

Nuffield EPG Project: Information Sharing Event

May 22nd
2014



Queen Margaret University
EDINBURGH

www.qmu.ac.uk

Improving the speech communication abilities of children with Down's syndrome: A new model of service delivery using electropalatography.

Principal Investigator - Sara Wood

Research SLT – Zoe Grayson

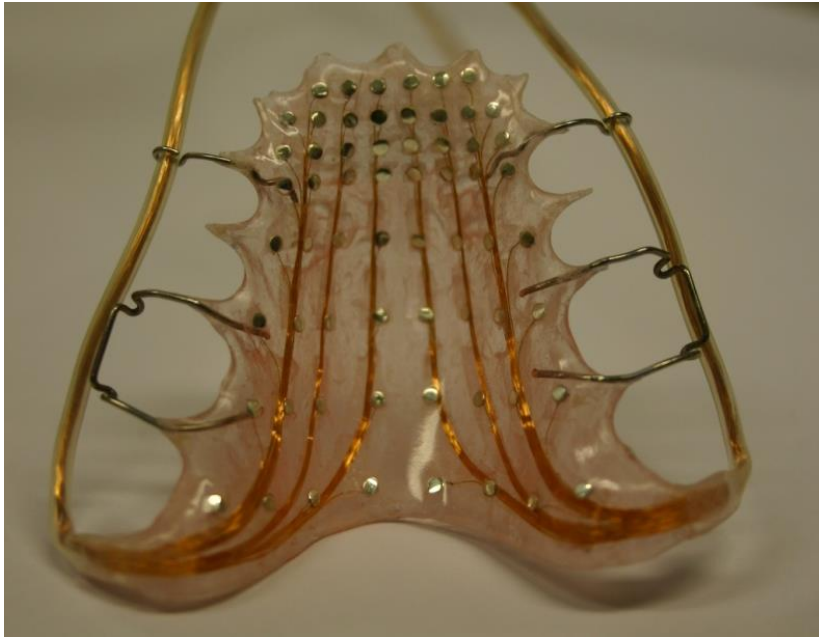
Research Fellow – Claire Timmins



Queen Margaret University
EDINBURGH

www.qmu.ac.uk

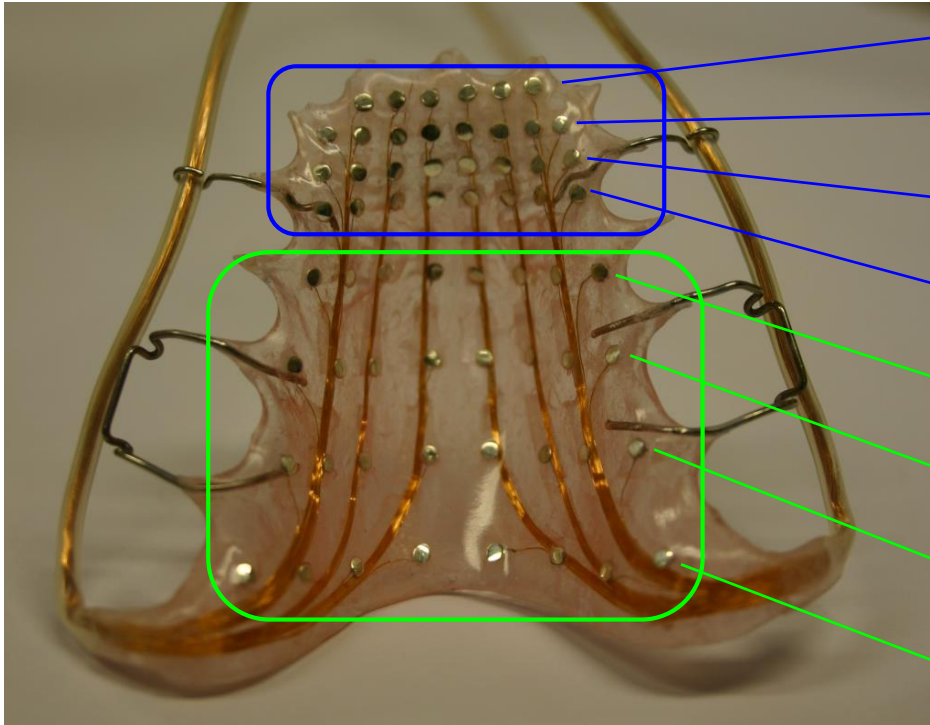
What is Electropalatography?



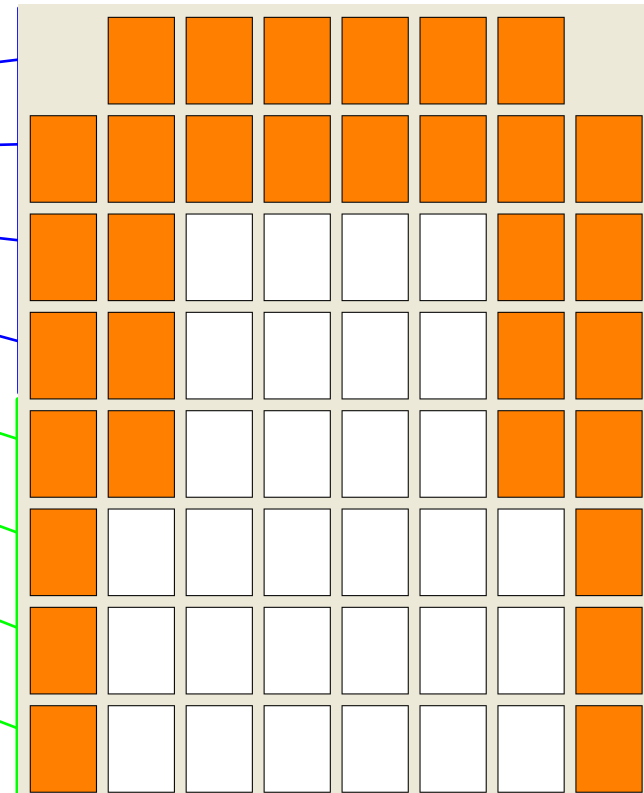
- records *timing* and *location* of tongue contact with the hard palate
- Involves wearing an artificial palate



EPG palate



Computer display



1999

Single case study

2005

2006

2007

2008

2009

2010

2011

2012

2013

2014

MRC

Assessment and Treatment of
Impaired Speech Motor Control
in Children with DS

Baily Thomas

Enhancing Speech Intelligibility in
Children and Young People with DS

PhD
Joanne
Cleland

PhD
Rebecca
Rodgers

PhD
Claire
Timmins

Nuffield Foundation

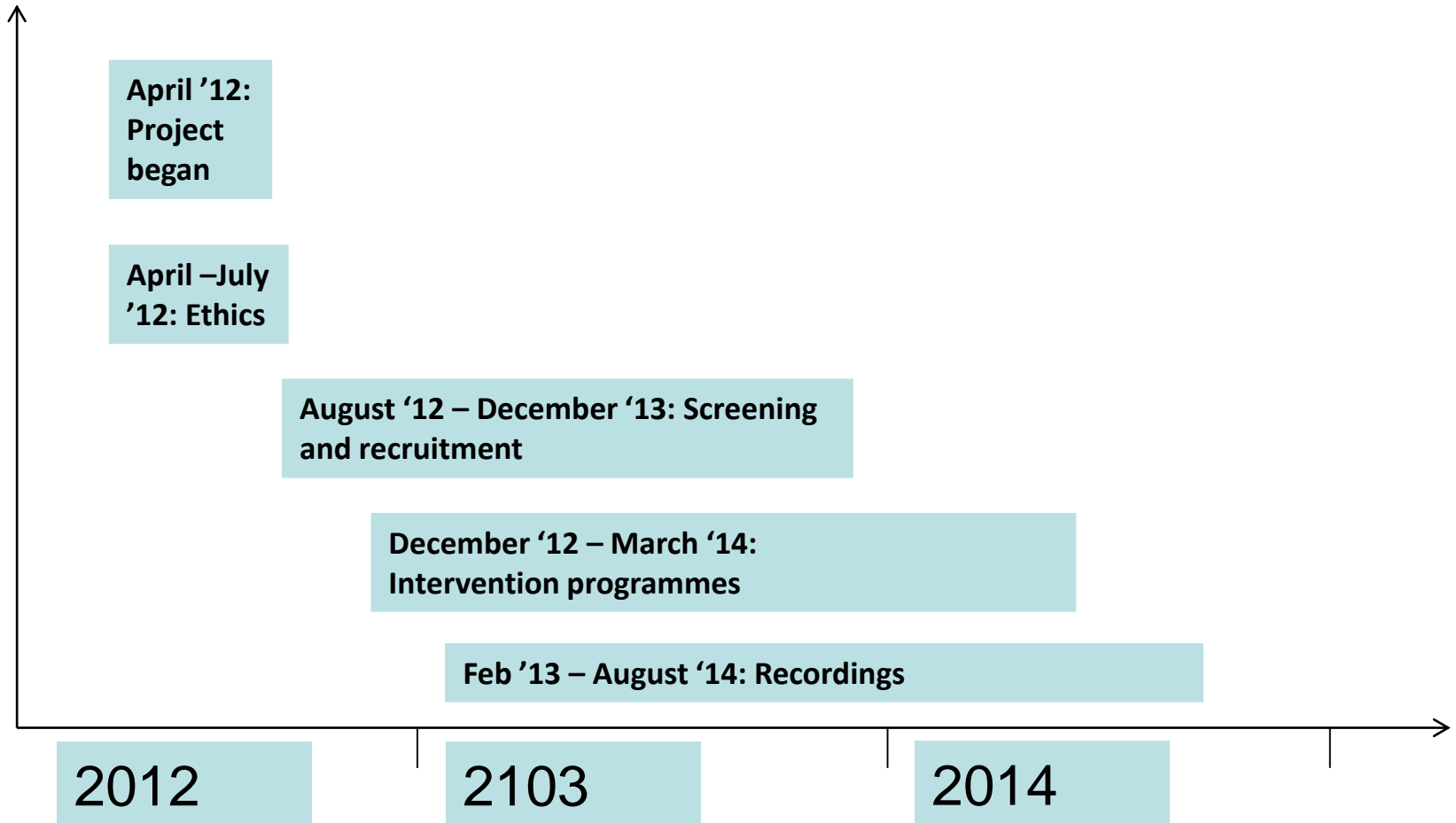
Improving the Speech Communication
Abilities of Children with DS: a New
Model of Service Delivery Using EPG

Current project

- Increase Learning Assistants knowledge of speech development in DS and provide workshops in use of EPG
- SLT assess child with DS at QMU, devise an intervention programme and share with Learning Assistant
- Therapy to be delivered daily within the school by the LA
- SLT weekly visits, phone and e-mail support



Timeline of activity



Background

- Ethics process – schools and NHS procedures.
- Participants chosen from within City of Edinburgh only initially, widened last year to include Mid and West Lothian
- Selected from both mainstream and special schools – 10 schools in total took part
- Learning Assistants (Pupil Support Workers) selected – whoever worked most with child

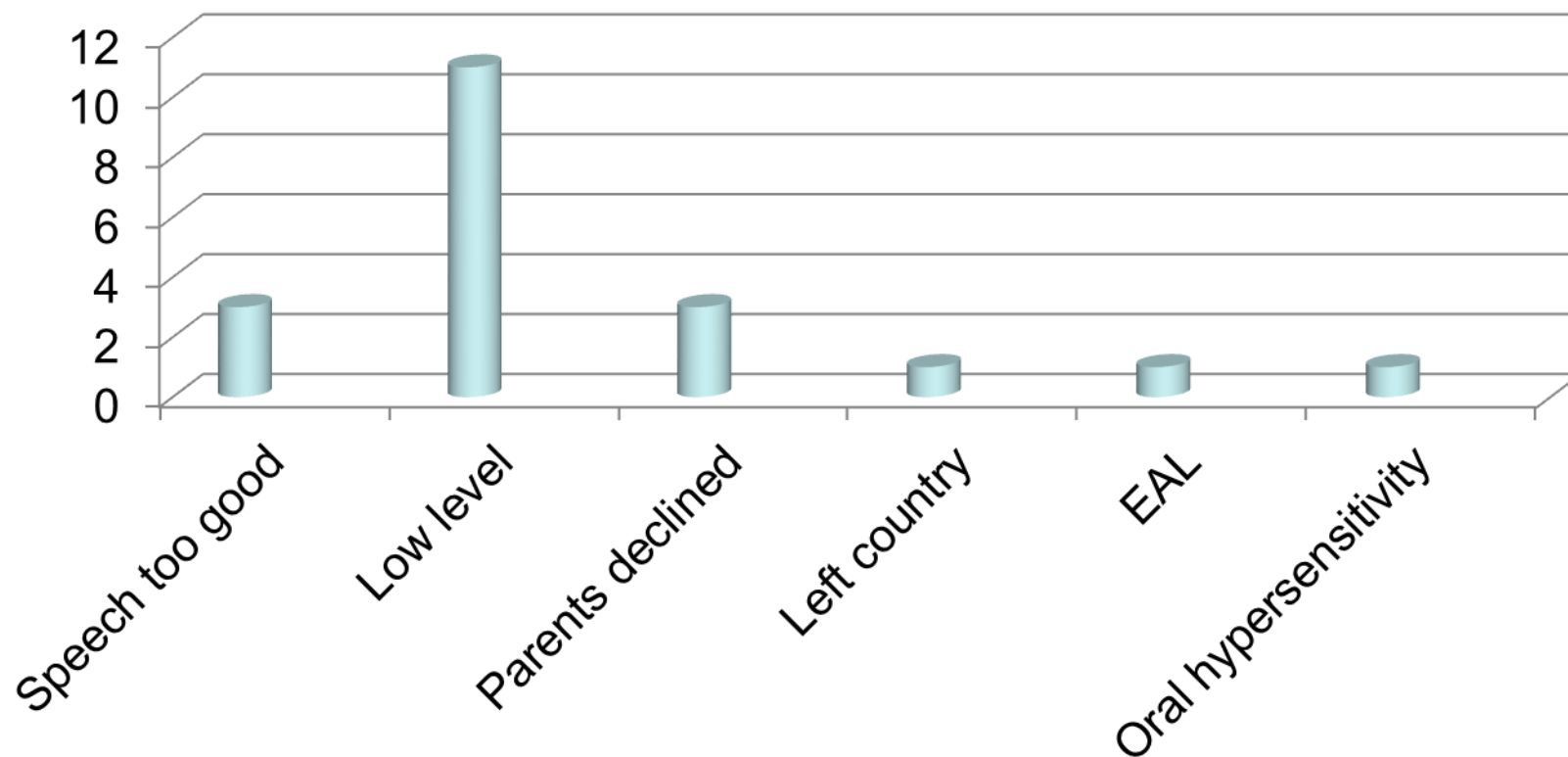


Participants

- 36 screened
- 18 recruited, 18 declined
- Of 18: 11 boys and 7 girls
11 attended Special School, 7 mainstream
- 2 withdrew after recruitment
- So - 16 'active' participants



Breakdown of those declined



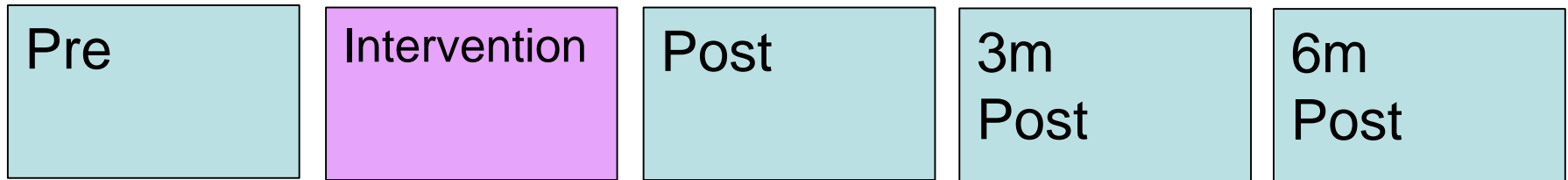
Palates

- All recruited participants had to be fitted for an individual palate
- Impression at orthodontist > sent to manufacturer (~3 months) > final fitting
- Various issues: delicate, only fit for certain length of time – dentition changes.
- Delicate kit – 3 broken during course of intervention



Recordings

- All participants recorded at 4 stages:
- Before, and 3 stages after intervention.

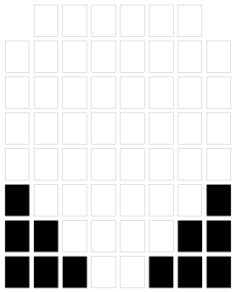


- Allows us to measure change, also see if changes maintained

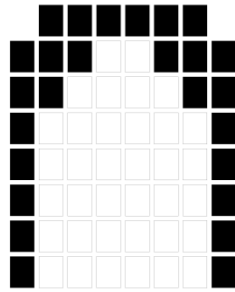


13 children with
velar/alveolar distinction
errors

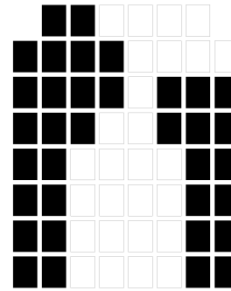
10 children with /s/ ~ /ʃ/
production errors



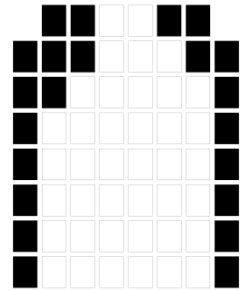
/k/, /g/



/t/, /d/



/ʃ/, /ʒ/



/s/, /z/



Learning Assistants



Queen Margaret University
EDINBURGH

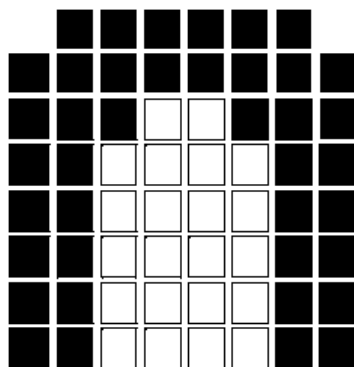
www.qmu.ac.uk



Queen Margaret University
EDINBURGH

www.qmu.ac.uk

This is the shape we need for **t**

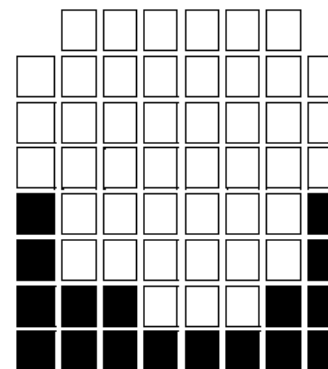


t

What do you think the shape looks like?



This is the shape we need for **k**

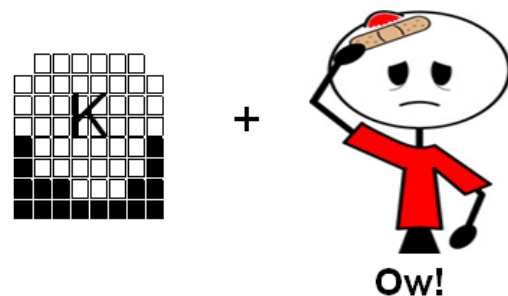
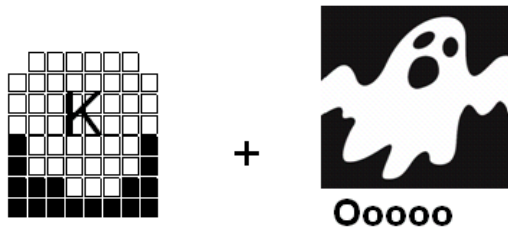


k

What do you think the shape looks like?

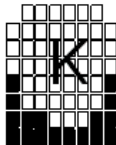

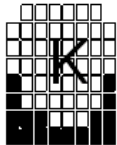
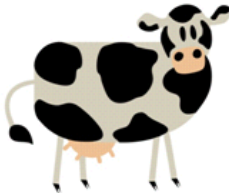
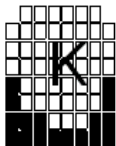

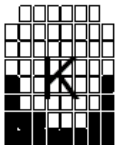



Now try with 'k' at the start



Remember to look for the k shape at the start

Now let's try some short words

- key  
- cow  
- car  
- cup  



Preliminary Data findings



Queen Margaret University
EDINBURGH

www.qmu.ac.uk

Data Collection

- Standardised Speech Assessment (DEAP)
- Pre-determined focussed wordlist
 - /t/, /k/, /d/, /g/, /s/, /ʃ/, /z/, /tʃ/, /dʒ/
 - Monosyllabic, Word initial and word final
- Recorded auditory and EPG information



Data Analysis

- Perceptual Analysis
 - DEAP (percentage consonants correct)
 - Wordlist (percentage consonants correct)
- EPG measures
 - Wordlist (articulation variability)



Some overall results

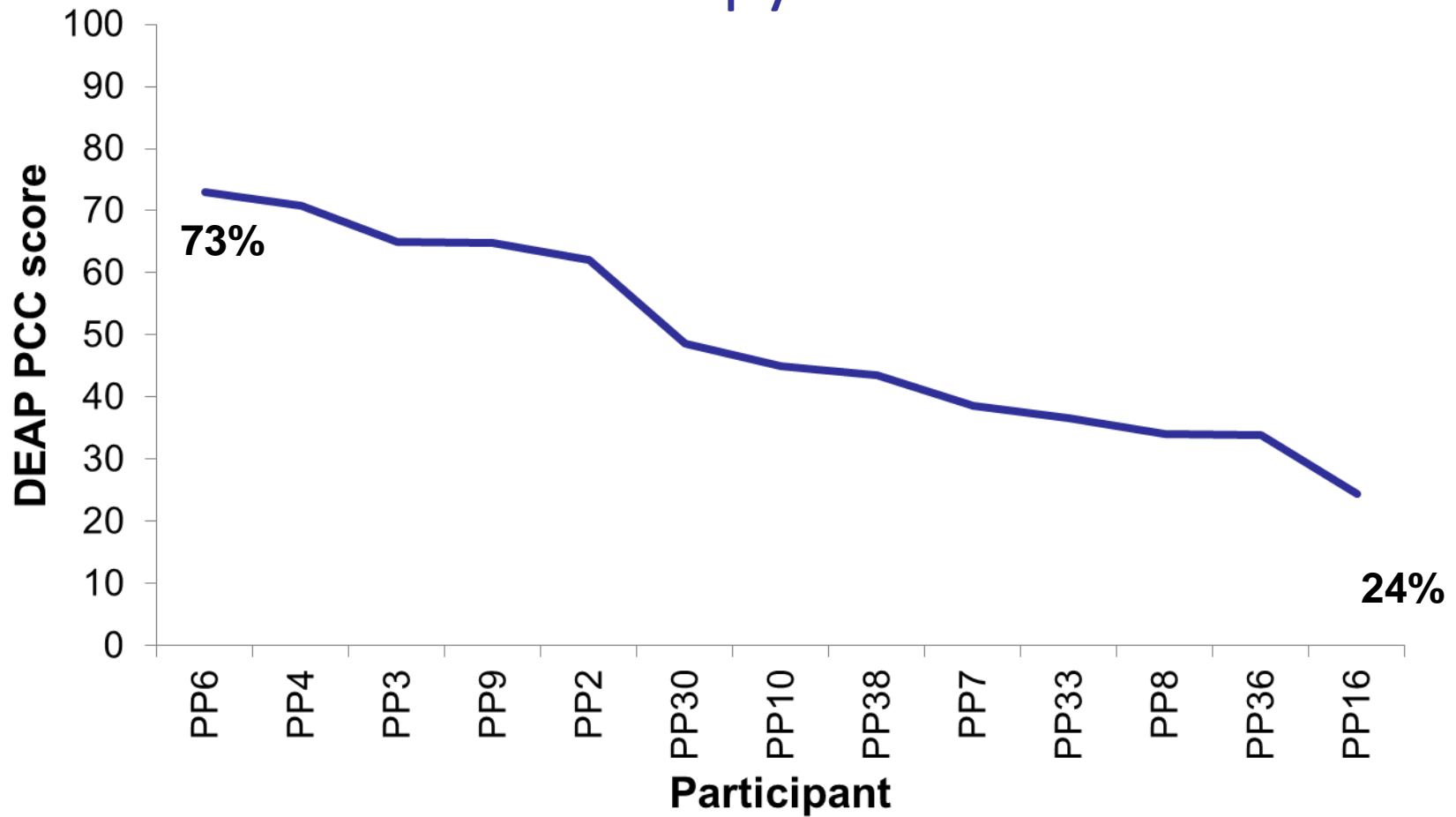
Perceptual (DEAP and Wordlist)

EPG (variability score)

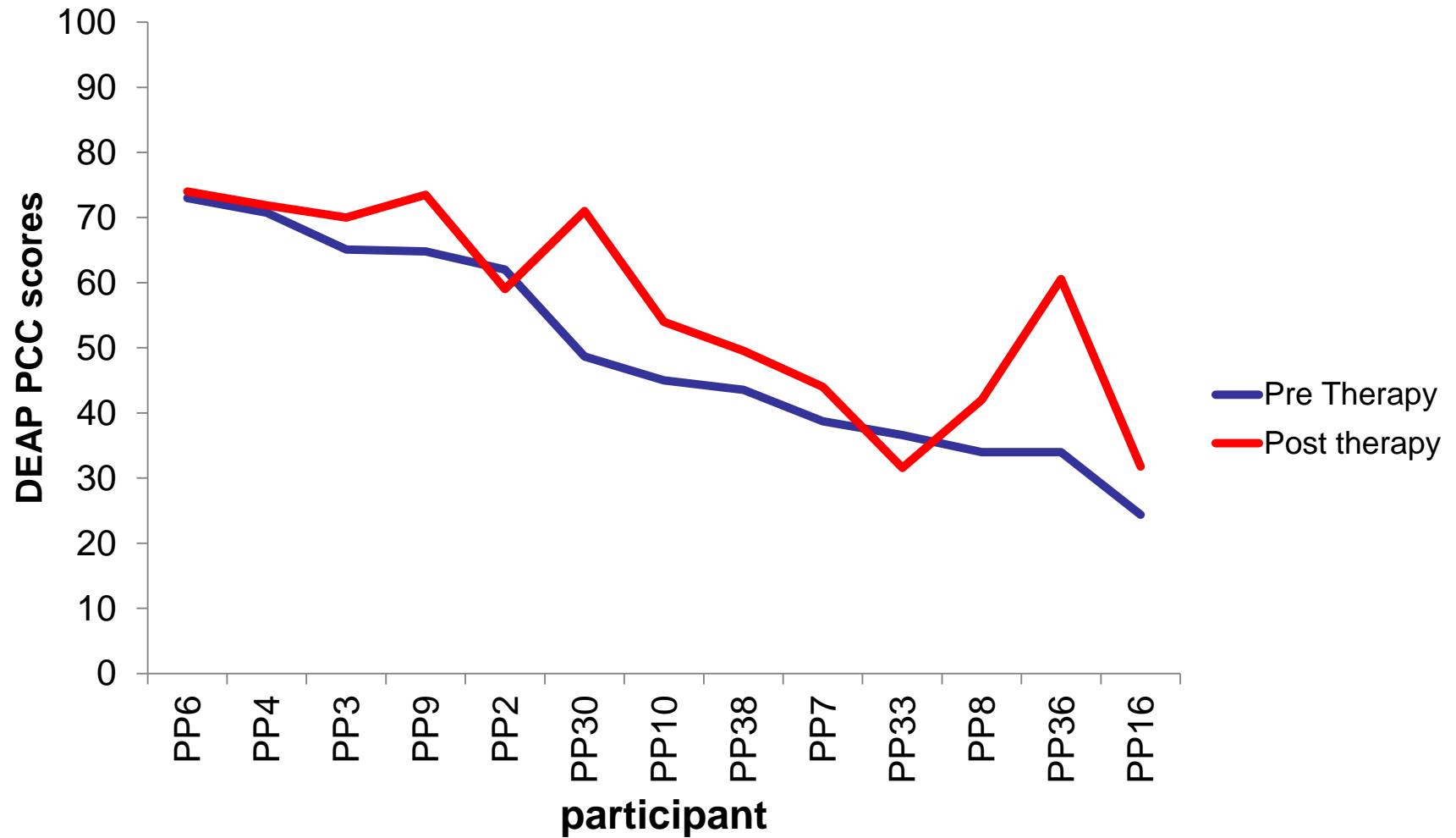
Case study



Pre-therapy DEAP PCC



Post-therapy DEAP PCC

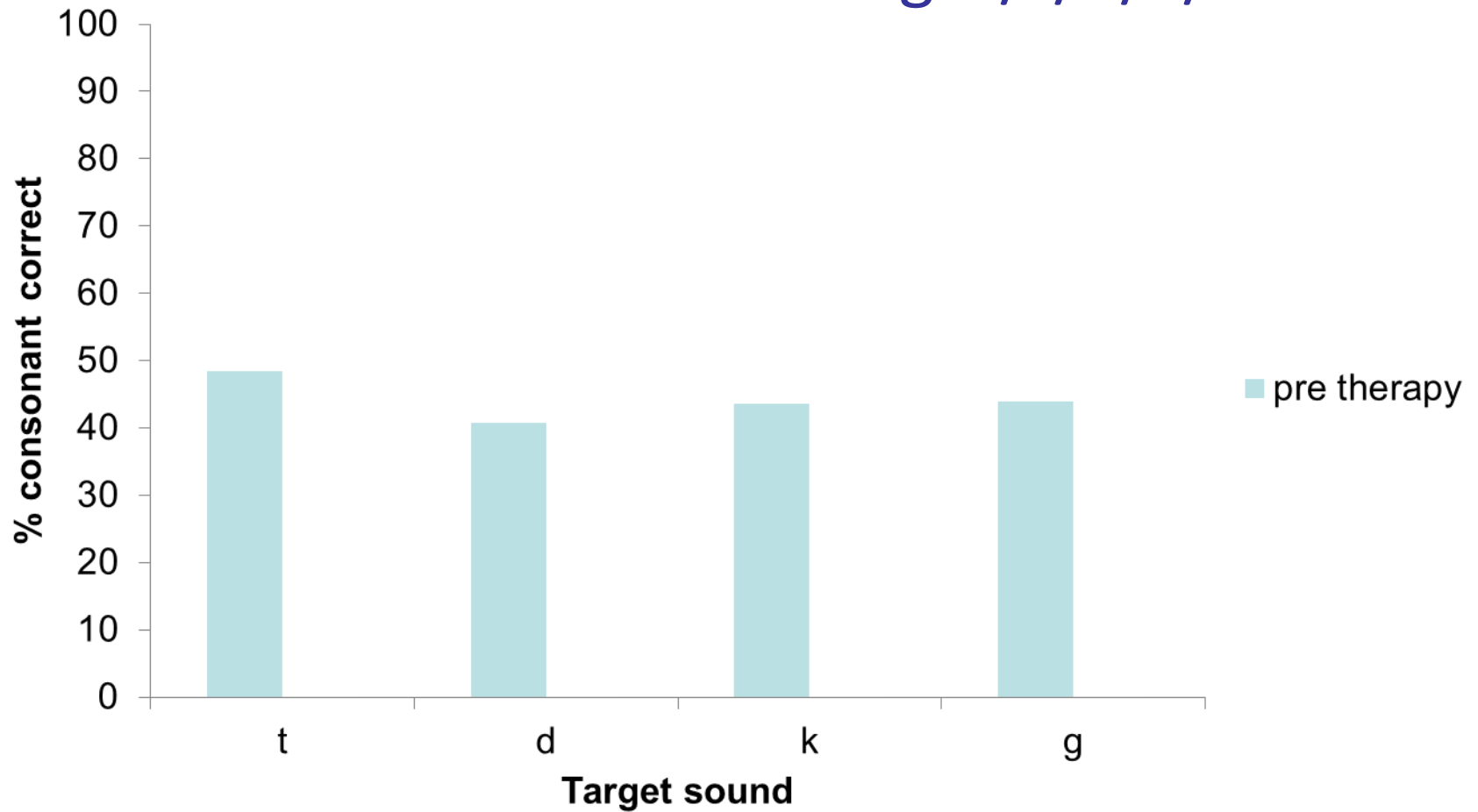


Word list analysis

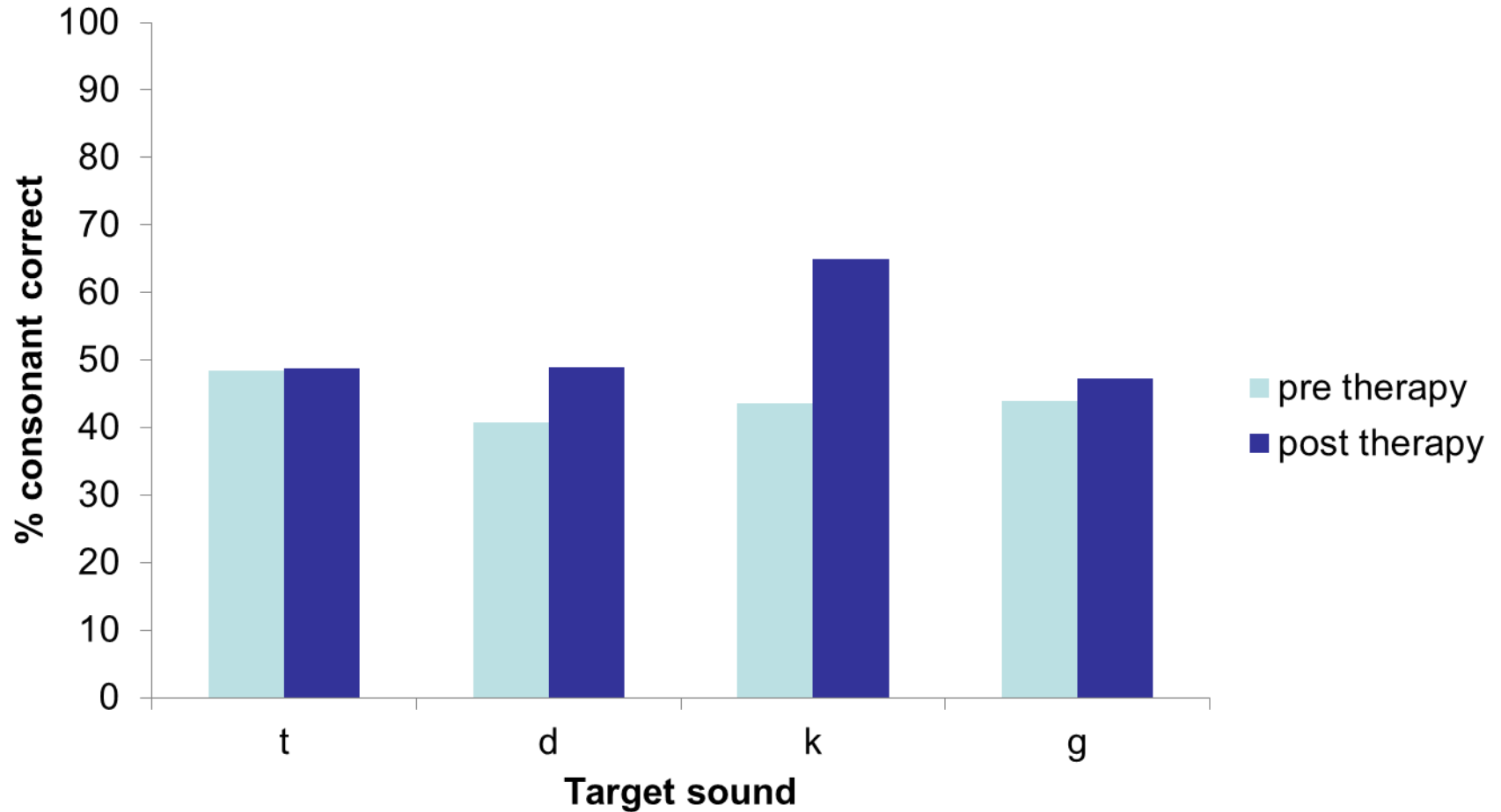
- Word initial and Word final scores combined
- /t/~k/ errors
- /s~/ʃ/ errors



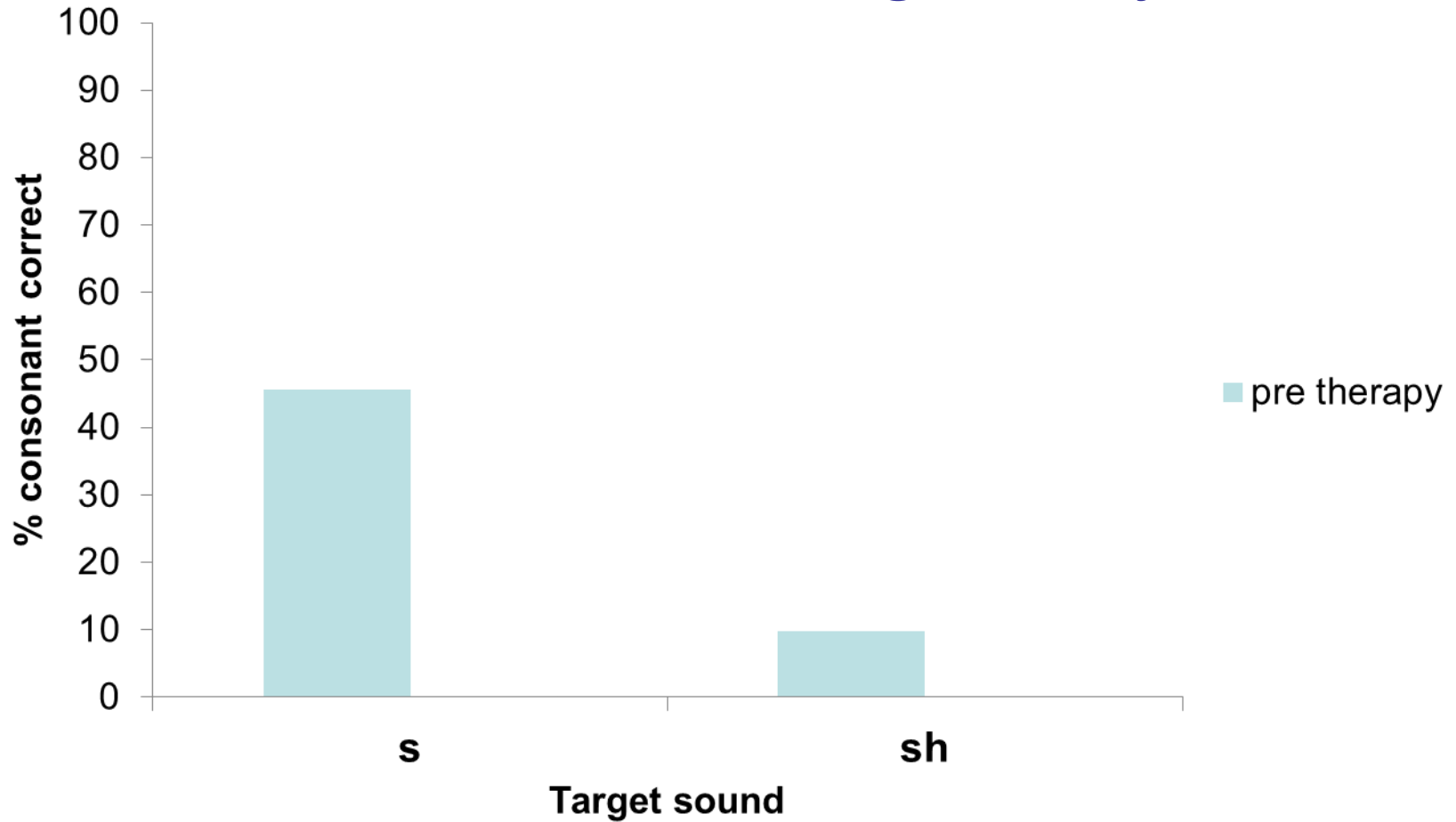
Word list recordings: /t/~/k/



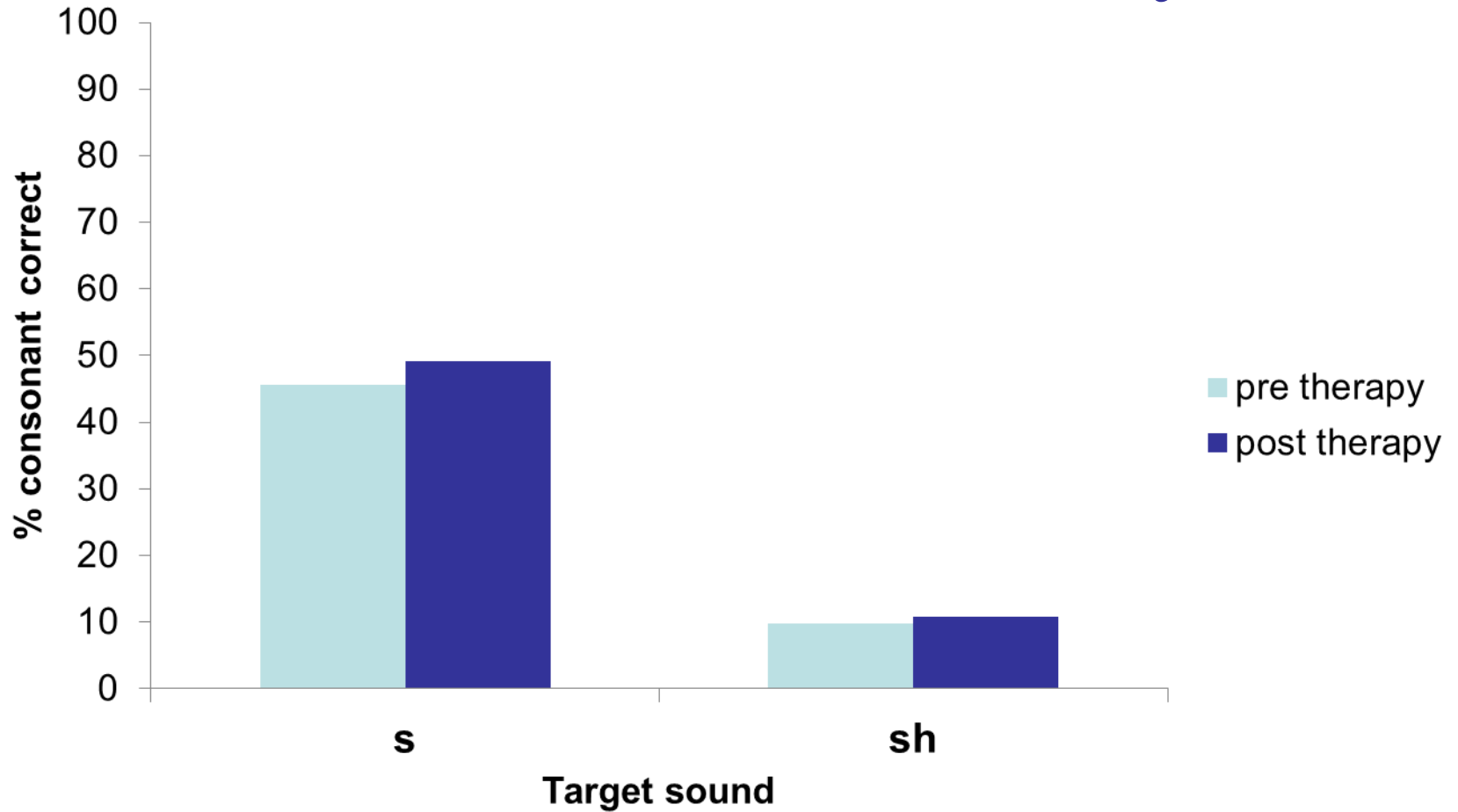
Word list recordings: /t/~/k/



Word list recordings: /s/~/ʃ/



Word list recordings: /s/~/ʃ/



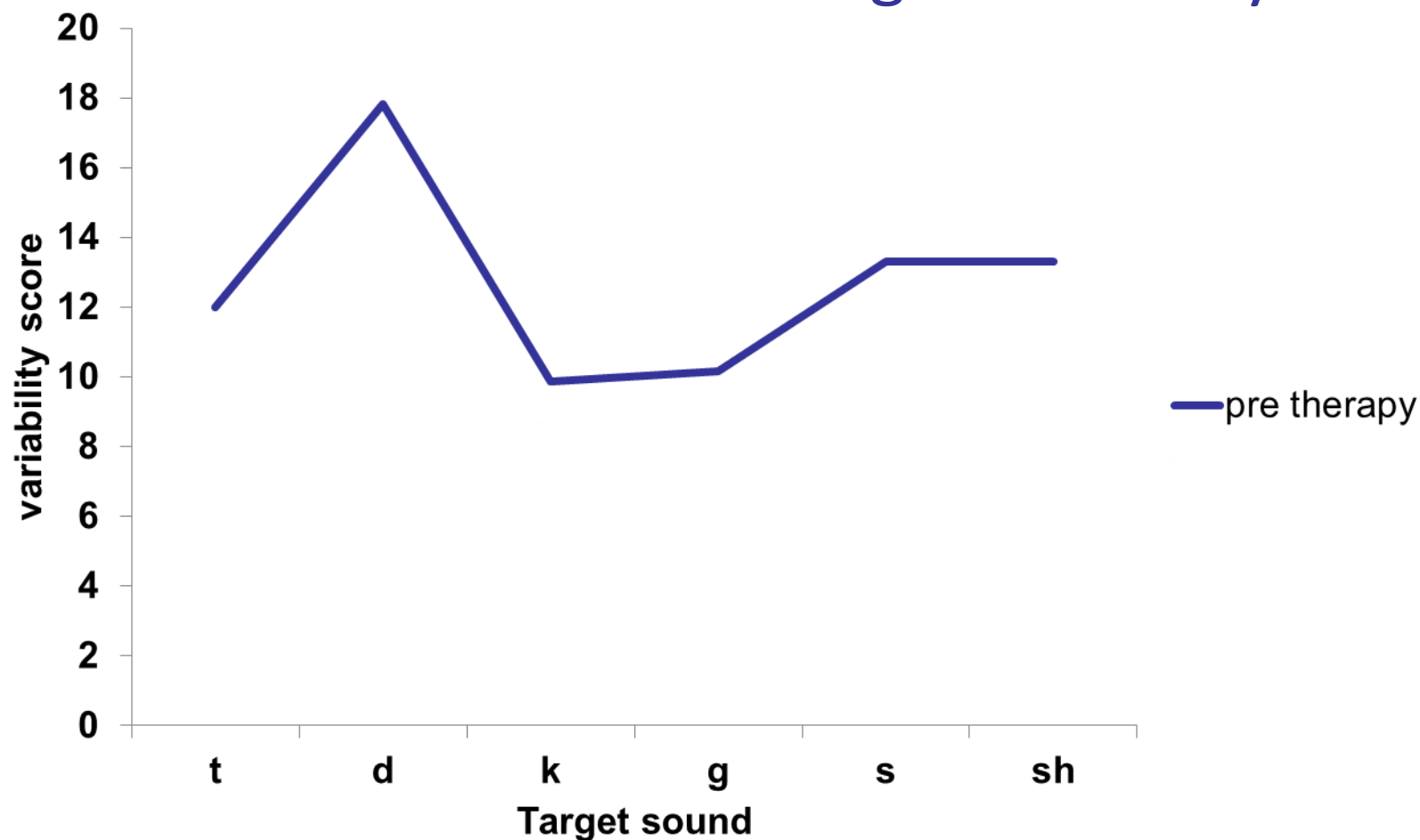
EPG variability measure



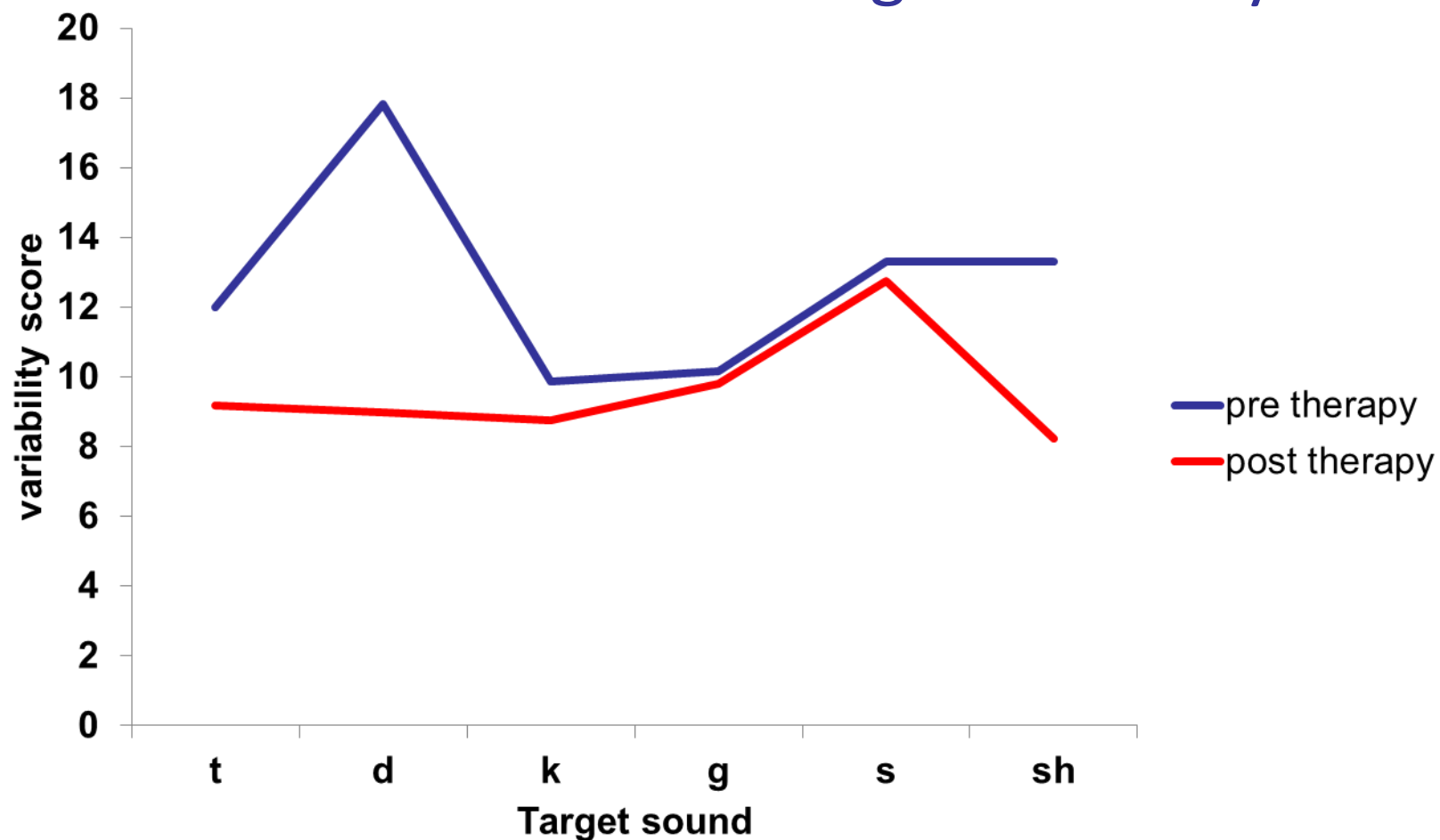
Queen Margaret University
EDINBURGH

www.qmu.ac.uk

Word list recordings: variability



Word list recordings: variability



Case study: Child A



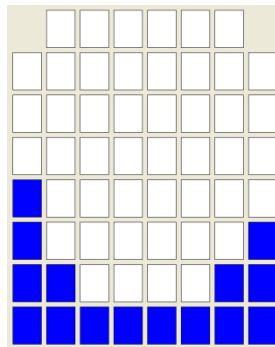
Queen Margaret University
EDINBURGH

www.qmu.ac.uk

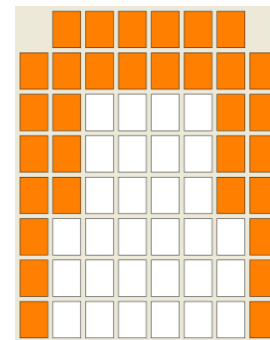
Some specific results: child A

Problems with /k/ and /g/ production

- (using /t/ and /d/ instead)



EPG pattern for /k/ and /g/



EPG pattern for /t/ and /d/

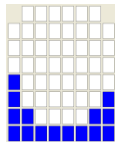


Some specific results: Child A

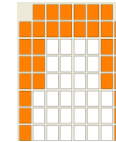
Pre therapy Articulations

	33	66	100	100	100	100	
66	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100
100	100	100	100	66	100	100	100
100	100	33	0	0	33	100	100
100	100	0	0	0	33	100	100
100	100	100	0	0	66	100	100
100	100	100	66	66	100	100	100

Pattern for /k/ in 'a key'



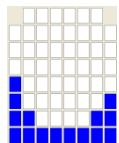
EPG pattern for /k/ and /g/



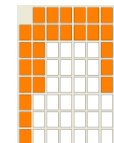
EPG pattern for /t/ and /d/



Some specific results: PP8



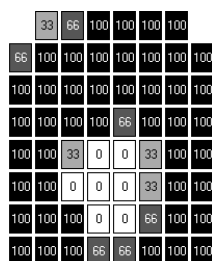
EPG pattern for /k/ and /g/



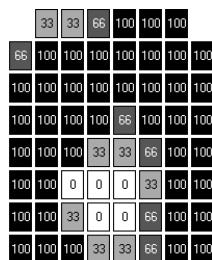
EPG pattern for /t/ and /d/

Pre therapy Patterns

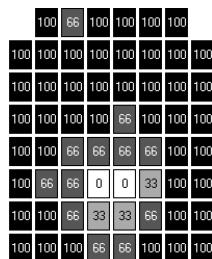
‘a key’



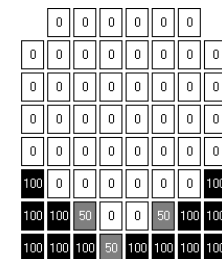
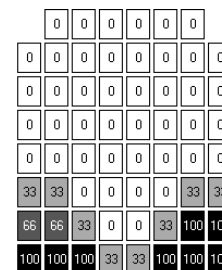
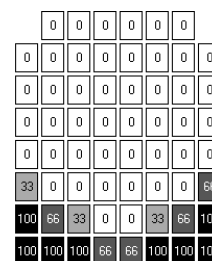
‘a car’



‘a kiss’



Post therapy Patterns



Conclusions

- Perceptual changes in most speakers
- Variability in speech articulation lowers
- Big articulation changes in some speakers



Feasibility



Preliminary findings



Queen Margaret University
EDINBURGH

www.qmu.ac.uk

Learning Assistants views

“I grew to understand the aims and objectives, and became more confident with every session”

“I felt my ability improved once we started the practical sessions”



“This was sometimes difficult due to class timetable and my other commitments to pupils”

“We had a lot of things on in the school when I was working with X which made finding time for sessions hard sometimes”



- *General feelings re taking part*

**Enjoyable
(100%)**

**Fun
(67%)**

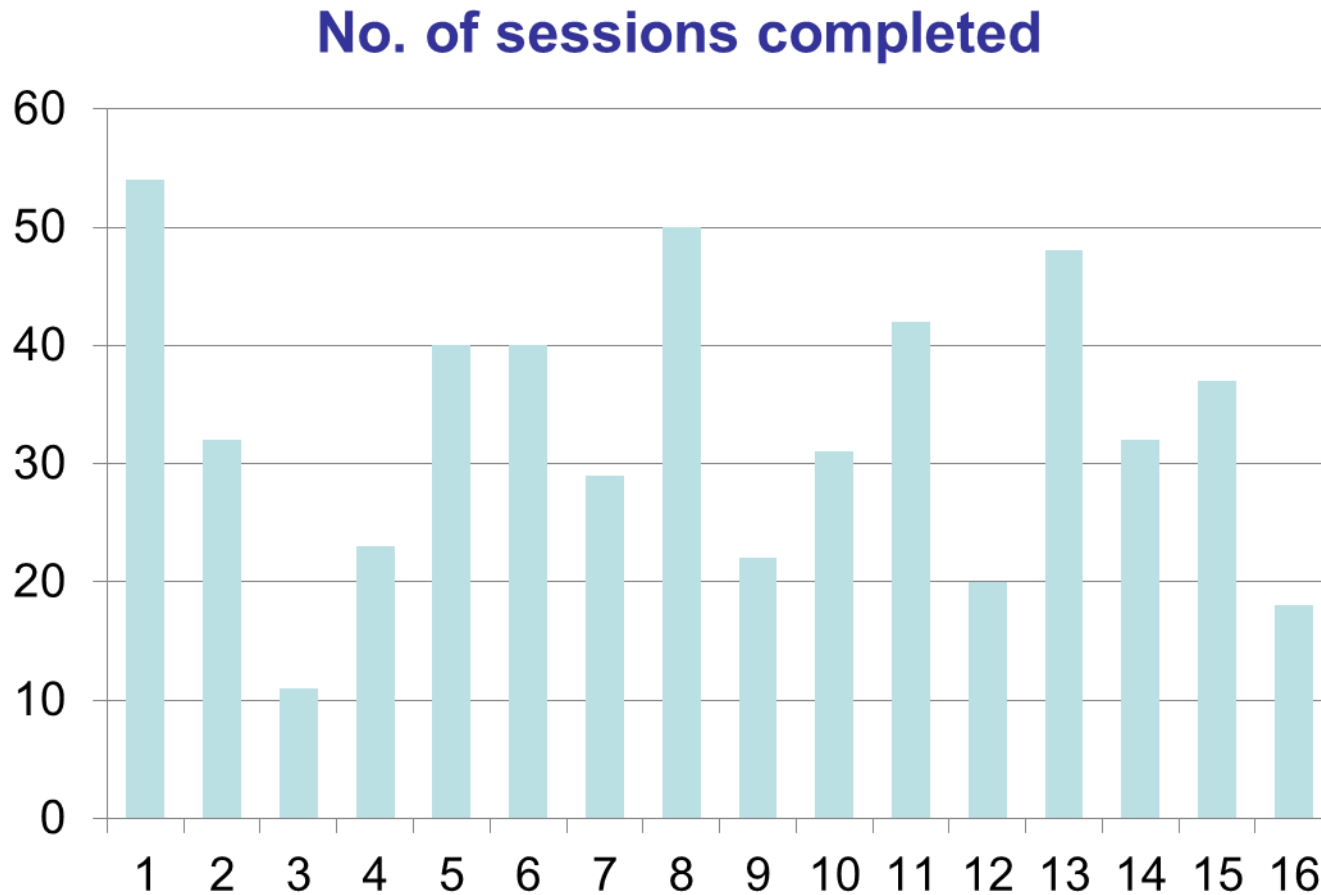
**Interesting
(100%)**

**Difficult
(33%)**

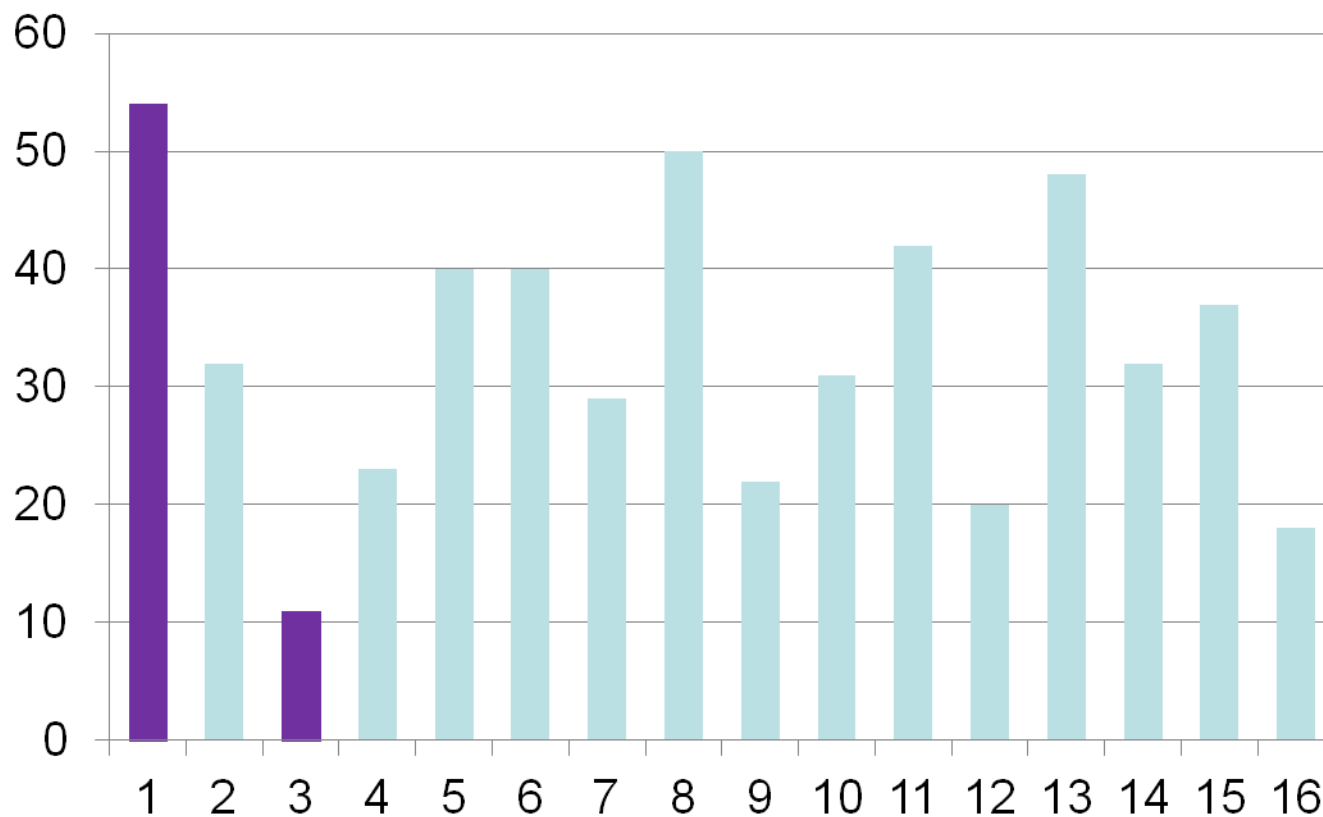
- *Equipment* – all found easy to set up and use; and store safely. Technical issues minor. Main issues were with palates.



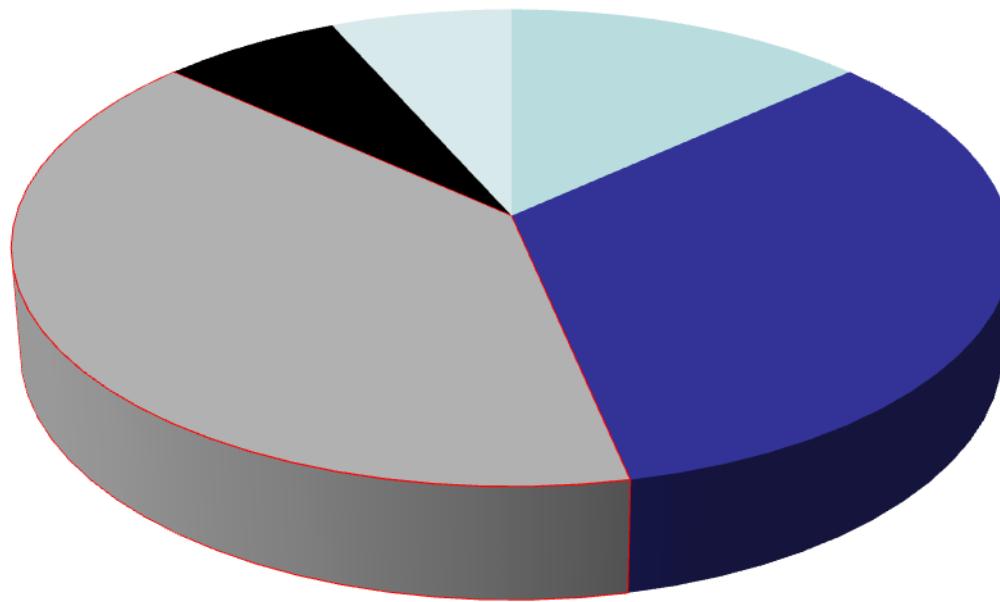
- *Sessions completed* - total 529 sessions!



No. of sessions completed



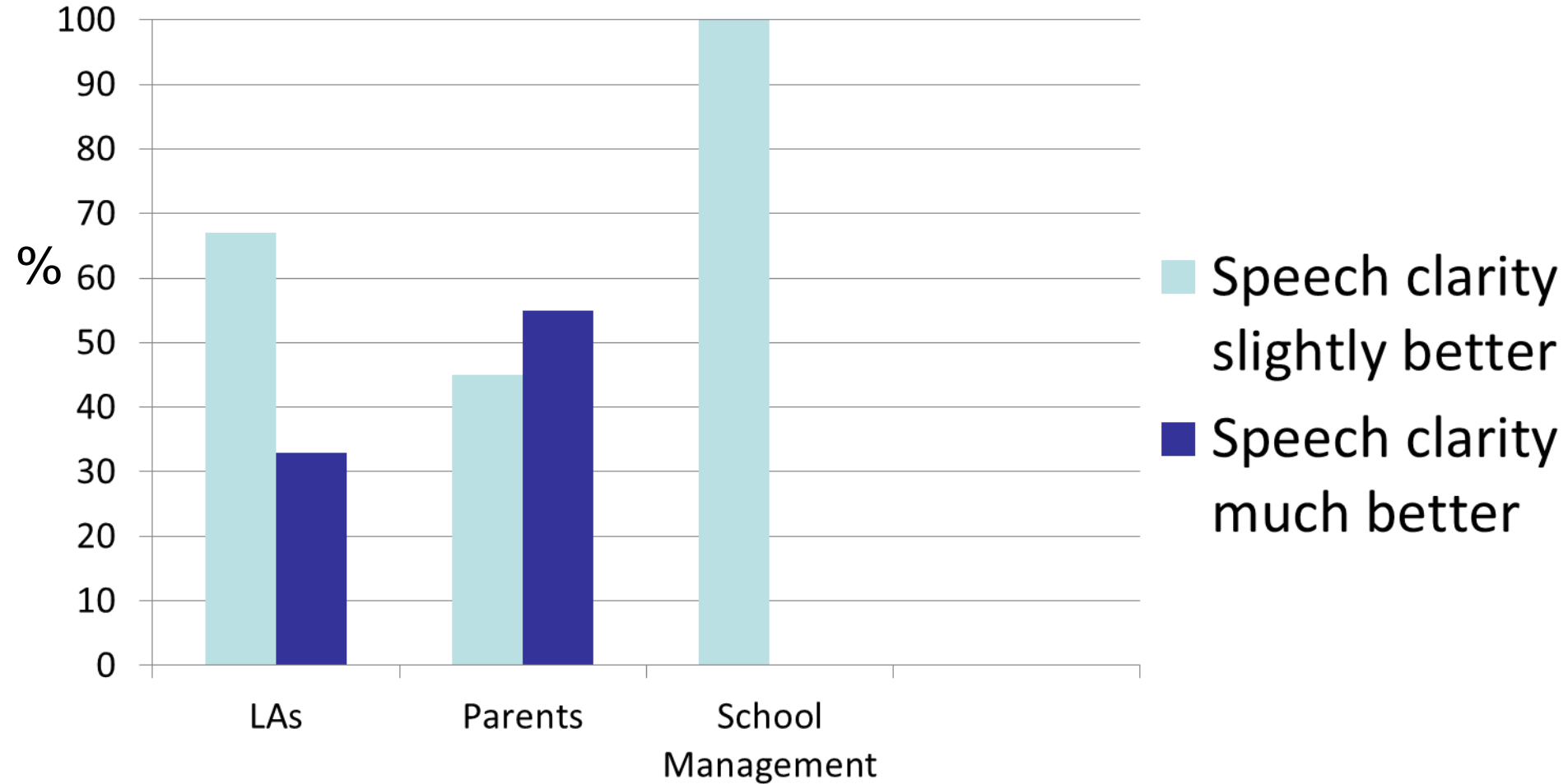
- *Reasons for missing sessions*



- LA absence or illness
- Child absence or illness
- School holiday disruptions
- Palate/equipment problems
- Practical issues within school

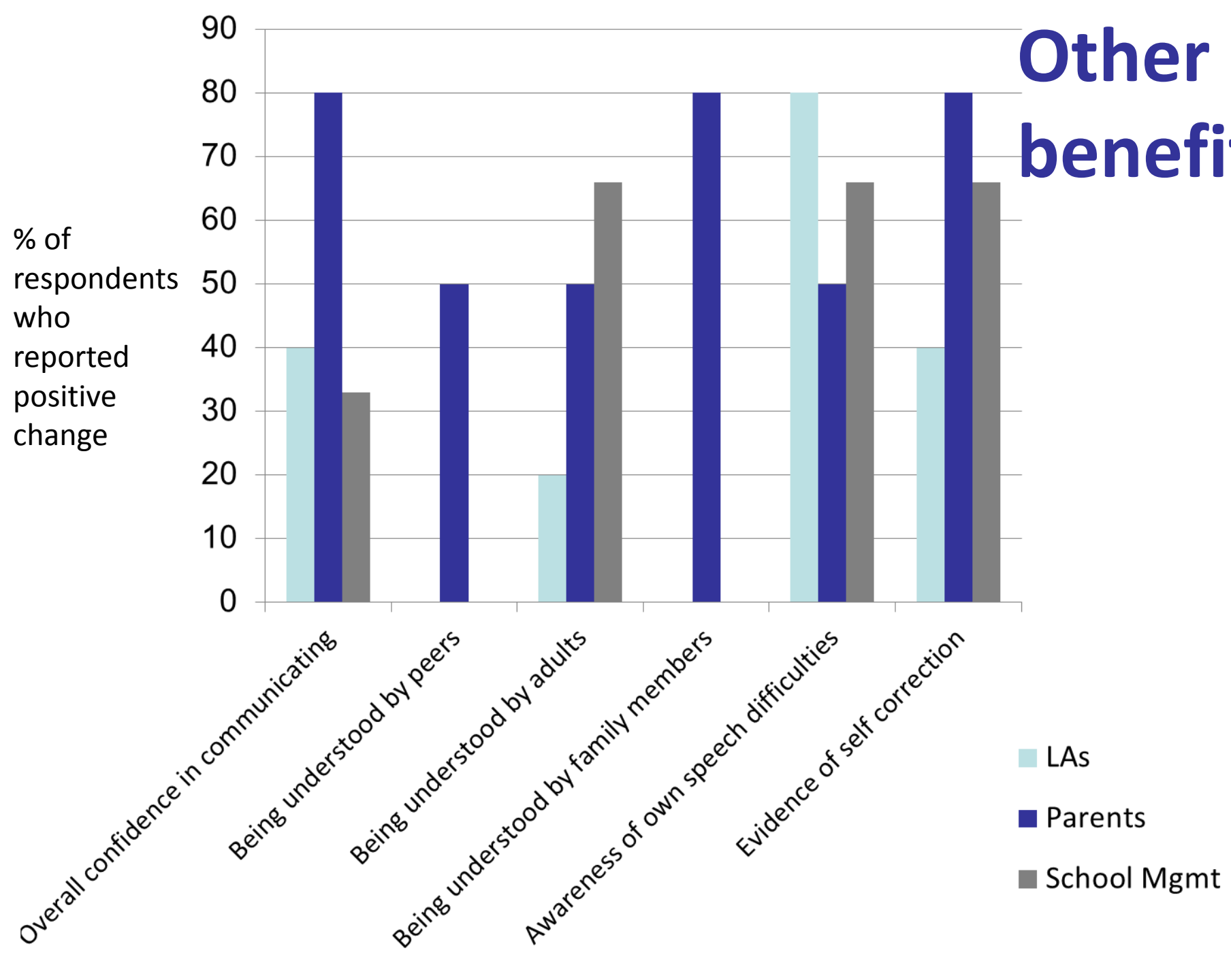


Effects - All saw improvements in speech clarity



Other benefits

% of respondents who reported positive change



Challenges

- Palates – delicate equipment, time to make, changes in dentition
- Commitment involved – logistics of daily 1:1 sessions within school difficult at times for LAs
- Younger children often lacked motivation, attention and listening skills – question of ‘readiness’ for EPG



Summary

- Despite there being some challenges, feedback overall is positive.
- All who have taken part have reported to have benefited in some way.
- All saw improvements to some extent in speech clarity
- Shown that it is feasible to:
 - carry our EPG in a school setting
 - train non-SLTs to deliver EPG intervention



THANK YOU



Queen Margaret University
EDINBURGH

www.qmu.ac.uk