 2015). On that account, theoretical approaches and models used in phonological research have incorporated this idea of simultaneous separation and interconnectedness of phonetics and phonology (Arvaniti 2022).

For that reason, when referring to the phonological aspect of languages, one cannot but mean the cooperation of all segmental and suprasegmental features, meaning the sounds (or *phones*) produced by a speaker along with their allophonic variations, the pitch fluctuations (the high, mid, or low points that a human voice can reach when speaking), the stressing/loudness (the intentional highlighting of a sound or even a whole word in a phrase), and length (i.e. the

manipulation of pauses and the stretching of syllables when speaking) in the context of variation in fundamental frequency (thereafter, F0)[1] and voice quality (Xu 2011). In phonology, the analysis of recurring pitch patterns inside a phrase is of utmost importance, among others. This is the focal point of *intonation* (Levis 2012).

A handful of researchers have formally defined intonation and noted its importance in everyday oral communication. In short, most definitions agree that intonation is the capacity of the human voice to assign specific meaning to utterances. Wennerstrom (2001) states that intonation is the sum of the melodic features of a language (i.e. stresses, pauses, and volume) that are utilized during speech production, defining the real intentions of a speaker's communicated message. On a similar note, Nolan (2022) clarifies that intonation can be used as a manipulator of meaning. He goes a step further and examines the role of intonation inside and outside the *formal linguistic concept* (Nolan 2022: 320), discussing the grammatical and attitudinal dimensions of intonation, respectively. Muniem (2015) also refers to intonation's central role (defined by him as the *music of speech*) in meaning-making. This essential tool of communication changes respectively to the changes of a speaker's intentions, meanings, and attitudes (Muniem 2015). Finally, regarding the grammatical dimension of intonation, Georgiafentis and Sfakianaki (2002) provide an insightful analysis of the importance of prosody in word-order decisions to be made by speakers in relation to the focus on new information placement (a similar notion is also made in Ladd 2008, Themistocleous 2011).

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[1] Fundamental frequency (*F0*) refers to the times per second a complete waveform is repeated; in particular, it is the mean physical measurement of the number of repeated vibrations of the opening and closing of vocal folds in one second as reflected in the acoustic signal or articulatory measures (Cruttenden 1997; Bäckström et al. 2022). For a more analytical approach to the physiological properties of F0 measurements, see also Zsiga (2013: 82-85).

In the whole discussion on what intonation actually is, some essential elements of the spoken discourse are inevitably mentioned. First, it must be clarified that intonation is related to pitch contours at the phrasal level (Arvaniti 2011), and it has nothing to do with the accentedness of words (i.e., the stressing of a word by using static tones) in the configuration of their lexical meaning (Levis 2012). What is of fundamental interest for intonational analysis is the disambiguation of pitch falling or rising movements in a scale of high-middle-low levels, or, according to Arvaniti & Baltazani (2005), the operation of High (H) or Low (L) tones as:

- pitch accents (there is at least one per spoken utterance, and each language holds its own conventions on the combination of H and L pitch accents); [2] the most prominent one (which bears the nucleus) is indicated with an *.

- phrasal tone (at the end of the intermediate phrase [ip]), indicated with a -; and

- final boundary tone (at the end of the intonational phrase [IP]) that is indicated with a %.

Another important note must be made in relation to what was mentioned above. Prosodic features of languages, mainly pitch, can be utilized in two main ways; first, to distinguish meaning between words with identical spelling in the so-called *tone languages* (a widely known example of tone language is Mandarin) (Cruttenden 1997; Jun 2005). In this case, intonation is employed for assigning lexical meaning to words by using distinctive pitch accents and tones to prominent syllables. On the other hand, Arvaniti (2011) disambiguates what happens in *intonation languages* like English and Greek; she describes that "a complex interplay between metrical structure, prosodic phrasing, syntax, and

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[2] Later in this dissertation, a section will be devoted to the occurrence of two different schools of thought based on the alternative comprehension of tunes/tones configuration, the British School and the American School.

pragmatics" is the determining factor of the fundamental frequency (F0) contour movement at the level of phrase (Arvaniti 2011: 1).

As far as the F0 contour movements are concerned, this dissertation aims to specify the relevant voice fluctuations during the production of polar questions in Standard Modern Greek (thereafter, SMG)[3] and Standard British English (thereafter, StBrE)[4], focusing on the nuclear tone placement and the estimation of the phrasal tones (especially the final boundary ones). Polar questions can be simply described as those interrogatives which can be answered with a *yes* or a *no* answer ('polar' and 'yes/no' thus are used interchangeably to describe the same set of questions); however, there are certain nuances which provide a multilevel differentiation among alternative polar questions, for example between negative and positive polar questions or rhetorical and tag questions (laying mostly on the semantic level of their analysis) (van Rooy & Šafářová 2003). A typical polar question in Greek and in English could be as follows:

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[3] The origin of the Standard Modern Greek variety is traced back at the abolishment of the High *Katharevousa* variety around the mid-70s, and the immediate domination of the Low *Dhimotiki* variety, described as the one largely chosen by the vast majority of educated people in Greece over regional varieties; it is tightly connected to the former Athenian dialect, located mainly in Athens as spoken by Athenians, and it is characterized by a majority of phonological and morphosyntactic features than can be traced back to Ancient Greek (Arvaniti 1999; Trudgill 2003).

[4] Standard British English includes a variety of dialects and accents, mainly depending on regional and socioeconomic parameters. According to Kerswill (2006), English dialects vary in pronunciation, grammar, and vocabulary, while accents of English reflect different phonetic and phonological realizations. By the term 'Standard' I mean: "the language [accent in this case] of educated native speakers but without any explicit indication of what it means to be 'educated'" (Seidlhofer, 2011: 71). It is the accent that is encouraged in the classroom, one that enjoys prestige and is not related to provinciality and/or lower social status (Wells 1982: 34-35). Moreover, although different from 'native', in this study, the term "standard" is used along with 'native' speech and refers to accents mainly spoken in the UK, lacking localizable sound features (Wells, ibid).

[1] "Πάμε καμμιά βόλτα αργότερα;" →*typical (positive) polar question*

"Shall we go for a walk later?" [páme kaɱɲá vólta arɣótera]

[2] "Do you love me?" →*typical (positive) polar question*

[ˈduː jə ˈlʌv ˈmiː]

Estimating the pragmatic value of pitch contour discrepancies both interlinguistically and intralinguistically, I have worked on the presentation of the similarities and differences between the two languages in the realization of F0 contours in yes/no questions and the subsequent pragmatic associations of these contour variations in meaning-making. The main reason for working on this thematic area is that there is limited research on this specific issue, especially on a contrastive basis between SMG and StBrE (without disregarding the importance of previous work on this issue in, for example, Arvaniti (1991; 2009) and Baltazani (2007). Furthermore, I have decided to look at this type of sentence from a pragmatic perspective too, because polarity is a fruitful area for various pragmatic meanings, even when using the same pitch contour (Baltazani 2003).

The process for this two-dimensional research pivots on a well-informed theoretical description of polar questions' intonation in the two languages and the investigation of interference of Greek F0 contour movements to the respective English F0 contours caused by native speakers of SMG. This is what portends the third goal of the dissertation, which is highlighting the pedagogical implications of intonation in the production of English as an FL[5] from native speakers of SMG.

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[5] In this part of the study, it should be clarified that English is perceived as a Second Language (SL) rather than a Foreign Language (FL), a factor that is due to the immersive exposure of the Greek audience to English speech in the current context of ELF (Dendrinou 2020).

So, the research questions that are raised in this dissertation can be summarized as follows:

1. RQ 1: Are there fundamental intonational differences in the production of polar questions between SMG and StBrE?
2. RQ 2: What is the interplay between intonation and pragmatics beyond the sentence level when uttering a polar question in the two languages?
3. RQ 3: Are intonational differences between SMG and StBrE sensitive to style?

All three research questions are thoroughly investigated with evidence drawn from a number of valid sources (both online and offline recordings) that are analyzed systematically. Regarding the structure of this research, there are five chapters.

Chapter one provides an informed presentation of the up-to-date research on the field that is relevant to polar questions' intonation. In particular, this chapter examines previous research findings in relation to F0 contours in SMG and StBrE polar questions. Also, there is a brief reference to the different intonational patterns observed in polar questions between StBrE and General American English. The outcomes of the studies discussed in this chapter are described in accordance with the theoretical approach followed in this dissertation too, that is, the Autosegmental-Metrical Model.

Chapter two describes the development of some core intonational systems and models that were -and some still are- excessively followed in the study of all types of intonational analysis, including the study of polar questions. First, the development of the International Transcription System for Intonation (thereafter, INTSTINT) suggested by Hans 't Hart (cited in Hirst and Di Cristo 1998) is presented as the ancestor of the Tone and Break Indices (thereafter, ToBI) system of transcription (Beckman, Hirschberg and Shattuck-Hufnagel 2014). The latter started as the system of intonational analysis for Mainstream

American English (thereafter, MAE_ToBI) and shortly incorporated a handful of other English dialects and other languages (the present dissertation analyses the English ToBI (thereafter, E_ToBI) and the Greek ToBI (thereafter, GRToBI) frameworks of intonational analysis, respectively). In addition, there is an important reference to the Autosegmental-Metrical model of H and L pitch contour analysis, followed by Arvaniti (1991, Arvaniti & Ladd 2006) throughout the GRToBI applications. Finally, this chapter discusses the pedagogical model of falling and rising tonal representation developed by Cruttenden (1997), which formed its own school of thought (the British one) (Nolan 2022).

The third chapter of this paper exhibits the methodological tools used for the extraction of data in both languages. More specifically, 12 tokens of English polar questions are drawn from online sources of spoken discourse (6 polar questions of spontaneous speech and 6 polar questions of instructed speech); 6 polar questions in Greek were drawn from online sources too (spontaneous speech), and 6 tokens were recorded as being produced by Native Speakers of Standard Modern Greek (thereafter, NSSMGs) (instructed speech). The exact same NSSMGs were also recorded as producing one polar question in English (6 English polar questions in total – this final step was followed in order to trace the possible interference of intonational patterns from the L1 to the L2. The Autosegmental-Metrical model was preferred for the analysis of the data.

Chapter four displays the results of this short-scale study with a reasonable amount of tables and figures (Chapter 4; Appendix II, pp. 89-95) exhibiting the intonational patterns followed in the production of polar questions in Standard British English and in Standard Modern Greek without disregarding any discrepancies from the prosodic norms observed.

Finally, the fifth chapter re-examines the research questions posited and, after a brief overview of the results, a pragmatic approach to the interpretation of the results follows meaning-wise. There are also some pedagogical implications of the findings suggested in terms of teaching EFL and intonational meaning. Weaknesses and shortcomings of the present research are also presented.

Chapter 1
The intonation of Standard Modern Greek and Standard British English polar questions

1.1 Introduction

A considerable amount of research is conducted in the area of intonational analysis of polar questions. The prosody of English polar questions has been researched long before the investigation of Greek polar questions' intonation. The interest in the latter has increased in the last couple of decades, with Standard Modern Greek gaining much of the attention (Arvaniti 2002; Arvaniti & Baltazani 2005; Arvaniti, Ladd and Mennen 2006; Arvaniti 2009; Baltazani 2007; Botinis, Chaida, Nikolaenkova and Nirgianaki 2016; Chaida, Sotiriou and Kontostavlaki 2016; Liosis 2019).

Until recently, there was a popular belief that different types of F0 contours reflect specific sentence types (Botinis 1998, Baltazani 2007), something that is open to question, at least for Greek utterances, due to some representative data in Kotsifas (2009) and in Arvaniti (2011; 2022), while similar references were made even almost two decades ago by Papazachariou (2004) supporting that there is no clear-cut correspondence between pitch patterns and sentence types.

This chapter presents the major outcomes of the relevant research conducted in the last couple of decades. More specifically, after the presentation of what seems to be the intonational norm in SMG and StBrE polar questions, there is a section devoted to the distinctive intonational features between the two widely known accents of English, that is, StBrE and General American English (thereafter, GenAmE).

1.2 Standard Modern Greek yes/no questions

The most acknowledged feature of Greek polar questions is the absence of an introductory question word at the beginning of the question [2a] (as opposed to wh-questions [1]), a feature that seems to reveal maybe the great need for proper intonational structuring in order to distinguish them from mere declarative statements [2b] (Mennen & den Os 1993; Themistocleous 2014). For example:

[1] "Ποιο τσάι σου αρέσει περισσότερο;" →*typical wh- question*

   "Which type of tea do you prefer the most?" [pço tsái su arési perisótero]

    ➔ *Ποιο* [Which] is fronted in order to form this type of interrogative

[2a] "**Ø** Θέλεις τσάι;" →*typical polar question*

   "Would you like a cup of tea?" [θélis tsái]

    ➔ Absence (**Ø**) of a fronted introductory question word

[2b] "**Ø** Θέλεις τσάι." →*typical declarative statement*

   "**Ø** You want a cup of tea."[6] [θélis tsái]

    ➔ *In written discourse:* The absence (**Ø**) of a fronted introductory question word + the declarative mark (full-stop) instead of the question mark (?) distinguish between polar question and declarative statement;

<center>**BUT**</center>

    ➔ *In oral discourse:* The absence (**Ø**) of a fronted introductory question word makes the difference between questioning intonation and statement intonation being the most important distinguishing factor.

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[6] Note also the difference between the [2a] and [2b] English translations; in English, inversion between subject and verb typically followed in questions makes the distinction easier to process; however, [2b] English translation could stand as an effective polar question depending on the intonation produced (further explained in section 1.3).

In order to describe the F0 movement in polar questions, one should be aware of the fact that intonation in Greek can involve five pitches (L*+H, L+H*, H*+L, H*, L*), three phrasal tones (H-, L-, or !H-), and three final boundary tones (H%, L%, or !H%) in different combinations, so that various F0 contours can occur (Arvaniti & Baltazani 2005). Although F0 movement has been described as interconnected with pitch accents by some scholars (i.e., stressed syllables that seem to be of high prominence inside the phrase define the movements of F0) (Botinis 1998; Chaida 2010), there is no absolute dependence on lexical stress (Arvaniti 2009). What research has shown, however, is that the melody of a sentence (and thus, of polar questions) is bound to the focused word (the one that bears the nucleus) inside the question.

More specifically, Arvaniti (2002; 2009) provides a distinction between two variations of the intonational pattern followed in the production of Greek polar questions; this distinction is related to the position of the nucleus (simply stated as the most prominent content syllable) inside the polar question (either at a phrase-final or at an earlier position). In that way, it is observed that F0 moves from an L (falling) pitch accent of the focused word (the nucleus in polar questions is always realized with the L pitch, marked as L*) to an H (rising) intermediate phrase accent (H-) before lowering again at the very end of the question at hand (L%) (Grice, Ladd and Arvaniti 2000; Baltazani 2007; Themistocleous 2014). According to Arvaniti et al. (2006), the nucleus placement indicates whether the peak of the rise (H-) occurs at the final vowel of the question or at the final accented vowel of the question (respectively to word-ending nucleus placement or earlier nucleus placement), something that is attested by a number of other scholars (Baltazani 2007, Chaida 2010, Chaida et al. 2016).

The above pattern (L* H- L%) is one of the five pitch contours that seem to be predominant in the production of Greek sentences and corresponds to the

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production of yes/no questions. Themistocleous (2014) proposes an interesting alternative to this, stating again that the intonation of polar questions is independent of word order (and, thus, of pitch accents), but it is relevant to the focus placement.[7] This alternative corresponds to three different placements of focus: a) at the beginning of the questions, b) in the middle of the questions, and c) at the end of the questions. In all three scenarios, the phrasal and the boundary tonal contour (which is of interest in this dissertation) remains the same (H-L%), but in the first two cases, there may be an alternation in the configuration of the pitches before the focused word (in other words, there may be instances of L* H + L% or even L* L + H- L% intonational patterns) (Themistocleous 2014: 333-335; Panussi 2016).

Regarding focus placement in questions and pragmatic meaning, research data support that each of the aforementioned scenarios can reveal different levels of meaning manipulation. Once again, Baltazani and Jun (1999), stated that the focused word in polar questions, always uttered with an L* pitch, can reflect that the meaning is not complete and that there are more things to be said (or implied) if followed by an H- pitch.

Botinis, Kontostavlaki, Nikolaenkova and Themistocleous (2019) provide some very important evidence regarding the effect of edge tones (%) on the width of syllable stretching. More specifically, their research indicates that the strength of the final boundary tone defines the pre-boundary tonal movement (-), while the lengthening of the edge tone leads to a two-way lengthening, both of the final boundary and of the intermediate (or pre-boundary) phrase [ip] (Botinis et al. 2019: 30-31).

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[7] In Themistocleous & Kyriacou (2010), the researchers have observed that, although intonation is irrelevant to the word accent and word order, there is a strong tonal alignment with the phonemic and phonetic realization of the nuclear (focused) syllable that affects the declining contour at the rightmost possible point of the sentence.

Another important contribution is made by Baltazani, Kainada, Lengeris and Nikolaidis (2015); they have given proper attention to the prenuclear part of the polar questions (i.e., the part that precedes the nucleus), a rather disregarded field in questions, in order to understand the fundamental intonational differences between declarative statements and polar questions of Greek, which are *string identical* (Baltazani et al. 2015: 1). This way, the results of their study add another dimension to the intonational patterning of Greek polar questions; that is, the prenuclear pitch accents can add to the manipulation of meaning. In addition, this part of the question's intonational pattern can properly inform the listener of whether a statement or a question is to be uttered (Baltazani et al. 2015: 5).

On the same basis, Kotsifas (2009) finally draws some conclusions regarding the prosodic differences between sentence types (declarative, interrogative, and imperative) and intentional pragmatic meaning. His study's results validate the overarching belief that traditional grammar neglects the multiplicity of speech acts that can be realized prosodically, no matter the type of sentence. In addition, his study's perception tests reflect that all sentence types are expected to convey either a declaration of a statement, a question, or a command/request, depending on their prosodic configuration rather than their lexical and syntactic structure (Kotsifas 2009: 52).

1.3 Standard British English yes/no questions

Contrary to what happens in Greek, English polar questions are fully morphosyntactically marked, either through the use of an operator (that is, the fronted auxiliary verb of the equivalent declarative sentence) [1a] or through the insertion of the auxiliary verb *do* when there is no operator given in the declarative [1b] (Vukasojević 2015). In both cases, subject-auxiliary inversion is observed, making polar questions easy to identify. In addition, there are

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unmarked polar questions (Geluykens 1988 refers to them as *Queclaratives*) with total absence of an operator [2]. More specifically:

[1a] "**Is** everything alright?" →*typical polar question with operator ('is') fronting (inversion between subject and auxiliary verb).*

➔ The question "Is everything alright?" derives from its equivalent statement "Everything is alright." which carries the operator 'is'.

[1b] "**Do** you agree?" →*typical polar question with the insertion of the fronted operator 'do' (auxiliary verb; inversion between subject and auxiliary verb).*

➔ The question "Do you agree?" derives from its equivalent statement "You agree." which carries no apparent operator.

[2] "**Ø** You said so?" →*pragmatically marked polar question in the form of a declarative statement with no operator fronting (used as an echo question, a confirmatory or even a rhetorical question, depending on the different intonational patterns produced).*

➔ The question "You said so?", grammatically speaking, is a declarative statement; however, intonation is the determining factor for its pragmatic effect on the hearer (i.e., whether it is a declaration or a question, what type of question, etc.).

Most of the literature on English polar questions concludes that there is a general tendency for native speakers of English to apply a rising F0 contour at the final boundary tone (Fletcher, Grabe and Warren 2005; Ladd 2012; Cruttenden 2014; Prieto 2015; Vukasojević 2015; Prieto and Borràs-Comes 2018). In addition to the H%, English is estimated to be open to pitch

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moderation (Wells 2006). More specifically, the commonest alternatives to the generally observed L*H- H% F0 are a) an H nucleus at the focused word followed by a (fall-)rising movement (H*L-H%); and b) a rare final falling movement that results in the H* L% contour (Kainada and Lengeris 2014). However, scholars like Geluykens (1988) have early opposed this universality of rising intonation in English polar questions.

In conjunction with the relation of prosody to sentence type characterization (which are two quite unrelated aspects of language, as mentioned above), Jeong (2016) has conducted very interesting research trying to establish any probable connection between intonational preferences and: a) speech acts (similarly to what is mentioned by Kotsifas 2009 and other scholars), and b) affective meanings. Based on the perception of English polar questions by different listeners after having manipulated the terminal boundary contours in many different contexts, Jeong supports that illocutionary forces as perceived by listeners and affective interpretation of polar questions are strictly dependent on different intonational contours. More specifically, it is estimated that polar rare level or even falling (L%) ending contours are perceived as implications for commands, while the more frequent H% boundary tone is interpreted as an invitation on the part of the speaker by the majority of the listeners (Jeong 2016: 910). As far as affective meaning is concerned, it is shown that negative interpretations (of impoliteness or annoyance) were signaled by level boundary tones, rising (H%) boundary tones were connected to politeness and positive meanings, while falling terminals were perceived as indicators of authoritativeness (Jeong 2016: 909).

Focusing on the semantic dimension of English polar questions' intonation, Prieto & Borràs-Comes (2018) shed light on the function of intonational contours as operators of dynamic epistemic contribution. In fact, Prieto & Borràs-Comes propose that question contours reveal binary distinctions of

commitment and agreement on the part of the speaker towards a) their own proposition, and b) the addressee's proposition. Their analysis involves a contrastive examination between English and Catalan polar questions with the use of Krifka's theoretical framework for a speech act analysis of the investigated questions (Prieto & Borràs-Comes 2018: 577-579). They conclude that the contribution of intonation can be parallel to the way modal markers reveal degrees of commitment and agreement in speech (Prieto & Borràs-Comes ibid.). Similar results have been already addressed in Šafářová (2005).

Although there is no indicative reason that seems to lead to the selection of the aforementioned intonational options (Levis 1999), what seems to be a probable factor of intonational variation in polar questions is the answer that the speaker expects to be uttered (Goodhue & Wagner 2018). This specific aspect of F0 modification is bound to the presence or absence of *interchangeability* (i.e., the response to polar questions with a yes or a no answer, interchangeably, to both agree or disagree with the proposition of the question), a behavior that is observed in the context of negative polar questions (Goodhue & Wagner ibid.). However, not all scholars agree on what intonation pattern is neutral (i.e., intonation which can be interpreted in one possible, objective way) and what intonational pattern is marked (i.e., which is subject to situational, context-based interpretation), even in the context of biased (negative) polar questions (Levis 1999; Arvanti & Godjevac 2003; Mala 2007).

In terms of psycholinguistic analysis, Tian, van Tiel, Clin and Breheny (2021) have run three eye-tracking tests to understand how listeners process polar questions in real time when dealing with negative and positive ones. In that respect, English negative polar questions seem to reflect no clear, pragmatic biases towards the purpose of enquiring, while positive polar questions revealed a connection to positive bias, that is, a tendency to attract positive replies (Tian et al. 2021: 1549-1551). However, intonation in such cases is claimed as a non-

definitive factor for gaze biases; thus, the gaze is not taken into consideration in this study. At a glance[8]:

[1] "Has John ironed his father's shirt?" →*positive polar question*
  "**Yes, he has.**" / "No, he hasn't." → POSITIVE BIAS

[2] "Has**n't** John ironed his father's shirt?" →*high negative polar question*
  "Yes, he has." / "No, he hasn't." → UNCLEAR BIAS

[3] "Has John **not** ironed his father's shirt?" →*low negative polar question*
  "Yes, he has." / "No, he hasn't." → UNCLEAR BIAS

(Tian et al. 2021: 1549)

1.3.1 Differentiation between StBrE and GenAmE yes/no questions

In , Sosa and Görgülü (2014), we find a detailed analysis of the intonational preferences of American speakers in the production of GenAmE[9] polar questions. As mentioned above, the Standard British English intonational pattern

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[8] In the example [1], the most probable unmarked intonation that a speaker would opt for is the placement of the nucleus on the word 'shirt', maybe using a L* L% pitch contour. However, in examples [2] and [3], the speaker would tend to have two nucleic tones, one on the negative particle (similarly to what happens in Greek) and one on the word 'shirt'. These intonational patterns ([1]: L* L%; [2]: %LH* L L-L* L%; [3]: %0 L* L-L%) seem to be less important than the existence of the negative particle 'not', either in full or in contracted form.

[9] According to Kretzschmar (2008), GenAmE is thought of as "a perfect and exemplary state of American English"; however, it connotes the qualitative features (in terms of morphosyntax, vocabulary, and phonology) that are selected by educated American speakers in formal situations. Kretzschmar prefers the broader term Standard American English, which seems to be bound to regional moderations; what applies in this dissertation, after all, is that the 'Standard' quality (describing the GenAmE, or even the MAE) is connected to the meaning used for the SMG accent (Introduction, p.4, footnote no3).

preferred in the production of yes/no questions is by far the rising (H%) contour, while L% is rarely observed as the terminal of a preceding H* pitch (Kainada & Lengeris 2011). There is no apparent reason behind the different realizations of the final boundary contour; thus, it is impossible to conclude which intonation is neutral and which is marked (Levis 1999; Vukasoyević 2015).

Things become slightly more concrete when it comes to Mainstream American English (thereafter, MAE)[10] variety. In particular, Hedberg et al. (2014) support that one intonational contour provides a clearly unmarked realization of polar questions, the L* H- H% contour, also found in British English (BrE). Additionally, in conjunction with the falling intonation that is not frequently used in BrE polar questions, when native speakers of MAE use an L- L% terminal contour (following an H*), they do it on purpose, indicating that questions' felicity conditions are not observed. In other words, what is meant here is that, as other scholars (mainly of the British school of thought) also support, an L% ending contour is a way of characterizing the proposition of the polar question as known, salient, or in syntax terms, this is a way of prioritizing the given information of the proposition -withholding any piece of new information for a number of reasons, for example when the speaker wants to mitigate a possible threat towards the listener's face with what is going to be said (Hedberg et al. 2014: 5-7). A possible scenario for this use could be the following:

two friends are discussing Speaker A's favorite TV series; in the course of their discussion and after having mentioned the X TV series, they have the following interaction:

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[10] Mainstream American English has the same sense as the General American English characterization of the Standard American English variety explained above (footnote no9).

[Speaker A]: - I can't wait to watch the next episode of "X" tomorrow evening!

[Speaker B]: -*Is it that interesting?* → polar question; in this context, Speaker B is prone to follow an intonation like the one shown below [%L *l* **!H* L- L%**]:
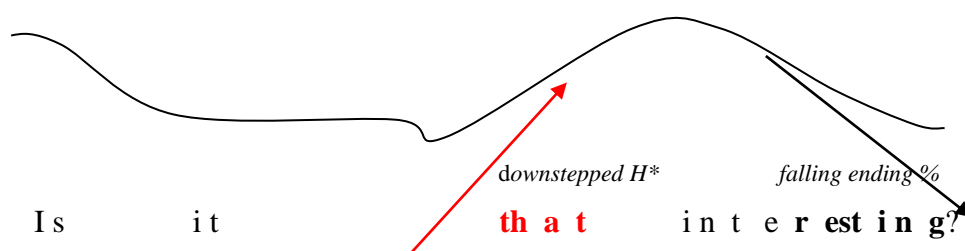
That way, Speaker B raises a seemingly polar question without actually performing any speech act relevant to the question form (e.g. requesting, seeking information, etc.). Here is a two-way analysis:

- *PRAGMATIC ANALYSIS:* In fact, they make a comment -which is at Speaker A's disposal to characterize it either as mild, unimportant, or even biting- about the so-called *importance* of the episode as expressed by Speaker A. This comment is an oblique way to criticize Speaker A's proposition and actually to contradict them; thus, it's a mitigated way of threatening Speaker A's positive face (I would characterize it as a mitigated off-record FTA).

- *SYNTAX ANALYSIS:* Speaker B does not provide any new information but makes a clear, linear reference to the already known, given/old information as extracted from Speaker A's proposition. New info could be for example a reason for considering the X series unimportant (on the part of Speaker B), violating however the mitigating strategy explained above. Note also that inversion, positive polarity, and a probable stretch-out of milliseconds of the sound [æ] in 'that', are all factors that could enhance the above pragmatic markedness of meaning.

Finally, it is possible to encounter a completely rising contour, that is, an H* nucleus moving upwards to a higher phrasal pitch (H-) in order to move even higher (H%), denoting information that is already given before (Ladd explains this H% as a *post-nuclear accent*) (Ladd 2008, as cited in Hedberg et al. 2014). A final remark of this study is that, as it becomes evident, MAE and BrE show differences in terms of nucleus phonetic alignment.

However, one characteristic both varieties share, in terms of intonation, is the final lowering (or *down-stepping*) of the terminal H peak (a down-stepped terminal H is marked as an *!H%*). Both BrE (RP in particular) and MAE (also known as General American English – GenAmE) seem to obey the rules of this independent phenomenon (Arvaniti 2007). What holds true is that the lowering of the final peak of the question seems to be grammaticalized in both varieties since the down-stepping occurs at the last accent rather than the very end of the utterance (for that reason, both the penultimate and the final peaks are examined). In Arvaniti (2007), data has shown that this phenomenon cannot be easily interpreted because its appearance is idiosyncratic.

Summing up, it is clear that SMG and StE have different intonational properties. Although SMG has been mostly described as a language of falling intonation while StE has been known as one of rising intonation, I have come to the realization that the truth lies in between regarding polar questions. What research has shown, after all, is that the two features that moderate F0 movements are nucleus placement and pragmatic meaning. However, even when a marked intonation is an option, again, there are dissimilar approaches to selecting contours for NSs of the two languages, making contour selection a quite personal issue tightly connected to the situational context at hand. Finally, the two greatest varieties of StE, that is StBrE (examined in this dissertation) and MAE, reveal considerable differences, too.

What is important now is to delve into the operation of the major instrumental models that scholars have used to make the aforementioned observations, as presented in the following chapter: first, there is a brief overview of the initial attempt for phonological transcription which paved the way for the development of the various tools of intonational analysis, along with a reference to the two major schools of thought (the British and the American ones). Then follows a description of the prevailing framework for intonational analysis (Tones and Break Indices framework), as developed in the context of the American school of thought, for both the SMG and the StBrE accents. Finally, the pedagogical models that emerged from the British-school method of analysis are presented.

Chapter 2
Systems and models followed in previous studies on polar questions' intonational analysis

2.1 Introduction

A great number of scholars have approached the investigation of speech prosody. In their effort to understand how exactly prosody functions and examine the operation of suprasegmental phenomena in meaning-making, a variety of models occurred. These models follow different theoretical approaches to the same issue, thus, different methodology.

In a rather primitive classification of the intonational models, it could be mentioned that the models fall under two broad categories, the *theoretical* (or, perceptual) and the *experimental* (or, instrumental) (Ladd 1996). This distinction is made on the basis of what approach is followed in the description of new phonological data. In essence, the approaches to phonology can be either merely auditorial (insisting on the phonological level of analysis), merely acoustic (focusing on the phonetic properties of speech), or a combination of the two (which examines phonology and phonetics as interconnected aspects of the same issue) (Anufryk 2011).

Before moving to a more detailed presentation of some important models of intonational analysis, I would like to refer to how the two major conceptualizations of the English prosody resulted in the formulation of two distinct schools of thought, the British and the American (a clearly descriptive and theoretical and a more prescriptive and practical one, respectively).

The core difference between these two schools of thought is that the American school treats intonation as a sum of discrete pitch *levels*; in addition, the four

distinctive pitch levels introduced by the American approach (that is, *extra-high, high, mid,* and *low*) create a concrete intonational contour that, "as a whole is a structural and semantic unity" (Anufryk 2011: 66). So, these levels are perceived as the initial marks of F0 changes in an intonational contour of a given pitch range and they vary from falling to rising tones. Many scholars, among them Pierrehumbert (1980), have objected to this configuration without however disregarding the fundamental contribution of the American school, that is, the description of contours as *local* and their alignment with specific accented syllables (the interplay between phonology and phonetics is the threshold of the models of this approach later on) (Arvaniti 2012).

In British theoretical research, contours are perceived as *global* entities with no exact tracking point inside an intonational phrase; thus, the nucleus is the most worth-mentioning intonational contour. Great theorists of the past, like O'Connor and Arnold (1973), have provided a variety of four basic tones for English intonation: *fall, rise, rise-fall,* and *fall-rise,* while in the form of expanded analysis, there are other combinations too, like *level* "plateau" tone, or *tridirectional* complex tones (rise-fall-rise & fall-rise-fall) (Ladd 2008). In terms of intonational contour arrangement, there is a *prehead* at the beginning of the intonational phrase, followed by the *head* and the *nucleus* (the latter is placed in the rightmost content words' prominent position), while *tails* complete the contour (Wells, 2006). Finally, the British approach is characterized as more suitable for pedagogical purposes due to its simplicity in tonal representation without its analysis being less in-depth than the American one (Nolan 2022).

From that, it must be realized that in the course of the years, it was not an easy task for all scholars to always follow one of the two schools of thought regardless of the improvements of the other part of theorists. In other words, it is clear now that both approaches have provided well-established models and

frameworks for the various phonological analyses, while the contribution of one to the improvement of the other is bold.

In this chapter, there is a reference to the ToBI framework of annotation for both SMG and StBrE with an explanatory illustration of the analysis that occurs from the application of the relevant tools. In addition, there is a juxtaposition to the British models of analysis accompanied by illustrations, too.

2.2 From INTSINT to ToBI annotation framework

In the initial steps of intonational research, theorists had to cope with a number of difficulties regarding the interlinguistic representation of intonational patterns. Taking the example of English and French phonological juxtaposition, which soon led to inadequate simultaneous intonational patterning due to the different nature of the two languages, Hirst and Di Christo managed to generate a prototypical transcription system for phonological representation, the *International Transcription System for Intonation* (INTSINT) (Hirst and Di Christo 1998: 14). The novelty of such a system lies both in the structural part of the system but also in its capability to be applied across languages. The major need that led to the development of such a tool was the absence of a valid mechanism that could generate a transcription of the melody of speech internationally or, in other terms, a phonological mechanism equivalent to the International Phonetic Alphabet (IPA).

This model of intonational analysis has some fundamental characteristics. Most of these characteristics are also induced in the frameworks and approaches that were later developed (Anufryk 2011), like the *Autosegmental-Metrical approach* and the *Tones and Break Indices* (ToBI) framework (both of them are further discussed in this dissertation), and for that reason, they are described below.

The core improvements of INTSINT are the following: first, it separated the pitch patterns' transcription from the orthographic or/and phonetic text (leading the way for the upcoming *tiers,* i.e., the labelling system developed in transcription tools of the Autosegmental-Metrical approach, like Boersma's Praat tool or the Points, Levels, and Ranges tool – *PoLaR*). Second and contrary to previous systems focusing on Germanic languages (more specifically, English and German), it sets the default initial boundary pitch to the mid-level of the speaker's range instead of the British unmarked initial low pitch. According to Anufryk (2011: 89), this *prima facie* unimportant change makes INTSINT capable of universal application and not bound to a specific language. Similarly to all systems, however, it categorizes pitches according to the highest and lowest points of the speaker's voice range, providing two distinctive qualities: a) the relative local positioning of a pitch with respect to its preceding one (resulting in *higher, lower,* or *same* variants, plus two subcategorizations of them as *downstepping [falling]* or *upstepping [raising]*); b) the extreme value of a speaker's pitch, giving the *Top* or *Bottom* values (Hirst and Di Christo 1998: 16-17; Anufryk 2011: 89). Finally, INTSINT introduced the representation of intonation units and phrase boundaries with square brackets ([ ]) (Hirst and Di Christo 1998: 15).

In this respect, a number of instruments for intonational annotation were proposed by a handful of researchers. However, a limited number of them could make a comparative investigation between unrelated languages possible (which is most of the time the desideratum). Among others, ToBI is the framework that best serves this cause, especially for the goals of the present study.

2.2.1 ToBI for Mainstream American English and Standard British English

Tones and Break Indices (ToBI) was an annotation system for the phonological labeling of spoken Mainstream American English (*MAE_ToBI*), initiated in the early '90s and incorporating all the important changes that INTSINT had already brought in the field (Beckman et al. 2014). As a matter of fact, it resulted from a series of actual workshops aiming at developing an automatic text-to-speech recognition system. As Beckman notes, the whole idea was an inspiration drawn from "the Penn TreeBank project[11] [...] to provide a common vocabulary so that researchers at different sites could [...] contribute complementary analyses and extensions of a common core of methods and datasets" for intonation and prosody (Beckman et al. ibid.: 13-14). The core principle of this idea was that, since it aims to apply to the great majority of languages, it should have processed and understood in detail the intonational phonology, pragmatics, and discourse analysis of the language to be analyzed.

In terms of phonological representation, ToBI system included the basic hierarchy of the Autosegmental-Metrical Theory, according to which segmentation of different levels of analysis is displayed. The so-called *tiers* in ToBI framework of analysis provided independent structural parts, including the *Words* tier (the orthographic transcription of the text), the *Phones* tier (the phonetic transcription of the text), the *Tones/Levels* tier (the successive H and L tones which constitute the intonational contour), and some other important tiers which correspond to the break index value and which relate to the parsing (or, juncture) of the text (*Prosodic* tier and *Points* tier, among others) (Beckman et al. ibid: 15-19). In the first (beta) versions of MAE_ToBI, another tier was included,

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[11] With the *Penn TreeBank Project*, linguists from various parts of the world developed an online corpus of vast scale in order to examine and annotate syntax aspects, to test different models of syntactic parsing, etc. (Marcus et al. 1993).

the *Miscellanea* (Misc) one, used for marking events like disfluencies, coughing, or commentary. Each tier holds its own conventions for its internal structure and symbols (explained in Figure 1, below). Of course, the hierarchy of the above tiers (displayed in a vertical order underneath the audio's spectrogram and the linear representation of the intonational contour), can be altered according to the needs of the research. In addition, the contour is displayed in terms of Frequency-F0 (Hz) -vertical axis- and Time (/s) -horizontal axis. The manipulation of Hz is available depending on the acoustic tool of analysis that is used and can be even higher than 5000 Hz; however, there are still some conventions set by default respective to the speaker's sex (thus, their voice range).

To give an illustration of a complete ToBI representation (Figure 1 shows an example of the current updated type of the '90s ToBI representation):

Figure 1 An example of a complete ToBI analysis (from Byron, Veilleux, Shattuck Hufnagel and Brugos 2021)
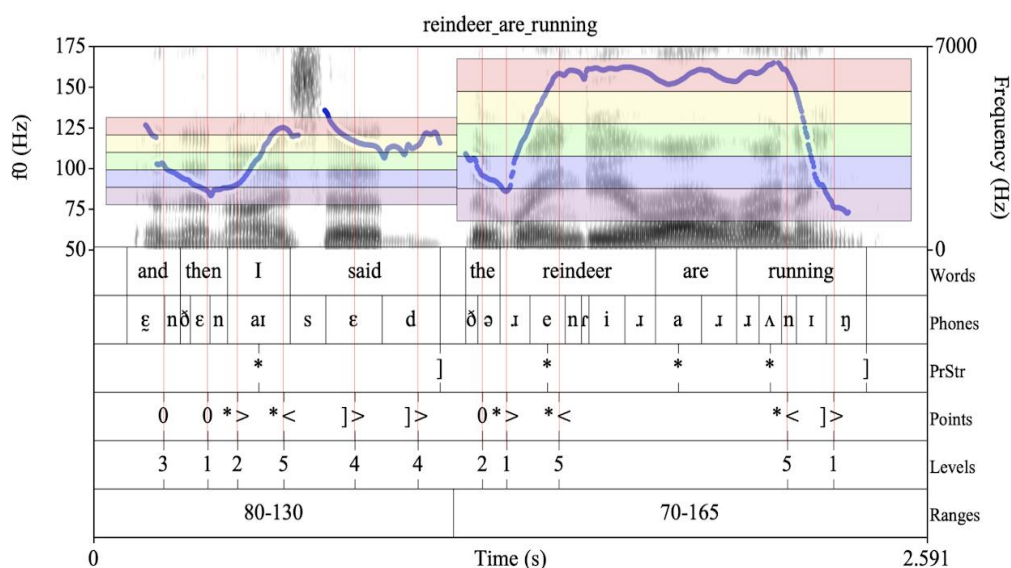
In a brief top-down explanation of the above illustration (retrieved from Byron et al. ibid.), there can be found the spectrogram (waveform) of the displayed audio text with the intonational contour being inscribed within it (marked with blue color). Next to that, there are the frequency rates (in Hz) of the intonational patterns. Below the spectrogram, there is the "Words" tier with the orthographic representation of the sentence, followed by the phonetic transcription of it in the "Phones" tier. A line separates each word and each distinct sound in both tiers. In the "Prosody" tier (PrStr) one can find the indication of the *nucleus* and the various *phrase accents* (both marked with an *) and the indication for the end of an intermediate and intonational phrase (both marked with a]). The "Points" tier is used as an indication of the F0 changes inside each intonational phrase (0 holds for every F0 turning point/event; *> shows that the event precedes the prominent point of the phrase, while *< shows that the event follows the prominent point of the phrase)[12]. Finally, "Levels" is an alternative to the *Tones* tier, where each number corresponds to a different realization of pitch (1 being the lowest and 5 being the highest reach of tone), and "Ranges" reflects the F0 floor and ceiling of the phrase. What is important, is that all constituent parts of all tiers are internally aligned with each other and with the waveform line (in Figure 1, red thin lines indicate alignment).

In their effort to create such an illustrative form of multilevel analysis, theorists have gone through a number of updates throughout the last decades. Pierrehumbert (1980), along with Beckman (1986), was the first to treat tones as components that can be located functionally, something that led to the distinction

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[12] The Points tier, indicates the strength of the breaks between the words of the utterance examined. The marking points of the tier vary from a scale of 0 to 4, with each value reflecting a different quality of break. In detail, 0 is used for clitics (inter-word junctures), 1 for ordinary phrase-internal word boundary, 2 for perceived juncture with no intonational change, 3 for intermediate phrase end with phrasal accent included, and 4 indicates the end of the intonational phrase with the boundary tone being included (Port 1999).

between *boundary edge tones* and *pitch accents* and the following "decomposition of the intonation contour into functionally distinct groups of H versus L tone" (Beckman et al. ibid: 15, 17). Another important contribution to the ToBI system was the proposition of *relativity*. Intonational contours are described in terms of *relatively low* (L) and *relatively high* (H) tones, both being measured in relation to their local phrasal pitch range rather than the nearest peak or plateau of the pitch (in other words, independently of the phrasal nucleus) (Beckman et al. ibid). So, an L tone, for instance, denotes an F0 downward movement compared to the F0 movements of its surrounding sounds, but not compared to the nearest prominent accent of the phrase.

In Pierrehumbert (2000), there is a handful of empirical evidence on one of the most worth-mentioning features of the ToBI system, that is, the stretching out of a contour tone around the (British-wise) sole nucleus. Instead of having one dynamic tone affecting the movement of the nucleus regardless of the post-nucleic elements (parts of the *tail*, according to British models of analysis), Pierrehumbert (2000) proved that a *tone target model* could explain the existence of a common plateau movement that follows a boundary L% or H%, when the nucleic syllable is followed by more than a few syllables, indicating that the plateau is the continuation of the stretched-out boundary tone (for more on tone target model, see Liberman and Pierrehumbert 1984). So, in the whole discussion of alignment, it is easy to understand that tones, confronted as targets, do not correspond to every vowel or syllable (Tone Bearing Unit – *TBU*) in a phrase, since a tonal element can be distributed to more than one consecutive phonetic realizations (Arvaniti discusses this *temporal* relation of target tones with the segmental string).

After all, ToBI system was the first to handle a bunch of different problems and achieved to solve most of the fuzziness that was overarching in the area of intonational analysis. From the strict practical issues of representation, providing

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the distinctive but internally aligned tiers of analysis, to the essence of how the tune is to be confronted (either as a sum of dynamic tones that define fragmented parts of the utterance or as an area of tone targets that work together to mark a unified movement), ToBI managed to fill a great gap in the acoustic phonological research. Over the years, it started broadening its scope to other varieties of English and languages, evolving into a holistic prosodic annotation framework. As a result, ToBI systems of British variety of English (E_ToBI), German (GToBI), Italian (IToBI), Serbo-Croatian (SCToBI), Tokyo Japanese (J_ToBI), Mandarin (M_ToBI), Cantonese (CToBI), and Athenian Greek (GRToBI) occurred, among others (Jun 2005: 433-435). In the following part, there is a description of the GRToBI as developed and refined to a great extent by Arvaniti, along with some core information about the Autosegmental-Metrical model that prevails in its functioning.

2.2.2 ToBI for Greek: the Autosegmental model

As mentioned above, the ToBI system was soon realized as an overall framework of phonological annotation for many different languages, including Greek. This means that it was able to present and process the many different features of the Athenian Greek accent (and, later on, of other Greek accents too). Arvaniti and Baltazani (2000; 2014) provide a neat explanation of the conventions held in the function of GRToBI, explaining step by step the probable differentiations of its tier segmentation.

One of the very first conventions of Standard Greek is the determination of stress accent as a lexical property that falls on the ante-penultimate, penultimate, or ultimate syllable of the word. At the same time, the so-called *enclitic stress*, which is realized in cases where a content word is stressed on the antepenultimate or the penultimate syllable and is followed by one or more enclitics, leads to a double stressing of the word (Arvaniti and Baltazani 2000).

This is important in the processing of intonation with GRToBI, since the transcriber/analyst has to bear in mind that, in Greek intonational analysis, stressed syllables are perceived as distinctive pitch accents accompanied by phrase accents and boundary tones.

Another important point made by Arvaniti, Ladd and Mennen (2006) is that pitch contours are widely affected by the position of the stress-holding syllables, the focus location and the length of the utterance, three factors which are not to be disregarded and add to the confrontation of tune as a sum of discrete but unified tone targets and to the loose distribution of tune along the phonetic realization of an utterance discussed in section 2.2.1 above (see also Arvaniti and Ladd 2009 on Greek polar and wh-question questions).

Regarding GRToBI's arrangement, there are no major deviations from the original MAE_ToBI described before. The illustration of the waveform with the inscription of intonational contour and the tiers following below them is the same; however, the tiers' order can be at the annotators' disposal (Arvaniti and Baltazani 2014 prefer the following order: *Tones, Prosodic Words [Phones], Words, Break Index [Points] tier*).

As far as intonational structure is concerned, Arvaniti and Baltazani (ibid.) consider of crucial importance that tones are nothing different but morphological elements with pragmatic meaning contrasting to lexically assigned stress; for that reason, the Tone tier cannot include accents for each and every (lexically) stressed syllable. In the transcription of tones in the respective tiers, they also provide some extra marking criteria, like the intensity value of the tone, which, if realized as of minimum intensity, can be characterized as *weak* with the diacritic *w* before the tone (for example, a wL* is used for an undershot movement of a prominent L). Finally, transcription in GRToBI includes the marks of less-than and more-than signs (< >), denoting the realization of accents

later or earlier than expected, respectively. Downstepping (!) is widely used, even in not-so-clear-cut instances of low scaling of pitch (Arvaniti and Baltazani ibid. 106).

One difference between GRToBI and MAE_ToBI is related to the juncture of words in the Break Indices/Points tier. While the latter includes four plus one break indices (*0, 1, rare 2, 3, 4*), GRToBI is limited to four levels of separation between words[13]. This is important for the phonological aspect of phonetic realization, especially in the transcription of the Greek language, where events related to tone, stress but also *sandhi* (the phonetic infusion of two morphemes resulting in a slightly different phone or allophone, widely encountered in compounding or blending processes) can suggest a completely different disjuncture of words than expected.

As mentioned before, Pierrehumbert's research (1980) led to the creation of the Autosegmental-Metrical model for phonological interpretation. Summarizing the gist of this idea, always in relation to how ToBI reified it, it is suggested that tunes can be realized as consecutive H and L target points in a linear representation of an autosegmental tier (in other words, of a unified metrical tree that bears associations between strong nodes [pitch accents] and edges) (Arvaniti 2012). The idea of locality and mismatch between the number of tones and the number of Tone Bearing Units (TBUs), mentioned above, is also generated from the development of AM model (Arvaniti 2022). Finally,

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[13] The marking points of this tier vary from a scale of 0 to 3, with each value reflecting a different level of break. In detail, 0 is used for total cohesion between words that form one Prosodic Word (similar to inter-word junctures), 1 for ordinary phrase-internal word boundary between separated Prosodic Words, 2 for separation between two consecutive intermediate phrases (ips) inside the exact intonational phrase (IP), placed consistently on the right of the ip, and 3 indicates the end of the IP with a bracket on the right of the IP (]) (Arvaniti and Baltazani ibid.).

Pierrehumbert (1980) supported that instances of bitonality are evidence of the tonal stretching out with no one-to-one correspondence between tones and phonological points.

Of course, there has been a lot of criticism, reevaluation, and reconsideration regarding the concepts described in the AM model. Gussenhoven (2018) is open to some of the AM's principles; however, he opposes the taxonomy of this model, and, more specifically, the proposed universality of it, suggesting that languages have bold structural differences among them. In addition, Ladd (2022) discusses the case of *uptalk* (widely used in American and Australian English), voicing some objections about how easily transcribers are led by a preset of intonationally uniformed interpretations of the phenomenon, disregarding the fact that the notational AM model should be excessively used for the phonetic account of so ambiguous phenomena (Ladd 2022: 252-254).

No matter what the objections are, it is more than appreciated that the AM model has brought some crucial changes in the mindset of phonologists, and the development of frameworks like the ToBI can provide informed and detailed analyses of intonational and broader phonological issues. There are still things to be considered, however, and the complexity of the concepts prevailing in such a prescriptive and practical approach makes the British-wise illustrations (pedagogical models) seem easier to understand and friendlier to use. A short discussion of them follows below.

2.3 Pedagogical and other intonational models: *then and now*

Before analyzing the purely pedagogical models that originate in the early stages of phonological analysis and are still widely appreciated and used, there should be a brief notion of the various models developed by some theorists in order to approach more detailed aspects of phonology.

In Fujisaki and Ohno (1997), there is an introduction to the basic principles of the models of analysis regarding the F0 movement's interpretation and synthesis. In this multilevel explanation, Fujisaki and Ohno note as important requirements the proper F0 scaling, the estimation of error measurements, the shape of the phrase and the accent components, and compare the "Piecewise linear" model to the "Command-response" model, each one making its own contribution to the contour analysis of F0.

Furthermore, Bernardy and Themistocleous (2017) provide an exciting model aiming more at a proper classification rather than an examination of the prosodic analysis of sentences between Cypriot Greek and Standard Modern Greek, focused on statements and questions.

Xu, Lee, Prom-on and Liu (2015) provide an answer to both the drawbacks of the AM model mentioned above (more specifically to the objections raised by Ladd regarding the phonological uniformity) and to the critique made by Arvaniti and Ladd (2009) towards their Parallel Encoding and Target Approximation (PENTA) model of analysis. This model sheds light on the communicative function and the articulatory mechanisms of speech that can be traced to prosodic features of speech. In fact, it aimed at connecting prosody with the meanings conveyed by it in order to find ways of decoding prosody (Yu et al. 2015: 507). This can certainly approach the concept of one-to-one correspondence between sentence structures and prosody (opposite to what is supported in Arvaniti 2014; 2022), or even a one-to-one correspondence between prosody and speech acts (similar to Kotsifas' 2009 point of view).

Pedagogical models (related to the British conception of intonational analysis) are known for their easiness in use and also for maximizing the intelligibility of intonational analysis on the part of the learners. Some core concepts of these models coincide with the concepts found in the British School of thought

referred above, the most important of it being the configuration of tones as dynamic global entities that reflect falls, rises and combinations of them. Also, the British view of intonation gives rise to the importance of one nucleus per intonational phrase (being the rightmost prominent syllable of the content word), separating it -at least, intonationally- from what happens in the pre-nucleic and post-nucleic parts of the sentence (that is, from the *head* and the *tail*, respectively).

In terms of illustration, all pedagogical models prefer effective but easy-to-understand linear illustrations of pitch movements. From a wide range of illustrations, Cruttenden (1997) seems to prefer the visualization of pitch levels as three horizontal lines, parallel one to the other, indicating the high, middle, and low levels of pitch, top-down. As for tones, he indicates each stressed syllable with a minor dot (°), and the accented syllables (nucleus including) with a bold bigger dot (●). The movement of the pitches is indicated with upward (R) or downward lines (F), starting from the dot onwards. Also, there is a specific marking for the in-text inscription of tonal moves: [↘] for falling tones, [↗] for rises, [∨] for fall-rises, and [∧] for rise-falls, [>] for the level plateau. Tonality is indicated with [/] for intermediate phrases and [‖] for intonational phrases' end. This illustration applies to many other theorists, including Wells (2006) among others. To give an example:

[1] "It's Johny!" → high-falling tone on '**Jo**hny' (and a slight rise at the end)
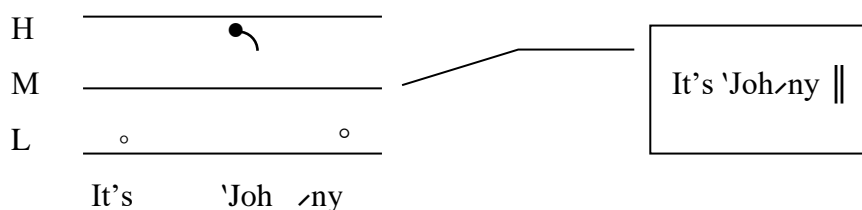
(Cruttenden 1997: 10)

Another fine illustration can be found in Bolinger (1998), with the use of some *squiggly* lines moving in all directions with respect to the pitch movements of the utterance:

[1] "I've lost more patients that way!" → a falling and immediately rising
movement

more
pa
I've lost   *tients that way!*
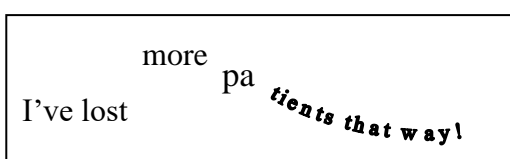
Even in the aforementioned ancestor of ToBI, the INTSINT model, the visualization of pitch movements is easy to follow and provides a solid understanding of the F0 fluctuations during the production of an utterance. Sticking to the above example, INTSINT representation would be as follows:

[2] "I've lost more patients that way!" → a falling and immediately rising
movement

I've	lost	more	patients	that	way!
[	→	⇑	>	⇓	↑]
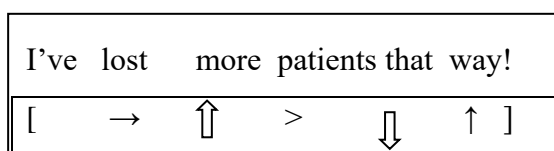
Of course, it should be mentioned that the latter representation cannot be considered purely pedagogical; although its annotation marks are comprehensible (*ups, downs, levels*, etc.), INTSINT set the foundation of the acoustic analysis found in the Autosegmental approach to intonational analysis.

Chapter 3 is dedicated to the methodology followed in this dissertation. The American type of intonational analysis, with the use of the ToBI framework and the Autosegmental-Metrical approach, was preferred for a number of reasons, the most important being: a) its relevance to the most up-to-date metrical analyses run by the greatest majority of researchers; b) the inclusion of the phonetic parameter which is considered of extreme importance for a detailed examination of intonation. Although personally, I find that the British School of analysis has accomplished maybe one of the most essential missions, that is, the development of comprehensive and analyzable material for obtaining a deep understanding of pitch variations that can and has been used in ELT, I opt for the American methodology for its capability of an in-depth, thus accurate, investigation.

Chapter 3
Methodology

3.1 Introduction

This study presents a small-scale research based on different realizations of F0 and the intonational patterning of specific polar questions in SMG and StBrE. For analyzing such precise elements of prosodic speech, it was necessary to collect a good number of data to have valid outcomes. For that reason, thirty tokens[14] were chosen (with *token*, I mean each polar question analyzed) of Greek and English polar questions, the selection of which was based on specific parameters analyzed below.

The aim of this research is to provide an auditory and acoustic analysis of pitch patterns of the aforementioned languages, looking both for qualitative and quantitative values. Of course, there were specific restrictions (see Chapter 5), but the pool of data managed to give some illuminating findings, which come to be added to what was mentioned in the literature review part as the intonational norm of the two languages, regarding polar questions. Last but not least, it must be noted that the data were collected under specific conditions, in order to meet the needs of the research questions set in the beginning (Introduction, p. 6).

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[14] All data can be accessed through the following Google Drive link; the taxonomy is in accordance with the taxonomy followed in this dissertation.
https://drive.google.com/drive/folders/1ZBY595zmCT5ytV5JUB_Xzn6o4kIz2gyp?usp=share_link

3.2 Collection of the data

3.2.1 Standard British English online data

Twelve tokens were collected, used, and analyzed for the examination of pitch patterns in the production of polar questions in English, specifically chosen to provide speech utterances of the StBrE accent.

Regarding RQ 1 (related to intonational differences between the two languages mentioned in Chapter 1, sections 1.2 and 1.3), there were six audios downloaded from two different online corpora of spoken English, namely *the UCLA Phonetics Lab: Phonetic Database by Peter Ladfoged* (http://phonetics.ucla.edu/index.html), and *the Intonational Variation in English (IViE project) by Esther Grabe and Francis Nolan* (http://www.phon.ox.ac.uk/files/apps/IViE/index.php).

The data extracted from the aforementioned sources follow some specific prerequisites. First, there was no selection of negative polar questions, and all sentences (more or less) are morphosyntactically marked, following the polar questioning conventions of English described in Chapter 1 (section 1.3). Of course, there was no indication of pragmatic interpretation since all tokens were isolated and, thus, decontextualized, so each sentence's intonation could be pragmatically interpreted according to the norms discussed before.

On a similar note, another six audios were recorded from the BBC online website (https://www.bbc.co.uk/sounds), where there are lots of podcast discussions and interviews. This specific site was preferred since it includes a collection of spoken discourse in StBrE[15]. The podcast from which the audios

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[15] Standard British English is equivalent and closest to the so-called 'BBC accent' (named after BBC, representing the accent selected by the formal broadcasters of the BBC news). For that

were recorded are the following: *Transfer Gossip Daily*, *Just One Thing (with Michael Mosley)*, *The Martin Lewis Podcast*, *How Do You Cope?...with Elis and John*, *Sliced Bread*, and *Wellness: The Curious Collection*. The latter six tokens could not be precisely of the same length and value as the ones extracted from the online corpora. However, there was an effort not to exceed the time limits followed in the first six tokens. This two-fold distinction (i.e, the collection from two corpora and the recording of authentic speech from podcast interviews) aims at examining RQ 3, which examines whether there is a difference in pitch contouring of polar questions respective to style differences. So, there is evidence for both instructed and spontaneous speech.

Appendix II (p. 90), Table 8 shows the classification of the tokens per language and style. More specifically, EN-1 is used to indicate the collection of the English data extracted from corpora, while EN-2 is used for the recorded audios. The second part of this labeling (*_number*) is the number of the utterance under examination. The same applies to the Greek data; GR-1 indicates data of instructed speech (offline recordings), GR-2 indicates data of spontaneous authentic speech (online recordings), and GR-3 is used for the English polar question produced by NSSMGs (offline recordings).

3.2.2 Standard Modern Greek online and offline data

For the SMG polar questions' investigation, there was again a division of two different sources of data extraction preferred. More specifically, twelve tokens were collected, both from online and offline sources.

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reason, recordings from authentic BBC podcasts were chosen for the analysis of the StBrE spontaneous speech intonation of polar questions.

The first six tokens are recordings of six native speakers of SMG. In an effort to minimize age and sex variation, an attempt was made to include three female and three male participants aged from 22 to 28 years old. An effort was made to select NSSMGs who were competent users of English, so that it is ensured they have been, at least on a very basic level, exposed to kind of formal language performance. The participants were recorded while producing one specific sentence provided to all of them:

[1] "*Θέλεις να πάμε σινεμά;*"

    [θélis na páme sinemá]

    ["Do you want to go to the cinema?"].

Through this procedure, the investigation of the intonational contours preferred by NSSMG in the production of Greek polar questions was aimed (RQ 1). In addition, all participants were instructed to think of a specific context in which such a question could occur while uttering the question. After the recording stage, they were given a questionnaire (see Appendix I, p. 89, Figure 35) created with the Google Forms tool to select (among a number of options) the context they had in mind while uttering the polar question. That way, the investigation of the pragmatic inferences that native speakers make when using particular intonational contours in questions is possible (RQ 2). After all, the close link between intonational choice and pragmatic interpretation has long been made obvious (Baltazani and Jun 1999; Kotsifas 2009; Jeong 2016; Tian et al. 2021; Nolan 2022). In the same questionnaire, they were asked to confirm whether they consented to have their recordings analyzed and used for the purposes of this research or not (Appendix I, p. 89, Figure 35).

The other six tokens were extracted from the TikTok online platform. More specifically, six video recordings that included authentic, spontaneous speech were downloaded, and, after an editing procedure necessary for isolating the

polar question part, these video recordings were converted into audios in order to undergo intonational analysis. This pool of tokens indicates what intonational contours can be observed in spontaneous, authentic speech, contrastive to what happens in the instructed questions recorded by the NSSMGs (RQ 3 about stylistic differences).

3.2.3 English data from NSSMGs

This last part of data collection is tightly connected to the second research question of this dissertation, that is, whether interference can be spotted when NSSMGs produce English polar questions. For this question to be answered, six tokens were recorded. The same NSSMGs who had been recorded for the Greek polar questions were later recorded, producing the following English polar question[16]:

[1] "May I lean on the railings?"

[meɪ aɪ liːn ɒn ðə ɹeɪlɪŋz]

3.3 Autosegmental-Metrical Method of Data Analysis

The approach selected for analyzing the data and interpreting the intonational contours of SMG and StBrE is the Autosegmental-Metrical one, adopting the ToBI framework of annotation. One of the greatest reasons for this choice is the fact that the vast majority of research on this specific topic is conducted in relation to this method, making the process of acoustic analysis easier to follow. Further than this, the software/tool used for such an analysis (Praat) can provide a more detailed and in-depth examination of the intonational contours.

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[16] This is one of the questions found in the English corpora; the selection of it was random.

Praat is a well-structured tool that sets a number of parameters for the precise interpretation of an audio's prosody and the extraction of some core intonational features, like contours, pitch movements, pitch range per minute, intensity, and others. In relation to the needs of this dissertation, parts of the tool were not included in the analysis. To be more specific, each audio was first opened via Praat (after going through a converting process in order to be transformed into '*.AIFF*' type files – one of the only acceptable types of audio files in this tool; this process was made with the use of *Switch Sound File Converter* software); then, it was converted into *mono-sound* audio (essential for getting the pitch of it). The next step was to use the "Annotation" button in order to get the "TextGrid" analysis, where the annotator should set the number of different *grids* (tiers) and name them accordingly. Following the guidelines provided on the Praat website by P. Boersma and D. Weenink[17], the tiers set for this research are: *Words, Phones* (these first two interval tiers are aligned in the "View and Edit" section of the tool for TexGrids), *PrStr, Tones, and Points* (last tiers are manually processed by the annotator). Finally, "Visible pitch contour" (in semitones)[18] and "Visible pitch contour and TextGrid" options are selected for the graphic representation of the intonational contour. The analysis focuses on the last part of each utterance, that is, the movements of F0 and the production of ip and IP pitches, on the basis of the final boundary tone selection and the phrasal tone selection, in relation also to the nucleic syllable (appeared either at the very end or before it in the IP). The *Points tier* is the one that gives additional information regarding tonality (that is, the intonational division of the message into pieces of information through pauses) so that all three important intonational

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[17] https://www.fon.hum.uva.nl/praat/

[18] Semitones are considered all the tonetic points in the intonational contour of the melody, which can be perceived by an untrained human ear. Due to this characteristic, they have been the fundamental element of logarithmic scale for the examination of pitch movements (Hirst and De Looze 2020)

choices that speakers make when decoding or producing an IP are examined (Wells 2006).

Finally, it should be mentioned that an immense amount of help and guidance came from the research and the guidelines found in some important researchers' websites for prosodic analysis: A. Arvaniti's on GRToBI[19], E. Kainada's[20], C. Themistocleous'[21], X. Yu's[22], and also to Praat and PoLaR[23] official websites.

Summing up, Chapter 3 presented all four corpora of data used for the purposes of this research, namely the English spontaneous and instructed speech tokens (retrieved from recordings of online podcasts and credible corpora, respectively), and the Greek spontaneous and instructed speech tokens (extracted from offline recordings of participants and online recordings of videos on TikTok). Finally, an explanation of the tools used for the analysis was provided. In the following Chapter, there is the presentation of the findings of this short-scale research, as interpreted in the Praat tool of annotation and analysis.

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[19] https://www.amaliaarvaniti.info/grtobi

[20] https://ekainada.wixsite.com/home?fbclid=IwAR2dYu4ZDUIxTmgzdN0Hqj7GQb9D--C9pYKMSKNLbycfIsj5IUtXqzm8ucg

[21] https://charalambosthemistocleous.com/

[22] http://www.homepages.ucl.ac.uk/~uclyyix/

[23] https://www.polarlabels.com/home

Chapter 4
Analysis of the results

4.1 Prosodic norms and deviations in Standard British English polar questions

Findings regarding the norms of the StBrE intonation of polar questions, according to the relevant corpora, are presented in this section. First, there are the illustrations of pitch movements (for a cross-reference of the graphic representation of pitch contours in linear form, similar to pedagogical models, see Appendix II, p. 90, Figure 36 onwards), and at the end of the section, there is a table that presents the ip and IP tones observed. Note that, the same procedure applies to all sections following. Also, in the great majority of the sentences, ip and IP boundaries coincide (since the sentences are limited to one ip). The boundary tone is included in red circles, while the blue circle includes the preceding tone.

Figure 2 EN-1_1 (*"You remembered the lilies?"*) →**H* & H%**
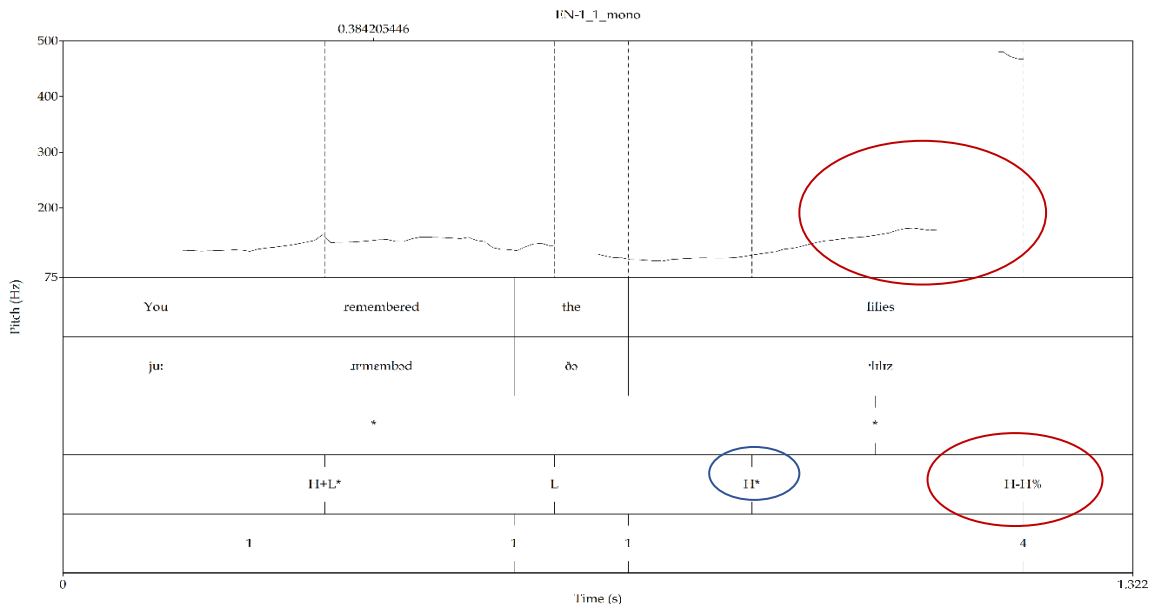
In this example, the speaker seems to initiate the question with a level % boundary initial tone on 'You' (maybe if the format of the polar question started conventionally with the fronting of the operator 'Did', the boundary initial tone would be different) in order to intensify their pitch acceleration on 'remember' as an H+L*, with a step-up on 're-' and an intense, nucleic downstep on '-me-' that is stretched to the following syllables '-mbered'; 'the' begins a bit higher in order to emphasize the basic nucleic accent that starts on 'li-' and is carried away throughout 'lilies', resulting in an ending boundary H% pitch. (*see also* Appendix II, Figure 36, p. 90)

Figure 3 EN-1_2 (*"May I lean on the railings?"*) ➔**!H & L*%**
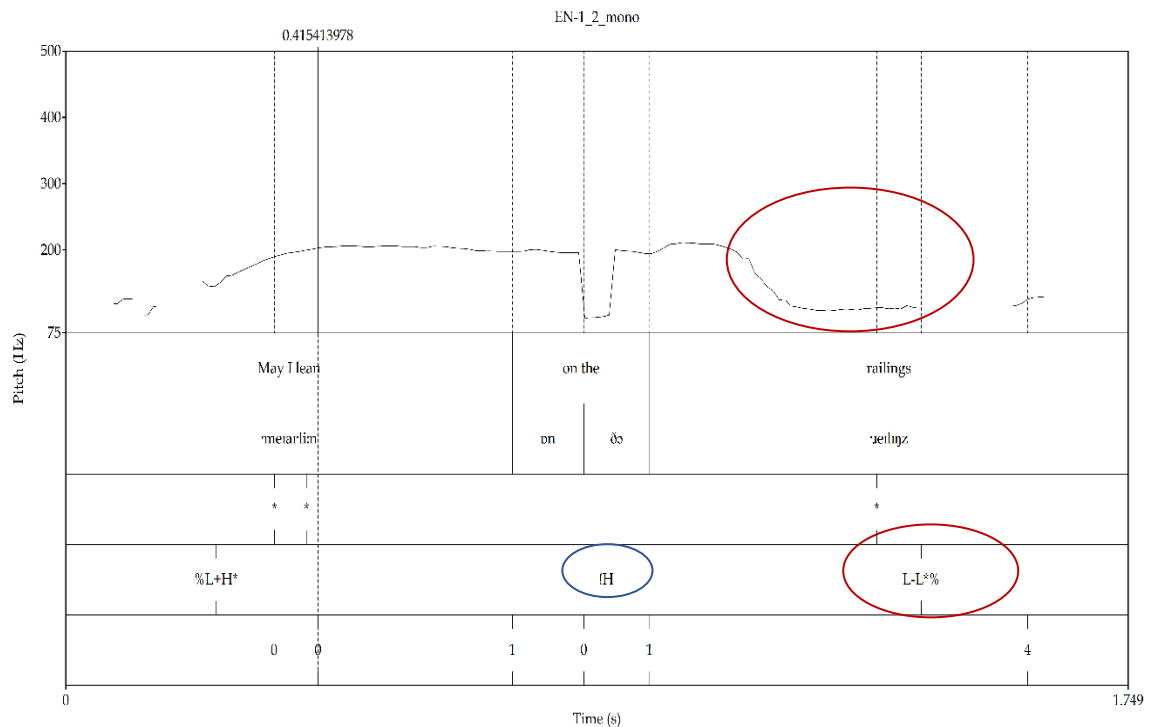
Example EN-1_2, contrary to the previous one, makes use of a fronted operator and this seems to reflect a different boundary initial pitch (%L+H*) that degrades on 'may I' in order to rise on 'lean', providing a primary nucleus at the very beginning of the sentence (as in the above example, the positioning of a nucleus at the very beginning, even when two nuclei seem to share the same

sentence, is really idiosyncratic and maybe connotates some kind of pragmatic marking). What follows on 'on the' is not a fall but a downstepping !H that steps up the pitch level and paves the way for the final lowering of the pitch on the main nucleus ('-lings') which is preceded by an L- phrasal pitch. The nucleus here coincides with the boundary ending tone but not with the accent of the nucleus-bearing word ('rail-'). (*see also* Appendix II, Figure 37, p. 90)

Figure 4 EN-1_3 (*"Are you going home?"*) →**L*+H%**
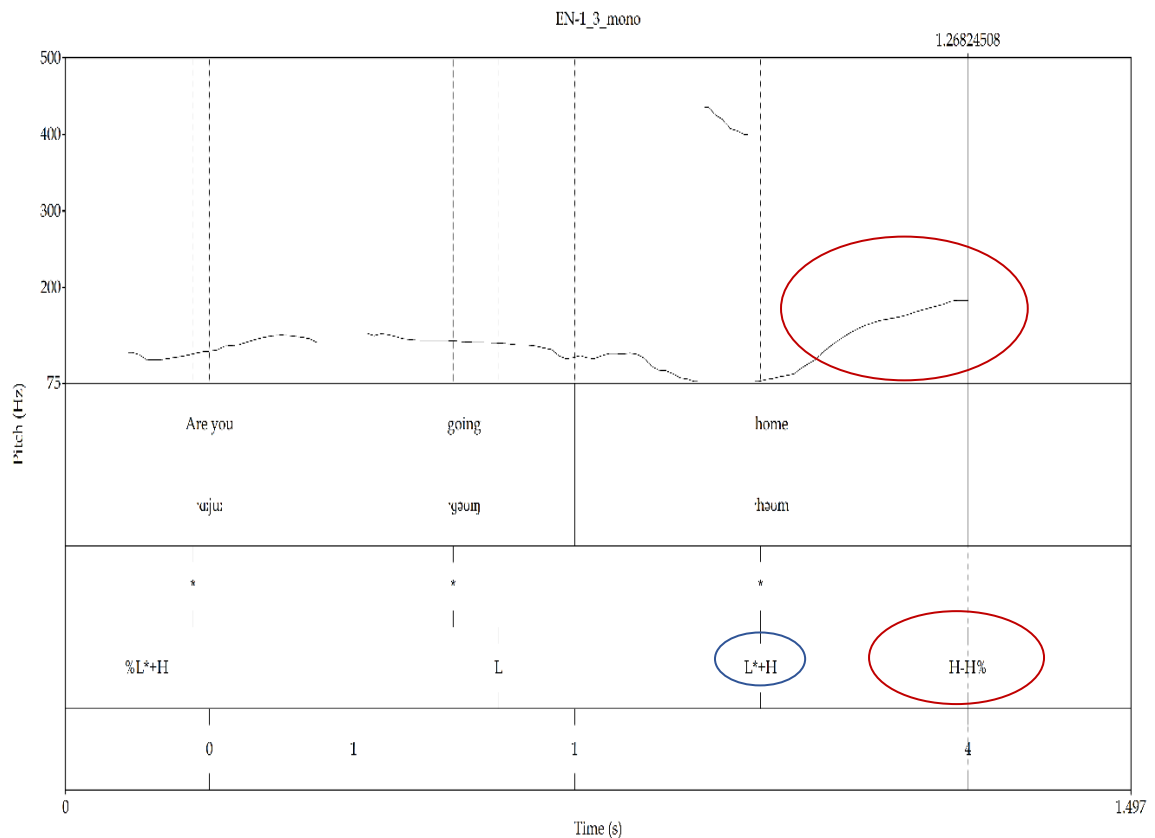
Again, this is an example of typical formation (inversion of the operator and the subject) that also shows the idiosyncratic accentuation of initial nucleus positioning at the boundary initial tone %L* on 'Are'; immediately the pitch seems to go higher, starting from an H on 'you' that stretches out and lowers on the basic nucleic L* tone placed on 'ho-', just before it rises again on the

breathing out at '-me', producing an L*+H-H% contour at the IP boundary. (*see also* Appendix II, Figure 38, p. 90)

Figure 5 EN-1_4 (*"Are you going away?"*) →**L*+H%**
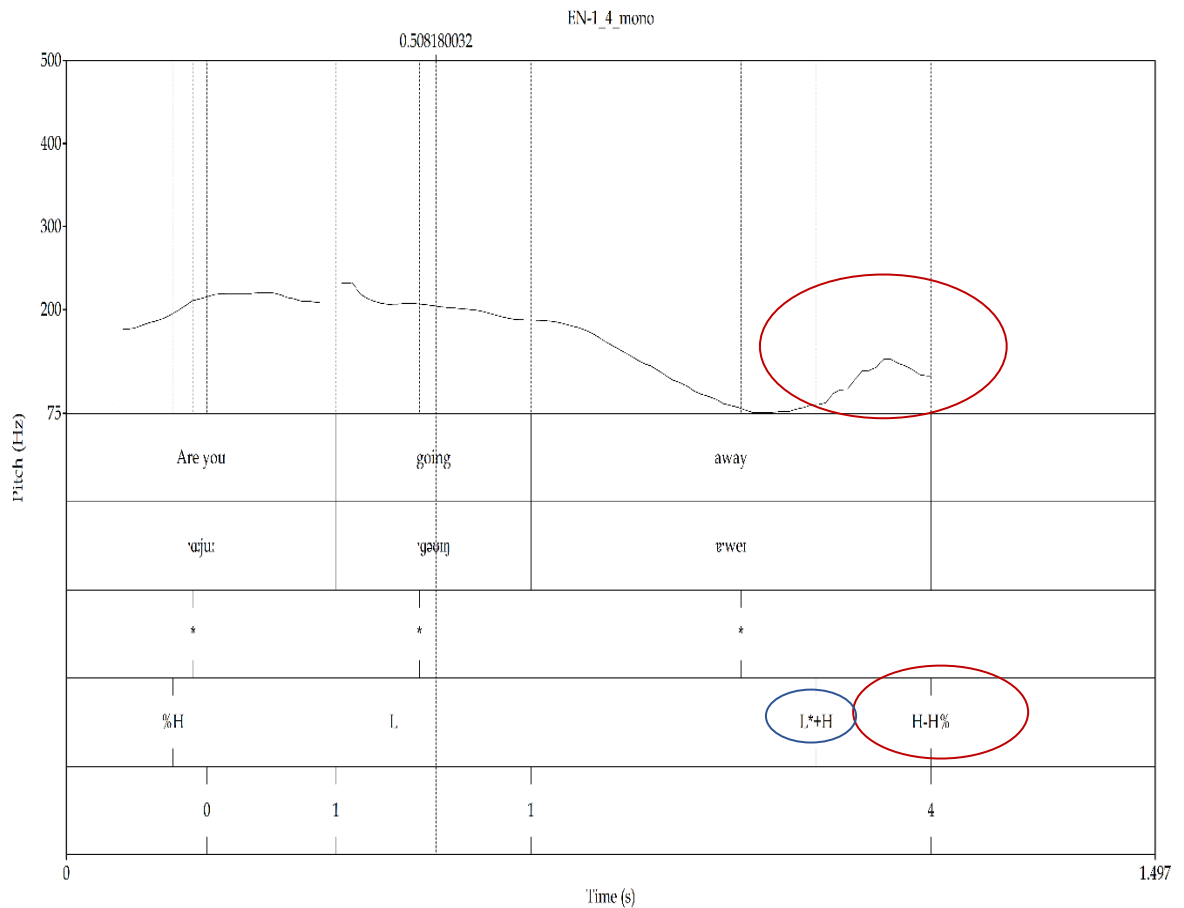
EN-1_4 is similar to the previous one in terms of formation (inversion of 'Are' and 'you'), without this time setting a preceding nucleus at the very beginning. Here, the %H boundary initial pitch on 'Are you go-' lowers on '-ing a-' and boosts the pitch to an even more degrading level for the nucleus L* on '-wa-' which, finally, rises at the end on '-y'. Here, the nucleus coincides with the accent of the word on which is located; in terms of breaks, it seems that there is a slight stoppage before the nucleic production, maybe subconsciously for emphasis purposes. (*see also* Appendix II, Figure 39, p. 90)

Figure 6 EN-1_5 (*"He's on the lilo?"*) →**H* & H%**
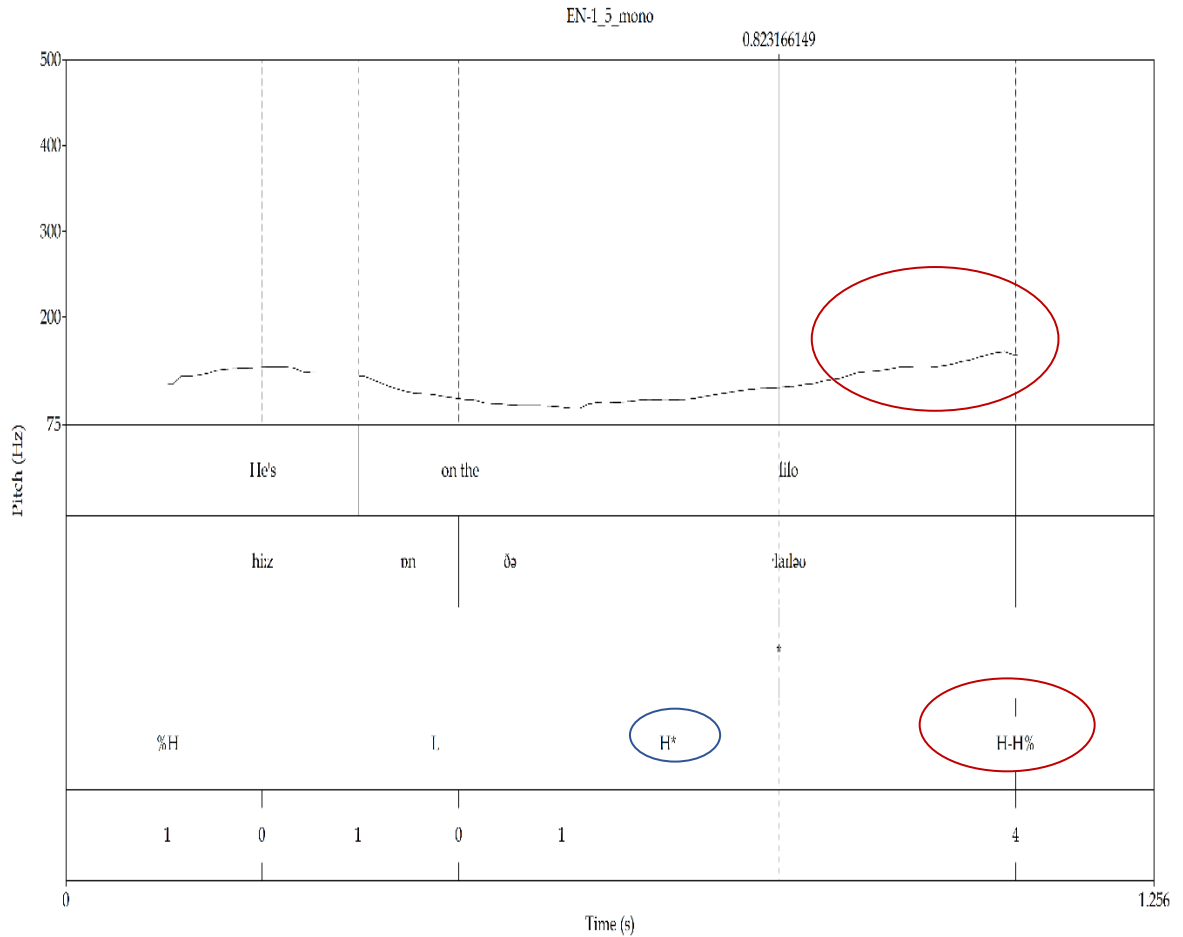
This example that could be characterized as a Queclarative (no morphosyntactic indication is used) is an interesting case of consecutive rising tones. More specifically, an initial %H pitch is conserved end-to-end (we cannot be that decisive regarding an L spotted on 'on the', since the degrading curve on the waveform cannot reflect a downward pitch but rather a leveling conservation of the high in a subtle way, with less intensity than expected), with an upstepping on the syllable 'li-' which rises even more on the nucleic (H*) syllable '-lo'. The nucleus identifies with the ending boundary H% pitch. (*see also* Appendix II, Figure 40, p. 91)

Figure 7 EN-1_6 (*"Will you mail me my money?"*) →**H* & H%**
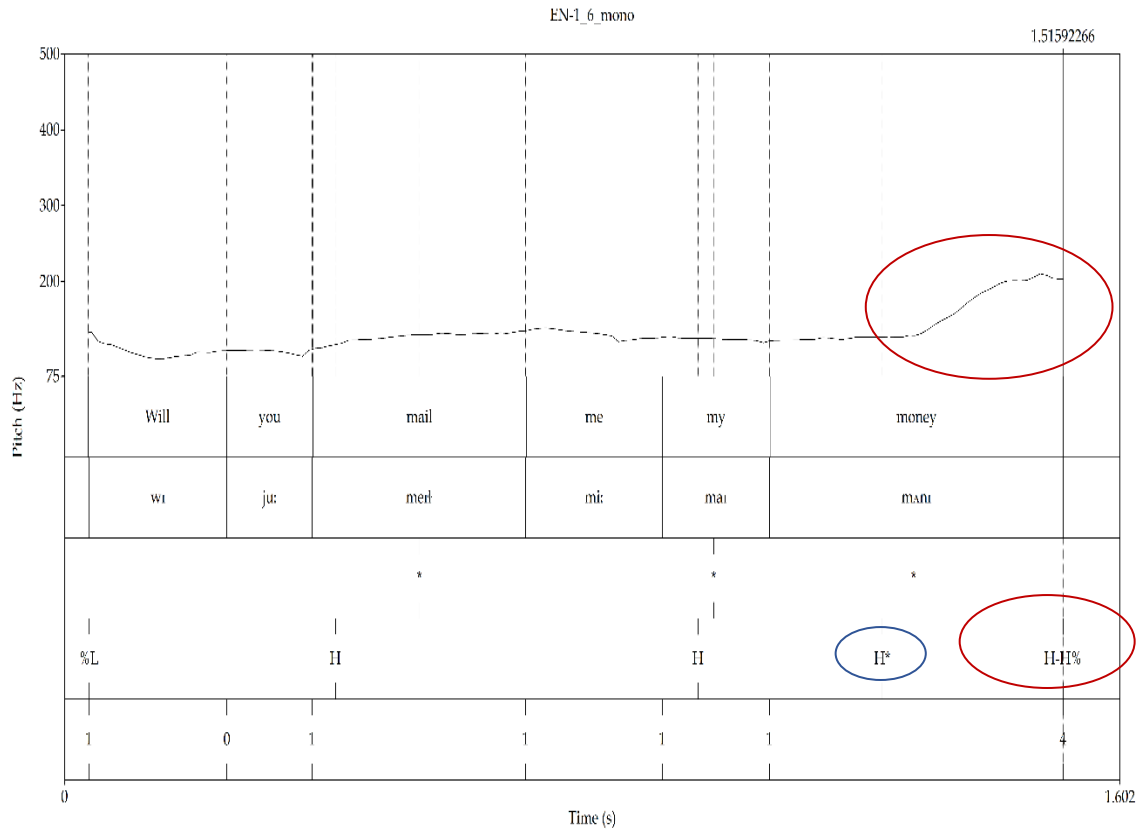
This final example of instructed speech is also formed in the typical inversion format, but again, no '*pre-positioning*' of the nucleus on boundary initial place is spotted. The question starts with an %L that starts stepping up on 'mai-'; it then boosts on 'my' in order to reach its ultimate rise on '-ney'. Again, the H nucleus is not placed on the accented syllable 'mo-' (but on its following one, i.e. '-ney'). (*see also* Appendix II, Figure 41, p. 91)

The results meet the definition of unmarked English polar questions as rising. More specifically, five of the examples analyzed are realized with an ending H% boundary tone, preceded mainly by H* or even bitonal L*+H intermediate phrasal tones. Only EN-1_2 shows a probably marked alternative to the above; in detail, EN-1_2 provides a downstepped !H immediately followed by a strong

L*-L%. It is impossible to know the pragmatic effect of EN-1_2's deviated intonational contour[24].

Table 1 Analysis of the StBrE polar questions (instructed speech)

Token	Contour	Characterization
EN-1_1	H*H%	Rising
EN-1_2	*!HL*L%*	*Falling*
EN-1_3	L*+HH%	Rising
EN-1_4	L*+HH%	Rising
EN-1_5	H*H%	Rising
EN-1_6	H*H%	Rising

Figure 8 EN-2_1 (*"For you, is that the reason?"*) →**H* & H%**

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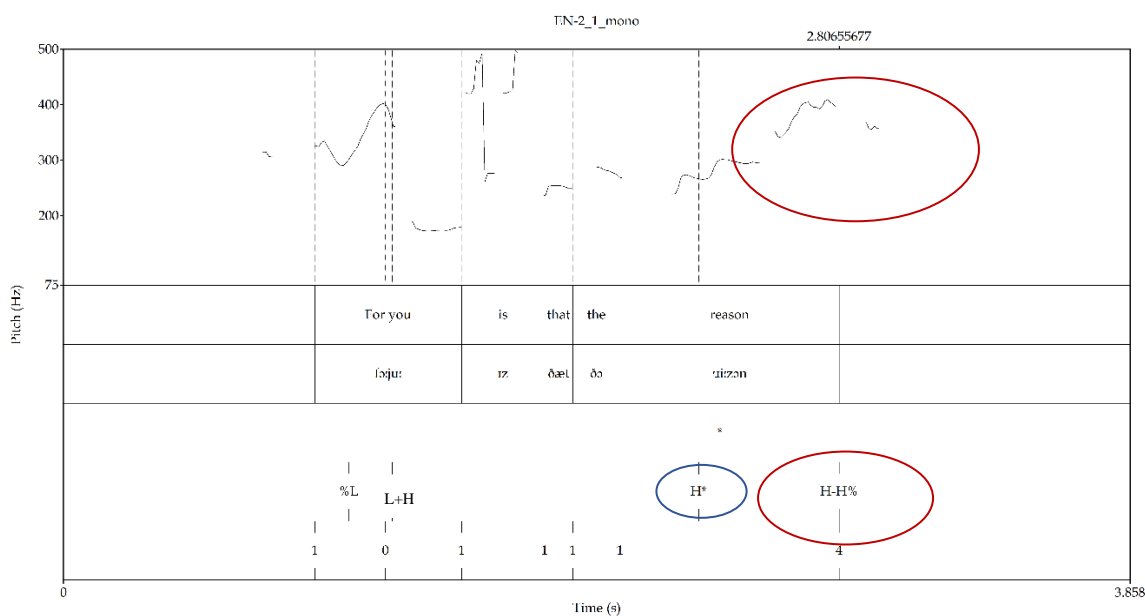
[24] Regarding questions' format, most of the examples follow the syntactic conventions of polar questions described in sections 1.2 and 1.3 (inversion, use of a fronted operator, etc.). However, some of the examples deviate from these conventions without losing the meaning of real questions.

In example EN-2_1, there is an introductory phrase (*head* in terms of the British school characterization) which, as happens in the majority of heads, presupposes a bitonal pitch, either an L+H (most likely) or a -rare- H+L; in this case, the boundary initial pitch is an %L on 'For' (it could be interpreted as a level, too), followed by an L+H on 'you'. An abrupt stop seems to take place, followed by minor leveling pitches on 'is that' which cue up the following H pitch on 'the', introducing the even higher pitch on the accented 'reas-' that results in a very high -boundary ending- nucleus on '-on'. (*see also* Appendix II, Figure 42, p. 91)

Figure 9 EN-2_2 (*"Have there been studies which also showed actual changes in the brain"*) →**L* & L**
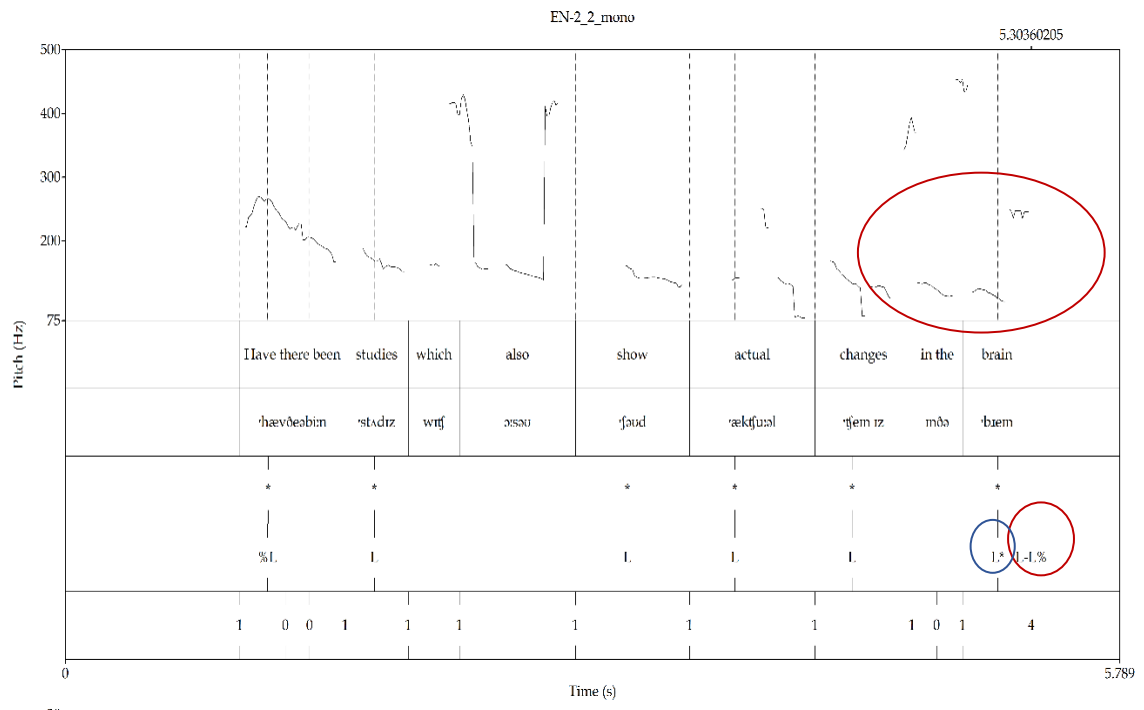
In parallel to the EN-1_5 (if interpreted as reflecting consecutive Hs), this example is interesting since it shows a series of downwarding falls, which however seem to be, most of the times, upstepping (initiated from a higher level than their preceding L pitch). In particular, the %L boundary initial pitch is

followed by at least five or six consecutive falls, all of them being disentangled from it preceding one; the starting %L, spotted on 'Have there been', is followed by an L on 'studies' which is followed by two upstepping Ls on 'which also' and 'show'; then, lower falls are placed on 'actual', on 'changes' and on 'in the bra-', so that the nucleus-bearing '-in' is the lowest one L*%. (*see also* Appendix II, Figure 43, p. 91)

Figure 10 EN-2_3 (*"Can they really say no?"*) →**L* & L**
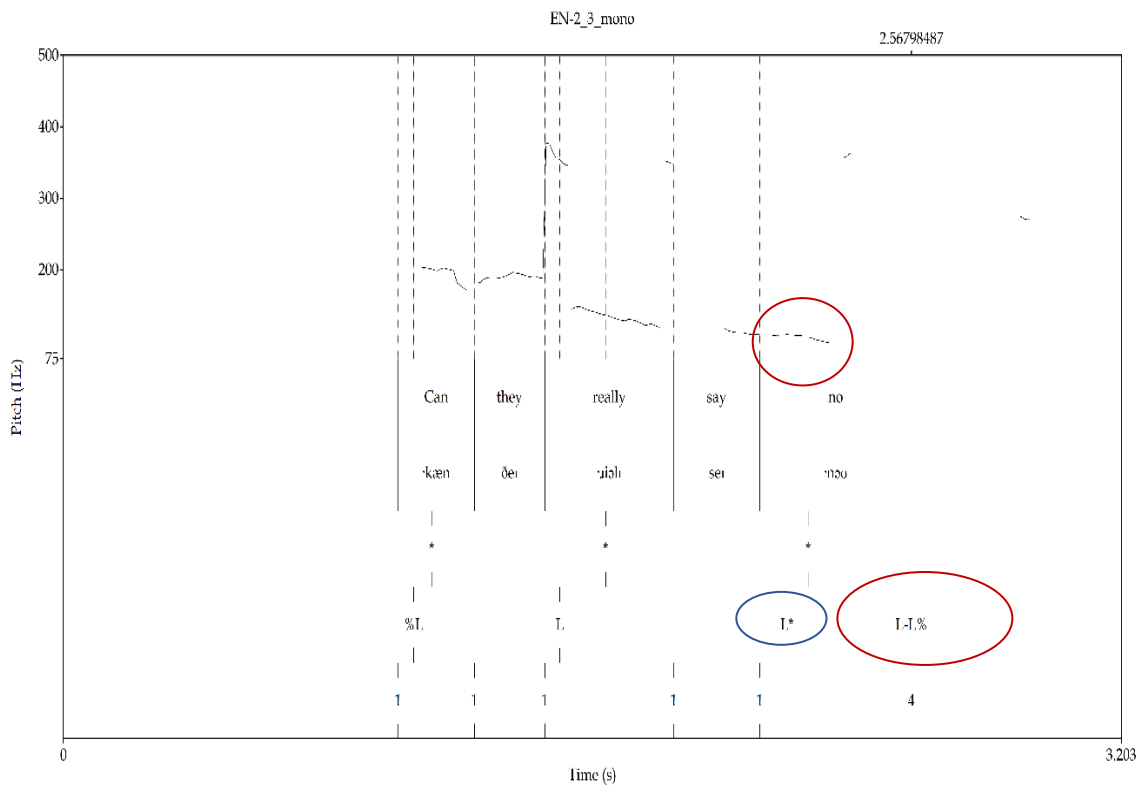
This example is structured with inversion (of the modal and the subject) and places the nucleus on the last accented content word 'no' (the accent coincides with the nucleus here). The contour is realized with many consecutive Ls that degrade end-to-end. (*see also* Appendix II, Figure 44, p. 91)

Figure 11 EN-2_4 (*"Have there been any sort of preparation or coaching for how to cope with that scrutiny"*) →**L* & L**
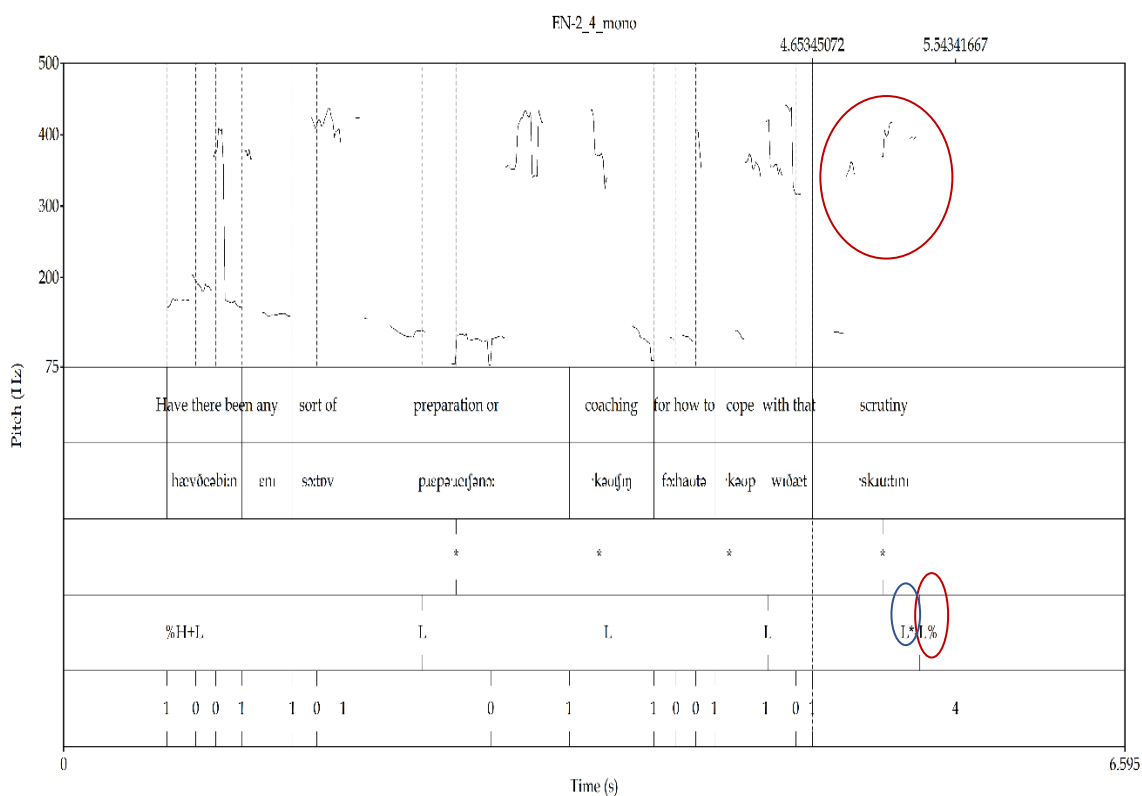
Example EN-2_4 is a long polar question that could also be analyzed as an ip from 'Have' to 'coaching'; in this part (ip), the boundary initial %H+L on 'Have there been any' (H emphasis on 'Have' and L emphasis on 'been any') is followed by a level on 'sort of' and immediately an upstepping L on 'prepa-', so that an intense L is placed on '-tion or'; the same L motive is repeated in 'coaching' and the affected 'for how to' introduces the L on 'cope with that'. Finally, the nucleus on '-ny' is an L*%, which is preceded by an L on 'scruti-'. (*see also* Appendix II, Figure 45, p. 92)

Figure 12 EN-2_5 (*"Does that chemistry improve?"*) →**H* & H%**
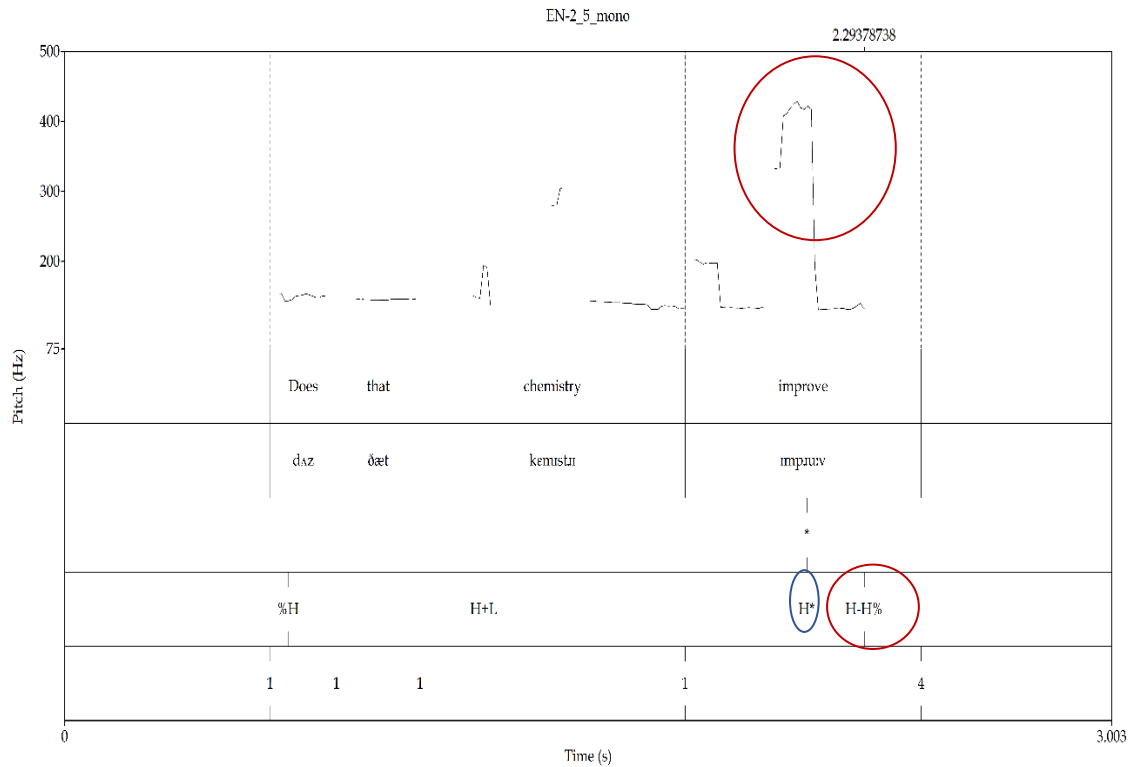
Here, it is interesting to see the rise-fall placed in the middle of the question (on 'chemi-' + '-stry'), without however affecting its surrounding Hs at the beginning (%H) and at the end of the phrase (H*H%). The nucleus is placed on the accented syllable '-prove'. The abrupt downward inclination of the pitch waveform which is found at the end of the sentence is justified by other prosodic parameters (such as breathing conditions, etc.) and does not reflect a pitch alternation (or, an F0 turning event). (*see also* Appendix II, Figure 46, p. 92)

Figure 13 EN-2_6 (*"Have you ever been to see your doctor and thought like they weren't listening to you?"*) →**L* & L**
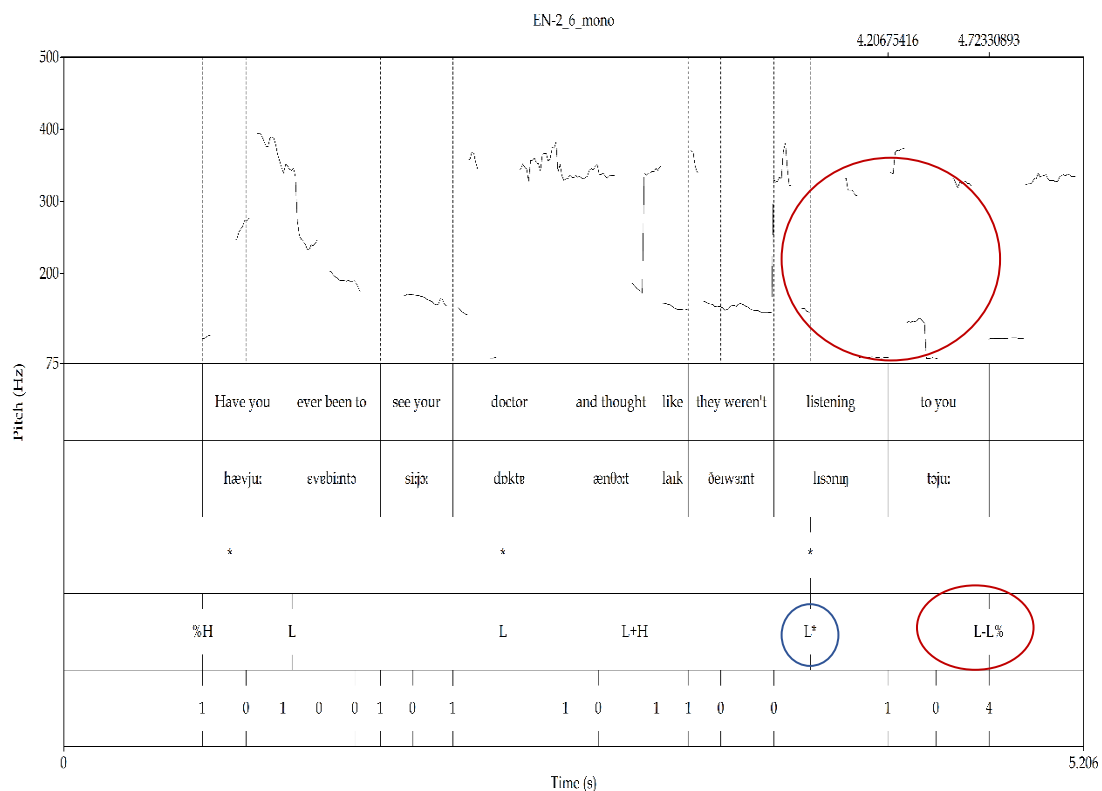
'Have you ever' is higher than 'been' which moves downwardly, affecting 'to see your'. After that, an upstepping L on 'do-' is conserved until the existence of an H on 'like', which is part of a broader L+H on 'thought like'. 'Li-' carries this time the nucleus (revealing a marked intonation) which is an L* followed by a boundary ending L% on 'you'. (*see also* Appendix II, Figure 47, p. 92)

Contrary to the results found from the analysis of the data of instructed speech, in the case of spontaneous speech, the prevailing contour is the falling one. More specifically, four of the six tokens are realized with an L% boundary tone, always preceded by an L*, outnumbering the two instances of the H*H% contour.

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Table 2 Analysis of the StBrE polar questions (spontaneous speech)

Token	Contour	Characterization
EN-2_1	*H*H%*	*Rising*
EN-2_2	L*L%	Falling
EN-2_3	L*L%	Falling
EN-2_4	L*L%	Falling
EN-2_5	*H*H%*	*Rising*
EN-2_6	L*L%	Falling

4.2 Prosodic norms and deviations in Standard Modern Greek polar questions

Figure 14 GR-1_1 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**
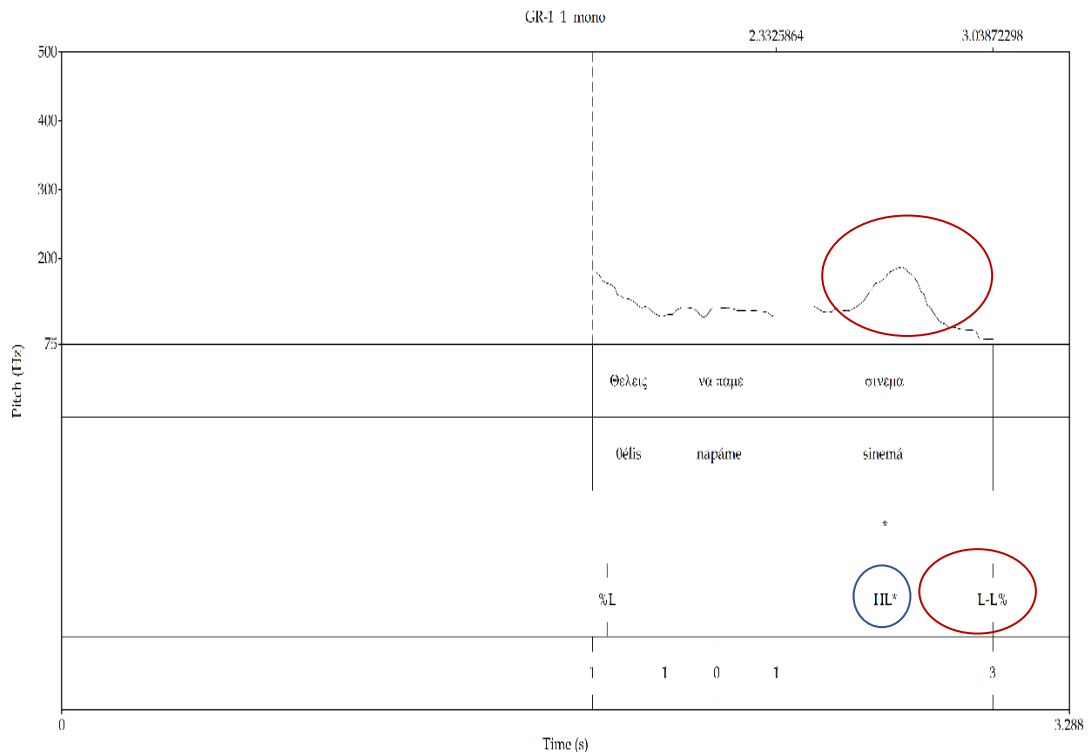
The overall lowering pitch movement that starts from the very beginning of the question ('Θε-') is interrupted by the typical H+L*% bitonal pitch of SMG polar questions, found in cases where the nucleus is placed on the very last vowel of the last, rightmost accented syllable of the sentence (here, this is '-α'). The nucleus coincides, therefore, with the accent of the word 'σινεμά'. (*see also* Appendix II,)

Figure 15 GR-1_2 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**
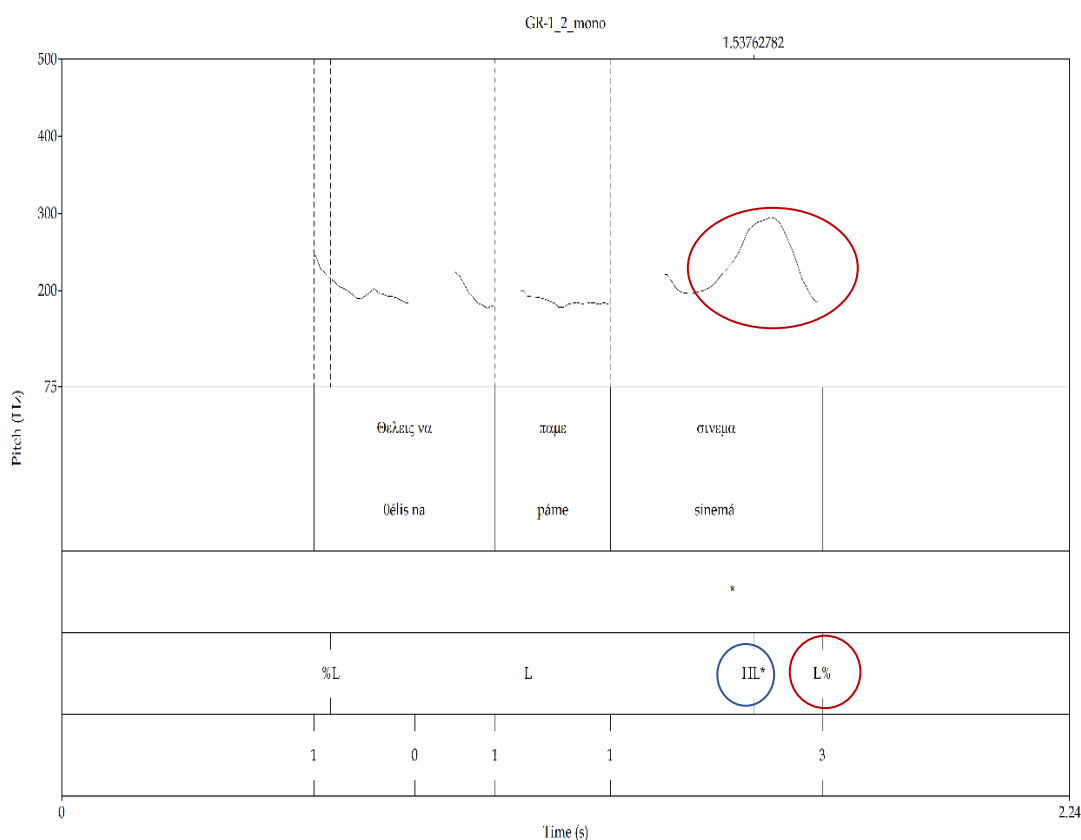
The exact same pitch pattern with GR-1_1 is followed here, too. (*see also* Appendix II,)

Figure 16 GR-1_3 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**
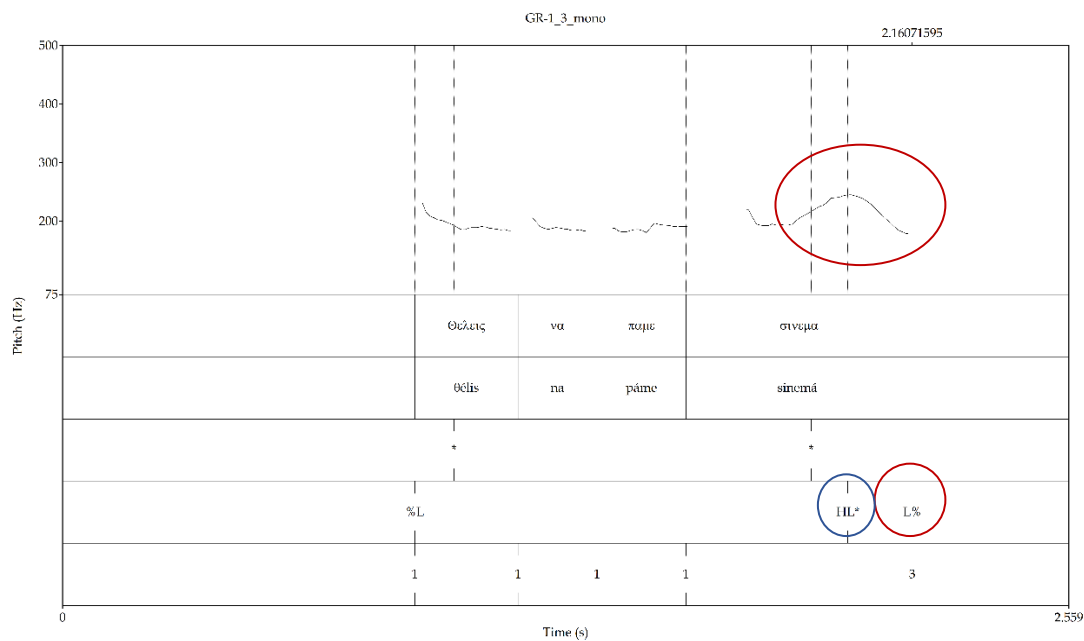
Same with the above examples (GR-1_1 & GR-1_2). (*see also* Appendix II, Figure 50, p. 93)

Figure 17 GR-1_4 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & H%**
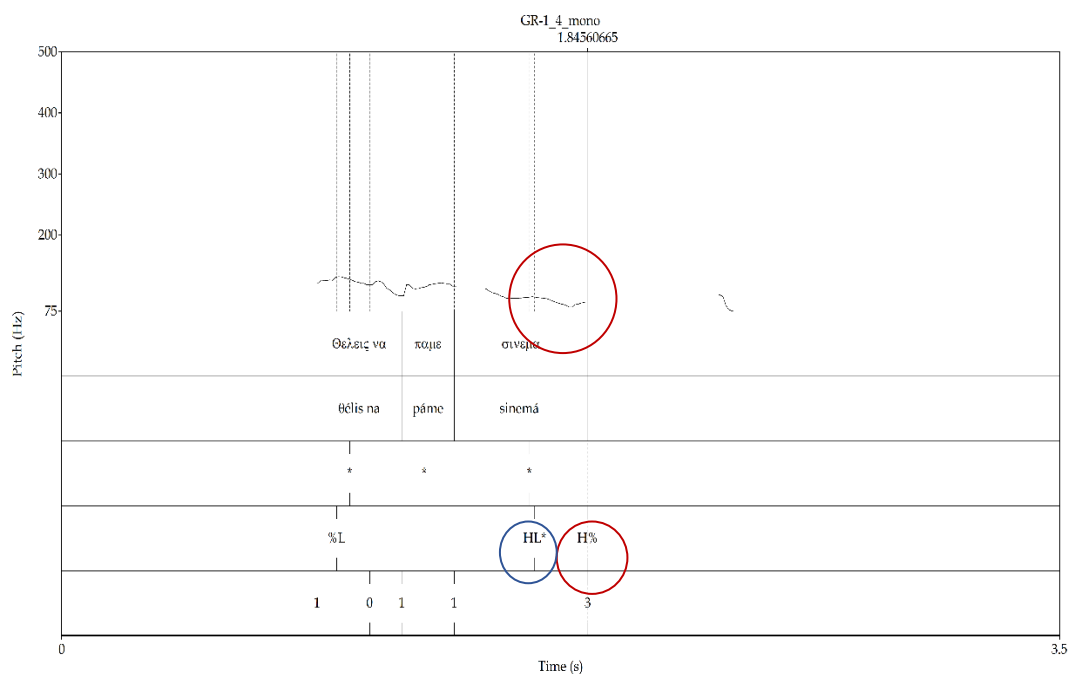
This is the first deviated pitch pattern in the examples of instructed speech offline recording. The speaker here applies the typical H+L* bitonal nucleic pitch but achieves to retrieve the H pitch at the very end (at the breath-out of '-α'), creating a marked intonational contour (justified by them as declaratory of surprise). (*see also* Appendix II,)

Figure 18 GR-1_5 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**
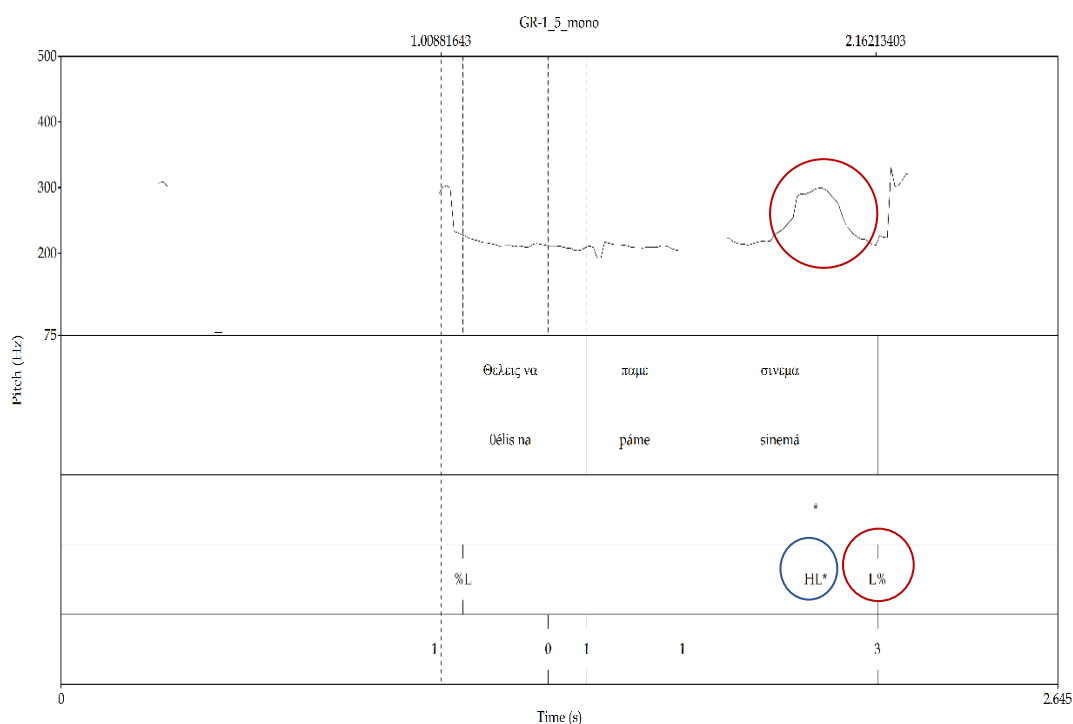
Here, the typical contour of the first three examples is spotted again. Note again that the upward line after the H+L* L% is irrelevant to pitch (it maybe result from breathing or other factors). (*see also* Appendix II,)

Figure 19 GR-1_6 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**
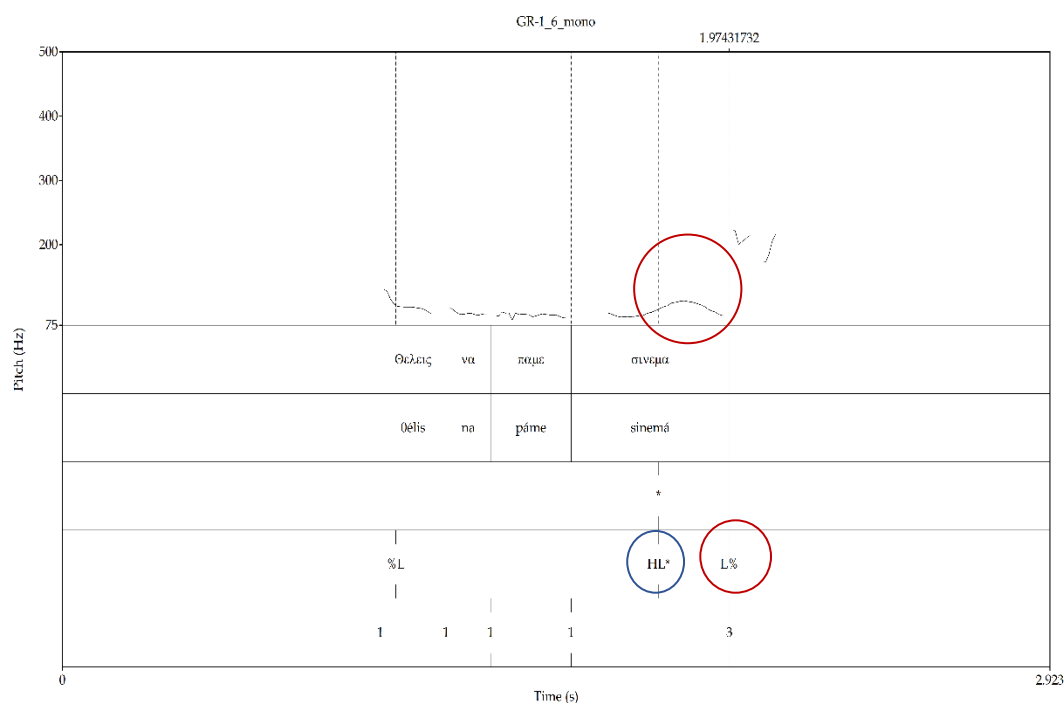
The typical pitch contour mentioned above is preferred here, too. (*see also* Appendix II, Figure 53, p. 93)

In the Greek polar questions produced by all participants, the phrase-final position of the nucleus is preserved, something which, according to Arvaniti (2002; 2009) can affect the overall pitch pattern of the sentence. Five tokens reflect a rise-falling tune (HL*) placed on the nucleus and are followed by smoothly degraded L tones. However, contrary to previously made observations (described in section 1.2) supporting that ending boundary L% tones are preceded, primarily, by an L* nucleus followed by an H intermediate phrase pitch accent (H-), all tokens of this study show that the % is preceded by HL*. The word-ending nucleus coincides with the last accented syllable of the word 'σινεμά' [sinemá, cinema], so the H peak of the HL exclusively affects the final accented vowel -ά [-á, -a] (Arvaniti et al. 2006; Baltazani 2007; Chaida et al. 2016). Finally, only one example is found to deviate from the intonational pattern of the majority of tokens, having an H% ending boundary tone (GR-1_4).

Table 3 Analysis of the SMG polar questions (instructed speech)

Token	Contour	Characterization
GR-1_1	HL*L%	Falling
GR-1_2	HL*L%	Falling
GR-1_3	HL*L%	Falling
GR-1_4	*HL*H%*	*Rising*
GR-1_5	HL*L%	Falling
GR-1_6	HL*L%	Falling

Considering the answers provided by the participants through the Google Form questionnaire, regarding the context they had set on their own while producing the question asked, the findings are really interesting:

Figure 20 Pragmatic implications according to participants' own context
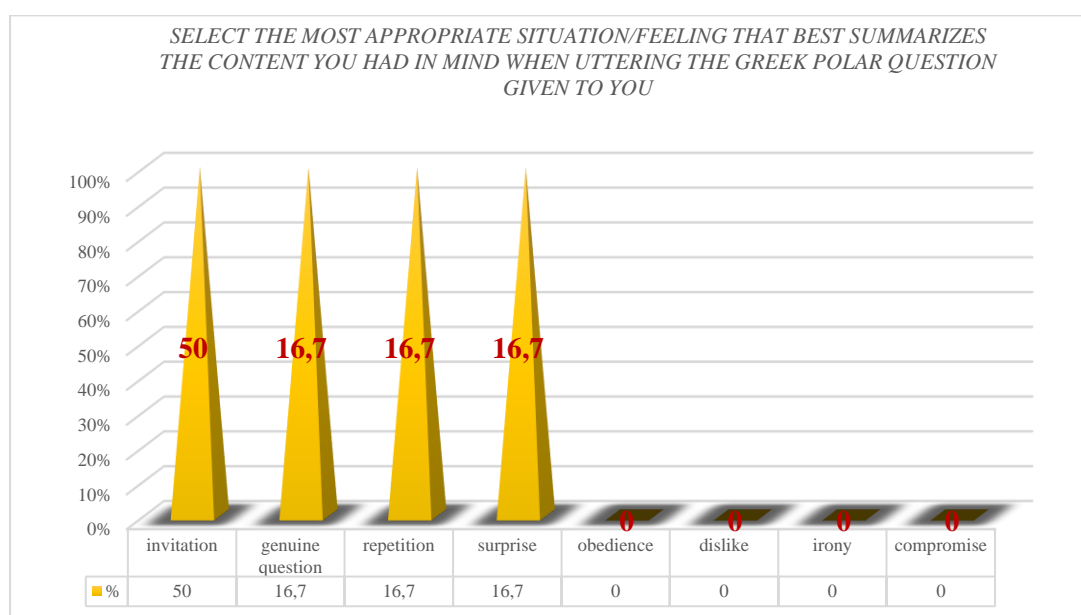
Three out of six participants (50%) seem to have connected the HL*-L% F0 movement with inviting others. In addition, the same contour is interpreted as a means of repetition or asking a genuine question. Finally, the deviated contour

(HL*-H%) shows surprise, according to the participant who made this intonational choice.

Figure 21 GR-2_1 (*"Αγάπη μου σίγουρα;"*) →**L*+H & H%**
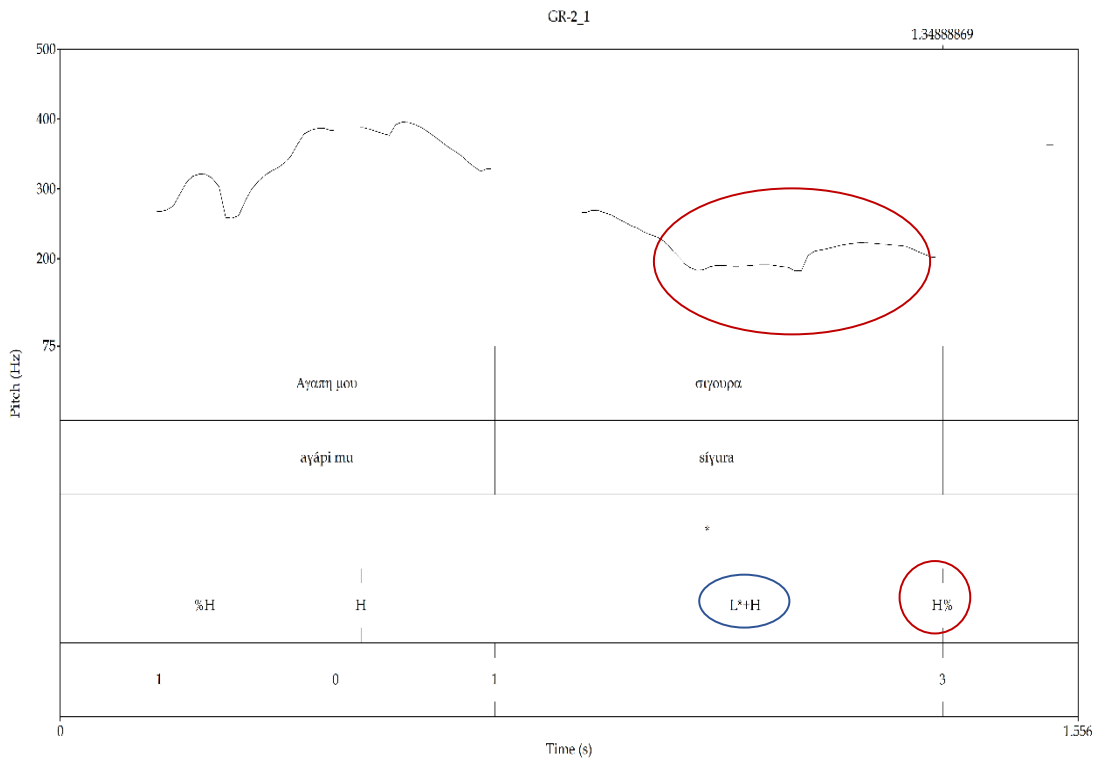
The first example of spontaneous speech starts with an %H interjection that is to be preserved all the way until the end of the question. However, the nucleic pitch is a bitonal one, an L*+H, starting from the L* 'σί-', continued in the syllable '-γου-' in order to go up in '-ρα'. It is important to note the elliptical form of such a question, where even the verb is omitted (or, in conversational terms, it is mutually implied, obeying probably the Gricean Cooperative Principle of conversations). (*see also* Appendix II, Figure 54, p. 94)

Figure 22 GR-2_2 (*"Είναι μονοπώλιο;"*) →**L*+H & L%**
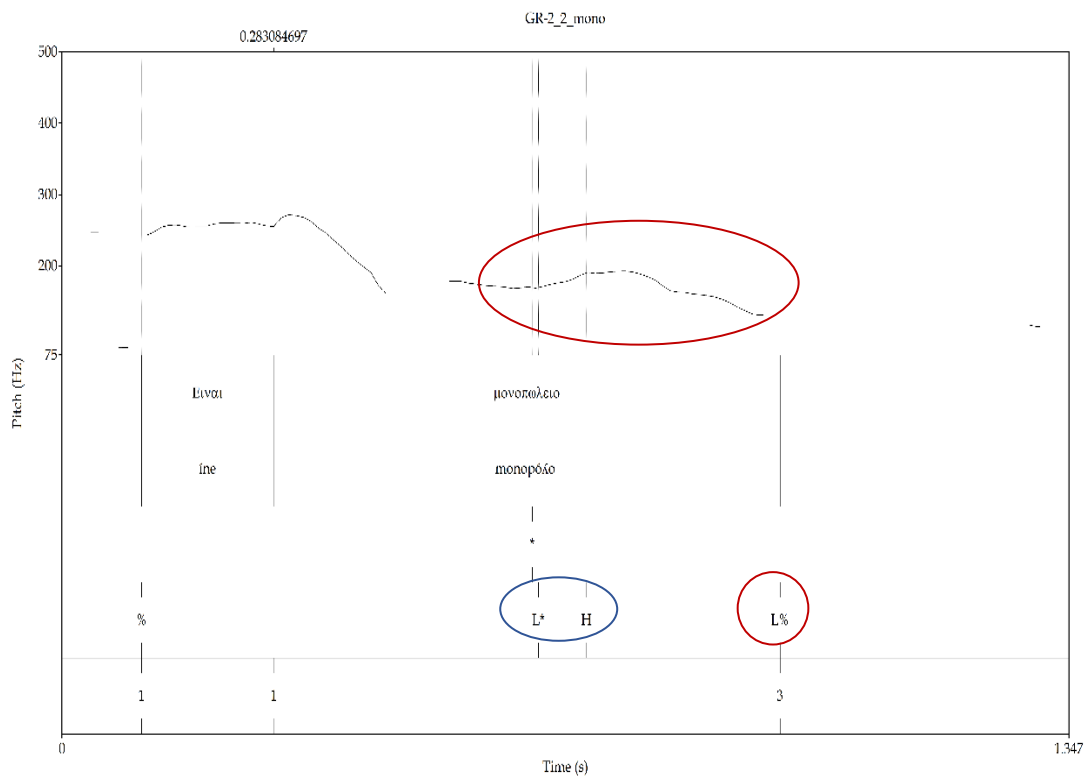
Here, the same rationale with the first example is prevalent, but the inclination of the pitch now is lowering rather than rising. The level that is probably the pitch of the fronted operator of the question is followed by the L*+H found in SMG polar questions and leads to a final L%. Multiple pragmatic interpretations can be assigned to such boundary-ending contours for SMG, but research has shown that it is typical for rhetorical questions. (*see also* Appendix II, Figure 55, p. 94)

Figure 23 GR-2_3 (*"Το βλέπετε αυτό το κοριτσάκι που κάθεται στη βροχή;"*)
→**L + H*%**
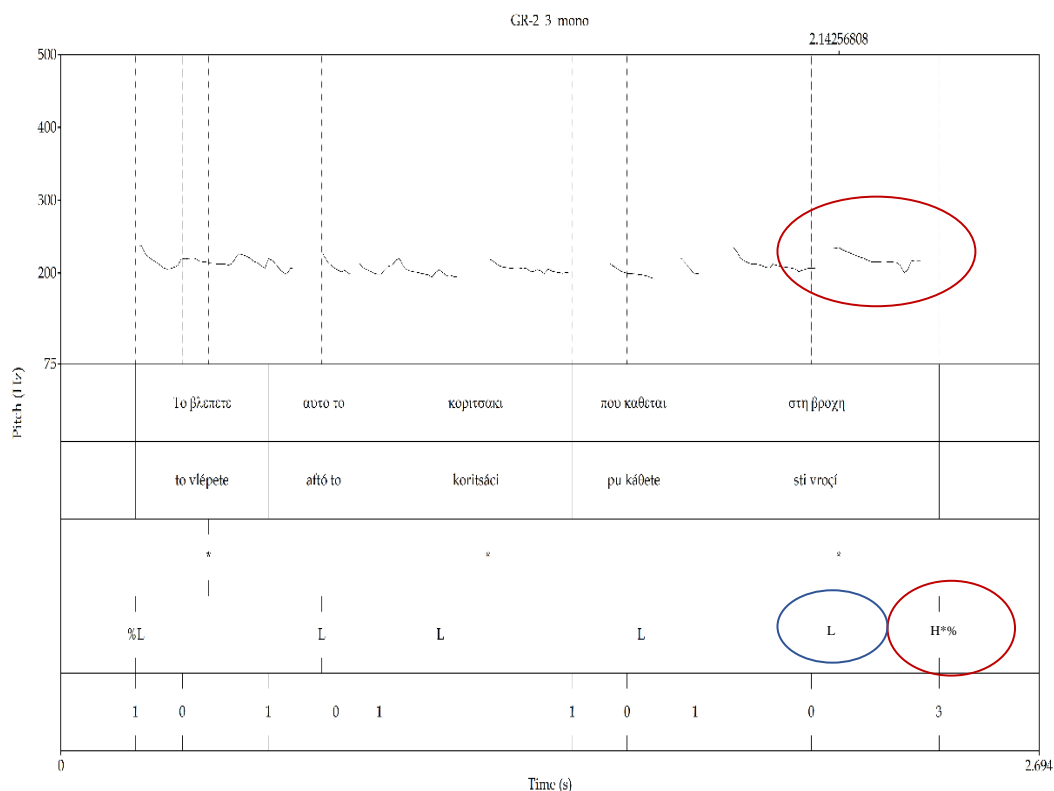
This example is a nice illustration of a clear-cut falling intonational contour; the case is that from the very beginning (%L) and before the pitch of the penultimate and the ultimate, nucleic syllable (L+H*% - 'στη βρο-' + '-χή'), there is a linear juxtaposition of similar pitches, that is, Ls which start on the very same level and are more or less of the same intensity and duration (namely: 'το βλέπετε' 'αυτό το' 'κοριτσάκι' 'που κάθεται'). This pattern (mainly with level tones) similes the one used when listing things in a sentence. (*see also* Appendix II, Figure 56, p. 94)

Figure 24 GR-2_4 (*"Να κόψω γλυκό;"*) →**HL* & L%**
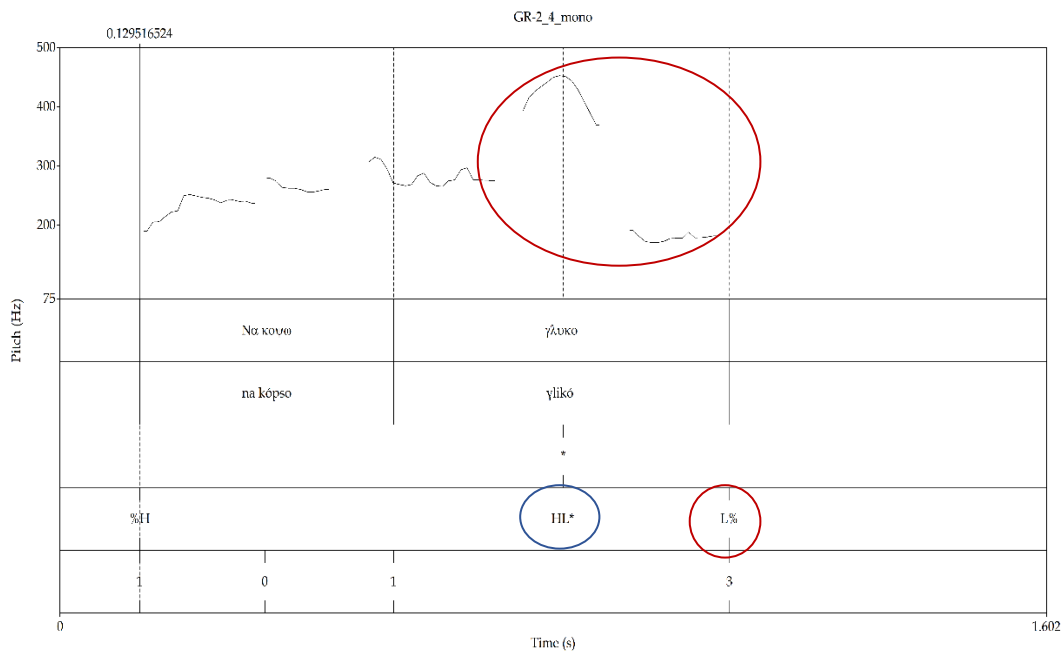
This example is really idiosyncratic since the speaker here opts for an H+L* nucleus, placed on the last accented word (the emphasis is given on the accented syllable '-κό' where the H pitch is followed by the loud L* pitch. It is also interesting that this is the first case among the spontaneous speech tokens of such a peculiar boundary-ending contour, while it is the first one that shows a kind of incitement (call for action, not exactly the same as an invitation). This could probably reveal the pragmatic dimension of similar contours in polar questions that could be described as incentives. (*see also* Appendix II, Figure 57, p. 94)

Figure 25 GR-2_5 (*"Έπινε η Πηνελόπη πορτοκαλάδα;"*) →**%L* & L-L%**
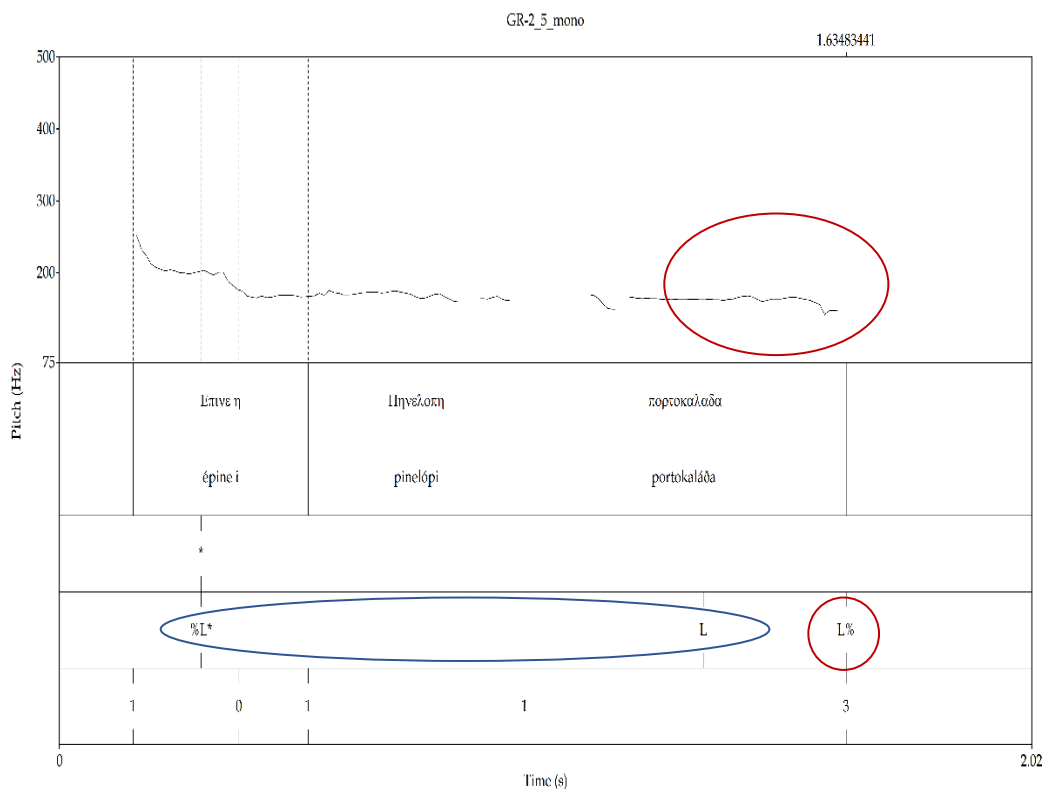
GR-2_5 cannot be interpreted in terms of what is known about polar questions' intonation. The speaker starts from a middle-range level producing an %L* boundary initial pitch (with nuclear fronting in the very initial place) and goes all the way down in a degrading trajectory. This cannot but reflect a very personal, non-identifiable pragmatic meaning. What I could possibly suggest for this specific example, after having listened to the complete form of the audio, is that the speaker produces something relative to a rhetorical question but shows even less satisfaction in finding a possible answer to their question (I would simply describe it as the contour of showing "hopelessness" and decrying their own thought). (*see also* Appendix II, Figure 58, p. 94)

Figure 26 GR-2_6 (*"Έχει νερό;"*) →**HL* & L%**
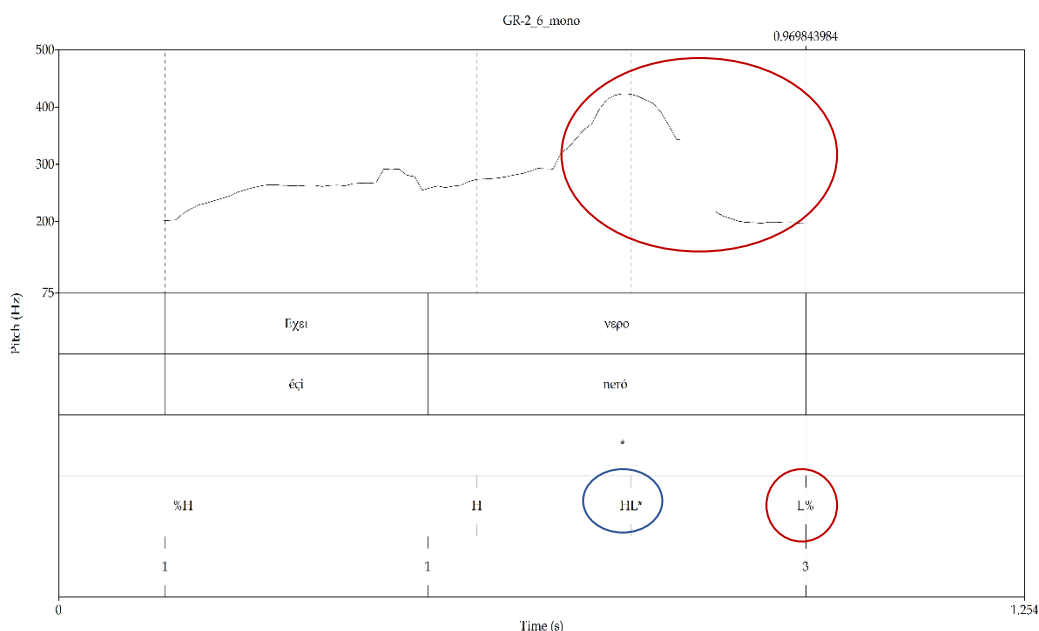
Although in terms of pragmatics, this example does not identify the incentive nature of GR-2_4, they both share the exact same contour that ends in an H+L* bitonal nuclear pitch placed on the last accented syllable of the question. (*see also* Appendix II, Figure 59, p. 95)

The six tokens recorded from the TikTok platform, used for the analysis of spontaneous speech, reveal a bunch of different intonational variations. First, only one token (GR-2_2) complies with the observations made by Arvaniti (2009) regarding the most preferable L*+H & L% pitch contour. All tokens seem to conserve the falling escalation of the nucleus (L*), in many different positions; however, in two instances, the L* nucleus is part of an HL* movement (the nucleus falls on the last accented syllable), while in GR-2_1 and GR-2_3 the ending boundary tone is an H%. All tokens, except for one (GR-2_5) place the tonic syllable (the one which bears the nucleus) always on the last lexical item ('σίγουρα', 'μονοπώλιο', 'βροχή', 'γλυκό', 'νερό'), and it seems that in all cases, the nucleus coincides with the accent of the word at hand.

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Table 4 Analysis of the SMG polar questions (spontaneous speech).

Token	Contour	Characterization
GR-2_1	*L*+HH%*	*Rising*
GR-2_2	L*+H-L%	Falling
GR-2_3	*LH*%*	*Rising*
GR-2_4	*HL*L%*	*Falling*
GR-2_5	*L*L-L%*	*Falling*
GR-2_6	*HL*L%*	*Falling*

What becomes evident from the analysis of all the tokens is that the position of the focused word (the one that bears the nucleus) is a determining factor for the melody of the voice. In GR-2_5, the focused word is placed at the very beginning of the sentence (*'Έπινε'*), in maybe one of the most unpredictable variations of pitch contours, introducing a downward movement for the whole question (%L*L-L%).

4.3 Contrastive Analysis (CA): How do NSSMGs produce English polar questions?

Figure 27 GR-3_1 (*"May I lean on the railings?"*) →**L* + HL & L%**
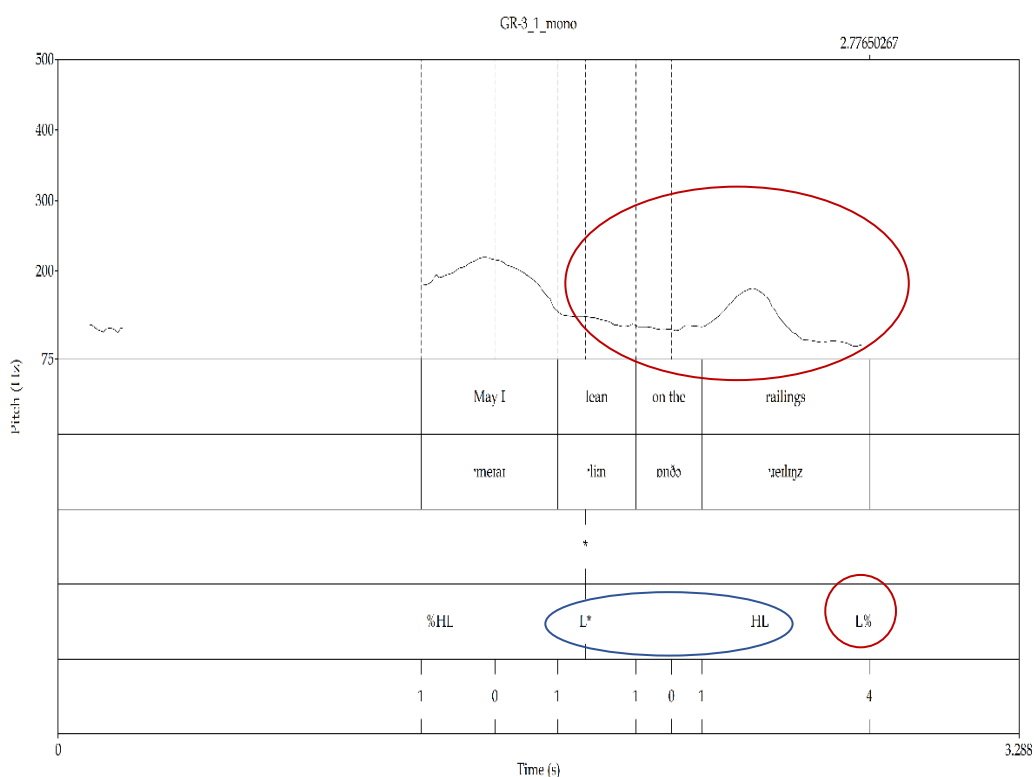
Although this example follows the typical contour found in most English tokens produced by NSSMGs, as shown below, it presents a peculiar nuclear placement in the middle of the sentence, and more specifically on 'lean'. This nucleus is abruptly and intensely underlined after the initial %H+L pitch on 'May I' (H emphasis on 'May I', L emphasis on the closure of 'I'). For some reason, the speaker recognizes as equally, if not more important, the role of 'lean' in meaning-making, rather than the 'railings', maybe seeking permission that is pragmatically linked to the action (the verb 'lean'), and no agreement on the place of action (the 'railings'). The final part of the contour is an H+L% pitch that has a peak on 'rai-' and falls on '-lings'. (*see also* Appendix II, Figure 60, p. 95)

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Figure 28 GR-3_2 (*"May I lean on the railings?"*) →**H* & H%**
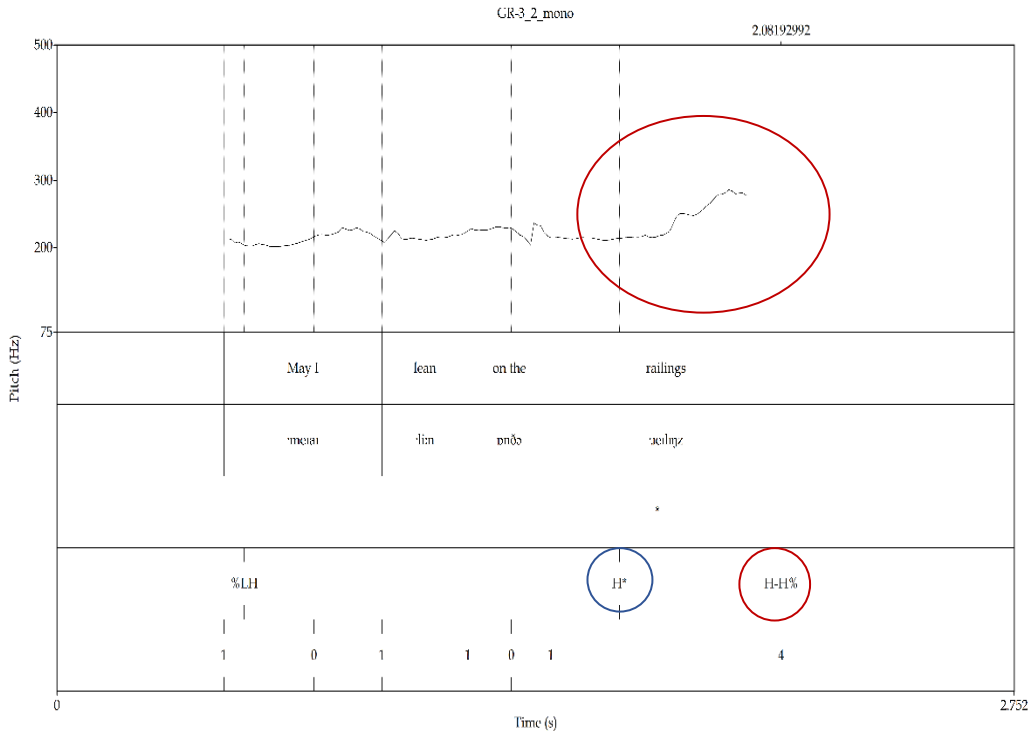
This is the first completely deviated contour of this category of data. In comparison to the rest of the examples, which all start with an %L or an %HL boundary initial tone and finish with an L% or an HL% boundary ending pitch, this is the only token that reverses the initial pitch (%LH) and follows an upward climax until the H*% final pitch. The nucleus is placed on the last syllable '-lings' of the lexical item, but not on the accented syllable 'rai-'. (*see also* Appendix II, Figure 61, p. 95)

Figure 29 GR-3_3 (*"May I lean on the railings?"*) →**H*L & L%**
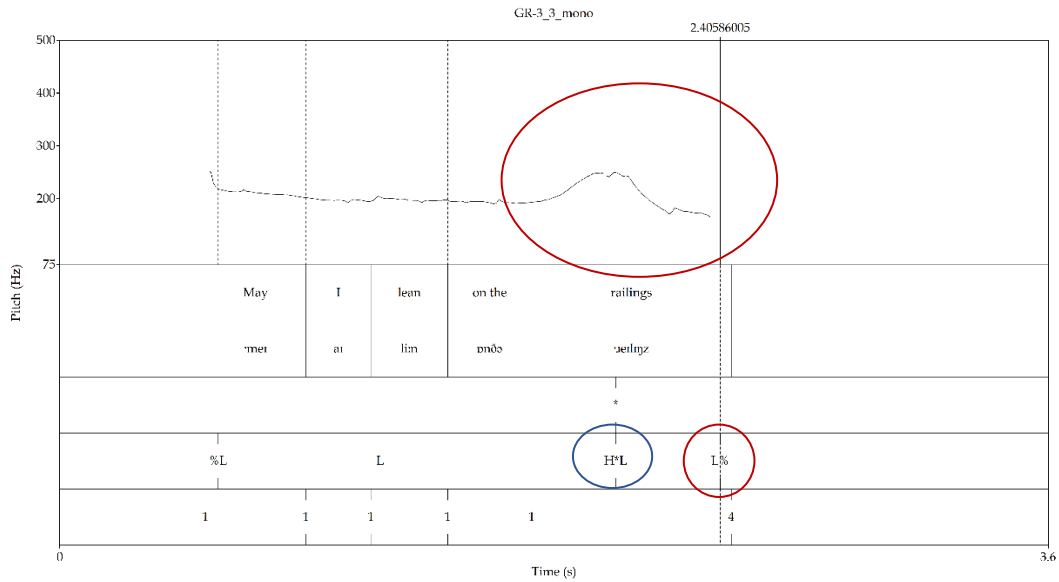
In this example, the speaker follows the commonest contour found, that is, the beginning of an %L pitch which is interrupted by an H*L nucleus on the last lexical item 'railings'. The H* starts when 'rai-' is uttered, while the rest of the word ('-lings') follows a falling pitch movement. (*see also* Appendix II, Figure 62, p. 95)

Figure 30 GR-3_4 (*"May I lean on the railings?"*) →**H*L & L%**
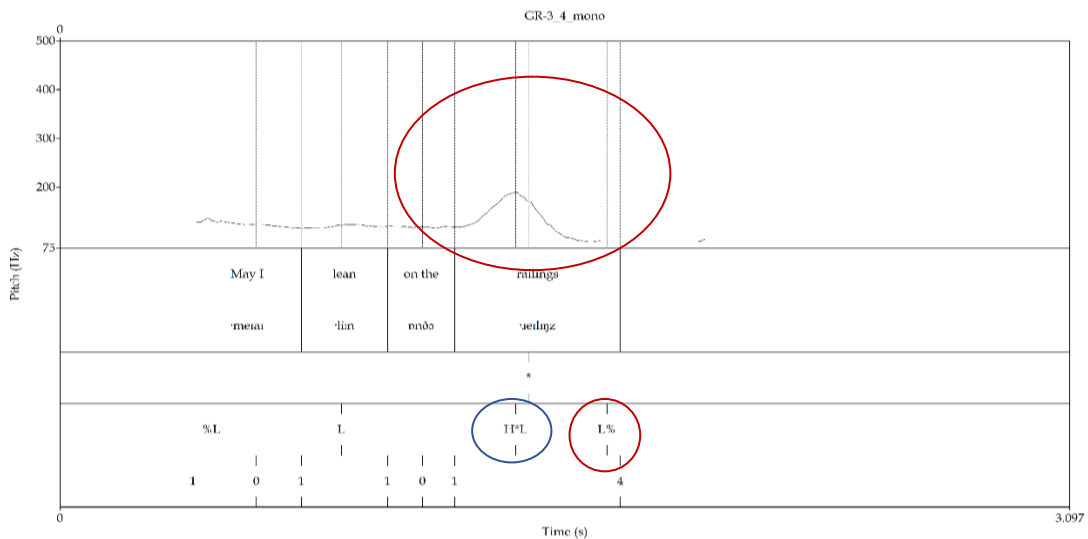
The same with the above example. (*see also* Appendix II, Figure 63, p. 96)

Figure 31 GR-3_5 (*"May I lean on the railings?"*) →**H*L & L%**
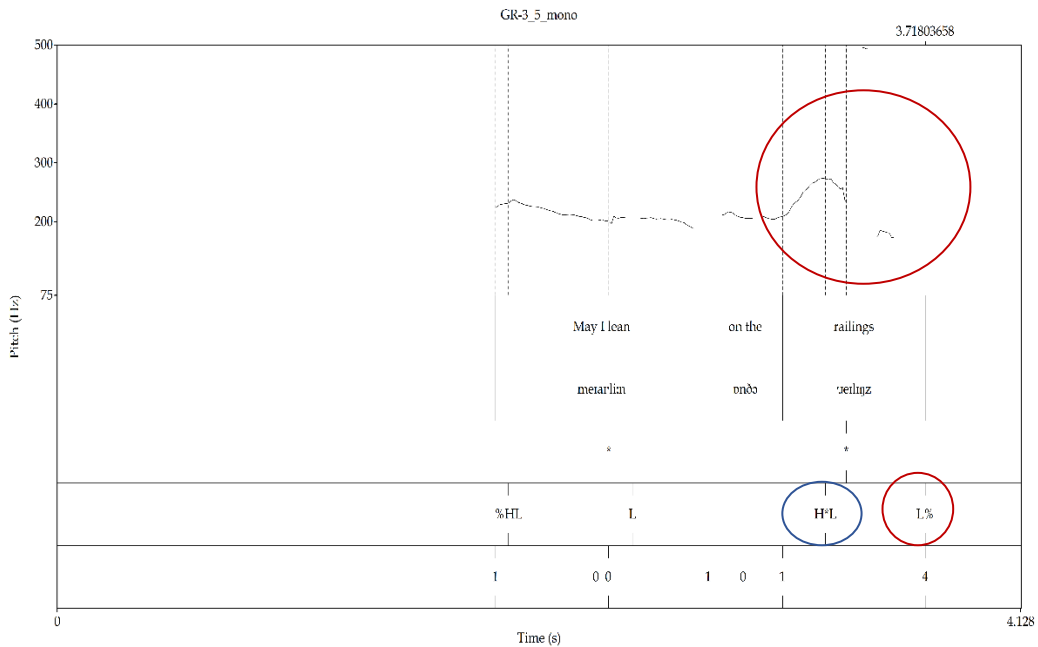
This example follows the same pattern as examples GR-3_1, GR-3_3, and GR-3_4, deviating only in the boundary initial tone. In this case, the speaker starts the question with an %H+L pitch, with the H component falling upon the 'May I' and the L on the 'lean' part of the contour. (*see also* Appendix II, Figure 64, p. 96)

Figure 32 GR-3_6 (*"May I lean on the railings?"*) →**H* + L & L%**
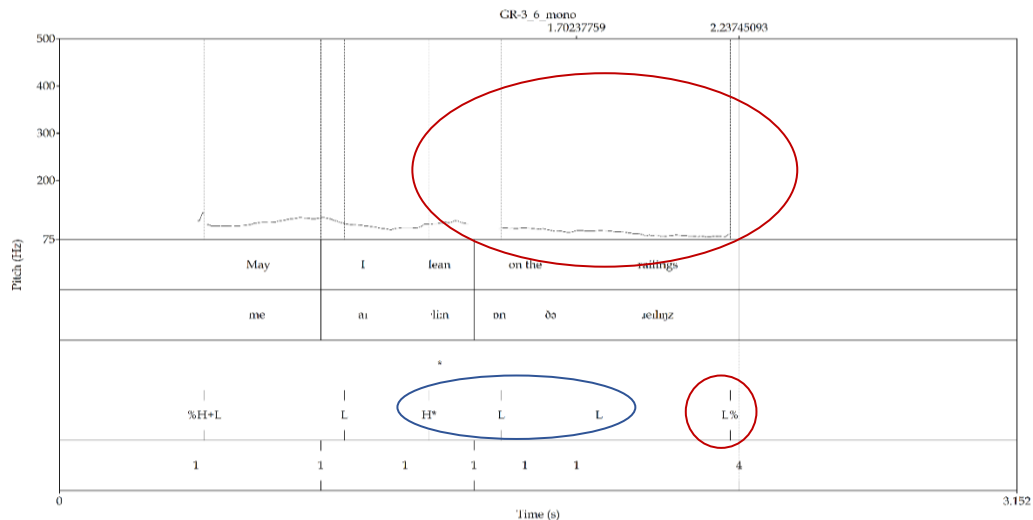
The last of the tokens analyzed in this part of the dissertation is the second completely deviated intonation (together with the example GR-3_2). Here the speaker opts for nucleus placement on an unexpected position, that is, on the word 'lean', utilizing an H* pitch followed by multiple falling tones. The boundary initial pitch is an %H+L one, also met before. (*see also* Appendix II, Figure 65, p. 96)

In this final part of the observations made on the six tokens of instructed English polar questions produced by NSSMGs, the results are illuminating. More specifically, the instances where participants opted for Greek-like intonational contouring to produce the polar questions outnumber the single case of English-proper intonational contouring (GR-3_2).

Table 5 Analysis of the English polar questions produced by NSSMGs (instructed speech)

Token	Contour	Characterization
GR-3_1	L*+HL-L%	Falling
GR-3_2	*H*H%*	*Rising*
GR-3_3	H*L-L%	Falling
GR-3_4	H*L-L%	Falling
GR-3_5	H*L-L%	Falling
GR-3_6	HL*-L%	Falling

4.4 Error Analysis (EA): tracing interference

As mentioned above (section 4.3), the great majority of NSSMGs project their L1 (Greek) intonational pattern when expressing themselves in the L2 (English). More specifically, five out of the six tokens prove interference from Greek to

English, both in terms of boundary ending tone (L%) and of the preceding pitch pattern (H*L, emphasis on H).

The only token complying with the overall English-wise polar question intonational pattern is GR-3_2 since it follows an upgrading H contouring, with an H* intermediate phrasal tone followed by an H% boundary ending one.

In addition, five out of six tokens (except for GR-3_6) reveal a unified selection of nucleus placement on the most accented part of the rightmost content word (*railings*). This is typical, especially for the Greek-speaking audience, and the effect of the nucleus is similar to all instances; the H* nucleus, either standing on its own [GR-3_2] or as part of a H*L intermediate phrasal pitch, is prominent primarily on the accented syllable without being stretched out, and lowering of the pitch starts immediately after this peak. Even in the last example (GR-3_6), where intonation resembles a statement rather than a polar question, the nucleus (placed on a different point than in the rest of the examples – *lean*) is realized with a rising H* tone, followed by consecutive L tunes.

So, it is clear that, although some of the instances attest to what is said to be an overarching tune for polar questioning in English and Greek, there are always exceptions which show that, pragmatically-wise, intonational contouring cannot but be bound to situational and contextual parameters. In the following, final chapter of the dissertation, there is an overview of the aforementioned outcomes along with an effort to find pragmatic interpretations that may add to the educational view of intonation in the EFL context.

Chapter 5
Interpretation of findings

5.1 Revisiting the Research Questions

This dissertation tried to contrastively examine the intonational patterns of polar questions in Greek (SMG) and English (StBrE), with a cross-examination of instances both of instructed and of spontaneous speech. The ultimate aims of this investigation can be summarized in the three research questions raised:

1. RQ 1: Are there fundamental intonational differences in the production of polar questions between SMG and StBrE?
2. RQ 2: What is the interplay between intonation and pragmatics beyond the sentence level when uttering a polar question in the two languages?
3. RQ 3: Are intonational differences between SMG and StBrE sensitive to style?

Regarding the first research question, as it was furtherly analyzed in Chapter 1 (sections 1.2 and 1.3), the two languages follow both similar and dissimilar patterns of pitch tuning, something that complicates the definition of one specific contour per sentence type (Arvaniti 2022). It has been observed, however, that Greek tend to apply a degrading lowering tune in the production of polar questions, while English opt for higher pitch combinations. In this dissertation, data analysis attests to the above conclusions, without excluding instances of pragmatically marked polar questions or even unmarked cases where pitch tuning is radically different.

In section 5.1.1 follows a summary of the intonational contours probed in this study, always in relation with the observations made in previous research.

5.1.1 Overview of polar questions' intonational patterns

Previous studies have revealed that the most valid element for tune specification of Greek polar questions is the observation of the nucleus placement on the sentence. In that manner, Arvaniti (2002), Themistocleous (2014), and Chaida (2016) support that the nucleic accent is an L* that falls in-between the antepenultimate and ultimate syllables of the word (or strings of words, if considered as one unified tune divided into tonetic "syllables"). In cases of ending boundary tone being the L* nucleus, there should be an H- peak before that affects the downward movement of the F0 at the production of the last accented vowel. Otherwise, in cases where the nucleus does not coincide with the last vowel of the question but rather precedes it, then an H peak follows the nucleus that, however, results in a boundary L% (Themistocleous 2014; Panussi 2016). In a schematic representation, the aforementioned scenarios are:

[1] *nucleus on the last accented vowel (ending boundary tone)*

H-   L*%

H + L* (L%)
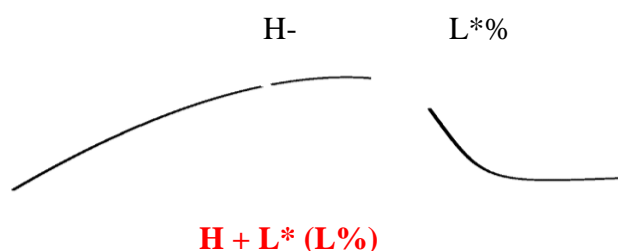
e.g. *Να κόψω γλυ*   **κό;**

   [na kópso ɣlik**ó**] [Shall I *serve in* the des**sert**?] (GR-2_4)

[2] *nucleus on the antepenultimate position*

| L* | | H- | L% |
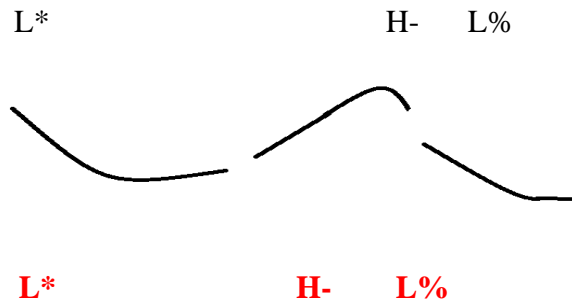
e.g. Είναι μονο **πώ** **λι** **ο;**

[íne monop**ó**ʎo] [Is *this* a mo**no**poly?] (GR-2_2)

The patterns illustrated above do not identify with the findings of the present study. More specifically, the great majority of instructed-speech tokens comprise an L% boundary tone, preceded by an HL* tune. In these cases, the H peak of the HL* affects the nucleus (which is placed on the final accented vowel of the word 'σινεμά'). The deviated contour (GR-1_4) that ends in an H* peak, connotes a bold marked pragmatic meaning (the answer provided by the participant was that, according to them, the H+L* H% pattern they used for "Θέλεις να πάμε σινεμά;" indicates surprise). The spontaneous-speech tokens do not exhaustively correspond to the norms suggested by the theorists. In detail, only one token (GR-2_2) follows the L*+H-L% contour (with nucleus placement on the antepenultimate syllable). Despite the conservation of an L* nucleus across all tokens, two of them reveal an HL* tune before the L%, with the H peak affecting the L* nucleus (placed on the ultimate accented syllable). Half of the tokens (three out of nine) suggest a completely different F0 movement: GR-1_1 and GR-1_3 set an L* nucleus followed by a H% ending boundary tone, while GR-1_5 applies L tones end to end. So, out of a sum of 12 tokens of SMG polar questions, only one seems to comprise a pitch contour identical to what is considered to be the norm (L*+H-L%). In short:

Figure 33 Distribution of pitch contours across SMG polar questions
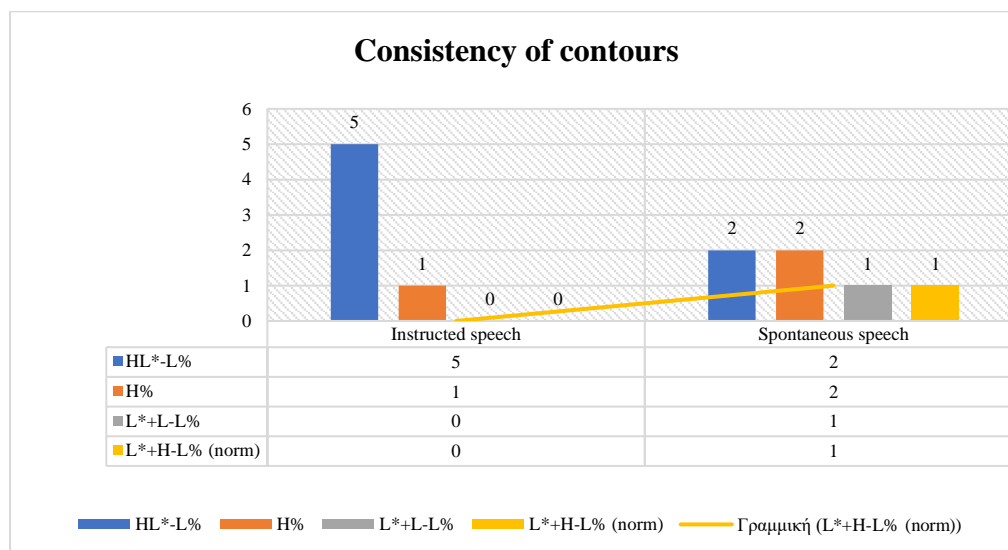
As far as English polar questions are concerned, the majority of definitions of StBrE intonational contour suggest that rising is always the case for ending boundary tones (H%) (Ladd 2012; Prieto 2015). There are considered to be many variations as to the intermediate phrase movements, with the main observations revealing that H*L-H% is the commonest alternative, while a rare H*L% contour is also important. English, however, seems not to obey a specific norm, making many scholars object to the universality of contours on StBrE polar questions (Geluykens 1988).

According to the findings in Chapter 4 (section 4.1), tokens of instructed speech follow, to a great extent, the rising (H%) final contour. Three of the tokens reflect an upward movement from the nucleus onwards (H*H%), while two of them set the nucleus on a falling point (L*), probably adopting a kind of fall-rising tone starting on the penultimate syllable of the nucleus-bearing words (*'home', 'away'*). Only one token deviates from the rising final tone; its peculiar melody ends in an L% final tone, preceded by the L* nucleus that follows a downstepped !H tone. The findings of the spontaneous speech are even more contrastive. The online recorded speakers favored more of a lowering tune (L%),

with four out of six speakers practicing an L*L% pitch contour. Also, there are two rising contours, consisting exclusively of an H* nucleus and a H% boundary edge tone:

Figure 34 Distribution of pitch contours across StBrE polar questions

	H*H%	L*+HH%	L*L%	!HL*L%
■ H% vs L% contours	5	2	4	1
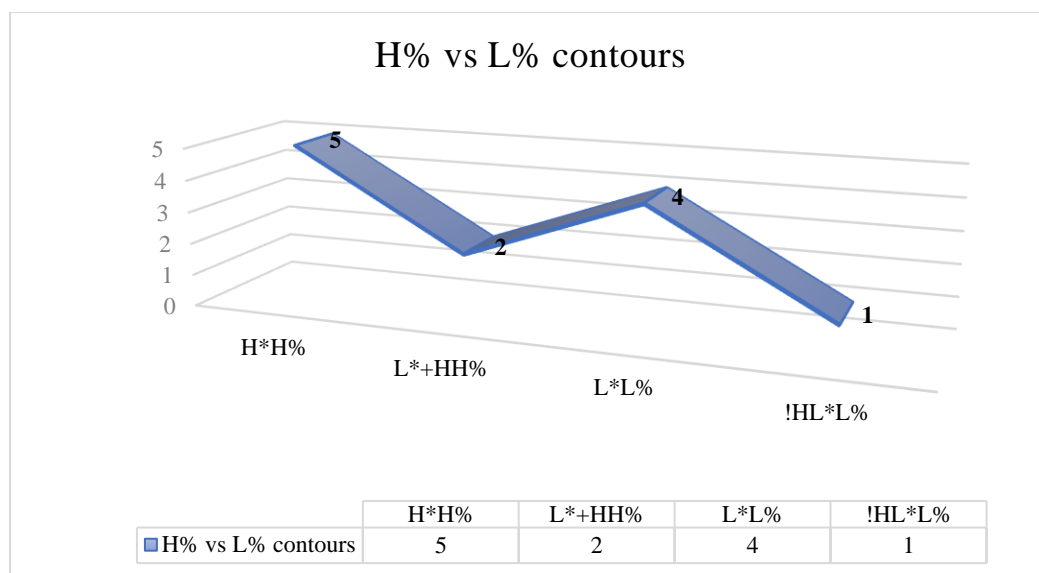
5.1.2 Pragmatic interpretation of the deviated instances

The majority of tokens (24 out of 30) were analyzed out of their context of occurrence, namely the English tokens of instructed speech (downloaded from the online corpora mentioned in section 3.2), the Greek tokens of instructed speech (recordings of six NSSMG participants producing one specific polar question), and the recordings of the six NSSMGs producing one particular English polar question. Only the English tokens of spontaneous speech (the recordings were part of longer interviews and podcast discussions) could be interpreted in terms of their context. In addition, for the six tokens of instructed Greek polar questions, the context was provided by the participants themselves.

As a result, from the literature discussed in section 1.3, English high-polar questions can reveal implications such as polite invitations or recommendations with no extra (marked) pragmatic meaning (Jeong 2016). On the other hand, low falling tones (L% contours) are linked to impolite commands, expression of authoritativeness, and negative connotations, in general (Jeong ibid.). From what can be traced by looking at the contexts of the English tokens of spontaneous research, such conclusions cannot be made. One of the two tokens ending in H% is used as an irony towards what was mentioned by the interlocutor (EN-2_1), while the other H% polar question expressed a genuine need on the part of the speaker to seek an answer to a query of theirs (EN-2_5). On top of that, half of the degrading L% polar questions (EN-2_2, EN-2_4) did not infer impoliteness; the speakers used one of the L% alternatives mentioned in section 1.3 in order to raise genuine questions, while the rest two L% questions (EN-2_3, EN-2_6) were used in the sense of rhetorical speech (the speakers did not seek for an answer, they rather introduced their point in such a way). Finally, the psycholinguistic remarks made by Tian et al. (2021) (about bias' relation to perspective answer) cannot be tested.

From the perspective of the Greek speakers' intonation of polar questions, studies cited in section 1.2 suggest that the frequent use of H% intonational contour can have the exact same pragmatic effect as any other intonational contour since the context is considered the determining factor for pragmatic inferencing of prosody. In that manner, the pragmatic effect of the Greek tokens of spontaneous speech can be described only through the answers of the participants to the questionnaire given to them. So, the only participant who opted for a rising (HL*+H%) contour (GR-1_4) mentioned that, according to their own point of view, the H% was a way to express surprise. The rest of the tokens make use of a similar pattern (HL*+L%) but prefer a falling end. It is quite interesting that, although the patterns are the same, the deviation among pragmatic implications is bold. More specifically, the L% pattern is described as

a genuine question (1 token), a type of repetition (1 token), while the great majority selected this intonation in order to make an invitation (3 tokens). A probable analysis of the English questions produced by the same NSSMGs could be revealing as to whether they conserve the same pragmatic connotations in both languages, disregarding the different intonational-proper options. No safe conclusions can be drawn, however, since participants were not asked to provide a context for the English polar questions. The only thing that can be noted is that only two participants altered their intonation in the two languages in terms of boundary edge tones (GR-1_2: L% - GR-3_2: H%; GR-1_4: H% - GR-3_4: L%).

Table 6 English polar questions' intonational contours and their pragmatic links

Intonational contour	Pragmatic inference
H*+H%	irony, genuine question
L*+L%	genuine question, rhetorical question

Table 7 Greek polar questions' intonational contours and their pragmatic links

Intonational contour	Pragmatic inference
HL*+H%	surprise
HL*+L%	invitation, genuine question, repetition

5.1.3 Stylistic-oriented differences and similarities

One final remark should be made regarding the differences and similarities that pertain to the stylistic mode of speech delivery (either being instructed or spontaneous speech). The tokens of instructed speech were either downloaded from online corpora (English tokens) or recorded (Greek tokens), while tokens of spontaneous speech were part of online podcasts and TikTok videos.

With that being said, it should be clarified that no bold differentiations are expected from this part of the research; that is because even the tokens that are used as indicators of spontaneous speech are actually part of either podcasts or videos, so in both cases, the speaker could have prepared their speech (in terms of content, voice quality, intentional meaning, etc). However, in the case of English polar questions, rising questions that prevail in the case of instructed speech (five tokens), seem to be outnumbered in the case of spontaneous speech (only two tokens). This could be interpreted as so: instructed examples are created to quite *obey* the norm of rising in English questions, while in discussions, speakers seem to be free to choose and select the pitch moderations that they think are appropriate according to their feeling and intention. Of course, this kind of manipulation can be rooted to nothing else but the native speakers' language intuition, rather than any form of phonetic training.

In contrast to the English paradigm, NSSMGs seem to stick to what they think of as pragmatically-proper intonation when asking polar questions. Although it was mentioned (in section 5.1.2) that the same pitch contour does not reflect the same pragmatic connotations for all NSSMGs, in terms of style, no notable changes exist. More specifically, in the case of instructed questions, five of them show a falling intonation, while in the spontaneous questions, the falling instances are reduced to four. No safe conclusions can be drawn again regarding whether this hints at a speech preparation on the part of the speakers or not.

5.2 Pedagogical implications

In the last couple of decades, English has been the focus of international communication, while the number of learners of English around the globe has increased radically (Sadeghpour and Sharifian 2017). That way, many researchers have tried to estimate the importance of language learning to learners' identity formation, especially in relation to accent and pronunciation,

with some revealing findings (on the importance of native-like pronunciation of English on the part of the learners) being presented in Pullen (2012). The Lingua Franca Core (LFC) proposed by Jenkins (1998; 2000) lists the minimum requirements of intelligible communication (especially for non-native English speakers), also providing a comprehensive framework for teaching intonation. However, there has been important opposition towards such viewpoints, since a number of parameters, learners' language abilities and function in the classroom setting being included, are not estimated (Zoghbor 2011).

Relating ELF to intonational contouring of English polar questions, and taking into serious consideration the research conducted by McCrocklin (2012), the LFC characterization of tonal events related to word stress as being of minimum importance for language intelligibility seems untrue. McCrocklin suggests that the varying nature of English stress patterns is what necessitates the proper introduction of non-native learners of English to the importance of intonation and pitch contouring for meaning making (McCrocklin 2012: 252-253). On top of that, Kainada and Lengeris (2011) have conducted an interesting study on polar questions' intonation, a study that reflects the role of intonation to language acquisition and the difficulty of Greek learners to cope with that, resulting in total interference from L1 to L2 (Kainada and Lengeris 2014; 2015).

On a different note, Sadeghpour and Sharifian (2017; 2019) support the integration of the features that exist in multicultural contexts where English is one among the number of languages spoken. That way, the authors criticize the disconnection between ELT and World Englishes (*WE* – a term closely connected to the globalization of English and the increase of English-speaking communities worldwide) (Sadeghpour and Sharifian ibid.).

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With the truth lying in-between the two opposing views, many theorists have tried to develop models and tools for successful teaching and learning of intonation. Cardinali and Barbeito (2018) seem to have approached this issue successfully since through their study it was observed that native Spanish speakers have become eligible teachers of English as an FL. Another essential study conducted by the research team of Bogach, Boitsova, Chernonog, Lamtev, Lesnichaya, Lezhenin, Novopashenny, Svechnikov, Tsikach, Vasiliev, Pushkin and Blake (2021) probed the calibration and improvement of phonological skills of language learners. To do so, they have tested a number of software and tools which they detected to be problematic in some respect. Despite their problems, it seems that the tools actually add to the learners' phonological performance of the L2.

Thus, the integration of phonology into the teaching context seems inevitable for a number of reasons linked to learners' successful language performance and even to the development of an intact learner's identity. In-class practice in parallel to the development of technological materials for this aim is of utmost importance. In this orientation, although the American approach of intonation analysis has provided detailed phonological and phonetic analysis of speech melody, the British models are spot-on for the respective pedagogical purposes, since they can serve the ultimate goal of EFL classroom, which is comprehensibility and simplicity.

5.3 Limitations and future implications

The present study was conducted using a small amount of data, which, however, have been indicative of the intonational patterns preferred for the production of polar questions in Greek and English. Besides the limited amount of tokens analyzed, the scope of the study was broad enough not to be restricted in terms of gender and age variables. In addition, the sources for data extraction varied;

using both online and offline means of oral communication, the aim pursued was to analyze an extensive amount of instances of spontaneous and instructed modes of speech.

Part of the limitations of this study is the partial use of acoustic instruments for the proper intonational analysis of pitch contours. The combined nature of the auditory and acoustic analysis of the study may have minimized the attentive estimation of phonetic and other prosodic features of the languages. To be more specific, the purposes of the present study did not require an exhaustive acoustic analysis of the phonetic and time accounts of speech melody. For that reason, as mentioned in Chapter 3, some features of the Autosegmental-Metrical model, as well as some aspects of the Praat tool (including a number of tiers), together with prosodic elements (like intensity or speech duration) were omitted.

Another important note that needs to be made, regarding the restrictions of this study, is the nature of the data analyzed. The method of collection (which opted for segmented, isolated chunks of speech), may have impeded some important factors that need further analysis in the future, like the intonational contours preceding and following the uttering of the questions, the position of focus throughout a discussion, as well as the answers given to the questions which may reveal a lot regarding pragmatic inferencing on the part of the hearer and regarding negative or positive biases.

Chapter 6
Conclusions

The present dissertation is an effort to draw some conclusions regarding the tonal movements and pitch contour choices made by speakers of SMG and StBrE when uttering polar questions. Beyond this initial goal, the ultimate purpose of this study is to locate similar patterns of pitch contouring between the two languages and to investigate the imposition of L1 intonation to the L2.

As far as the first goal is concerned, this study managed to handle a number of instances that are in accordance with the overarching idea of up-to-date research on the field. In other words, there is considerable evidence that intonational choices, after all, do not comply with specific rules, neither syntax-wise nor grammar-wise (Papazachariou 2004). Even in cases of indicator-initial questions (Themistocleous 2014) or in *Queclaratives* (Geluykens 1988), the intonational contour preferred by the speaker is determined by the pragmatic context in which the question is raised. The only valid characteristic which seems to affect the level of voice height in a way is the nucleus placement (more specifically, the broadening or narrowing of focus). What needs to be realized is Arvaniti's (2011) point that no pitch contour can identify with a specific syntax, and vice-versa (Kotsifas 2009); even more, there is no one-to-one correspondence between certain F0 movements and sentences (Arvaniti 2022).
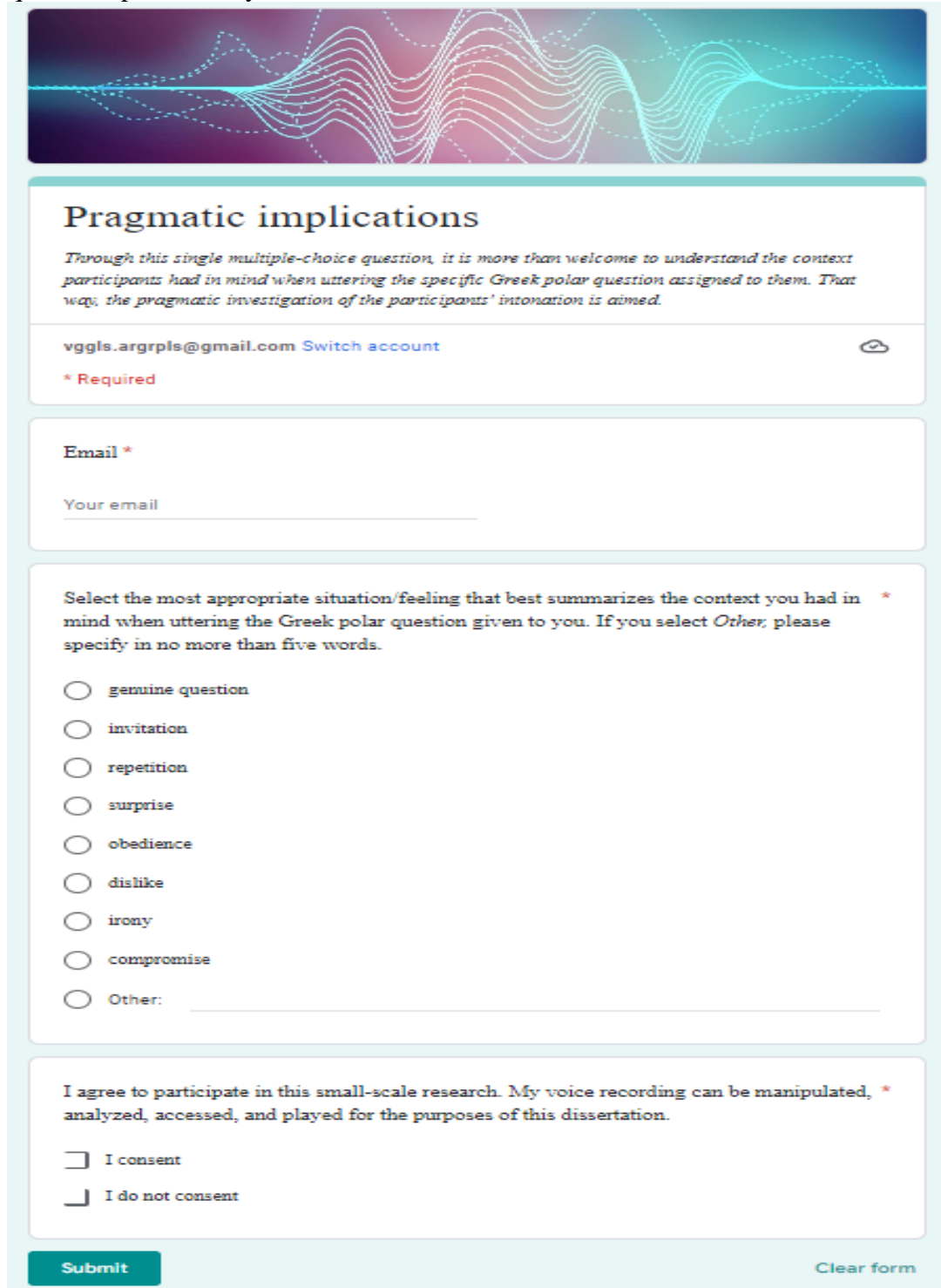
This final remark is completed by the point made in Kotsifas (2009), which has to do with the intentional pragmatic meaning attached to prosody. His conclusion is that all sentences can be open to any type of characterization depending on the prosodic configuration of the sentences (his study contributes to the importance of the strong tights between speech acts and locution and prosody). After all, it seems to be a matter of both perception and interpretation

on the part of the hearer -something which enhances the need for further research on the importance of mismatch between *what is said*, *what is implied*, and finally *what is understood* between the interlocutors (i.e., an issue to be examined from the point of view of pragmatic miscommunication studies).

Finally, the contrastive investigation and visualization of the commonest patterns found in this study's sample along with the illustrations of the deviated patterns projected the bold interference that seems to be inevitable between the two languages, on the part of NSSMGs. However, as discussed in section 5.3, the current approaches to education and teaching of ELF oppose the old-school generalities proposed by models that were in favour of one proper intonation, disregarding the vastness of the language users across the globe. On the surface, the above seems to bring conflicting arguments: on the one hand, the intonational variation observed in the speech tokens of NSSMGs surfaces the importance of intonation teaching in the EFL classroom. On the other hand, and given the unprecedented use of English globally as the world's top Lingua Franca and an international language, the EFL teachers and educators have to think closely about laying hierarchies in their intonation instructions and guidance (where to teach what, etc.) (Georgountzou and Tsantila 2023). After all, inclusivity and integration of ELF and World Englishes seem to be the core of current research on the development of frameworks for teaching pronunciation to foreign learners of English.

Appendix I

Figure 35 The questionnaire for the pragmatic investigation of the Greek polar questions produced by NSSMGs

Appendix II

Table 8 Classification of tokens

Language	Style	Example number
EN	-1	_v
GR	-1	_v
GR	-2	_v
GR	-3	_v

Figure 36 EN-1_1 (*"You remembered the lilies?"*) →**H* & H%**
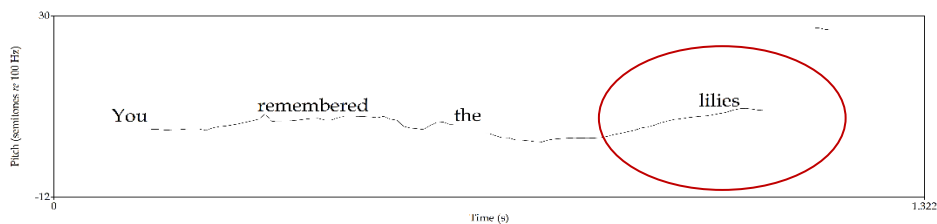
Figure 37 EN-1_2 (*"May I lean on the railings?"*) →**!H & L*%**
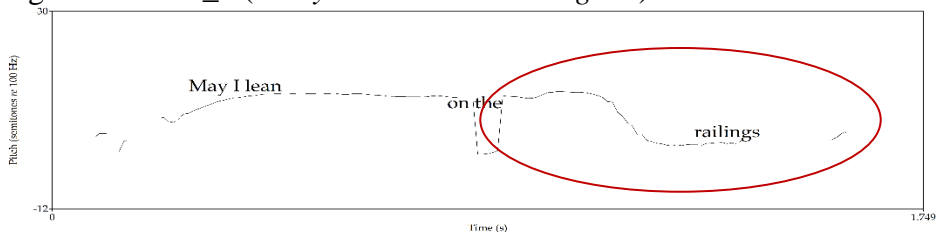
Figure 38 EN-1_3 (*"Are you going home?"*) →**L*+H%**
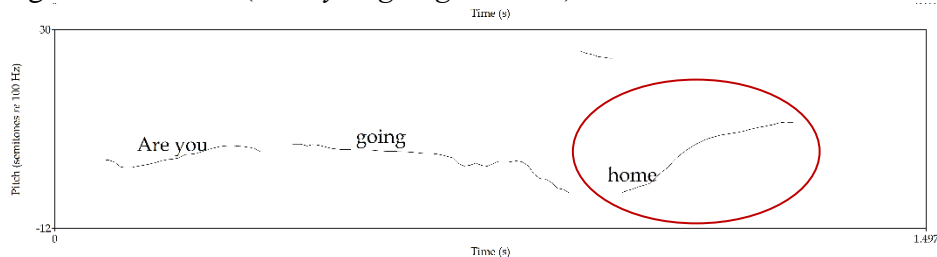
Figure 39 EN-1_4 (*"Are you going away?"*) →**L*+H%**
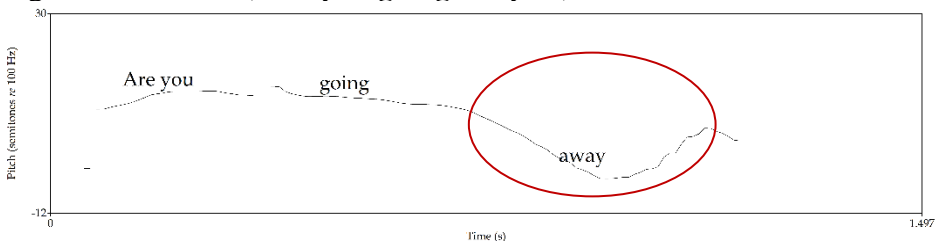
Figure 40 EN-1_5 (*"He's on the lilo?"*) →**H* & H%**
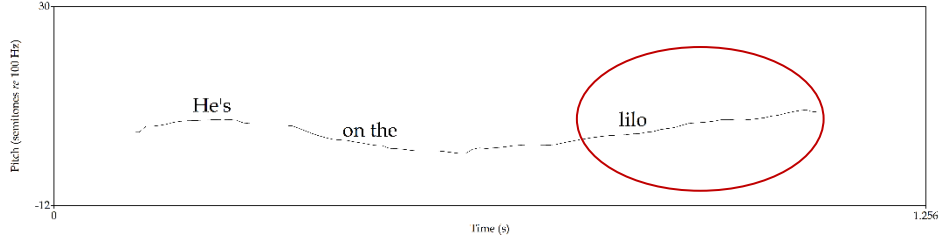
Figure 41 EN-1_6 (*"Will you mail me my money?"*) →**H* & H%**
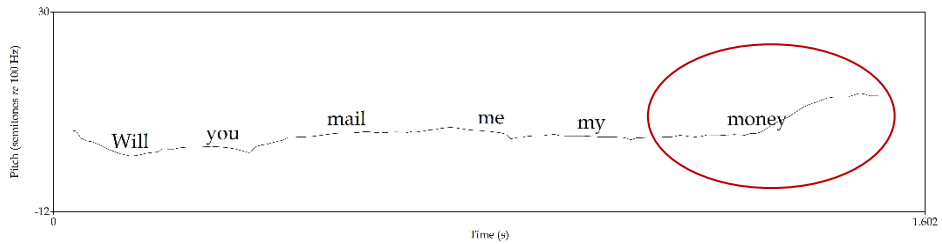
Figure 42 EN-2_1 (*"For you, is that the reason?"*) →**H* & H%**
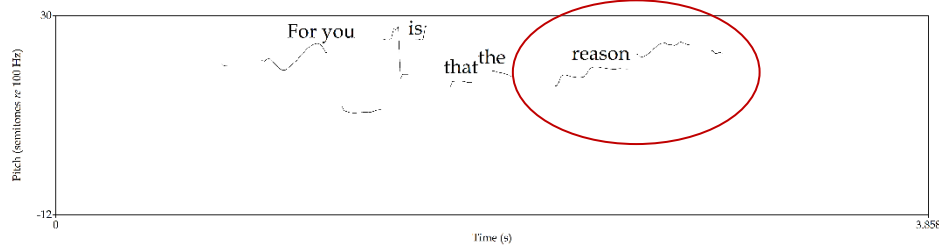
Figure 43 EN-2_2 (*"Have there been studies which also showed actual changes in the brain"*) →**L* & L**
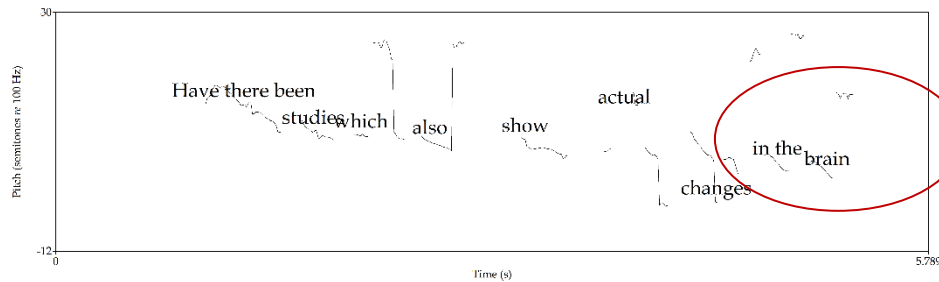
Figure 44 EN-2_3 (*"Can they really say no?"*) →**L* & L**
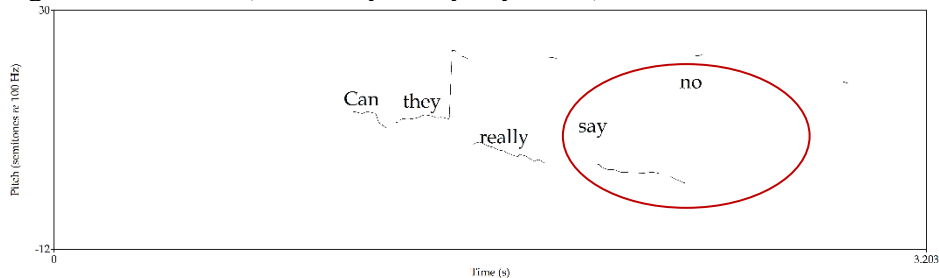
Figure 45 EN-2_4 (*"Have there been any sort of preparation or coaching for how to cope with that scrutiny"*) →**L* & L**
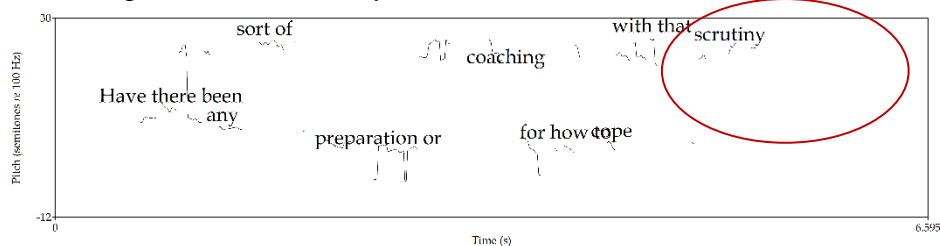
Figure 46 EN-2_5 (*"Does that chemistry improve?"*) →**H* & H%**
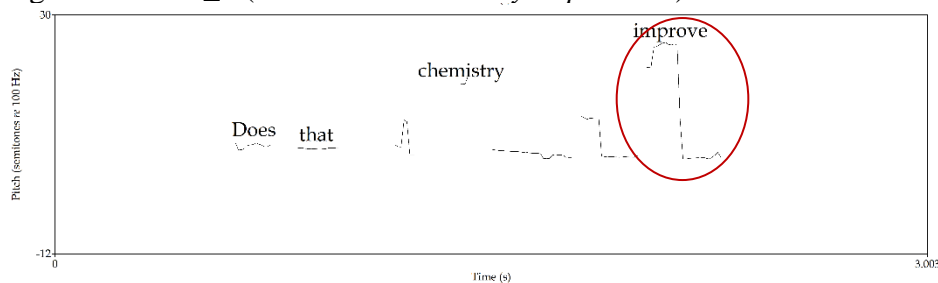
Figure 47 (*"Have you ever been to see your doctor and thought like they weren't listening to you?"*) →**L* & L**
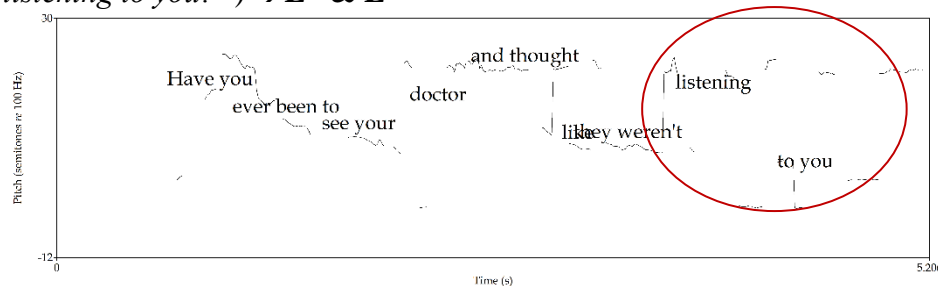
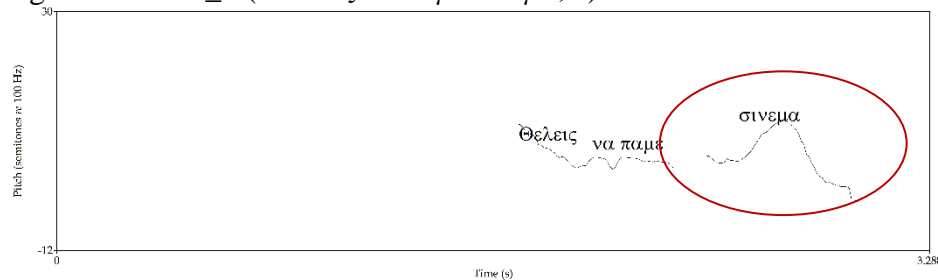Figure 48 GR-1_1 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**

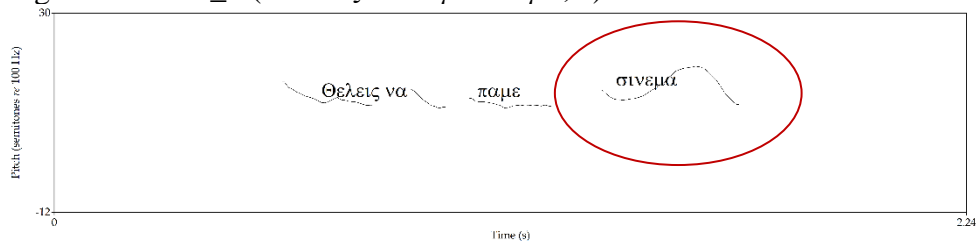Figure 49 GR-1_2 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**

Figure 50 GR-1_3 (*"Θέλεις να πάμε σινεμά;"*) →**HL% & L%**
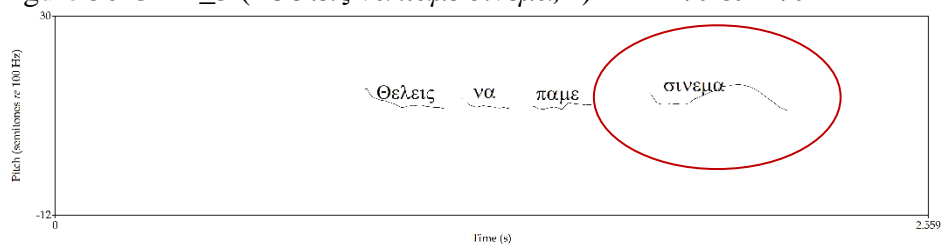

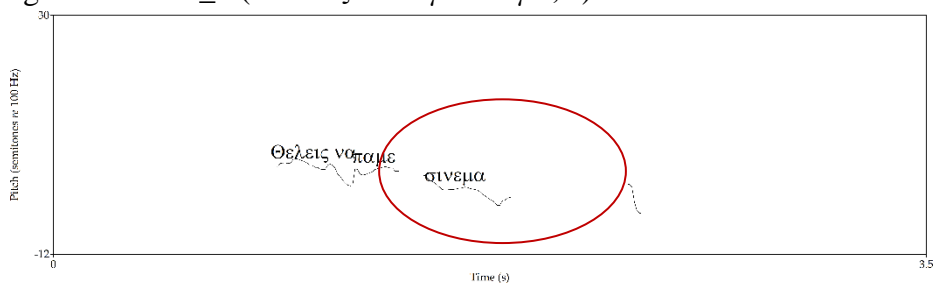
Figure 51 GR-1_4 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & H%**

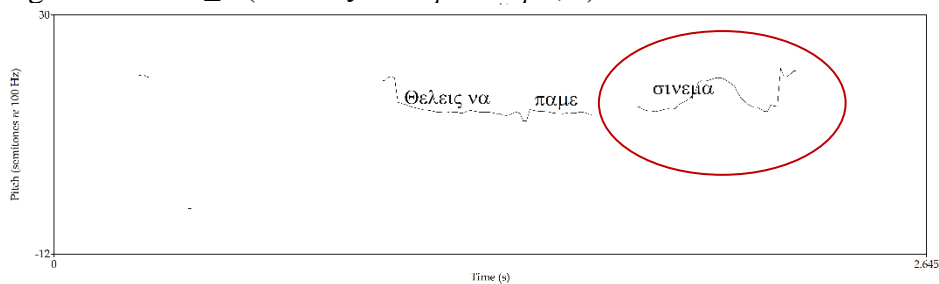Figure 52 GR-1_5 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**

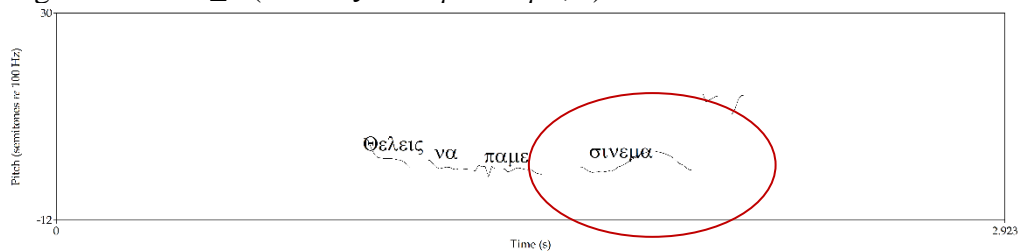Figure 53 GR-1_6 (*"Θέλεις να πάμε σινεμά;"*) →**HL* & L%**

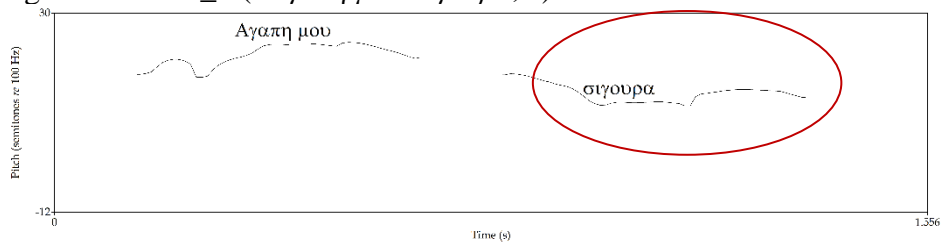Figure 54 GR-2_1 (*"Αγάπη μου σίγουρα;"*) →**L*+H & H%**

Figure 55 GR-2_2 (*"Είναι μονοπώλιο;"*) →**L*+H & L%**
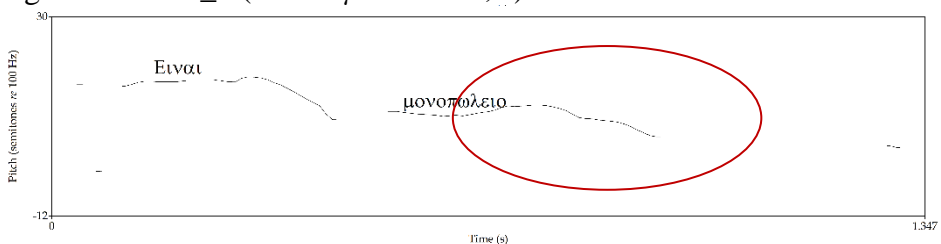

Figure 56 GR-2_3 (*"Το βλέπετε αυτό το κοριτσάκι που κάθεται στη βροχή;"*) →**L* & H%**
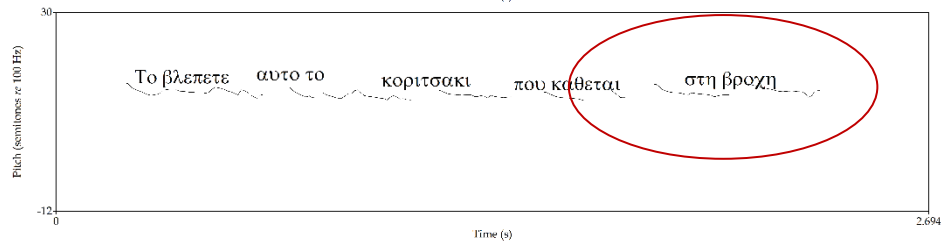
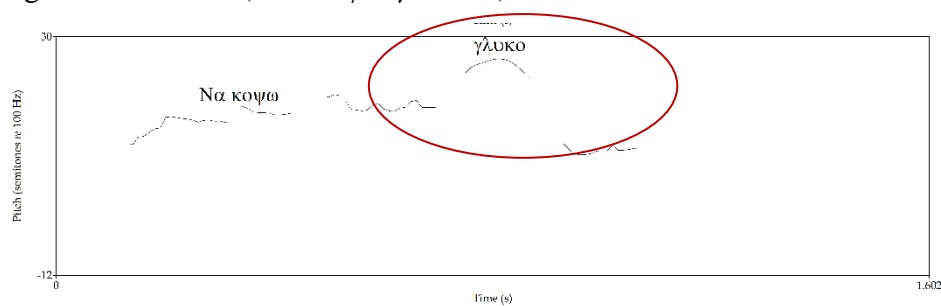Figure 57 GR-2_4 (*"Να κόψω γλυκό;"*) →**HL* & L%**

Figure 58 GR-2_5 (*"Έπινε η Πηνελόπη πορτοκαλάδα;"*) →**%L* & L-L%**

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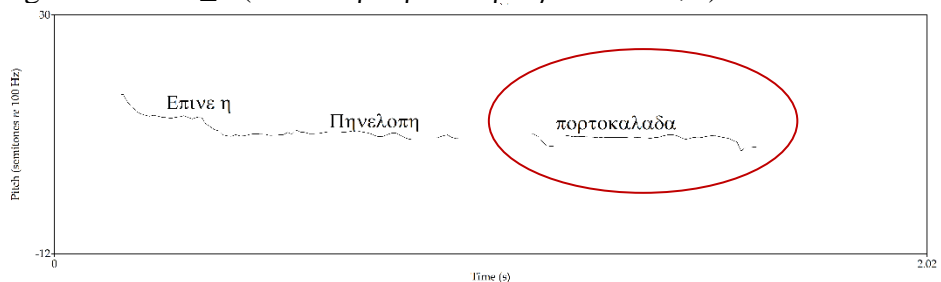
Figure 59 GR-2_6 (*"Έχει νερό;"*) →**HL* & L%**
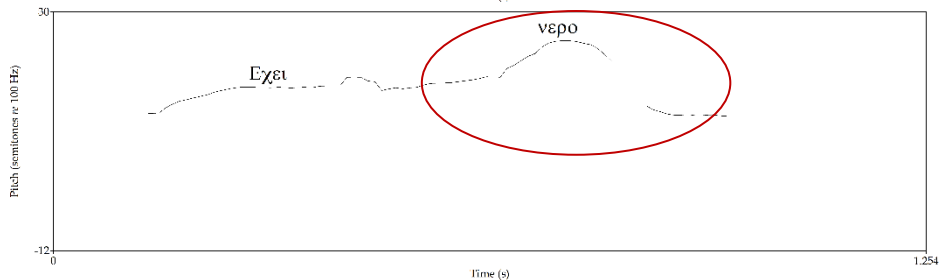
Figure 60 GR-3_1 (*"May I lean on the railings?"*) →**L* + HL & L%**
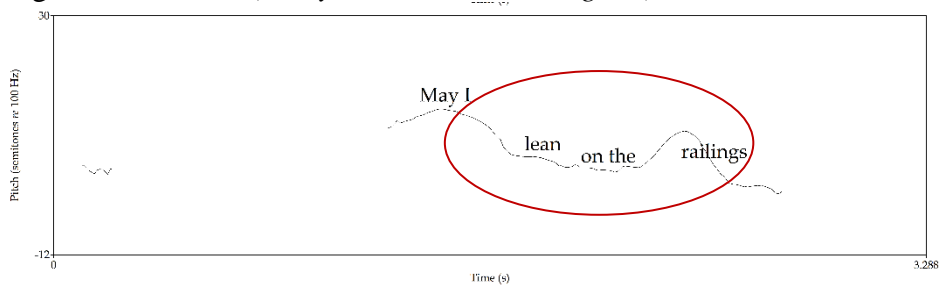
Figure 61 GR-3_2 (*"May I lean on the railings?"*) →**H* & H%**
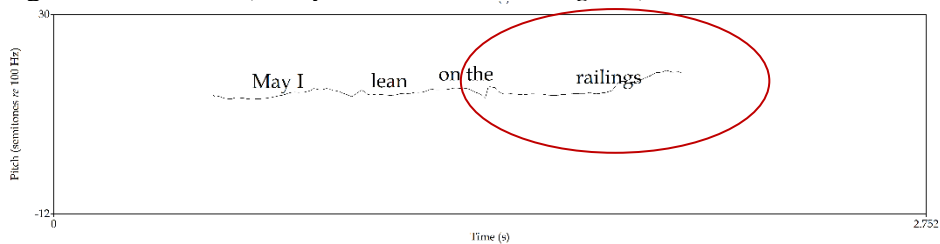
Figure 62 GR-3_3 (*"May I lean on the railings?"*) →**H*L & L%**

Figure 63 GR-3_4 (*"May I lean on the railings?"*) →**H*L & L%**

Figure 64 GR-3_5 (*"May I lean on the railings?"*) →**H*L & L%**

Figure 65 GR-3_6 (*"May I lean on the railings?"*) →**H* + L & L%**
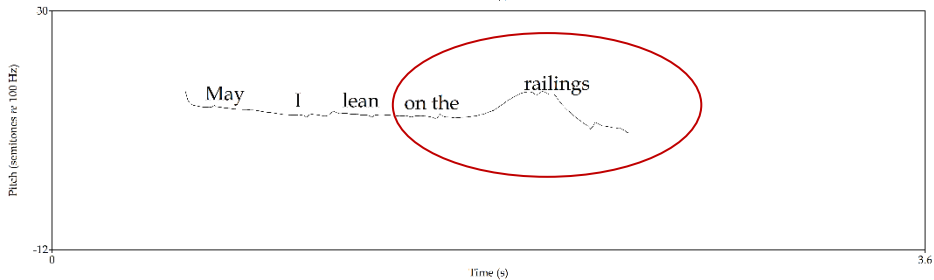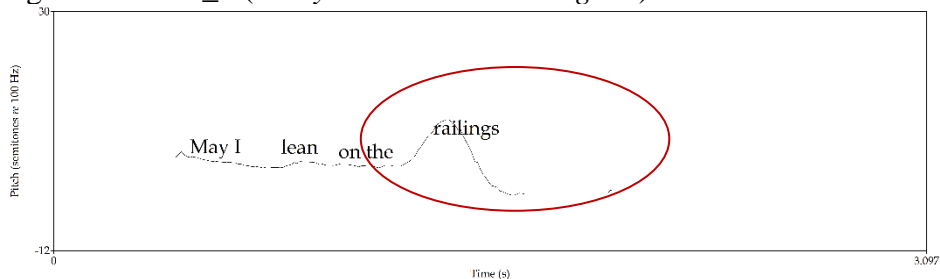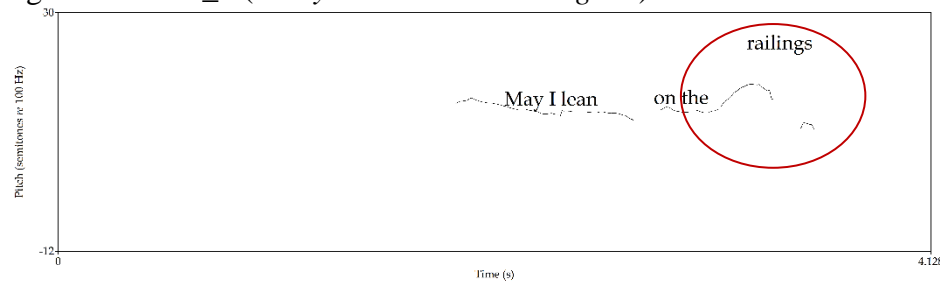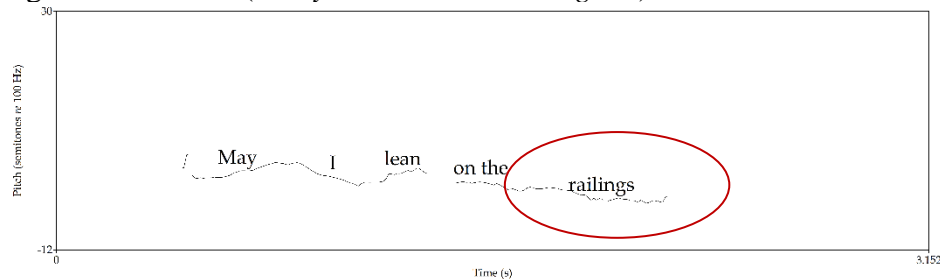

You can access the above (30) recordings by:

1. Clicking on the Google Drive link provided below

https://drive.google.com/drive/folders/1ZBY595zmCT5ytV5JUB_Xzn6o4kIz2gyp?usp=share_link

2. Scanning the following QR code

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