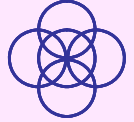




Trade-offs Between Speech Intelligibility and Word-finding: A Case Study



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Introduction

Models of language processing link phonological, lexical, and syntactic domains. Research support for such linking in children with delayed-speech includes:

- Concurrent speech and language delays (reported comorbidity ranges from 9% to 77% [1])

- Improvements in speech-sound production following language work via narratives [2] or morphosyntax [3], particularly for inconsistent errors [4]
- Trade-offs between domains (e.g., syntax and speech sounds) with increased demands in one resulting in decreased performance in another [e.g., 5, 6]; trade-offs are less likely when proficiency increases and performance becomes more automatic [7]

Missing from the literature are reports of trade-offs between speech-sounds/intelligibility and word-finding.

We provide a case report of a child whose breakdowns in speech-sounds/intelligibility appear to result from trade-offs with demands associated with word-finding difficulties. Word-finding difficulty = problem accessing production of a word for which the conceptual structure and semantic, syntactic, and phonological features are stored; word-finding is evident in mislabeling, mispronunciation, and no-response [8].

Methods

Participant

- H, male, 3;8 when first seen at a university clinic for twice-weekly 50-minute sessions, during one university semester

- Parents' primary concern was speech-intelligibility; they described H's speech as frequently 'garbled' and difficult to understand without contextual cues

- At intake, speech-language skills were within normal limits:

- consonant inventory = 22 consonants; many were inconsistently correct
- age equivalent for vocabulary comprehension on Peabody Picture Vocabulary Test (PPVT-4) [10] = 4;3
- MLU in morphemes = within 1-SD below the age-level SALT mean [9]

- All word-finding difficulties consisted of no-response

Methods, continued

General Procedures

Sources of information include formal and informal assessments, clinician observation, and outcomes following treatment targeting word-retrieval and inconsistently correct consonants.

Treatment Program

•Procedures for targeting word-retrieval

- repeated practice retrieving categorically-organized words during structured communication activities and story-retell
- practice taking thinking pauses to retrieve desired words
- speaking at a slower rate to allow more time for word-retrieval
- all practices structured for turn-taking, with SLP modeling and describing target behaviors and demonstrating that everyone has word-finding difficulties and can take time to think of words
- when H did not retrieve a word after a thinking pause, the SLP provided alternative labels, followed by creating opportunities for repeated, meaningful use of the word to facilitate automatic retrieval [11]

•Procedures for practice of inconsistently correct consonants

- targeted one consonant per week in initial and final positions at the word and carrier-phrase levels followed by practice in connected speech during story-retell. Each story was sent home to practice with family members

Results

Evidence for an unstable consonant inventory

- On the Photo Articulation Test (PAT-3) [12], at intake, H: -consistently produced only 4 of the 22 consonants in his inventory -inconsistently produced remaining 18 consonants in one or more word positions; replacement errors were consistent
- Production of consonants in short utterances during spontaneous connected speech was consistent with production on PAT-3

Evidence for word finding difficulties

- Significant difference ($p = .01$) between percentile scores on the PPVT-4 [10] (70th percentile) and the Expressive Vocabulary Test (EVT-2) (34th percentile) indicative of word-finding difficulties [13]
- At intake, H requested labels for 45 of the words on the PAT-3 and in 14 of the 100 utterances of a language sample which contained frequent within-utterance pauses (5.02 SDs above SALT age-level mean) of long duration (6.18 SDs above SALT mean) [9]

Results, continued

Evidence for trade-offs between speech intelligibility and word-finding

•SLP's observations

- Vulnerability of H's consonant inventory to breakdown under more demanding language-formulation shown by: unintelligible and imprecise-sounding speech when utterance length increased, decrease in number of completely intelligible utterances when referent absent (4.44 SDs below SALT age-level mean) versus present (2.1 SDs below SALT mean) [9], and occasional inability to talk about a topic when a critical word could not be retrieved—which resolved when H retrieved/was given the word

•Changes during treatment

- Frequency of requests for labels gradually decreased; while H continued to have word-finding difficulties, he frequently retrieved desired labels following spontaneous thinking pauses
- By end of treatment, H was speaking at a slower rate (down from 1.13 SDs above SALT age-level mean at intake to within 1 SD of SALT mean [9]) which may have allowed more time to retrieve words while speaking, was retrieving words more rapidly as suggested by shorter within-utterance pauses (down from 6.18 SDs above SALT age-level mean at intake to 1.65 SDs above SALT mean [9]), and had a somewhat more stable consonant inventory as demonstrated by the increase in the percentage of consistently correct consonants in at least two positions (up from 32% at intake, to 64%)
- At end of treatment, parents reported H was easier to understand, was talking more (including with more individuals and about more topics), and seemed more confident in his ability to communicate verbally

Conclusions

While the reported results provide preliminary support for the described trade-offs, further study is needed to:

- Better understand the nature of the trade-offs

- Determine whether the most effective and efficient treatment for increasing speech intelligibility involves treating word-finding, or inconsistently produced consonants, or both simultaneously as was done

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