

Idiosyncratic and linguistic information in /s/ in telephone speech

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Telephone speech can be characterised by a limited bandwidth, varying bitrates (in the case of mobile signals), and different speech behaviour. For vowels, formants that are situated near lower signal cut offs are shown to be affected (e.g., Künzel 2001). Investigating the effects of telephone filters is particularly relevant for forensic speaker comparisons, where wiretapped telephone conversations are commonly analyzed. However, not much is known about the effect of telephone filters on different consonants.

In the current work, we investigated fricative /s/, which has been described to contain relatively high amounts of idiosyncratic information (Kavanagh, 2012; Van den Heuvel, 1996), even in narrowband telephone recordings where most of its high-frequency spectral characteristics are compromised (Smorenburg & Heeren, 2021). We annotated >100 /s/ tokens for 60 speakers of British English from the West Yorkshire Regional English Database (WYRED: Gold, 2020). These participants performed a forensic speech task in which they conversed over the telephone with an ‘accomplice’ and were recorded both over a microphone placed in front of them and wiretapped over the landline.

Results show that linguistic information (effects of phonetic context and syllabic position) is compromised in telephone recordings compared to microphone recordings, but that some linguistic environments still show more between-speaker variability. Specifically, when /s/ is followed by labial sounds, speaker-classification accuracy was higher. This indicates that coarticulation contains idiosyncrasies that can be used in forensic speaker comparisons.

References

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