

Gestures Used in Word Search Episodes – by Persons with and without Aphasia

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Abstract

This study investigates recurring patterns of gesturing during episodes of word search and own communication management, i.e. choice and change operations in speech. Two databases of word search episodes, one of person with aphasia and one of persons without aphasia, each containing 100 episodes, were analyzed. An extensive set of recurrent features of gesture and meaning connections was identified. In general, the same recurrent features were found for persons with and without aphasia. The recurrent gesture patterns can be used for educating health personnel and families of persons with aphasia in order to enhance understanding or aphasic gesturing.

1 Introduction

1.1 Background on aphasia and gesture

How gestures interact with words in conveying meaning is a question, which has attracted attention for some time (cf. Kendon 1983, 2004). Theories differ with respect to the role of gesturing for persons with aphasia. Some researchers claim that speech and gesture are co-generated and cannot be generated separately – if speech is disturbed, so is gesture (e.g. McNeill 1985, 1992, 2000, 2007). Others claim that speech and gesture are separate systems – then gesture can be used if speech is disturbed (e.g. Hadar and Butterworth 1997, Beattie and Shovelton 2000, 2002, 2011). Most likely is perhaps that gesture and speech are closely linked but to also some extent independent, which would also make compensatory gesturing possible. This has been assumed in a number of studies, that have shown compensatory gesturing by persons with aphasia in spontaneous communication (e.g. Ahlsén 1985, 1990, 1999, Feyereisen 1991, Lott 1994, LeMay et al. 1988, Macauley and Handley 2005).

A related question is whether gesturing helps word finding and communication more in general for the speaker. A number of studies have claimed that this is the case, in general (Kita 2000, Kraus et al. 2000, Melinger and Kita 2006, Rauscher et al. 1996) and for persons with aphasia (e.g. deRuiter 2006). Studies of brain activity have also addressed this question (Willems et al. 2007, Wu & Coulson 2007).

A recent study showed that persons with and without aphasia use iconic-illustrating gestures accompanying verbs and nouns, much in the same way in spontaneous conversations. There were some differences, i.e., how much eye contact was maintained, the number of one vs. two hand gestures and to some extent the “complexity” of gestures. We also found that clearly iconic/illustrating gestures occurring during word search episodes can be found in at least 25-30% of the cases, for persons with and without aphasia (Ahlsén and Schwarz 2013).

Departing from these results, the general questions investigated in the present study are: (i) What are the features of iconic/illustrating gestures occurring during word search episodes, i.e., when a speaker is struggling to find the right words to express something, giving rise to hesitation and/or self-interruption and reformulation henceforth called OCM = Own Communication Management, see further below)? and (ii) What are the features of the rest of the gestures occurring with word search episodes?

1.2 Background on word search and OCM (Own Communication Management)

Behaviour during own communication management can be of two main types. The first type is related to choice operations. Such behaviour can be pause, hesitation sounds, like “eh”, lengthening of continuants or OCM phrases like “what’s it called”. The second type involves change of expression, e.g. self-interruption, self-repetition and/or reformulation. Combinations of several of these phenomena of either type or of both types are common. In Allwood, Nivre and Ahlsén (1990) a typology of OCM phenomena is presented, where OCM units can be either a single type of feature or a combination of features. Single features can be either basic OCM expressions (pause, hesitation sound, OCM expression or OCM phrase) or basic OCM operations (lengthening, self interruption and self repetition). These features were mainly identified in relation to speech, whereas the present study concerns multi-modal communication, including gesture in a wide sense.

1.3 Research questions

The specific research questions to be addressed in this study are:

- 1) What gesture types and functions occur in episodes of OCM/word search/reformulation for persons with and without aphasia?
- 2) What are the applications of our findings for understanding communication of persons with aphasia?

2 Method of the empirical study

2.1 Database

The database consisted of gestures in 100 word search episodes for persons with aphasia and- 100 word search episodes for persons without aphasia, videorecorded in informal conversation or narration. Each of the two parts of the database contained data from 10 different persons. The databases were collected in earlier projects and the episodes were chosen by extracting consecutive sequences of relevance. The participating speakers with aphasia had moderate to mild aphasia, according to the BDAE (Goodglass and Kaplan 1973). All participants were between 20 and 60 years old, the gender distribution was equal in both data sets and the types of conversation and narration were comparable, i.e. they were all collected in studio or studio-like environments during informal conversation on various everyday topics. All videorecordings had been transcribed and annotated, however, the gesture analysis was made in the present study.

2.2 Gesture coding

The gestures occurring in OCM episodes (word search/reformulation episodes), where they occurred were coded with respect to the following features:

- Topic of discussion,
- Preceding, accompanying and succeeding speech and kinetic context,
- Gesture components for hand gestures (see specification below),
- Iconic and illustrative features of the gestures.

The coded components of hand gestures were:

- Configuration
- Plane
- Orientation
- Straight line movement or curved movement
- Laterality vs. symmetry
- Localization relative to body
- Localization in space
- Accompanying eye gaze, head movement
- Recurrence

Each of the gesture episodes was also coded for choice (i.e. pause, hesitation) or change function (i.e. self-interruption, reformulation).

2.3 Analysis

A number of patterns of gesture features were identified. After this, typical examples of the different patterns were selected for qualitative microanalysis in context. A number of types and functions related to specific gesture features were suggested. Finally, the features were compared between the corpora for aphasic and non-aphasic communication. All gesture annotation was checked by two coders and determined by joint re-analysis, if there were discrepancies.

3 Results - Recurrent patterns of illustrating gestures

3.1 Reference to person (in a wide sense)

If we start by the hand movements showing direction in space and reference to person, we find recurrent hand directions. Moving one hand towards your own body is used for reference to “I”, “me”, and “one” (both by persons with and without aphasia). Moving a hand towards one’s head is used with reference to mental processes, “think”, “read” (in the aphasia group), “remember”, “forget” (in both groups) and also for “generalize” (in the non-aphasic data). One hand towards the interlocutor is used as reference to the interlocutor, for turn giving and for asking for help; it also occurs with “as you know” (in both groups).

3.2 Spatial orientation (other than person reference)

Hand away from body

Moving one hand away from the body and forward is associated with many related meanings, like: “out”, “away”, “ahead” and metaphorically “promote” (in both groups). If the movement is pushing or moving up and down with the palm directed forward, this is associated with “marking a limit”, “protect” and with the utterance “he is dead”.

When one hand is moved sideways with the palm directed to the side, this is connected to “throw away”, “get rid of” and “reject” (in both groups), and also to the more abstract “confrontation” (in the non-aphasic data). If the hand is moved sideways, with the palm instead directed downwards, this is connected to reference to “landscape”, “fields”, “ground.” and the more abstract “exploitation” (all in the non-aphasic data).

Other hand and finger movements in the air

The hand circling (or cyclic hand movement) occurs in the context of “progress”, “action”, “forward”, “start” and “eagerness” and when the circling movement is directed towards the speaker’s own body: “own emotion” (in both groups).

Finger movements during another hand gesture indicate turn keeping, especially during word search (in both groups). Both hands are moving upwards with: “raise” and “lift” (in the non-aphasic group), while both hands move downwards with “dead” (also in the non-aphasic group). Both hands come together in relation to words like “summary”, “join”, “agree”, “group” and “totality” (in the non-aphasic data).

Hand towards table

Moving the hand towards the table is connected with a number of actions that are done on a table, e.g. to writing, sorting etc. Some examples are: “stamp” (simple movement) or small movements: for “categorize”, “classify” (in the non-aphasic data, and “read”, “one by one”, “lines”, and “map out every word” (aphasia data).

3.3 Raised hand (choice), shaking movement of hand or head (change)

There are a number of gesture features indicating own communication management, i.e. choice and change operations, when a person is searching for words, hesitating or self-interrupting and repeating or reformulating their speech. The most typical word choice and hesitation gesture is hand raised, palm up, with small movements or shaking. In both groups, this gesture occurs with phrases like “What’s it called?”, involving “choice” operations, e.g. word finding problems. See examples 1 and 2 below.

Example 1. Raised hand – choice (non-aphasic data)

upload ... eh n/ like one

[left hand small movements up and down, palm up]

Example 2. Raised hand – choice (aphasia data):

then it was... eh then: it was eh ... eh what's it called

[palm up, fingers moving quickly, ending with fingers still and hand moving up-down]

A shake of a raised hand with the palm turned up as well as a shake of the head are used by both groups in a “change” situation, i.e. when an error is corrected by self-interruption and reformulation. The shaking movement is, thus, connected to cancellation/denial of one’s own speech production and self-correction.

Example 3. Head shake – change

invoi+ eh ... classification system

[gaze down, head shake]

Example 4. Head shake – change.

then it so/ ... flashed or what it is called

[head shake]

Example 4. Head shake – change.

it was I myself that myself the oth/ it they didn't notice

[head shake]

Pointing

Pointing indicates direction, and place (in both groups).

3.4 Examples of illustrating gestures

If we look more closely on iconicity in gesturing, pantomimes occur frequently, in different forms. In both groups, It is also common that the concrete part of an action is performed, or the outline of an object or the concrete part of an object is given, often with the use of both hands (if applicable and possible).

Example 5. Index-Icon Illustrating mental process (reading and listening to the same text)

the more eh ... directions ... it ... comes from

[left hand index finger pointing, semicircles from different directions towards own head]

that eh ... more it sticks

[left hand towards left ear, making ”pushing” movements with fist]

Example 6. Gesture indicating interest with asynchronous movements of the left and the right hand:

Like eh ... like eh ... the text ... is interesting then you know

[both hands moving in small circles, not synchronized]

Example 7. Gesture indicating activity, dynamics using both hands in synchrony.

so so eh ... so you can ... get started

[both hands, palms directed toward each other, small circular movements]

4 Conclusions

4.1 Recurrent gesture patterns carrying meaning

A number of recurrent gesture patterns with systematic relations to meaning were identified in this study. This means that gestures in context of word search and own communication management, which often precede or replace corresponding spoken words, convey information to the listener about several aspects of the meaning of a multimodal contribution. As we have seen above, aspects which

were identified were reference to objects and persons in space, reference to different persons in the interaction, information about which type of action, property or object is being referred to – if it is fast or slow, sudden or even, if it is stretched out along a line or surface or an on-going process, if it involved symmetric or asymmetric movement etc. In relation to word finding problems, gestures also convey important information about the speaker’s attitude to what he/she has just said, especially if it should be retracted, changed or disregarded. Furthermore, there are features of typical word search gestures, i.e. raising one hand, which provide cues about the actual word search process and possibly also about the intended target words. A repertoire of more specific recurring gesture features related to more specific meanings exist, as described and exemplified above.

4.2 How different is aphasic gesturing?

In general, the same types of gesturing were found in aphasic as in non-aphasic gesturing, which indicates that there is no major difference of the kind that would suggest a gesture disorder comparable to the speech-language disorder of aphasia. As identified by Ahlsén and Schwarz (2013), there are, however, a few differences, which can, at least to some extent, be considered as secondary effects, caused by other primary motor or aphasic difficulties.

(i) One difference is the more frequent use of only the left hand by the persons with aphasia, which is even more pronounced in contexts of own communication management. This is in most cases an effect of earlier right-hand hemiplegia, which has caused residual weakness of the right arm and hand and/or a change of habitual gesturing that has remained. Since a) bimanual gesturing has been considered more complex (it also gives wider possibilities) and b) left hand gesturing can be less precise than right hand gesturing, the frequent use of only the left hand easily leads to less complex gestures. Less complex gestures can, therefore, not unambiguously be ascribed to less complex semantics, although there may be a disorder directly affecting gestures, to some extent.

(ii) Another difference is that in aphasic gesturing there is quantitatively more marking of word search and more pointing to the interlocutor than in non-aphasic gesturing. There is, however, most often some content feature or features in the gestures produced by PWA. The gestures, thus, reflect difficulties in speech-language.

(iii) The aphasic gesturing also involves considerably more gaze aversion during word search, both compared to other word production in the same persons and compared to word search in persons without aphasia. This strongly points to a higher cognitive load involved in word search, caused by anomia.

5 Discussion

Proponents of a very tight relation, co-generation and interdependence between words and gestures have inspired a view that assumes that if a disorder of word finding also means a corresponding disorder of gesture finding. In aphasia with anomia, especially fluent, Wernicke-type aphasia and global aphasia, the frequent hand movements and pointing have not been considered as illustrating or indicating content. In our data, however, we find very few cases of what has been called “indecisive hand waving” during OCM/word search/ reformulation. Gestures usually refer to something and/or fill an interactive or own activation function. This applies to persons with aphasia as well as persons without aphasia. There are patterns of recurrent gesturing indicating just search for words and lack of expression, but most often some indication of the word searched for actually occurs. The patterns found in this study for Swedish were in many cases similar to those found by Bressemer and Müller (in press) and Ladewig (in press) for German.

Reference conveyed by gesture may be both concrete and abstract – where the concrete part is being shown. It can be vague and general or precise and specific. Indexical gestures are common; some iconic feature is often included. Pantomimes also occur. Access to the linguistic and situational context is, however, essential for the interpretation of recurrent but often polysemous gesture patterns.

6 Possible applications

If gesture patterns during word search episodes are, to some extent, consistent, they give clues to the intended word. These clues can be systematically learned by people communicating with persons with aphasia – to some extent they can be intuitive, but they could be more consciously applied in interpret-

ing communication attempts. Tutorials could, for example, be made, in order to make conversation partners of persons with aphasia aware of recurring patterns of gestures. The persons in the study often produced also verbal clues or the actual target word after the gesture.

Other persons with more severe aphasia than the ones on our data might not be able to do this. Still, the gesture patterns might be preserved, and, in these cases, could be very helpful for communication. More systematic studies of the recurrent features of gesturing in persons with severe aphasia, taking the full context into consideration, could investigate this possibility.

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