



EFFECT OF USING SEMANTICALLY ALTERED SPONDEE WORDS ON SPEECH RECOGNITION THRESHOLDS

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INTRODUCTION

Audiologic evaluations include Speech Recognition Threshold (SRT) testing which determines the lowest level in decibel hearing level (dB HL) that a patient correctly repeats spondee words with 50% accuracy.

Spondee words are two syllable, compound words in which each syllable has equal stress and are semantically related (e.g., "hotdog", and "baseball"). It may be possible that listeners may only hear one syllable and fill in the other syllable using top-down auditory processing skills.

We were wondering if syllables of spondee words were not semantically related (e.g., "hotball," "basedog"), how might that impact SRTs for listeners with normal hearing (NH) and when those participants had a simulated conductive hearing loss (SCHL) using earplugs.

It is hypothesized that using semantically unmatched (SU) spondees will result in higher SRTs than using semantically matched (SM) stimuli particularly with SCHLs.

PURPOSE

The purpose of the study was to determine the effect of SM and UM spondee words on SRTs for listeners with NH and in a SCHL condition.

METHODS

Twenty listeners' SRTs were obtained using SM and SU spondees in NH (without earplugs) and SCHL (with earplugs) conditions using the American Speech-Language-Hearing Association method¹.

The SU stimuli were created by randomly recombining first and second syllables from existing spondees.

1- SM	2- SM	3- SM
pancake	horseshoe	hotdog
duck pond	hotdog	oatmeal
oatmeal	railroad	sunset
ice cream	blackboard	horseshoe
horseshoe	eardrum	eardrum
eardrum	mousetrap	blackboard
sunset	ice cream	cowboy
mousetrap	duck pond	ice-cream
railroad	sunset	railroad

1- SM	2- SM	3- SM
Horsedrum	Mouseshoe	Mousewest
Panpond	Airbridge	Northcream
Mousemeal	Whitedrum	Iceboy
Playbridge	Hotroad	Sundrum
Icestrap	Iceboard	Horseroad
Aircream	Suncream	Cowset
Raildog	Oatpond	Blackshoe
Basewash	Baseboy	Basebridge
Northset	Playwest	Hotpond

A speaker of General American English rerecorded SM and SU spondees for this experiment. Types of spondees and listening conditions during testing were counterbalanced across listeners to prevent order effects.

Listeners were not familiarized with the speech stimuli prior to testing to assess the impact of the semantic differences between the types of spondee words.

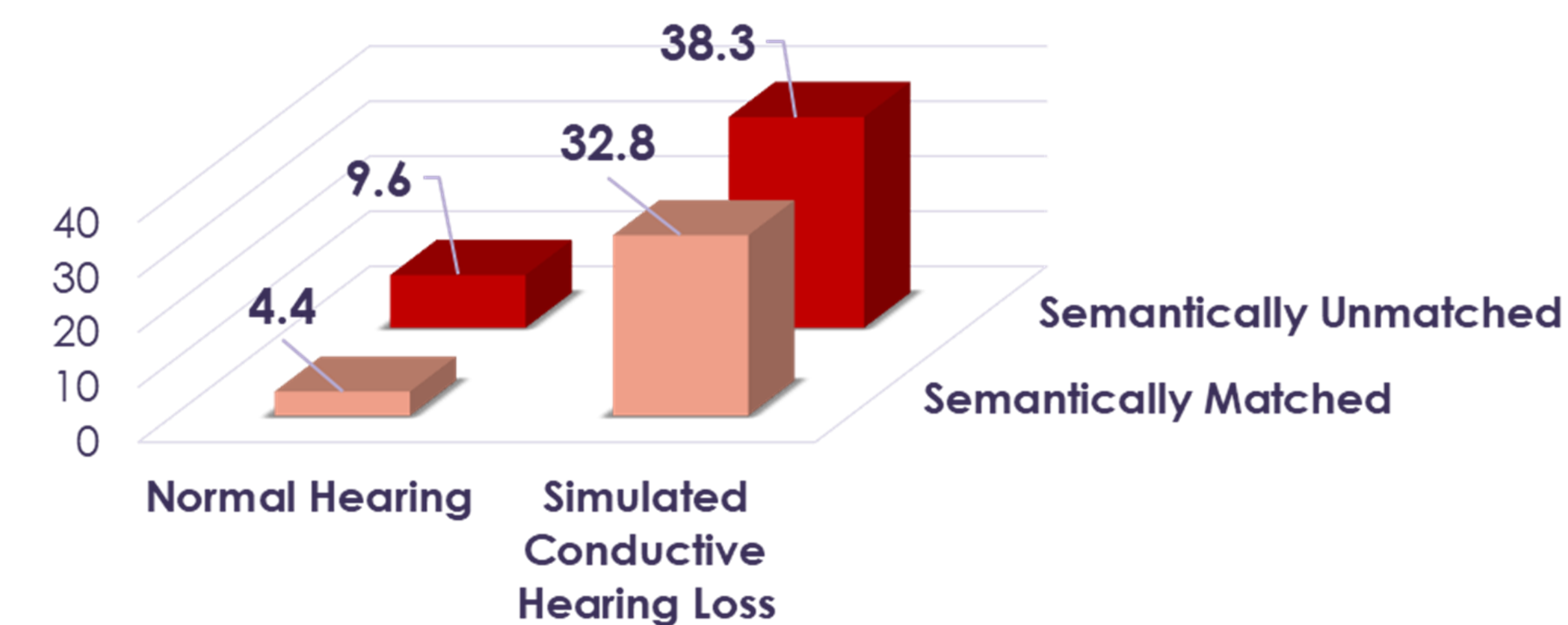
Differences between SM and SU spondees in NH and SCHL conditions were assessed using repeated measures ANOVA with a compound symmetric covariance structure. All statistical tests were conducted assuming a 5% chance of a type one error, using SAS 9.4.

RESULTS

Twenty adults (M = 7; F = 13) with an average age of 27 y (SD = 8.9 y) had mean pure-tone averages of 5.0 dB HL (SD = 4.0) in the NH and 31.8 dB HL (SD = 8.5) in the SCHL condition.

SRTs were higher in the SCHL condition compared to NH condition using both SM and SU spondees ($p < 0.0001$ for both). In the NH condition, SRTs were 5.1 dB (95%CI: 2.50, 7.80) higher using the SU spondees (M = 9.6; SD = 3.0) compared to the SM stimuli (M = 4.4; SD = 4.3). In the SCHL condition, SRTs were 5.5 dB (95%CI: 2.85, 8.15) higher using the SU spondees (M = 38.3; SD = 6.8) compared to SM stimuli (M = 32.8; SD = 8.0).

Figure 1. Mean SRTs in Two Different Listening Conditions using Different Spondee Types



DISCUSSION

These results suggest that there is a semantic relationship between the syllables paired in spondee words in CID Lists 1 and 2 that impact testing results. SRTs were lower (better) using the SM (e.g., "hot dog," "baseball") than the SU (e.g., "hot ball," "base dog") spondees. The difference in SRTs was similar in both the NH and SCHL conditions. However, it is not known if a larger difference in SRTs would be observed if using patients with sensorineural hearing losses. Future research is needed in this area.

Audiologists should re-examine the stimuli chosen for SRT testing. Audiologists should not just use the same spondees for testing but mix up the use of stimuli across patients. SRTs should be a bottom-up task of word recognition, rather than a top-down task which relies on patients' knowledge of stimuli and top-down processing skills.² Participants commented that the SU stimuli required more effort to recognize and that their confidence significantly decreased in relation to the SM conditions.

CONCLUSIONS

SU spondee results in higher SRTs than when using SM stimuli in a similar way in both listening conditions.

REFERENCES

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