

Preferences for Vowel Epenthesis and Child ESL Cluster Reduction

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Introduction:

• Children learning English as a first language (L1) often **delete** the most sonorous segment in a consonant cluster (e.g. Pater & Barlow 2003).

• Adults learning English as a second language (L2) often retain both consonants but insert an **epenthetic vowel** into the cluster (e.g. Major 1994).

- The affected clusters and error type found in adults L2 phonology are believed to be partially motivated by the speaker's L1 (Altenberg, 2005).
- Adult speech may also be impacted by **recoverability** - adults choose repairs that maximize listener's ability to recover the target (Zsiga & Kim, 2005).

• Previous work on *children learning English as an L2?*

- More accurate on phonemes that occur in both languages (Goldstein 2004).
- Children sometimes **transfer** phonological patterns from L1 - e.g., applying Spanish spirantization rule to English, 'water': [waðə] (Goldstein, 2004).
- 4/5 children learning L2 English produced consonant clusters correctly, the remaining child used **deletion** as a repair strategy (Anderson, 2004).

Research Question:

Are child L2 learners more like adult L2 learners (as suggested by findings of transfer) or do they more closely resemble child L1 learners (as suggested by the choice of repair)? Or are they unique?

Methods:

- Participants:
 - 2 children learning English as a second language
 - First languages: Hindi, Punjabi
 - Age: 5;07, 5;05 with 5 and 8 months of exposure to English
- Procedures:
 - 15 minute spontaneous speech samples
 - Edmonton Narrative Norming Instrument (Schneider, Dubé, & Hayward, 2005)
 - Acoustic analysis of all contexts for word-initial consonant clusters in both tasks

Results:

Repair Strategy:

- Children's most common production of consonant clusters involves an epenthetic vowel.
- This finding is robust across cluster types.
- Exemplified in Spectrograms 1 and 2.

Summary of Counts for Word-initial Clusters

	Correct	Singleton	Epenthesis	Other	Total
Child 1	9	12	28	2	51
%	0.18	0.24	0.55	0.04	
Child 2	5	17	49	7	78
%	0.06	0.22	0.63	0.09	

Summary of Epenthesis by Cluster Type

Cluster Type	Child 1		Child 2	
	Epenthesis	Total Contexts	Epenthesis	Total Contexts
stop-approximate (tr, dr, pl, pr, kl, br, bl,)	16	25	24	36
fricative-approximate (fl, sl, sr, sw, thr)	2	9	10	24
s-stop (st, sk, sp)	9	12	11	14
other clusters (sm, sn, s tr)	1	5	4	4

Location of Epenthesis:

- In 9/9 /sp/ clusters that involved epenthesis, Child 1 placed the epenthetic vowel word-initially.
- In 18/19 other clusters undergoing epenthesis, the epenthetic vowel appears between the consonants.
- See Spectrogram 3 and 4.

Target	Adult Production	Child 1's Production	Target	Adult Production	Child 1's Production
'climb'	/klaɪm/	/kɪlaɪm/	'spider'	/spaɪdə-/	/ɪspaɪdə-/
'play'	/pleɪ/	/pɪleɪ/	'spiderman'	/spaɪdə-mæn/	/ɪspaɪdə-mæn/
'fly'	/flaɪ/	/fɪlaɪ/			

- Child 2 consistently places the epenthetic vowel between all consonants - 48/49 cases with an epenthetic vowel.

Target	Adult Production	Child 2's Production	Target	Adult Production	Child 2's Production
'scared'	/skæd/	/sɪkæd/	'blue'	/blu/	/bəlu/
'spiders'	/spɑɪdɜz/	/səbɑɪdɜz/	'fly'	/flaɪ/	/fəlaɪ/
'school'	/skul/	/səkul/	'plane'	/plen/	/pɪlen/

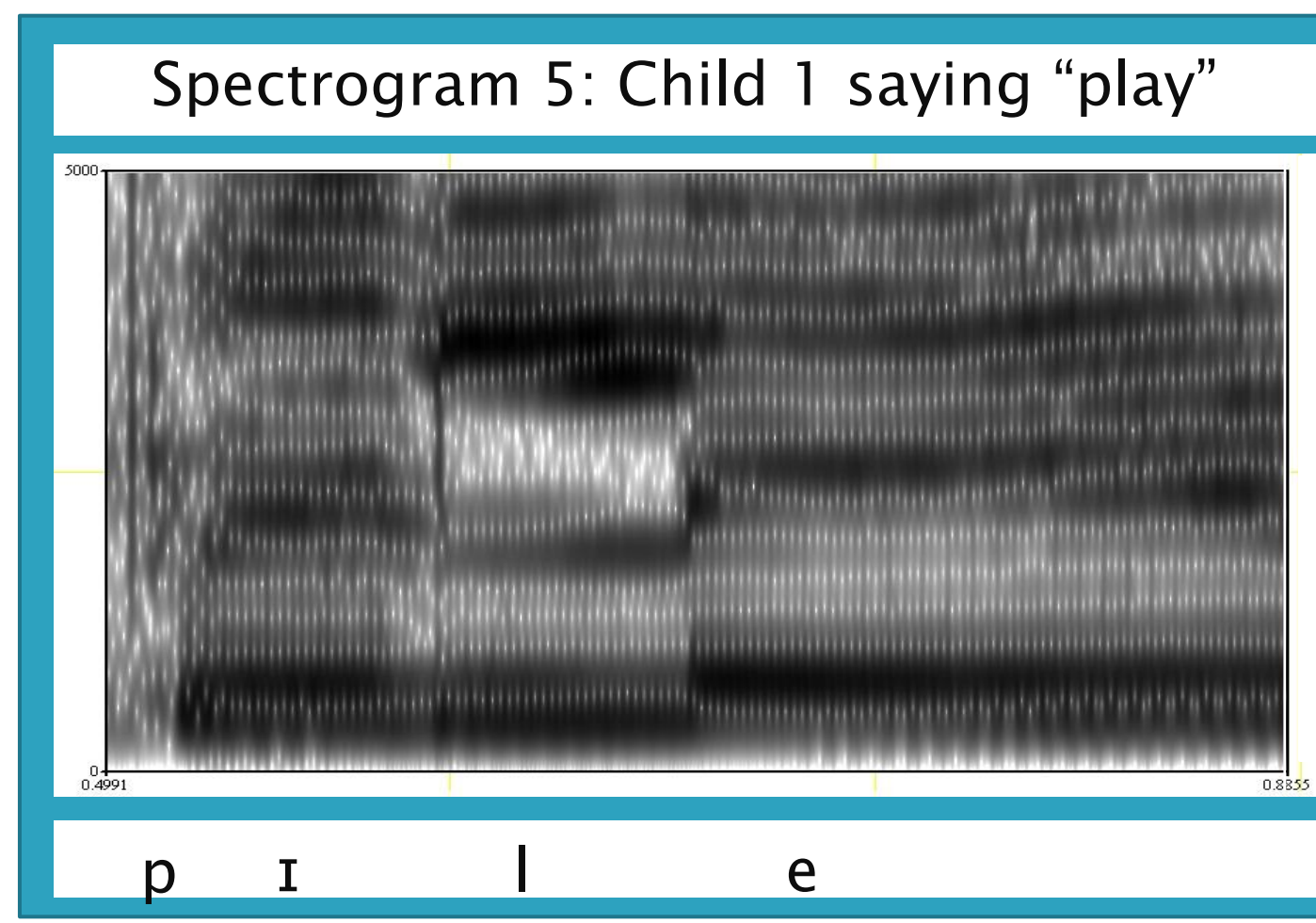
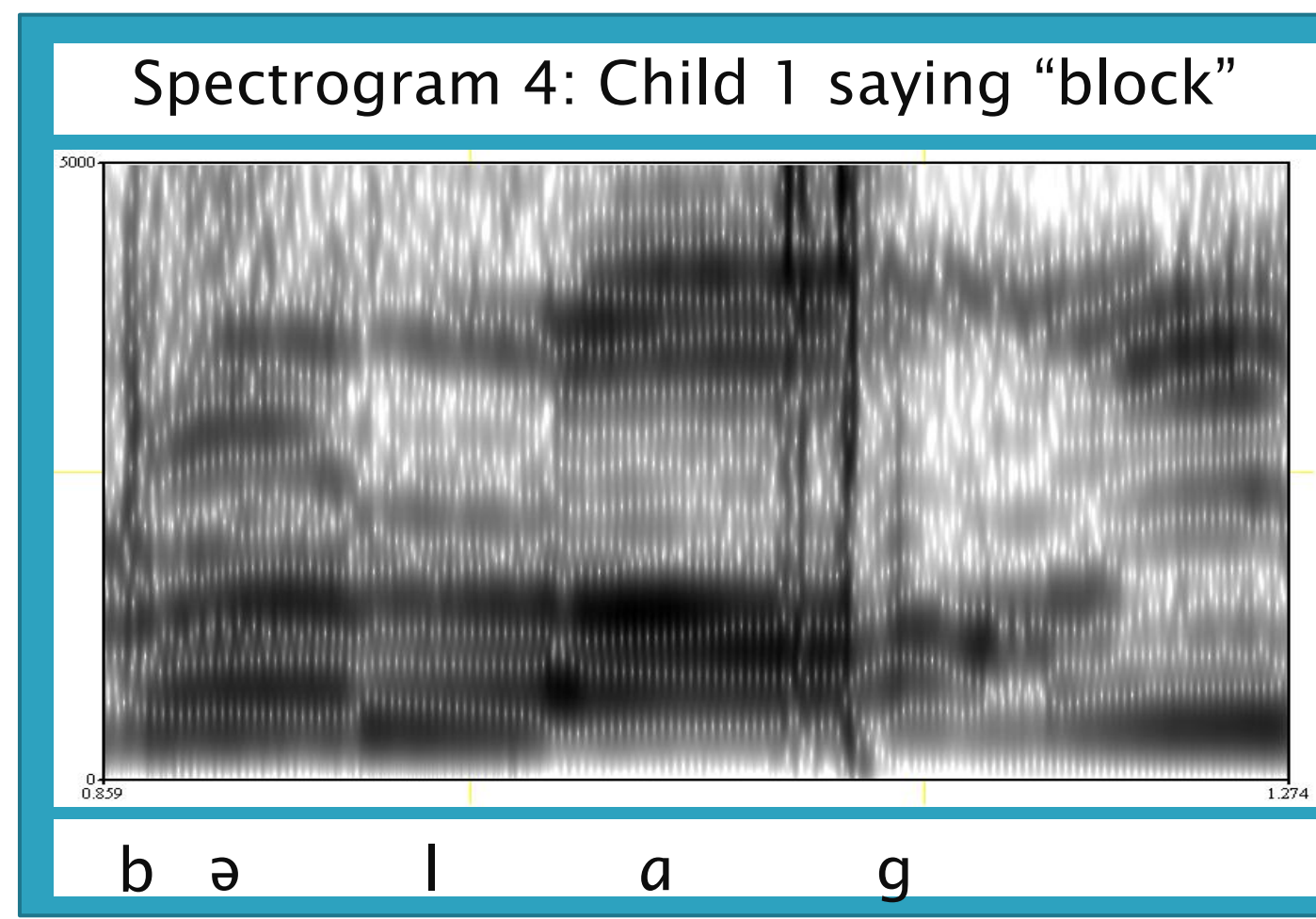
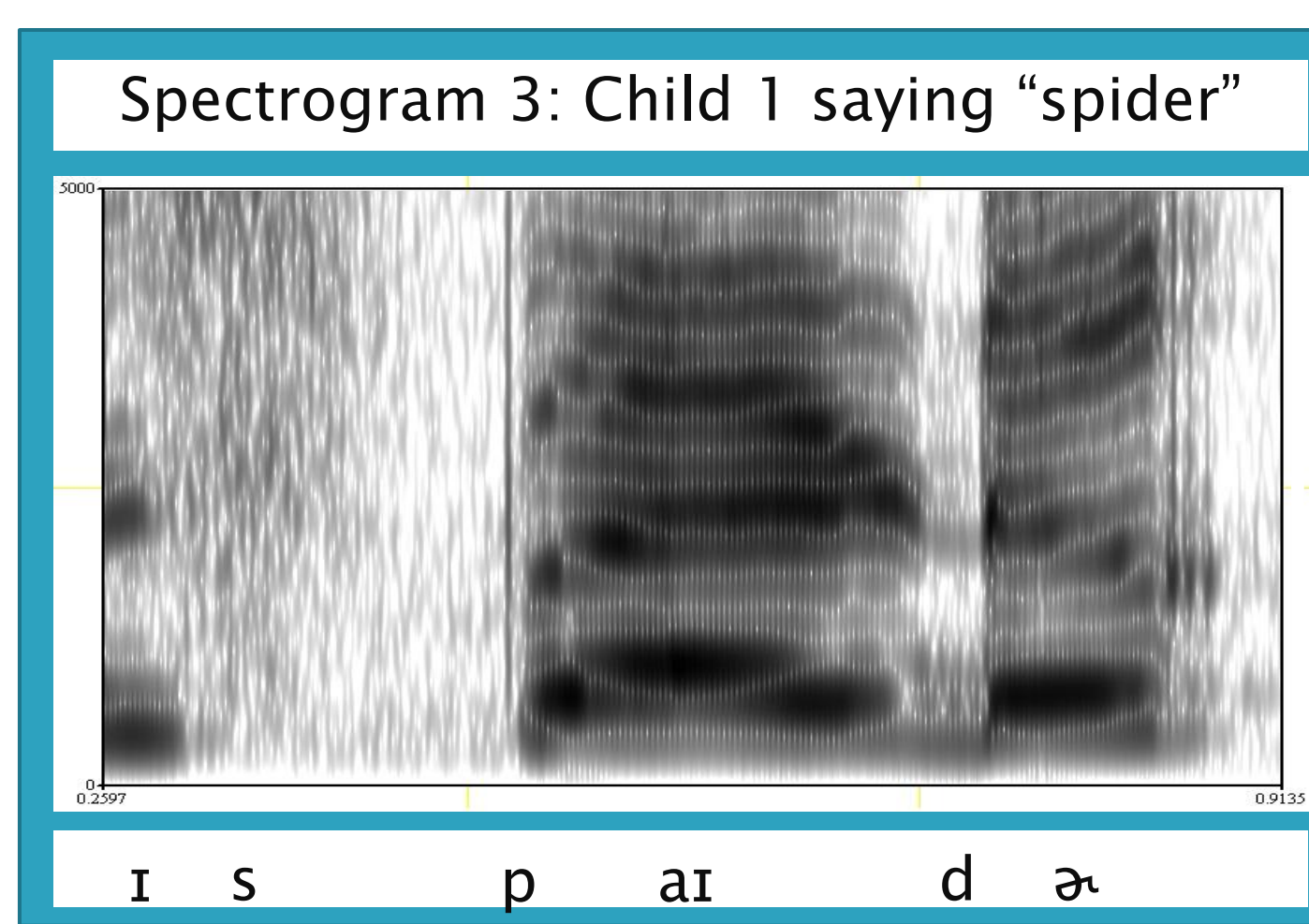
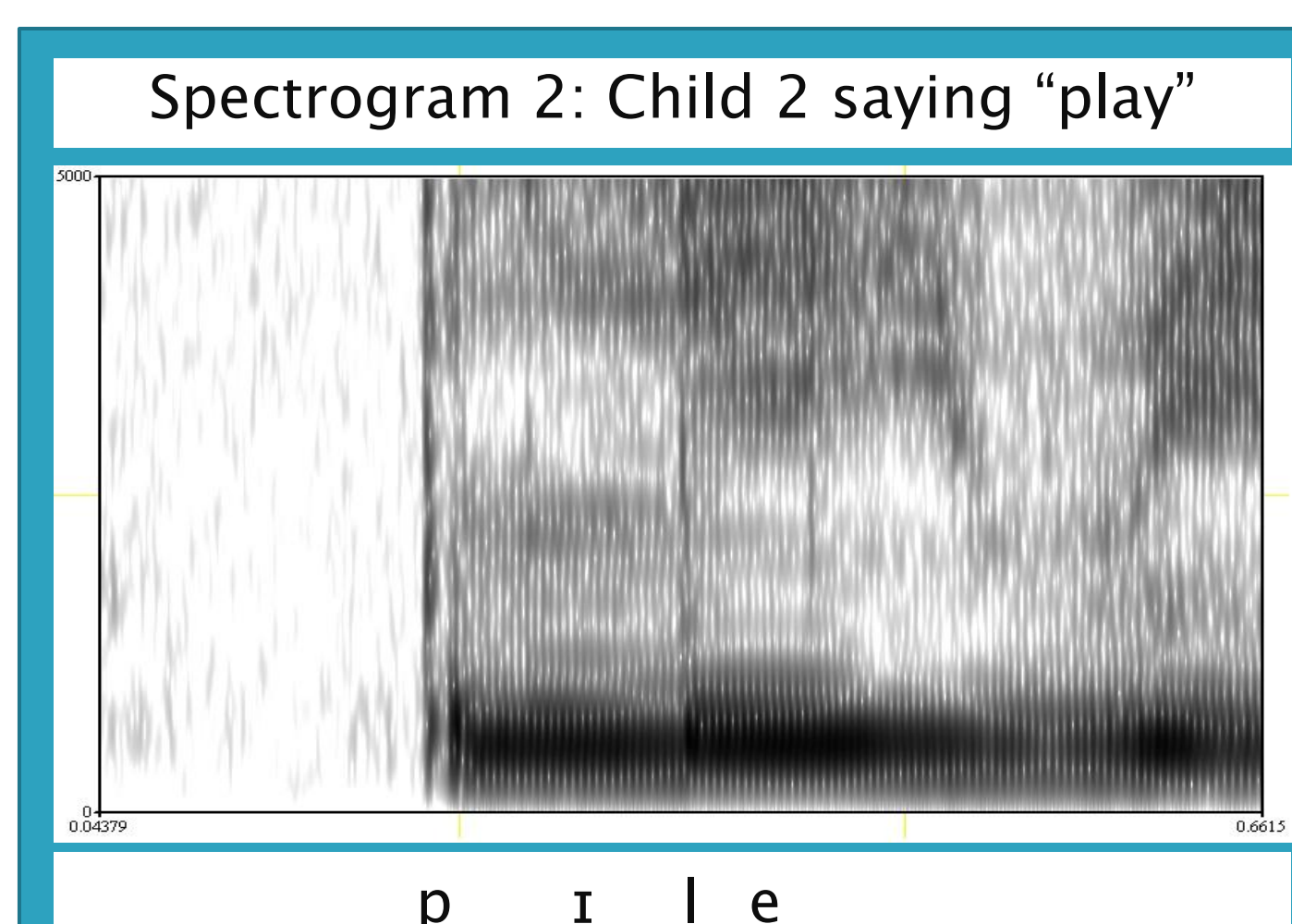
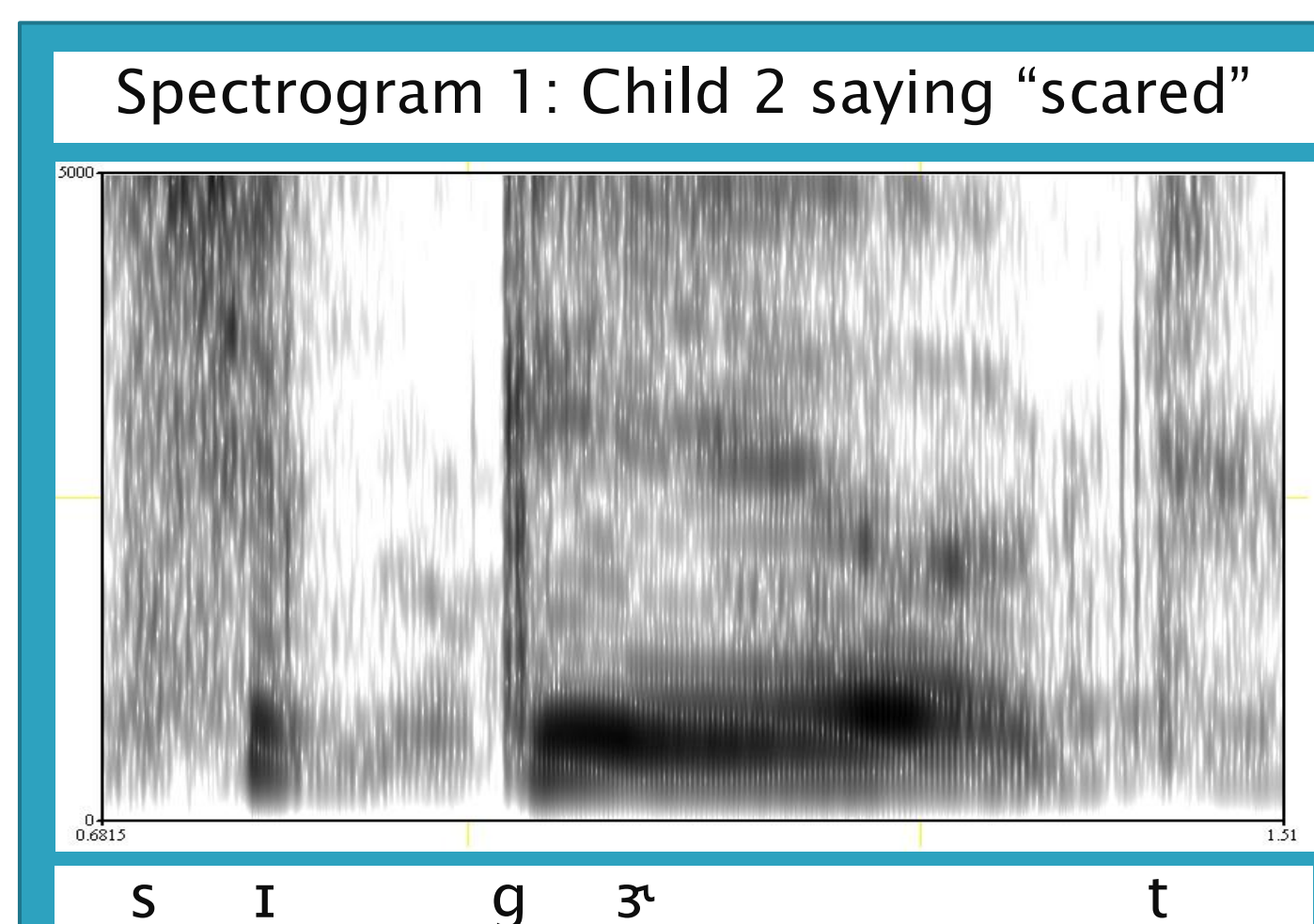
Quality of the Epenthetic Vowel:

- In choosing an epenthetic vowel, Child 1 shows evidence of front/back vowel harmony, determined by the first target vowel of the word (see Spectrogram 4 and 5).
- In 19/24 words which contain a front vowel (/i,ɪ,e,aɪ/) and involve epenthesis, Child 1 used /ɪ/ or /ɛ/ as the epenthetic vowel.
- In 4/4 words with an underlying back vowel, Child 1 uses /ə/ as the epenthetic vowel.

Target	Adult Production	Child 2's Production	Target	Adult Production	Child 2's Production
'play'	/pleɪ/	/pɪleɪ/	'block'	/blæk/	/bəlæg/
'trains'	/tɹeɪnz/	/tɹeɪnz/	'broke'	/brɒk/	/bəlɒk/
'spiderman'	/spaɪdə-mæn/	/ɪspaɪdə-mæn/			

- Child 2 appears to use /ɪ/ and /ə/ interchangeably.

Target	Adult Production	Child 2's Production	Target	Adult Production	Child 2's Production
'play'	/pleɪ/	/pɪleɪ/	'play'	/pleɪ/	/pəleɪ/
'clubs'	/klʌbz/	/kɪlʌbz/	'clubs'	/klʌb/	/kəlʌb/
'sleep'	/sli:p/	/sɪli:p/	'sleeping'	/sli:pɪŋ/	/səli:pɪŋ/



Discussion:

- Overwhelmingly, these children choose epenthesis as a repair strategy. Why?

Source of the Repair – Developmental

- Developmental Errors: errors made by children who learn the language as a first language (e.g. deletion: CC→C) (Archibald & Libben, 1995).

- Epenthesis is attested, but is definitely not the most common strategy in child L1 repairs of English consonant clusters (Gnanadesikan 1995, Pater and Barlow 2003).

- **Summary:** robustness of epenthesis is not a purely typical L1 developmental result.

Source of the Repair – Transfer

- Transfer Errors: productions which seek to satisfy the conditions of their first language, and crucially are rarely (if ever) made by children learning the target language as an L1 (Archibald & Libben, 1995).

- Consonant clusters in Hindi and Punjabi:
 - Native and borrowed strata of Hindi lexicon include nearly all English clusters:
 - Ohala (1983): Native words include word-initial sw, tr, dr, br, sk, st, sp, str.
 - Ohala (1983): Common borrowings include word-initial kl, pr, pl, sm, sn.

- Complication: variable epenthesis into consonant cluster is reported (Mehrotra 1980).
- However: Ohala (1983: Appendix 2) experimental results: Hindi native speakers judging nonce words with initial clusters (e.g. pr, gr, sm) did not epenthese, even when word shapes were low-probability.

- **Summary:** Abundance of consonant clusters make transfer unlikely, but potential for L1 epenthesis does not rule transfer out as a source of the repair.

Second Language Phonology in Childhood : Unique Developmental Trajectories

- Children learning English as a L2 differ from children learning L1 English phonology in two fundamental ways:
 1. they already have a first language
 2. they are older and thus more cognitively mature

- Recoverability: adults choose repairs that maximize listeners' ability to recover the target (e.g. Zsiga & Kim 2005).

- Recoverability is connected to Theory of Mind, i.e. the understanding that others have different thoughts than one's self (Schaffer et al, 2002). As the children in this study are older than children learning an L1 phonology (and older than the children in Anderson's study), it is possible that they are more concerned with issues of recoverability than younger learners.

- These children's productions appear to be less impacted by their first language than adults who are learning a L2, but their repair strategy also separates them from children learning English as an L1.

- **Child L2 learners are a unique learner group, whose study is crucial to the understanding of typical phonological development.**

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