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Revisiting significant action and gesture categorization

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As the field of gesture studies has developed researchers have created ways of analyzing and categorizing bodily movement phenomena. In this paper we look at whether gesture categorisations have any resonance with the ways that people other than gesture researchers approach bodily movement. Building on Kendon's (1978) observations that people generally have a consistent attitude towards what constitutes 'significant action' we asked 12 participants to conceptualize their own categories of gesture and then analyze a short video that contained a pre-determined variety of bodily movements. We found that non-analysts had a wider conception of what constituted gesture than analysts. In regards to the categorisations of gesture that non-analysts made, there were a range of schemas, which we broadly categorised as being 'form-based' and 'function based'.

Keywords: *gesture, categorisation, significant action*

1. Introduction

The study of gesture as a communicative act has been a field of rapid growth over the last thirty years (Kendon 2004). Over this period, researchers have developed and refined definitions of gesture, with the typical definition referring to those movements that may accompany speech and which are generally performed with the hands, with the intention of communicating information (although this will be discussed below). The increased academic interest in gesture has resulted in the creation of complex categorization strategies. However, one area that has received scant attention is the study of how interlocutors interpret the use of gesture in communicative interaction. In this study, we aim to provide initial insight into native English speakers' conscious understanding of their interlocutor's gestures. In discovering what speakers consider to be gestural we can determine whether individuals orient to similar instances of significant action and whether there is a relationship between speaker classification and academic classification used in such research.

2. Background Literature

2.1 Analyzing Gesture

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. A great deal of work in the field of gesture research makes use of categorization schemas that have evolved through observation, research and discussion.

While early gesture research focused around the emotionally expressive potential of communications that occur without speech, in what researchers have termed as ‘non-verbal communication’ (Critchley 1971; Wolff 1945; Feyereisen & de Lannoy 1991), a more recent focus has been specifically on the gestures that co-occur with speech. Kendon has proposed that there is a specific form of intentionally meaningful bodily movement¹ that co-occurs with speech which is as important in an utterance as the verbal, i.e. speech, content (Kendon 1972, 1980, 1988, 1997, 2000, 2004). He argues that the form of these movements is distinguishable from other bodily movements 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: 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 co-speech gesture, other body parts such as the head (Kendon 2002; McClave 2000) and lips (Enfield 2001) may also be employed communicatively. Kendon (2004: 10) argues that the function of these bodily movements differs from the function of manual gestures that are much more closely aligned to the propositional content of speech than other bodily movements, although this remains to be tested empirically.

Kendon’s (1980) interest in co-speech gestures paved the way for researchers in psycholinguistics, particularly David McNeill, who were interested in the cognitive processes of language. Over several decades, McNeill’s specific focus has been on the way gestures relate to speech (McNeill 1987, 1992, 2000a, 2000b, 2005). There is a strong body of evidence in the field of gesture studies that shows that co-speech gestures are of particular communicative and cognitive importance. For example, people will still use gesture even if their audience is not present (Cohen & Harrison 1973), and congenitally blind language-users also gesture (Iverson & Golden-Meadow 1997, 1998). Krauss, Chen & Gottesman (2000) suggest that this is because gestures are as much an aide to lexical retrieval as they are a tool of interpersonal communication.

2.2 Categorization of gesture

Researchers studying gesture as a language-related phenomenon in a co-speech relationship have a quite specific definition of gesture, as given above, with a range of relatively unspecific sub-categorizations. The classification of bodily movement, that has become something of a benchmark for linguistic study of gesture, was first proposed in its entirety by McNeill (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 earlier work (1985, 1986, 1987). There are two aspects to this system: the first is a continuum of bodily movements, and the second is a categorization of movements such as gestures.

¹ The terms ‘bodily movement’ and ‘body movement’ are used interchangeably in the literature and throughout this paper.

McNeill (1992) termed his continuum of intentionally communicative bodily movements ‘Kendon’s Continuum’ in homage to Adam Kendon, who first proposed a rough outline of such a system (Kendon 1988). This system has been crucial to the linguistic theory of gesture as it proposes that different communicative phenomena have different properties. These are not discrete categories but rather are placed at different points along a cline. The continuum is most often presented thus:

Gesticulation→*Language-like gestures*→*Pantomime*→*Emblems*→*Sign Languages*
(McNeill, 1992: 37)

As we move along the continuum from left to right several changes occur. Firstly, there is a decline in the obligatory presence of speech. Secondly, the presence of spoken-language-like properties increase. 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 typically highly codified, much like any other semiotic system.

In McNeill’s (1992) exploration of gestures he lists five types: iconic; metaphoric; deictic; beat and cohesive. Iconics refer to gestures representing concrete objects. Metaphorics generally refer to gestures representing abstract concepts in physical form. Kendon (2004: 101) notes that in McNeill’s typology a category of metaphorics is first proposed. It is a contentious category, for example Fischer (1994: 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. Despite some theoretical objections, this category still remains in the schema, as evidenced in the collection of papers in Cienki and Müller (2008), which focus on metaphoric gestures. The third type is deictic gestures, which have the function of referring, via pointing, to locations and objects. The fourth type is beats, which are repetitive bi-phasal hand strokes with an emphatic quality that, among other things, draw attention to what is said. The bi-phasal nature of their form makes them visually different from the other gesture categories. The fifth and final type, cohesives, are used to indicate continuity in speech. This category is the most problematic of the five. McNeill (1992: 16) states that a cohesive ‘can consist of iconic, metaphoric or point gestures; they can even consist of beats’. With this confusion about their form, and a lack of clarity as to their actual function, McNeill (2005) later discards them. Even though they are no longer considered part of McNeill’s schema they are worth noting to show that even gesture analysts may modify their coding categories.

McNeill’s categorization system has been developed by taking into consideration both the form and function of the various categories. For example, the difference between iconic and metaphoric 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. The functional category of cohesives was dissolved altogether in McNeill’s later work (2005) and gestures that would have been a part of it have been reanalyzed on the basis of form.

The construction of the continuum and gesticulation typology has not been without contention and has undergone changes since it was first proposed. A major

alteration came when McNeill (2000b) proposed 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 within his typology. Additionally, he suggests that a gesture may exhibit 'dimensions' of several categories simultaneously (2000b, 2005). Farnell (1994: 929) argues that the continuum creates false divisions between various forms of movement and these divisions risk being unintentionally moulded to the research questions being asked, a concern 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 pinned down into a typology in any fixed way' (Kendon 2004: 84). Bäuml & Bäuml (1997) argue that any such distinction is an artificial boundary, and instead define a gesture as any movement of the body that is meaningful for some people regardless of boundaries.

Given the criticisms of McNeill's categorization continuum, it is not surprising that several researchers have employed different analytical tools in their analysis of meaningful bodily movements, either with or without co-present speech. Goodwin (2000) uses a Conversation Analysis framework in 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 categorized, but studied in-depth individually. Heath & Luff (2007) also employ individual event microanalysis instead of categorization in their study of gesture production by an art auctioneer. While these studies present alternative strategies for studying gesture, McNeill's categorization is still a dominant framework in the field of gesture analysis, employed as a foundational tool in research papers that take different theoretical positions (see Stam & Ishino 2011). Despite the popularity of McNeill's categorizations, he acknowledges that most gestures are 'multi-faceted' – they are 'dimensional and not categorical' and may manifest multiple semiotic dimensions (McNeill 2005: 38, 41, 268) beyond the unitary categories assigned in this framework.

The creation and employment of a categorization schema has been of great use to researchers working in the field of gesture as it has provided a framework for data analysis that has allowed for comparative research. There has been, however, limited investigation into whether these categories have any perceptual saliency for those who use gesture in daily interaction, or, specifically how language users themselves make sense of gestural events.

2.3 Studies of native speaker gesture categorization

In one study examining language users' perception of bodily movement in communication, Kendon (1978: 308) investigated whether certain bodily movements constituted 'significant action', and whether these, rather than other bodily movements, were noticed more readily by language users. The participants in this study were native English speakers residing in Australia. They viewed a silent video of a man speaking at an event in Papua New Guinea. After viewing it as many times as they liked participants were asked to recall the movements observed in the video. Kendon reports that all the participants mentioned the 'significant' movements first and only after that did they mention the non-communicatively significant movements (Kendon 1978: 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 video, or which ones the participants focused on, nor does he test to see whether the presence of speech can affect the perception of what he terms 'significant action' (Kendon 1978, 2004).

Building upon Kendon's (1978) research Gawne, Kelly & Unger (2010) investigated English native speaker awareness and understanding of gestural events to examine the perception of co-speech gestures. Half of their participants viewed a short monologue video without sound, and half with sound to ascertain whether the presence of speech has an effect on the types of gestures participants were more likely to pay attention to. After reading a definition of gesture, participants were then asked to count the number of gestures that they saw and to list the five gestures they felt to be the 'best' examples of gesture. There was no significant difference between the number of gestures counted by those viewing the video with sound or without it. This supports Kendon's (1978) original findings in his study without sound, since even without sound English speakers still see the same number of significant actions. However, Gawne, Kelly & Unger (2010) also found that when gesture analysts completed the same task, they counted significantly fewer gestures than untrained in gesture analysis. The question of what may underlie this difference and how this is related to Kendon's claims regarding significant action is the motivation for the current study.

3. Investigative aims

In light of the above claims by Kendon (1978, 2004) regarding English speakers' orientation toward significant action, this study investigates speaker intuitions about gestural events and compares how they differ from each other and from the categorizations of gesture analysts. We address the following questions:

- 1) How do native English speakers without gesture analysis training perceive and categorize gesture?
- 2) Is their gesture categorization form or function oriented?
- 3) How do untrained native English speaker categorizations of gesture compare to those of trained gesture studies specialists?

The first question is designed to capture what it is that speakers are doing when they look at gestural behaviour. By first of all looking at what speakers consider to be gestural, and what they do not, we are investigating whether Kendon's claim regarding perception of 'significant action' holds. We have taken this one step further, by asking speakers to also categorize that which they thought was gestural (RQ1). In order to see what might be motivating people's perception of 'significant action' we have looked at whether people have taken a form or function approach to categorization (RQ2). This research design has allowed us to compare the understanding that speakers have compared to those who specialize in the study of gesture, which is discussed as part of question three (RQ3). It should be noted that we are not primarily concerned with the intuitive impressions of gestures that the non-analysts may have but rather their conscious impressions of gestural information.

4. Methodology

4.1 Participants

Twelve middle-class, native speakers of Australian English (7 females, 5 males) living in a large urban centre participated in the study. 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. As this was a homogenous group of participants, variation is more likely to be a result of individual differences and not cultural or language differences. 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.

4.2 Procedure

There were three sections of the procedure. All participants completed stage one, a survey, and stage two, a gesture transcription task. Eight participants (four male, four female) also agreed to participate in section three, which was a post hoc interview. The three sections were all completed in a single session of 45-55 minutes duration in a research laboratory space with each participant meeting individually with the primary researcher.

In section one all participants commenced with a survey in which they were asked to give their definition of gesture. They were then asked to construct their own categorization of gesture based upon their knowledge. While this task was very open-ended we were interested in whether or not speakers considered gestures to be communicative and also, which bodily movements they considered to be communicative gestures. Providing further direction in this task ran the risk of steering participants toward the researcher's notion of these concepts. This task was completed before participants watched the video so that that they would consider the task without pre-emptively shaping their schemas towards the data that they would subsequently be coding.

Participants were shown a stimulus video of 52 seconds in length (a detailed description of the video is given below) and they were given the opportunity to view the video as many times as they wished (between 3-10 times). This was to ensure they did not feel pressure to attend to the gestural content immediately, and meant that the participant could work at their own pace. When they became acquainted with the narrative stimulus in the video, they were asked to count the number of gestures they observed and record this on the survey sheet. This was done so that we could see if participants changed their minds about the number of gestures while working on the subsequent task.

In the second stage, participants were required to highlight all the events in the video that they thought constituted a single gesture. This involved using ELAN² video annotation software (Wittenburg et al. 2006). An ELAN template was created with two tiers for transcription of manual and non-manual information to allow participants to mark simultaneous gestures formed with different articulators. Figure 1 shows an ELAN screenshot with the video and the annotation template. The template design ensured that the researcher had no involvement in the process of transcribing the data, thus removing any possibility of leading participants towards pre-existing notions of gesture categorization.

² Available from the Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, The Netherlands <http://tla.mpi.nl/tools/tla-tools/elan/>

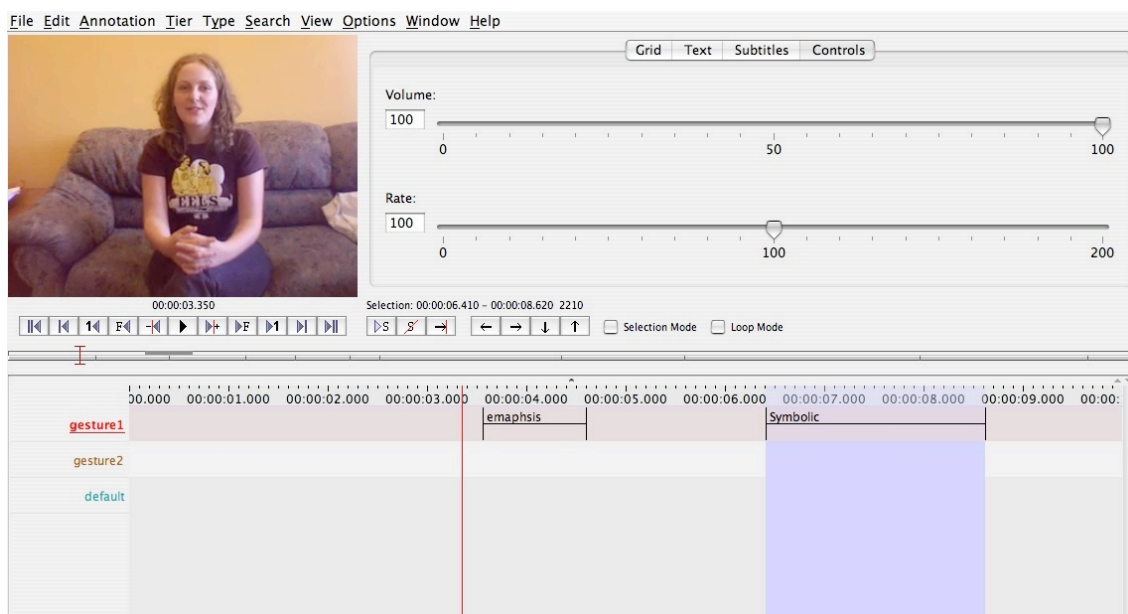


Figure 1 Screen shot of ELAN annotation file with embedded video

Participants were given as long as necessary to annotate what they observed to be gestures. Once the gesture events were selected, the participants were asked to label each one corresponding to the gesture categories they had created in the survey section. Upon completing the gesture-marking task, the participants were then able to amend the categorizations that they had created earlier in light of the task of categorizing. This way, any feature of their schema that was motivated by watching the video could be tracked as a difference from the earlier categories they had devised prior to viewing the video.

The third and 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 video-recorded interviews were intended to provide supporting evidence of speaker intuitions shown in the survey and transcription. Eight of the participants were involved in this section of the study and the interviews were 2-6 minutes in duration. The participants were asked very general questions about the nature of the task, with further questioning used to elucidate anything that the researcher felt was relevant to the task.

4.3 The Video

The video data depicted a young woman in a semi-scripted personal experience narrative. 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 McNeill's schema discussed in detail below, although an effort was made to ensure they remained as natural as possible.

In total, 12 movement events, predetermined by the researcher, featured in the video. These are detailed in Tables 2-4 (Appendix 1). The choice to use a semi-scripted stimulus was made for a number of reasons. The first was to ensure that there was at least a minimum of two gestures from each category that were discussed in 2.2 above, as well as a number of emblematic gestures, which can also be found in the presence of speech. We aimed to see whether or not speakers aligned with common gesture-categorization schemas or created schemas of their own. The second reason for scripting

the task was that any naturalistic data with this density of appropriate gestures would likely be much longer and too complex for an initial experiment design such as this. Lastly, as this video was used in Gawne, Kelly & Unger (2010), this would allow us to compare the results from both experiments.

Metaphoric gestures were not included in the video since they are the most complex and contentious category of McNeill's (1992) schema. Two of each gesture 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. 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.

As seen in Table 2 (Appendix 1), gesticulations included deictic, iconic, and beat gestures. One deictic gesture referred to an object within sight (the narrator) and the other to an object out of view (the narrator's neighbour's house). The iconic gestures used different strategies of representation. One referring to 'mockdogs' (a tofu hotdog) had the hands represent the entity by statically holding a shape, while a gesture referring to 'brandy' used the hands acting out the role of pouring from a bottle. There was also a short sharp beat gesture and a longer, less complex one. The gesture events occurred in close synchrony with speech affiliates.

The emblematic bodily movements included in the video are shown in Table 3. The first is an opening and closing of index and middle fingers alongside each of the narrator's ears, and suggesting quote marks. The second is a finger and thumb joined to form an 'O' shape, suggesting an 'okay' sign. There are also examples of gestures other than those made with the hands, such as a head shake and a head nod. We also included two additional bodily movements – a self-grooming action and a major posture shift – which are given in Table 4. There were also a number of gaze shifts and other small bodily movements throughout the video. In the following section we outline the approach to data analysis before moving on to an analysis of the results.

4.4 Data analysis

To determine how native English speakers categorize gesture (RQ1), a close analysis of participant gesture definitions and categories was undertaken. The analysis of whether native speakers categorize gesture by function or form (RQ2) entails analysis of the categories created by speakers and grouping on the basis of whether they are function-based schema, form based schema, or a combination of the two. The analysis of how native English speaker categorizations of gesture compare to those of the gesture research community (RQ3) entails first counting the number of gestures that participants recorded when watching the video, and then the number of gesture events they recorded in the transcription activity. These will be compared using a dependent *t*-test to ascertain any significant differences. For all sections information gained from the interviews was used to further illuminate the motivations of the speakers in determining categories.

5. Results

The results of the study are presented in sections relating to the research questions, and drawn from all three sections of the experiment. We turn now to the first research question: *How do native English speakers categorize gesture?*

Prior to investigating how speakers categorize gestures, we examine the

definitions of gesture offered by participants, which indicate some strong definitional tendencies. All participants defining gesture used the term 'movement' in their definition, and ten explicitly stated that it was a part of communication. Eleven participants noted that gestures occur with speech, and ten of those also noted that they can also occur in the absence of speech. Only three 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.

The participants' definitions of gesture in the first task appeared to be relatively homogeneous, with all mentioning meaningful body movement. However, in looking at the categories they then created when they viewed the video it is apparent that they were not so homogeneous in their perceptions of what constituted gesture and in their subsequent categorizations. In terms of deciding which body movements of the woman in the video were 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 wider range of body movement in their analysis and transcription.

There was a wide variation between participants in the number of events counted and transcribed, with participants first counting between 9-31 events and then transcribing between 10-27 events. 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; participant 4 transcribed only the self-grooming action, participant 2 only transcribed an incidental hand movement, participant 8 only transcribed the gaze shift, and other participants transcribed different combinations.

With such variety in such a small population, there is very little that can be said about the gestural categories proposed by participants. While they identified similar instances of gestures, their categorizations differed. Even the few times where there are observable similarities between categories created by participants, it cannot be assumed that participants have the same concept 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.

The participants used a variety of definitions and categorizational strategies in order to describe gesture and another way we can analyze the data is to examine whether participants used form or function as the basis of their schema. This analysis addresses RQ2: *Is gesture categorization form or function oriented?*

In order to establish this, we examined the names that speakers gave to the categories they created. Those that focused on the body part, or shape of the gesture were labelled as 'form-based.' Examples of this included 'hand gestures' (participant 5) or 'facial expressions' (participant 3). Those that focused on the semantic content were labelled as 'function-based.' Examples of these kinds of categories included 'emphasis' (participant 7) and 'surprise/amazement' (participant 4). Where a participant talked about the form of the gesture and what it was used for it was counted as both a form and function gesture, for example 'head movements to show understanding' (participant 5).

Participants primarily focused upon the function of a gesture or a combination of form and function. The only participant 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).

Of participants whose assessment was based on a combination of form and function, there were several ways this was accomplished. The most common was where function-based categories and form-based 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 evident in one participant’s creation of a categorizational matrix. There were three functional categories of ‘specific gestures’, ‘non-specific gestures’ and ‘unconscious gestures’ that were divided into two functional groupings of ‘body’ and ‘head/face’. As with RQ1, participants have a range of ways of approaching gesture and, not surprisingly, form and function are relevant to their approach. The final question focuses on how these lay-person assessments of gesture compare to gesture analyst assessments, and this is addressed in RQ3: *How do native English speaker categorizations of gesture compare to those of the established research community?*

Participants each counted an average of 16.7 gestures in the first section of the experiment, the counting task, and then went on to annotate an average 15.3 gestures each in ELAN (the motivation for the discrepancy is not clear from participant comments). A dependent t-test indicates there was no significant difference between these two results ($t = 2.028$, $*p = .067$). This indicates that there is no statistically significant difference to the number of gestures they counted before and after coding the gestures, indicating that the task did not appear to greatly alter the number of gestural events that participants observed.

The number of gestures transcribed by participants and thus counted ($X=15.3$) is greater than that by researchers in the field ($X=10$) (see Gawne, Kelly and Unger 2010), with no participants transcribing less than ten gesture events. All participants except one annotated all of the gesture events in the video set out in the table in the methodology. The participant who did not transcribe all ten did not transcribe the nodding gesture event. This may have been because they were attending more to manual gestures than head gestures, or because it is one of the more subtly performed gestures in the video, or simply in error.

In order to examine whether the fact that participants counted a greater number of gestures is a result of participants having a wider definition of gesture, we compared categories created by participants that nevertheless are not generally considered within the scope of ‘gesture’ for the many of researchers, as discussed in 2.1.

Table 1 Participant-identified bodily actions falling outside the scope of McNeill’s schema.

Category created by participant	Number who created this category
Facial expression	5
Posture shift	3
Nervous actions	2
Unconscious actions	2
Emotive body language	1
Breathing	1

The above table indicates that there are some elements of body movement that participants consider to be within the scope of gesture, even though researchers do not generally include these within the scope of gestural research. 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.

6. Discussion

This study shows that native speakers do not categorize gestures in a consistently similar manner. The most obvious difference between participants, which accounts for the differences in what they accept as gestural and the types of categories they create, is variable ways in which they perceive ‘communicative intent’. Participants either attributed communicative intent to a broad range of body movement and thus counted and annotated a larger range of movement phenomena as being significant actions, or had a narrower understanding, generally annotating fewer events.

While the initial definitions of gesture provided by participants are relatively homogeneous, the variety of events they considered to be gestural in the second task is clearly not. One example where the boundary between significant and non-significant action is not consistent is seen in the decision about whether or not to include the posture shifting action (Table 4, Appendix 1). Participant 6 annotated the body shift and wrote that ‘it’s like it indicates moving onto the summary of the next topic.’ Participant 8 commented that they did not transcribe this movement because they ‘didn’t know how to interpret it if [they] did call it a gesture.’ Participant 8 did not consider the movement to be a significant action in the way that participant 6 did, and therefore did not transcribe it as a gesture.

For most participants, viewing the video did not impact greatly upon their preconception of gesture, or their categorization of bodily movements. Only five of the twelve participants took the option of amending their schema after viewing the video. Of these, one created sub-categories of one category and three created two or three new categories. There was one participant whose schema was heavily influenced by the video (Participant 4) creating 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. It appears that this participant created new categories for every event that they felt did not fit into their existing categories. None of the other participants resorted to this strategy. Thus it appears that the video did not increase the similarity of the perception or categorization

of gesture among the majority of participants. This indicates that a priori assumptions about gestures were relatively stable for participants.

That all but one of the participants transcribed all ten of the gesture events depicted in the video indicates there is some basic agreement among participants as to what constitutes the minimal set of 'significant actions'. However, there was a wide variety of additional phenomena transcribed by participants, with between one and seventeen additional movements transcribed. This indicates that, while speakers may have a consistent 'lower limit' (Kendon 2004, 2008; McNeill 2005) of what constitutes 'significant action', it is less clear where the boundaries lie between 'significant action' and actions that aren't communicatively significant. Instead, native speakers have varying understandings of the communicative intent (or lack of it) of the speaker. The broad range of events transcribed by the participants adds a level of complexity Kendon's observation that native speakers appear to have a common understanding of what counts as a 'significant action' (Kendon 1978). While Kendon used the broader term 'significant action,' even within a narrower conceptualization of gesture participants defined their ideas of it in similar ways, even as they differed in their application of definitions to a range of bodily actions.

Of the twelve participants, only three 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 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. While in section 2.1, we observed that many researchers specifically make reference to the prominence of manual gestures (McNeill 1992, 2005; Goldin-Meadow 2003; Kendon 2004), this does not appear to be as pressing a feature for this group of speakers, who recognize that gestures can also be non-manual.

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. The high level of education of the participants (ranging from second year of undergraduate studies to PhD studies) may have also influenced the outcome since all participants were familiar with analyzing and synthesising data. Work by McNeill, Cassell & McCullough (1994) has found that language users are very attuned to the communicative information present in gestures. While it appears that native speakers are proficient at sub-consciously processing gestures and bodily communication, we have established that language users can also be consciously attuned to the role of gestures in communication. For some participants, the categorization of these bodily movements aligns closely with that of gesture analysts while for others this constitutes a much broader understanding and focus. For example, participant 3 transcribed 24 gesture events, and had a very broad concept of what constituted gesture. One of their categories was labelled 'those associated with speaking', and was used to annotate a variety of actions, from co-speech gestures to eyebrow flashes.

The abundance of events annotated (31 discrete events across all participants) could be attributed to over-sensitising participants to body movement as they had the opportunity to watch the video many times over. Normally, people process and infer meaning in real time. The effect of over-sensitivity cannot be gauged, although all participants watched the video at least two 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 whose preconceptions about gesture categories were broad prior to watching the video. Over-scrutiny also cannot account for the fact that participants 1, 2, 4 and 7 transcribed either ten or eleven events. These were the ten events created by the researcher, although participant 2 only transcribed nine of them. Participants 1, 2 and 4 also extended to 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 small nervous thumb fiddle but did not give any motivation for its inclusion. These participant conceptions of what constitutes gesture appear to be very similar to that of researchers. The categorizations 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.

The fact that some of the native speaker definitions of gesture are much broader than researchers’ ones is not surprising, given the specific definition of gesture that researchers work with, and the fact that the current framework schema used in research has been refined 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: 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 difficulty in agreeing on the basics of what constitutes meaningful bodily action, even though the lower-limit of this varies greatly across individuals.

7. Conclusion

This study provides some primary insight into speaker intuitions as to the nature and form of gesture and how speakers understand gestural and bodily communication. Although some gesture researchers have sought to make a hard and fast distinction between gesture and other bodily actions, the boundary between phenomena is not so discrete for speakers when talking about ‘significant actions’ that they perceive. It may be that non-analysts generally have a pre-disposition towards a broader understanding, or it may be the influence of pop-psychology discussions of ‘body language’ leads people to form a basic dichotomy between what has been described as ‘verbal’ and ‘non-verbal’ communication. These questions are complex and subtle, but worthy of further consideration.

This raises an interesting point regarding gesture in interaction. Much of the research on gesture has focused on 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. McNeill (1992) focuses mainly on language processing features 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 ‘mismatched’ (for an overview see McNeill 1992: 134-144), however the majority of the work focuses on the production of an utterance rather than on perception. While this is crucial, as seen in this study, it is equally as important to focus on how those gestures are perceived since, as

Kendon (2004:1) suggests, '[w]illingly or not, humans... continuously inform one another about their intentions, interests, feelings and ideas by means of visible bodily action'.

The results of this study have reinforced the fact that the speaker, no matter how much they monitor their communicative bodily movements, actually has little control over how their gestures are perceived and understood. In actions such as the posture shift enacted in the video, interlocutors may or may not assign meaning to that action. One obvious direction this research could be taken in would be to perform the same activity with sign language users. As sign language sits at the opposite end of the continuum, it would allow us to see if those whose language is primarily in the visual domain have a different perception of the boundary between 'significant' and 'non-significant' actions.

There are other questions that this study raises that further research may come closer to answering. This paper discusses a range of tasks undertaken as part of a single experiment, but running each task independently would allow for more variables to be controlled and manipulated. There is also certainly a need to replicate this study with more diverse populations, and to attempt using spontaneous data.

Understanding how people think about movement, and which movements are meaningful, is not only worth considering in light of the development of theoretical approaches to gesture. The use of gestural interfaces in technology is becoming more common, and the implementation of this is rapidly improving. Understanding how people think about meaningful and communicative movements can help in the design of more intuitive and sophisticated ways of interacting with technology through bodily movements.

This study has provided some initial insights into how native speaking English language users perceive the communicative content of gestures. The results indicate that their understandings of gesture are broad. They are highly perceptive to gestural information and have sophisticated intuitions regarding its structure and use. Kendon (1978) suggested that speakers may have a common conception of 'significant action'. Our study has shown that what constitutes significant action is multi-faceted and complex.

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Appendix 1

Gestural and non-gestural events that appear in the video stimulus. The speech that the gestures co-occur with is underlined.

Table 2 Gesticulations in the video

Gesticulations			
Time (seconds)	Description	Type	Accompanying Speech
3.3-4.9	Left hand points across body to the right side, index finger extended.	deictic	<u>My neighbour's house, she lives across the road...</u>

6.0-8.7	Both hands held in front of body creating an oval	iconic	she made these <ahh> <u>vegetarian hot-dogs</u> I think <u>she</u> called them...
12.2-14.8	Flat hand, palm down, two straight strokes	beat	<u>and they were so disgusting...</u>
23-29	Partially closed hand, 5 rolling strokes	beat	it <u>had</u> custard and cream and <u>ice-cream</u> and jelly and cake <uh>...
30.2-33.7	Hand grasping imaginary bottle, pouring	iconic	<um>. it also had a lot of brandy as well. I was feeling a little bit...
48.8-50.5	Flat hand pressed to chest	deictic	I think I'll cook myself dinner <u>before</u> I go.

Table 3 Emblem gestures included in video

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

Table 4 Non-gestural body movements

Non-Gestural Movement		
Time (seconds)	Description	Accompanying Speech
16-18.1	Right hand brushes hair behind right ear	I couldn't bring myself to <u>eat</u> them <u>um</u> fortunately...
35-37.6	Speaker uncrosses legs and adjusts seating position	<um> so <uhh> it was seriously like the best trifle...

