

The Role of Morphosyntactic Features in Sentence Processing

The goal of this paper is to investigate the role of several morphosyntactic features in sentence processing, more specifically, the role of case features in the processing of Russian. Earlier research has suggested that partial structures containing nominals bearing the same case cause more processing difficulty than partial structures containing nominals bearing different cases. However, many of these earlier studies have serious confounds: nominals bearing the same abstract case also often surface with the same morphological case-markings, have the same discourse status and occupy the same structural position. This makes it hard to determine whether it is the repetition of the abstract case features that causes processing difficulty or some other factor. Besides, to the best of our knowledge, there is no unifying theory about *why* repetition of the same morphosyntactic features makes partial structures difficult to process.

Babyonyshev (1996) conducted an experiment in Russian where she attempted to pull apart the effect of abstract case features and that of their morphological realization by varying these two factors independently (see examples in (1a-d)). Word-by-word self-paced reading paradigm was employed with comprehension questions asked after each sentence. The reading times in the critical region (underlined in (1a-d)) revealed a main effect of abstract case ($p < 0.002$), with the same abstract case conditions ((1a) and (1b)) being read slower, and a main effect of morphological case-marking ($p < 0.02$), with distinct case-marking conditions ((1b) and (1d)) being read slower. Babyonyshev reached the somewhat paradoxical conclusion that abstract case feature repetition and case-marking repetition have different effects on sentence processing.

Recent advances in the field of sentence processing reveal a potential confound in the experiment described above. One theory within which this confound can be described is the Dependency Locality Theory of sentence processing (see Gibson 1998, 2000), where the processing cost associated with a structure is quantified in terms of the minimal number of predicted syntactic heads required to form a grammatical sentence. Thus, in the same case conditions two verbs are always necessary to form a grammatical sentence, whereas in the different case conditions, one verb can be sometimes sufficient, as illustrated in (2). This effect is predicted to go in the same direction as the case repetition effect, making the results hard to interpret.

To remedy this problem and to further deepen our understanding of the effects of case features on sentence processing, we are currently conducting a follow-up experiment (results expected Aug 2003), based on participle constructions. Russian participles possess some verbal and some adjectival properties. Like verbs, they assign abstract case, but, similarly to adjectives, they agree with the head noun in number, gender and case. Using participles allows us to avoid the confound described above and gives us an opportunity to test the effect of case repetition within simpler structures. The basic form of the structure is as follows (see (3 a-d) for actual examples):

[participle-past-acc (embedded "verb")	NP1-acc/dat (embedded obj)	[NP2-acc] (matrix obj)	Verb (matrix verb)	[NP3-nom] (matrix subj)
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We propose two alternative hypotheses to explain the effects of case repetition. One possible explanation is that when a human parser maintains two or more structural predictions for the upcoming elements, at the point of encountering a word, which satisfies some criteria of both predictions (the first noun in the participle structures), competition arises among the two structural interpretations of that word, resulting in slower reading times. Another explanation is that syntactically similar partially processed structures interfere with each other. If the latter explanation is true, we expect to see an effect on post-interpretative processes (Caplan & Waters, 1999) which should be reflected in poor question-answering performance for same case conditions. The results of the current experiment will allow us to distinguish between these two alternative hypotheses about why morphosyntactic feature repetition causes processing difficulty.

Examples:

- (1) a. Same abstract case, same case-marker:
Neposlušnuju devočku sestru ugovorila navestit' bespokojašcajasja mat'
Disobedient **girl-acc** **sister-acc** **convinced** **visit-inf** **worried** **mother-nom**
'The worried mother convinced the disobedient girl to visit (her) sister'
- b. Same abstract case, different case-marker:
Neposlušnuju devočku brata ugovorila navestit' bespokojašcajasja mat'
Disobedient **girl-acc** **brother-acc** **convinced** **visit-inf** **worried** **mother-nom**
'The worried mother convinced the disobedient girl to visit (her) brother'
- c. Different abstract case, same case-marker:
Neposlušnuju devočku bratu ugovorila pozvoniť bespokojašcajasja mat'
Disobedient **girl-acc** **brother-dat** **convinced** **call-inf** **worried** **mother-nom**
'The worried mother convinced the disobedient girl to call (her) brother'
- d. Different abstract case, different case-marker:
Neposlušnuju devočku sestře ugovorila pozvoniť bespokojašcajasja mat'
Disobedient **girl-acc** **sister-dat** **convinced** **call-inf** **worried** **mother-nom**
'The worried mother convinced the disobedient girl to visit (her) sister'
- (2) Neposlušnuju **devočku** **bratu** pokazala sestra.
Disobedient **girl-acc** **brother-dat** showed sister-nom.
'The sister showed the disobedient **girl** to the **brother**.'
- (3) a. Same case, same marker
Navestivšuju podругu devočku pobjagodaril ucitel'.
Visiting-acc **friend-acc** **girl-acc** **thank-past** **teacher-nom**.
The teacher thanked the girl who visited (her) friend.
- b. Same case, different marker
Navestivšuju brata devočku pobjagodaril ucitel'.
Visiting-acc **brother-acc** **girl-acc** **thank-past** **teacher-nom**.
The teacher thanked the girl who visited (her) brother.
- c. Different case, same marker
Pozvonivšuju bratu devočku pobjagodaril ucitel'.
Calling-acc **brother-dat** **girl-acc** **thank-past** **teacher-nom**.
The teacher thanked the girl who visited (her) brother.
- d. Different case, different marker
Pozvonivšuju podruge devočku pobjagodaril ucitel'.
Calling-acc **friend-dat** **girl-acc** **thank-past** **teacher-nom**.
The teacher thanked the girl who visited (her) friend.