
MEASURES OF NARRATION AS A METHOD FOR STUDYING APHASIC LANGUAGE

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Background and Aim

During the last few decades, a number of studies of aphasia, traumatic brain injury,

Narration can be an interesting form of task for evaluating parts of language and communication skills, since, on the one hand, it can be elicited as a fairly well controlled task in a clinical setting (e.g. as part of a standardized test), while, on the other hand, it can be argued that it represents some of the pragmatic and functional communication skills that play a role in communicative interaction.

There are a number of possible narration tasks which have been used, such as:

- * listening to a story and retelling it (e.g. Ernest-Baron, Bookshire and Nicholas, 1987, Chapman, Culhane, Levin, Harward, Mendelsohn, Ewing-Cobbs, Fletcher, and Bruce, 1992).

- * describing thematic pictures (e.g. Cookie Theft (BDAE) from Goodglass and Kaplan 1972, cf. Menn & Helm-Estabrooks, 1994).
- * narration of a known story (fairy tale) from memory (e.g. Menn and Obler, 1991)
- * narration of real-life events from memory (e.g. Menn and Obler, 1991).

Procedural tasks, e.g. "How to mail a letter" (Ulatowska, North, and Macaluso-Haynes, 1981), have also been used in some studies.

There are several phenomena of theoretical interest to be studied in narration:

Speech Flow and/or Speech Rate

Since narration is connected to monological speech, measures of flow and speed can be applied, provided that the sample is large enough (cf. Ulatowska, Freedman-Stern, Doyel, and Macaluso-Haynes 1983; Hartley and Jensen, 1991, 1992). We can expect to find different characteristics of speech flow in different forms of aphasia. While dynamic disturbances are considered essential in all aphasia by Luria (Luria, 1976), most sparse, slow and hesitant speech, and short phrases would be expected in aphasics with frontal and/or deep lesions, and most fast flowing speech (possibly vague and somewhat disordered) in aphasics with posterior (temporal, parietal, occipital) lesions (cf. the non-fluent vs. fluent distinction often used in the characterization of aphasia, e.g. by Goodglass and Kaplan, 1972).

Content (information)

Concerning content, patients with frontal and/or deep lesions (Broca's, agrammatic, dynamic, transcortical motor etc.) are expected to be basically correct but very sparse and possibly concrete, focusing on one thing at a time, rather than the totality. Patients with posterior lesions (Wernicke's anomic, transcortical sensory, semantic, acoustic etc.) would produce more speech, but not necessarily more content, and their share of target content, i.e. comunicatively correct and relevant content, would be relatively low.

Structure and Cohesion

Macro-structure, e.g. story structure and the structure of the main components (episodes) of the story, as well as the linking together of episodes, using cohesive devices, such as conjunctions, has also been studied (cf. Halliday and Hasan, 1976; Ulatowska et.al., 1983, Ahlsén, 1985), but specific features of different aphasia types have not been described in any detail. It appears that the basic structure is kept by most aphasics, whereas one can expect some problems in aphasics with frontal lesions, concerning the use of cohesive ties (cf. Menn and Obler, 1991).

The aim of the present study is to describe some features of aphasics' narration and the development of these features over time (during nine months of rehabilitation). The features that are described here pertain to the area of factual content (i.e., the goal is to find out how much factual information is conveyed and how this is done).

This means that content (information) phenomena are in focus. It should, however, be noted that content phenomena in narration are influenced by (and influence) speech flow (productivity) as well as structure and cohesion. The choice has further been to use measures that are simple enough for clinical application, put together into an individual "narration profile". The study of aphasics' narration aims at finding features affecting the proficiency of aphasics in spoken interaction in general. Narration plays an important part in most types of spoken interaction, but is studied here under strict control in specific narration tasks, in order to obtain comparability among subjects and over time. The variables chosen for study are features that are considered as critical for informativeness in everyday discourse narration. The five case studies include aphasics with different aphasic symptoms and different expected profiles of discourse features. Finally, and differently from previous studies of aphasic narration, the study is longitudinal, comparing different measures of narration before and after a period of intensive rehabilitation and, thus, trying out the narration profile as a tool for evaluating possible effects of rehabilitation and/or spontaneous recovery.

The first main question about the narration of aphasics is: How does the narration of aphasics differ from that of non-aphasics, concerning features critical for informativeness?

This question has, at least partially, been answered in earlier studies of controlled narration tasks (see also above), although not many extensive case profiles of aphasics of different types have been presented. The main findings in summary are the following:

- * Aphasics seem to keep the same structure and basic content of narratives as non-aphasics (Ulatowska, North, and Macaluso-Haynes, 1983; Ahlsén, 1985).
- * Aphasics provide less factual content in a narrative than non-aphasics (Berko-Gleason, Goodglass, Obler, Green, Hyde and Weintraub, 1980; Yorkston and Beukelman, 1980; Ahlsén, 1985; Correia, Brookshire and Nicholas, 1990; Brenneise-Sarshad, Nicholas and Brookshire, 1991). The factual content has been measured in various ways, i.e., (a) as target lexemes (as compared to controls) or number of correct information units and percentage of words that are correct information units, (b) as number and percentage of content words (nouns, verbs and adjectives), (c) as number of descriptive statements or communication units.
- * Aphasics tend to use a smaller relative share of nouns and a larger relative share of pronouns than non-aphasics (e.g. Ahlsén, 1985).
- * Aphasics provide less specific and explicit information about new entities which are introduced in the narrative and they provide less information about the setting (Ahlsén, 1985, Brenneise-Sarshad et al., 1991).
- * Aphasics tend to use more varying means of reference than non-aphasics, i.e., also nonverbal means, such as pointing and appealing to the interlocutor (Ahlsén, 1985).
- * Some aphasics tend to get 'sidetracked' and produce narration with unexpectedly focused information (Luria, 1976; Frawley, 1980; Ahlsén, 1985).

The content (information) variables chosen for the present study are specified below. If aphasics, as assumed here (see above), include less factual content in their narratives, it is important to find reasonable ways of measuring and describing this difference from non-aphasic narration. Factual content can be measured by different simple measures, whereas more complex and relational aspects of content are hard to capture. The ability to make precise and specific reference is crucial. Less factual content can be a) less content in general (i.e., the sparse production of aphasics with frontal and/or deep lesions) or less precise and specific information, which would be more expected in aphasics with posterior lesions, but could also be a consequence of a generally sparse production (i.e., in short forms of reference, like *he* instead of longer ones, like *Mr Brown who is my neighbour*). The chosen measures (operationalized under Method, below) were:

- (a) The number of descriptive statements;
- (b) The number and percentage of nouns, verbs and adjectives (i.e., so called 'content words', leaving out adverbs);
- (c) The relative share of pronouns versus the relative share of nouns;
- (d) Specificity and explicitness in the introduction of new entities and information about the setting.

The second main question is: Which patterns of development in narration can be found in aphasics undergoing rehabilitation?

This question will be operationalized as several sub-questions in comparing narration recorded before and after nine months of rehabilitation.

1. *Do the amount and share of factual content in the narratives increase?*

- (a) *Do the number of descriptive statements increase? If an aphasic patient initially produces fewer descriptive statements than control subjects typically do, an increase after nine months would be one possible sign of increasing information. The descriptive statements that can be counted are statements produced by control subjects and, thus, the relevance and informativeness of these statements are ensured.*
- (b) *Do the number and relative share of nouns, verbs and adjectives change, and in that case how? So called content words, most typically nouns, verbs and adjectives, are the words that, relatively independently of the context, carry the heaviest information load. Since the content, rather than the structure, is focused on in this study, the number and relative share of these words are other possible indications of the amount of information. These measures tap the ability to produce content words (a well-known difficulty for most aphasics, especially Wernicke's and anomic aphasics, something which is expected to increase during a rehabilitation/recovery period. It does not, however, ensure that the produced nouns, verbs and adjectives are necessarily correct information units (cf. Brenneise-Sarshad et al., 1991). (The choice in this study was instead to use the descriptive statement measure for the control of correctness, compared to controls). The noun+verb+adjective measure, besides being a possible measure of lexical richness, is also a possible measure of structural poverty, i.e., if the relative share of content words is higher for an aphasic than for the controls, while the total number of words is low for the aphasic, one might expect that too little of the information burden is carried*

by linguistic structure (as represented by so called function words), as in the case of an agrammatic aphasic. In such a case, the relative share would decrease while the total number of words would increase as the patient becomes a more adequate narrator. The noun+verb+adjective measure is, thus, a potentially interesting measure, which, also in combination with other measures (e.g. total number of words and number of correct information units) gives information about important aspects of content in narratives.

- (c) *Does the relative share of pronouns versus nouns change and in that case how?* A simple measure, which is related both to the ability to produce content words (see above) and to the specificity and explicitness in introducing new entities (see below), is the relative share of pronouns versus the relative share of nouns. Aphasics with word finding problems and tendencies to give vague information (mostly posterior lesions), as well as aphasics with very sparse output (mostly frontal and/or deep lesions), are expected to produce more pronouns than non-aphasic persons in their narratives, thereby making them possibly less explicitly and specifically informative. (Further analysis of how pronouns are used can give more information about this). The relative share of pronouns should, thus, in most cases, decrease to a more normal one after rehabilitation/recovery, and the relative share of nouns should show the reverse development. (Note, however, that a very low proportion of pronouns, and a high proportion of nouns, in combination with a very low total number of words, can indicate an agrammatic, disconnected narration, and in this case, an increase of pronouns and a decrease of nouns (in relative terms) would be the desirable development. The control data as comparative target numbers, is, as we can see, indispensable for the use of several measures, since changes in one and the same quantitative direction is not always desirable for all aphasics).

2. *Do the specificity and explicitness in introducing new entities increase and is there more information about the setting in the second (and third) recording?* The establishment of a common frame of reference, topic (who and what we are talking about), appears to be a typical problem in conversations involving aphasics, partially caused by vagueness in reference by the aphasics (in its turn caused by word finding problems) (cf. Ahlsén, 1993). The most important part of a narration as well as a conversation, is the introduction of new characters and objects and a new setting. For clinical purposes, it is important to find out what goes wrong for the aphasics in the introduction of new information of this type, something that can be studied in their narratives.

Do the problems vanish or decrease after some rehabilitation/recovery or is special therapy called for?

3a) *Are there any differences in the 'sidetracking' that one might find between recordings before and after nine months of intensive training?*

b) *Does 'sidetracking' decrease?* The point about 'sidetracking' only applies to the few aphasics that show features in their narration which could be ascribed to such a phenomenon. If 'sidetracking' occurs, it is bound to affect the informativeness of the narrative extensively and in specific ways. By trying to find out more about possible reasons behind 'sidetracking', we can attempt to get closer to both explanations and possible therapy.

The non-directional questions (concerning change only), i.e., 1b and 1c and 3a above, indicate that we cannot, *a priori*, predict that a change in the same direction would benefit the narration patterns of all aphasics, so that the amount of factual information would increase. Combination with other measures in the narration profile and with control data is needed. The directional questions (concerning increase and decrease), on the other hand, hypothesize that a positive answer to the question would be a sign of a more efficient communicative pattern on the part of the aphasic in most cases.

METHOD

Subjects

Five aphasics, showing different symptom patterns (three with fluent speech and anomic problems and two with nonfluent speech) were compared in video-recorded narration tasks at two points in time, at the outset of an intensive rehabilitation period and nine months later.

As a criterion for inclusion in the study, the aphasics had to have sufficient language comprehension and language production ability to be able to take part in the study in a meaningful way. This implies that a certain minimum of output fluency was required as well as fairly intact auditory comprehension, enabling the aphasics to correctly understand the instructions. No aphasic with visual field impairment was included. The aphasics were selected, according to the criteria above, from a group which had already been selected for intensive training. Their characteristics (age, sex, profession, time post onset at the start of the study, lesion, aphasia type, and severity of the aphasia, according to BDAE (Goodglass and Kaplan, 1972) are summarized in Table 1. The patients were studied as individual cases (cf. Caramazza

and Bedecker, 1989; Kahn, Joannette, Ska and Goulet, 1990), representing fluent as well as non-fluent aphasia types, in order to test the usefulness of the discourse measures in a longitudinal and clinical perspective.

Table 1:
Summary of data concerning the aphasic subjects

Aphasic	Age	Sex	Time post onset	Lesion	Aphasia	BDAE severity
1	47	f	3; 2	frontal sub-cortical	discrete anomic	4-5
2	41	f	1, 6	parietal	mixed nonfluent	4
3	47	m	3; 8	temporal parietal	Wernicke	2
4	27	m	0; 9	temporal parietal	Wernicke	3
5	28	m	9; 9	frontal parietal sub-cortical	mixed nonfluent	3

The five aphasics all underwent intensive rehabilitation over a period of nine months in a boarding school environment. The rehabilitation programme included language training, participation in an adapted full-time programme of studies in different subjects, and social activities. (All of the aphasics, except aphasic 3, had undergone some language training earlier).

A control reference group consisting of six non-aphasic subjects (3 male and 3 female subjects, representing different ages and professions and all non-hospitalized with no neurological, speech, hearing, language, visual, or intellectual impairments) were given the same tasks.

*Data Collection: Discourse Tasks, Stimulus Material, and Procedure**Discourse tasks*

Each aphasic and control person was given three narration tasks:

- (a) narration of the events in a picture series
- (b) narration of the events in a thematic picture
- (c) narration of a well known fairy tale (Little Red Riding Hood) from memory

These tasks were chosen in order to study narrative production (i.e., not comprehension, as in retelling tasks, and not procedural production) in controlled and inter-individually comparable tasks (i.e., excluding narration of real-life events, which is not in the same way comparable among individuals).

Stimulus Material

Both the picture series and the thematic picture tasks aim to elicit narration from picture material, whereas the fairy tale elicit narration of a specific content, but from memory. The stimulus material for the picture narration tasks were the picture series 'Man and Leaves' and the thematic picture 'Thieves' from 'Composition Through Pictures', by J.B. Heaton (Heaton, 1966, see Figure 1).

Procedure

The subjects were tested in a quiet room at the boarding school, in the context of a longer video-recording. The narration tasks were preceded by a free narration task (the patient's history of illness), and then they were administered by a speech pathologist who was familiar to the subjects. No extra prompting was used during the narration tasks. The instructions were 'Tell me what happens in the picture(s)' for the picture narration tasks, and for the free narration 'Tell me the story of Little Red Riding Hood and the Wolf or as much as you remember of it'

The narration was video-recorded by the author and transcribed by a research assistant and by the author independently, using conventional orthography adapted to spoken language forms. Nonverbal sounds and gestures were also noted in the transcriptions. The transcription reliability was 90-95%. All points of disagreement were checked and disambiguated by both the transcribers together

Analysis of the Transcriptions

A number of measures were calculated for comparison of the narration in the two (or three) recordings of each aphasic and for comparison with the narration of the controls. The measures were operationalized and calculated as specified below

1. Number of target descriptive statements

The target descriptive statements for each narration task were identified as all the statements which were included totally in the narratives of the controls. A target descriptive statement was defined as a unit of information, consisting of a predicate with one or more arguments (cf. 'propositions', in Kintsch and van Dijk, 1978; 1985, and 'communication units', in Hartley and Jensen, 1992). The number of descriptive statements was then calculated for each narration and each subject (the aphasics in each recording and the controls). The numbers were used as indicators of the amount of factual content in the narratives.

2. Total number of words, number and relative share of nouns, verbs, adjectives and pronouns

The total number of words in each narrative and for the three narratives of each recording was calculated and used for two purposes, as a measure of the total output and as a basis for comparisons of the relative shares of 'lexical content words' and pronouns. The relative share of nouns, verbs and adjectives out of the total number of words was calculated. The total number and relative share of nouns was also compared to the total number and relative share of pronouns for each recording.

3a. Verbal specificity and explicitness

A simplified scale of verbal specificity and explicitness was used for grading the introductions of new entities in the narratives. The scale reaches from 1) NP with indefinite noun (in some contexts definite noun or proper name) as the most specific and explicit reference, via 2) NP with definite noun or proper name, 3) specific pronouns, and 4) general pronouns, and 5) nonverbal reference, to 6) no reference (cf. Ahlsén, 1985). The simplified scale is motivated by the restricted choice of reference used by the aphasics, i.e., avoidance options of the full-blown system for reference, according to Martin (1992), both by use of "the grammar of little text" (Halliday, 1985), in the case of agrammatic aphasia, and by use of generalised reference.

There is no reason, *a priori*, to expect that in controlled narration of the types used in this study it would necessarily be more correct or normal to use verbal references of types 1 and 2 in the scale above for introducing new entities than to use the other types. The subjects know that the examiner has seen the stimulus pictures, and the title of the folk tale, including the name of the main character, has been mentioned. It would thus be perfectly acceptable to treat many entities as already introduced. The basis for still using the scale in this context is that, in fact, the controls consistently opt for the two most explicit reference alternatives (1 and 2) for introduction, i.e., they seem to disregard the possibility of treating certain information as given and automatically direct themselves to an audience which is not familiar with the material. This leads us to believe that deviances from this pattern are, for the aphasics, most likely related to their aphasic symptoms (cf. also Brenneise-Sarshad et al., 1991, who found no important effects of apparent listener knowledge of stimuli in aphasic patients, whereas aphasics differed considerably from non-aphasic controls on several variables of narrative discourse).

3b. Number of problems of reference

Instances of five behaviours were calculated: vague phrases or clauses, indefinite nouns or pronouns, deictic terms, pronouns that were non-indexed, ambiguous or incorrect, and uncorrected paraphasias (cf. Hartley and Jensen, 1991, 1992).

3c. Establishment of setting

A qualitative study of the establishment of setting of each narration was performed, checking the following variables: form and quantity of initial reference to persons, objects and surrounding (situation), i.e., identification of characters, time and place (cf. Labov 1972) plus ongoing action.

4. Sidetracking

With the target descriptive statements (i.e., the number of descriptive statements that contained specific but inaccurate information relative to the discourse task, cf. Hartley and Jensen, 1991, 1992) as a basis for comparison, a qualitative analysis of deviance was made in order to identify and describe possible sidetracking.

RESULTS

The Control Data

The quantitative data for the control group, which can be used as a measure of target values in the analysis of the aphasic data are summarized in the "narration profile" below

Table 2.1:
Narration profile of the control group

N of descriptive statements: Leaves	mean 7, range 4-11
N of descriptive Thieves	mean 8, range 4-12
N of descriptive statements: Little Red Riding Hood	mean 13.5, range 7-21
N of words	mean 338, range 183-535
% content words	mean 33.8, range 31-41
% nouns	mean 16, range 12-32
% pronouns	mean 6, range 3-10
N of reference problems	0
First reference: Leaves	category 1 only
First reference: Thieves	category 1 only
Introducing reference: Leaves	range of means 1
Introducing reference: Thieves	range of means 1-1.54

N = number

The number of descriptive statements shows considerable individual variation. It is an interesting feature mainly in aphasics who fall outside the control range totally or for either picture narration or narration from memory (Little Red Riding Hood). The number of words totally is expected to be different for different types of aphasics, nonfluent aphasics having low numbers and fluent aphasics having high numbers, sometimes, although not necessarily, outside the range

of the controls. Changes from more extreme numbers in the direction towards the control mean value are expected to be a positive feature.

If the percentage of content words, nouns and pronouns is other than within the range of the normals, this is considered as a possible aphasic feature. There should thus ideally be around 1/3 content words and more nouns than pronouns.

All reference problems are potentially aphasic features. It is expected that most aphasics will have such problems and that they should in most cases decrease over time. The controls are consistent in establishing the setting by always giving the first reference as a noun phrase containing an indefinite noun. This is also practically always the case in all introducing reference throughout the picture narration. The only exceptions are a few definite noun phrases introducing family members in the "Thieves" story (In this case the family as such is already given information). We can expect first reference of category 1 and a mean value for introducing reference of 1 in "Leaves" and between 1 and 2 in "Thieves" to be the normal range, and values outside this very limited range are considered as "deviant" ("Little Red Riding Hood" is not used for comparison, since the main characters are introduced in the title of the story). In fact, the controls generally add a relative clause to the first indefinite noun phrase as in "it is a man who is working in the garden" and "there is a family who is watching TV," thus establishing the setting. This feature is not included in the reference hierarchy used here, but is considered in the qualitative analysis of "establishment of setting"

By definition, the controls do not produce any inaccurate descriptive statements/ potential sidetracking. If such features are found in the aphasic narratives, they are analyzed qualitatively

The aphasics

The narration profiles of A1-A5 are presented below. In the tables, numbers outside the normal range are in bold, and + or - indicates the direction of the deviation. The tables are supplemented by a short description, also including the qualitative analysis.

Table 2.2:
Narration profile of A1 (Discrete anomic, BDAE severity 5)

	Recording 1	Recording 2
N of descriptive statements: Leaves	5	5
N of descriptive statements: Thieves	12	7
N of descriptive statements: Little Red Riding Hood	10	15
N of words	321	269
% content words	27 -	31
% nouns	10 -	10 -
% pronouns	12 +	20 +
N of reference problems	21 +	16 +
First ref: Leaves	3 +	3 +
First ref: Thieves	1	2 +
Introd ref: Leaves	1.67 +	2 +
Introd ref: Thieves	1.64 +	1.83 +

A1 has a mild anomic aphasia. Her aphasia is hardly noticeable in spontaneous speech, but typical anomic features show up in her narration profile. The reference problems are there, a variable which shows improvement of the anomic features over time. Other anomic features are the high share of pronouns and the variation in first and introducing reference. These variables, however, do not show any improvement over time. The share of pronouns even shows an increase. When it comes to the setting, A1 seems to take for granted that the listener knows the pictures. She only talks in terms of given information, i.e., references are made by pronouns or definite nouns. The 'setting' is given as a description of what happens first or what happens in the foreground of a stimulus picture. A1 shows no development in the establishment of settings. Judging from the decrease in reference problems in general, it should be possible for A1 to also give more specific introducing reference and setting and perhaps this is

something which she should be made aware of in order to change her reference strategies. The increase in pronouns does not seem to be necessary for A1; perhaps it is also the result of a reference strategy that has become habitual. An alternative interpretation is, however, that precisely the introducing reference is the most vulnerable and last recovered anomic feature, being the cognitively and linguistically most demanding type of reference.

Table 2.3:
Narration profile of A2 (Mixed, BDAE severity 4)

	Recording 1	Recording 2
N of descriptive statements: Leaves	7	7
N of descriptive statements: Thieves	12 +	7
N of descriptive statements: Red Riding Hood	12	19
N of words	402	387
% of content words	32	35
% nouns	15	15
% pronouns	9	14 +
N of reference problems	21 +	16 +
First ref: Leaves	15 +	3 +
First ref: Thieves	3 +	3 +
Introd ref: Leaves	1.25 +	1.5 +
Introd ref: Thieves	1.67 +	1.75 +

A2 has a mixed aphasia, and can thus not easily be described in terms of one specific syndrome. Her aphasia is also relatively mild. It mainly shows up in the large number of reference problems in recording 1, which have almost vanished in recording 2, in the high and rising share of pronouns, and in the varied reference, which has not vanished in recording 2. A2 has a clear sense of the conventions for

giving an introductory setting of the type that we find in the controls. She strives

opment towards this target. The two alternative interpretations of the combination of decrease in reference problems in general, the increasing use of pronouns, and persisting variability in introducing and first reference suggested above for A1 can also be applied to A2, although A2 shows more pragmatic awareness of the need for specific reference than A1. This would make the second alternative (i.e., as an anomic feature) more likely for A2.

Table 2.4:
Narration profile of A3 (Wernicke, BDAE severity 2)

	Recording 1	Recording 2
N of descriptive statements: Leaves	5	4
N of descriptive statements: Thieves	4	4
N of descriptive statements: Red Riding Hood	10	7
N of words	381	298
% content words	29 -	29 -
% nouns	10 -	16
% pronouns	8	14 +
N of reference problems	26 +	14 +
First ref: Leaves	5 +	1
First ref: Thieves	2 +	1
Introd ref: Leaves	3.67 +	3 +
Introd ref: Thieves	1.4	1.5

Here we encounter a Wernicke's aphasic who has aphasia and a different character than that of Aphasics 1 and 2 above. His condition is also more severe. We can see this in his low number of descriptive statements in both recordings, as well as in his low number of nouns, high number of reference problems and unspecified first and introductory reference in the first recording. This pattern reflects many problems of specificity in reference and the use of a number of stereotype phrases, which provide a fairly large number of words, including content words (mainly verbs and adjectives).

In the second recording, we find that the share of nouns and the types of first and introducing reference have normalized. The number of reference problems has decreased. The share of pronouns has, however, increased to a high level and the total number of words has decreased. This reflects the inhibition of stereotype phrases and the attempt to speak in a more focused way. Since the reference problems, although decreased, still persist, we find "inadequate" and general phrases replaced by more focused phrases with anomic symptoms, leading to the increased use of pronouns. In this aphasic, thus, we have to consider a complex interaction of features in the narration profile, which reflects his initial problems and his partial improvement. When it comes to providing a setting, A3 lacks the verbal means for reference to a great extent in both recordings. For example, he makes no introductory reference at all to the main character of "Leaves" in recording 1 and 2. In "Thieves", he goes from an introducing definite noun followed by a specification in recording 1, to an indefinite noun phrase, which can be considered as both grammatically and discourse functionally more correct, although less specific, in recording 2.

A3 is the only aphasic in the study who produces a substantial number of non-target descriptive statements, compared to the controls. He tends to get stuck on non-focused elements in recording 1, possibly as a result of stereotype strategies/patterns of expression, such as counting the exact number of persons or things in the picture and elaborating the description of furniture and objects. He reads the small visible text on the newspaper in the "Thieves" picture, which is in English and relates his own experiences of England. In Little Red Riding Hood, he appears to stress the ages of the characters more than expected. In recording 2, possible sidetrackings reappear, but less frequently. Examples are personal, evaluating comments, counting, and detailed elaboration of the contents of the food basket in Little Red Riding Hood.

We can ask if these potential sidetrackings of A3 are by-products of his particular aphasic symptoms. There are, in fact, plausible explanations in terms of typical aphasic symptoms. The sidetrackings seem to reflect the following features: (1) A disproportionately high dependence/reliance on the objects in the pictures, given the instruction "tell me what happens". Aphasics who, like A3, often lack means of expression, tend to keep very close to the stimulus material which can then serve as a prop for the narration (for example, pointing can be used, cf. Ahlsén, 1985). (2) Counting and giving exact numbers of objects and ages, which for this formerly global aphasic, might very well have developed as a strategy of expression used in as many contexts as possible, where it can lead to a suitable target expression, e.g. *she one two three four five six seven years old* could be a way of naming Little Red

Riding Hood (cf. Jackson, 1874). (3) As for personal comments and identification with the characters in the story, *the emotional/evaluating register is in many aphasics better preserved than strictly factual information giving* (cf. Ahlsén, 1985). There is also a *tendency for aphasics to take the role of characters in a narration*, for example by playing a dialogue (cf. Ahlsén, 1985; Ahlsén and Dravins, 1991). Both these features are found in the narration of aphasic 3. Evaluating descriptions of furniture and objects can be a reflection of the fact that this type of communication has been personally focused for the patient, due to his occupation. These features could together account for the non-target descriptive statements produced by A3. As mentioned above, they show a decrease.

Table 2.5:
Narration profile of A4 (Wernicke, BDAE severity 3)

	Recording 1	Recording 2
N of descriptive statements: Leaves	5	7
N of descriptive statements: Thieves	7	10
N of descriptive statements: Red Riding Hood	3-	8
N of words	416	428
% content words	28 -	32
% nouns	10 -	11 -
% pronouns	9	21 +
N of reference problems	14 +	31 +
First ref: Leaves	1	1
First ref: Thieves	3 +	2 +
Introd ref: Leaves	23 +	2.5 +
Introd ref: Thieves	2.3 +	2 +

A4's number of descriptive statements is adequate for picture narration, but initially too low for free narration (he is, in fact, unable to complete the task without help). His free narration increases to within normal range in recording 2. The total number of words produced and the share of content words are normal. A4, although his aphasia is less severe, shows similar features to the other Wernicke aphasic, A3. They both have a low share of nouns, as expected, and they both show an interesting increase in their use of pronouns, to 'overuse' them, in recording 2 (as A1 and A2), while, at the same time, they succeed in making their first and introductory references more and more specific. (There is one difference, however, in that A4 increases the total number of reference problems in recording 2, while A3, like the other aphasics, decreases his number of reference problems. The increase in reference problems in recording 2 consists of ambiguous anaphoric reference in the story narration, which did not appear, since A4 could not complete the story in recording 1). A4 is very much aware of his reference problems and spends much time on circumlocutions and attempts to specify by elaboration. He, thus, shows pragmatic awareness of the need for specific reference. He clearly attempts to establish a setting in his narration. He tries the same structures that are used by the controls. For example, "Leaves" is introduced in recording 1 by the phrase *there is a man who* which is a typical opening in the control data. He cannot, however, complete the relative phrase because of his anomia. In recording 2, he tries an alternative opening *on the grass out there is a lot of leaves rubbish which he* and he now succeeds in producing the whole introductory sentence (although the reference to the man loses its explicitness). The setting for "Thieves" also gains by the first reference being changed from *they* to *there is a family*.

A4 produces a few long sequences, which might be taken for unnecessary settings in recording 1. This type of sequence does not appear in recording 2. He is fairly anomic in recording 1, and the sequences are best explained as elaborate circumlocutions and attempts to establish frames for his own word finding, i.e., as a word searching strategy. Also in this case, the few potential sidetrackings appear to be by-products of the patient's particular aphasic symptoms and disappear when the symptoms disappear.

Table 2.6:
Narration profile of A5 (mixed nonfluent, BDAE severity 3)

	Recording 1	Recording 2
N of descriptive statements: Leaves	4	6
N of descriptive statements: Thieves	7	7
N of descriptive statements: Red Riding Hood	0-	5
N of words	74 -	100 -
% content words	53 +	48 +
% nouns	22	18
% pronouns	15 +	25 +
N of reference problems	14 +	10 +
First ref: Leaves	4 +	3 +
First ref: Thieves	3 +	1
Introd ref: Leaves	2 +	2.5 +
Introd ref: Thieves	2 +	1.75 +

A5 has a narration profile which differs considerably from most of the other aphasic profiles. He has a low number of descriptive statements, in free narration clearly below normal range in recording 2. (In recording 1 he is unable to do the task at all without help). Other specific features are the low number of words in combination with a high share of content words (clearly above the means of the controls), and he also has a high and rising share of pronouns. He shows an interesting difference between general specificity in introducing reference, which is within the normal range, and his first references in each narrative, which are more unspecified than those of the controls. This profile reflects typically "frontal" aphasia, with its sparsity in verbal output and elaboration of phrases, seen in the low number of words and the relative lack of function words. Most of his reference problems

seem to be connected rather to a lack of pragmatic skill in realizing how to provide a setting in starting a story or when and how to disambiguate anaphoric reference than to actual word finding problems. A5 does not really provide a special setting. His opening references do, however, become more correct and specified when he changes his reference to the main character in "Leaves" from *one* to *he* and the reference to the thieves in "Thieves" from *he* to *two thieves*.

Discussion: The Narration Profile as Indicator of Aphasic Problems and Progress

The Role of the Individual Features

As pointed out above, narration tasks provide potentially interesting data on aspects of linguistic and communicative ability in aphasics, being controllable tasks and at the same time tapping some crucial abilities needed in conversation. They are easy to administer and video- or audiorecord, but the analysis can be cumbersome. There is not one agreed-upon method and the process of transcription and coding can be considerably more time-consuming than the scoring of an ordinary aphasia test. The narration profile used here was designed in order to provide an easy way of scoring narration data (in Swedish and for the particular picture and story narration tasks used) that would be clear and quick enough for clinical use. By relatively few and simple calculations from the produced narratives, it is possible to compare the data for a specific aphasic with that of the controls (and that of the other aphasics involved in this study). The aphasic can also be compared in narration at different points in time during rehabilitation.

The usability of the features calculated and studied by the use of the narration profile has to be considered. The measures included are the same as, or based on, measures used in other studies of narration in patients with aphasia and traumatic brain injury (TBI). What does each one of the features tell us? What is the motivation for using that feature for the analysis? What do the features in combination tell us? What can be discovered from the use of the narration profile, that could be hard to discover from testing and informal conversation? Can the narration profile be used as a basis for therapy and in that case how? Does it capture relevant aspects of restitution of the ability to narrate, so that it can be used for therapy evaluation?

We could see above that *the number of descriptive statements* is a feature that is rarely deviant from the normal range, except in severe aphasics. It is, however, worth keeping as a control measure which can reveal if some task is, for example, not completed. The number of descriptive statements is more important and much more varied for the free story narration than for the picture narration. If an aphasic should be outside the normal range, his/her development should be studied (cf. A5).

The total number of words also shows a wide normal range. It can be interesting to see how an aphasic develops over time within the normal range, especially in combination with the development of other features, but the main interest is, of course, aphasics who fall outside the normal range, e.g. A5 in the present study, and how they develop over time. This is, thus, an interesting measure for very nonfluent aphasics (typically frontal syndromes) and potentially for very fluent aphasics (i.e., jargon aphasics). The direction of development should, as mentioned, for these two main groups of aphasics have different directions in order to approach the normal range (an increase for very nonfluent aphasics, as we see in A5, and a decrease for very fluent aphasics).

The share of content words (in this case nouns, verbs and adjectives) is also a feature which singles out the nonfluent frontal aphasics as being far above the rather limited normal range, while most of the other aphasics seem to have values at the lower end of the normal range or just below it. It is, of course, of interest to be able to study the development of this feature in the different types of aphasia. Also here, the mainly nonfluent aphasics and the mainly fluent aphasics having extreme values should develop in opposite directions. This time the nonfluent aphasics should show a decrease, while the fluent aphasics should show an increase. We see the expected development in all the aphasics, except A3 who shows no change.

The share of nouns and the share of pronouns are two measures that should be studied together and also in interaction with the number of reference problems and types of first and introducing reference. If we start by looking at the share of nouns, it covaries to some extent with the share of content words in most aphasics, although it could also be of interest to look at e.g. the share of nouns versus the share of verbs in some aphasics. A low share of nouns is especially indicative of word finding problems (anomia). Since most aphasics, in particular fluent aphasics with mainly posterior lesions (Wernicke, anomic etc.), have some word finding problems, a low share is expected (as in A1, A3 and A4). In nonfluent aphasics, however, nouns should be within normal range (as in A2 and more clearly A5) or possibly above for

certain severe cases. The desired development would be the same as for the share of content words.

The share of pronouns can be parallel to or inversely related to the share of nouns (e.g., both are overused in relation to other categories or one is used instead of the other). Overuse of pronouns is a feature which can be indicative of several possible underlying reasons, such as, e.g., strategies for referring, lack of pragmatic adaptation to the listener, agrammatism, or anomia. The share of pronouns should, thus, not be studied on its own, but can indicate, as indeed it does in this study, that a closer look at the aphasic's reference to persons and objects and his/her communication strategies is needed. The share of pronouns is, in the present study, very high for all the aphasics, in recording 1 over the control mean value and in recording 2 well above the normal range. All five aphasics, thus, show an increase in their share of pronouns, where the desired development should have been in the opposite direction, looking only at the control range and means. This points to the complexity of the narration task and the need for considering several features in relation to each other.

The number of reference problems (as operationalized above) is a quite simple measure which, however, is likely to interact with communicative strategies and is very context sensitive. If we consider both type and severity of aphasia, more nonfluent aphasia and less severe aphasia both should give lower numbers than more fluent and more severe aphasia. It should be noted that an increase in production can result in an increase in reference problems (as in A4 who produces most of the story narration only in recording 2). The generally desired development is, however, to approach the control target, i.e., no reference problems in these tasks.

Staying with the topic of reference, the four last features of the profile are not numbers or shares of the same type as the preceding ones, but *types of reference in the reference hierarchy*, where a lower number means a more specific reference type. The target value is, thus, 1, for the first reference in each picture-based narrative and for the means of all references introducing new persons or objects 1 and 1.54, respectively. This feature is very sensitive to aphasia and the aphasics in our study mostly 'soar' above the target values, showing wide variation in types of reference and only occasionally giving a type of reference. Introducing reference is an integral part of providing the setting for a narrative, a skill which is much needed in interactive communication. It is therefore of great interest to look further at the interaction between this feature and the number of reference problems as well as the share of nouns and pronouns, in order to try to find out more

about the reasons for unspecified reference in different aphasia types of different severity

The short case descriptions reveal that there are examples of how the aphasics 2, 3, 4 and 5 attempt to provide settings of some kind. Their means for this are (i) to provide a more specific reference to the first person who is mentioned, (ii) to give an additional special reference to the surroundings, (iii) to give a summarizing reference to the persons in the setting, (iv) to provide conventional opening phrases, and (v) to strive to give indefinite noun phrases, often followed by relative phrases, for introduction.

Among the aphasics in the study, aphasics 3 and 4 produce narration with non-target descriptive statements, that could be interpreted as *sidetracking* in recording 1. But it is possible to explain the sidetracking of the aphasics' narration in this corpus as secondary to their aphasic symptoms and to strategies directed towards coping with these symptoms. Changes over time would then be dependent on changes in the aphasic symptoms as well as changes of strategies. Since changes of strategies might very well be slower than changes of symptoms, the relation symptom-strategy is not always obvious from narration at a single point in time. The impression of sidetracking could even be strengthened by strategies which are still present although the symptoms that caused them have ceased to exist. The two patients showing potential signs of sidetracking in this study both showed a decrease of these signs over time.

Features in Combination

Reference problems - share of pronouns - introducing and first reference

All the five aphasics have reference problems and a high share of pronouns. But the relation between these two features is not, as one might expect, direct or simple. We can see this in the development of the two features over time in opposite directions (a decrease in reference problems versus a still higher share of pronouns). The reasons for this development can probably be found in a growing awareness and inhibition of phenomena such as circumlocutions, recurring more or less automatized phrases, etc. (where various content words are included) and maybe also in decreasing dependence on the picture stimuli, i.e., less disconnected naming attempts and more focus on events. With more targeted, although not yet completely successful, attempts to insert the intended lexical items (i.e., mostly nouns for reference) in their right place, the use of more and more adequately specified pronouns in-

creases. This means that the overt reference problems decrease. In a separate longitudinal study of A3 (Ahlsén, 1991), the increased share of pronouns was found to be a passing stage on the way to more adequate word finding with a higher share of nouns and a decreased share of pronouns.

It is also true that all the aphasics display a lack in the specificity of their first and introducing references, and that the development of these features is not only related to the number of reference problems and the share of pronouns. The actual ability to produce a correct introducing and first reference is one of the factors behind first and introducing reference, but other important factors are awareness of the pragmatically adequate level of specificity and the application of different strategies for reference. We can thus see individual differences between the aphasics which are not only connected to their lexical ability. For the Wernicke aphasics A3 and A4, first and introducing reference shows improvement over time, as their reference problems decrease, while there is no real change for the other three aphasics. At least for A1 and A5, awareness of pragmatic features of the particular task seems to be lacking.

Number of words - share of content words - share of nouns

The total number of words is only important for aphasics who fall clearly outside the normal range, i.e., very nonfluent aphasics with low numbers and very fluent (jargon) aphasics with high numbers. But the number of words in combination with the share of content words, which is high for the nonfluent and low for the fluent aphasics, seems to clearly differentiate these groups. The share of content words and the share of nouns are similar (low or normal) for each of the fluent aphasics, but different in the nonfluent A5 (high share of content words vs. normal share of nouns). (The relation between the share of nouns and the share of verbs could also be an interesting measure for nonfluent aphasics, where verbs can be expected to cause problems).

Summary of Features In Combination and Different Aphasic Symptom Combinations

Table 3 summarizes the narration profiles and the development over time of nonfluent aphasia with mainly anterior lesion versus fluent aphasics with mainly posterior lesion. Further studies of a greater number of aphasic cases using the profiles could serve to support and refine the analysis, and individual profiles of more complex combinations could be added (see the individual cases above).

Table 3
Example narration profiles

Feature	Nonfluent mainly anterior lesion		Fluent mainly posterior lesion	
	Status	Change	Status	Change
Number of words	low	+	normal to high	=
Share of content words	high	-	low	+
Share of nouns	normal/high	-	low	+
Share of pronouns	high	+,-	high	+,-
Reference problems	high		high	-
First & introducing reference value	high	=	high	+/=

For each aphasic patient, the individual narration profile can potentially be used as a point of departure. It can be "matched" to suggested profiles for different "types" of aphasia, based on the analysis of a larger material of individuals. We can see that some features are similar and other features are opposite for the two main types of aphasics suggested here. The suggested feature combinations are assumed to be typical. We can also see that the change (increase, decrease, or no change) of different features is sometimes different and sometimes the same for the two types of aphasics. The combination of changes in features and its relation to the initial profile would be the most relevant characterization of the development of narration.

For the aphasics in this study, the changes in Table 3 indicate normalization of most of the features and especially of the combined profile over the 9 months of rehabilitation (see also the individual tables above). The profile changes also, however, show that: (i) individual features might show a complex pattern of development towards restitution of normal function (e.g. the share of pronouns), (ii) the complex process studied via the narration profile is a very slow one, where the 9 months of intensive rehabilitation does not cover the whole restitution for the aphasics of this study, (iii) as a consequence of the above, further studies of more cases and over more extended time are needed in order to further develop the profile and use it as an instrument of evaluation, (iv) some of the features seem to be to a large extent affected by pragmatic awareness and reference strategies, and this implies that targeted therapy should address both a) the ability to produce the intended reference, and b) pragmatic awareness and reference strategies.

Use of the Narration Profile for Investigation, Therapy Planning and Evaluation

In conclusion, we can say that all the features of the narration profile seem to fill a function. Some of them can be interpreted directly and on their own, such as the measures of first and introducing reference and the number of reference problems. Other features, such as the number of words, content words, nouns and pronouns, as well as the number of descriptive statements, are best interpreted in combination with the other features. The total profile gives a good picture of how the narration of an aphasic patient deviates from the normal profile for the included content features. This information can be used as guidance for specifically targeted therapy, which can then be evaluated, again with respect to the whole pattern of the profile, which makes it possible to estimate the "balance" between different features.

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