Modeling misretrieval and feature substitution in agreement attraction

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INTRODUCTION

Consider sentence (1), adapted from Staub (2010):

(1) The clubs that the advertisement were promoting …

Agreement attraction (AA): The non-local NP clubs is occasionally able to license the plural verb were

How is the interpretation of the sentence affected by AA?

Subject-as-plural misinterpretations (advertisements) would support an account of AA as being encoding-based: Feature change of the subject NP can occur in the presence of the attractor (e.g. Eberhard, Cutting & Bock, 2005)

Attractor-as-subject misinterpretations (the clubs were ...) would support an account of AA as being retrieval-based: Feature-matching attractor is misretrieved as the sentence subject (e.g. Wagers, Lau & Phillips, 2009)

Recent findings:

Patson & Husband (2016): Misinterpretations of subject NP as plural increase in the presence of plural attractor

Schlueter, Parker & Lau (2019): Misinterpretations of attractor as subject slightly increase in the presence of plural attractor

We investigate the occurrence of feature change- and misretrieval-based misinterpretations simultaneously

Encoding- and retrieval-based explanations are compared using computational modeling and 10-fold cross-validation in Stan (https://mc-stan.org/)

Current results complement previous work on AA in Armenian (Avestisyan, Lago & Vasishth, 2019)

EXPERIMENTAL DESIGN

2×2 design with factors grammaticality, attractor match

43 subjects, 36 items

Self-paced reading, free-response end-of-sentence comprehension task (Who ignored O?)

Computational modeling

Encoding-based model implemented as a multinomial processing tree (MPT)

Latencies modeled as mixture of lognormals, one component for each path

Retrieval-based model implemented as a lognormal race between all possible responses (Rouder et al., 2015; Nicenboim & Vasishth, 2018)

Besides the basic models, we also implemented

an extended retrieval model that allows systematic matching of NPs with non-veridical features

a hybrid model that assumes that feature match affects the interference stage of the MPT

a hybrid model with feature spreading from the verb

Only hybrid+verb model improves predictive performance over basic encoding model

Modeling results

Distributions of predicted response proportions (violins) do not closely match data means (white circles) for either encoding or retrieval model

Hybrid+verb model increases predictive performance

10-fold cross-validation

10% held-out data points (per 10 model runs) are better predicted by encoding versus retrieval model, hybrid+verb versus encoding model

Discussion

Encoding model predicts data better than retrieval model

Adding the verb as a source of plural features improves fit

Further supports encoding model if one assumes that features can freely spread through the sentence

Caveat: Are we using the right task and latency measure?

End-of-sentence comprehension probes may not be reflective of on-line processing (e.g. Bader & Meng, 2018)

Use of RTs in spillover region motivated by earlier results, but critical region or question response RTs are candidates for


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