

Phonetics Colloquium at UdS

on Wednesday, 22 April 2026, 14:15, in room 5.08 (build. C7.2)

Sascha Schäfer (UdS)

On the role of inhalation noises in forensic phonetic casework: Practice, findings, and perspectives

In contrast to breathing at rest, speakers typically produce audible inhalation noises while speaking. However, the potential of such noises for forensic phonetic casework remains opaque. An international survey of speaker comparison practices (Gold & French, 2011) indicates that some practitioners consider paralinguistic parameters such as audible breathing, though the overall proportion of experts using them was not disclosed. At the same time, research on inhalation noises from a forensic perspective is scarce, with only a few notable exceptions (Kienast & Glitza, 2003; Link, 2012; Werner et al., 2022).

Audible breathing may nevertheless hold considerable promise for speaker discrimination. Early work suggests that breathing patterns are individual and relatively stable over time (Benchetrit, 1989). Moreover, as breathing co-occurs with speech rather than forming part of the linguistic signal, it may be less subject to conscious control. Non-verbal vocalisations (NVVs), including inhalation noises, could therefore be relatively robust to variation in language, speaking style, or to deliberate disguise (see Braun, 2020).

At the same time, empirical findings present a mixed picture. Kienast and Glitza (2003) report speaker-specific differences in the spectral properties of audible oral inbreaths, as well as variation in preferred breathing types (oral, nasal, combined). In contrast, temporal measures such as duration showed high within-speaker variability, limiting their forensic usefulness. A replication study by Link (2012), based on female speakers and read speech, found greater between-speaker variation in duration. In addition, factors such as physical or psychological stress appear to influence multiple parameters, highlighting the challenges for forensic application. Perceptual evidence is also limited: Werner et al. (2022) found little support for reliable speaker discrimination by lay listeners based on breath noises alone.

By integrating insights from the wider phonetic literature with forensic requirements, this study aims to clarify the evidential potential and limitations of inhalation noises, and to provide a basis for their more informed and systematic consideration in forensic applications. The parameters discussed include the number and type of inhalation noises—(a) nasal, (b) predominantly oral (with possible nasal airflow), and (c) combinations thereof—as well as their duration, the proportion of pauses with and without inhalation, and the duration of inter-pausal units. Particular attention is paid to often overlooked phonetic detail within breath pauses, including the co-occurrence of other NVVs (e.g., clicks, smacks, sighs, glottal hesitations; Trouvain et al., 2014) and the duration of surrounding silent “edges” (Trouvain & Werner, 2022).

Systematic approaches on the topic are overdue and have already been made for other forms of non-conscious speaker behaviour, such as disfluencies (e.g., Braun & Elsässer, 2023; McDougall & Duckworth, 2017, 2018; Muhlack et al., 2023).

References

- Braun, A. (2020). Nonverbal vocalisations - A forensic phonetic perspective. *Laughter and Other Non-Verbal Vocalisations Workshop, Bielefeld, Germany*. 19–23.
- Braun, A., & Elsässer, N. (2023). Are there individual disfluency patterns? *International Congress of Phonetic Sciences, Prague, Czech Republic*, 3854–3858.
- Benchetrit, G., Shea, S.A., Pham Dinh, T., Bodocco, S., Baconnier, P., Guz, A. (1989). Individuality of breathing patterns in adults assessed over time. *Respiratory Physiology*, 75, 199-210.
- Gold, E., & French, P. (2011). International practices in forensic speaker comparison. *The International Journal of Speech, Language and the Law*, 18(2), 293–307.
- Gold, E., French, P. and Harrison, P. (2013). Clicking behavior as a possible speaker discriminant in English. *Journal of the International Phonetic Association*, 43(3), 339-349
- Kienast, M., & Glitza, F. (2003). Respiratory sounds as an idiosyncratic feature in speaker recognition. *International Congress of Phonetic Sciences, Barcelona, Spain*. 1607–1610.
- Link, L. (2012). *Individualtypische Aspekte des Atemgeräusches. Eine experimentalphonetische Untersuchung [Unpublished MA dissertation, Philipps-Universität Marburg, Germany]*.
- McDougall, K., & Duckworth, M. (2017). Profiling fluency: An analysis of individual variation in disfluencies in adult males. *Speech Communication*, 95, 16–27.
- McDougall, K., & Duckworth, M. (2018). Individual patterns of disfluency across speaking styles. *The International Journal of Speech, Language and the Law*, 25(2), 205–230.
- Muhlack, B., Trouvain, J., & Jessen, M. (2023). Distributional and acoustic characteristics of filler particles in German with consideration of forensic-phonetic aspects. *Languages*, 8(2), 100.
- Trouvain, J. (2014). Laughing, breathing, clicking – The prosody of nonverbal vocalisations. *Speech Prosody, Dublin, Republic of Ireland*. 598–602.
- Trouvain, J., & Werner, R. A phonetic view on annotating speech pauses and pause-internal phonetic particles. In Schwarze, C. & Grawunder, S. (Eds.), *Transkription und Annotation gesprochener Sprache und multimodaler Interaktion: Konzepte, Probleme, Lösungen* (pp. 55-70). Narr.
- Werner, R., Trouvain, J., & Möbius, B. (2022). *Speaker discrimination and classification in breath noises by human listeners [Conference Presentation]*. Annual Conference of the International Association for Forensic Phonetics and Acoustics, Prague, Czech Republic.