**INTRODUCTION**

Language production errors affecting speech sounds in aphasic patients ➔ phonetic or phonological origin?

- **Problem in classical literature and in clinical assessment of these errors:**
  - Distinction between phonological and phonetic paraphasias is generally based on perceptual analyses ➔ could be influenced by the experimenter’s perceptual system and/or expectations (Marczyk & Baqué, 2013).

Our approach ➔ Acoustic analyses of the productions of aphasic patients.

**Focus:** Voice onset time (VOT) in stop consonants

- Major cue for implementing the voicing contrast in French and many other languages (Cho & Ladefoged, 1999).
- Reliable cue of speech motor control that may be affected in patients with phonemic impairment (Lagacé, 2015).

**Hypotheses** (based on literature, e.g., Nespoulous et al., 2013; Marczyk & Baqué, 2013).

**Phonetic deficit:**
- Impairment: Difficulties to maintain voicing in voiced stop consonants.
  - French voiced stops have a long and negative VOT ➔ requires to maintain both voicing and supra-glottal closure.
- Expected acoustic observations: Partial or complete devoicing of voiced stops.

**Phonological deficit:**
- Impairment: Difficulties to select phonemes within the phonological system.
- Expected acoustic observations:
  - No clearly-established tendency in devoicing errors
  - And/or phonemes substitution errors (changes of place of articulation)

**METHOD**

**Participants**

4 French-speaking aphasic patients with a left hemispheric ischemic stroke

- Healthy control participants matched for age
  - U: 50-59 years (N=11)
  - TD: 60-69 years (N=10)
  - BD: 70-79 years (N=8).

**EXPERIMENTAL TASK**

- Repetition of 84 CVCV nonwords
  - 18 items C2V1C2V1 with C1=p,t,b,d,g and V1=a,i,u (ex. papa/papa)
  - 18 items C1V1C2V2 with C1=p,t,b,d,g and V1=a,i,u (ex. papa/papa)
  - 36 items C1V1C2V2 with C1 and C2=p,t,b,d,g (ex. papa/papa)
  - 12 items C1V1C2V2 with C1=C2=p,t,b,d,g and V1=V2=a,i,u (ex. papa/papa)

**Acoustic analyses**

- VOT duration for each stop consonant: time gap between the beginning of the burst and the onset of the voiced signal (Lisker & Abramson, 1964)
- Voicing is evidenced by the observation of periodicity in the spectrogram.

**RESULTS**

**VOT values of stop consonants: correct productions only**

- Complete voicing and devoicing errors, changes of place of articulation, changes of manner of articulation are excluded.

**Distribution of error types**

- Phoneme devoicing and voicing, changes of place of articulation, changes of manner of articulation, addition of phonemes.

**Other observations**

- Irregularities (including disruptions) of voiced consonants in IJ, CL and BD.

**DISCUSSION**

**Phonetic impairment**

- Devoicing errors ➔ voicing errors
- Stops of voicing
- ... But mainly [l,d] ➔ [k] difficulties to raise the tongue?

**Phonological impairment**

- Changes of places of articulation
- Changes of places & manners of articulation
- Important variability of negative VOT values
- Voicing errors ➔ devoicing errors
- Changes of places & manners of articulation
- ... No clear-cut dichotomy between phonetic and phonological impairment

**Interest of acoustic measures to distinguish between phonetic and phonological impairment**

- Shorter negative VOT values in some patients: confirm the hypothesis of difficulties to maintain voicing and supra-glottal closure.

**But...** No clear-cut dichotomy between both deficits

- Non homogeneous characteristics of phonetic and phonological impairment across patients
- Possibilities of mixed deficits
- Compensatory strategies used by some patients?
- Influence of other deficits on the patients’ errors such as their executive impairment (TM & BD)

**REFERENCES**


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