

A Study of Hand Gestures in Adult Speakers of Malayalam

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Abstract

It is known that people of different cultures and linguistic backgrounds gesture. This study aimed to understand the nature of co-speech gestures in Malayalam speaking individuals, in terms of the types of gestures produced, frequency and patterns of occurrence, and linguistic encoding of gestures. 6 native speakers of Malayalam within the age range of 20-25 (3 males and 3 females) were selected and were instructed to describe four pictures to a listener who was unaware of these scenes. The results indicated that all participants used gestures, though there were individual variations seen. Almost all individuals were either unimanual or bimanual while speaking. Most of the gestures were produced in synchrony with the ongoing speech. It was also seen that these gestures represented nouns, action words, prepositions and adjectives.

Key words: Co-speech gestures, Frequency of occurrence, Patterns of occurrence, Malayalam

Introduction

Gestures constitute the nonverbal aspect of communication. People of all ages, culture and backgrounds gesture when they speak and gestures emerge in children even before the development of language. Gestures are not random movements; rather these movements are used to communicate some meaning. Gestures are spatio-visual phenomena that are influenced by contextual and socio-psychological factors and are closely tied to sophisticated speaker-internal, linguistic processes (Gullberg, deBot, & Volterra, 2008). Contrary to the earlier observation that

gestures are movements produced by hands in a human being, it is now affirmed that gesture is not only performed with hands, but by other parts of body, such as head, face or arms. Thus, gestures are defined as manual [waving to say goodbye], facial [e.g., pouting to show displeasure], or other body movements [e.g., miming an object or person], (Capone, 2010).

There are four main types of co-speech/conversational gestures, namely, iconic, metaphoric, deictic, and beats (McNeill, 1992). Iconic gestures bear a close formal relationship to the semantic content of speech. These gestures visually represent the object attributes, actions and spatial relationships (e.g. when one mimes the holding of a steering wheel while saying ‘drive’). Metaphoric gestures are very similar to iconic gestures except that they depict abstract concepts rather than concrete objects (e.g. when one cups their hands while saying the word ‘concept’). Deictic gestures refer to things indicated by pointing with the hand, finger or chin. They can be either concrete such as pointing to someone, something or somewhere or it can also be abstract, for example, pointing to something/someone who is not present or a place or even a moment in time. Abstract deictics can be shaped by cultural characteristics such as geographical and time references which differ across languages and culture. Beat gestures are rhythmic movements that have no semantic connection to speech that is accompanied. They rather stress important words or phrases expressed in speech. A typical example of a beat would be a flick of the hand or finger.

McNeill (1992) documented four major characteristics of the adult gesture – speech co-production:

- First, although gesture and speech often convey complementary aspects of an underlying message, they do so simultaneously, temporally linked within the bounds of a single utterance.
- Second, when adults gesture while speaking, gestures consist primarily of hand, arm, and finger movements (manual). It is relatively uncommon for mature speakers to produce gestures that involve legs, feet or whole body (non-manual).
- Third, among right-handed speakers (majority of all speakers), coexpressive gestures tend to be unimanual and are produced primarily with the right hand (Kimura, 1973).
- Fourth, gestures and speech have a constant relationship in time, with the manual movements of gesture either slightly anticipated or occurring in synchrony with co expressive speech.

Despite the absence of compelling evidence, to many, the communicativeness of gestures is self-evident. Gestures communicate, it is contended, because, like the words they accompany, they convey semantic information (Kendon, 1983; McNeill, 1985). And indeed, from the perspective of a naive observer, gesture and speech do seem to convey closely related meanings. In literature, there are also suggestions about the presence of semantic coordination between gestural and linguistic representations. Overall, the findings of studies on speakers of different languages like English, Turkish, Japanese and Dutch have shown that there are differences in the way gestures encode same events across these languages (McNeill, 1985; Lemmens, 2002; Kita & Özyürek, 2003; Özyürek & Kita, 1999).

Need for the Study

The review mentioned above points to the fact that gestures are an inherent part of human communication process. Investigators have observed that gestures are highly integrated with speech and they aid in language production and comprehension (McNeill, 1992; Goldin-Meadow, 2003). Thus, gesture has the potential to convey substantive information. As in the case of verbal communication, the influence of culture on nonverbal behaviors is undeniably large. And yet, we cannot ignore the universal bases for many nonverbal behaviors that cut across cultural differences. Thus, it would be interesting to document the nature of co-expressive gestures in languages across the globe. And currently gesture is a phenomena which has received very poor attention in the Indian subcontinent. Thus, this study has been undertaken.

Objectives of the Study

The study aimed to understand the nature of co-speech gesture production in Malayalam speaking individuals, with respect to:

- a) The frequency of occurrence of the four types of gestures, namely: iconic, metaphoric, deictic and beats
- b) The pattern of occurrence of gestures, with respect to the modality of expression (uni-/bi- manual) and temporal relation to speech (synchronous/asynchronous)
- c) The coordination of gestures and linguistic representation

Method

Participants

A total of 6 participants were randomly selected for the study, including 3 males and 3 females, within the age range of 20–25 years. All the participants were native Malayalam

speakers (a language that belongs to the Dravidian family), right handers, and were from a post graduate class of a university. They were screened for having normal speech, language and hearing functions. The participants were not informed regarding the purpose of the study.

Materials

Four scenes, those depicting real life themes such as a restaurant, circus, accident, and airport, were selected for the study. They were presented as black and white picture cards.

Instrumentation

A Sony HDD handycam, with a steady shot, 10x optical zoom and built-in surround and uni-directional microphone was used for recording the task.

Procedure

The participants were instructed and recorded individually in a quiet room without any distractions. They were provided with the picture cards and encouraged to describe each picture, one at a time, to a listener seated in the room, who was unaware of the contents of the picture. They were given a warm-up time of 1 minute before the recording to get familiar with the picture. They were also asked to ignore the presence of the camera in the room and only to face the listener seated opposite to them.

Coding

Coding of the gestures was done by one of the investigators, a speech language pathologist (native speaker of Malayalam), with a minimum of three years' experience, using ELAN software. This coder was trained by the primary investigator to identify the communicative and intelligible gestures based on a key which included a list of the operational

definitions of all the parameters of gesture that needed to be identified (Appendix 1). In order to establish reliability of the identification and segmentation of sentences, twenty percent of the data were independently processed by a second coder (primary investigator) who was also a speech language pathologist and a native speaker of Malayalam. Thus, Inter- and intra- judge reliability was also calculated and there was 85% agreement between the coders.

The following were annotated:

- Types of gestures: iconic, metaphoric, deictic and beats
- Communicative encoding of gestures: concrete nouns, action words, prepositions and adjectives
- Manner of gesture production: unimanual/bimanual; synchronous/asynchronous

Scoring and analysis

Presence of a gesture was scored as 1. Absence of a gesture was scored as 0. The repeated occurrence of the gestures was also noted. The following analysis was carried out:

- Frequency of each type of gesture was calculated
- The communicative encoding of gestures was noted, i.e. whether the gesture represented a concrete noun, action word, prepositions, and adjectives
- The hand preferences for the production of gesture was noted
- The synchronous or asynchronous occurrence of gesture was noted

Results

The analysis of the nature of production of gestures in Malayalam revealed the following results, which are as summarized in the following tables. Table 1 shows the types of gestures, the

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frequency and the patterns of occurrence. Table 2 shows the pattern of semantic encoding of three types of gestures, namely, iconic, deictic and metaphoric.

Table 1: Frequency and patterns of occurrence of gestures.

| Subject | Types of gestures (Frequency %) | | | | Unimanual | | Bimanual | Synchronous | | Asynchronous |
|---------|---------------------------------|------------|---------|-------|-----------|------|----------|---------------|---------------|--------------|
| | Iconic | Metaphoric | Deictic | Beats | right | left | | Complimentary | Supplementary | |
| 1/M | 43.47 | 5.79 | 30.43 | 20.28 | ✓ | ✓ | ✓ | 52 | 3 | 1 |
| 2/F | 52.38 | 2.38 | 27.38 | 17.85 | ✓ | - | ✓ | 64 | 5 | 6 |
| 3/M | 50.94 | 9.43 | 24.52 | 15.09 | ✓ | - | ✓ | 39 | 6 | 2 |
| 4/F | 48.14 | 9.25 | 38.8 | 3.70 | ✓ | - | - | 52 | 3 | 6 |
| 5/F | 42.22 | 0 | 31.11 | 26.66 | ✓ | - | ✓ | 33 | 0 | 1 |
| 6/M | 40 | 6.66 | 26.66 | 26.66 | ✓ | ✓ | ✓ | 11 | 0 | 1 |

From Table 1, it can be observed that the individuals used all four types of gestures. Iconic gestures were most frequently occurring (46.19%), followed by deictic (29.82%) and beats (18.37%). Metaphoric gestures were least observed (5.58%). All individuals, with the exception of one, used both their right and left hands (bimanual) while gesturing. And at those instances where individuals were unimanual, majority used their right hands. Only two individuals used their left hands to gesture at certain times, which was again not frequent. The occurrence of synchronous gestures (94.44%) was more frequent than those of asynchronous

(5.55%).The occurrence of complimentary gestures (88.88%) was more frequent than supplementary (11.11%).

Table 2: Patterns of linguistic encoding by co-speech gestures.

| Types | Concrete Nouns (%) | Prepositions (%) | Adjectives (%) | Action Words (%) |
|------------|-----------------------|---------------------|-------------------|---------------------|
| Iconic | 24.16 | 26.17 | 10.73 | 38.92 |
| Deictic | 55.55 | 33.33 | 5.55 | 5.55 |
| Metaphoric | 62.36 | 4.30 | 13.97 | 19.35 |

From Table 2, it can be understood that among the three types of gestures, namely, iconic, deictic and metaphoric, most gestures encoded concrete nouns (47.35%), action words (21.27%) and prepositions (21.26%). Adjectives (10.08%) were least encoded in their gestures. Iconic gestures encoded more action words, deictics and metaphoric gestures encoded more nouns than the other categories.

Discussion

This study done on 6 Malayalam speaking adults has revealed a few interesting findings in the context of nonverbal communication.

Types and Frequency of Gestures

All the participants used gestures, though there were individual variations observed. Some used gestures more often than others. But, all the participants used iconic, deictic, beats and metaphoric gestures. This finding is similar to that reported in other studies on adults form

different linguistic backgrounds (McNeill, 1992). Among the four types, iconic gestures were most frequently seen, followed by beats and deictic gestures. Metaphoric gestures were used less frequently by all the participants. This is a novel finding; as such an analysis has not been reported previously. But it has to be considered with caution since there were individual variations in the use of gestures.

Patterns of Occurrence of Gestures

Almost all individuals, were producing gestures either unimanually or bimanually at various junctures while speaking. Only one participant did not use produce gesture bimanually. While they used only one hand to gesture, most preferred to use their right hands, and only two of the participants used their left hands to convey few gestures at certain instances. This does not altogether conform to earlier reports that among right-handed individuals, the coexpressive gestures tend to be unimanual and are produced primarily with the right hand (Kimura, 1973). All the participants in this study were right handed individuals and they did not show any hand preferences while gesturing.

Also as observed, most of the gestures were produced in synchrony to the ongoing speech. Only few of the gestures were not timed with speech and were produced with a delay. This again is similar to the findings by McNeill (1992), who reported that gestures and speech have a constant relationship in time, with the manual movements of gesture either slightly anticipated or occurring in synchrony with co expressive speech.

Another observation was that most gestures were complimenting the spoken information, i.e. gestures reflected the same meaning as that of the spoken word. This was again reported by McNeill (1992) that adult hand gestures provide complementary information.

Coordination of gestural and linguistic representation:

It was observed that the gestures produced encoded the following linguistic forms: nouns, action words, prepositions and adjectives. Among these, concrete nouns were frequently represented by gestures and adjectives were least represented. Concrete nouns were also represented by deictic and metaphoric gestures. Prepositions were represented by iconic and deictic, least by metaphoric. Adjectives and action words were mostly represented by metaphoric and iconic gestures. These reflect on the fact that gestures also convey linguistic information and are thus communicative. Similar findings have also been reported in studies done in native speakers of English, Turkish, Spanish, and Japanese, wherein gestures have been reported to represent semantic and syntactic (McNeill, 1985; Lemmens, 2002; Kita & Özyürek, 2003; Özyürek & Kita, 1999). But, further analysis has to be carried out to understand the differences in the gesture used in the representations of these forms across languages.

Conclusion

Gestures form a part of our day to day conversation, and just like speech encodes linguistic representations, so do gestures. Thus gestures are communicating. This study does provide evidence to the position that gesture and speech co-occur during production because they are linked to one another and to the same underlying thought process. The gesture production in Malayalam speakers followed some similar patterns as reported in literature, but there were also differences noticed. Therefore, like spoken languages across the globe have certain universalities

and differences, gestures also show similar characteristics. And since nonverbal communication is important in all aspects of normal and disordered individuals, it is important to document the same. This study can further be strengthened by including more participants to get a better representation of the population and also by assessing gestures in various discourse tasks to get a better picture of the gesture speech link.

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Appendix 1: Operational definitions

| Item | Operational definition |
|------------------------|--|
| Iconic gesture | Gestures that represent concrete concepts |
| Deictic gestures | Gestures that provide reference in space |
| Metaphoric gestures | Gestures that represent abstract concepts |
| Beat gestures | Up-down flicks of the hand that indicates the rhythm of speech |
| Unimanual gestures | Gestures produced using only one hand |
| Bimanual gestures | Gestures produced using both hands |
| Synchronous gestures | Gestures that occur at the same time as that of spoken word represented by them |
| Asynchronous gestures | Gestures that occur either before or after that of spoken word represented by them |
| Complimentary gestures | Gestures that represent the spoken word |
| Supplementary gestures | Gestures that add related information about the spoken word |

Source: McNeill (1985)

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