

# On-line processing of tense and temporality in agrammatic aphasia

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## BACKGROUND

### Tense morphology in Agrammatic Aphasia

- Errors in production of tense morphology are frequently reported in a variety of languages and tasks:  
\*Yesterday Mary walk to work; \*Cinderella working all day
- However, evidence for tense processing deficits is inconsistent<sup>1,2,3</sup>, and theories of verb inflection deficits differ regarding the involvement of a processing deficit in agrammatism<sup>1,2,4</sup>.

### The following questions remain unanswered:

- Is there a deficit in processing local syntactic constraints (henceforth **morphosyntax**)?
- Is there a deficit in processing temporal-semantic aspects of a message, either adverbial and morphological (henceforth **morphosemantics**)?
- Is there a more specific deficit in extracting temporal information from either the adverb or verb morphology?

## PROCEDURES

### The following factors were investigated:

#### Type of tense anomaly:

Morphosyntactic (My sister locked/\*locking/\*will locked a door) vs.

Morphosemantic (Last/\*Next year my sister lived in N.H.)

**Position of the adverbial:** preposed vs. postposed

**Type of tense:** past, present, future

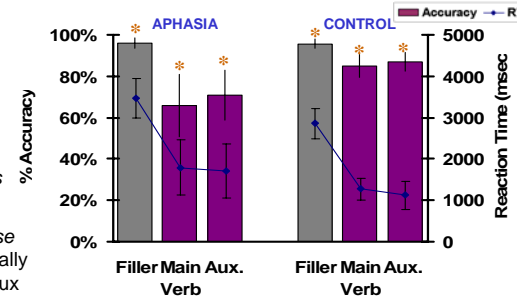
Also manipulated **location of tense marker:** main verb vs. auxiliary (previous studies have found no effect of location<sup>3</sup>)

**Procedure:** On-line acceptability judgment task with audio-recorded sentences (100 with morphosyntactic violations; 200 with morphosemantic violations; 75 fillers with pragmatic anomalies).

**Participants:** 10 agrammatic Broca's aphasic (3 female, age: 37-68y); 10 age-matched normal controls (4 female, age:46-67y)

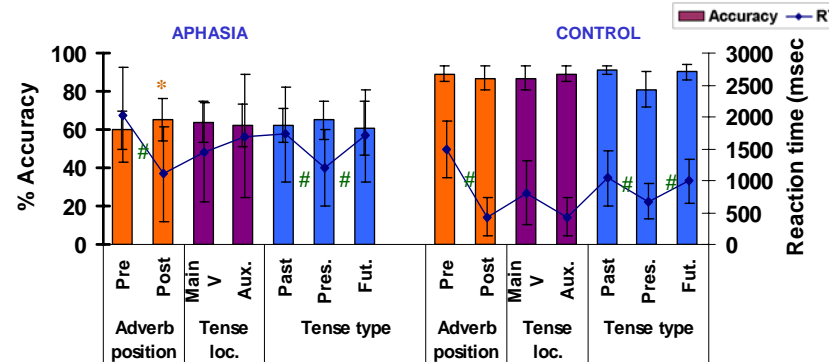
## RESULTS: MORPHOSYNTACTIC VIOLATIONS

- Aphasic participants were slower [ $t(18)=2.4, p<0.01$ ] and less accurate [ $t(18)=4.4, p<0.01$ ] than controls, but the groups showed similar patterns:
  - ✓ Above chance performance for morphosyntactic judgments in both groups
  - ✓ No influence of position of tense marker: Both groups were equally fast/accurate for main V and Aux



\* significantly above chance performance; # significant RT difference between conditions ( $p<0.05$ )

## RESULTS: MORPHOSEMANTIC VIOLATIONS



- Aphasic participants were slower [ $t(18)=2.7, p<0.01$ ] and less accurate [ $t(18)=7.1, p<0.01$ ] than controls, but both groups again showed similar patterns of performance

✓ Judgment of sentences with *pre-posed adverbials* was slower than *post-posed adverbials* for both groups [ $F(1,9)=108.3, p<0.01$  for aphasic group.;  $F(1,9)=451, p<0.01$  for controls] and less accurate for aphasic participants [ $F(1,9)=10.6, p<0.01$ ].

✓ Response to present tense (V+s, "is") was faster than for other tenses (past, future) for both groups [ $F(2,18)=35.1, p<0.01$  for aph.;  $F(2,18)=15, p<0.01$  for control].

✓ No influence of position of tense marker for either group: no diff. between Main V and Aux

## CONCLUSIONS

Consistent with previous work<sup>3,5,6,7</sup>, the current results provide evidence of tense processing deficits in agrammatism, and furthermore show stronger effects of morphosemantics than morphosyntax:

### Morphosemantics:

- Effect of position of adverb**  
Grammaticality judgments were slower and less accurate when predictions regarding the appropriateness of verb morphology need to be made on the basis of preceding temporal context (as in pre-posed adverbial conditions)<sup>6</sup>
- Effect of tense**  
Judgments were slower and less accurate for sentences referring to non-present (past, future)<sup>7</sup>

### Morphosyntax:

- Above-chance accuracy when morphosyntactic constraints need to be checked<sup>5</sup>
- No effect of tense position: whether tense is marked on a free-standing auxiliary or a main V<sup>3</sup>

However, the morphosemantic deficit is specific:

judgments were fast and accurate (above chance) when tense information extracted from verbal morphology had to be checked for consistency against the post-sentential adverb (suggesting that processing of adverbs is not impaired<sup>6</sup>).

These findings suggest a specific difficulty in choosing the correct tense form given temporal-semantic information (translating semantic information into grammatical form)<sup>5</sup>

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