

Does Intonation Matter?

The impact of monotony on listener comprehension

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Abstract

The study described in this paper aims to investigate whether monotony has a negative impact on audience comprehension. Whereas in previous research intonational deviations were produced mainly through voice acting, the present study employs digital audio editing to produce two versions of one and the same simultaneous interpretation. This method allows the researcher to modify intonation leaving other speech parameters unchanged. The material thus produced was validated by a pool of experts and submitted to several randomised groups of listeners in a simulated conference setting. Analysis showed that monotony can have a negative impact on both comprehension and the assessment of the interpreter's performance. These findings have major implications for both interpreting theory and practice.

1. Introduction

Intonation is an important feature of spoken language comprehension, as listeners use intonational cues to predict utterances as they unfold (cf. Féry *et al.* 2009). Intonation seems to be even more important in conference interpreting, where users strongly rely on the interpreter's voice. Surprisingly, intonation has received relatively little attention in both interpreting research and training. One reason for the limited interest in

the subject may be that there is no agreement on how to define intonation. Ahrens (2005: 53), for example, defines intonation as “the pitch contour of an utterance”, while Shlesinger (1994) considers intonation to be characterised by parameters like accent, pitch, duration and speed. This inconsistency in the definition of intonation is not unique to interpreting studies, but is evident across a number of relevant disciplines. By the same token, the functions of intonation and their relative importance are rather elusive, as explained by Chun (2002: 75):

[...] the functions of intonation cannot be divided into neat, clear-cut categories since they typically involve the grammatical, attitudinal, information-structural, illocutionary, pragmatic, and sociolinguistic domains of conversations and discourses with much potential overlap.

Furthermore, the functions and use of intonational cues vary across languages and cultures. Pitch modulation, for example, is used less often in German than in English (cf. Gibbon 1998: 89).

Another problem faced by intonation researchers is how to manipulate intonation to test the effect of different intonational patterns on the listener. On the one hand, speakers are not able to alter their fundamental frequency, which is considered the main correlate of intonation (cf. Vaissière 2005), without simultaneously changing other voice parameters. On the other hand, software-induced changes tend to render the speech stimuli less natural or less intelligible. And most importantly, intonation is considered rather irrelevant as a feature of output quality by both interpreters and users (cf. Collados Aís 1998, Kopczyński 1994, Zwischenberger and Pöchhacker 2010).

This paper will briefly summarise existing research on intonation in interpreting studies and will also present an experiment conducted by the author to analyse the impact of intonational deviations on listener comprehension. The results imply that, despite its seeming unimportance, intonation has a considerable impact on listener perception and comprehension.

2. Previous research

2.1. Expectation surveys among users and interpreters

Although empirical interpreting research has neglected prosodic parameters like intonation, they have often been listed among the quality criteria assessed in user and interpreter expectation studies (cf. Collados Aís 1998, Kopczyński 1994, Kurz 1989, 1993, Zwischenberger and Pöchhacker 2010). As these studies show, intonation is regarded as rather irrelevant, while sense consistency with the original is considered the most important quality parameter (cf. Bühler 1986, Kopczyński 1994, Zwischenberger and Pöchhacker 2010). On the whole, content-related

criteria are considered more important than delivery-related characteristics.

2.2. Quality assessment studies

Though the expectation surveys mentioned above have yielded a relatively stable pattern of findings, users' expectations seem to differ from their actual quality judgments. In an experiment by Collados Aís (1998), three different versions of an interpretation were presented to university lecturers and interpreters to assess whether monotony (i.e. flat intonation) had an impact on their perception of the overall quality of an interpretation. The first of the three interpretations was both consistent with the original message and spoken with lively intonation, while the other versions were either monotonous or inconsistent with the original message. The inaccurate but lively version obtained higher ratings than the correct but monotonous version, which implies that monotony has a negative influence on users' and interpreters' perception of the quality of an interpretation, regardless of whether or not the content is delivered correctly. These findings may be attributable, at least in part, to the fact that most listeners do not understand the source text and are thus unable to assess whether its content is adequately reflected in the interpretation.

2.3. Output analyses

The most comprehensive analysis of prosodic characteristics of simultaneous interpretations was carried out by Ahrens (2004), who conducted a detailed examination of the output of six professional interpreters working from English into German, their A language. She found the interpretations to differ from their source texts in terms of segmentation and final pitch movements. "That interpretation has an intonation all its own" was also observed by Shlesinger (1994: 234) in her ground-breaking study on the impact of interpreters' prosody on listener comprehension (see 2.5.).

An analysis by Nafá Waasaf (2007) yielded contrary results, as the prosodic units in the interpretations examined roughly corresponded to the segmentation of the source texts. Yet it seems likely that interpreters adopt special segmentation strategies to meet the requirements of the specific processing conditions of simultaneous interpreting. According to Ahrens (2004), interpreters try to organise the words they hear into meaningful units as fast as possible to decrease working memory requirements, thus producing relatively short intonational phrases. Furthermore, interpreters tend to use non-final intonation (i.e. medium to high-pitched voice at the end of a prosodic unit) more often than

original speakers to account for the possibility that there is more information to come.

2.4. Interpreters' perception of source text intonation

Other studies involving intonation in simultaneous interpreting have focused on the effect of source text intonation on the interpreter's performance. Pelz (1999), for instance, found that interpreters adjust to the fundamental frequency of the speaker and tend to be more monotonous than the speaker.

The data collected by Seeber (2001), who examined the impact of flat fundamental frequency on interpreters' ability to correctly anticipate the verb, suggest that monotony does not compromise anticipation. In fact, interpreters anticipated the verb more often when interpreting from the monotonous speech. Seeber argues that interpreters successfully compensate for lack of intonational cues by adopting specific processing strategies. However, this result cannot be generalised to interpreting performance as a whole. Further research is needed to establish the effect of monotony on other output parameters.

2.5. Impact of interpreters' intonation on audience comprehension

The seminal study by Shlesinger (1994) remains the only investigation to date of the impact of intonational deviations on audience comprehension.

Shlesinger's experiment aimed to test whether "interpretational intonation" has a negative effect on listener comprehension. The results indicate that abnormal intonation and stress patterns may compromise comprehension. Similar findings have been reported from psychological studies on the perception of flattened fundamental frequency (cf. Hillenbrand 2003, Laures and Bunton 2003, Watson and Schlauch 2008).

Inspired by Shlesinger's work, an experiment was designed to test the role of intonation in audience comprehension in a sizeable group of experimental subjects using a novel approach to the production of the stimulus material.

3. Methodology

3.1. Experimental material

So far, studies on the perception of interpreters' intonation have relied on shadowing, reading and voice acting to produce different intonational patterns. However, intonation is a highly complex phenomenon that strongly interacts with other speech parameters like pauses, syllable

length and intensity (cf. Gut 2000, Ingram 2007). For this reason, it is very difficult, if not impossible, for a speaker to deliberately alter fundamental frequency, i.e. intonation, without (unintentionally) changing other speech parameters as well. The study described in this paper adopted a new software-based approach to tackle this problem.

In line with previous work describing German intonation (e.g. Ahrens 2004, Möbius 1993, Seeber 2001, Wunderlich 1988), intonation was defined for the purposes of this study as the range and variation of fundamental frequency. Consequently, monotony was defined as the lack of variation of fundamental frequency.

Two versions of one and the same interpretation were produced to test the hypothesis that monotony has a negative impact on audience comprehension. The lively interpretation was produced by a professional conference interpreter (A language: German) under laboratory conditions from a videotaped English source speech given by a professor at Bocconi University, Italy, on the topic of post-modern marketing. The interpretation was then manipulated with the audio-editing programme PRAAT to render it more monotonous. PRAAT estimates the fundamental frequency and visualises the frequency values as a series of dots, which can be manually raised or lowered. This method enables the researcher to modify fundamental frequency leaving all other speech parameters unchanged.

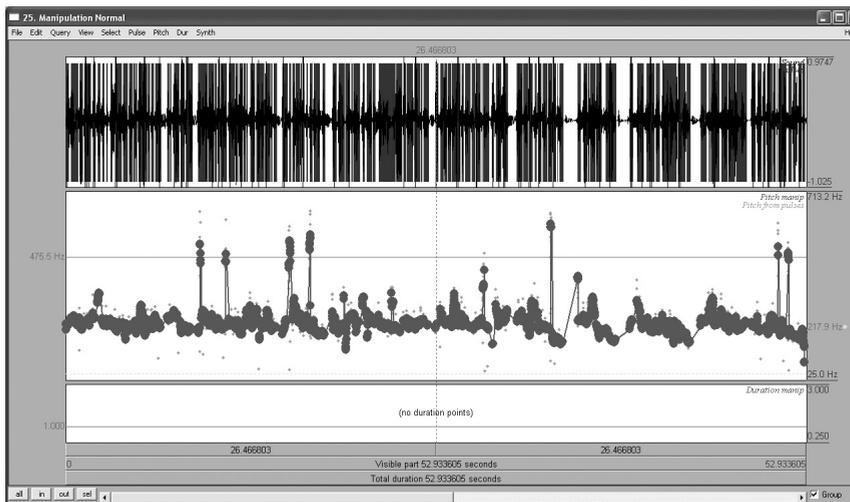


Figure 1: Pitch manipulation in PRAAT

The versions thus produced were validated in a pre-test to make sure that the experimental version still represented a professional performance but was nevertheless recognised as more monotonous. The subjects were 22 students at the Center for Translation Studies in Vienna, who were randomised into two groups. After listening to one of the two versions,

the subjects were asked to rate the liveliness of the presented speech on a seven-point scale. The monotonous sample was rated slightly lower than the lively version. None of the subjects reported to have heard any artefacts. The samples were also assessed by a pool of experts, who confirmed that the monotonous version sounded both natural and professional. In addition to the subjective analysis by the students and experts, an objective (acoustic) analysis was carried out in PRAAT to compare the fundamental frequencies of the two versions. Table 1 shows the fundamental frequency values of the control and the experimental versions. The standard deviation, which represents the variation of fundamental frequency, is considerably lower in the experimental (= monotonous) sample, indicating that this version is indeed more monotonous.

	Lively	Monotonous
Minimum	67.3 Hz	70.3 Hz
Maximum	598.9 Hz	604.7 Hz
Mean	210.6 Hz	194.2 Hz
Standard dev.	45.8 Hz	34 Hz

Table 1: Fundamental frequency values of the lively vs. monotonous versions.

3.2. Questionnaire

The questionnaire was designed to both test comprehension and gather information on subjects' perception of the intonation and quality of the interpretations. The comprehension questions were phrased in such a way as to only test specific facts mentioned in the text. Two types of questions were used to test comprehension: multiple choice questions and half-open questions. In the second part of the questionnaire, the subjects had to rate certain quality criteria including intonation and the overall quality of the interpreter's performance on a seven-point scale.

Cognitive interviews were conducted to exclude or refine overly complex or incomprehensible questions. In the pre-test (see 3.1.), none of the subjects reported any difficulties in answering the questions, and all questions were answered correctly by several subjects, indicating that the questions were indeed comprehensible.

3.3. Experiment

The main comprehension experiment was conducted in a simulated conference setting on three days in mid-April 2010. A total of 63 subject-matter experts participated in the experiment, which took place in a

lecture room at the Center for Business Administration of the University of Vienna. All subjects were advanced marketing students and had a similar educational background, age and knowledge of the subject. They were parallelised according to the marks they had achieved in the previous semester and randomised into two groups to avoid bias. An interpreting booth was installed in the lecture room to convey the impression that the subjects were about to hear a live interpretation. The audio equipment was installed and handled by a professional audio technician. It was not connected to the booth but transmitted the pre-recorded versions of the interpretation to the listeners' headphones. Prior to the experiment, the subjects were instructed not to take notes and listen to the interpretation as though it were presented at a conference.

During the experiment, the original speech was displayed on a video wall, while a professional interpreter was sitting in the booth pretending to interpret. The students were listening to the pre-recorded interpretations, which differed only in fundamental frequency but were still the same in terms of wording, pausing patterns, speed, intensity, duration etc.

After listening to the interpretation, the subjects were asked to complete the questionnaire with the comprehension questions and the questions on the performance of the interpreter.

4. Results

Fourteen subjects were excluded from the analysis as their knowledge of German was limited, leaving data for 49 native-German subjects. Figure 2 shows the mean comprehension scores in the experimental (white bar)

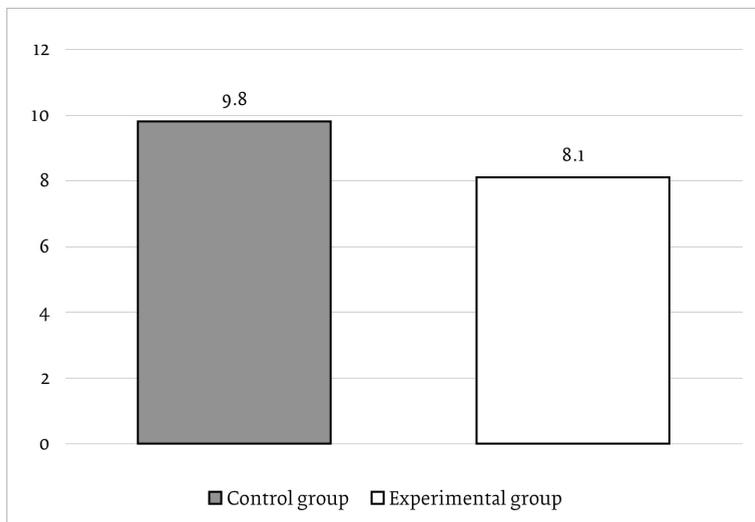


Figure 2: Mean score in the control and experimental groups.

and control groups (grey bar). The control group, i.e. the group that had heard the lively interpretation, achieved an average of 9.8 out of 19 points, while the group that had listened to the monotonous version obtained a mean score of 8.1. The difference between the groups did not turn out to be statistically significant in a t-test ($p = 0.098$, $t = 1.69$, $df = 47$), but the p-level indicates a strong tendency that flattened fundamental frequency impedes comprehension.

The difference in the scores of the two groups of participants tested on day 1 of the experimental run seemed particularly striking. Again, the control group obtained a mean score of 9.8. However, the experimental group achieved no more than 6.5 points on average. Although the number of subjects per group was very small (only 7), this difference was statistically significant ($p = 0.05$, $t = 2.15$, $df = 12$) and provides additional support for the hypothesis that monotony has a negative impact on comprehension.

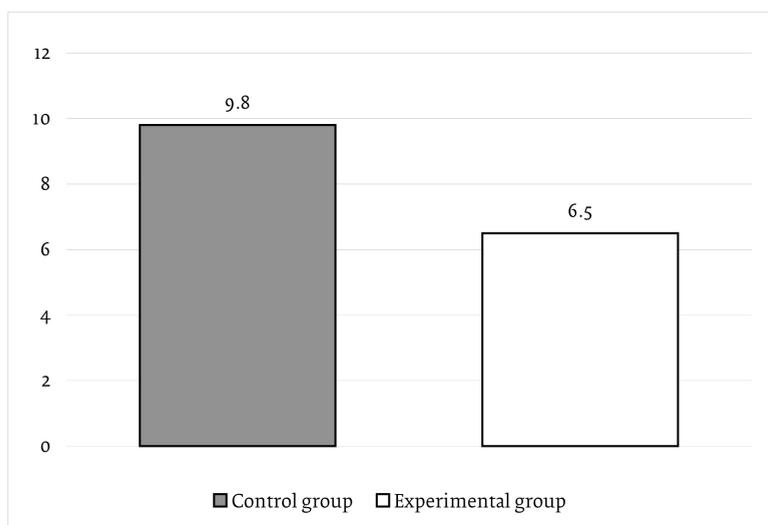


Figure 3: Mean score in the control and experimental groups on day 1.

The monotonous presentation also had an effect on the overall assessment of the interpreter's performance. Analysis showed a moderate correlation ($r = 0.4$) between the assessment of the liveliness of the interpretation and the overall performance rating, i.e. the livelier the rating of the interpretation, the better the rating of the interpreter's performance.

5. Conclusions

The data presented above suggest that monotony has a negative impact on the overall performance assessment of an interpretation, which confirms

the findings by Collados Aís (1998). This means that interpreters may be perceived as being less professional when speaking in a monotonous voice, regardless of whether they correctly convey the content of the original speech.

Furthermore, monotony can have a negative impact on listener comprehension. This result is in line with the initial findings by Shlesinger (1994) and confirms recent findings from cognitive and psychological studies (Hillenbrand 2003, Laures and Bunton 2003, Watson and Schlauch 2008). Intonation should thus receive greater attention in interpreting theory and practice, where the importance of prosodic features appears to have been underestimated.

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