**RESEARCH AREA: SECOND LANGUAGE STUDIES**

**Processing variability in intentional word learning: a case series**

**Keywords:** Processing variability; lexical processing; the coefficient of variation; intentional word learning, second language psycholinguistics

**Background**

A basic tenet of skill acquisition theory is automatization, a process through which learners achieve automatic processing (DeKeyser, 2015). Processing automaticity is important for learners because it is the cognitive basis on fluency (Segalowitz, 2010). It can be measured by the coefficient of variation (CV) derived from one’s reaction time data (Segalowitz & Segalowitz, 1993). Second language acquisition is expected to have a downward trend as language learners develop processing skills, indicating their processing becomes more stable (or less variation). This expectation has recently been challenged in that the coefficient of variation could increase in initial stages of development (Solovyeva & DeKeyser, 2018). There is a need to investigate a fuller trajectory to understand the limitations of the coefficient of variation before it can be applied to second language research in a valid manner.

**Aim**

The primary aim is to investigate the pattern of change in the coefficient of variation over time in the case of intentional learning of form-meaning mappings of novel words. A full trajectory of word learning are studies from first encounters to a series of practice or testing blocks.

**Study Design**

This is a case series where participants first learn the meaning of 16 Swahili-English pairs in a *learning block* where participants are given eight seconds to learn each word pairs. This is followed by ten *testing blocks* where participants make animacy judgements (Is it a living thing?) on the target Swahili words by pressing a button on a response pad. Reaction time (RT) is measured to compute the coefficient of variation (mean RT divided by the standard deviation of RT) for each participant at each testing block.The psycholinguistics software, Superlab is used to collect data.

**Inclusion Criteria:** Undergraduate students at Michigan State University (MSU) who are native speakers of English with no knowledge of African languages.

**Exclusion Criteria:** Participants who did not achieved 80% accuracy at the seventh block and beyond.

**Statistical methods**

RT data are trimmed to remove overly long or short RTs which are believed to be not indicative of processing. Only RT of correct trials are included, following conventions in language processing research. Multilevel, mixed effects regression models will be used to account for inherent clustering between observations. Time and its quadratic term are the primary predictor of the coefficient of variation. Each participant had 10 coefficient of variation values in the dataset, one from each test block. As such, these 10 observations were nested within each individual participant (coefficient of variation values clustered by participants). A forward selection procedure is used to determine the random effect structure. Model fit is assessed with the Akaike information criterion (AIC).

The data will be analyzed using the R software and the lme4 package (version 1.1-17).

**Sample size considerations:** This is a convenience sample with 35 participants.

**Strengths and Limitations.**

The participants are chosen from a specific age group and demographics and thus would limit the generalizability to other populations. A small sample size is a limitation of this study.

A strength of this study is the design to follow a full trajectory in learning acquisition.

**Data management**Data with no identification are stored in a password-protected local drive which only the principal investigator has access to. Upon acceptance of the paper reporting this research, these data are shared to Open Science Framework in the spirit of open science practices.

**References**

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**Abbreviations**

AIC – Akaike Information Criterion

CV – the coefficient of variation

MSU – Michigan State University

RT- Reaction time

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