English Native Speaker Perceptions of Gesture

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Table of Contents

1. Introduction ........................................................................................................... 5

2. Background Literature ......................................................................................... 6
   2.1 Categorisation as a feature of human cognition ........................................... 6
   2.2 History of the study of gesture ....................................................................... 6
   2.3 Gesture as 'significant action' ......................................................................... 8
   2.4 Categorisation of gesture .............................................................................. 9
      2.4.1 Kendon’s Continuum ........................................................................... 10
      2.4.2 McNeill’s classification of gesticulation .............................................. 11
   2.5 The influence of McNeill’s categorisation ..................................................... 16
   2.6 Research on native speaker categorisation of gesture .................................. 17

3. Research Questions ............................................................................................. 19
   3.1 Native speaker categorisations (research question one) .............................. 19
   3.2 Comparisons to research (research question two) ........................................ 20

4. Methodology ......................................................................................................... 22
   4.1 Participants ..................................................................................................... 22
   4.2 Procedure ....................................................................................................... 22
      4.2.1 Stage one - survey ............................................................................... 22
      4.2.2 Stage two - transcription ..................................................................... 23
      4.2.3 Stage three - interview ...................................................................... 25
   4.3 The video ......................................................................................................... 25
   4.4 Data analysis .................................................................................................. 28

5. Results .................................................................................................................... 30
   5.1 Native speaker categorisations (r.q. 1) ......................................................... 30
      5.1.1 Native speaker definitions ................................................................... 30
      5.1.2 Native speaker categorisations ............................................................ 31
   5.2 Form/ function (sub-question 1) ................................................................... 32
   5.3 Comparisons to research (r.q. 2) .................................................................. 34
   5.4 Beat gestures (sub-question 2) ..................................................................... 35

6. Discussion ............................................................................................................... 36
   6.1 Native speaker categorisations (r.q. 1) ......................................................... 36
   6.2 Form/ function (sub-question 1) .................................................................... 39
   6.3 Comparisons to research (r.q. 2) .................................................................. 40
   6.4 Beat gestures (sub-question 2) ..................................................................... 42
1. Introduction

The study of gesture as a communicative act has been a field of rapid growth over the last thirty years (Kendon 2004, p. 74). Over this period, researchers have developed and refined definitions of gesture. By gesture, it is meant those movements that generally accompany speech and, are generally performed with the hands, with the intention of communicating linguistic information (although this will be discussed below). The increased academic interest in gesture has resulted in the creation of complex categorisation strategies.

While these academic advances have occurred, there has been little attention paid to how native speakers understand the use of gesture in communicative interaction. This study aims to provide initial insight into the conscious understanding of gesture held by native speakers, elicited through a series of tasks. In discovering what native speakers consider to be gestural and how they would create a categorisation of gesture based on their intuitions, we can see whether there is a relationship between native speaker classification and academic classification used in research.

The results of this research may potentially have important implications for the current state of research on gesture. It also has possible implications for work with digital avatars, as well as for our comprehension of how native speakers understand and perceive gesture.
2. Background Literature

2.1 Categorisation as a feature of human cognition

Categorising phenomena that exist in the world is a particular trait of human cognition (Markman 1989; Smith & Medin 1981). It allows us to make sense of the complex variety of entities and actions that occur around us. As Smith & Medin (1981, p. 1) note, if we did not resort to categorisation the human mind would be completely overwhelmed by trying to make sense of the world. Thus we categorise entities, for example, as human or animal, and then relate to those entities accordingly.

The tendency to categorise is present in all facets of human life. In creating categories we can sort things by their properties and then make observations about them. Categorisation is a vital element of academic enquiry as it allows researchers to make observations about a small subset of a population and then extrapolate these to the wider group. The academic study of linguistics makes use of categorisation in order to analyse and comment upon the features of languages; for example, in syntax we classify words into categories such as nouns and verbs.

There is a great deal of work in the field of gesture research that makes use of categories. Like any categorisational schema it has evolved through observation, research and discussion. In order to understand the current state of linguistic gestural categorisation it is best to begin with the evolution of gesture as a linguistic phenomenon.

2.2 History of the study of gesture

While the study of gesture as a linguistic phenomenon is relatively recent, communicative bodily movement has been a topic of interest for millennia.
Kendon (2004) gives a detailed history of the development of interest in gesture. This interest in gesture is recorded as far back as Quintillian in the first century AD, who wrote of the use of gesture in rhetoric, through to the middle ages and the Renaissance. Well before researchers were interested in the linguistic properties of gesture people have been interested in its communicative function (Kendon 2004).

In more recent history a resurgence of interest in the topic came from the discipline of anthropology. In Morris (1977) and Lamb & Watson (1979) gestures are included with all other non-verbal forms of human communication. Neither of these works consider the verbal context in which gestures can be produced. In works such as this, gesture is thought of more for its use in 'emphasising' (Critchley 1971, p. 9) or its 'emotional' content (Wolff 1945, p. 3). Argyle (1988) and Feyereisen & de Lannoy (1991) examine gesture in the context of speech, and offer a more formal approach to the study of gesture than contemporaneous research. In this more recent work we begin to see categorisation of gestures and bodily movements, however Argyle (1988) focused on a range of non-verbal communication, and much of the work in Feyereisen and de Lannoy (1991) is still interested in the emotionally expressive supra-linguistic relationship between gestures and speech (p. 70).

While other researchers were interested in the emotionally expressive potential of non-verbal communication, Adam Kendon has been much more interested in the gestures that occur with speech. Kendon proposed that there is a specific form of bodily movement that co-occurs with speech that is as important in an utterance as the verbal content (Kendon 1972, 1980, 1988, 1997, 2000, 2004). These movements are easy to distinguish in their form from others as they have a structure that involves a pre-stroke movement, a climatic point called the 'stroke', followed by a return to a relaxed position (Kendon 2004, p. 112). Also in relation to form, these types of movements are typically made with the hands, and many researchers define gesture with specific reference to manual movements (McNeill 1992, 2005; Goldin-Meadow 2003; Kendon 2004). While
the hands and arms are frequently used in gesture, work that examines the gestural use of other body parts, such as the head (Kendon 2002; McClave 2000), and lips, which can be used for pointing in Laos (Enfield 2001), have been undertaken. Kendon (2004, p. 10) argues that their function is also different as it relates much more closely to the propositional content of speech than other bodily movements do. Such a specific definition of gesture excludes phenomena like gaze and posture. While both have been studied for their importance in regulating discourse relationships they do not feature strongly in the work of linguists who have an interest in the way gestures co-exist with speech to produce linguistic utterances (Kendon 2000, p. 49).

Kendon's interest in co-speech gestures was taken up by researchers in psycholinguistics, especially David McNeill. In looking at the cognitive processes of language McNeill focuses specifically on the way gestures relate to speech (McNeill 1979, 1987, 1992, 2000a, 2000b, 2005). There appears to be a strong body of evidence in the field of gesture studies that shows that co-speech gestures are of particular communicative and cognitive importance. One example of the communicative importance of gesture is the research conducted by Graham & Heywood (1975) in which they found that speakers have to modify speech to include more spatial cues if their gestures are suppressed in such situations as a map drawing exercise. Of all the bodily actions, co-speech gestures appear to have particular cognitive importance as well. For example, people will still gesticulate even if their audience is not present - for example, while talking on the telephone (Cohen & Harrison 1973), and congenitally blind language users will still gesture (Iverson & Golden-Meadow 1997, 1998). Krauss, Chen & Gottesman (2000) argue that this is because gestures are as much a tool of internally accessing lexis as they are a tool of interperson communication.

2.3 Gesture as 'significant action'

In one study examining language users' perception of the various forms of
bodily movement in communication, Kendon (1978) investigated whether certain types of bodily movement that constituted 'significant action', by which he means gestures as defined above, are noticed more readily by language users than other bodily movements (p. 308). The participants in this study were native English speakers residing in Australia. They viewed a silent film of a man speaking at an event in Papua New Guinea. After viewing it as many times as they liked the participants were asked to recall the movements observed in the film. Kendon reports that all the participants mentioned the 'significant' movements first and only after that did they mention the non-communicatively significant movements (p. 309). This suggests that people have some ability to distinguish which movements are important to communication, even when the gestures are not culturally familiar and speech is absent. Kendon does not provide details as to which type of gesture events were in the film, or which ones the participants focused on, nor does he test to see whether the presence of speech can affect the perception of 'significant action' (Kendon 1978, 2004).

2.4 Categorisation of gesture

As the study of gestural phenomena evolved it became more apparent that different forms of bodily movement were involved in communication in different ways. Markman (1989, p. 2) notes that it is common for categories to change, sub-divide or collapse as links between phenomena are reviewed.

As discussed above, researchers studying gesture as a linguist phenomenon have come to have a much more specific definition of gesture than those working in other domains. Within this narrow definition sub-categorisation has occurred. The categorisation that has become the benchmark for linguistic study of gesture was first proposed in its entirety by David McNeill in *Hand and Mind* (1992). It builds upon the previous classification proposals of Efron (1941/1972), Ekman & Friesen (1969), Feyereisen & de Lannoy (1991) and Kendon (1980, 1988) as well as McNeill's previous work (1985, 1986, 1987). There are two levels to this system, the first is a continuum of gestural movements, the second
is a categorisation of movements that occur at one section of the continuum (McNeill 1992, 2000b, 2005).

2.4.1 Kendon's Continuum

McNeill (1992) christened his continuum of bodily movements 'Kendon's Continuum' in homage to Adam Kendon, who first proposed a rough outline of such a system (Kendon 1988). This system is very important to the linguistic theory of gesture as it proposes that there are different communicative phenomena with different properties and these should not be conflated. Here McNeill presents us with a classification based on the function of the body movement. The same physical action could be placed at any point along the continuum depending on its communicative function (Kendon 2004, p. 104-5).

The continuum is most often presented thus:

*Gesticulation -> Pantomime -> Emblem -> Sign Language*

(McNeill 1992, p.37)

Gesticulations require the presence of speech and are highly idiosyncratic, it is these gestures that linguists such as McNeill are interested in because of their close relationship with speech. Pantomime is a crude combination of gestures and simplified speech that has limited communicative abilities where a sequence of actions can combine to form a meaning, while gesticulation does not have this sequential combination ability. Emblems are those culturally established gestures with defined meanings, such as 'thumbs up', the 'peace' sign or nodding to signal 'yes'. These gestures can be understood with or

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1 In McNeill 1992 there is a category called 'language-like gestures' situated on the continuum between gesticulation and pantomime. This category was for gestures that function in a sentence in place of a lexical item. For example 'the food was lovely, but the wine was a bit [gesture].' These gestures do not have a culturally codified form, and occur in the presence of speech, so were not added to emblems. By the time McNeill (2000b) published his revised continua this category no longer existed. It is unknown whether it was collapsed into another category, or whether it still floats, unplotted, somewhere on the continuum.
without speech and have standards of well-formedness not found in gesticulations. At the far right of the spectrum we have sign language, such as Auslan, which has all the features of language.

As we move along the continuum from left to right several changes occur. Firstly, there is a decline in the obligatory presence of speech. That is, gesticulations are dependent upon speech for us to understand them, but sign language requires no speech as it is a language in itself, pantomime and emblems can be understood with or without the presence of speech. Secondly, the presence of language properties increase. As mentioned above, sign language displays all of the syntactic, phonetic and pragmatic features of language, only using the body instead of the voice to communicate. Gesticulations on the other hand, do not display the same features as a codified language. Thirdly, socially coded signs replace idiosyncratic gestures. This is in some ways an extension of the second point, in that sign language and emblems are highly codified, much like any other semiotic system. Gesticulations on the other hand vary greatly among speakers, and even for the same speaker (McNeill 1992, p. 37-8).

The continuum has undergonel changes since it was first proposed. A major alteration came when McNeill (2000b) argued that the relationship between the categories should not be seen as a single continuum, but four continua - allowing us to see more clearly the multiple properties that distinguish the categories. Kendon (2004, p.104) believes that this revision is a legitimate addition to the theory and illuminates that what is being explored is a range of interrelated factors. While it may be of theoretical importance, most work since 2000 still operates on the basis of a single continuum for clarity and simplicity.

2.4.2 McNeill's classification of gesticulation

Having outlined the various gestural phenomena McNeill's area of interest was gesticulation, of which he compiled a typology (1992, 2004). While
gesticulations are idiosyncratic we can still create categories of these phenomena. Though we have seen above that gestures can be made by parts of the body other than the hands and arms, work on gesticulation tends to focus on manual movements. While the nature of the moment created in a gesture can vary greatly, it is broken into three parts in analysis. The first is the preparation phase, where the hand or arm moves from its resting place, such as in the lap or on the arm of a chair. The next phase is the stroke phase, which is where the main physical force of the movement of the gesture is exerted, and is considered to be the section where the communicative intent of the gesture is enacted. The final part of a gesture is the recovery, where the hand relaxed from the stroke position and returns to a rest position. McNeill uses this analysis structure (1992, 2005), which he inherited as an already established research protocol (Kendon, 2004: ch. 7).

As we are focusing primarily on gesticulation in this paper I will use the common term ‘gestures’ following McNeill (1992, 2005). In *Hand and Mind* (McNeill 1992) there are five categories of gesticulation which we will now examine.

**Iconic**
These gestures refer to concrete objects. Their form is modelled upon the object and thus act as an icon. The classic ‘and the fish was this big’ gesture is iconic. Fingers moving like legs to indicate walking is another example of an iconic gesture.

**Metaphoric**
Then there are metaphoric gestures, which generally have the same form as iconic gestures, but refer to abstract concepts. These gestures tend to incorporate cultural beliefs; for example, English speakers tend to gesturally represent the abstract concept of knowledge as a solid form, while Turkana speakers from Kenya represent knowledge as a more abstract stream from the brow (Kendon 2004, pp. 46-7). This category can share the same form as iconic gestures, however their functions differ in relation to whether that being referred
to is abstract or concrete.

Kendon (2004, p 101) notes that McNeill's typology is the first time that this gestural category is proposed. It is also the most contentious. Fischer (1994, p. 346) argues that the creation of this category assumes that the metaphor enacted in the gesture is cognitively real to the speaker, when there may be no proof that this is the case. Despite such theoretical objections this category still remains in the schema, though not all researchers use it. Cassel (2007) works with embodied conversational agents (ECA); computer generated avatars that are designed to interact with people. Because the mental state of the ECA is not important in Cassell's study, iconic and metaphoric gestures are condensed into the category of 'illustrators', as they were before McNeill made the distinction between the two (Kendon 2004).

**Deictic**
The third category is deictic gestures, which have the function of referring, via pointing, to locations and objects. That which is being referred to may or may not be in the visual field of the interlocutor. While the exact form of these gestures may vary, usually on a cultural basis (Enfield 2001; Kita & Eggesbey 2001), there is an underlying form of making an indicating movement towards a location.

**Beats**
The fourth category is beats, which serve more of an emphatic function than the previous categories. These are repetitive bi-phasal hand strokes with an emphatic quality that draw attention to what is said. The bi-phasal nature of their form - as opposed to other gestures - makes them visually different from the other gesture categories. Linguists count a single gesture from the moment that preparation begins, through as many bi-phasal repetitions as occur until the hand returns to a state of rest. Politicians who 'hammer home a point' by repeatedly drive their hand up and down at a moment of rhetorical importance are using a beat gesture.
Cohesives
The final category, cohesives, is also something of a discourse gesture, used to indicate continuity in speech. This category is the most problematic of the five. McNeill (1992) states that a cohesive 'can consist of iconic, metaphorical or point gestures; they can even consist of beats' (p. 16), which means they are more of a supra-category than part of a discrete taxonomy. With this confusion about their form, and a lack of clarity as to their actual function, McNeill (2005) discards them in later work.

McNeill (1992) also mentions the category of butterworths - named after Brian Butterworth - as gestures that are used when the speaker can not recall a word. McNeill argues that because these gestures do not accompany speech directly, but occur with the absence of speech, they are not truly a part of the category of gesticulation (p. 77). This position is challenged by the work of Krauss and colleagues (Krauss 1998; Krauss & Hadar 1999; Krauss, Chen & Gottesman 2000) who argue that the function of such gestures in lexical retrieval is one of their vital functions.

This categorisational system has been developed taking into consideration both the form and function of the various categories. For example, the difference between iconic and metaphorical gestures is a functional one as they can have exactly the same form, yet their functions differ because one group refers to concrete entities while the other does not. Form is also important for this system; beat gestures are identified as much through their bi-phasic stroke pattern as their emphatic function, while the functional category of cohesives was dissolved altogether and gestures that would have been a part of it divided up based upon their form.

Arnheim (1994) and Fischer (1994) realised at the time Hand and Mind was released that by only studying a section of the range of gestural activities McNeill was able to bring to it greater clarity and empirical purpose. While this is
the usual motivation behind any phenomenal categorisation the construction of the continuum and gesticulation typology has not been without contention. Farnell (1994, p. 929) argues that it creates false divisions between various forms of movement and is self serving, a position shared by Armstrong, Stokoe & Wilcox (1995) and Feyereisen (1994). Kendon (2004) is also wary of gestural typology, claiming that while a taxonomy may be useful for a particular task 'gesture can not be penned down into a typology in any fixed way' (p. 84). Bäuml & Bäuml (1997, p. 1) argue that any such distinction is an artificial boundary, and instead define a gesture as any movement of the body that is meaningful. This is a common definition outside the domain of gesture research, with Morris (1977, 1994) and Critchley (1971) also taking this definitional position. Even McNeill (2000b, 2005) has relaxed his original taxonomy, conceding that a gesture may exhibit 'dimensions' of several categories simultaneously.

Bavelas (1994) has argued that McNeill's categories are too form-oriented and that a meaning-based category approach should be employed instead. Bavelas' list of 16 different sematic categories (Bavelas 1994, p. 213) was created for use with types of gestures that she estimates consitute 10% to 20% of conversational gestures. This is an unwieldly number of categories for such a small component of co-speech gestures, especially compared to the elegant simplicity of McNeill's four. As Markman (1989, p. 2) observes, no matter how logical and efficient a classification system is it will not be useful if it places too much strain upon the user's memory. With this in mind it is no surprise that his typology continues to be employed while researchers have not used Bavelas' more complicated categorisation. Researchers argue over the cognitive merit of their form of categorisation, yet no systematic research has yet been carried out to investigate whether there is a gestural categorisation schema that native speakers do not find to be artificial.
2.5 The Influence of McNeill's categorisation

While McNeill's typology is influenced by his predecessors, it is more clearly defined than those that went before. Despite any criticisms discussed above, McNeill's classification has been widely taken up by researchers in the field of gesture studies. In a survey of research articles in the primary journal of the discipline, Gesture, from edition 2, volume 1 (2002) to edition 7, volume 1 (2007) we can see the influence of McNeill's gesture categorisation.

Of the thirty-two papers examined, fifteen of the papers did not use gestural categorisation. Eight papers made exclusive use of the categorisation schema found in McNeill (1992), seven used McNeill as well as other references in relation to the classification of gesture, though McNeill's categorisation is still cited as the major, or one of the major, references. Those papers that did use McNeill's categorisation were not necessarily working in the domain of psycholinguistics that McNeill works in; Loehr (2007) used McNeill's categorisations in analysing the rhythmic relationship of speech and gesture production. Eight papers do not cite McNeill's categorisation at all. These papers are usually referencing a specific sub-genre of gestural activity - for example Tanner (2004) and Liebal, Pika & Tomasello (2006) are both papers that focus on non-human primate communication using a semantic-based classification of movements that is a sign language more than a gesture system, while Katsman (2007) draws upon the Jewish tradition of gestures that accompany the reading of the Torah and uses the traditional names of these actions accordingly.

It should be noted that not all researchers working with gesture make use of categorisation. Goodwin (2000) is an example of a study that focuses on gesture, but does not rely on categorising data. Goodwin uses a Communicative Analysis framework to perform a microanalysis of the speech and gesture used in short interactions between a man with aphasia and his family. The gesture events that occur in the conversation are not categorised,
but studied in-depth individually. Heath & Luff (2007) is another study that makes use of individual event microanalysis instead of categorisation in the study of gesture production by an art auctioneer. While this is one strategy for studying gesture, the majority of research still relies upon categorising movement events to make greater sense of them, as evidenced by the survey of articles in Gesture above.

While the creation and employment of a categorisation schema has been of great use to researchers working in the field of gesture, there has been limited investigation into whether these categories have any perceptual saliency for those who use gesture in daily interaction, or how language users themselves make sense of gestural events.

2.6 Research on native speaker categorisation of gesture

In a study of English native speaker perception of gestural events Gawne & Unger (2007) made some primary investigations into the way that native English speakers perceive gestures that accompany speech. This study was implemented to build upon the research undertaken by Kendon (1978) and to act as a pilot for this study. It was also designed to serve as a pilot for the current study by giving basic data on what forms of bodily communication speakers focus on.

In the study 48 Native English speakers completed a web-based task containing a short video of a conversational monologue aimed at eliciting whether speakers paid more attention to 'gestural' as opposed to 'non-gestural' movements as defined by the contemporary categorisation of gesture outlined above. Half of the participants viewed the video without sound so as to ascertain whether the presence of speech has an effect on the types of gestures participants were more likely to pay attention to. Participants were asked to count the number of gestures that they saw. Then they were asked to list the five gestures they felt to be the 'best' examples of gesture. The video
was created using ten gestures as per McNeill's definition, as well as grooming movements, facial movements, as well as posture and hand shifts (Gawne & Unger 2007, p. 7).

There was no significant difference between the number of gestures counted by those viewing the video with sound or without (t = 0.731, *p = 0.469). Participants who viewed the video with sound counted a mean of 15.57 gestures (sd = 5.358), while those with no sound counted a mean of 16.87 gestures (sd = 6.676). This supports Kendon's (1978) original findings, as it indicates that even without sound English speakers still see the same number of 'meaningful actions'. It is impossible to say if the two groups counted exactly the same movements in their tally as a comprehensive inventory of what they counted was not elicited. While the study gave evidence that the variable of sound appears to make no impact upon the number of gestures participants counted, the average number of gestures counted was greater than the ten counted by researchers, indicating that participants did count a greater number of gestures than a researcher working in the field of linguistics would.

Speaker intuitions have also been consulted in the creation of a dictionary of gesture. Morris, Collett, Marsh & O'Shaughnessy (1979) presented images of twenty common emblem gestures to groups of speakers at 40 locations throughout Europe and asked whether they had any meaning for the speaker. This was done in an attempt to understand the variety of meanings, and distribution, of the most common emblematic gestures in Europe. This study only asked speakers to give the meaning that they attached to the action. It worked on the presumption that speakers were likely to be aware of the gesture and interpret it to be meaningful.

While a quantitative approach provided statistical evidence that there is a difference in the way native speakers and linguists perceive gesture, a qualitative approach is required to gain a more complex understanding of at what point they differ.
3. Research Questions

The aim of this study is to investigate native speaker intuitions about gestural events and to compare how they differ from each other and from the categorisations of those studying gesture in the field of linguistics.

The two main research questions are:

1) Are native speakers homogeneous in the way they categorise gesture?

2) How do native English speaker categorisations of gesture compare to those of the established research community?

3.1 Native speaker categorisation (research question one)

In regards to research question one there are two levels of homogeneity that will be examined. The first is whether native speakers are homogeneous as to what they include in the larger category of gesture; that is, what they define as gesture. It is hypothesised that native speakers will define gesture in a similar way. As a homogeneous group of language speakers they have similar perceptual frames to draw upon. As Kendon (1978) and Gawne & Unger (2007) provided evidence for, there appears to be some underlying acceptance among native speakers of what counts as a 'significant action', or gesture, when accompanying speech.

The second level of this hypothesis is whether native speakers categorise the events they define as gestural in a homogeneous way. This is predicated upon a validation of the first hypothesis. It is hypothesised that while native speakers will not create identical gesture categories, they will categorise gestures in similar ways.
There is one specific sub-question relating to this research question:

Sub-question one: *Do native speakers tend to categorise gestures by function or form?*

As discussed in the background literature above (p. 12-14), the categories created by gesture researchers draw both upon the form and the function of gestures. It is hypothesised that native speakers will focus primarily upon the form of the gestures in creating categories, paying most attention to the part of the body the gesture was made with.

### 3.2 Comparisons with researchers (Research question two)

In regards to research question two it is hypothesised that there will not be a one-to-one correlation between English native speakers' and researchers' categorisations of gesture. As discussed above in the evolution of the study of gesture as an area of linguistic enquiry, the definition of what constitutes a gesture has become quite narrow, in comparison to the wide range of bodily movement that can occur with speech. Gawne & Unger (2007) provided some evidence that non-linguists' categorisation of gesture will be broader than that of researchers working with the established categorisation.

There is also a specific area of this research question to be addressed, pertaining to the phenomenon of beat gestures:

Sub-question two: *Do native speakers see beat gestures as a single unified gesture composed of several smaller bi-phasic movements, the way researchers do?*

While researchers count the multiple bi-phasic movements of a beat gesture as a single gesture unit, as discussed in the background literature above, it is unknown how native speakers analyse these gestures. Gawne & Unger (2007)
reported that native speakers on average count more gesture events than researchers. This higher count tally may be the result of native speakers counting and analysing each stroke of the beat gesture as a single gesture event. It is therefore hypothesised that native speakers are likely to consider each stroke of a beat gesture a separate communicative act.
4. Methodology

4.1 Participants

Twelve native speakers of Australian English (7 females, 5 males) participated in the study without remuneration. The participants were all studying for, or had recently completed, tertiary degrees and were aged 20 - 27 years with a median age of 23.3 years. This was a very homogenous group of participants, which means that any variation observed is most likely to be a result of individual differences and not affected by different cultural or language backgrounds. Linguistic homogeneity is important in this research, but so is gestural and cultural homogeneity. As Rector & Trigo (2004) noted in a study of the gestures of Portuguese speakers in three different countries, speaking the same language does not result in the same use of gestures by language users.

4. Procedure

There were three sections of the procedure. All participants completed stage one, a survey, and stage two, a gesture transcription task. 8 participants (4 male, 4 female) also participated in section three, which was a post hoc interview. The three sections were all completed in a single session of between 45 and 55 minutes duration. All sessions were conducted in a research lab space with each participant meeting individually with the researcher.

4.2.1 Section one – survey

All participants commenced with a survey (appendix 1) in which they were asked to give their definition of gesture. This was done to make the participants think about the topic, as gestures are not a phenomenon that is given much conscious attention by native speakers. Participants were then asked to construct their own categorisation of gesture based upon their knowledge.
While this task appears to have a very wide scope, and the limited time frame only taps into the primary intuitions of native speakers, there is no precedent for this study that allows any assumptions to be made, and it is therefore necessary to leave it as a fairly open activity.

At this point participants were shown a video. The video was 52 seconds long and was specifically created for use in Gawne & Unger (2007). A detailed description of the video is given below. Participants were given the opportunity to view the film as many times as they wished, and participants viewed the video between 3-10 times. When they were well aquatinted with the narrative they were asked to count the number of gestures they observed and record it on the survey sheet. This was done so that it could be observed whether participants changed their minds as to the number of gestures while working on the subsequent task.

4.2.2 Section two – transcription

For the next stage of the session, participants were required to highlight all the events in the video that they thought constituted a single gesture. This involved using ELAN. ELAN is a professional sound and video transcription tool developed by the Language Archiving Team at the Max Plank Institute for Psycholinguistics (image 4.1 below).

While the program can be used to create highly complex simultaneous transcriptions of audio-visual data, the participants used ELAN simply to transcribe where they believed a gesture had occurred in the video. Most gesture transcriptions mark out and separate the different elements of a gesture - the on-set, stroke and end-phase - however this was beyond the scope of what the researchers required of the participants and as such they were only asked to mark out gesture events as they saw them.

The ELAN template was created to allow participants to mark two separate
gestures occurring simultaneously but having two separate lines of the program that they could transcribe on. The use of ELAN and the written survey are important in this study as they diminish the influence of the researcher over the participants. Kendon (1978, p. 308) showed participants the video and asked them to tell him where they saw a gesture. With this design the researcher is not involved in the process of transcribing the gesture, thus removing any possibility of leading participants.

![Image 4.1](image.png)

**IMAGE 4.1 the ELAN transcription program**

Participants were introduced to the program using a training video that did not contain any gestural information (attached cd, appendix 7). The training video consisted of a crude animation with circular forms appearing on the screen for varying durations. This was to ensure that the participants could be introduced to ELAN without the researcher inducing bias - as may occur if a figurative video was used. The participants were introduced to the program and were given as much instruction time as was required for them to feel comfortable using the software. The participants responded favourably to the task and all of them very quickly became proficient at using the program.
The participant was given as long as necessary to mark what they observed to be gestures. Once the gesture events were marked out, the participants were asked to label each one that corresponded to the gesture categories they had created in the survey section of the procedure. This was to ensure that they thought critically about how their categories stacked up against natural data. Upon completing the gesture marking task the participant returned to the last sheet of the survey which gave them the opportunity to amend the categorisations that they had created earlier in light of the task.

4.2.3 Section three - interview

The final stage was a short semi-structured post-hoc interview that was used to gain a greater understanding of the participants' intuitions about gesture. The interviews were not designed with the intention that they would be a major source of material for analysis, but simply to provide some supporting evidence of speaker intuitions shown in the survey and transcription. Due to technical availability only eight of the participants were involved in this section of the study (5 male, 3 female) and the interviews were 2-6 minutes in duration. Appendix 2 gives a list of various questions that were asked of the participants, with further questioning used to elucidate anything that the researcher felt was of concern to the project. These interviews were video recorded using a Sony DCR-PC1000E Handycam. This device had an adequate level of audio-visual quality, but as the recordings were not being subjected to any microanalysis it was not of major importance.

4.3 The Video

The video data used was created by the researcher and a colleague for a previous project (Gawne & Unger 2007) (attached CD, appendix 8). It depicted a young woman in a conversational narrative (transcript, appendix 2). The woman was sitting, and the shot was framed from her head to just below her knees. Throughout the video, her gestures were designed to conform to a
schema discussed below, though an effort was made to ensure they remained natural. While all attempts were made to ensure that the movements were as controlled as possible, it was understood that it is impossible to control absolutely every movement made. The subjects gaze shifted at times, and she continued to make small hand, body, and facial movements throughout the video. 12 movement events, predetermined by the researcher, featured in the video. These are detailed in tables 4.1, 4.2 and 4.3.

On the basis of careful consideration of other studies of gesture, a planned narrative was created to address the needs of both the study design and the participants. For the researcher it allowed for complete control over the types of gestures being performed, with a balance of gesture and non-gesture events evenly distributed across the categories used by gesture researchers. Using completely naturalistic data would place too great a burden upon the participants. It would have required filming for a great deal longer than 50 seconds to obtain a good range of data. Naturalistic data is subtle and complex enough to make clear transcription difficult for even the most experienced transcriber. As no study of this type has ever been undertaken with novice transcribers it was deemed best to not make the task too complicated.

To the best that could be enacted in the video the gestures were prototypical examples of distinct categories. Metaphoric gestures were not included in the video since they are the most complex and contentious category of McNeill's (1992) schema, as discussed in the background literature above (pp. 12-13). As this is the first time an experiment of this design has been run, it was decided to not include the category of metaphoric gestures. It was also deemed that it was preferable to use this video so that the results of this test group could be compared to the previous test group from Gawne & Unger (2007).

Two of each type were used to give a reasonable number of events to mark out for the task and to give a wide range of gesture events. Thus there was a nod as well as a shake for the head gestures. For the deictic gestures one referred
to an object within sight ('me') and the other to an object out of view ('neighbour's house'). With the iconic gestures the one referring to 'mockdogs' had the hands represent the entity, while the gesture referring to 'brandy' used the hands acting out their role pouring the bottle. There was also a short sharp beat gesture and a longer less rigid one. One of each gesture type was included in the first half of the video, and all the types were then repeated in the second half.

The footage was viewed by another student in the field of gesture studies and a researcher in the field and both concurred that the gesture events were both naturalistic and conformed to the categories listed in tables 4.1, 4.2 and 4.3 below.

<table>
<thead>
<tr>
<th>Gesticulations</th>
<th>Description</th>
<th>Type</th>
<th>Accompanying Speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3-4.9</td>
<td>Left hand points across body to the right side of screen, index finger extended.</td>
<td>deictic</td>
<td>My neighbours house, she lives across...</td>
</tr>
<tr>
<td>6.0-8.7</td>
<td>Both hands held in front of body creating an oval</td>
<td>iconic</td>
<td>...ade these ahh vegetarian hot-dogs I think s..</td>
</tr>
<tr>
<td>12.2-14.8</td>
<td>Flat hand, palm down, two straight strokes</td>
<td>beat</td>
<td>and they were were so disgusting...</td>
</tr>
<tr>
<td>23-29</td>
<td>Partially closed hand, 5 rolling strokes</td>
<td>beat</td>
<td>... had custard and cream and ice-cream and jelly and cake uh...</td>
</tr>
<tr>
<td>30.2-33.7</td>
<td>Hand grasping imaginary bottle, pouring</td>
<td>iconic</td>
<td>um. it also had a lot of brandy as well. I was feeling a littl...</td>
</tr>
<tr>
<td>48.8-50.5</td>
<td>Flat hand pressed to chest</td>
<td>deictic</td>
<td>I think I'll cook myself dinner befor...</td>
</tr>
</tbody>
</table>

Table 4.1 gesticulations included in video
### Emblems

<table>
<thead>
<tr>
<th>Time (seconds)</th>
<th>Description</th>
<th>Term</th>
<th>Accompanying Speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.0-12.1</td>
<td>Index and middle fingers extended and retracted several times</td>
<td>quote marks</td>
<td>'...s like mockdogs'</td>
</tr>
<tr>
<td>15-16.3</td>
<td>Head moves backward and forwards</td>
<td>head shake</td>
<td>couldn't bring myself to each th.</td>
</tr>
<tr>
<td>41.3-43.2</td>
<td>Thumb and index finger come together to create circle, other three fingers extended, facing up, palm outwards</td>
<td>ok sign</td>
<td>'...ages, it was so good.'</td>
</tr>
<tr>
<td>44.8-48.3</td>
<td>Head moves up and down</td>
<td>nodding</td>
<td>get myself invited back there but maybe just for dessert</td>
</tr>
</tbody>
</table>

Table 4.2 emblem gestures included in video

### Non-Gestural Movement

<table>
<thead>
<tr>
<th>Time (seconds)</th>
<th>Description</th>
<th>Accompanying Speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-18.1</td>
<td>Right hand brushes hair behind right ear</td>
<td>'T'eat them um fortu...&quot;</td>
</tr>
<tr>
<td>35-37.6</td>
<td>Speaker uncrosses legs and adjusts seating position</td>
<td>&quot;um. so uhh&quot;</td>
</tr>
</tbody>
</table>

Table 4.3 non-gestural body movements

### 4.4 Data analysis

In order to provide evidence to answer the research questions set out above, the data analysis is set out for each question below.

To assess whether native speakers are homogeneous in the way they categorise gesture (research question one) a close analysis of the definitions of gesture given and the categories created by the participants will be undertaken.
For the sub-question as to whether native speakers categorise gesture by function or form, the categories created by speakers will be analysed and grouped depending on whether they are function based schema, form based schema, or a combination of the two.

To assess how native English speakers' categorisation of gesture compares to that used by the research community (research question two) the first step will be to count the number of gestures that participants counted. The number of gestures they recorded when watching the video, and the number of gesture events they recorded in the transcription activity will be compared using a dependent t-test to ascertain whether they are significantly different. The number of gestures counted by participants in this study will also be compared to the number of gestures counted by participants in Gawne & Unger (2007) using an independent t-test. This will indicate whether participants are consistent with the wider population in the number of gestures they count. If the average number of gestures that participants counted is greater than that counted by researchers ( >10 ) then it is likely that this is due to native speakers categorising events differently to how researchers do.

To assess how native speakers categorise beat gestures (sub-question two), their ELAN transcriptions will be analysed and supporting information will be drawn from the post hoc interview.

For all sections information gained from the interviews will be used to further illuminate the motivations of the native speakers where appropriate.
5. Results

The results of the study will be presented in sections relating to the research questions. Data used in the results and discussion were drawn from all three sections of the experiment, and all participant quotations have been annotated according to whether they were taken from the written survey, ELAN transcription task or the post hoc interview. With such a wealth of qualitative data to draw upon, a great deal more can be said than there is space for here, and only those points most pertinent to the research questions will be discussed in depth.

5.1 Are native speakers homogeneous in the way that they categorise gesture? (research question one)

As mentioned in the research questions (ch. 3.1 p. 19) there were two levels to this question; the first looking at native speaker definitions, the second looking at categorisations of gesture. We will look at these in turn

5.1.1 Native speaker definitions

The key phrases from participant definitions can be found in appendix 4. Table a5.1 (appendix 5) includes the main definitional themes mentioned by the participants. There were some strong definitional tendencies among participants. Eleven used the term 'movement' in their definition, and 10 explicitly stated that it was a part of communication. Eleven participants noted that gestures occur with speech, and 10 of those also noted that they can also occur in the absence of speech. Only 3 people mentioned the hands as the primary way to create gestures, although they also noted that the rest of the body can be used, as did five other people.
5.1.2 Native Speaker categorisations

While the participants' definitions appear to be relatively homogeneous, in looking at the categories they created it quickly became apparent that they were not so homogeneous in their perception of what constituted gesture. The major difference between participants is the level at which they decided that the body language of the woman in the video was communicative. The participants fall across a spectrum, with those with a narrow definition of communicative intent at one end, and those with a broad conception of communicative intent at the other. Those with a broad understanding of the communicative intent of the interlocutor were more likely to have included a much broader range of body movement in their analysis and transcription.

Table a5.2 (appendix 5) gives a list of the number of gestures each participant recorded in both sections of the task, all participants counted and transcribed ten or more except participant 4 who counted nine but transcribed eleven events. From this table we can see that there was a wide variation between participants in the number of events counted and transcribed, with participants counting between 9-31 events and transcribing between 10-27 events.

Table a5.3 (appendix 5) records whether the participant transcribed all ten of the gesture events created by the researcher and also lists some of the non-gesture events in the video and whether participants ascribed them. The self-grooming and posture shift are both described in table 4.3 in the methodology, while the small movement of the hands that occurs at 00:02-00:03 seconds and the gaze shift that occurs at 00:08-00:10 seconds were incidental body movements that could not be controlled in the production of the video and which half of the participants transcribed. While the researcher was aware that there were movements produced in the video that could not be controlled
(methodology, p. 26) there does not appear to be any consistency across the group as to which of the 'non-gesture' events are more likely to be transcribed than others; of the four phenomena listed, participant 4 transcribed only the self-grooming action, participant 2 only transcribed the hand movement, participant 8 only transcribed the gaze shift and other participants transcribed different combinations. Those who had a broader understanding of communicative intent were more likely to transcribe a larger number of events; three of the four participants who transcribed the four 'non-gesture' events in table 5.3 also transcribed the greatest number of gestures.

With such variety in such a small population there is very little that can be said about the gestural categories proposed by participants. The categories made by the participants, and amendments made to them after viewing the video can be found in short form in appendix 6. Even the few times where there are observable similarities between categories created by participants it can not be assumed that participants have the same mental representations of what these categories mean. For example, both participants 3 and 4 created a category called thinking. Participant 3 used this category to transcribe gaze shifts made by the subject of the video, while participant 4 did not use this category in their transcription at all.

5.2 Do native speakers tend to categorise gestures by function or form? (Sub-question one)

While the participants used a variety of definitions and categorisational strategies in order to describe gesture, another way we can analyse the data is to examine whether participants used form or function as the basis of their schema.

As table 5.1 below shows, people were much more likely to focus upon the function of a gesture, or use a combination of form and function. The only person who used a form based schema created three categories - 'hand
gestures', 'head movements' and 'facial expressions'. Even though the participant used a form based schema they still elaborated on these types with functional properties; 'hands' being used to indicate objects, 'head' to show understanding and 'facial expressions' to show emotions (participant 5).

<table>
<thead>
<tr>
<th></th>
<th>Pre-video</th>
<th>Post-video</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Function</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Combination</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 5.1 *Categorisational strategies employed by participants*

Of those that had a system based on a combination of form and function there were several ways this was accomplished. The most common was where functional categories and formal categories were presented together. For example, one participant had four categories with 'emphasis', 'direction' and 'substitution' as function categories and the form based 'facial expressions' as the fourth (participant 8). Four of the six participants with combination schema had this arrangement. The second, used by one participant, involved creating some categories that were either form or function, and then having categories that were a combination of the two. Participant 4 had multiple categories including 'thinking' (function), 'head gestures' (form) as well as 'multiple movements to show complexity' (form and function). The final way of combining form and function was participant 10's creation of a categorisational matrix. There were three functional categories of 'specific gestures', 'non-specific gestures' and 'unconscious gestures' which were divided by two functional groupings of 'body' and 'head/face'. As with research question one, participants have a range of ways of approaching gesture.
5.3 How do native English speaker categorisations of gesture compare to those of the established research community? (Research question two)

The number of gestures counted by each participant in section one and the number transcribed in ELAN are listed in table a5.2 (appendix 5). Participants counted an average of 16.7 gestures each in the first section of the experiment, and transcribed an average 15.3 gestures each in ELAN. A dependent t-test indicates there was no significant difference between these two results ($t = 2.028, *p = .067$). An independent t-test comparing the number of gestures counted by this group and the number counted by the participants in Gawne & Unger (2007) showed no significant difference ($t = .443, *p = .66$). The number of gestures counted by the sample population in this study is congruent with those in Gawne & Unger (2007).

In looking at the number of gestures counted by participants we will use the number they transcribed as this is a more considered total. The number of gestures counted by participants ($X=15.3$) is greater than that by researchers (10), with no participants transcribing less than ten gesture events. As table a5.3 (appendix 5) shows, all participants except one transcribed all of the gesture events in the video set out in the table in the methodology. The participant who did not transcribe all ten neglected to transcribe the nodding gesture event, which is one of the more subtly performed gestures in the video.

In order to examine whether participants counting a greater number of gestures is a result of participants having a wider definition of gesture, table 5.2 was drawn up containing categories created by participants that are not considered within the scope of 'gesture' for researchers:
<table>
<thead>
<tr>
<th>Category created by participant</th>
<th>Number who created this category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td>5</td>
</tr>
<tr>
<td>Posture shift</td>
<td>3</td>
</tr>
<tr>
<td>Nervous actions</td>
<td>2</td>
</tr>
<tr>
<td>Unconscious actions</td>
<td>2</td>
</tr>
<tr>
<td>Emotive body language</td>
<td>1</td>
</tr>
<tr>
<td>Breathing</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 5.2 *Table of gesture categories created by participants that fall outside of the scope of gesture used by researchers.*

This table indicates that there are some elements of body movement that participants consider gestural, even though researchers do not. There was a strong tendency among the participants to consider facial expressions to be gestures, as well as posture shifts and nervous or unconscious actions. However, even in categories that appear, at first, to resemble those used by researchers this isn't always the case. For example, participant 3 created a category named 'thinking', which was used in ELAN to transcribe gaze shifts, and another category called 'in association with speech' which was used to transcribe eyebrow flashes.

**5.4 Do native speakers see beat gestures as a single unified gesture composed of several smaller bi-phasic movements, the way researchers do? (sub-question two)**

To ascertain how participants analysed beat gestures, their ELAN transcriptions were analysed. All participants transcribed the first beat gesture as a single gesture event. The second beat gesture was transcribed as a single event by all but one of the participants, who analysed it as 5 separate gesture events. The motivation behind participants' analysis of beat gestures will be explored in the discussion section.
6. Discussion

The results of this study indicate that many of the original hypotheses put forward at the outset were not supported. Each research question is discussed below, with an explanation of whether the hypothesis was supported, and if not, why that may be the case.

6.1 Are native speakers homogeneous in the way they categorise gesture? (Research Question One)

From the data it is apparent that the original hypothesis that native speakers will categorise gestures in a similar fashion is unsupported. The most fundamental difference between participants, which accounts for the differences in what they accept as gestural and therefore the types of categories they create, is the level at which they perceive communicative intent. By 'communicative intent' I mean the point at which the participant assumed that the subject in the video was communicating using bodily language. Where a participant saw communicative intent they would be more likely to view the movement event as a 'significant action' as per Kendon's (1978) definition. Participants either attributed communicative intent to a broad range of body movement and thus counted and transcribed a larger range of movement phenomena, or had a narrower definition, generally transcribing fewer events.

While the definitions of gesture provided by participants are relatively homogeneous, the variety of events they considered to be gestural is clearly not. One example of this is the participants' decision to transcribe the posture shifting action, shown in table 5.3 of the results. Participant 6 transcribed the body shift and wrote in ELAN that 'it's like it indicates moving onto the summary of the next topic.' While this participant has analysed it as a discursive gesture, participant 8 commented in the interview that they did not transcribe the same movement because they 'didn't know how to interpret it if [they] did call it a
gesture.' Participant 8 did not attribute the same communicative intent to the movement as participant 6 did and therefore did not transcribe it as a gesture. Participant 5 also chose not to transcribe the posture shift, arguing that it was 'more that you were uncomfortable, unless you wanted to gesture you were uncomfortable.' This comment is one of many made by participants that indicates that they were aware of the fluidity between the gestural and non-gestural, and that this was somehow connected to the communicative intent of the speaker.

For most participants, viewing the video did not impact greatly upon their conception of gesture, or their categorisation. Only five of the twelve participants took the option of amending their schema after viewing the video (appendix 6). Of these, one created sub-categories of one category and three created two or three new categories. There is no evidence that they created these categories based exclusively on the evidence drawn from the video. There was one participant whose schema was heavily influenced by the video. Participant 4 created seven categories in the first section of the survey, much higher than the 3-4 category average of the group. After watching the video the participant added another seven categories, which were clearly heavily influenced by the video, for example, one named 'showing dubiousness' appears to have been created entirely to account for the use of the quote-mark emblem used in the video. Markman (1989, p. 4) argues that there is a general reluctance to create new categories for single objects when existing categories can be stretched to accommodate these single instances, and yet this participant appears to go against this tendency. It is so clear that this participant created new categories for every event that they felt did not fit into their existing categories that it makes it very apparent that none of the other participants resorted to this strategy. Thus it appears that the video did not increase the similarity of the perception or categorisation of gesture among the majority of participants.
The wide range of events transcribed by the participants calls into question the strength of Kendon's observation that native speakers' appear to have a common understanding of what counts as a 'significant action' (1978). All but one of the participants transcribed all ten of the gesture events created by the participants, which indicates there is some basic agreement among participants as to what constitutes 'significant action'. However, there was a wide variety of other phenomena transcribed, with participants also including between one and seventeen other movements in their transcriptions, none of which were systematically transcribed by the whole group. This indicates that native speaker understanding of where 'significant action' stops and actions that aren't communicatively significant begin is not so clear cut as it was supposed to be at the outset of this study. Instead, native speakers have varying understandings of the communicative intent of the speaker. The variety of events transcribed by participants is especially dramatic when it is taken into consideration that the video used in the study is a simplified example of how non-verbal communication interacts with verbal communication. Frequently, in natural conversational interaction, gestures tend to be less clearly defined in their movement in relation to other body movements.

At all times during the analysis of participant created gesture categories the researcher was quite aware that these were only created upon primary intuition. Native speakers are taught ways of categorising verbal information through language literacy education, such as word classes, and various text genres, yet there is no real equivalent category education for non-verbal communication. That this is the case makes the data even more interesting as it highlights the variety of ways in which the human mind will try and make sense of an array of data through categorisation. Smith & Medin note 'categorization is the process of determining that a specific instance is a member of a concept' (1981, p. 7). Here we see a variety of ways that native speakers can draw the line at what is, and is not, an acceptable member of a category. As we can see from the participants in this study, there are a variety of points at which native speakers draw the line between what is gestural and what is not. Although speakers are
not always confident in where they draw the line between gesture and non gesture there is still a considerable range of variation.

6.2 Do native speakers tend to categorise gestures by function or form? (Sub-question one)

Participants were more likely to categorise gestures by the function they perform, or to use a combination of function and form. The original hypothesis that participants would focus on the form of the gesture due to a lack of experience in consciously analysing body movement appears to not be valid. Even though the categories created by participants were based on primary intuitions they were a lot more sophisticated than was expected. This may be a result of level of education, which will be discussed below (pp. 47-48)

Speaker definitions give some indication of this. As shown in table a5.1 (appendix 5), only three participants made reference to the hands in their definition, and they also mentioned that other parts of the body could be used. The general focus was upon gestures being communicative, either in the presence or absence of speech. The focus on the communicative aspect of gesture in the definition fed over into the creation of categories, with a strong focus on the use of a certain movement in communication, rather than the part of the body that produces that movement.

What is most interesting about the participant data is the complex ways in which they combined attributes of form and function to create sophisticated schema. Work by McNeill, Cassell & McCullough (1994) has found that language users are very attuned to the communicative information of gestures, especially when they are mis-matched with the accompanying speech, and Breckinridge Church, Garber & Rogalski (2007) have found that the communicative force of gestures was less likely to deteriorate over time than that of spoken language. While we know that native speakers are proficient at sub-consciously processing gestures

2 See appendix 5, explanation of table a5.2 for more information.
and bodily communication this study has also found that language users are more perceptive of the role of gesture in communication than was thought at the outset of this study.

6.3 How do native English speaker categorisations of gesture compare to those of the established research community? (Research question two)

It was hypothesised that there would be no clear relationship between the intuitions of native speakers and the categories established by researchers. Given the variety of categorisational strategies employed by participants as discussed in relation to research question one, it appears safe to assert that the hypothesis for research question two is supported. However, on closer inspection of the data it becomes apparent that perhaps there is a consistent relationship between what researchers and native speakers consider to be gestural action.

Some participants had such a broad understanding of gesture that they were focusing on very different things to what researchers in the field look at. For example, participant 3 transcribed 24 gesture events in ELAN, and had a very broad understanding of what constituted gesture. One of their categories was labelled ‘those associated with speaking’, and was used in ELAN to annotate all the gesture events that researchers would consider to be in the separate gesticulation categories of iconic, beat and deictic, as well as emblems, which belong to a different class on Kendon’s Continuum, and eyebrow flashes, which are not even considered gestural in the current categorisation employed by researchers. Participants 6 and 10 are also noteworthy for the number and variety of events that they transcribed as gestural, and the breadth of the categories they created.

The abundance of events counted could be attributed to over-sensitising participants to body movement in that they had the opportunity to watch the video many times over. Normally, native speakers process and infer meaning in
real time, whereas the video gave them the opportunity to examine events in greater depth than they would normally experience. The effect of over-sensitivity can not effectively be gauged, although all participants watched the video a similar number of times, so no participant was over-sensitized as a result of watching the video more times than the others. Over-sensitivity alone does not appear to have had that great an effect on participants 3, 6 and 10. Participant 3 was the only one of these three to make minor changes to their categorisations after viewing the video – which indicates that, at least for the other two, their understand of gesture was already broad and then applied to the video, and not greatly influenced by it.

Over-sensitivity can not account for the fact that participants 1, 2, 4 and 7 transcribed either ten or eleven events. These participants only transcribed the ten events created by the researcher, except for participant 2 who only transcribed nine of them, and participants 1, 2 and 4 transcribed one extra 'non-gesture'. Participant 1 included the posture shift and participant 4 included the hair push – both participants annotated their transcription, linking the action to narrative structure. Participant 2 included a nervous thumb fiddle but did not give any reason for their motivation. These participants' conception of what constitutes gesture appears to be very similar to that of researchers.

The categorisations created by participants 1, 2 and 7 tended to reflect their narrower focus; they did not have categories that focus explicitly on actions that researchers would not consider gestural; such as the 'breathing' category created by participant 3. Participant 4 is interesting, as their categorisation, discussed above in relation to research question one, does not tend to reflect the nature of their transcription. As we saw, participant 4 created a total of 14 gesture categories, yet only transcribed the ten gesture events and the hair sweep, which is a total of eleven events. This gives an indication that perhaps asking participants to create categories is not the best way of trying to capture their perception of gesture, as participant 4’s categories appear rather incongruous with their transcription. It also indicates that there is not a one-to-
one relationship between perception and transcription for speakers.

The fact that some of the native speaker definitions of gesture are much broader than researchers’ is not surprising, given the specific definition of gesture that researchers work with, and the fact that the current schema used in research has been developed and narrowed over a lengthy period of time. What is of great importance in this study is that all participants consistently included the ten gesture events deliberately created by the researcher as the minimal set of what constituted gestural action. Kendon (2000, p. 49) observes that ‘[t]here is, to be sure, no hard-and-fast line between what is ‘gesture’ and what is not, but there is, nonetheless, little difficulty with agreeing what it includes.’ The results of this study indicate that participants and researchers do not appear to have any difficulty in agreeing on the basics of what constitutes gestural action. The variation occurs when native speakers bring a broader definition to the data and include events that researchers would not include.

6.4 Do native speakers see beat gestures as a single unified gesture composed of several smaller bi-phasic movements as researchers do? (Sub-question two)

The hypothesis that participants would consider each stroke of a beat gesture as a separate gesture was based upon the same assumption as the hypothesis for sub-question one; that participants would resort to the most straight-forward analysis based on their lack of experience at analysing gesture. All but one of the transcriptions produced by participants represents the multiple bi-phasic strokes of the beat gestures as a single event, indicating that native speakers perceive beat gestures as a single event. Participant comments further illuminate how native speakers perceive these gestures and indicate that they have a very sophisticated perception of how these complex gestures function.

In the ELAN transcription several participants made interesting notes when transcribing the second beat gesture as a single event. Participant 6 wrote
'hand gestures to emphasise', while participant 5 wrote 'hand gestures to symbolise', participant 4 also transcribed the beat gesture as a single event but referred to it in the plural – the other participants made no reference to the event as singular or plural. It appears from the transcription and notes that these participants understand the gesture is made up of multiple movements but is still one event. This analysis is only apparent for beat gesture 2, which was a longer series of more pronounced movements than beat 1. Participants 4, 5 and 6 all referenced beat 2 in the plural, but discussed the first beat gesture in the singular, only participant 2 called beat 1 a 'series of complementary gestures'.

During the interview, when questioned about how they came to the decision to analyse the beat gesture as they did participants showed perception of the structural nature of a gesture. When participant 9 was asked why they analysed the beat as a single event they answered 'I think my rational was that the hand didn't go back down, but the hand stayed up and continued.' This explanation was also given by participants 2, 5 and 6. Participant 2 also felt that it was one gesture as it communicated a single semantic idea, which was also the reason given by participant 11. Other participants who participated in the post hoc interview could not give a reason for their intuition that the beat gestures should be analysed as a single event, but generally felt certain that their analysis was justified. The analysis given by participants provides evidence of native speaker cognitive processes that supports the definition of the category of beat gestures as proposed by researchers.
7. Conclusion

While this may not be the way that native speakers process and understand gestural and bodily communication in real-time interaction, this experiment has given some primary insight into native speaker intuitions as to the nature and form of gesture. This chapter is an opportunity to reflect upon the implications of the results of this study. First, we will examine the potential implications the results have for the current state of gesture categorisation theory. Second, we will look at how this study may possibly interact with current practical gesture research. Third, the ramifications of the study design will be discussed. In conclusion the major findings of the study will be reiterated.

7.1 Relation to theory

The results of this study serve as a timely reminder to those working in the field of gesture research that focusing exclusively upon gesture and ignoring other body movement that fall outside the scope of the definition may be to the detriment of understanding the complete communicative force of the utterance. Gesture researchers have long been the champions of seeing the utterance as more than just the spoken word (Kendon 1980, 1988; McNeill 1987, 1992). Now they run the risk of also missing out on the full illocutionary potential of an utterance by only focusing on that which falls into their own definition. Native speakers who participated in the study were receptive to, and found communicative intent in, a range of movements, such as gaze shifts, posture shifts and nervous actions. Native speakers ascribe meaning to a variety of phenomena that are neglected by researchers, possibly to the detriment of understanding the complexity of the communicative information conveyed through body movement.

The results of this study may also be of interest to gesture researchers, as they highlight the role of the person receiving the utterance and understanding its
meaning. Most research on gesture has been focused on examining the way gesture is used by the person producing the utterance. This focus has largely been motivated by the psycholinguistic background that scholars such as David McNeill brought to the study of gesture. In his work, such as *Hand and mind: What gestures reveal about thought* (1992), McNeill focuses mainly on the cognitive processing of gestures for the speaker. Some attention is given to the way listeners process gesture, such as in situations where the semantic content shown in the gesture and speech channels are 'miss-matched' (McNeill 1992: p. 134-144), however the majority of the work done focuses on the person who produced the utterance.

It is not just those with a psycholinguistic background that focus on the speaker. Kendon notes in *Gesture: Visible action as utterance* (2004) that '[w]illingly or not, humans... continuously inform one another about their intentions, interests, feelings and ideas by means of visible bodily action' (p. 1). The results of this study have reinforced the fact that the speaker, no matter how willing or unwilling they are in their communicative body language, actually has little control over how their gestures are perceived and understood by their interlocutors. In actions such as the posture shift enacted in the video, interlocutors may or may not assign meaning to that action. This study serves as a timely reminder that researchers should be careful to not spend too much time being preoccupied with how we inform one another using gesture at the cost of studying how we are informed by gesture.

### 7.2 Relation to practical application

The results of this study may have practical implications for work in two areas that involve speakers being highly conscious of the use of gesture in communication.

Firstly, the findings from this study may be of use in work with embodied conversational agents (ECAs) (Cassell 2001: 2007). Cassell and her lab group
have been working on creating avatars that can engage in interaction with humans in order to come to a greater understanding the communicative properties of humans (2007 p. 350-1), and how they interact with intelligent systems (2001, p. 67). Cassell originally studied gesture and places great emphasis on employing the gestural mode as well as the verbal for successful communication (2001, 2007 p. 69). In interacting with ECAs, people are more conscious of what constitutes a gesture, and how meaning is constructed in body language. Cassell's intention to 'help users... into automatically applying such a theory of mind as will allow them not to have to spend their time constructing awkward new theories of the machine's intelligence on the fly' (2001, p. 71-2), can be furthered by this study. Although this study has a very small, homogeneous sample size, the results from the experiment indicate that there is a broad range of phenomena that native speakers consider to be meaningful. As the ECAs created by Cassell’s team are cartoonishly humanoid, but not photorealistic, people are very much aware of how they interact with them. While the exact findings of this study may not be applicable to work with ECAs, the results, with the video playback of which participants were also highly conscious, indicate that in work with ECAs it is important to understand that native speakers have a broad range of communicative expectations from an interactant.

Secondly, in a world of ever increasing video communication it has potential implications for daily interaction. The in-depth study of gesture was greatly facilitated by the increasing availability of video recording and playback technology from the 1970s onwards (Scherer & Ekman 1982; Farnell 2004, p. 100). In the quarter of a century since Schere & Ekman (1982) noted how prohibitively expensive video equipment could be, the cost has plummeted and video is now ubiquitous. With the increase in mobile phone video messaging, and the growing use of internet video blogs and vodcasts, native speakers have a greater opportunity than ever before to closely scrutinise and analyse the elements of a recorded utterance in their daily lives.
There is also a more serious side to the prevalence of video recording than
native speakers' scrutinising their friends' online video diaries. In the last
decade Australian police forces have replaced audio recording of interviews
with audiovisual recording, and we are world leaders in the implementation of
such technology in crime fighting. This footage is being used more and more
frequently in trial proceedings (Barraud 2007). Both members of the police force
and members of the general public are viewing this footage. In an interview on
'Law Report' on ABC Radio National, Steve Longford, a former police officer,
mentioned one particular case where he felt that the accused's innocence was
more strongly protested in non-verbal cues than in the verbal channel. (Barraud
2007). In such situations neither members of the police force, or the general
public, have training in non-verbal communication analysis, and as such they
will be relying on the same intuitions about what constitutes a communicative
event as the participants in this study employed.

7.3 Reflections on study design

The categories created by participants were very much based on primary
intuitions. If participants are given more time to consider their categories, and
are given a wider range of stimulus than a short, scripted video, they may
produce differently motivated schema. However, given the scope of
categorisational variety shown even by this small and very homogeneous
sample, it is doubtful whether there is anything that we can readily consider as a
stable feature of native speaker categorisation of gesture (research question
one), although the perception of beat gestures by native speakers appears to
be highly consistent (sub-question two).

It is possible that the lack of categorical homogeneity is a result of the age and
education level of the participants. Without having developed intuitions about
what is gestural through formal education, the variety of speaker variability may
be a result of participants developing individual intuitions. Therefore, targeting
younger speakers may result in more homogeneous results as participants will
not have had as long to develop individual intuitions about gesture. The level of
education of the participants may have also influence the outcome. Participants
had a high level of education, varying from second year of university to PhD
studies. While this was the first time that the participants had to categorise
gestures, they brought with them experience in analysing and synthesising
data. As one participant noted after completing the task 'I probably spent too
much time making my categories sound clever'. Perhaps working with
participants with a different educational background will yield different results.
Working with speakers from other background may also provide different
results, for example, thespians or public speakers who have been taught to be
more conscious of their bodily actions, as opposed to this population who had
relatively little experience in considering the use of communicative body actions,
may again provide different results.

It is unknown what influence the variable of language has on these results. As
the intuitions about gesture are so varied for this small population of English
speakers, there is little reason to assume that the language they use, and the
variety of gesture that accompanies it, had any influence on the results obtained
in this study. However, it is possible that working with samples of speakers of
other languages, or those who have been raised in English speaking
environments with different gestural forms may produce different results.

7.4 Reflections on study findings

This study has attempted to provide evidence of what native English speakers
understand the phenomenon of gesture to be, and how this compares to the
highly refined notion of gesture that researchers have developed. The research
indicates that, even in this small and homogeneous sample, native speakers
have a rich variety of ways in which they approach communicative body
movements.

It was found that there does not appear to be a consensus among native
speakers as to the boundary between 'gesture' other body movements, including nervous actions and gaze shifts. In categorising gesture participants were very individualistic in their approach, yet tended to focus more on the function of an action than the form that the action took.

In comparison to researchers, native speakers were more inclined to include a wider range of events in the category of gesture, however there appeared to be strong consensus about the ten gesture events deliberately used in the video. Native speakers' analysis of beat gestures also appeared to agree with that employed by researchers.
References


Liebal, K., Pika, S., & Tomasello, M. (2006). Gestural communication in


origins and distribution. London: Jonathan Cape.


Appendix 1 – Survey

The first section of this session involves a short hand-written survey in which you will be asked about your personal thoughts on gesture. We are interested in your intuitions as English speakers so there is no 'correct' answer - just write what you think makes the most sense.

Step one:

Please tell us a bit about yourself

Gender: [ ] Male [ ] Female

Age: _________________

Native language:_________________

In which country have you spent the most time:_________________

Highest level of education:______________________________________
Step two:

For this study we would like to know what your personal definition of gesture is. Don't worry, there is no right or wrong answer.

definition:_________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
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__________________________________________________________________________
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Step three:

Think of when you see/use gestures while speaking. Using your intuitions and all the different examples that come to mind create a categorisation of different types of gesture. You can explain each group by writing down examples:

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_______________________
Step four:

You will now be shown a short video. Once you have watched it a few times write down the number of gestures that you see in the film.

number of gestures: ________

Step five:

the next step involves a gesture marking activity. The researcher will now show you how to use the program so that you can complete the task.
Step six:

Now that you have completed the task would you like to amend, or make alterations to your original categorisation of gesture? If so, please make amendments below.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________
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________________________________________________________________________
________________________________________________________________________

This concludes the survey section of this session.
Appendix 2 - Post hoc interview questions

Subjects were not shown these questions, but were asked as many of these as the researcher saw fit. Further sub-questions below the main questions were used to elicit further information.

1. Is there anything in the video that you had trouble deciding if it was a gesture or not?
   - Can you describe it?
   - How would you classify it?
   - Would you modify your categorisation system to include it? (see q. 3)

2. At several points in the video there were a series of repeated hand movement, how did you analyse these?
   - Did you count them as one gesture?
   - If yes, why?
   - If no, why?
   - How many individual gestures did you count?

3. Did the categorisations that you created in the survey change after you completed the gesture marking task?
   - If yes, what would you change?
   - Why would you change it?
   - If no, are you confident that everything you saw on the film works within the categorisation that you created?

4. Has watching the video critically made you reconsider the definition of gesture that you gave at the start of the survey?
   - If yes, in what way?

5. Where there any movements in the video that you can remember that you would say are definitely not gestures as you defined them in the survey?
   - what were they?
   - why do you thin they occurred?
   - do you think that they could be communicative in another context?

6. If you were to use one or two of the gestures that you saw in the video to define what a ‘gesture’ is, which one(s) would you pick?
   - Why?
   - (Suggest others and ask why not these)
Appendix 3 – Video dialogue transcript

(A does not appear on screen)

A: So what did you do last night for dinner?

L: Last night for dinner I went to my neighbour's house, she lives across the road, and she made these uh vegetarian hot dogs. I think she called them something hilarious like "mock dogs". And they were so disgusting - I couldn't bring myself to eat them. um.

Fortunately though she makes the best desserts. um. She made a trifle and it had custard and cream and ice-cream and jelly and cake uhh it was so good. um. it also had a lot of brandy as well. I was feeling a little bit ill by the end of it. um. so uhh it was seriously like the best trifle I think I've had for ages. It was so good. I'll um I'll have to try and get myself invited back there but maybe just for dessert. I ah I think I'll cook myself dinner before I go.

A: Laughs
Appendix 4 – Participant definitions (summarised)

**Participant 1**
body movement that communicates
may be meaningful in itself or add cues/information to an utterance

**Participant 2**
body language explicitly communicate emotions/feelings
sometimes accompany verbal instruction/dialogue or be alone
can be used to great, insult, add emphasis

**Participant 3**
movement of any part of the body in association with talking
or in reaction to someone else’s speech and/or gesture

**Participant 4**
Movement of the body, commonly arms or hands, sometimes whole body
used to help speaker convey event/point to another
or used during conversation to help visualise or clarify subject or create rapport
sometimes used consciously/ sometimes unconsciously

**Participant 5**
movement people make when communicating to enhance or convey meaning

**Participant 6**
physical movement - esp hands - made to reinforce something when speaking
or to indicate something without speaking
I think my definition is quite broad - but I haven't thought about it much.

**Participant 7**
Movements of the body, usually hands, to emphasise, elaborate, or provide
visual alignment to speech.

**Participant 8**
a movement that substitutes/augments verbal communication. A way of
communicating without words.

**Participant 9**
Physical movement re-enforces meaning of communication, and/or
communicates simple ideas/concepts without need for further communication.

**Participant 10**
Movements made with body, conscious or not, communicate some kind of
information.

**Participant 11**
Physical movement implicitly or explicitly conveys information about a person
or stands in for verbal communication
implicit convey info about person's mood or state of mind.

**Participant 12**
Type of body movement used in conversation, or when trying to convey something without words.
Used to emphasise point of what we are trying to say.
## Appendix 5 – Extra results information

<table>
<thead>
<tr>
<th>Participant</th>
<th>Involves movement</th>
<th>Communicative</th>
<th>Adds to speech</th>
<th>Can be alone</th>
<th>Explicit/consc.</th>
<th>Implicit/unconsc.</th>
<th>Mainly hands</th>
<th>Involves the body</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>X</td>
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<td>6</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<td>7</td>
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<tr>
<td>total</td>
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<td>11</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>8</td>
</tr>
</tbody>
</table>

Table A5.1 major definitional themes as mentioned by participants

This table indicates the themes that appeared with the greatered frequency in the definitions of native speakers (summarised in appendix 4 above). The cells indicate whether a participant included this definitional feature in their definition. As discussed in section 5.1.1 of the results above (pp. 30-31) there are some highly consistent definitional tendencies among participants.

Table a5.2 below gives the number of events each participant counted in step four of the survey, and how many events they transcribed in step five of the survey. As discussed in section 5.1.2 of the results above (pp. 31-32) these results are of interest because of the variation between speakers.
<table>
<thead>
<tr>
<th>Participant Number</th>
<th>Number of gestures counted</th>
<th>Number of gestures transcribed</th>
</tr>
</thead>
<tbody>
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<td>13</td>
<td>11</td>
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<tr>
<td>2</td>
<td>13</td>
<td>10</td>
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<td>11</td>
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<td>13</td>
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<tr>
<td>12</td>
<td>16</td>
<td>16</td>
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<tr>
<td>average</td>
<td>16.66</td>
<td>15.33</td>
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</tbody>
</table>

Table a5.2 the number of gestures counted by participants in sections two and three of the procedure.

This table is also interesting in that nine of the twelve participants were not consistent in the number of events recorded in each activity. In the results section it is noted that in a dependent t-test there is no statistically significant difference between the two results (p. 34). The difference is of interest though as is indicates that there is not a one to one correlation between the number of events a person may perceive and then transcribe. This could possibly be a result of the participant being even more conscious what they consider to be gestural in the more focused task of transcription.

Just because a movement has been transcribed does not mean that the participant was absolutely certain that it was a gesture. In transcribing the motion of pushing the hair behind the ear participant 6 annotated it and then wrote in brackets 'is that a gesture???' Although the participant shows hesitancy in their transcription, choosing to include it does mean that the participant felt
that it was a more significant action that the other movements present in the video that were not transcribed.

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<td>yes</td>
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<td>11/12</td>
<td>6/12</td>
<td>6/12</td>
<td>6/12</td>
<td>6/12</td>
</tr>
</tbody>
</table>

Table a5.3 Participant transcription of pre-determined gestures, and of non-gesture events both pre-determined and uncontrolled

Table a5.3 gives a tally of whether participants transcribed certain events determined by the researcher. The first column gives the participant numbers. The second column indicates whether participants transcribed all ten of the gesture events in tables 4.1 and 4.2 of the methodology (pp. 27-28). The third and fourth columns indicate whether participants transcribed the two 'non-gesture' events in table 4.3, while the last two columns indicate whether the participants transcribed two other non-gesture movement events unintentionally created by the speaker in the video. This is further explained in section 5.1.1 of the results (p. 30)
Participant categories (summarised)

Italics denote those categories added after completing video task.

**Participant 1**
- directives/demonstrators - miming movements
- verbal enhancers - hand flourishes during speech ("framers"?)
- euphemisms (leave taboo things unsaid) head shakes here?
- 'verbal enhancers' to broad, have many different functions
  - inferred meaning
  - spatial descriptions
  - emphatics

**Participant 2**
- complementary gestures used in conjunction with speech; enhance words or draw attention
- natural or more unhinged if the speaker is confused
- sometimes used to approximate an object of indicate agreement
- negative; need no verbal accompaniment

**Participant 3**
- gesture to signify 'I'm thinking' and/or want to speak
- those in association with talking recreate actions or accentuate rhythms or speech or phrasing
- facial expressions; indicate 'I understand' etc
- change in breath depending on what is being said
- unconscious action (unrelated)
- changing physical position

**Participant 4**
- explain shape/size of an object
- mimicry; explain actions of another person
- surprise/amazement, hand over mouth etc
- comfort/sympathy; hug
- indicate one is thinking; i.e. hand on chin
- indicate emotions'
- those designed to try and create rapport with audience
- those showing direction or location
- those showing dubiousness (e.g. quote marks)
- gestures showing dis/like; similar to emotional gestures
- show complexity of an object; ie multiple hand chops
- gestures that stand in for/show an activity
- gestures differentiating between "I" and "You" for example
- I would add head gestures, which originally lumped in with face gestures

**Participant 5**
- hand gestures; show interest or movement of object being spoken about
- head movements; to show understanding, e.g. nodding head
- facial expressions

**Participant 6**
- reinforce what is being spoken about, forceful if to emphasise a point
- indicate something; pointing, or simulate something; walking made w fingers
- fill in gaps in a conversation
- nervous gestures; picking at fingers, fidgeting

**Participant 7**
- emphasis
- elaborative "to imply either wide reaching results, or influence, or to augment with some sort of spatial component (small, large, tall, short)"
- dissociative; e.g. 'bunny ears' or use of gestural mimicry
- recognised gestures e.g., request for a bill
- ambiguous waving of the hand in response to a question about well being

**Participant 8**
- emphasis; drive home the message
- direction; easier, emphasise/clarify
- substitute for spoken words; when environmental factors affect communication.
- more subtly facial gestures

**Participant 9**
- convey simple ideas or substitute for spoken words
- reinforce what is being spoken
- tease out ideas and not necessarily work to aid understanding; i.e. when you can't think of a word
- emotional body language

**Participant 10**
- Body gestures
  - communicate specific; waving; 'the finger'
  - conscious gestures that aren't meant to communicate something specific (but may anyway; scratching, biting nails.
  - unconscious gestures that aren't meant to communicate something specific (but may anyway; posture, *rubbing fingers together*
- Facial gestures
  - communicate specific; smiling
  - conscious gestures that aren't meant to communicate something specific (but may anyway; frowning/confused, *raising eyebrows*
  - unconscious gestures that aren't meant to communicate something specific (but may anyway; facial tics, biting lip, *looking away*

**Participant 11**
- offensive; use of commonly known symbols, i.e. 'the finger'
- beseeching; beckoning
- demonstrative; used as illustration
- convenient; gestures replacing speech when non-verbal communication is needed.
- emphatic; reinforce verbal communication
- unconscious; betray 'implicit' information, e.g. leaning forward

**Participant 12**
- angry
- excited
- non-verbal
- flirty
- nervous
- emphasising
- subtext; what you say and what you mean are different - gestures are sarcastic and make the meaning clear
- sincerity; essentially when you touch your chest.
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