



Get in sync: rhythm in speech entrainment as a mechanism for scripted sentence learning in aphasia.

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Introduction

1

Spanish speakers with aphasia – an understudied population

450 million native Spanish speakers (~360 million English native speakers)
85% of published aphasia treatment research has focused on English^[1,2]

2

Script training

Well-established treatment for aphasia^[1-3]
Mechanisms of action remain understudied

3

Speech entrainment

Unison production of speech^[4]
Depends on detection and integration of rhythmic features^[5]

4

Highlighting rhythm during speech entrainment

Should facilitate scripted sentence learning by helping:



Lexical retrieval – via alignment to beats highlighting word stress^[6]



Memorization via chunking – via alignment to metronomic beats^[7,8]

Aims

1 Adapt a script sentence learning protocol to Spanish.

2 Examine the effects of speech entrainment to rhythmically-enhanced sentences compared to control sentences on scripted-sentence learning (rhythmic features as a mechanism of action).

2.1 Compare two types of rhythmic cues to test for differential contributions.



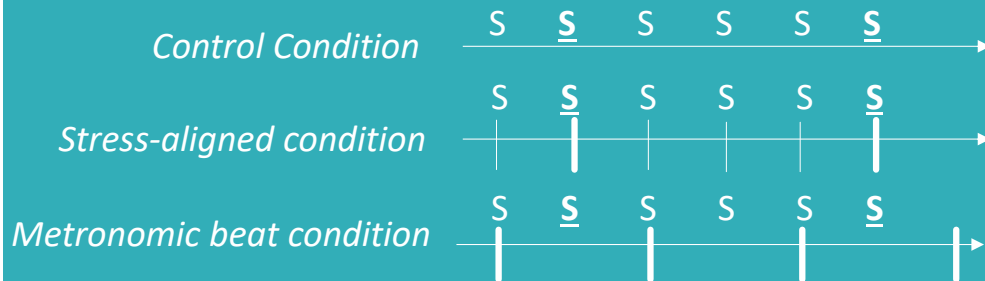
Stress-aligned condition → Lexical retrieval



Metronomic beats condition → Memorization via chunking

Methods

- ❖ 13 PWA from Colombia
- ❖ 30 scripted sentences (presented twice in each session)
- ❖ 5 sessions over two weeks
- ❖ 3 conditions



- ❖ DV: post-session probes (sentence production in response to a related image)
- ❖ Mixed-effects logistic regression models.^[9,10] Condition coded with orthogonal contrasts.

```
glmer(cbind(successes, failures) ~  
  Condition * Session +  
  (1 + Session | Subject) +  
  (1 + Condition | Sentence) + (1 | obs)
```

Results

1

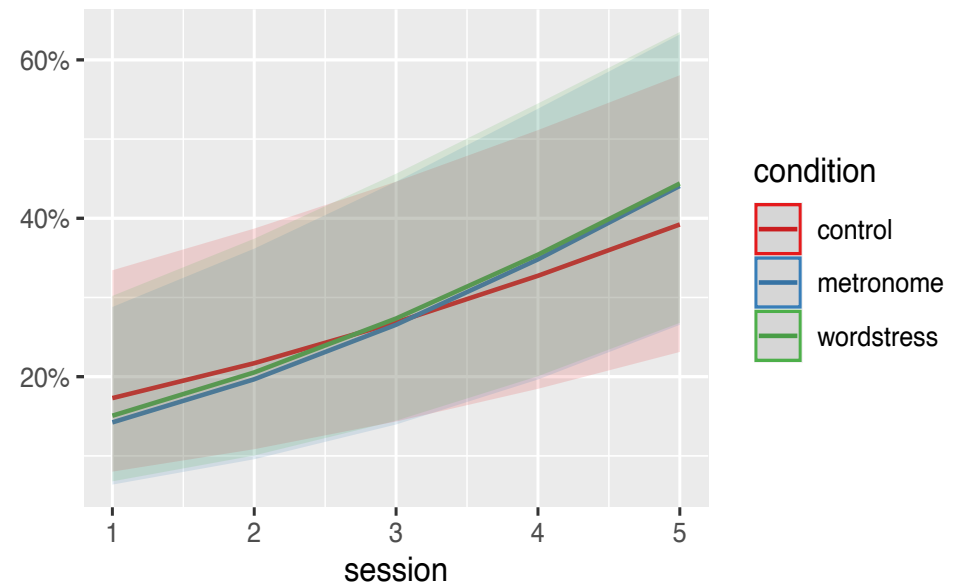
The odds of producing a correct syllable were 1.5 times greater with each additional session ($\beta=0.41$, $SE=0.06$, $p<0.001$)

2

As session increased, the difference between the rhythmic-enhanced and control conditions also increased ($\beta=0.12$, $SE=0.05$, $p=0.014$).

2.1

As session increased, the difference between the metronomic and stress-aligned conditions did not vary ($\beta=-0.01$, $SE=0.05$, $p=0.86$).



Discussion



-Successful scripted sentence learning in Spanish speakers with aphasia.

-Further evidence for script training as an efficacious treatment for aphasia.

-Cross-linguistic benefits of script-training interventions.



-Rhythmic-enhanced conditions engendered greater scripted-sentence learning compared to the control condition.

-Rhythm, inherent to speech entrainment, is a key mechanism for scripted sentence learning^[4,5,11]



- Learning in the two rhythmic-enhanced conditions (stress-aligned vs. metronomic) did not differ.

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