

# Sentence Comprehension in Aphasic Speakers of Standard Indonesian

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## Introduction

Studies on aphasic sentence comprehension have shown different performance patterns. Though agrammatic comprehension regularity has been disputed (Berndt, Mitchum, & Haendiges, 1996), several theories such as the Trace Deletion Hypothesis (TDH; Grodzinsky, 1995) and the Derived Order Problem Hypothesis (DOP-H; Bastiaanse & Van Zonneveld, 2005) support performance consistency. In particular, the DOP-H is based on empirical findings across languages (for a review of the hypothesis, Abuom, Shah, & Bastiaanse, 2013) and accounts for both production and comprehension. The DOP-H assumes that every language has a base word order where the constituents are placed in the array that occurs “naturally” or is most common; all other word order are derived by linguistic operations and, therefore, difficult for aphasic individuals with a grammatical deficit. In the current study, this hypothesis is tested for Standard Indonesian (SI)

In a case study (Postman, 2004) and a spontaneous speech analysis (Anjarningsih, Haryadi-Soebadi, Gofir, & Bastiaanse, 2012) it was shown that SI aphasic speakers could comprehend passive sentences and also produce them at a rate that is proportionate to healthy speakers. The difference between passives in SI and other languages is the frequency with which passives are used: Passives in SI are highly frequent (Sneddon, 1996). The current study aims to test whether passive sentences are relatively spared in aphasic individuals with a grammatical deficit, as suggested by Postman (2004) and Anjarningsih et al. (2012). To compare the influence of both word order and frequency we tested actives (high frequency, base order); passives (high frequency, derived order); subject clefts (low frequency, base order); object clefts (low frequency; derived order). The DOP-H predicts that passives and object clefts will be more impaired than the actives and subject clefts. However, if frequency plays a role, the passives will pair with the actives (and subject clefts) and the object clefts will be selectively impaired.

## Methods

### *Participants*

Five individuals with aphasia (IWAs) and 12 non-brain-damaged Indonesian speakers participated in this study. IWAs originated from 2 nursing homes in Central Java. A screening test was held prior to testing. The Token Test was translated to SI and IWAs with more than 12 errors were then tested

with the SI aphasia battery “TADIR” (Dharmaperwira-Prins, 1996) to classify the aphasia types. IWAs with the diagnosis Broca’s aphasia or transcortical motor aphasia were included on the basis of their agrammatic speech. One IWA who was classified as ‘global aphasia’ was excluded because the aphasia was too severe to elicit reliable data.

## Materials

Sentence comprehension was tested with a spoken-sentence-to-picture matching task. It contains 40 semantically reversible sentences distributed equally over 4 experimental conditions (10 actives, 10 passives, 10 subject clefts, and 10 object clefts). Each item is presented as a set of four pictures: one target and three distractors (reversed role distractor, lexical distractor, and lexical distractor with reversed roles).

## Results

The control group of 12 non-brain-damaged participants (NBDs) performed close to ceiling level (mean= 0.97, range=38-40 out of 40), which is significantly higher than the IWAs (Mann-Whitney U Test:  $U=0$ ,  $p=.001$ ). The scores for each aphasic individual are shown below in Table 1.

Table 1. Sentence comprehension results for aphasic speakers (maximum 10 per condition; 40 in total per IWA)

|   | type         | total       | active      | s-cleft     | passive     | o-cleft     |
|---|--------------|-------------|-------------|-------------|-------------|-------------|
| 1 | Broca        | 25          | 8           | 7           | 5           | 5           |
| 2 | Broca        | 23          | 9           | 5           | 7           | 2           |
| 3 | TCM          | 31          | 9           | 9           | 10          | 3           |
| 4 | Broca        | 29          | 9           | 9           | 5           | 6           |
| 5 | Broca        | 23          | 6           | 7           | 5           | 5           |
|   | <b>Total</b> | <b>131</b>  | <b>41</b>   | <b>37</b>   | <b>32</b>   | <b>21</b>   |
|   | <b>%</b>     | <b>0.66</b> | <b>0.82</b> | <b>0.74</b> | <b>0.64</b> | <b>0.42</b> |

\*total represents raw score of correct responses; active, s-cleft, passive, and o-cleft show raw scores in the respective categories. % shows the average percentage of correct responses

Fisher’s exact tests were used to test for significance. There was no difference between the sentence types with base word order (active-subject cleft:  $p=0.4695$ ). There was a significant effect of word order in the cleft sentences (subject vs object clefts:  $p=0.0022$ ). The passive sentences were not more difficult than the active sentences ( $p=0.0705$ ) and significantly easier than the object clefts ( $p=0.0046$ ).

Errors were classified into the three distractor types which are: reversed role distractors (RR), lexical distractors (LD), and reversed role lexical distractors (RRLD). RR occur significantly more often than the two other error types (Fisher’s exact: LD,  $p<.0001$ ; RRLD,  $p<.0001$ ). The difference between LD and RRLD was not significant ( $p=.0771$ ).

## Discussion

The research question was whether frequency could overrule the effect of derived word order. The scores on the cleft sentences show that for this group of IWAs, sentences with derived word order are harder to comprehend than sentences with base word order, as predicted by the DOP-H.

However, the highly frequent passive constructions are not significantly harder than the actives, suggesting that comprehension of passive sentences is relatively preserved. This would confirm the findings of Postman (2004) and Anjarningsih et al. (2012) that the passive is relatively well spared in SI IWAs.

However, the group of IWAs is very small, so the data should be interpreted with caution. Inspection of Table 1 shows that 4 of 5 of the IWAs with Broca's aphasia are more impaired on the passives than on the actives, in fact as a group, they perform at chance level on the passives (and the object clefts). Moreover, the effect of frequency is not in line with earlier findings for agrammatic production. Bastiaanse, Bouma, and Post (2009) reported that frequency of verb forms and grammatical constructions in Dutch did not influence agrammatic performance on production tasks. Hence, although performance on passives is not significantly lower than on actives, more data are needed before we can draw firm conclusions on the effect of frequency of the passive construction on agrammatic sentence comprehension in SI.

## References

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