**Naturalness Brainstorming**

1. Conceptual
   1. Definition (Human Likeness, odd/rare, predicted/expected sound “probability-based vs. typicality-based predictability”). Dimensions: Categorical, individual, deviation, prediction.
      1. Does this voice sound like a real human speaker? (***Human Naturalness***)
      2. Does this voice (of a real familiar speaker) sound like the real person, or like a (similar, synthesized) voice (***Authenticity-Naturalness***)
      3. Does this voice sound distinctive/untypical, or, in a specific context, rare/unexpected? (*Typicality Naturalness or Predictability Naturalness, which could be conceived as what is perceived as natural either in the context of long-term or lifetime encounters (T.N.) or in the context of transient or situational encounters (P.N.), hence I propose to call this* ***Naturalness in Context.*** *N.B. this is also what could be changing in a researcher spending days or months on morphing, distortion etc.*)
      4. Does this voice sound distorted? (***Technical Naturalness***) (How? Telephone, technical artifact, noise, speech disorder….)
      * Other (sub-) categories with comments (to be amended/modified depending on your literature search): Does this voice sound like the speaker tries to disguise him-/herself / tries to imitate a specific target speaker? (🡪 Human disguise – voice imitators. Hm. This should probably fall under ii., and so should deepfake synthesized voices as the computer variant of disguise).
      * Influence of Health/disease. Hm. This should probably fall under iii…..
      * s
   2. Conceptual Models & Implications (Are voices special?)
      1. “Auditory face model”
      2. Voice space model in analogy to face space model
         1. Norm-based or exemplar-based?
   3. Research Fields (Clinical, computational, human empirical, methods)
2. Empirical
   1. Acoustic features
   2. Voice samples
      1. Length/complexity:
         1. Vowel, (pseudo) word, sentence, conversational
      2. Types
         1. Human
            1. Age, gender, pathologies
         2. Synthesized
         3. Human-manipulated / re-synthesized
   3. Measurement
   4. Test/questionnaire development
   5. Perceptual dimensions and verbal descriptions
   6. Interaction with other dimensions (emotion, identity, age, personality, impressions…). Perhaps discuss the particular importance of trust/trustworthiness
   7. Voice manipulations (e.g. morphing, ….)
3. Neurophysiological – naturalness in the brain
   1. Brain processing – TVA specificity for natural voices?
   2. Networks
   3. Activation
   4. Timing (e.g., ERP)
4. Applied
   1. Healthcare
   2. Synthesized voices (uncanny valley for voices?)
   3. Adaptability of naturalness perceptions by interaction with synthesized voices?
   4. Research: Validity, Quality, Replicability
   5. Deepfakes

First approach into conceptualization/the dimensionality of naturalness: We talked about an opinion paper and a systematic review – both would be good and an OP can be quicker. Both would be (kind of) top-down approaches; concepts (or studies) first, then the research on them. But also, you should have a look at the approach taken in Lavan, 2023, Cognition, which is a more bottom-up approach. A similar but slightly more specific approach applied to topic, this could be utilizing peoples ´ verbal description of what is perceived as natural…