Expectation-based model informing cross-linguistic differences in argument interpretation between Russian and Swedish

Yulia Kashevarova[1], Thomas Hörberg[2]
[1] Umeå University; [2] Stockholm University
yulia.kashevarova@umu.se

Human communication allows for the verbal description and comprehension of events, which requires understanding the roles participants play in them – who acts and who undergoes the action's effects. In a sentence structure, the actor and undergoer roles are expressed by the arguments of the verb, which most often are grammatically encoded as the subject and the object. Previous research has shown that in online processing, comprehenders incrementally update their commitment to a certain interpretation of these roles as new information (cues) becomes available from the input [2, 4]. The strength of this commitment depends on how informative different cues (e.g., word order) are in a particular language, and the differences in the cues' informativity are reflected in their distribution (or statistical regularities) in the language input, which speakers implicitly learn to make use of. Encountering an unexpected combination of cues can cause interpretation difficulties, which can be estimated, e.g., in terms of Bayesian surprise – a measure of prediction error experienced when processing new input and estimated as a divergence between prior and posterior probability distributions of possible interpretations at a processing point [5]. These distributions can be estimated from statistics of a corpus, which can be assumed to approximate the statistics that a speaker has been exposed to in a language. Hörberg and Jaeger created a corpus-based model for Swedish transitive sentences predicting changes in the expectations of argument roles, estimated in terms of Bayesian surprise [5]. The model's Bayesian surprise predicted correlated with reading times of transitive sentences, obtained in a self-paced reading experiment [5]. Building the model for another language that uses similar cues in a likely different distribution, e.g., Russian, allows to predict and quantify processing difficulties associated with unexpected cue combinations and make testable predictions for cross-linguistic influences for Russian-speaking learners of Swedish. We present the model and its predictions which we aim to test experimentally in the future.

In Swedish, only personal pronouns can be case marked (see example 1(a) in Table 1). This can make object-fronted (OVS) sentences with lexical initial noun phrases (NP1s) locally ambiguous. However, NP1 animacy can serve as a cue. In the self-paced reading experiment used to test their model predictions, Hörberg and Jaeger found faster reading times at disambiguating subject NP2 in sentences such as 1(b) in Table 1, where object NP1 is *inanimate*, compared to sentences such as 1(c) with *animate* object NP1 [5]. In contrast, in Russian, both lexical and pronominal NPs are generally case marked, and the verb agrees with the subject in terms of number and person in the present and gender in the past tense (examples 2(a–c) in Table 1). This high availability of morphological cues to argument roles in Russian should render the reliance on animacy less strong, which was observed by Kempe and MacWhinney [7]. Moreover, in Russian OVS sentences, subjects are most frequently discourse new and objects discourse given [6, 8]. *Givenness* (i.e., a referent's accessibility or cognitive status in the discourse [1, 3]) might thus serve as a stronger cue than animacy in Russian, in contrast to what has been found for Swedish. If the model supports these predictions, we expect that Russian learners of Swedish will rely more heavily on givenness, and less strongly on animacy, than Swedish L1 speakers in their interpretation of ambiguous OVS sentences in Swedish.

Table 1. Examples of Swedish and Russian transitive sentences with fronted objects with glosses [9].

Object	Swedish examples	Russian examples
Pronominal	1(a) *Mig valde han.* 1SG.OBJ choose-PST 3SG.M.NOM 'He chose me.'	2(a) *Меня выбрал он.* 1SG.ACC choose-PST.SG.M 3SG.M.NOM 'He chose me.'
Inanimate	1(b) *Boken valde han.* book-DET.SG choose-PST 3SG.M.NOM 'He chose the book.'	2(b) *Книгу выбрал он.* book-SG.F.ACC choose-PST.SG.M 3SG.M.NOM 'He chose the book.'
Animate	1(c) *Katten valde han.* cat-DET.SG choose-PST 3SG.M.NOM 'He chose the cat.'	2(c) *Кошку выбрал он.* cat-SG.F.ACC choose-PST.SG.M 3SG.M.NOM 'He chose the cat.'

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