

Immediate Recall and Information Predictability in Reading and Listening Comprehension

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Background: Recent studies [1,2] have documented systematic differences in the extent to what readers recall certain types of information immediately after reading a sentence. For example, information conveyed by direct objects tends to be recalled significantly better than information conveyed by temporal or locative adjuncts. This can be interpreted as a selective attention process: while reading, people drive their attention to information which they learned should be important/useful and they attend to a limited degree to information that is peripheral [3]. The present study examines immediate recall of information conveyed by subjects and locative adjuncts in Czech (Loc) and how it is influenced by adjunct predictability [4,5].

Method: First, predictability of Loc in combination with 57 transitive verbs was normed (N=115 Czech speakers). 24 of these combinations were then used for creating stimuli for further experiments. Two reading experiments were conducted using a self-paced reading paradigm with whole sentences appearing at once for the first experiment, and with sentences presented word-by-word for the second experiment. Once the sentence disappeared, an open-ended question was shown targeting either the subject (Who did it?), or the Loc (Where did it happen?). Then, two listening experiments were conducted. The first one used stimuli audio-recorded by native speakers of Czech with flat intonation. For the second experiment, stimuli generated by an artificial intelligence were used. The open-ended questions were visually presented, and participants responded by typing. All experiments use the same 24 experimental items and 72 fillers and manipulate word order, information targeted by the comprehension question and Loc predictability (see Table 1).

Results: Fig. 1 shows the differences in recall accuracy between the conditions in all experiments. The nested logit mixed-effects model showed a general recall difference for listening experiments (but not for the reading ones): subjects were recalled better than Loc. Moreover, the model yielded a significant effect of predictability for Loc recall in all experiments and for subject recall in experiment 1.

Discussion: Previous findings on Czech reading data [1,2] showed a tendency for better immediate recall of core information in sentences compared to accessory information. However, the present study replicated these results only in experiments involving spoken materials, not in reading. In Experiment 1 (reading, with the entire sentence presented at once), Loc predictability affected not only recall of the locative information, but also of the subject information (which stayed the same across the conditions). However, no such effect was found in the other experiments, likely due to the possibility to revisit sentences in Experiment 1. This may also explain why recall success in Experiment 1 was higher than in the other experiments. Finally, Experiment 4 (listening, AI-generated stimuli) showed no significant differences from Experiment 3. In consequence, we may conclude that stimuli generated by artificial intelligence could be suitable for use in similar experiments in the future.

Word order	Predictability	Sentence
ltvso	pred	V obchodě v neděli koupila Klára hrozně hezký pruhovaný tričko.
ltvso	unpred	V parku v neděli koupila Klára hrozně hezký pruhovaný tričko.
stvlo	pred	Klára v neděli koupila v obchodě hrozně hezký pruhovaný tričko.
stvlo	unpred	Klára v neděli koupila v parku hrozně hezký pruhovaný tričko.

Table 1: Item example. Word order values: ltvso = locative adjunct - temporal adjunct - verb - subject - object; stvlo = subject - temporal adjunct - verb - locative adjunct - object. Sentences have the same meaning and only differ in their word order and locative adjunct predictability: “Klára bought a really nice striped T-shirt in the store/in the park on Sunday.”

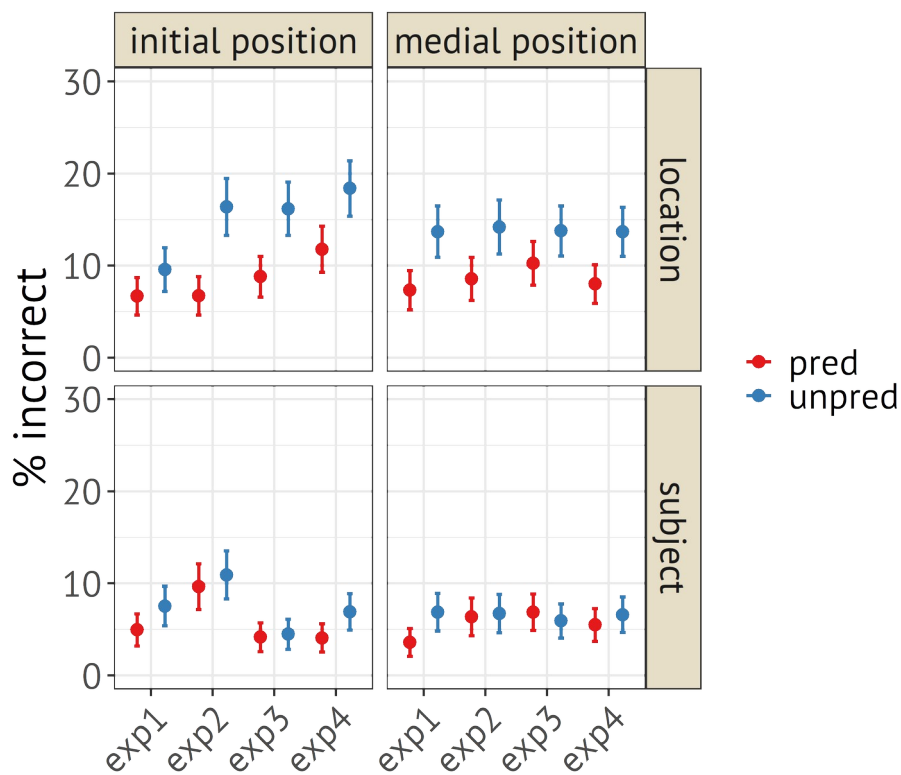


Figure 1: % of incorrect answers in all experiments. Pred = predictable locative adjunct, unpred = unpredictable locative adjunct, exp1 = reading experiment, sentence presented at once, exp2 = reading experiment, sentence presented word-by-word, exp3 = listening experiment, stimuli recorded by real speakers, exp4 = listening experiment, stimuli generated by AI.

References

- [1] Chromý, J., & Vojvodić, S. (2024). When and where did it happen? Systematic differences in recall of core and optional sentence information. *QJEP*, 77(1), 111–132.
- [2] Chromý, J. & Tomaschek, F. (submitted). Learning or boredom? Task adaptation effects in sentence processing experiments. *Open Mind*.
- [3] Ferreira, F., & Yang, Z. (2019). The problem of comprehension in psycholinguistics. *Discourse Processes*, 56(7), 485–495.
- [4] Ryskin, R., & Nieuwland, M. S. (2023). Prediction during language comprehension: what is next? *Trends in CS*, 27(11), 1032–1052.
- [5] Haeuser, K. I., & Kray, J. (2023). Effects of prediction error on episodic memory retrieval: evidence from sentence reading and word recognition. *LCN*, 38(4), 558–574.