Inhibition Mediates Individual Differences in Top-Down Lexical Processing

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Research Questions

Are individual differences in top-down lexical processing a stable perceptual style [1] mediated by inhibition-related functions?

When does lexical processing occur in the perceptual time course of sound processing?

Lexical Tasks

Ganong Task

“Does the vowel in each sound file sound more like /s/ as in bet or /z/ as in bit?”

Locally Time-Reversed Speech (LTRS) Task

“Did the two speakers say the same thing (i.e. whether all of the vowels and consonants are the same)”

Inhibition Tasks

Flanker Task

(Early-stage inhibition)

Go/No-go Task

(Late-stage inhibition)

Background

Lexical information influences speech perception throughout the entire perceptual time course in the TRACE model. Lexical information influences speech perception at the decisional stage in the MERGE model.

Ishida, Samuel & Arai [1] indicated that individual differences in lexical processing are stable by finding that two tasks that measured lexical processing correlated highly within the individual.

Inhibition-related functions refer to the ability to suppress irrelevant information and responses [2]. They can be categorized into several subgroups:

• resistance to distractor interference inhibition operates during the early stage of perceptual processing
• prepotent response inhibition operates during the late stage of perceptual processing

Methods

Participants

• 32 native, monolingual speakers of North American English
• ages 18-30, M = 21.8

Materials

• LTRS task: 288 time-reversed/non-reversed token pairs
• Ganong task: 5 five-step /s/ word condition continua, 5 five-step /s/ word condition continua

Procedure

• Counterbalanced task order
• Alternate between inhibition and lexical tasks

Models

The relationship between individual lexical processing and individual cognitive abilities was investigated by running two mixed effects logistic regression models. One for the LTRS task and one for the Ganong task.

Correlations

Positive correlation means that those who exhibited a bigger LTRS effect suggesting that individuals with worse early-stage inhibition had a larger lexical effect.

Negative correlation means that those who were faster at the Go/No-go task exhibited a bigger LTRS effect suggesting that individuals with worse late-stage inhibition had a larger lexical effect.

Conclusion

Individuals with worse early-stage and late-stage inhibition [2] utilize more lexical processing as a stable perceptual style. [1]

Lexical processing occurs in parallel to perceptual processing, supporting the TRACE model of speech perception. [3]