

# Successive Approximations at Producing Sentences – Longitudinal Analysis of Conduite d'Approche Behavior Observed in a Broca's Aphasic

## *Introduction*

In the aphasia literature, conduite d'approche behavior has been described for an aphasic's successive approximations at producing target words in various language production tasks (e.g. Joannette, Keller, & Lecours, 1980). On the sentence level, Goodglass, Gleason, Bernholtz & Hyde's (1972) discuss qualitative aspects of their client's attempts at producing responses to items of a story completion task. In the child language literature (Weir, 1962), successive attempts at producing sentences are classified in terms of three types of sequences: 'build-ups', 'breakdowns' and 'completions'. Whereas build-ups and completions represent an attempt to produce linguistically longer, more complete sequences, i.e. utterances, breakdowns result in shorter productions. In this presentation, successive approximations at adequately describing pictures depicting single activities in sentence form over a six-year period will be analyzed. The implications of our findings regarding the pattern of language recovery in chronic Broca's aphasia and the characterization of agrammatic symptomatology are discussed.

## *Methods*

### *Participant*

TH, 46-year old, male suffered a massive left hemisphere CVA in 2001. Initially, TH presented with global aphasia which evolved into Broca's aphasia with severe agrammatic sentence production, apraxia of speech, and difficulties comprehending semantically reversible sentences with 2- and 3-place predicates.

### *Procedure*

Starting 15 months post onset, TH participated in six therapy protocols aimed at facilitating oral sentence production to picture stimuli. Each protocol consisted of 60 sessions with extensive pre- and post-therapy language testing. All test and therapy sessions were videotaped. For this presentation, responses from eight test applications of an oral sentence production task (n = 40), the Boston Naming Test (BNT) (n = 60 items), and the Action Naming Test (ANT) (n = 63 items) are analyzed:

- Test 1 = Pre-therapy I, 15 months post onset
- Test 2 = Post-therapy I, 21 months post onset
- Test 4 = Post-therapy II, 33 months post onset
- Test 6 = Post-therapy III, 41 months post onset
- Test 8 = Post-therapy IV, 56 months post onset
- Test 10 = Post-therapy V, 69 months post onset
- Test 11 = Pre-therapy VI, 72 months post onset
- Test 12 = Post-therapy VI, 79 months post onset.

## *Results*

In Figure 1 for each test item all the attempts at producing sentences (n = 40) are shown with regard to:

- 1) the average number of attempts at producing a response
- 2) the average number of fresh starts at producing a new sentence

- 3) the average number of correct responses
- 4) non-analyzable productions per item, e.g. single word responses.

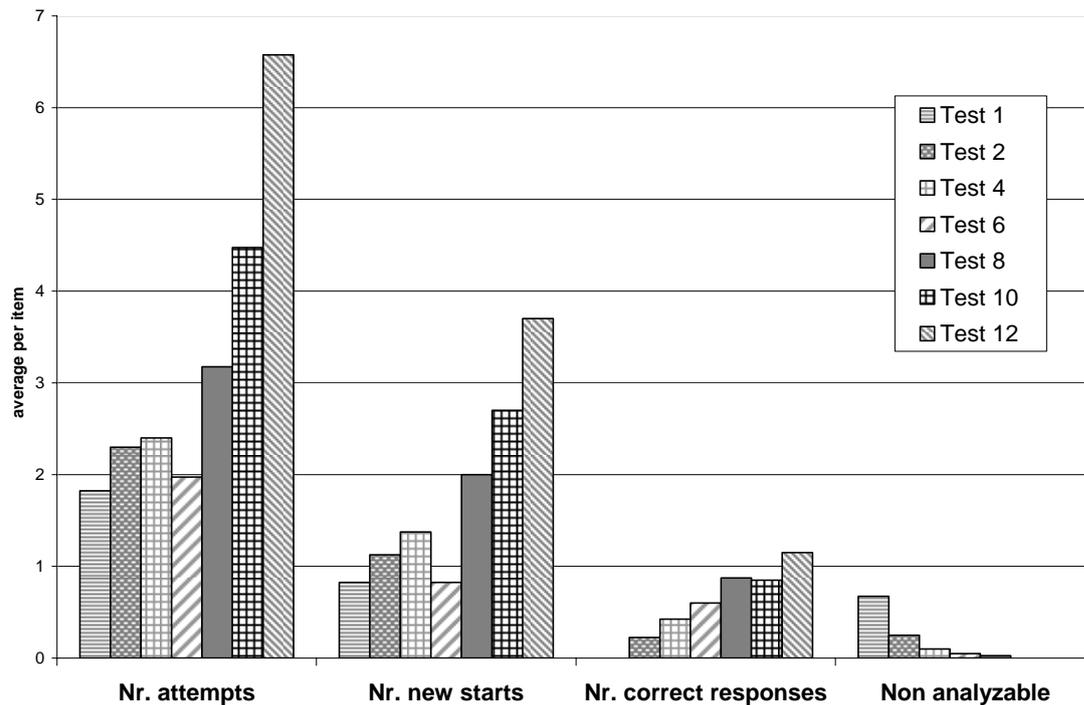


Figure 1 TH's average number of attempts per item at producing sentences for seven test applications (n = 40 items)

As of Test 8, TH produced a greater number of attempts in response to each item (3.2 , 4.5, and 6.6 respectively), and the most fresh sentence starts averaged per item (2.0, 2.7, and 3.7.respectively). By Test 8, the non-analyzable utterances decreased to zero. In contrast, the length of the longest produced correct sentence increased to 14 words by Test 8 and has

remained stable to date.

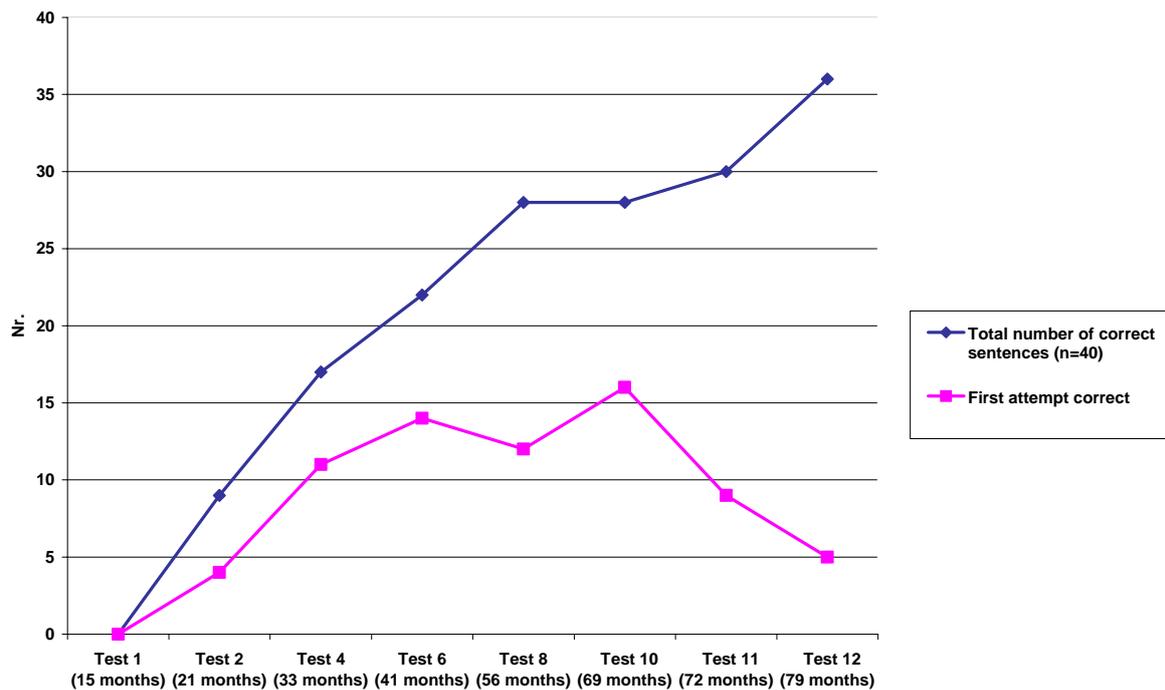


Figure 2 The total number of sentences correctly produced in comparison to the total number of first attempts correct for eight test times

In Figure 2 the discrepancy between the total number of correct sentences including new starts and various attempts and the total number of correct sentences produced as the first attempt is shown. As of Test 11 the number of correct first attempts declines, whereas the overall number of correctly produced sentences increases to 90% for Test 12. Test 11 is included in this figure to show that the score for Test 12 is the continuation of a pattern already observed and therefore is not an isolated occurrence. An increase in the number of correctly produced sentences is observed for Test 11 which was administered following a three month therapy pause.

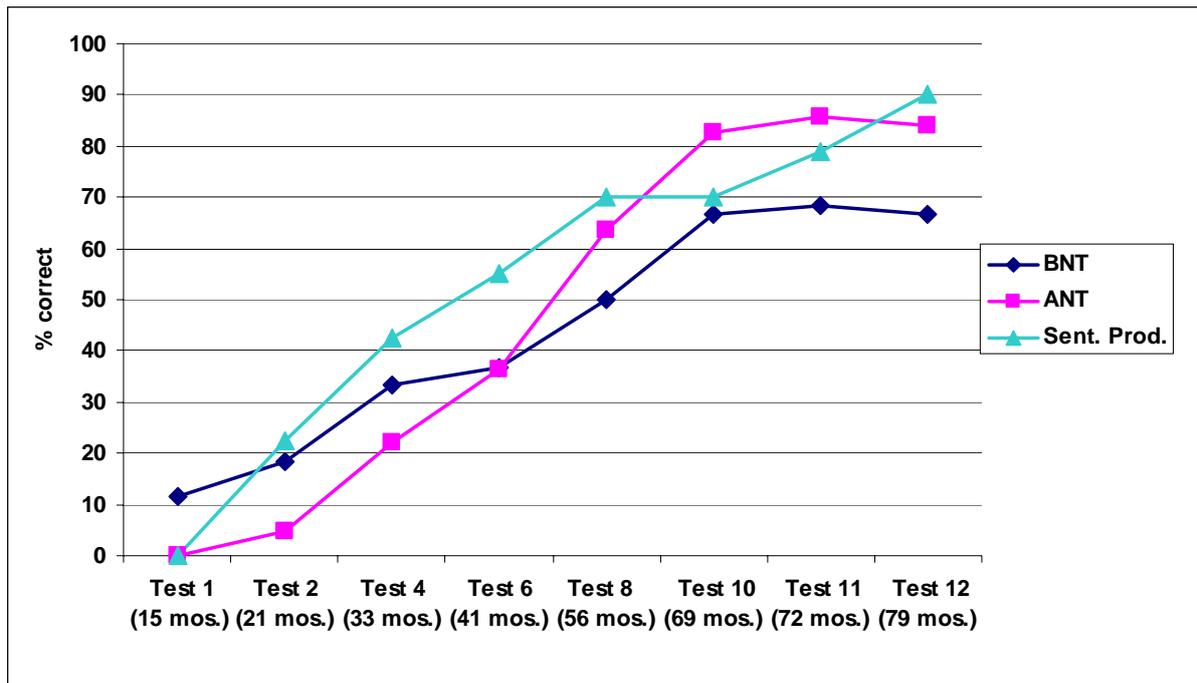


Figure 3 The percentage of correctly produced items on the Boston Naming Test (BNT), action naming test (ANT) and a sentence production task

In Figure 3 TH's performance - the percentage of correctly produced items - on the Boston Naming Test (BNT), action naming (ANT) and the sentence production task is given. TH's sentence production performance continues to improve, whereas his verb retrieval and noun retrieval has levelled off.

### Discussion

The 'build-ups' sequences produced by Weir's (1962) two-year old son share the feature of becoming more complete and longer with each successive production. Goodglass et al. (1972) stress that even though there was a high degree of variability among successive trials of the same item, their client's (RH) successive attempts usually improved the grammaticality of the output. The responses RH left unchanged were the best production of which he was capable.

TH's longitudinal sentence production data presented in Figure 1 to 3 corroborate their findings and provide a documentation of changes in the pattern of performance: Initially, TH produced no correct sentences and few successive approximations. His utterances were incomplete and several errors were observed. Particularly striking were his verb omissions and the production of semantically inadequate verbs. As of the fourth post-therapy assessment, TH produced a greater number of successive approximations. These attempts resulted in longer, more correct and semantically adequate utterances. The successive attempts reveal his dissatisfaction with his own responses. An example from Test 10 demonstrates this behavior:

- The man is ...
- The man is watching a ...
- The man is... listening ...
- The man is listening with?
- from? to? to the radio
- The man is listening to the radio.

TH's improved word-finding for verbs enables him to describe a depicted activity until he is satisfied with his result or he gives up. Verbs and prepositions still show impairment. For both of these categories TH produces a list of items and sometimes cannot decide which item is correct. Longitudinally we observe an 'underuse' due to unavailability of particular forms (i.e. verbs and prepositions) changing to an 'overuse'. However, in several cases an incorrect form is produced in the last attempt. Although the number of immediately correct sentences shows a decrease for the last two test times, TH's overall number of correctly produced sentences has increased from zero to 90% and his retrieval of verbs from zero to 83%.

Analysis of TH's attempts at producing sentences provides insight into how oral sentence production changes across time. In particular, the interactions between improved word-finding and sentence production are relevant. These findings are also important for specifying long term therapy goals. Although the pattern of performance showed great variability in the process of producing a correct response, TH continues to show improvement over seven years post onset. Ongoing qualitative analysis of TH's responses in terms of build-ups and completions will provide insight into his *conduite d'approche* behaviour.

#### References

- Goodglass, H., Gleason, J.B., Bernholtz, N., & Hyde, M.R. (1972). Some linguistic structures in the speech of a Broca's aphasic. *Cortex*, 8, 191-212.
- Joanette, Y., Keller, E. & Lecours, A.R. (1980). Sequences of phonemic approximation in aphasia. *Brain and Language*, 11, 30-44.
- Kaplan, E., Goodglass, H., & Weintraub, S. (1983). *Boston Naming Test*. Philadelphia: Lea & Febiger.
- Obler, L.K., & Albert, M.L. (1979). *Action Naming Test*, Experimental Edition.
- Weir, R. (1962). *Language in the Crib*. The Hague: Mouton.