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The Language of Lying in Elizabeth Holmes's Talks

MA Paper

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Abstract
The cultivation of one's own image directly affects the development of a personal brand. In the case of Elizabeth Holmes, her statements and public presence had a significant impact on the development and subsequent collapse of her company, Theranos, a blood-testing venture. With the help of the media, she nurtured the narratives such as “affordability” and “accessibility” that are recognised issues in the US healthcare. Holmes claimed to provide a solution, yet failed to deliver a much-needed remedy to this problem. Nonetheless, she managed to draw the attention of the general public.
This paper focuses predominantly on foregrounding elements in Holmes' speeches. Its main purpose is to elicit a pattern occurring in her talks. Deviations and parallelisms present in those speeches closely correlate with the deception cues and, therefore, are taken into account and referred to interchangeably. Such a correlation is based on the shared intent, namely, influencing the receiver/listener.
We hold that parallelism and deviation are present both on the vocal and verbal levels and manifest throughout different interviews and talks. We also considered temporal relations as part of stylistic choice, with a strong emphasis on the present. As a result, we distinguished some of the patterns that though share common characteristics and foregrounding elements are still distinct enough to recognise. Despite our initial assumptions of foregrounding elements indicating deceitful speech, we couldn’t fully commit to this idea due to other factors taking place (e.g., setting, excitement, etc). Yet at the same time, we can state that the patterns in question could partially correspond to the idea.
In the conclusion, we considered the possible expansion of the work to a full-fledged comparative analysis. We assume that Holmes could have developed her distinct speaking style based on the public figures of that time.

Key words: *deviation, Elizabeth Holmes, foregrounding, parallelism*

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I. Introduction

Silicon Valley has presented itself as a hub of innovation in the tech sector for a long time. It attracted many individuals willing to contribute to the field. Among those, we could see the emergence and rise of young entrepreneurs such as Elizabeth Holmes, a notorious American biotechnology entrepreneur and CEO of Theranos. For the time of the company's existence, Elizabeth managed to cultivate an image of a capable individual at the forefront of the upcoming revolution in the medical field. However, in 2015, the Wall Street Journal (the WSJ) published an article where it was alleged that Theranos produced faulty results that were different from ones delivered by traditional machines that used larger samples. It led to the subsequent downfall as other allegations emerged. Some of them targeted one of the most prominent features of Holmes's identity, her low voice. According to a number of people (Dunn et al., 2019), Holmes did not originally speak in a lower voice, but rather altered it. It makes this case particularly noteworthy, as it serves as an example of deliberate modification of speaking behaviour.

This leads us to the idea that there are other underlying aspects of lying manifested in Holmes' speeches. These aspects in question are on different levels and are both verbal and non-verbal.

Though we acknowledge that not all cues and patterns are indicators of lying, we should also note that they are attributes of her speaking style. They contribute to the character's perception and thus are a point of our interest. However, it's incorrect to assume that everything produced by the subject is false. Therefore, what we aim to do in the study is to elicit individual elements as well as to trace the difference in speaking patterns and indicate which ones are more likely to belong to a lying individual. We work under the initial assumptions that:

- The answers to certain questions, though, may appear spontaneous are premeditated, hence, repeated vocabulary units can be spotted. Subsequently, this may lead to a lack of lexical diversity in impromptu responses.
- The responses and the speaking style are inconsistent due to the effects of cognitive load.

Our general knowledge of Theranos and Holmes (further referred to as "the subject" or "the speaker") is largely based on publicly available data, specifically interviews and talks. We narrow the timeline from 2014 (end earlier) to 2015 in order to elicit the characteristics of the speaking style of that particular period, which roughly covers the first responses to the allegations of fraud. With this in mind, we will try to revisit some of these materials to extract speech patterns and analyse those with the means of manual processing and a corpus tool. Our intention is not necessarily to identify misinformation; since we already are provided with the hindsight of events and false claims, this information seems redundant.

This paper also focuses on the different means Elizabeth Holmes used in her speeches to cater to her audience. It is a stylistic analysis with elements of corpus analysis of Holmes' talks, in particular of foregrounding methods that are used that are associated with deception.

Although there are many ways to define lying, we take some liberty with the interpretation of this notion. Generally, there are several aspects that dictionaries account for. For example, the Cambridge Dictionary presents the notion "lie" as something that is not true, while it can be both written and spoken (Lie, 2024). However, Merriam-Webster expands it and adds "deliberation" to the meaning ("Lie," 2024). Other dictionaries (Longman, Oxford Learner's Dictionary, etc) present a similar outlook on lying.

In one of Ekman's works (1992), he defines "lie" as follows: "… one person tends to mislead another, doing so deliberately, without prior notification of this purpose, and without having been explicitly asked to do so by the target" He suggests two ways of lying: to conceal (hide or withhold the information) and to falsify (present false information). Falsification requires a purposeful change in content, which may lead to a verbal slip or other mistakes and inconsistencies in presenting information. Taking everything above into account, we can say that, in general terms, lying is a deliberate act of producing information that is not true. It is done so with the intention to benefit from it.

We would argue that the study of lying provides us with valuable insight into the mechanisms and means at work that people like Holmes might employ for personal gain. Thus far, the technology that we have now can predict abnormal speaking patterns with an accuracy ranging from 80 to 90 % (Evans, 2018) with the help of polygraphs. However, its results could be manipulated, and therefore, are not admissible in court for this reason. Conversely, Vrij and Mann (2005) present an overall range of 55%. This number includes human lie detectors, such as police officers. That could contribute to the idea that, in general, people who are not trained to spot a lie would most likely guess based only on the knowledge they have at hand. However, if one is familiarised with possible cues, one becomes more capable of recognising deception at a higher rate (Vrij and Mann, 2005). It surprisingly correlates with the ideas of foregrounding in stylistics. Stylistics questions the reasoning of certain choices of words and everything that goes beyond them, with a focus on the possible implications of such choices. It presents a highly subjective view of the decisions made by the speaker/writer. And with foregrounding, the author, whether deliberately or not, makes the text stand out. It shifts the focus from "what is said" to "how it was said" (Beedham & Hall, 2016).

This paper is divided into five major sections, with the first being introduction. The second section gives a brief overview of the existing studies that covered the same topic, along with the approach that we're going to follow. The third section analyses the foregrounding elements of the subjects' talks. This section begins with an introduction to the corpus tool (Prosogram), the

values extracted, and their further analysis. It is also subdivided into two subsections that cover non-verbal and verbal cues, respectively. The non-verbal subsection covers vocal cues such as voice pitch, intonation, pauses, and speech rate in their respective order, which were processed with the script. The next subsection includes verbal cues selected based on the style, namely, lexical diversity and sentence complexity. It also touches upon verbal expressions of time and their relation to foregrounding. However, we did not cover medical terminology or any adjacent vocabulary, since we do not possess the domain knowledge required. Additionally, the discussion of visual and invisible cues (Feine et al., 2019) falls outside the scope of this paper and therefore is not covered. The fourth, results section, presents a concise summary of our findings, in which we distinguish two separate patterns with typical features and possible contextual implications. Some of our conclusions are presented in the final section. There, we explore the limitations of our work, such as the peculiarities of extracting textual and numerical data from audio materials.

The research has been approbated:

1) conferences:

- Germanic languages: corpus, concept and discourse (2025)
- New Trends in Translation Studies, Philology and Linguodidactics in the Context of Globalisation Processes (2024)

2) articles:

- "The Language of Lying in Elizabeth Holmes' Talks" (Papirna, 2024)
- "Voice Pitch Peculiarities in Elizabeth Holmes' Interviews" (Papirna, 2025)

II. Theoretical background

There is a considerable amount of literature, ranging from research papers to news articles, regarding Holmes. They expand on linguistics (Ho, 2021; Tauber, 2022; Liubertė & Dimov, 2021), economics (Martins et al., 2024), social sciences (Dundes et al., 2019), etc. Some of them go beyond the character of Elizabeth Holmes and address the issue of Theranos altogether. For instance, there has been some discussion regarding the methods that were employed to create an identity. According to Ho, Elizabeth Holmes took advantage of legitimation strategies in her interviews, such as abstraction, evaluation, comparison, etc. With this, Holmes aimed to build a corporate image for her company that reflects the core values of that time (innovation and accessibility). Yet, persuasion tactics are only part of the picture. Articles from the BBC (2022) and Mercator (2022) reflect on the history of interviews and present an idea of self-deception. According to them, Holmes might have deluded herself into believing in her ideas. This suggestion is reflected in the comments that describe her responses as genuine (Mercator 2022). This assumption, if proven correct,

could affect the subject of our study; the supposed unusual behavioural patterns could be attributed to this; therefore, it is taken into consideration.

Liubertė. and Dimov (2021) analysed Holmes' speeches with the help of the speech act theory (Austin, 1975). As a result, they identified four major aspects: 1) framing (highlighting particular experiences with blood testing); 2) filling (providing detailed descriptions for better visualization); 3) connecting (creating the idea of a connection between stakeholders and the technology, personal involvement) 4) committing (providing a narrative which asserts the existence of tangible results).

When it comes to deception, several methods are used: analysis of verbal and nonverbal cues, polygraph, strategic interviewing, etc. (Brennen & Magnussen, 2023). For the reasons of space we limit ourselves with the dissection and further interpretation of deception cues, in particular. Further in this paper, verbal and nonverbal cues will also be referred to as part of social cues. It is important to specify the social cue as a notion. It can be interpreted as a bit of information (expressed verbally and non-verbally) that is produced by a conversational agent and triggers a social reaction (Feine et al., 2019).

The topic of verbal and nonverbal characteristics has been widely studied in the context of deceitful speech and truth telling specifically (Scherer et al., 1985, Sporer & Schwandt, 2007; Vrij, 2008; Loy et al., 2018;). In the studies, these cues represent the unconscious manifestation of lying and are called respectively as "deception cues". Ekman, on the other hand, regards some speech discrepancies as "thinking cues" (e.g., latency response) and "emblematic slips" (pertaining to body language). Conversely, Loy et al. (2018) in their empirical research questioned whether these cues can function as deception markers. They maintain in their initial hypothesis that liars have an understanding of the works of deception and are thereby able to manipulate those to an extent. A similar may apply to the listeners (guessers) as well, which allows them to identify false statements. Still, in their findings, they present the following:

"*Guessers' impressions about lying reflect the cognitive hypothesis, where producing untrue utterances requires additional mental effort, resulting in cue behaviours indicative of this load* (Sporer & Schwandt, 2006; Vrij, 2000)."

According to the results of their research, a truth-lie bias was observed. The guessers' perception of falsehood differed from the speaker's. Notwithstanding, the findings work in line with the pre-existing theories on deception (Vrij et al., 2001), where placing a cognitive burden results in these cues.

In this instance, we regard the cues specifically as a byproduct of cognitive load, a term to which we will refer in this study. Von Hippel and Trivers (2011) define it as "a result of maintaining two types of content simultaneously".

In other words, cognitive load represents the effort required to process several tasks at the same time. Whilst speaking, an individual performs a number of those, such as planning, formulating, and delivering. In addition to this, the speaker is also responsible for instantaneous feedback to the audience, which makes speaking even more taxing.

Thus, when an individual lies, they experience a cognitive load that is far greater than that of those who are truth-tellers. It comes as a result of an additional task placed on an individual that involves control over vocabulary, grammar, or body language, etc. Therefore, we could argue that the speaker would leave some cues, as an unintended result of lying. It allows us to differentiate the deceitful language from the truthful one to some extent. Vrij (2008) claims that there are consistent patterns of deceptive behaviour. Hence, we can assume that cognitive load may manifest in the spoken language repeatedly and subtly.

Foregrounding, on the one hand, also deals with unusual variations, but those are not necessarily tied to the intention to mislead the audience. It is closer to the idea of making someone feel a certain way. Yet, at the same time, it focuses on the manner of speaking rather than the content of produced speech. Intentionality connects these two notions: both have the purpose of eliciting a reaction, and both could be produced unconsciously. In literature, foregrounding is heavily grounded on: 1) deviation - a violation of rules and conventions, which makes the target language stand out; 2) parallelism - the use of a pattern that is above the normal degree. (Childs & Fowler, 2006).

Deviation is divided into external and internal (Levin, 1965; Leech & Short, 2007). External deviation could be described as a deviation from general language norms or across different texts, whereas internal deviation violates the rules previously established by the author or those that are violated within one text.

Parallelism, as a part of foregrounding, relates to linguistic devices on all language levels. Repetition is only one aspect of parallelism, as it comes in other forms depending on the volume (e.g., repetition of clauses, separate words) or position (e.g., anaphora, anadiplosis, etc.). Cohesion is another aspect, which refers to the explicit or implicit connection of two units (Leech & Short, 2007) bound by the content. According to the book “Style in Fiction” (2007,) cohesion is expressed by cross-referencing and linkage. Cross-referencing is subdivided into the following categories: definite reference, substitution, ellipsis, formal repetition, and elegant variation. Linkage is subdivided into: coordinative conjunctions (e.g., and, but, or, etc) and linking adverbials (e.g,. for, so, yet, however, etc.)

That being said, here we will equate deception cues and foregrounding techniques, since those share a similar purpose of creating a certain narrative or perception, whether it was done with the intention or not. In this paper, however, we will mostly dwell upon verbal and auditory social cues, as ones that are the

most prominent and abundant in Holmes' speeches, thus avoiding invisible ones. In addition to this, to trace the cognitive load in our subject, we will rely on nonverbal cues presented by Vrij in his works: pause durations and pause frequency, hesitations, high-pitched voice, speech rate, and speech errors, as those are indicators of foregrounding.

Deception cues (taxonomy).

It is also important to establish first that the way Holmes speaks is not completely natural for her. That is, provided we assume that lying can affect certain speaking patterns. Here are some aspects we will focus on further in the next section. The aspects in question are targeted based on the Vrij taxonomy of deception cues and social cues by Feine et al. (2019). These terms will be further used interchangeably.

Pauses. Several studies have shown a correlation between pausing and deceptive speech, including those mentioned before. Some of those have a close relation to the aforementioned cognitive load.

The mental demand can disrupt the speaking flow, which subsequently leads to increased use of pauses. These pauses could be either silent or filled (Chandler & Munday, 2011) with hesitation markers and vocalisations such as "uh", "um", etc. One of the studies (Zhang et al., 2022) in particular dwells upon the duration of both silent and filled pauses. They claim that the silent pauses are not only common in deceitful speech, but also longer than in truthful one. The same applied to the filled pauses as well.

Voice pitch. In the American Scientist article, Casey A. et. al (2017) note that voice pitch is "an expression of physiology, not psychology". That implies that the pitch is something that is innate and comes naturally for a person to produce. Therefore, any voice alterations could be considered purposeful and forced, especially concerning a higher or lower pitch.

High pitch, one of the vocal cues, is indicative of deceitful speech. The issue, however, is that in the case of Elizabeth Holmes, what we could actually hear is the opposite. She purposefully lowered her tone and pitch in order to sound more masculine. In the New York Times interview (2023), it is stated directly:

"... Ms. Holmes speaks in a soft, slightly low, but totally unremarkable voice, no hint of the throaty contralto she used..."

Moreover, her family seems to acknowledge that fact as well (The NYT, 2023), as it is also reflected in the article with the comments:

- "…even Mr. Evans agrees, the voice was real weird."
- "That would be crazy, if she answered the door and said, 'Hi. I'm Elizabeth Holmes," Mr. Evans said, imitating the voice. Ms. Holmes let out the slightest of giggles from the back seat."

The possible rationale for using a deeper pitch could be creating an image of a person in power. For example, Mayew et al. (2013) present the correlation

between a lower pitch and success on the labour market. They state that males with a deeper voice are more likely to get and retain a job in larger firms.

According to Klofstad (2012), people tend to opt for a person with a lower voice when it comes to someone in charge; that goes for officials or other leadership positions. It is not limited to gender specifically, since participants preferred someone with a lower pitch, whether that was male or female. A similar idea was presented by Jay Miller, a vocal coach who claimed that a lower voice was used to "counteract the initial impression of being young and inexperienced" (MarketWatch, 2019). Quite the opposite idea was presented in Midam Kim's work (2022). She takes Holmes as a case study and claims that the lower pitch did not produce a desirable outcome from the audience, because of the different expectations people hold for women. As stated in the work and the article from the University of Kansas:

"Low pitch is an auditory cue that has been expected of men leaders. So, first of all, people have not had many experiences with women leadership – so it's hard to apply the same auditory expectation for women leaders." (Kim, 2022)

Repetition. Some narratives may become more believable if a listener is exposed to them multiple times. This phenomenon is often called the illusory truth effect (Hasher et al., 1977). Hassan and Barber (2021) conducted an experiment where they showed a correlation between increased frequency and perceived truthfulness. The idea is applicable in this case as it stems from our initial assumptions of repeated constructions in speech.

Speech rate (also articulation rate or speaking rate) is a number of words a person can produce within a certain time limit. It is typically measured in syllables per minute and this is the way we will calculate the articulation. Contrary to peoples perception disingenuous speaker tends to have a faster speech rate than a truth-teller (Loy et al., 2018)

As was mentioned before, each of those markers does not necessarily indicate deceitful language. Nonetheless, by checking ones that are present, we are more likely to detect whether a person is lying by discerning a pattern.

III. Methodology

3.1 Data collection methods for vocal and verbal cues.

In the stage of data collection, we primarily look at video and audio material to extract information. In total, 19 video materials were analysed, which is approximately 440 minutes. As we intend to capture on-spot reactions, articles and written interviews were omitted. This selection falls into two categories: textual data with repeated constructions and audio that shows the subjects' voice range.

The latter became an issue as we faced a challenge that could be described roughly as: "How exactly can we measure the tone or pitch of Elizabeth's voice in the first place?". Such prosodic features as pitch, pause duration and frequency, speech rate and intonation are values that are difficult to measure accurately by ear. However, it is still possible to make a perceptual description of a target unit. One can make an approximate guess and describe it for further study. Nonetheless, for a reader, it is hard to perceive the exact tone of the voice, relying on a written description. This leaves some room for imagination that was provided by an unreliable narrator. It is unreliable in the sense that by giving an estimate of "X is higher than Y," we are not provided with the exact data, whether it is visual or auditory.

Therefore, in this study, we rely on perceivable fluctuations and changes in pitch in addition to a Prosogram script to showcase prosody. The latter is a script of PRAAT, a model designed to capture and visualise the pitch variations. This program was chosen since it also covers the prosodic features and properties of a speaker. Moreover, it presents a visual profile of a subject to which we will also refer further. (*Prosogram*, n.d.)

Prosogram provides two values, which are used to measure the range of pitch: semitones (ST) and Hertz (Hz). We will look at both of them since those represent the changes in the voice; however, in most instances, we will refer to Hz for convenience and to avoid further confusion.

As it is stated in the Prosogram's guide (Piet Mertens, 2022), semitones are used to capture the changes in the pitch of the voice. It can capture minor fluctuations occurring and showcase the difference in pitch between the given sounds visually on a scale. However, one of the potential drawbacks of such a measurement comes from the fact that semitones are commonly used for measuring singing, not speaking.

One of the possible drawbacks of using this system is inaccurate data that does not correspond to reality, which could be a direct result of human error. This presents a major concern at the early stages of this study. So, to avoid such complications, samples are cross-referenced with the source material manually. In other cases, samples are processed several times to avoid possible faulty

readings. Thus far, in the process of producing and analysing the data, no abnormal readings were spotted.

Another relevant question is, "Why exactly do we need to measure it?". Leech and Short (2007) maintain that it is unreasonable to demand an explanation for every observation regarding numerical frequency, due to its subjectivity in reading. Here, the issue lies in occurrence. It can be argued that it is hard to mimic and maintain a lower pitch of voice constantly. The data intends to showcase the difference not only within one interview or speech but across multiple public appearances. The data helps to track not only the changes in voice but also consistency. It is important to know how much it fluctuates and whether it is connected to the cognitive load.

3.2 Foregrounding in vocal cues

Pitch as a foregrounding device in Holmes' speeches.

External deviation in pitch. Firstly, to cover the apparent differences in pitch, we used a generated speaker profile with the help of a Prosogram script. The video samples were segmented and converted into wav. files for further analysis. Some of the parts were abridged to separate the speaker from the other noise (e.g., the interviewer talking and interrupting).

The profiles below are based on videos claiming to capture the subject's real voice. Those are from earlier speeches (posted in 2013) and one of the last public appearances before the WSJ exposé publication (posted in 2015) (Figure 3.2.1).

Pitch Range (after stylization)

	ST	Hz
range (span)	11.1	
top	97.2	275
mean	89.7	180
median	89.1	172
bottom	86.2	145
stddev	2.76	38.43

Pitch Range (after stylization)

	ST	Hz
range (span)	13.6	
top	98.3	293
mean	90.5	188
median	90.0	181
bottom	84.7	133
stddev	3.01	38.08

(Figure 3.2.1 speaker profiles - Elizabeth Holmes with a "real voice")

In Figure 2.2.1, the mean for the pitch ranges from 180 to 188 Hz. It correlates with the average mean for a female-speaking voice, which is around 200-220 Hz (Berg et al., 2016), albeit still being on the lower end. In addition to this, the similarity of these data may suggest that the voice remains consistent. The consistency, in turn, leads us to believe that the pitch produced might be real or close to the real range of the subject, especially taking into account the difference in time of recording.

However, it highly contrasts with Figure 2 presented below. In this instance, the profile was created from the promotional video for the Theranos company

(2014). Here, the mean is around 150, and although it does not seem significant, the contrast is perceivably apparent. Especially taking into account the lowest value of 96 Hz.

Pitch Range (after stylization)

	ST	Hz
range (span)	12.7	
top	91.7	200
mean	86.5	150
median	86.9	151
bottom	79.0	96
stddev	2.81	26.89

(Figure 3.2.2 Better Blood Test Experience - Theranos 2014 (speaking profile)

To compare, the mean for the average male-speaking voice is at 100-120 Hz. Although the speaker does not reach that low pitch-wise, we can observe a proclivity that is manifested in the recordings. The mean, however, might fluctuate depending on a number of factors such as age, lifestyle, voice intensity (whether a speaker is using a shouting or conversational voice), smoking status, etc (Berg et al., 2016).

Therefore, to assess the general picture further, other interviews were analysed. It seemed reasonable to juxtapose the subject with other interlocutors. It was done with the intention to check whether the gender of the interviewer had any effect on the subject's speaking patterns. In the following examples, samples were compared to male (WSJ, 2015) and female (Fortune Magazine, 2014, 2015) interviewers. Those samples were cut to match the speaking time for each speaker.

Pitch Range (after stylization)

	ST	Hz
range (span)	16.6	
top	97.7	282
mean	88.0	165
median	87.6	158
bottom	81.1	108
stddev	3.54	37.94

Pitch Range (after stylization)

	ST	Hz
range (span)	10.8	
top	84.1	129
mean	77.8	90
median	77.3	87
bottom	73.3	69
stddev	2.50	14.45

(Figure 3.2.3 WSJ on the left, Holmes, on the right, male interviewer)

The figures above are from the Wall Street Journal interview and show the difference in pitch range between the two interlocutors. The male interviewer has the lowest register of all presented samples in this section, with a mean of 90 Hz. The subject, on the other hand, has a mean of 165 Hz. The point of interest here, however, is the highest point of 282 Hz. This point indicates an emphatic

stress (she raises her pitch to indicate the contrast), which is a typical pattern for the subject's interviews.

Pitch Range (after stylization)

	ST	Hz
range (span)	13.7	
top	94.1	229
mean	85.8	143
median	85.2	137
bottom	80.3	104
stddev	3.09	30.70

Pitch Range (after stylization)

	ST	Hz
range (span)	22.4	
top	98.9	303
mean	88.6	171
median	87.9	160
bottom	76.5	83
stddev	4.09	44.49

(Figure 3.2.4 Fortune Magazine 2014 Elizabeth on the left, female interviewer on the right)

The samples presented above are from Fortune Magazine (2014) with a female interviewer. The other speaker has a relatively lower voice, yet the contrast between the interviewer and the subject pitch is perceivable and is reflected in the figures above. In addition to this, we can trace the fluctuation of voice. Those were less distinct in comparison to the data provided previously. During the interview, the voice of the subject was relatively monotonous, it did not reach the highest points as used to. It may suggest a well-maintained control over the voice.

Pitch Range (after stylization)

	ST	Hz
range (span)	9.9	
top	92.3	207
mean	88.0	162
median	88.1	162
bottom	82.4	117
stddev	2.09	20.65

Pitch Range (after stylization)

	ST	Hz
range (span)	20.6	
top	108.9	538
mean	94.6	246
median	93.2	218
bottom	88.3	164
stddev	5.05	89.50

(Figure 3.2.5 FORTUNE MAGAZINE 2015 Elizabeth on the left, female interviewer on the right)

Another peculiar example is also from Fortune Magazine (2015). A one-year difference makes this particular sample of great interest, due to the similar setting. In this case, however, she is conversing with another interlocutor. In the right table (Figure 3.2.5) female interviewer showcases a great variety in pitch fluctuations, with a mean of 246. In addition to this, perceptually, the interlocutor's voice is significantly higher than the voice of the subject. It creates a contrast between two speakers (Holmes and the female interviewer), where the subject's voice, though higher than in the previous example, still contrasts highly with the other female interviewer.

To summarise, the external deviation in pitch is highly observable in the majority of interviews. Moreover, the fluctuations are not dependent on the other interlocutor but contrast regardless.

Internal deviation in pitch. Everything mentioned above thus far deals with the patterns throughout her active career as an entrepreneur. So to further the idea, we decided to take several segments from the same interviews to trace the consistency in pitch throughout recordings as well. The figure below presents three separate samples of Holmes from the beginning, middle, and end of the CHM Revolutionaries conversation. The data is presented in order.

Pitch Range (after stylization)

	ST	Hz
range (span)	15.0	
top	94.2	230
mean	83.6	126
median	83.2	122
bottom	79.1	97
stddev	2.78	24.77

Pitch Range (after stylization)

	ST	Hz
range (span)	13.6	
top	93.5	222
mean	84.3	132
median	83.9	127
bottom	79.9	101
stddev	2.95	29.59

Pitch Range (after stylization)

	ST	Hz
range (span)	13.4	
top	90.1	182
mean	84.1	129
median	83.9	127
bottom	76.7	84
stddev	2.44	18.57

Figure 3.2.6 CHM Revolutionaries consistency in pitch

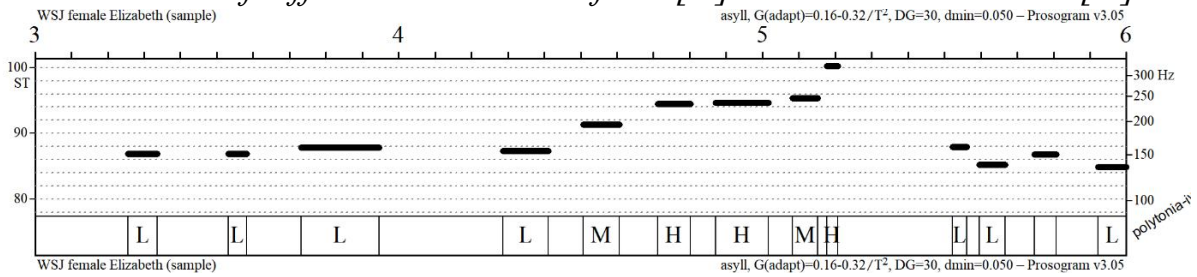
The data from the profiles above show that the voice pitch remains overall consistent with a mean of 126 Hz (beginning), 132 Hz (middle), and 129 Hz (end) with minor fluctuations for the top figures. It contrasts with the data from other interviews, where Holmes' pitch may range drastically.

However, there is one piece of data that the table does not indicate, namely, a small fluctuation pattern within those samples. This pattern, though not unique to this instance, is extremely prominent here. The top and bottom numbers may suggest an occurrence of a subtle pitch shift. The pattern itself consists of gradual declines and rises of pitch and does not affect changes in intonation.

Intonation as a foregrounding device.

As with the pitch, the intonation is another vocal cue, deviations of which might suggest underlying narrative choices. The examples below were taken from The Wall Street Journal interview (2015). Example:

"*And there's a lot of different ↗elements of our [H]work that ↘ have been [...]*"

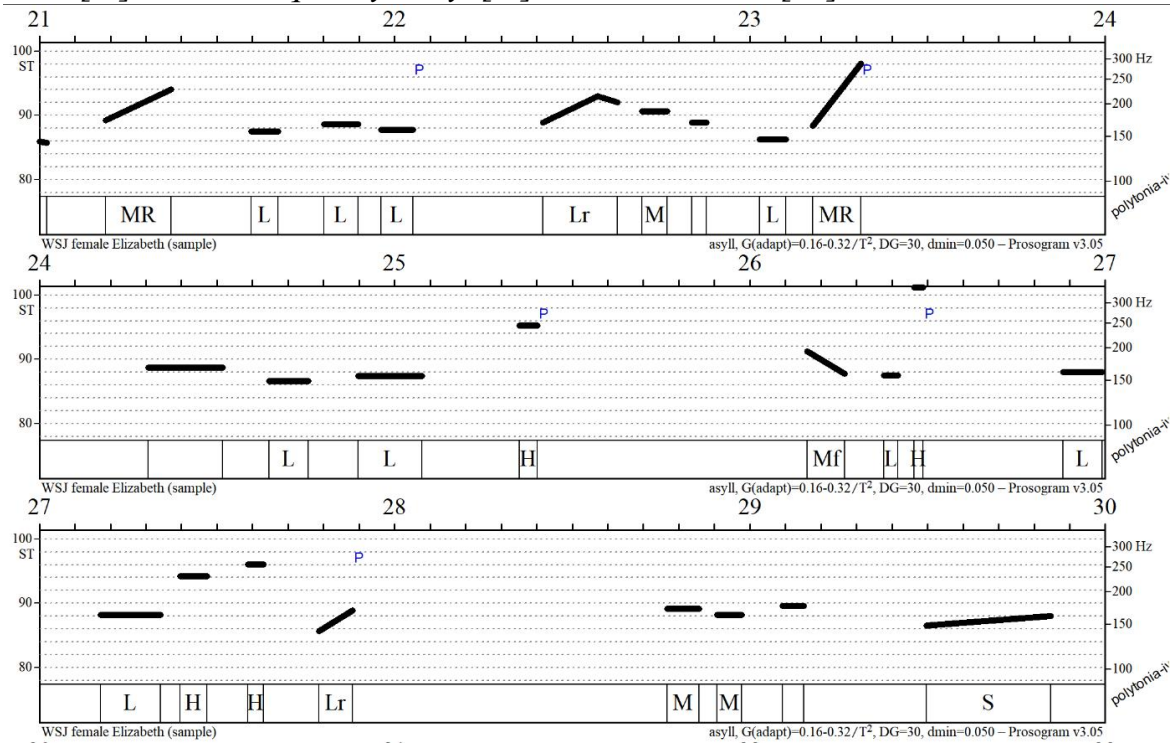


(Figure 3.2.7)

In this example, the voice is slightly rising, peaking at the word 'work' (denoted with [H]). On one hand, from the script, we can see that the sentence is not complete, which could partially explain the rise. On the other hand, the rise is analogous to the one in the inquiry and thus creates an impression of

peculiarity. It could imply a couple of things: doubt and dismissal. It is important to note that the WSJ interview was made public on October 21, 2015, after the article from the same news outlet (October 16), detailing the struggles of the company. Therefore, we can assume that the allegations could have facilitated the abnormalities. A similar sentiment is also reflected in the following example. The speaker sounds unsure because of the excessive emphasis put on the rise. Example:

"*[...]meant that we have to move as a [Mr]company from the [H]lab ↗frame[H]work and quality ↗sys[H]tems to the FDA[...]*"



(Figure 3.2.8)

In other cases, the rising intonation is at the end of the sentence. It creates an impression that the sentence is not complete since the utterance produced does not indicate a finished thought. Moreover, it is supported by the content of the said sentence. It recreates a stream of consciousness. And we could argue that it is the result of spontaneous speech.

Example (Holmes speaking about confidentiality motto):

"I think, you know, one of the things as a ↗culture is really important to us ↗is. I'm executing before I talk about ↗something and so…" (The Berkman Klein Center for Internet & Society, 2018)

The intonation patterns, both rising and falling, were sometimes mirrored and repeated to amplify the overall effect. As shown in the following example, Holmes uses the rising pattern to imply the similarities between two notions; the framework transition is compared to changing driving from right to left. In addition to this, these words are equally stressed to intensify the effect.

"Because we're at the moment in time in which we decided to transition from a ***lab*** *↗framework to the* ***FDA*** *↗framework. [...] I think about this kinda like cars driving on a road. And you say 'Okay, I'm gonna take everybody driving on the* ***right-hand*** *side of the ↗road to the* ***left-hand*** *side of a ↗road."* (WSJ 2015)

Similar patterns occurred in other subject's interviews. In those examples to highlight the similarity or juxtaposition between two different aspects or things, word stress is used as well. The intonation from the example below, however, is more subtle, and the rise is less distinct.

"*[...] yet we know more about ↗****credit*** *cards than we do about our ↗****lab*** *data.*" (CHM, 2014)

In the example below, Holmes briefly tells about their laboratories. The similarity is implied in two ways: 1) with the expression "just like other labs" 2) with the rising intonation, mirroring "other labs" and "our labs". As with other statements, intonation does not necessarily show incompleteness but rather creates links with homogeneous units, where "lab" is a key notion.

*"So we're a certified ↗****lab****, a high complexity Cleo certified ↗****lab****, just like all the other ↗****labs****, that provide lab ↗****testing****." (CHM, 2014)*

Emphatic stress is not commonly scrutinised in literary analysis, since it is a vocal cue that cannot be perceived in the text. The author may emphasise the change by providing graphic means to accentuate it for the reader. Yet in most cases, it is up to the reader's interpretation whether the word should be marked. Conversely, we have a clear indication of placed stress in the spoken language. Therefore, we decided to leverage this opportunity to look at the emphasised words in order to find some manifestations of possible foregrounding.

As it was mentioned before, Elizabeth Holmes shows a tendency to put an emphatic stress on certain words. Some of the choices are semantically motivated, thus presenting the importance of certain concepts of her business. In the example below, she puts stress on the words that define key aspects of the technology, such as "testing", "clinical", and "tool". The wording and stress placement are not arbitrary. Example:

"...creating of a decentralized ***testing*** *infrastructure, because laboratory data drives 80% of* ***clinical*** *decisions, can be a* ***tool*** *for facilitating a decentralized care delivery infrastructure."* (Fortune Magazine, 2014)

In another instance, a sequence of words is stressed, instead of separate words. In the phrase "basic human right," each word is equally emphasised. It creates an impression of uniformity, where each word used is of equal value.

"The right to protect ***our*** *health and well-being [...] is a* ***basic human right****."* (Ted Talk, 2014)

The sentence itself is a parallel; it mirrors the idea at the beginning and the end of the statement. "*The right to protect …*" is a subject that is followed by the predicate "*is a basic human right*". So, in addition to the emphasis, the echoing reinforces the message even more. The use of the pronoun "our" is deliberate.

Throughout the Ted Talk, Holmes keeps her speech more generic in that regard, avoiding the personal pronoun "I", since the intention is to create an idea of shared struggle; she and the audience are on equal footing. Usually, personal pronouns are not stressed, since they are a part of functional language. Therefore, it is an intentional decision made by Holmes. She does so on a number of other occasions. For instance, to talk about collaboration with another company. She also stresses possessive pronouns "our" and "their" and a personal pronoun "we". The example above illustrates an emphasis that is being built through the sentence. The word order is essential here. First goes "` our work", which represents Theranos as a company; it is followed by "their expertise", which shows the value provided by another company; and finally ends with "work that `we do" to showcase a joint effort. We can even consider the additional underlying meaning that emphasis on "we" provides, in a way climactic, namely a unification.

"*...is a long-term alliance that will not only integrate `**our** work, but also integrate `**their** expertise in some of the work that `**we** do.*" (SIEPR, 2015)

As mentioned previously in the case of the intonation, where Holmes used the rising tone to indicate the alignment between two separate concepts, an emphasis is put on. The example below demonstrates a juxtaposition of the highlighted notions. In this example, however, there are no perceivable changes in rises or falls. A credit card statement is opposed to a lab report as something that presents more significance for an ordinary individual. Example:

"*... someone would understand a `**credit** card statement, better than they would a `**lab** report.*" (SIEPR, 2015)

Something similar is observed in the following example. It illustrates the usage of emphatic stress that equates the value of a simple expense, such as a meal, to the cost of the blood test. It furthers the narrative of affordability, on which the subject often relies on. Furthermore, it is expressed both with emphasis and a vocabulary choice; "the cost of" is mirrored twice, and it is used to frame the statement at the beginning and the end.

*"... `**the cost** of the `**tests** would be a little more than `**a cost** of the `**meal**."*

In conclusion, the subject creates parallel constructions with the help of emphatic stress. By highlighting homogeneous units, rhythm is created.

Pausing as a foregrounding device.

Long and short pauses usually indicate the end of the utterance, to show the finished idea. However, in the case of Holmes, those are not necessarily applied for this specific purpose. Long pauses may sometimes occur in the middle of a sentence or even a phrase. Most likely, in this case, pauses are employed to help the speaker remain collected. Holmes stops in order to collect her ideas, especially during challenging questions. In the example below, she presents an idea about her company's beliefs.

"So our belief [pause], fundamentally, is that [pause] the answer to our challenges in healthcare lies in [pause] engaging and empowering the individual" (Fortune Magazine 2014)

On the contrary, some of them are premeditated and placed, probably, for dramatic effect. It probably intends to create engagement with the audience, since those pauses, in particular, are used to emphasise a message. Notably, the messages mentioned in this talk will be defined for the core narrative, hence the accentuation of each word. The concepts highlighted (e.g., "health", "basic human right", etc) are recurring themes in further talks. In the example below, however, their abundance may feel off-putting to the listener, and the talk feels excessive and overly rehearsed. Holmes is likely trying to sound more serious and collected, yet struggles to achieve the desired effect. Example:

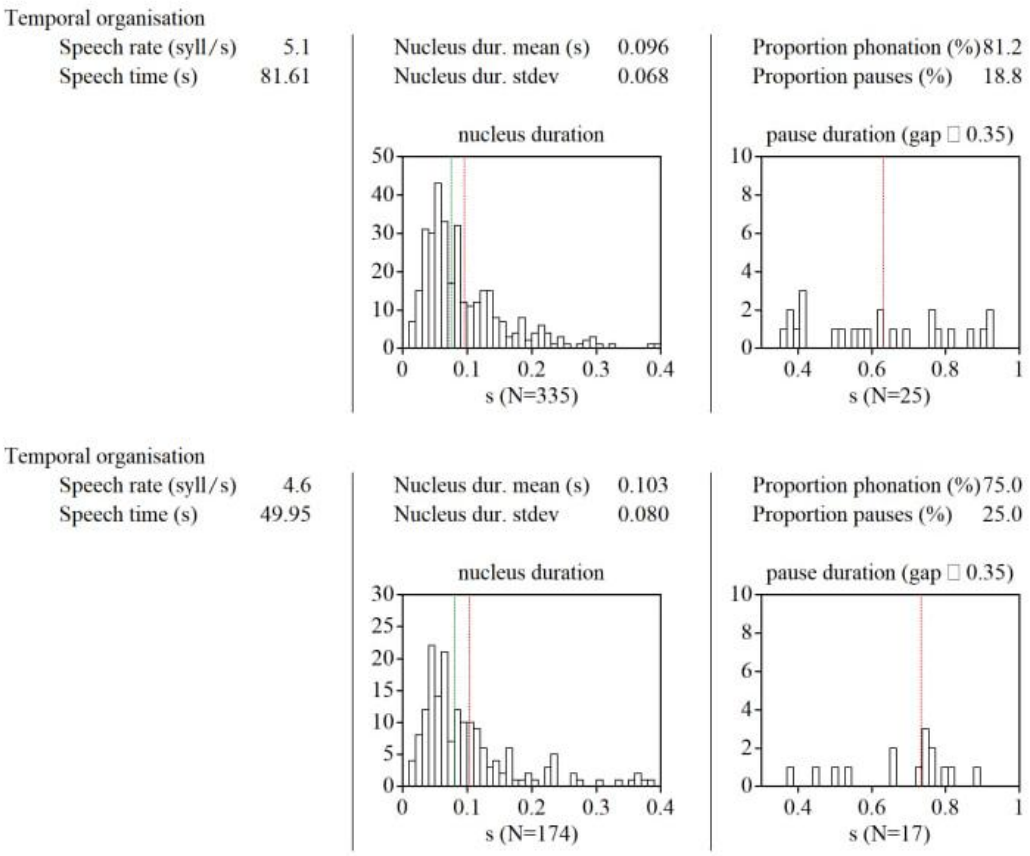
" The right [pause] to protect [pause] the health [pause] and well-being [pause] of every person [pause], of those we love [pause], is a basic [short pause] human [short pause] right" (Ted Talk, 2014)

In other cases, the pauses are utilised to give some time for the subject. In the example below to the question on the potential of lab testing, Holmes presents two different patterns. Firstly, she makes an off-hand remark, it is spontaneous and does not require a particular choice of words, hence there are only a few pauses. In the next sentence, she slows down and changes the pattern. The pauses are longer (though not significantly), and their frequency is increased.

"We understand that our competition would like us [short pause] to tell them how we do everything, that we do [Long pause]. But you know, [pause] I've always believed [pause] we spent 10 years [pause] in stealth mode [short pause], we basically had nothing on our website [pause], we never did any interviews, no press." (CHM, 2014)

To further look into the deviation in the temporal organisation of speech, we decided to get excerpts from another interview. The figure below presents two samples from the conversation of Jonathan Zittrain with Elizabeth Holmes in 2015. They were extracted based on the topic (technical and personal) that the subject spoke on. We motivate this choice by the already perceivable deviation between them. The first sample above is on work with the FDA, a more technical question. The pauses are 18.8% in proportion to the speech from the sample, where phonation is 81.2%. It should be noted that the number reflects the usage of silent pauses specifically and does not account for filled ones. That being said, there were a few filled pauses, and the duration of silent pauses was shorter than in the next sample. In the second graph (Figure 2.8,) Holmes speaks about her vocation and work. The speech is not rehearsed, and it is reflected in the data. It shows that proportionally, pauses are more frequent and shorter than in the sample above. Example:

"...I've always believed that [short pause] in any field when people find [short pause] what they love [short pause] it is by definition what they have [short pause] the potential to be [short pause] incredibly great at [pause]."



(Figure 3.2.9 Speech rate and phonation in Holmes' answers)

Such a difference in the pattern leads us to believe that the second sample reflects the effects of cognitive load. The subject speaks on a relatively new topic, therefore, it takes more mental resources not only to produce coherent sentences but also to keep the voice pitch low at the same time (first sample mean - 154 Hz; second sample mean - 149 Hz). Notably, the first sample is higher pitch-wise not only in the mean but at the top point; the subject is more familiar with the topic and has less control over her voice.

Speech rate as a foregrounding device.

In this instance, articulation rate is one of the prominent vocal cues that we can perceive along with the pitch of voice. In the interview, the subject presents two different patterns, the use of which is governed predominantly by the questions asked. In the previous Figure (3.2.9), we can see a slight change in speech rate and nucleus duration. In the first case, Holmes reflects on the FDA submissions required; she relays this information at a slightly faster pace since she is familiar with talking points and does not need to slow down to think about the wording. In the second case, she presents a new bit of information, she is less excited, and it translates into slower pacing.

Something similar occurs in other interviews as well, providing a reason to believe that two major contributors to a speech pattern are the topic of the conversation and the emotional state of the subject.

3.3 Foregrounding in verbal cues.

When it comes to repetition, the general intention is to trace the occurrences of such. And though the message could be significant, it is not a priority, since parallelism as a part of foregrounding focuses on "how something is said", rather than "what is said". We intend to abide by this principle. However, we still reflect on the purpose of the repetition and the general intention. In the analysis, the samples are not limited to isolated words, which means that we set out to look into more complex constructions as well.

The example below shows a simple word-to-word repetition, which is common for the subject. The phrase "early detection and prevention" is a parallel construction and used twice: first time as an object, and second time as the subject of a relative clause.

*"We have a vision and a dream for **early detection and prevention**. And we want to change in such a way in which **early prevention and detection** can become realities. "*(Vanity Fair, 2015)

She tends to extend her sentences with repeated linkers or phrases. The example below shows anaphora where the phrase "part of it (that) is (because)" is at the beginning of each clause. It is deliberate and creates a sense of rhythm, where the main idea builds up with each following unit. Here, it also enumerates the downsides of conventional lab testing technology.

Example:

… and part of that is because of fear of needles [...], part of it is because of cost, even if people are insured [...], part of it is because of convenience, the need to have to leave work [...] and part of it is …" (Fortune 2014)

Sometimes the repetitions are not intentional, and the following examples of "to be able to" and "in order to" are indicative of that. Those may be the signs of unprepared speech, since the repeated vocabulary functions as filler. They do not add any additional semantic value, however, they do extend the sentence. Like with other recurring constructions, the subject creates a sense of rhythm by replicating these units. In some cases, they are repeated multiple times in the same sentence. It might suggest that these units are a part of the core active vocabulary.

to be able to/being able to is followed by an infinitive	
CHM, 2014	*"the distance that they have to travel to be able to do something like get a blood test done in order to be able to get the care they need is shocking"*

CHM, 2014	*"...people should be able to get their blood tested on a Sunday night without going to an emergency room. And they should be able to be able to do that on a Sunday morning."*
Vanity Fair, 2015	*"... we're building a company that is very focused on being able to realize a shift in the healthcare system and being able to realize a shift in the healthcare policy and being able to do something ..."*

The tables below present other types of repetitions that appeared frequently enough to be featured. Notably, the examples shown do not constitute the whole selection, but the most prominent samples found.

Type of repetition	Example
Anaphora	*... to show to their little girls that absolutely **you can** `go into engineering, **you can** `go into science and **you can** `be successful and **you can** `build a family [...] (Fortune 2014)*
	*"... for ten years **we never did** a press release, **we never had** a website, **we never talked** about anything except..." (Jonathan Zittrain, 2015)*

The structures "you can + bare infinitive" and " we never + past participle" are used to establish a rhythm. In the first example, "you can" builds a progression of events where entering engineering or science leads to subsequent success. Whereas in the second example, "we never" + past participle is used for enumeration.

There is a distinct pattern observed in terms of time and a sequence of tenses.

But before we look further, it is worth noting that temporal relations described here do not deal with discourse and are covered predominantly from a stylistic point of view. Such distinction is important since in discourse it is defined as a sequence of events that builds the narrative.

That contrasts with the literary methodology where "a text-producer can choose to foreground anything s/he wishes by placing it against an appropriate background." (Hwang & Merrifield, 1992). In this instance, there is a reason to believe in the connection between the tense and foregrounding based on the recurrence of several dominating tenses and avoidance in using other ones.

The following example encapsulates a general tendency that could be expressed as:

- Past tenses and present perfect are commonly used by the subject to reflect on the events of the past, developments and recent results, affecting the present.

- The present simple and present continuous are used to reflect on ongoing situations;

Anaphora	*"so many partners [...] have seen our technology, they've worked with us, they've used our systems. And they understand what we're doing and they understand that [...] people react to it." (CNBC, 2015)*

As was mentioned in this section before, the CNBC interview was closely tied to the WSJ article. The subject appeals to the authority of their partners (Walgreens) and constantly reinforces it by repeating the structures "they have + past participle", implying the previously done work that is still relevant to the present (e.g., they've used our systems - our system works). This message is further intensified with repeated clauses "they understand". Tense used highlights the present cooperation.

The future, however, is rarely expressed directly. Future Simple "will" is used only regarding future expansions of their lab testing sites. It is not used to elaborate on the technology itself. In the example below the subject reflects on the future lab operations in non-US regions.

"…outside the US it'll be a different model…" (Disrupt SF, 2014)

Here the usage future tense could be considered as a part of deviation

Next examples show the repetition at the end of a clause.

Epiphora	*…so having women `involved with* ***this company*** *and `building* ***this company*** *and `leading* ***this company*** *[...]* (Fortune 2014)
	"...it would look ***painless****, because I'd have to make it* ***painless****"* (Disrupt SF, 2014)
	*"...****that's why we do what we do, that's why we work the way we work****."* (Vanity Fair, 2015)

The first quote features parallel grammatical constructions, where three phrases are coordinated with the help of the conjunction "and" (linkage). Each preceding verb is additionally emphasised by stress. It makes the utterance rhythmical and cohesive.

The epiphora in the second example highlights the word "painless". It sets these two words in opposition because the adjacent verbs create the distinction between "perceivable pain" (expectation) and "actual pain" (reality).

The third example presents a syntactical repetition. The sentence itself is deliberately redundant. Furthermore, this generates an additional layer of repetition, alliteration. The consonant /w/ is repeated at the beginning of a word ten times in total within one sentence.

Epiphora	*"... with tests running on **our proprietary devices** [...] Every test that we offer can run on **our proprietary devices**. We bring tests up on **our proprietary devices** [...]"* (CNBC, 2015)

For contextual purposes, we would like to note that the example of repetition cited above came from the interview on CNBC. There, Holmes commented on a recently published article from the Wall Street Journal. The expression "proprietary devices" was repeated three times in succession. Such repetition creates a rhythmic chain with an emphasis on the structure. Moreover, the use of the possessive pronoun "our" in this context contrasts with the previously made example of "our work". There, "our work" is used to signify the collective effort of the company, whereas here it separates the Theranos team. Holmes evades the usage of the personal pronoun "I" as she speaks for another entity, the Theranos company. This tendency is repeated and rarely violated.

The word proprietary is often repeated separately and used more commonly after the WSJ 2015 article. It indicates the vagueness of language since it alludes to the restricted and not publicly available information.

Anadiplosis and ring repetition does not occur as often as other types. Still there are enough cases with these constructions to consider as a part of the selection.

Anadiplosis	*"...this is no longer **my mission or my vision**, it's the **mission and vision** of every person in our company."* (IIT GLC, 2015)

The example with vision and mission is used to showcase the company as a collective of like-minded individuals. Here, "my vision and my vision" is mirrored by a similar construction followed by "every person". As a result, it draws a distinction between now and then. This idea is reinforced by "no longer". In both cases the phrase functions as a complement. As with the example prior, we can spot the repetition on the phonological level, but in the form of consonance. Here, fricative sounds (voiceless /ʃ/ and voiced /ʒ/) are repeated twice each. As a result, they contribute to the rhythm of the sentence.

In the earlier examples with the stress and pausing, it was shown how those means are used to frame the words, thus audibly separating them from the utterance. Something similar happens in the next example as well. The word "mindset" is not only repeated twice, but it also creates two parallel constructions. The main purpose of this repetition is to show contrast between a visionary ("being able to build something") and an investor.

Framing (ring repetition)	*"And you're in a **mindset** of being able to build something great for the long term is not necessarily a **mindset** that every investor has."* (Jonathan Zittrain, 2015)

Another peculiar example of parallelism is manifested in a wider variety than a simple repetition of phrases. Holmes tends to recycle whole narratives when answering a question; using one core phrase, she makes small adjustments in the vocabulary units, at the same time preserving a core idea. The mentioned parallels occur predominantly when Holmes touches upon major talking points (e.g., the purpose and mechanics of the technology). She mixes the sentences seamlessly in her answers, which makes them, yet at the same time, coherent with the overall message. On the other hand, sometimes the repetition is more explicit with the word-to-word mirrored constructions.

TED Talk 2014	*We see a world in which [...], a world in which no one has to say goodbye too soon.*
IIT GLC 2015	*... which is having to say goodbye too soon to people we love*
The CCWA YouTube Podcast, 2015	*... to go through having to say goodbye too soon to someone you love.*
Vanity Fair, 2015	*I looked at people I had to say goodbye too soon.*

The recurring phrase "have to say goodbye too soon" undergoes minor changes in the form, but not in content, where the message is unaltered. The possible intention behind the saying could be to evoke an emotional response from the audience. Since most likely have experienced something similar. And the remark from Vanity Fair, where Holmes uses the first-person pronoun "I", makes the expression more personal. In other examples, the statement is more generalised, which allows listeners to engage with it by adopting or even relating to this standpoint. Moreover, this particular sentence was once referenced in the report of ABC News (2019). They also point out the recurrence, calling it "Elizabeth's mantra".

It is not the only example of glaring repetition. The tables below present other instances of parallel constructions found throughout the talks.

Theranos - Better Blood Testing 2014	…provide insight into the onset of disease in time to do something about it.

Fortune Magazine, 2014	And Theranos means detecting the onset of disease in time for therapy to be effective. So, being able to see the onset of disease in time to be able to do something about it.
PAGE Ambassador, 2015	… to catch the onset of disease, to do something about it.
IIT GLC 2015	… to find out people are sick in time to do something about it. [...] Theranos, which is about being able to see the onset of disease in time for therapy to be effective.
Vanity Fair, 2015	"… in which people are seeing the onset of disease in time for therapy to be effective."
Clinton Global Initiative, 2015	we're determining that people are sick […] being able to make lab testing accessible to people in time for therapy to be effective

All of the examples present almost identical points with minor deviations in the word choice. "The onset of disease" remains the unchanged part (with few exceptions; however is always preceded by a verb and followed either with a phrase "to do something about it" or any other iteration. The focus on timeliness is present in all of them. Expression encapsulates a number of key points, such as extreme emphasis on time with words like "*in time", "to do something about it",* and *"for therapy to be effective*". It not only highlights the urgency to the listener but also introduces the aspect of convenience. In every case, the phrase is preceded by a verb denoting "to detect"; all verbs presented function as contextual synonyms and are used interchangeably.

In the next example, we can observe more variability in the answers, but the general message relies on three points:

- access - the word is used predominantly as a noun and a transitive verb. A variant of accessible (adj) is also spotted, yet it is less frequent in use. Highlights the importance of the availability that their technology provides.
- health information or actionable information - these phrases are contextual synonyms, sometimes used interchangeably, and are examples of elegant variation. Predominantly function as direct objects to the verb "access". Actionable information evokes necessity as it implies something relevant and useful, something affecting the decision-making process. However, coupled with "at the time it matters" makes the expression somewhat redundant.
- timeliness - expressed in two ways: with the word "actionable" and the phrase "at the time that matters".

PAGE Ambassador, 2015	*Every person [...] has the basic human right to access to their own health information.*
Vanity Fair	*How do you make that information accessible at the time that matters?*
Fortune Magazine 2014	*We defined our mission as "access to actionable information at the time it matters."* *"People should have a right to their own health information"*
Clinton Global Initiative, 2015	*... the belief that access to health information is a basic human right.*

The example below is particularly interesting since every element of the sentence undergoes changes in form or content. Moreover, the highlighted units were recycled in different conversations in other contexts. It contributes to the idea of rather limited vocabulary diversity regarding certain technical questions. Their subject refers to previously constructed narratives to expand on new questions, which may reduce cognitive load.

The following example illustrates how the mentioned units are recycled. In the previous statement, access to health information was in the context of the company's values. Here, on the other hand, it is compared to gun ownership to contrast the ideas.

"...yet the ability to have access to their own health information is somehow considered dangerous." (SIEPR, 2015)

Another example from TED Talk (2014) shows a phrase "at the time it matters" as an extension of the same narrative repeated again later. It is tied with the help of the anaphora ("We see a world in which"). Upon further inspection, we can spot the overlapping narratives that were seen earlier in this section. Here, "actionable" and "the time that matters" are closely connected with previously expressed sentiment of "in time for therapy to be effective", whereas "people can be tested" is contextually synonymous with "find out people are sick". Such paraphrasing not only allows the speaker to expand the answer without additional meaningful load, but it also alleviates the issue of vocabulary diversity. On the other hand, the subject can use both narratives at the same time, which is another example of parallelism, albeit more apparent.

As with the "to be able to", it appears to be a part of vocabulary selection that the subject regularly recycles, sometimes verbatim and sometimes with small alterations.

Ted Talk, 2014	*We see a world in which every person has access to actionable health information at the time it matters.*
	We see a world in which the interaction with a physician becomes actionable because people can be tested at the time and frequency that matters.
Glamour, 2015	*...when people get access to their own health information they can begin to see the onset of disease in time to do something about it.*

IV. Results

Some of the verbal and non-verbal cues presented are not unique or unusual for an individual to manifest. After all, we tend to some extent, emphasise certain words or speak at a certain pace. However, as we stated before, the point of the study was to create a profile that describes Holmes' speech patterns. As a result, we would argue that the intentional alterations go beyond a simple change of register. The combination of those features makes the subject distinct from other speakers. In the table below, there are some features that were analysed earlier. Each of them is marked according to the foregrounding type identified. Some of those features manifest the characteristics of both foregrounding categories.

Feature	Deviation	Parallelism
Low pitch	+	
Intonation	+	+
Emphatic stress	+	+
Pauses	+	
Speech rate	+	
Vocabulary	+	+
Syntax		+

Firstly, low pitch as a deviation functions in two separate ways internally and externally. On one hand, deviation occurs because of the perceivable difference in pitch between different speakers, especially female ones. However, the said effect is less pronounced with the male counterparts. It is an example of external deviation. Although the data does not indicate a significant change in voice, it is still present. On the other hand, the variety of pitches from different recordings

is another form of deviation, an internal one. Holmes violates her own established pattern, though unintentionally. Here, the lowest numbers observable are from the promo materials and talks, where Holmes has no interlocutor to interact with. Hence, we can assume that this particular setting allows for control over the narrative and, subsequently, the vocal cues. And that could explain this variation. Although later it was shown that the use of the lower register was not inherent to Holmes, the change also correlates depending on the emotional state of the speaker. It may also correspond to the spikes in pitch from Figure 3.2.3. There, the highest point may reach (282 Hz) despite having a mean of (165 Hz) and a lowest of (108 Hz). Under pressure or in a supportive setting subject displays a range of emotions affecting the data. It is a natural response since at the same time we can observe similar, if not a bigger, difference in range from other female speakers (Figures 3.2.4, 3.2.5). The wider range in this case is of greater interest to us. We assume that despite the display of emotions mentioned before, the subjects is able to maintain control over the voice at the expense of said diversity. That also might explain the inconsistency in profiles, especially in the range fluctuation.

Secondly, throughout the interviews, Elizabeth Holmes shows a tendency to use a rising intonation. The rise is similar to one that people commonly use to denote an inquiry rather than a rise that is usually made at the end of an incomplete statement. Although a rise occurs in the middle of a sentence, it is also present at the end, which is, as a rule, uncommon for declarative sentences. It is less subtle and more pronounced. There might be multiple reasons for doing so:

1. Pattern creation: The speaker uses rising intonation in the utterances repeatedly with the purpose of making a pattern (e.g., to show the similarity between two objects or contrast different notions)
2. Expanding the sentence: this creates an illusion of an unfinished sentence, thus elongating it. It creates a stream of consciousness.
3. Indication of uncertainty: In this case, the rise is produced unintentionally.
4. Sign of deflection: The speaker uses rising intonation to signal to the interlocutor that they express doubt in their claim.

From the materials studied, there was one of the outliers where the rising intonation was extremely prominent, in the Wall Street Journal interview. As we suggested in the previous section, the rise is attributed to the setting. The deflection is expressed as the subject is confronted by the interviewer. Holmes highlights the words "*our ↗devices*", "*↗ proprietary ↗devices*", "*develop and ↗manufacture ↗ourselves*", etc. It may suggest the expression of doubt. This is another example of internal deviation where Holmes modifies the pre-existing pattern of highlighting the key words. In this case, in addition to the emphatic stress, words are reinforced with a rise in intonation. We presume that this is a

case of stylistic convergence, where both intonation and emphatic stress may cause the same stylistic effect at the same time.

Thirdly, pauses were categorised as deviations for the following reasons:

1) Pauses frame separate words and puts an emphasis on them. A prominent example of that is the TEDMED Talk in 2014. The subject used silent pauses to section word units into full utterances. As a result, it creates a subtle hierarchy of concepts, where the words highlighted presented more significance for the speaker and subsequently for the audience (e.g., “access”, “information”, etc.). The pausing was not syntactically motivated and was rather arbitrary. It could be argued that it was used predominantly to produce a dramatic effect.

2) Pauses, both filled and silent, were used frequently in other interviews; however, the said frequency depended on several aspects: setting, preparedness, and topic. When the subject is comfortable with the topic presented, the pause frequency and length are less than in unprepared speech (Figure 2.8). In addition to this, such deviation also reflects on other features: speech rate and voice pitch as well. It makes the deviation highly traceable as a listener could notice the shift between two answers. Moreover, the increased usage of long silent pauses usually occurs at the beginning of the answer as it allows the subject to reflect and prepare a coherent response.

It is worth noting that the noticeable response latency is insignificant in terms of duration, contrary to the anticipated outcomes. It is, however, compensated by the mentioned pause duration and phrase repetition, on which we will expand next.

Fourthly, the repetition of word units occurs on micro (within a sentence) and macro (throughout different interviews) levels. When it comes to the choice of vocabulary, the subject is not limited to individual words or expressions, although they are often repeated. Some of these expressions are possibly part of a larger narrative, the beginnings of which can be found in the promotional materials and TED Talk of Holmes' speech. Some of the repeated expressions echo the available information both in these materials and on the official website of Theranos (*Theranos*, n.d.), sometimes almost verbatim.

In addition, some of the units are used repeatedly in other contexts, such as “right to information” or “in time that matters”, mentioned in the previous section. Besides that, repetitive structures are often paraphrased without a significant change in meaning; these are utilised for the subject’s convenience, possibly to reduce the cognitive load. It allows the speaker to allocate more mental resources to produce an answer while maintaining a low pitch of voice. Another form of repetition occurs when the speaker artificially expands a sentence; there, we can observe the instances of polysyndeton. Cohesion is established with the help of linkage, where coordinative conjunctions are

systematically used (e.g., and). It enables the speaker to maintain the rhythm and the flow of an answer. Consequently, it creates parallel constructions.

She predominantly uses complex sentences as a means of expanding the idea and framing the message. The complexity is achieved by the usage of parallel constructions and relative clauses. It is additionally supported by the rising intonation that makes the sentence feel incomplete. Such expansions do not provide additional meaning to the conversation.

Next, when analysing speech rate, we discovered that the speaking behaviour was topically dependent. In the early stages, it was assumed that cognitive load would affect the pacing in the answers related to the technology in question and its work directly. In addition to this, we presumed that in the more personal questions, the speech rate would be marginally faster. However, the result was somewhat the opposite. The speech rate was reduced and the pause frequency and length increased (Figure 3.2.9).

Finally, emphatic stress is utilised in the patterns mainly for three reasons: 1) highlighting the importance of word units, as it is with intonation. This evokes an emotional response by stressing key words (e.g., basic human right). 2) presenting uniformity of units that are equal in value, and 3) to show the contrast between two or more identical items.

In recapitulation, each parallelism and deviation, whether verbal or vocal, has two goals: to equate or to contrast ideas. Parallelism most commonly occurs in the form of repetition, predominantly at three levels:

1) Syntactic - grammar constructions and full utterances are repeated, without major alterations in form or content. It makes the answer syntactically redundant.

2) Lexical - separate words and word units recur in the same answer to amplify the message. The repetition can occur at the beginning (anaphora), end (epiphora) and middle (anadiplosis) of an utterance.

3) Phonological level - manifested in the form of consonance and alliteration; exists both within an utterance and the sequence of utterances, directly tied to repetitions on the lexical and syntactic levels.

In the initial stages of research, a pattern and subsequent violations of one was anticipated. As a result, at least two distinct patterns were identified. The patterns presented were inconsistent and not uniform, albeit still existing. Such inconsistency was present both throughout the number of interviews and within a single one. And as mentioned previously is tied to a topic of conversation and the content of an answer, rather than a deception aspect itself. This reason leads us to believe that there is more than one speaking pattern that the subject adopts and uses in public. In the table below, there are two major patterns observed. At the same time, we assume that there is some room for in-pattern deviation. These patterns are formed according to manifested cues and correspond to a degree of cognitive load. Pattern 1 illustrates speech that could be observed at the beginning of an answer or an answer relating to a non-technical or non-

Theranos-related question. Pattern 2, on the other hand, illustrates the tendencies that occur in other instances.

Pattern 1 (strong)	Pattern 2 (light)
Low pitch (consistent, little fluctuations in pitch)	Slightly higher pitch (inconsistent, significant fluctuations in speech are present)
A significant amount of pauses (both long and short)	Pauses are less frequent and shorter
complex sentences	complex sentences
frequent use of emphatic stress	a significantly increased use of emphatic stress
Slower speech rate	Faster speech rate
Vocabulary diversity	Less diverse vocabulary (significant use of repetitions and parallel structures)

Topics regarding her family, career choices, or contemplations are also in accord with the first pattern. It is not a premeditated answer; the speech rate is slower and the pauses are more frequent as it gives the speaker an opportunity to prepare. On one hand, we can assume that it is due to the fact that additional cognitive load could affect the information conveyed. The speaker is forced to hold control of the voice and the narrative at the same time, making the production of new utterances more taxing than usual. It makes the speaker make longer silent pauses and speak slower overall, provided the speech is spontaneous. On the other hand, it could be argued that pausing correlates with truth-telling behaviour for another reason. According to Loy et al. (2018), speakers are likely to be truthful if the utterance contains both filled and silent pauses.

The aforementioned inconsistency in speaking styles may also correlate with the fact that some answers were or were not prepared beforehand. The mentioned patterns were alternated freely and were highly traceable (the listener could distinguish a change of pace and overall speaking style). These changes were also reflected in both manually picked textual data and vocal profiles shown in the previous section. Notably, deception-induced arousal (Turck & Miller, 1985) could be considered as another factor that impacts the speaking style. Thus, in the impromptu answers, the speaker might raise the pitch of their voice involuntarily.

V. Conclusions and discussions

This paper has investigated the strategies that Elizabeth Holmes used in her talks. As stated in the Introduction, our main aim was to identify the main characteristics of Holmes's speaking style and determine whether they have any correlation to deception. In the course of this paper, we shifted our focus closer toward the foregrounding aspect rather than the deception one. However, due to some overlapping characteristics in stylistic peculiarities and deception, we were able to equate those concepts in the form of social (or deception) cues. The results of this study support the idea that Holmes used some foregrounding techniques, such as deviation and parallelism on the verbal and vocal levels. The close adherence to them manifested both consciously (as a stylistic choice, to maintain an image in male male-dominated sphere) and unconsciously (which is partially the result of cognitive load).

Our initial expectations were partially met. In the course of writing this paper, we identified and marked several instances of repetition. However, we cannot clearly connect the use of recurring phrases to the lack of vocabulary diversity. In fact, despite the abundant use of parallelism, Holmes utilises a wide range of vocabulary. The issue is that some recurring constructions are woven into the narrative, which makes repetition more subtle, yet memorable enough. These constructions are recycled and used in different contexts. It could probably reduce the cognitive load on the speaker. It is correlated with a change in different aspects, such as speech rate and pause frequency.

Another aspect we intended to touch upon was inconsistency in speaking style as a result of cognitive load. We expected that maintaining the pitch would be taxing enough for a subject to manifest variations in speech. As a result, we identified some deviations present. It was significant for us to associate those as a part of the deception markers; however, we would also like to establish that other aspects, such as repetition (e.g. anaphora, epiphora) would manifest regardless, since it is a part of the subject's speaking pattern. The only distinction that would separate "repetition as a pattern" and "repetition as a deception marker" is the frequency and the content of repetition.

Taken together, these findings highlight the role of foregrounding in image cultivation. The significance of this work lies in demonstrating the close relation of deception to the stylistic choices that the speaker makes. Moreover, in the course of processing the compiled selection, it turned out that the subject does not meet all the criteria that are usually attributed to liars. The high pitch partially demonstrates that. On the one hand, we can argue that the low register is used as a character-building device. We are also open to the idea that the subject was aware of the effect on the public and therefore could have utilised the voice to change the perception of the audience. On the other hand, shifts in pitch range could also indicate the increased load on the subject. We assume that the maintaining pitch possibly made speaking more mentally taxing, hence the subject was forced to keep a relatively low voice at the expense of other aspects

in speech (e.g. speech rate). It is also possible that the shifts could be indications of deception-induced arousal or excitement in general.

All in all, it opens the discussion about the view on perception from the liar's and listener's perspective. With the exposure to media, the public has developed certain expectations about lying, which were only reinforced by popular TV shows (e.g., Lie to Me) and books (e.g., works of Paul Ekman). It created a confirmation bias, which was reflected in the work of Loy et al. (2018).

When it comes to limitations, we couldn't help but mention several things that emerged in the planning and writing stages. At the stage of data collection, we faced an issue where some of the previously available audio and video files became restricted for one reason or another. Subsequently, it reduced our data pool, though not significantly.

Prosogram has shown itself as a somewhat unconventional way to look at stylistic foregrounding. It was used to present visual data to be available for further cross-referencing. It works in a manner similar to the other corpus tools; in this scenario, though, it stylises vocal data rather than textual. The experience working with this script was valuable, yet at the same time came with its own limitations. As it was mentioned before, the files were cut and converted into proper format (WAV files) and only processed through the script. It complicates the processing routine and leaves some room for possible variation in the data. As we tried to minimise the plausible change from its original source, we would still like to acknowledge that the default WAV format could yield a far more precise result. Despite that, manual cross-referencing has shown a minor deviation and no perceivable corruption, especially regarding intonation analysis in graphs. In addition to this, we would also like to highlight the key advantages of using the scripts, such as automated analysis of auditory data and providing visual support, which sometimes becomes intricate, since readers may not be familiar with the source. In our case, Elizabeth Holmes, though notorious in the business and tech circles, is less known outside of the US, let alone her signature voice.

If the opportunity to expand the research is provided, that is something we would like to consider further. It opens the opportunity not only to look at the speakers' style in terms of vocal change but also recipients' responses.

The current study was also limited by the previous works on the subject. It narrowed the general direction we initially probed into. Nonetheless, it presents an alternative view that does not defy the original work of others but rather expands on it. In the process of writing the paper, we deepened our understanding of the connection between corpus stylistics and foregrounding. Both rely on the identification of conspicuous repetitions; however require further clarification, since the frequency itself does not provide us with substantial information.

As for future research, we can expand it into two different aspects. Firstly, the ABC News report that was mentioned in the early sections of the work also

referenced an interesting observation. They claimed Holmes had an obsession with Steve Jobs as an individual. And the similar sentiment was expressed in a number of other articles (Geigel, 2022; Khorram, 2021) and corroborated by ex-workers from Theranos. Such a so-called "obsession" translated into the manufactured identity we know now, with a deep voice and black turtleneck. Even so, we can presume that the similarity may go further than that. The acquired results of this study allow us to expand the paper, where we can delve into a more comparative analysis of these two individuals, their speaking patterns in particular. Secondly, we can look into the aftermath of the 2015 article, specifically Holmes' SEC Deposition recordings from 2017. It is of particular interest to us for a number of reasons:

1. To trace deviations in speech that are related to the change of setting, how the person may reflect on the same topic under additional pressure, and in a less favourable environment.
2. How consistent produced patterns with the previous statements from earlier interviews.
3. Does the voice pitch fluctuate, and how high or low is it in comparison to the previously acquired data.

Finally, derived from already established similarity of foregrounding and deception cues it also seems reasonable to verify whether the audience is malleable to narratives produced by Holmes. As it could be achieved based on pre-existing methodology of empirical studies of literature (Zyngier et al. 2008; Чеснокова 2011; van Peer and Chesnokova 2019).

References:

1. ABC News. (2019, March 16). "The Dropout" Part 2: Elizabeth Holmes begins marketing her Theranos devices [Video]. YouTube. https://www.youtube.com/watch?v=MjWS8hQk188
2. Beedham, M., & Hall, G. (2016). Stylistics: A Resource Book for Students by Paul Simpson. Style, 50(2), 233–237. https://doi.org/10.1353/sty.2016.0002
3. Berg, M., Fuchs, M., Wirkner, K., Loeffler, M., Engel, C., & Berger, T. (2016). The speaking voice in the general population: normative data and associations to sociodemographic and lifestyle factors. Journal of Voice, 31(2), 257.e13-257.e24. https://doi.org/10.1016/j.jvoice.2016.06.001
4. Blandón-Gitlin, I., Fenn, E., Masip, J., & Yoo, A. H. (2014). Cognitive-load approaches to detect deception: searching for cognitive mechanisms. Trends in Cognitive Sciences, 18(9), 441–444. https://doi.org/10.1016/j.tics.2014.05.004
5. Boersma, P. and Weenink, D. (2005) Praat: Doing Phonetics by Computer [Computer Program]. Version 5.4.08. https://www.fon.hum.uva.nl/praat/

6. Brennen, T., & Magnussen, S. (2023). Lie detection: What works? Current Directions in Psychological Science, 32(5), 395–401. https://doi.org/10.1177/09637214231173095
7. Carroll, G. (2022, February 4). The cultural power of Elizabeth Holmes. The Stanford Daily. https://stanforddaily.com/2022/02/03/the-cultural-power-of-elizabeth-holmes/
8. CBS Mornings. (2015, April 16). Youngest self-made female billionaire takes high-tech approach to blood testing [Video]. YouTube. https://www.youtube.com/watch?v=UiNFXcI9Rb8
9. Chandler, D., & Munday, R. (2011). A Dictionary of Media and Communication. In Oxford University Press eBooks. https://doi.org/10.1093/acref/9780199568758.001.0001
10. Charlie Rose. (2015, June 3). Elizabeth Holmes on her Billion-Dollar Health Care Idea (June 3, 2015) | Charlie Rose [Video]. YouTube. https://www.youtube.com/watch?v=9DHeIz9VCUY
11. Childs, P., & Fowler, R. (2006). The Routledge Dictionary of Literary Terms. http://eng255fisk.qwriting.qc.cuny.edu/files/2014/12/The_Routledge_Dictionary_of_Literary_Terms.pdf
12. Clinton Global Initiative. (2015, September 30). President Clinton speaks with Elizabeth Holmes and Jack Ma (2015 CGI Annual Meeting) [Video]. YouTube. https://www.youtube.com/watch?v=l7Be_6NEPQE
13. CNBC. (2015, October 16). Theranos CEO Elizabeth Holmes: Firing back at Doubters | Mad Money | CNBC [Video]. YouTube. https://www.youtube.com/watch?v=rGfaJZAdfNE
14. Commonwealth Club World Affairs (CCWA). (2015, September 26). Elizabeth Holmes, CEO of Theranos, in Conversation with Sal Khan [Video]. YouTube. https://www.youtube.com/watch?v=JkfXZ73WPqE
15. Computer History Museum. (2015, June 15). CHM Revolutionaries: Theranos Founder & CEO Elizabeth Holmes in Conversation with Michael Krasny [Video]. YouTube. https://www.youtube.com/watch?v=LeA7rCvoyhU
16. Couper-Kuhlen, E. (1989). Foregrounding and temporal relations in narrative discourse. In De Gruyter eBooks (pp. 7–30). https://doi.org/10.1515/9783111355207.7
17. Dictionary.com | Meanings & Definitions of English Words. (2025). In Dictionary.com. https://www.dictionary.com/browse/lie
18. Dundes, L., Buitelaar, M. S., & Streiff, Z. (2019). Bad Witches: Gender and the Downfall of Elizabeth Holmes of Theranos and Disney's Maleficent. Social Sciences, 8(6), 175. https://doi.org/10.3390/socsci8060175
19. Dunn, T., Thompson, V., & Jarvis, R. (2019, March 16). Ex-Theranos employees describe culture of secrecy at Elizabeth Holmes' startup: 'The

Dropout' podcast ep. 1. ABC News. https://abcnews.go.com/Business/theranos-employees-describe-culture-secrecy-elizabeth-holmes-startup/story?id=60544673
20. Entrepreneurship.org. (2013, August 28). Elizabeth Holmes-Progressing as a teenage entrepreneur [Video]. YouTube. https://www.youtube.com/watch?v=pIXAmjUFSso
21. Evans, B. G. (2018, October 4). How credible are lie detector tests? https://www.bbc.com/news/world-us-canada-45736631
22. Feine, J., Gnewuch, U., Morana, S., & Maedche, A. (2019). A taxonomy of social cues for conversational agents. International Journal of Human-Computer Studies, 132, 138–161. https://doi.org/10.1016/j.ijhcs.2019.07.009
23. Former Walgreens CFO Describes How Theranos Wooed Him. (2021, October 13). The Wall Street Journal. https://www.wsj.com/livecoverage/elizabeth-holmes-trial-theranos/card/7kS65DLYUGkDBNqkDXxp
24. Fortune Magazine. (2014a, October 8). Elizabeth Holmes Mission | Full Interview Fortune MPW [Video]. YouTube. https://www.youtube.com/watch?v=YecjzEScXqU
25. Fortune Magazine. (2014b, December 8). A conversation with Elizabeth Holmes at MPW Next Gen | Fortune [Video]. YouTube. https://www.youtube.com/watch?v=vsSt-tiFuCQ
26. Glamour. (2015, November 10). Elizabeth Holmes on revolutionizing blood tests [Video]. YouTube. https://www.youtube.com/watch?v=d8dT7EoX5iY
27. Hasher, L., Goldstein, D., & Toppino, T. (1977). Frequency and the conference of referential validity. Journal of Verbal Learning and Verbal Behavior, 16(1), 107–112. https://doi.org/10.1016/s0022-5371(77)80012-1
28. Hassan, A., & Barber, S. J. (2021). The effects of repetition frequency on the illusory truth effect. Cognitive Research Principles and Implications, 6(1). https://doi.org/10.1186/s41235-021-00301-5
29. Ho, J. (2021). Purposeful life or sugar-coated lies: How Elizabeth Holmes legitimised her fraud. Language & Communication, 77, 106–120. https://doi.org/10.1016/j.langcom.2021.01.001
30. Hot Startup Theranos Has Struggled With Its Blood-Test Technology. (2015, October 16). The Wall Street Journal. https://www.wsj.com/articles/theranos-has-struggled-with-blood-tests-1444881901
31. How voice pitch influences our choice of leaders. (2017, August 10). American Scientist. https://www.americanscientist.org/article/how-voice-pitch-influences-our-choice-of-leaders

32. Hwang, S. J. J., & Merrifield, W. R. (1992). Language in context: Essays for Robert E. Longacre.
33. IIT Global Leadership Conference 2015. (2015, July 28). Elizabeth Holmes latest interview - CEO Theranos, at IIT GLC 2015 [Video]. YouTube. https://www.youtube.com/watch?v=s_3tHCdiMY0
34. Kim, M. (2022). Think leader, think Deep voice? CEO voice pitch and gender. Academy of Management Proceedings, 2022(1). https://doi.org/10.5465/ambpp.2022.17778abstract
35. Klofstad, C. A., Anderson, R. C., & Peters, S. (2012). Sounds like a winner: voice pitch influences perception of leadership capacity in both men and women. Proceedings of the Royal Society B Biological Sciences, 279(1738), 2698–2704. https://doi.org/10.1098/rspb.2012.0311
36. Leech, G. N., & Short, M. (2007). Style in Fiction: A Linguistic Introduction to English Fictional Prose. Pearson Education.
37. Levin, S. R. (1965). Internal and External Deviation in Poetry. WORD, 21(2), 225–237. https://doi.org/10.1080/00437956.1965.11435425
38. lie | meaning of lie in Longman Dictionary of Contemporary English | LDOCE. (n.d.). https://www.ldoceonline.com/dictionary/lie
39. lie verb - Definition, pictures, pronunciation and usage notes | Oxford Advanced American Dictionary at OxfordLearnersDictionaries.com. (n.d.). https://www.oxfordlearnersdictionaries.com/definition/american_english/lie2_1
40. Liubertė, I., & Dimov, D. (2021). "One tiny drop changes everything": Constructing opportunity with words. Journal of Business Venturing Insights, 15, e00242. https://doi.org/10.1016/j.jbvi.2021.e00242
41. Liz Holmes Wants You to Forget About Elizabeth. (2023, May 7). The New York Times. https://www.nytimes.com/2023/05/07/business/elizabeth-holmes-theranos-interview.html
42. Loy, J. E., Rohde, H., & Corley, M. (2018). Cues to Lying May be Deceptive: Speaker and Listener Behaviour in an Interactive Game of Deception. Journal of Cognition, 1(1). https://doi.org/10.5334/joc.46
43. Martins, I., Poças, A., Freitas, A., & Au-Yong-Oliveira, M. (2024). A Review on Elizabeth Holmes and her Sinking Ship's Backstory. European Conference on Innovation and Entrepreneurship, 19(1), 469–478. https://doi.org/10.34190/ecie.19.1.2661
44. Mayew, W. J., Parsons, C. A., & Venkatachalam, M. (2013). Voice pitch and the labor market success of male chief executive officers. Evolution and Human Behavior, 34(4), 243–248. https://doi.org/10.1016/j.evolhumbehav.2013.03.001

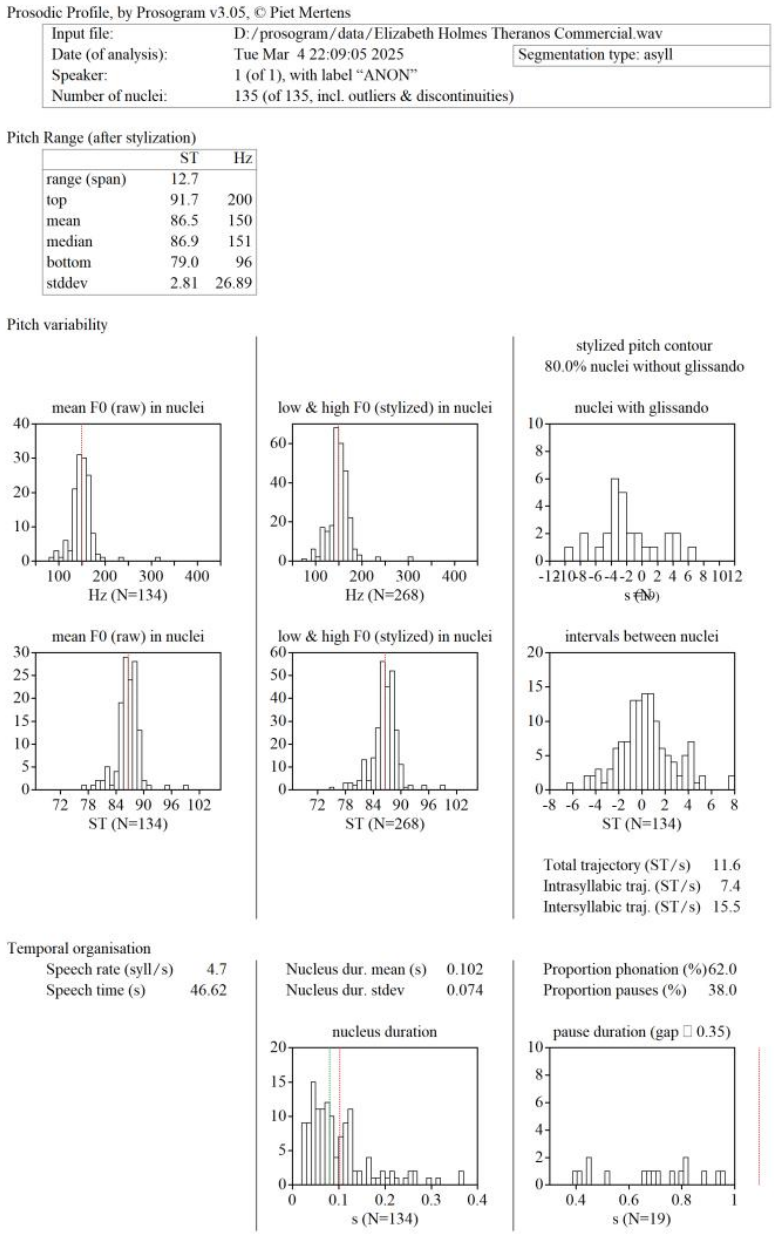
45. Mertens, P. (2022). The Prosogram model for pitch stylization and its applications in intonation transcription. In The MIT Press eBooks (pp. 259–286). https://doi.org/10.7551/mitpress/10413.003.0010
46. New study finds a lower voice adds credibility to leadership, depending on gender. (2022, August 25). KU News. https://news.ku.edu/news/article/2022/08/25/new-study-finds-lower-voice-adds-credibility-leadership-depending-on-gender
47. Oo, P. P., Jiang, L., Sahaym, A., Parhankangas, A., & Chan, R. (2023). Actions in words: How entrepreneurs use diversified and changing speech acts to achieve funding success. Journal of Business Venturing, 38(2), 106289. https://doi.org/10.1016/j.jbusvent.2023.106289
48. Peer, W., & Chesnokova, A. (2019). What literature does to our emotions, and how do we know? Empirical studies will tell. Synopsis Text Context Media, 1(25). https://doi.org/10.28925/2311-259x.2019.1.1
49. Prosogram. (n.d.). https://sites.google.com/site/prosogram/home
50. Rodero, E. (2010). Intonation and Emotion: Influence of Pitch Levels and Contour Type on Creating Emotions. Journal of Voice, 25(1), e25–e34. https://doi.org/10.1016/j.jvoice.2010.02.002
51. Scherer, K. R., Feldstein, S., Bond, R. N., & Rosenthal, R. (1985). Vocal cues to deception: A comparative channel approach. Journal of Psycholinguistic Research, 14(4), 409–425. https://doi.org/10.1007/bf01067884
52. Self-Deception (Stanford Encyclopedia of Philosophy). (2023, March 13). https://plato.stanford.edu/entries/self-deception/#MoraRespForSelfDece
53. Simpson, A. P. (2009). Phonetic differences between male and female speech. Language and Linguistics Compass, 3(2), 621–640. https://doi.org/10.1111/j.1749-818x.2009.00125.x
54. Sporer, S. L., & Schwandt, B. (2007). Moderators of nonverbal indicators of deception: A meta-analytic synthesis. Psychology Public Policy and Law, 13(1), 1–34. https://doi.org/10.1037/1076-8971.13.1.1
55. Stanford Institute for Economic Policy Research (SIEPR). (2015, March 25). George Shultz interviews Elizabeth Holmes at the 12th SIEPR Economic Summit [Video]. YouTube. https://www.youtube.com/watch?v=CB5_68CIt_k
56. Tauber, D., PhD. (2022, September 21). Elizabeth Holmes and the language of Plausible Deniability. Medium. https://daveenamtauber.medium.com/elizabeth-holmes-and-the-language-of-plausible-deniability-975549d4156
57. TechCrunch. (2014, September 8). Getting Blood Work Done with Elizabeth Holmes of Theranos | Disrupt SF 2014 [Video]. YouTube. https://www.youtube.com/watch?v=AaTHtSy5le4

58. The Berkman Klein Center for Internet & Society. (2018, October 11). Jonathan Zittrain in conversation with Elizabeth Holmes [Video]. YouTube. https://www.youtube.com/watch?v=uYRafsRu2NU
59. The Wall Street Journal. (2015, October 21). Theranos CEO Holmes: Company uses its own technology [Video]. YouTube. https://www.youtube.com/watch?v=MBs-oj7U-bo
60. Theranos. (n.d.). Theranos. https://web.archive.org/web/20150226043143/https://www.theranos.com/our-company
61. Theranos and Elizabeth Holmes: History of the WSJ investigation. (2021, August 24). The Wall Street Journal. https://www.wsj.com/tech/theranos-and-elizabeth-holmes-history-of-the-wsj-investigation-11629815129
62. The Wall Street Journal. (2015, October 21). Theranos CEO Holmes: Company uses its own technology [Video]. YouTube. https://www.youtube.com/watch?v=MBs-oj7U-bo
63. Turck, M. A., & Miller, G. R. (1985). DECEPTION AND AROUSAL. Human Communication Research, 12(2), 181–201. https://doi.org/10.1111/j.1468-2958.1985.tb00072.x
64. Vanity Fair. (2015, October 12). Theranos's Elizabeth Holmes on the Lifeblood of the Internet - FULL CONVERSATION [Video]. YouTube. https://www.youtube.com/watch?v=hqQ3CMv_4XM
65. Von Hippel, W., & Trivers, R. (2011). The evolution and psychology of self-deception. Behavioral and Brain Sciences, 34(1), 1–16. https://doi.org/10.1017/s0140525x10001354
66. Vrij, A., Fisher, R., Mann, S., & Leal, S. (2008). A cognitive load approach to lie detection. Journal of Investigative Psychology and Offender Profiling, 5(1–2), 39–43. https://doi.org/10.1002/jip.82
67. Vrij A., & Mann S. (2001). Telling and detecting lies in a high-stake situation: The case of a convicted murderer. Applied Cognitive Psychology, 15, 187–203.
68. Why Theranos founder Elizabeth Holmes may have faked a low voice, according to professional vocal coaches. (2019, March 19). MarketWatch. https://www.marketwatch.com/story/why-theranos-ceo-elizabeth-holmes-may-have-faked-a-low-voice-according-to-professional-vocal-coaches-2019-03-20
69. Zyngier, S., Bortolussi, M., Chesnokova, A., & Auracher, J. (2008). Directions in Empirical Literary Studies: In honor of Willie van Peer. In Linguistic approaches to literature. http://ci.nii.ac.jp/ncid/BA86448840
70. Zuckerman M., DePaulo B. M., & Rosenthal R. (1981). Verbal and nonverbal communication of deception. In Berkowitz L. (Ed.), Advances in experimental social psychology, (vol. 14, pp. 1–57). New York: Academic Press.

71. Папірна, Ю. (2024). РИТОРИКА БРЕХНІ (НА МАТЕРІАЛІ ПРОМОВ ЕЛІЗАБЕТ ХОЛМС). MUNDUS PHILOLOGIAE, (3). вилучено із https://mundphil.kubg.edu.ua/index.php/journal/article/view/39
72. Чеснокова, Г. В. (2011). Як виміряти враження від поезії або Вступ до емпіричних методів дослідження у мовознавстві. К.: Ленвіт.

Appendices

APPENDIX 1 Better Blood Testing - Theranos “low voice”(full speaker profile)



APPENDIX 2 CCWA, 2015 “real voice” sample (full speaker profile)

Prosodic Profile, by Prosogram v3.05, © Piet Mertens

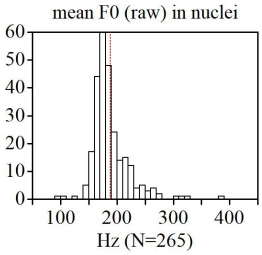
Input file:	D:/prosogram/data/real voice pitch change/Elizabeth Holmes of Theranos accidentally using her real voic
Date (of analysis):	Tue Mar 4 23:05:15 2025
Speaker:	1 (of 1), with label “ANON”
Number of nuclei:	269 (of 269, incl. outliers & discontinuities)

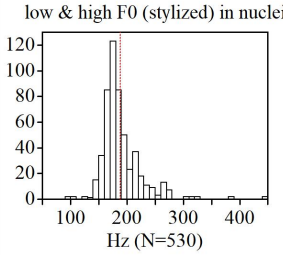
Segmentation type: asyll

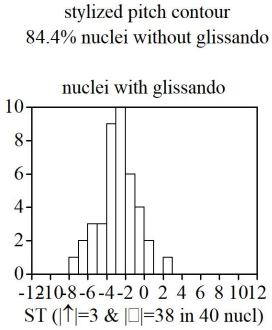
Pitch Range (after stylization)

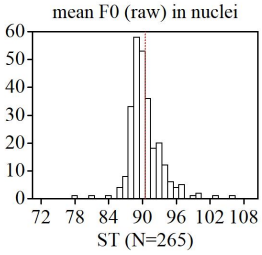
	ST	Hz
range (span)	13.6	
top	98.3	293
mean	90.5	188
median	90.0	181
bottom	84.7	133
stddev	3.01	38.08

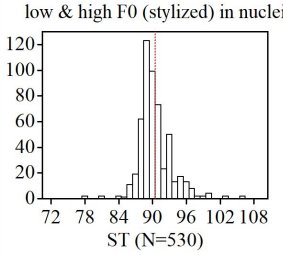
Pitch variability

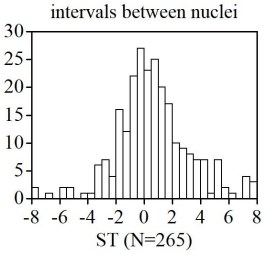










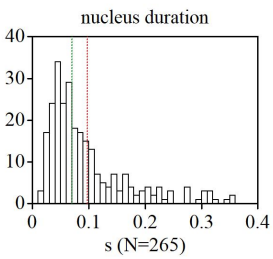


Total trajectory (ST/s)	12.9
Intrasyllabic traj. (ST/s)	4.9
Intersyllabic traj. (ST/s)	19.8

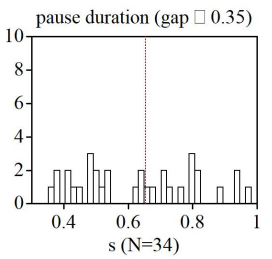
Temporal organisation

Speech rate (syll/s)	4.8
Speech time (s)	79.16

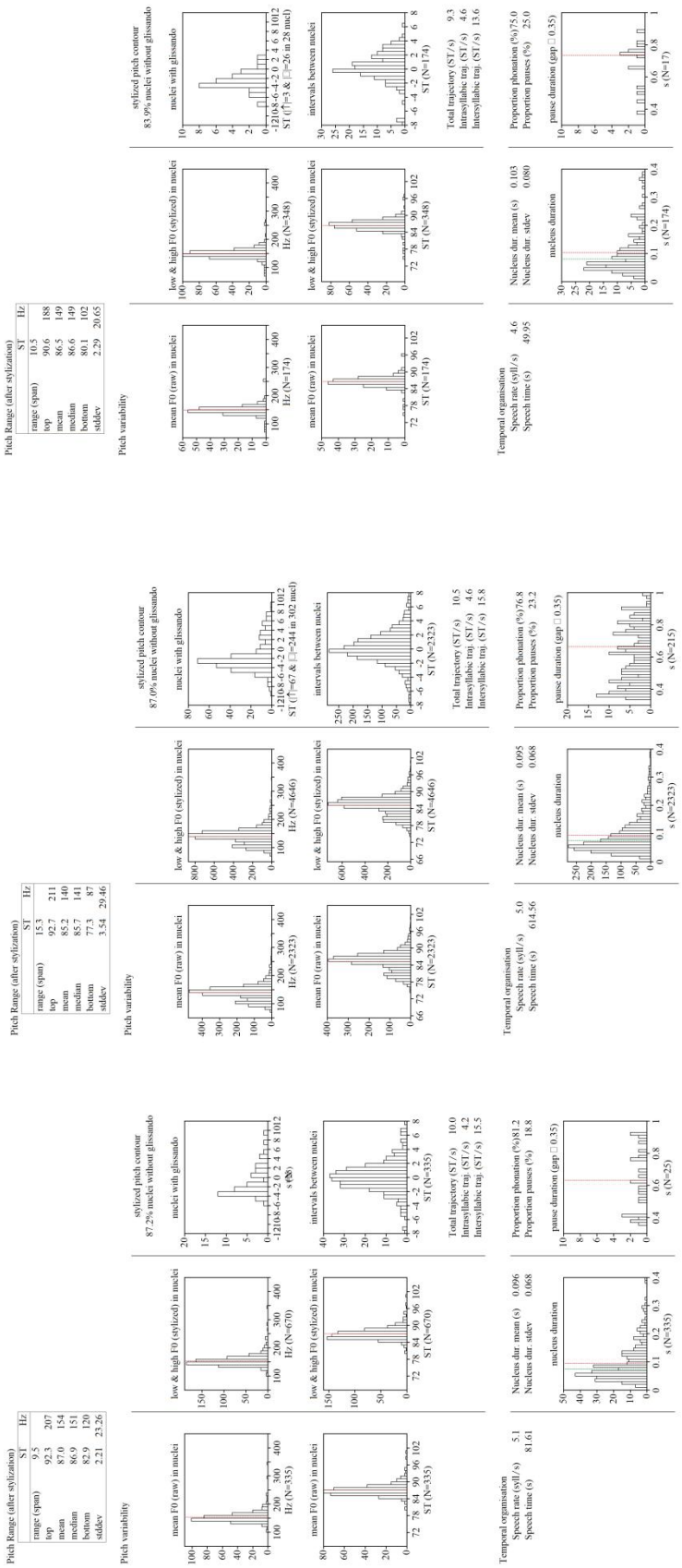
Nucleus dur. mean (s)	0.097
Nucleus dur. stdev	0.074



Proportion phonation (%)	70.9
Proportion pauses (%)	29.1



APPENDIX 3 Jonathan Zittrain interview with Holmes, 2015 speech rate samples (full speaker profile)

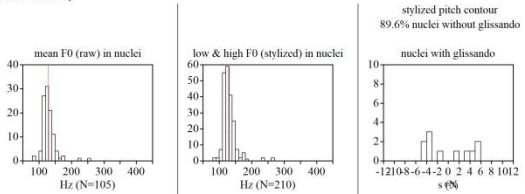


APPENDIX 4 CHM Revolutionaries (full speaker profiles)

Pitch Range (after stylization)

	ST	Hz
range (span)	11.4	
top	91.3	195
mean	84.1	129
median	83.7	126
bottom	79.9	101
stddev	2.61	22.91

Pitch variability



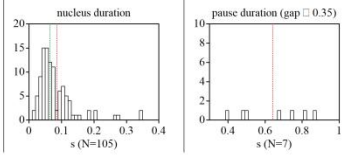
Total trajectory (ST/s) 10.8
Intrasyllabic traj. (ST/s) 4.4
Intersyllabic traj. (ST/s) 15.4

Temporal organisation

Speech rate (syll/s) 4.9
Speech time (s) 25.99

Nucleus dur. mean (s) 0.086
Nucleus dur. stdev 0.067

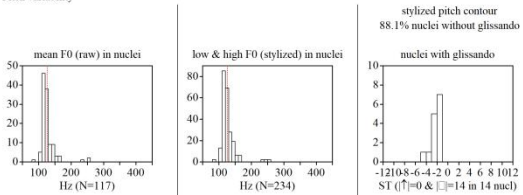
Proportion phonation (%) 82.7
Proportion pauses (%) 17.3



Pitch Range (after stylization)

	ST	Hz
range (span)	15.0	
top	94.2	230
mean	83.6	126
median	83.2	122
bottom	79.1	97
stddev	2.78	24.77

Pitch variability



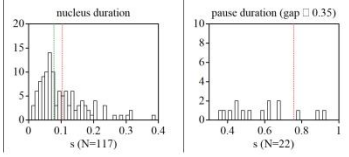
Total trajectory (ST/s) 9.6
Intrasyllabic traj. (ST/s) 2.4
Intersyllabic traj. (ST/s) 16.5

Temporal organisation

Speech rate (syll/s) 4.8
Speech time (s) 42.00

Nucleus dur. mean (s) 0.104
Nucleus dur. stdev 0.073

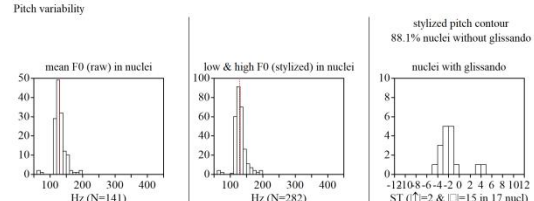
Proportion phonation (%) 59.0
Proportion pauses (%) 41.0



Pitch Range (after stylization)

	ST	Hz
range (span)	13.4	
top	90.1	182
mean	84.1	129
median	83.9	127
bottom	76.7	84
stddev	2.44	18.57

Pitch variability



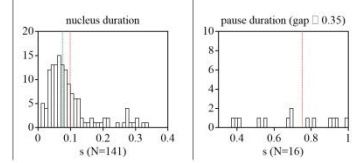
Total trajectory (ST/s) 7.9
Intrasyllabic traj. (ST/s) 3.2
Intersyllabic traj. (ST/s) 11.6

Temporal organisation

Speech rate (syll/s) 4.5
Speech time (s) 43.99

Nucleus dur. mean (s) 0.099
Nucleus dur. stdev 0.076

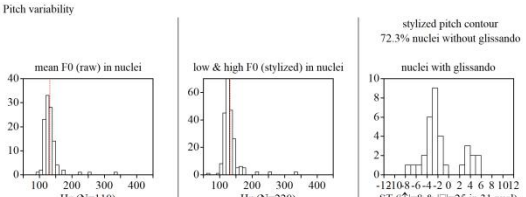
Proportion phonation (%) 72.7
Proportion pauses (%) 27.3



Pitch Range (after stylization)

	ST	Hz
range (span)	13.6	
top	93.5	222
mean	84.3	132
median	83.9	127
bottom	79.9	101
stddev	2.95	29.59

Pitch variability



Total trajectory (ST/s) 10.4
Intrasyllabic traj. (ST/s) 7.9
Intersyllabic traj. (ST/s) 13.2

Temporal organisation

Speech rate (syll/s) 4.3
Speech time (s) 42.90

Nucleus dur. mean (s) 0.124
Nucleus dur. stdev 0.093

Proportion phonation (%) 61.2
Proportion pauses (%) 38.8