Using a Visual Analogue Scale (VAS) to Assess the Effect of Speech Therapy in Children with Cleft Lip and Palate

Marie Dokovova[1], Lisa Crampin[2], Linsay Campbell[2], Joanne Cleland[1]
[1]University of Strathclyde, UK; [2]NHS Greater Glasgow and Clyde, Glasgow, Scotland
maria.dokovova@strath.ac.uk @DrDokovova, joanne.cleland@strath.ac.uk @DrJoanneCleland

University of Strathclyde Humanities & Social Sciences

Background

- Most speech intervention studies use binary metrics of correctness in outcome measures (e.g., percentage consonants correct).
- However, some children make phonetically gradient changes to their speech during, and after intervention.
- Gradient changes in speech may be captured using a visual analogue scale (VAS) even by naïve listeners[1].

- **RQ: Will a child with UCLP show progress in therapy?**
- **RQ: Are backed /t/ productions different from /k/?**

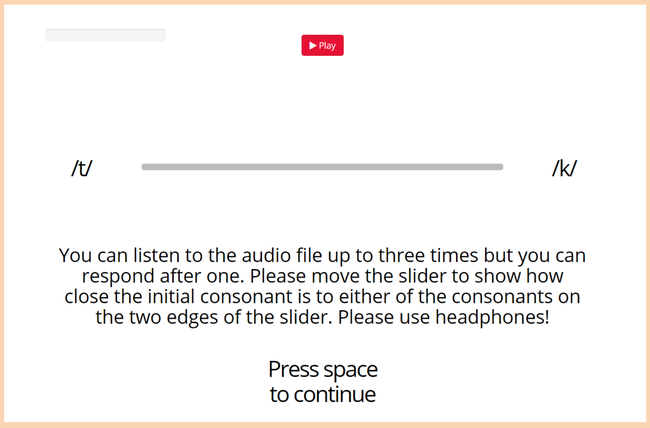

Figure 1. Gorilla experiment view for the participants.

Speaker

Group	• Child with repaired UCLP[2]
n	• 1
Age	• 7;4

Listeners

Group	• SLT students
n	• 12
Age	• 18+

KEY FINDINGS

1. Using a visual analogue scale, student SLTs detected subtle phonetic differences in backed /t/s across treatment sessions of a child with repaired Unilateral Cleft Lip and Palate.
2. Listeners did not detect phonetic differences between /k/ and backed /t/ using a visual analogue scale.

Speech Materials

Therapy target: /t/,
Error: backing.

- 30 /t/-initial word tokens (12 unique), possible minimal pairs with /k/
- 18 /k/-initial word tokens (6 unique), possible minimal pairs with /t/
- a schwa at the start (e.g., /ə'kap/).

/t/ word recordings from five speech therapy sessions (session 1 excluded due to glottal realisations of initial /t/).
/k/ word recordings from pre-, 1 week post & 1 month post-therapy.

Results

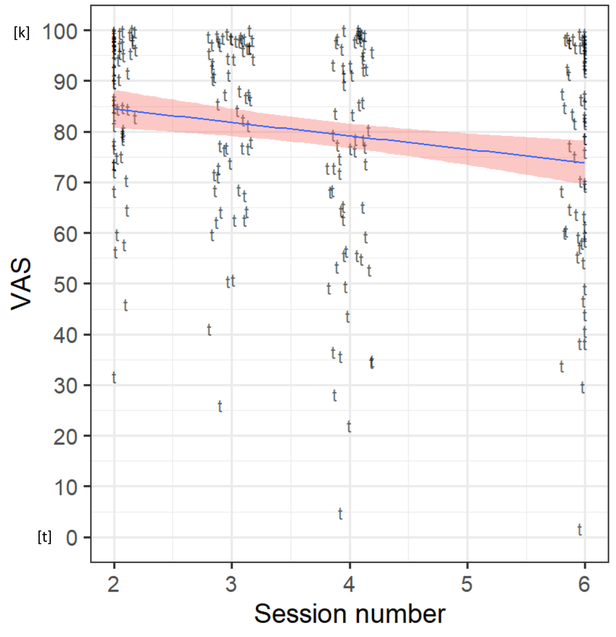

Figure 2. /t/-initial therapy words. 100 = most /k/-like, 0 = most /t/-like.

Results

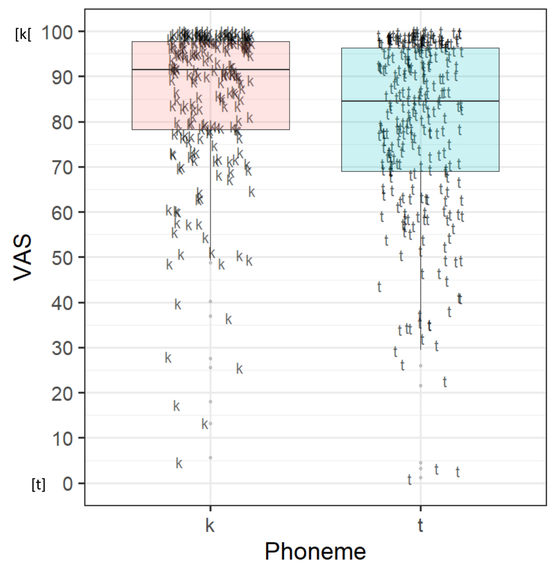

Figure 3. /k/-initial control words vs /t/-initial therapy words. 100 = most /k/-like, 0 = most /t/-like

- Linear mixed models for analysing outcome variable VAS, maximal possible random structure.
- **Model1 Effect of therapy session:**
  - The later the therapy session, the more /t/-like was the /t/. (Figure 2)
- **Model2 Effect of consonant:**
  - There was no significant difference between /t/ and /k/ in VAS responses. (Figure 3)

Acknowledgements
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CHIEF SCIENTIST OFFICE

References
[1] S. K. Schellinger, B. Munson, and J. Edwards, 'Gradient perception of children's productions of /s/ and /θ/: A comparative study of rating methods', *Clinical Linguistics & Phonetics*, vol. 31, no. 1, pp. 80–103, Jan. 2017, doi: 10.1080/02699206.2016.1205665.
[2] J. Cleland, L. Crampin, L. Campbell, and M. Dokovova, 'Protocol for SonoSpeech Cleft Pilot: a mixed-methods pilot randomized control trial of ultrasound visual biofeedback versus standard intervention for children with cleft lip and palate', *Pilot and Feasibility Studies*, vol. 8, no. 1, p. 93, Apr. 2022, doi: 10.1186/s40814-022-01051-x.