

Investigating the contribution of sentence length to verbal morphology deficits in non-fluent aphasia

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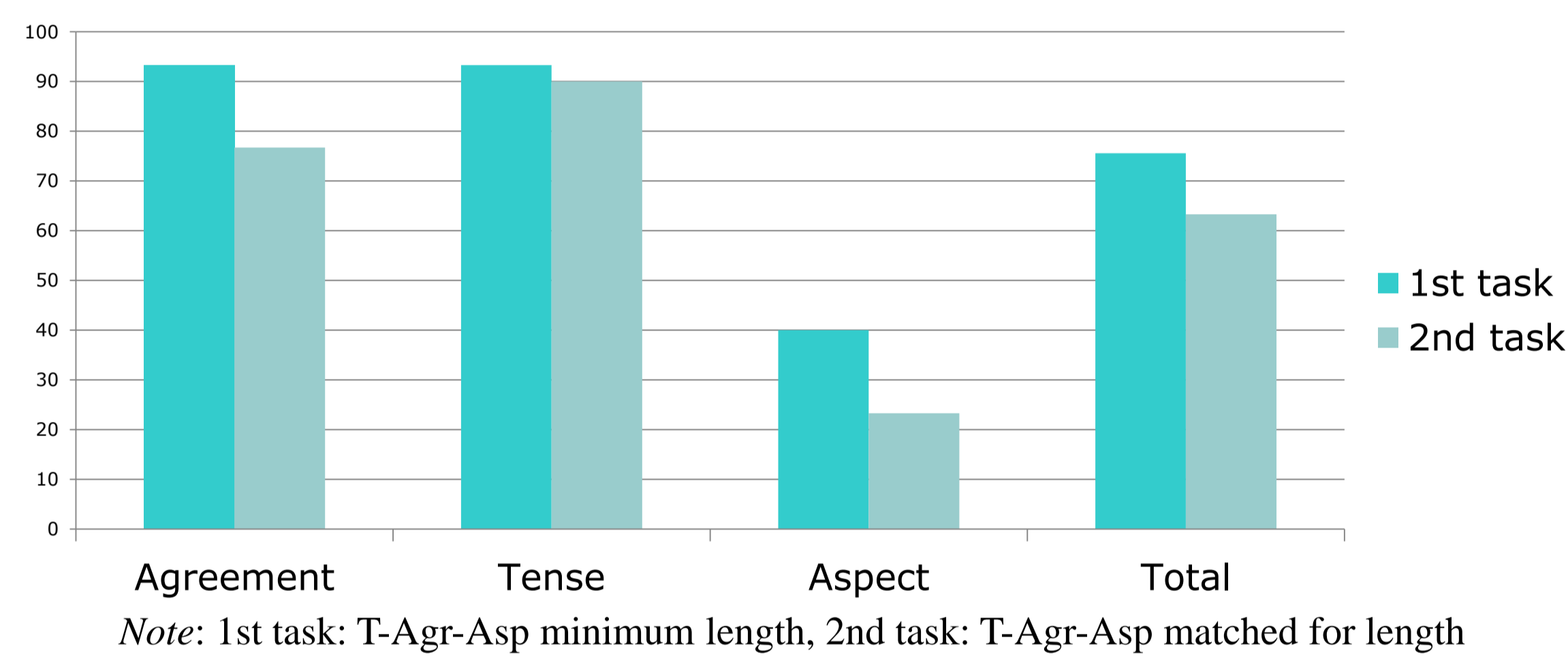
Introduction

- Several studies on aphasia have reported asymmetries between subject-verb Agreement, Tense, and Aspect. Nevertheless, not all of these studies had all three conditions matched for *sentence length*.
 - For instance, in the sentence completion tasks reported in Varlokosta et al. (2006) and Fyndanis, Varlokosta, and Tsapkini (2012), the agreement sentences were shorter than the tense sentences, and the latter were shorter than the aspect sentences.
 - Interestingly, the pattern of the agrammatic performance reported by Fyndanis et al. reveals an inversely “proportional” relationship between sentence length and accuracy scores.
 - This raises the question whether the differences between the three categories were genuine, or reflected just length effects. In fact, Cheimariou et al. (2010) reported equal degrees of impairment in Agreement, Tense, and Aspect in Greek-speaking individuals with aphasia tested with materials matched for length.
- This study aims at teasing apart the contributions of the above-mentioned functional categories and sentence length to agrammatic performance.

Methods

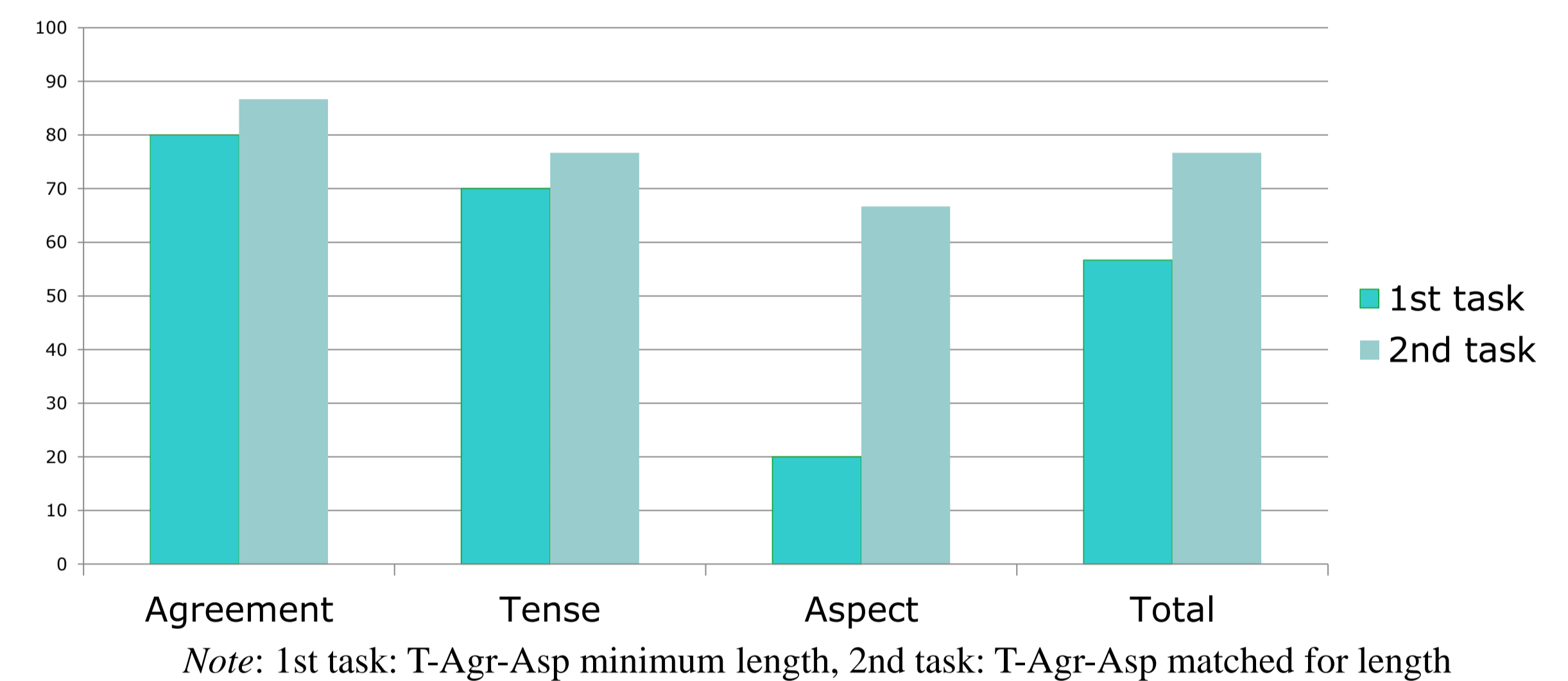
- Two sentence completion tasks were administered to two Greek-speaking agrammatic individuals, PG and PK, with a five-day interval in between.
 - The first task included the shortest possible sentences for each condition (Agreement < Tense < Aspect), while the second task had all three conditions matched for length (Agreement = Tense = Aspect).
 - The second task used the sentences included in the first task, except that the agreement and tense sentences were longer, as some additional adverbials had been added in these conditions.
 - In both tasks, the adverbials used to elicit the target values immediately preceded the target verb forms.
- Between-task differences for Agreement or Tense would probably point to a sentence length effect.

Results for PG



- In both tasks, PG was significantly more impaired in Aspect than in Tense and Agreement.
- No dissociation was observed between Tense and Agreement, in any of the two tasks.
- No dissociation was observed between the tasks for either Tense or Agreement.
- PG performed worse (albeit not significantly so) on all three categories of the second task, compared to the first one.

Results for PK



- PK's pattern of performance on the first task was similar to PG's, since he performed **significantly worse on Aspect, compared to Agreement and Tense**.
- Although Agreement elicited a higher accuracy rate compared to Tense, these two categories did not differ significantly.
- While the same pattern emerged in the second task (Agreement > Tense > Aspect), no significant dissociations were observed across categories.
- Surprisingly, PK's performance on Aspect improved significantly in the second task.
- Tense and Agreement elicited higher accuracy rates in the second task, but the between-task differences were not significant for any of the two functional categories.

Discussion

- Sentence length does not have a significant effect for PG, although it seems that it places an extra burden on her processing system, since her performance drops when the sentence length increases.
- Interestingly, PG's performance on Aspect is lower in the second task, compared to the first one, although the length of the aspect sentences was kept constant across the two tasks.
- It appears, thus, that the extra burden placed on PG's processing system by the increased length of the tense and agreement sentences affects the categories under investigation across-the-board.
- However, the overall results and the lack of a significant dissociation between the two tasks, for any of the functional categories, reveal that, for PG, there is a genuine dissociation between Aspect, on the one hand, and Tense and Agreement, on the other hand. It appears that inherent properties of Aspect (e.g., subjectivity) render its testing or processing “difficult” (see Fyndanis et al., 2012).
- Given his similar patterns of performance across tasks, PK appears to be more impaired in Aspect than in Tense and Agreement, with Tense being slightly more impaired than Agreement.
- Unlike PG, PK performed better on the second task, in all three categories, despite the longer sentences used for Agreement and Tense.
- Therefore, *prima facie* increased sentence length does not cause greater difficulties for PK.
- Most importantly, his performance on Aspect improved significantly in the second task.
- PK's overall better performance on the second task possibly reflects increased familiarity with it, which was achieved due to his previous experience with the first task.
- His significantly better performance on Aspect in the second task, in the face of non-significant improvements for Agreement and Tense, could be accounted for by assuming that increased sentence length does cause extra difficulties for PK, but these difficulties are wiped out and overridden by the facilitatory effects of his increased familiarization with the task.
- Crucially, while in the tense and agreement conditions in the second task there is a counterbalance between these two variables (*increased sentence length* and *increased familiarization with the task*), this is not the case with Aspect, since the length of the aspect sentences was kept constant across the two tasks. Thus, in the case of Aspect (in the second task), only increased task familiarization was at play, which resulted in PK's significantly better performance.
- In contrast to PK, PG's performance on the second task does not appear to reflect increased familiarity with it.
- Nevertheless, we could not rule out the possibility that, for PG, both facilitatory effects of increased task familiarity and inhibitory effects of increased sentence length were at play, with the former, however, being wiped out and overridden by the latter.

Concluding remarks

- Although sentence length seems to play a role in linguistic performance in agrammatic aphasia, the dissociations between functional categories are genuine, at least for PG.
- It is difficult to determine the exact “magnitude” of the sentence length effect in the context of the proposed experimental paradigm, since it is likely that increased sentence length and task familiarization act in opposite directions, which results in different patterns of performance depending on which of the two variables has a stronger effect for a given agrammatic speaker. To obtain a clearer picture regarding the role of sentence length, perhaps the two tasks should be administered at least 15 days apart, so that the task familiarity effects are minimized.

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