Background

• Relationship between oral reading rate and i) linguistic features & ii) general cognitive processes (Caneva, 2014; Fernand, 2013; Stecula, 1996; New et al., 2016).

• Investigation of oral and silent reading rates with respect to language level (Pellegrino et al., 2009; O'Brien et al., 2013; Wright, 2011).

• Non-linear positive correlation between self-paced reading time and word expectation (Souch & Levy, 2013).

• Compensation between oral reading rate and average amount of information carried by syllables (Pellegrino et al., 2011).

Research goals

• Address an under-researched question: how do silent and oral reading rates vary cross-linguistically?

• Better understand the cognitive and articulatory processes underlying reading: what is the impact of syllabic complexity on oral and silent reading rates?

• Study the relationship between text length and reading duration: what are the effects of increasing word predictability and cognitive load?

Main findings

• Silent and oral reading rates are strongly correlated across languages

  — Cross-linguistic differences in word structure complexity influence phonological processing in both reading modes

  — Results from (Pellegrino et al., 2011) are confirmed and extended

  — Information density and both silent and oral reading rates are negatively correlated at language-level

  — A logarithmic relationship exists between text length and reading duration, for both silent and oral reading

  — Word predictability seems to increase with longer texts.

• Sex is a significant predictor of oral but not silent reading rate

  — A sociolinguistic effect of sex when it comes to orality?

• Languages with different writing systems have similar reading rates

  — The writing system does not seem to impact reading speed

Perspectives

• Evaluate participants’ reading skills and text comprehension (e.g. with self-paced reading) to better assess inter-individual variation

  — Record silent and oral rates in a more symmetrical fashion

  — Recordings with Rocme! (Ferragne et al., 2013)

  — Strong positive correlations between silent and oral reading rates (table 1)

  — Result confirmed by M-E models: significant effects on $\text{SilSR}_t$ and $\text{OrSR}_t$ as fixed effects, and of Text and Subject as random effects ($p < .001***$ for all effects). No effect of $\text{Sex}$

  — Strong negative correlation between 1D and both $\text{OrSR}_t$ and $\text{SilSR}_t$ at language level ($\text{Spearman's Rho} = -.81, p=.021^*$) (fig. 2)

  — Result confirmed by M-E models: significant effects of 1D, Language, Text and Subject ($p < .001**$) on both $\text{SilSR}_t$ and $\text{OrSR}_t$. Significant effect of Sex only on $\text{OrSR}_t$ ($p=.019^*$)

Comparison of oral and silent syllabic rates

• Noticeable differences of $\text{SilSR}_t$ and $\text{OrSR}_t$ between languages (fig. 1)

• Correlated with information density, syllabic rate and duration; Use of Vietnamese as a reference language to normalize computations and avoid quantifying semantic content

Methodology

• Pauses longer than 150ms in the oral recordings discarded with Praat

• Computations of information density, syllabic rate and duration; Kept pauses in the oral recordings

• Relationship between oral reading rate and i) linguistic features & ii) general cognitive processes (Chetail, 2014; Ferrand, 2000; Naveh-Benjamin & Ayres, 1986; New et al., 2006)

• Better understand the cognitive and articulatory processes underlying learning (Jacewicz et al., 2009)

• Collection of reading times

• Recordings with RSRP and CMN, SRP, and both models (p < .001***)

• Stronger correlation between $\text{SilSR}_t$ and $\text{SilD}$ ($r = .67$, ***), weaker prediction and no effect of $\text{Sex}$

• Averaged by speaker (N = 80) Pearson's R: .67***

• All data (N = 1161) Pearson's R: .60***

• Data set Correlation coef. [Average by speaker] $r = .67***$

• Comparison of oral and silent syllabic rates

• Strong positive correlation between 1D and both $\text{OrSR}_t$ and $\text{SilSR}_t$ at language level ($\text{Spearman's Rho} = -.81, p=.021^*$) (fig. 2)

• Result confirmed by M-E models: significant effects of 1D, Language, Text and Subject ($p < .001**$) on both $\text{SilSR}_t$ and $\text{OrSR}_t$. Significant effect of Sex only on $\text{OrSR}_t$ ($p=.019^*$)

• Weak correlation between $\text{SilD}$ and the number of syllables ($\rho$ (Pearson’s $R = .11, p < .001**$)), stronger correlation between $\text{OrD}$ and $\rho$ (Pearson’s $R = .71, p < .001**$)

• Comparison of 3 different M-E models with $\text{OrD}$ as dependent variable, $\text{Sex}$ and either i) $\log(\rho)$ or ii) $\exp(\rho)$ as fixed predictors, and Text, Language, and Subject as random predictors:

  — Significant effects for Text, Subject, Language and Sex in all three models

  — Best prediction obtained with $\log(\rho)$. Significant improvement over the two other models ($p < .001***$)

  — Similar results with $\text{SilD}$, but weaker prediction and no effect of $\text{Sex}$

References


