Nonverbal Vocalisations: A Forensic Phonetic Perspective

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INTRODUCTION

The forensic application of phonetics makes use of nonverbal vocalisations in voice comparisons (Wagner 2019). In order to be successfully applied in the forensic domain, a parameter has to fulfill the following requirements:

- low intraspeaker variability
- high between-speaker variability
- availability
- robustness (to telephone transmission and disguise)
- measurability [adapted from Wolf 1972].

Therefore, the principal question asked by the forensic phonetician in relation to nonverbal vocalisations is invariably how speaker specific they are.

We are still lacking systematic data on all of them, but there are some indications that hesitations [Braun and Rosin 2015] and breathing [Kienast and Glitza 2003] as well as speaking tempo [Schilz 2008] are definitely promising candidates. Laughter, swallowing, and clicks of various origins are rare and thus generally lack availability, but they are used whenever present.

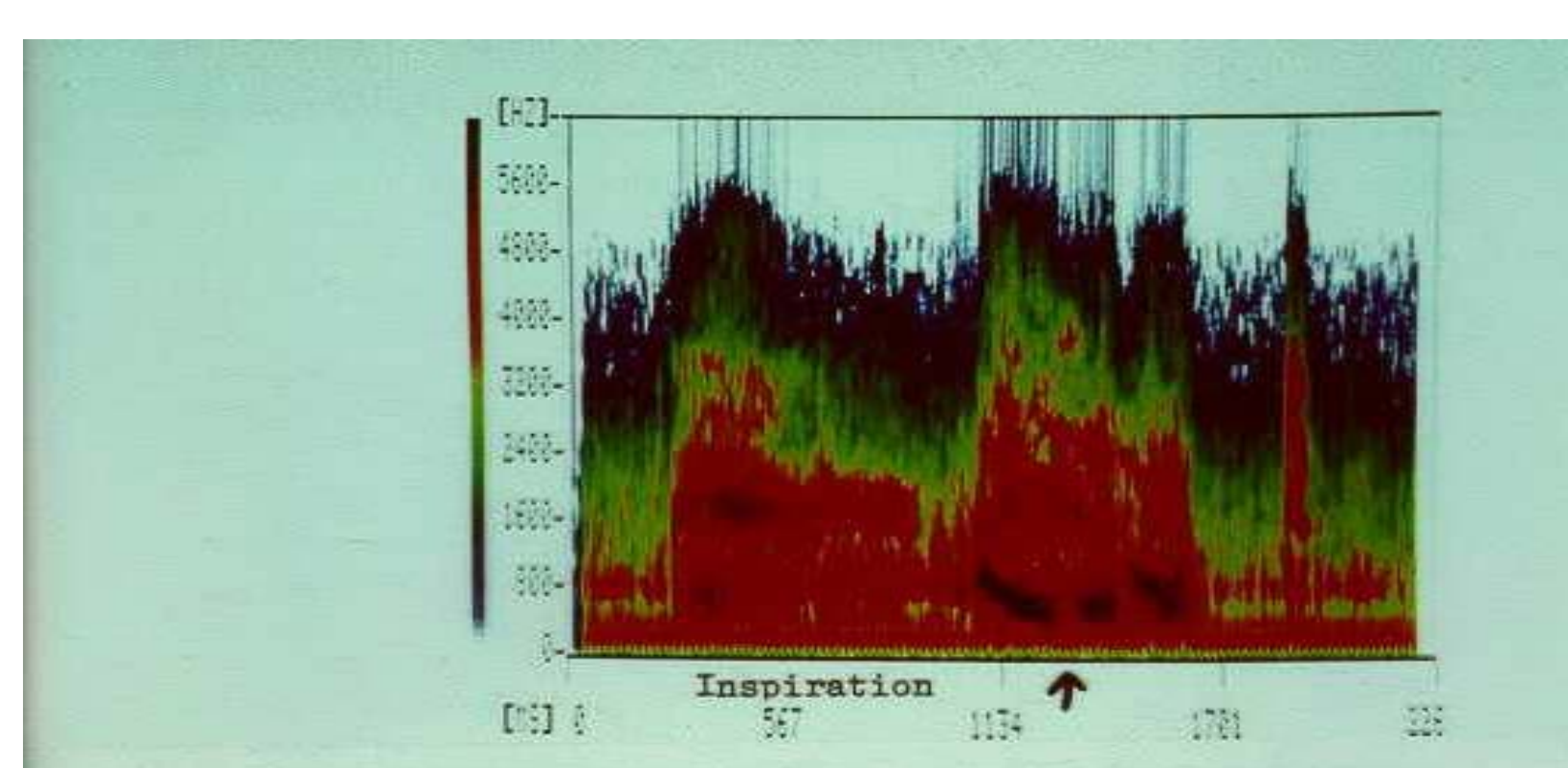## SPEECH BREATHING
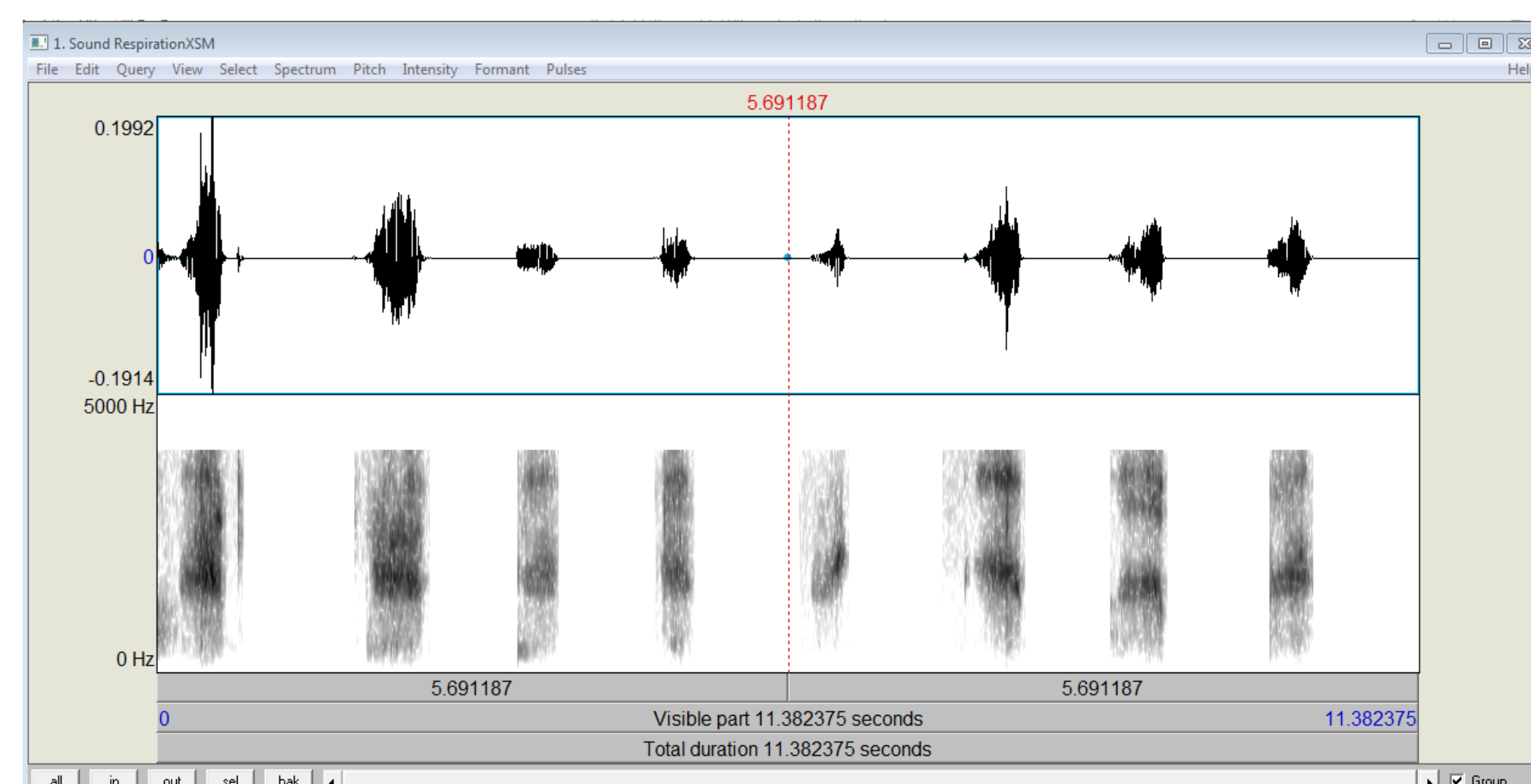
Respiration: perpetrator
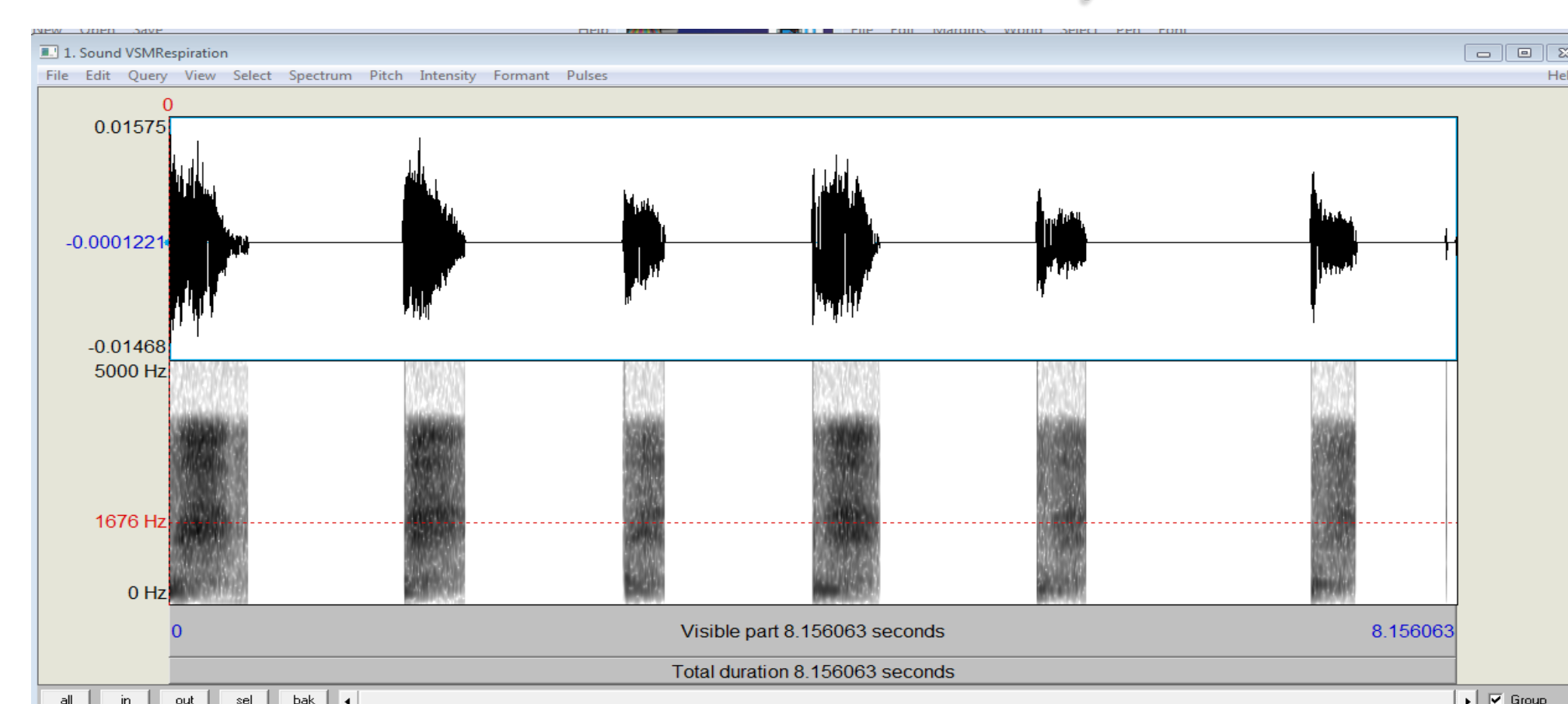
Respiration: suspect
Resonances: F1 = 1600-1700 Hz;
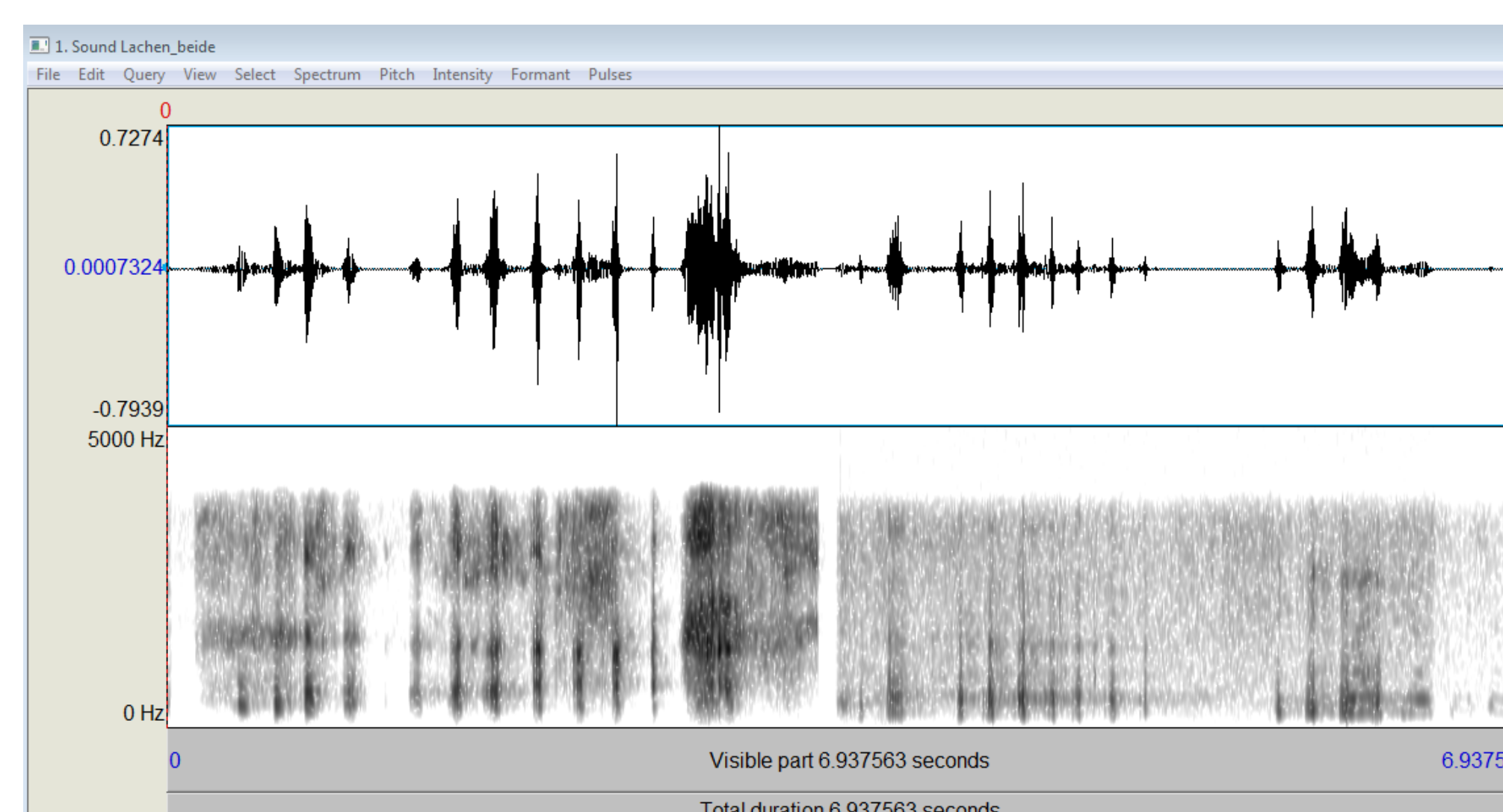F2 = 3300-3500 Hz

BREATHING - ANOTHER EXAMPLE

An example from Künzel [1987]. Inspiration is almost as loud as phonation.

Case details: A kidnapping and murder in Karlsruhe in the late 1970s. The kidnapper was arrested and reported to have refused to be examined by an ENT specialist by saying: <insp.> *ich weigere mich*. That was sufficient information for the specialist.
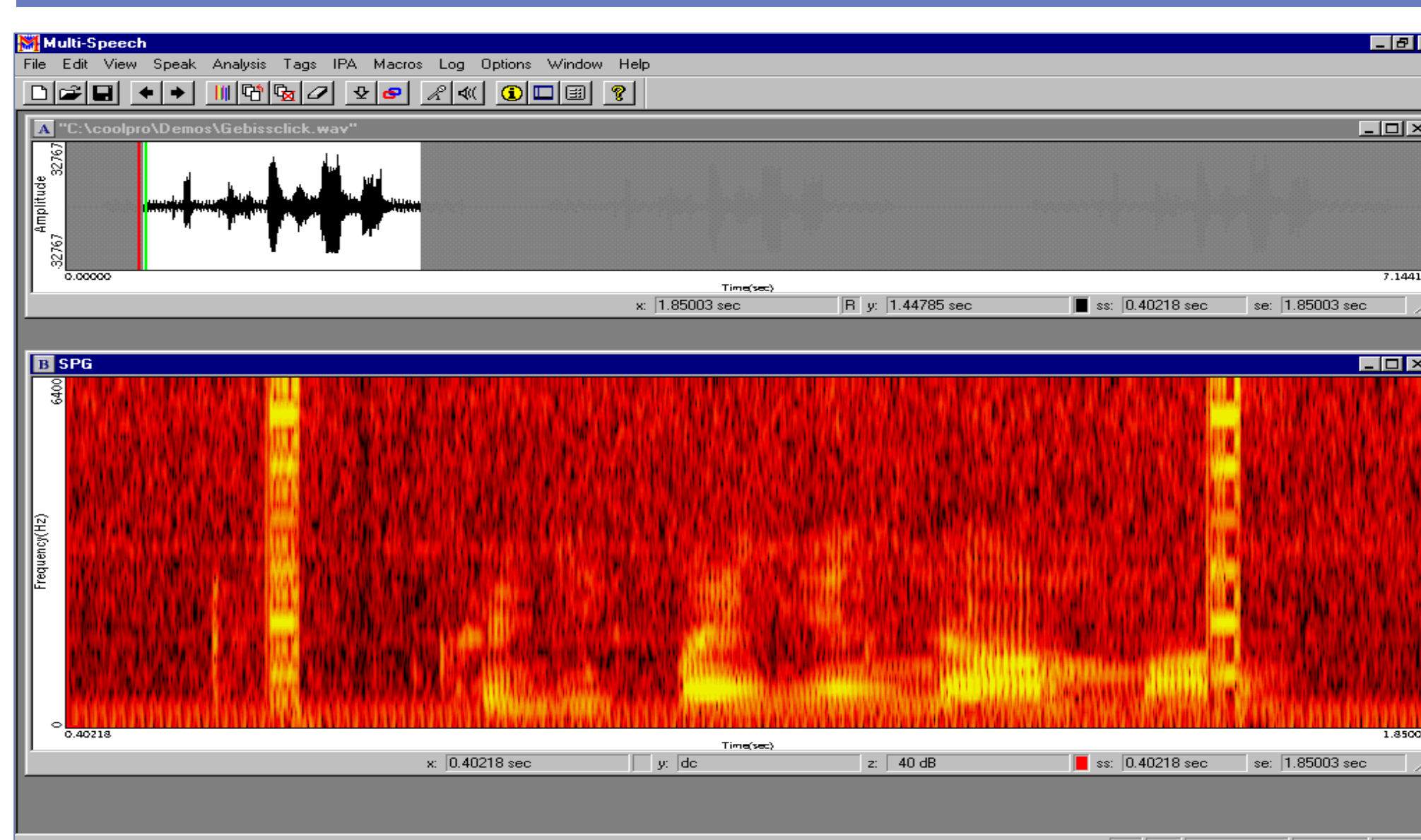
LAUGHTER

Laughter perpetrator   Laughter suspect

Case details: A so-called rip case where money is to be laundered, and when the person brings the cash, it is ripped off, and the robber flees.
In this case, there was compelling evidence against speaker identity, but the laughs are very similar. So it is conceivable that the speaker was a close relative.

DENTURE CLICKS

Click – beep – *kann ich mal Ihren Namen ham*?

Case details: There were several recordings with frequent clicks like the one documented. They reminded of denture clicks which regularly occur if dentures are ill-fitted. However, this speaker was in his 20s.
When I made the reference recording, it turned out that he had mandibular protrusion and was therefore wearing dentures even at his young age.

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OUTLINE OF FURTHER RESEARCH TOPICS

Speech breathing:
- Pathway
- Frequency
- Timing
- Duration
- Spectral composition (Trier 2020)

Hesitations
- Filled pauses
- Unfilled pauses
- False starts
- Corrections
- Repetitions (Saarbrücken and Trier)

Speaking tempo
- Articulation rate
- Syllable rate
- SRQ (syllable reduction quotient)

Articulatory precision
- Various kinds of target undershoot

Laughter
- Timing
- Number and spectral composition of bursts
- Pathway
- Glottal stops

Clicks
- ill-fitting dentures or other
- Medication
- Ejectives

Voice quality
- laryngeal settings according to Laver (1989)

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