Lasting effects of broken readings, a testing ground from Turkish suspended affixation

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In the processing of ambiguous sentences, the parser may need to perform Reanalysis. Previous research have found that the reanalyzed readings can still be accessible both in comprehension and production tasks [1, 7]. To find out if reanalyzed readings are still accessible in Turkish, I have designed an SPR study ($N = 126$) using Suspended Affixation (SA) . SA is a morphological ellipsis process taking place in conjunctions. Only one of the conjuncts carry the overt suffix the other conjuncts share in interpretation (1). Performing SA can be made optional using embedding, and create structural ambiguity (3).

(1) *Kağıt ve kalem-i al.*
paper AND pencil-ACC take
'Take the paper and the pencil!'

Exp: I designed an experiment (4) with factors Disambiguation[*Subject, Object*] and Parallelism[*Parallel, Non-parallel*]. *Subject* disambiguates towards no SA and *Object* disambiguates towards SA reading. Both disambiguations are plural pronouns. In *Parallel*, the conjuncts are Noun&Noun. In *Non-parallel*, the conjuncts are Noun&Adj Noun. Parallelism is used to see if SA is modulated by conjunct identity. Participants are asked to judge two types of statements after trials targeting the theta roles as true or false. One statement type is true with *Subject* and the other is true with *Object*. The critical region is the disambiguation pronoun and the spillover region is the word after. **Results:** Figure 1 panel A shows the average RTs for the critical and spillover regions. Figure 1 panel B shows the regression model results for both regions. RT analyses only include the correct trials. *Subject* and *Parallel* increase RTs, the effects are more prominent in the spillover region. Figure 2 panel A shows the participant accuracies in question responses. Figure 2 panel B shows the regression model results for the accuracy. Participant accuracies are lower in questions where the correct answer is *No* and in *Subject*. There is an interaction between Disambiguation and Correct_answer. **Discussion:** Increased RTs in *Subject* compared to *Object* reflect that the SA is performed before disambiguation. Both disambiguations require the retrieval of locally bound antecedents and they are shown to be syntactically oriented [3, 6]. This means that the increased RTs in *Subject* are due to the inaccessible antecedent and the increase is Reanalysis cost. The verb is not reached at the critical or spillover regions, so probability of reciprocal interpretation depending on the action is not feasible. *Parallel* increases RTs for both disambiguations. The disambiguating pronoun in both disambiguations is PL but there is no antecedent with PL. It is a complex number feature that has to be formed on the conjunction as opposed to the individual nouns during the retrieval process. Marked or contrasted conjuncts are easier to address in memory [4] and similarity can cause interference [5]. This makes it harder to form a complex number feature in *Parallel* compared to *Non-parallel*. The question responses are used to see if the Reanalyzed readings affected accuracies. There is an interaction between Disambiguation and Correct_answer besides a main effect of Correct_answer. *Yes* increased accuracy. When the participant is supposed to answer with *Yes* in *Subject*, both correct and incorrect readings are accessible, and answering with 'Yes' only requires one reading to be true. In *Object*, only one reading is built in memory. There is an interaction of *Subject* and *No*. When the participant is supposed to say *No* in *Subject*, presence of an incorrect reading makes it hard to say *No* since there is a reading compatible with answering with *Yes* that persists in memory even after Reanalysis and this lowers accuracy. **Conclusion:** In this study, I have shown an effect of Reanalysis in RTs using SA. The reanalyzed readings affected participant accuracies, showing that they are still addressable in the memory. Performing SA of CASE even in ambiguous sentences can be the result of CASE SA being unambiguous in the local environment thereby frequently carried out, or it could be the parser's choice to perform SA since not performing SA would require building an embedded clause for the second conjunct before a relativized verb is reached, which can be more costly.

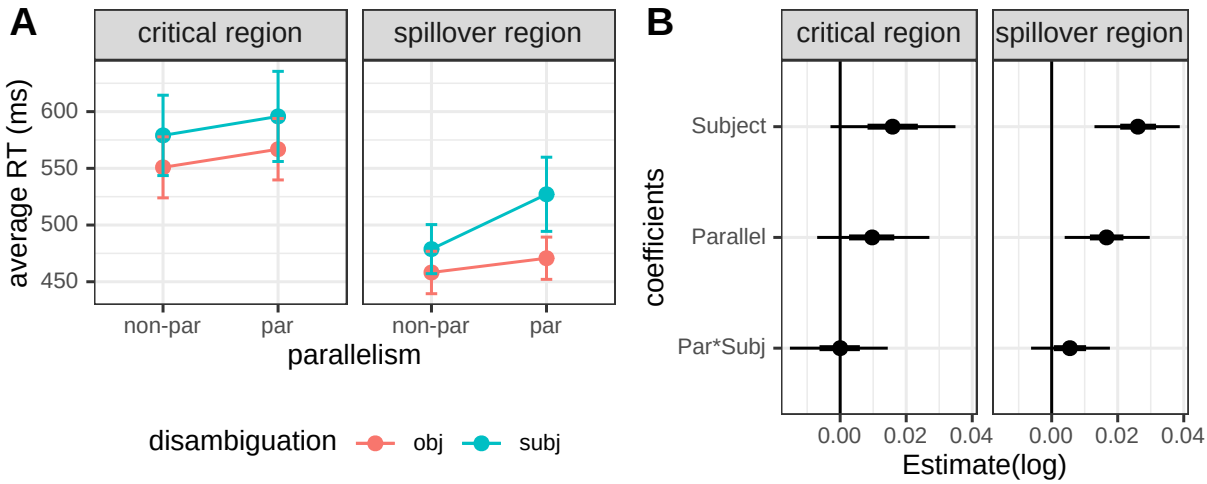

Figure 1: RT figures, A: average RTs with %95 adjusted confidence intervals [2], B: predictors Disambiguation[Subject,Object] and Parallelism[Parallel, Non-parallel], random intercepts and slopes for participant and item, point= median estimate, thick line %50 credible intervals, thin line=%90 credible intervals

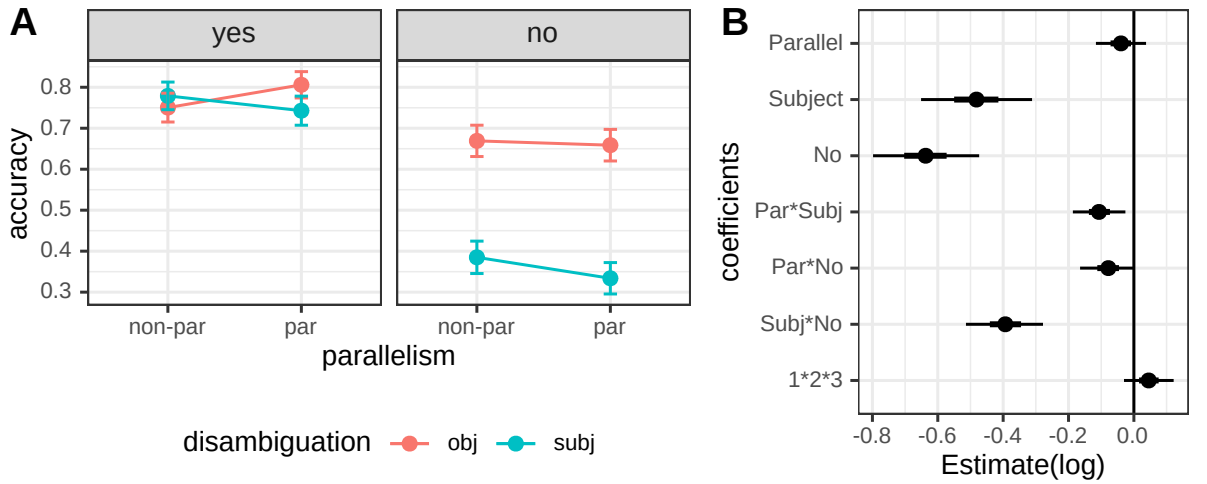

Figure 2: Accuracy figures with same settings, A: average accuracies, B: predictors Disambiguation[Subject,Object] and Parallelism[Parallel,Non-parallel] Correct_answer[yes,no]

More on Suspended Affixation (SA): In simplex sentences, SA of PL and POSS is optional, however suspension of CASE is unambiguous (2). The unambiguous SA of CASE can be made ambiguous by using an embedded sentence (3). The color coding indicates which morpheme is responsible for which interpretation.

(2) a. Ambiguous SA of PL

kitap ve kalem-ler pahalı.
book AND pencil-PL expensive
SA: 'The books and the pencils are expensive.'
No SA: 'The book and the pencils are expensive.'

b. Unambiguous SA of CASE

kitap ve kalem-i al-dı-m.
book AND pencil-ACC take-PST-1SG
SA: '(I) took the book and the pencil.'
No SA: '*(I) took the book and a pencil'[1]

(3) Ambiguous SA of CASE

Kadın ve çocuğ-u kurtar-an adam ev-e gel-di.
woman AND child-ACC save-FP man house-DAT come-PST
SA: 'The man who saved the child$_{ACC}$ and the woman$_{ACC}$ has come home.'
No SA: 'The man who saved the child$_{ACC}$ and the woman$_{NOM}$ have come home.'

(4) Subject, Parallel

Bence baron ve şövalye-yi ödüllendiren kral birbirlerin-i şato-da dinle-yecek.
I_think baron AND knight-ACC reward.FP king each_other-ACC chateau-LOC listen-FUT
'I think [the baron] and [the king who rewarded the knight] will listen to each other at the chateau.'

Object, Parallel

Bence baron ve şövalye-yi ödüllendiren kral onlar-ı şato-da dinle-yecek.
I_think baron AND knight-ACC reward.FP king 3PL-ACC chateau-LOC listen-FUT
'I think the king [who rewarded the baron and the knight] will listen to them at the chateau.'

Subject, Non-parallel

Bence baron ve cesur şövalye-yi ödüllendiren kral birbirlerin-i şato-da dinle-yecek.
I_think baron AND bold knight-ACC reward.FP king each_other-ACC chateau-LOC listen-FUT
'I think [the baron] and [the king who rewarded the bold knight] will listen to each other at the chateau.'

Object, Non-parallel

Bence baron ve cesur şövalye-yi ödüllendiren kral onlar-ı şato-da dinle-yecek.
I_think baron AND bold knight-ACC reward.FP king 3PL-ACC chateau-LOC listen-FUT
'I think the king [who rewarded the baron and the bold knight] will listen to them at the chateau.'

Subject true statement

Baron kral-ı şatoda dinle-yecek.
Baron[NOM] king-ACC chateau-LOC listen-FUT[3SG]
'The baron will listen to the king . . . '

Object true statement

Kral baron-u ödüllendir-miş.
King[NOM] baron-ACC reward-PRF[3SG]
'The king has rewarded the baron.'

Selected References

[1] K. Christianson et al. *Cognitive psychology*. 2001. **[2]** D. Cousineau. *Advances in cognitive psychology*. 2017. **[3]** M. Gračanin-Yuksek et al. *Journal of Psycholinguistic Research*. 2017. **[4]** P. Hofmeister and S. Vasishth. *Frontiers in Psychology*. 2014. **[5]** L. A. Jäger, F. Engelmann, and S. Vasishth. *Journal of Memory and Language*. 2017. **[6]** D. Kush and C. Phillips. *Frontiers in Psychology*. 2014. **[7]** R. P. Van Gompel et al. *Journal of Memory and Language*. 2006.

[1] the determiner 'a' is used to indicate a non-referential object in Turkish, which is interpreted as a pseudo incorporated (non-referential) object when there is no overt CASE.