The interaction between subject-verb agreement and register-situation formality congruence in German sentence processing: an eye-tracking-reading pilot study

Camilo R. Ronderos[1,2], Aine Ito[1], Katja Maquate[1], Pia Knoeferle[1,3,4]

[1]*Humboldt-Universität zu Berlin,* [2]*University of Oslo,* [3]*Berlin School of Mind and Brain,* [4]*Einstein Center for Neurosciences Berlin*

c.r.ronderos@ifikk.uio.no

The present research assesses the (representational and procedural) similarities between comprehenders' processing of standard-language grammar and their processing of register (situation-dependent language variation). Can we parsimoniously assume a single mechanism and closely-linked mental representations or must we model standard-language and register processing via distinct mental representations and / or mechanisms? Incongruence between language input and our knowledge of morphosyntax elicits rapid brain and eye-gaze responses during sentence comprehension (Pearlmutter et al., 1999; Tannen et al., 2013). Likewise, we know that incongruence in social aspects of meaning elicits rapid effects on language processing (e.g., van Berkum et al., 2009). Investigating these two kinds of incongruence can help refine extant models of sentence processing (e.g., Altmann & Kamide, 2009; Münster & Knoeferle, 2018; Venhuizen et al., 2018) also considering research on modelling social meaning (e.g. Burnett, 2019).

The present eye-tracking reading pilot study compares the processing cost of encountering morpho-syntactic (in)congruence and situation-(in)appropriate register. Participants (N=16, 40 critical items, 56 fillers) read two-sentence stories in German (context and target sentence, see example 1). They read each sentence one by one and answered comprehension questions on 1/3 of trials (fillers only). We crossed two independent factors: register-situation formality congruence (congruous vs. incongruous) with subject-verb agreement congruence (congruous vs. incongruous with linguistic knowledge). To establish register-situation-formality congruence, we paired verbs with a formal (*bereden*) and an informal (*belabern*) variant of the verb 'talk' either with a register- / formality-matching or mismatching context sentence (see 1). The register congruence factor was counterbalanced for formality. The subject-verb agreement congruence factor was established by varying grammaticality of subject-verb agreement (grammatical: 3rd person singular: … *beredet* 1.a. *vs.* ungrammatical: the infinitive: …*bereden,* 1.b).

We expected to replicate longer reading times during the verb or subsequent noun region (spillover) for morpho-syntactic incongruence (vs. congruence, Pearlmutter et al., 1999). Observing rapid interaction of morphosyntactic congruence with register-congruence would support accounts of one conceptual store and set of mechanisms. Delayed or no interaction of these two stimuli aspects would by contrast suggest the implicated mechanisms are distinct (eliciting delays and / or more subtle processing effects). We fitted linear mixed-effects models (sum contrast coded) to the log-transformed first-pass, regression path, and total reading times of the verb and spill-over regions, as well as to the total target sentence reading times. The results replicated longer reading times for sentences with subject-verb agreement mismatches than matches (all measures on verb region, regression path duration of the spill-over region: t=2.7, p < .01; total sentence reading times: t=2.5, p < .05; Bonferroni-corrected, von der Malsburg & Angele, 2017). No significant main effect or interaction involving register congruence emerged (see Figures 1, 2 and 3).

The results show clear subject-verb agreement effects, an absence of any register congruence effects and no interaction of these two factors. It is possible that overt subject-verb agreement incongruence overshadowed any subtle situation-dependent register incongruence effects that might have otherwise been observed. It is also possible that the implementation of the register incongruence was not strong enough. Follow-up research will omit incongruence in subject-verb agreement and strengthen the implementation of register-context congruence, giving us a more sensitive paradigm for investigating the processing of social meaning.

1. Example critical item

Formal context

Die Empfangsdame verkündigte der vornehmen Gesellschaft:

Informal context

Die Groupies posteten auf der Fanpage:

Target sentence versions:

formal, grammatical

  a. *Der Rocksänger /beredete VERB/ den Schlagzeuger SPILLOVER/.*

formal, ungrammatical

  b. *Der Rocksänger /bereden VERB/ den Schlagzeuger. SPILLOVER /.*

informal, grammatical

  c. *Der Rocksänger/ belaberte VERB/den Schlagzeuger. SPILLOVER/.*

informal, ungrammatical

  d. *Der Rocksänger/ belabern VERB/den Schlagzeuger. SPILLOVER/.*

Figure legend:'grammatical' refers to sentences with subject-verb agreement match; 'ungrammatical' refers to sentences with subject-verb agreement mismatch
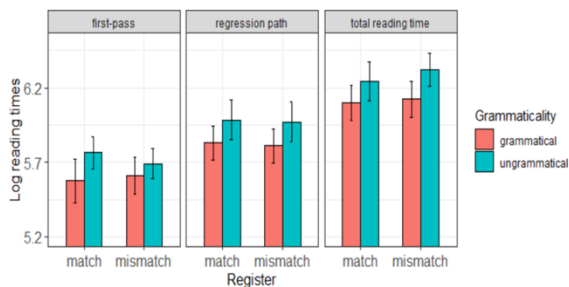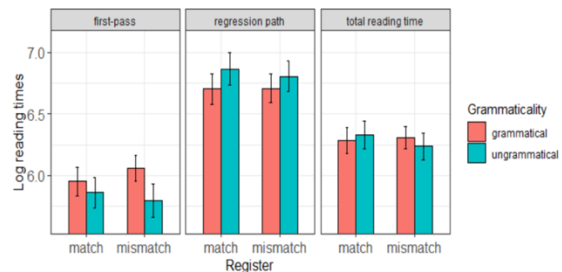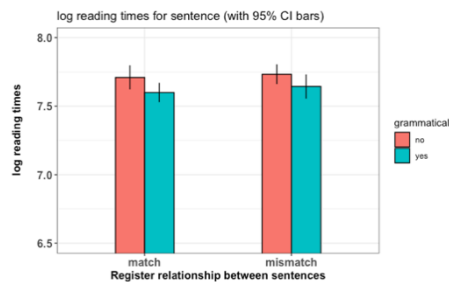
Figure 1

Figure 2

Figure 3

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