Gresham College

How Spontaneous Gestures Connect to Thinking

Professor Geoffrey Beattie

First of all, I would like to thank Gresham College for inviting me to present this public lecture. This is a lecture about the very stuff of everyday life – the hand movements that we make when we talk. I will discuss why we make these movements and what their possible functions are.

However, I need to begin by discussing more generally what nonverbal communication, or body language, does because there are a lot of erroneous beliefs about its nature and how it operates. I want to challenge some of these beliefs and present a new theoretical perspective on spontaneous hand movement and gesture (and body language generally). I want to persuade you that much of our everyday understanding is wrong, wrong because it has rarely studied *spontaneous* nonverbal behaviour. And finally, I want to demonstrate the enormous practical significance of this new theoretical approach.

So what's different about this new theory? The first thing that it challenges is the assumption about the basic function of nonverbal communication. The traditional view is that nonverbal communication is primarily concerned with the communication of emotions and interpersonal relations. This new theory will propose that *some* nonverbal communication does reveal emotional state/interpersonal relations but some (particularly hand movements) reveal unconscious aspects of thinking. This is the focus of the second half of the lecture.

The second feature of this new theory is that it recognizes that nonverbal communication is powerful but it is *not* 93% of all communication, as is widely stated in the literature. For example, an ad for a credit card from a few years ago said 'Only 7 per cent of communication is verbal, make the other 93 per cent count'. But it is much more complex than that.

Where does this particular claim that nonverbal communication is 93% of all communication come from? It comes from the work of Albert Mehrabian in the 1960's who had individual words conveying liking, neutral or dislike (for example, 'honey', 'maybe' 'brute') delivered in different tones with accompanying facial expressions, and found that facial expression was responsible for 55% of the total communicative effect, tone of voice 38%, and the content only 7%. In the 1970's Michael Argyle had three messages (friendly, neutral or hostile) delivered in three conflicting nonverbal styles and found that the nonverbal component (both facial expression and tone of voice) was 12.5 more powerful than the verbal component (the actual content).

However, these studies had very significant limitations. The communications were not spontaneous, but consciously delivered using a script of individual words or messages. The hostile message in the Argyle study (slightly amended to make it more relevant to this lecture) was 'I don't much enjoy meeting the people who attend these sorts of talks. I often find then rather boring and difficult to deal with. Please make your way out after the talk as quickly as possible.' This is a little bit too direct to make it appear to be natural. These messages were then delivered in three nonverbal styles, which again are hardly representative of the styles shown in everyday life:

- Hostile - *harsh voice, frown with teeth showing, tense posture.*
- Neutral - *expressionless voice, blank face.*
- Friendly – *warm, soft tone of voice, smiling face, relaxed posture.*

Argyle and his colleagues found that the mean 'friendliness' ratings were as shown in the table below (where the rating '7' means 'extremely friendly', and '1' means 'extremely hostile'). It appears that people seem to disregard the verbal content almost completely – just look at the ratings when the message is delivered in a hostile nonverbal style (from Argyle et al., 1971).

Mean ratings:			
Verbal	Nonverbal		
	Friendly	Neutral	Hostile
Friendly	6.03	4.27	1.60
Neutral	6.03	4.10	1.37
Hostile	5.17	2.83	1.80

But how general are these findings? Are the verbal/nonverbal style representative of real *spontaneous* communications? I collected a couple of examples of real spontaneous communications of hostility - 'Would you mind leaving?' 'You used to be such a nice person.' These are certainly not friendly. Would the nonverbal component really outweigh the verbal component here (by a factor of 12)? Or would a friendly style just make these seem even more hostile? Judge for yourself from the following clips.

Also, how many encoders (senders of the message) were used in the original research? Does it apply to people generally? Rather surprisingly, just two encoders were used in the Mehrabian work, and just one in the Argyle study, so they don't allow us to reach firm conclusions about the generality of any effects (see Beattie, 2003, *'Visible Thought'*, Routledge).

The third 'new' aspect of this theory that I am presenting tonight is the connection between nonverbal communication and speech. The traditional assumption in both the academic and the popular literature is that they're separate systems of communication. But when you study people closely, you can see immediately that the two systems are very closely connected, as you can see in this clip.

The fourth new feature of this theory is that much of nonverbal communication is quick and fleeting (rather than slow and easy to interpret). Again this is easy to illustrate.

I am going to argue why we need to rethink the function of nonverbal communication. As part of that, it is worth considering how psychologists established in the first place that the primary function of nonverbal communication is the communication of emotions (and interpersonal attitudes). Emotional expression has been shown to be a core function of bodily communication, with claims about universality in the expression of the six core emotions (happiness, sadness, surprise, fear, disgust, anger) and also about gender differences in the ability to send and read messages in the face. But what expressions were actually used in this classic research? They were posed expressions, consciously delivered for the camera, as you can see from the following set of images. But what happens if we use real spontaneous displays of emotion, images captured when the individuals are not deliberately trying to send particular emotional messages. It becomes much more difficult, as you can see in the following slides, even when they are frozen in time, as they are here.

Then, of course, in everyday life there is the issue of *control* where people try to inhibit their emotional expression and where many facial expressions of emotion are either very quick or inhibited. Reading emotion

from the face involves detecting micro-expressions, which are full-face emotional expressions compressed in time, flashing on and off the face in less than one-quarter of a second. If we miss the micro-expression, we will not judge emotional state correctly. Then there are squelched expressions - as the expression emerges, it is covered with a false smile. So to read people, we have to distinguish genuine and false smiles and then read the underlying expression. The main indicators of a genuine smile are bilateral symmetry and a slow onset and decline. The main indicators of a masking smile are bilateral asymmetry and an abrupt onset and decline.

Therefore, to decode facial expression accurately:

1) We have to be able to interpret *spontaneous* expressions.
2) We have to *detect* micro-expressions.
3) We have to *discriminate* types of smiles.
4) We have to *decode* facial expression as masking smiles fade.

The conclusions so far are that:

1. Body language is dynamic, quick, and presumably harder to read.
2. How important it is does depend on many factors.
3. Body language and speech are closely integrated.

Now, I will turn my attention from the face to the study of hand movements and gesture, which does have a considerable history, particularly in the context of the study of rhetoric and oratory. Cicero wrote that 'The body is like a musical instrument with the delivery or action being 'a sort of eloquence of the body, since it consists in gesticulation as well as speech.' Quintilian (in 'Institutio Oratoria', 100 AD) offered precise instructions on how to produce specific gestures: 'If the first finger touch the middle of the right-hand edge of the thumb-nail with its extremity, the other fingers being relaxed' in order to produce the ring gesture meaning 'okay'. Quintilian wrote that 'the hands may almost be said to speak.' Bulwer (in 'Chirologia -Chironomia',1644) cautioned against the improper use of 'manual rhetoricke' and offered a glossary of gestures, with correct interpretation and usage. His goal was to get speakers to consciously control hand movements; to make them less spontaneous for maximum communicative effect.

(From Bulwer, 'Chirologia - Chironomia',1644)

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More recently, Ekman and Friesen in their article 'The repertoire of nonverbal behavior', published in 1967 distinguished between different sorts of hand movements, including:
1. Emblems
2. Illustrators

> Iconic/metaphoric gestures
> Batonic movements
> Deictics

3. Self-adaptors

Emblems (following Quintillian and others) were defined as:

- Hand gestures with a standard form and precise meaning (which are culturally-specific).
- Gestures with a direct verbal translation.
- Gestures generated with conscious awareness: 'people know when they are using an emblem, can repeat it if asked to do so.'
- Gestures that can occur without speech.

Iconic/metaphoric gestures, on the other hand, were defined as:

- Gestures with no standards of form and no lexicon (in other words, spontaneous images in the hands).
- Gestures that are unconsciously produced (although speakers may be aware that they are doing something).
- Gestures that are closely integrated with the speech itself with the start of the gestural movement (in its preparation phase) preceding the associated speech where the stroke phase of the gesture occurs (the stroke phase is the meaningful phase of the gesture).

It is these sorts of gestures that may tell us a great deal about underlying thoughts. So what are the functions of these hand gestures. There are three broad hypotheses:

1) They are connected to the encoding of speech and word finding when we speak.
2) They are just an evolutionary relic.
3) They are a core part of the underlying representation.

To test the first hypothesis, I put people into a tip-of-the-tongue state where I read out a word definition and watched their response. Sometimes people knew the work but just couldn't quite find it. I was interested in whether being allowed to gesture facilitated them finding the word. They certainly produced a lot of gestures when they were in this state (the [   ] indicate the start and end points of the gesture):

'Oh it's a type of circumference thing, I know what it is, it's that [bloody arc thing. Oh no what's the word] it's on the tip of my tongue. It's…'

Iconic: right hand makes a semi-circular movement, moving quickly up and downward twice with index finger pointing outwards. Right hand and left hand then move quickly round each other five times in circular fashion.

'[Erm] It's an arc, no it's an arch, it's a ro- something. It's an, oh God, something arc . . . arch . . . rotor . . . arc.'

Iconic: right hand makes a semi-circle shape.

However, I found that allowing people to gesture didn't facilitate them finding the words.

David McNeill from the University of Chicago has disputed the evolutionary relic hypothesis and argued instead for hypothesis 3, namely that 'To get the full cognitive representation that the speaker had in mind, both the sentence and the gesture must be taken into account.' Consider, for example, a description of a simple action sequence

'And she [chases him out again]'

Hand appears to swing an object through the air.

McNeill argues that the speech conveys the idea of pursuit ('chases') and recurrence ('again') but not the means of pursuit. The gesture shows the method – swinging an umbrella. Furthermore, the sentence is well formed and the gesture is not a repair. To understand the full message, you need to take the speech and gesture into account. McNeill's conclusion is that 'Utterances possess two sides, only one of which is speech; the other is imagery… To exclude the gesture side, as has been traditional, is tantamount to ignoring half of the message out of the brain.' Thus, the argument goes, both gesture and speech communicate but they are very different vehicles of meaning. Consider the following example:

'The table can be [raised up towards the ceiling]'

Hands are wide apart, palms facing down, hands move upwards.

Differences between speech and gesture

Speech: linear and segmented

- Identifies:
- What is being raised ('the table')
- The action ('can be raised up')
- The direction of the action ('towards the ceiling')

Gesture: multidimensional

Object
Movement ➡ All simultaneous
Speed
Direction

Speech works in terms of bottom-up processing, we interpret the words and work our way up to clauses and sentences. Gesture works in terms of top-down processing. We need to know that 'the table is being raised' to understand the different components of the gesture. Speech has got standards of form but iconic and metaphoric gestures have no standards of form. In other words, we spontaneously and unconsciously create meaning in gesture.

But the question remains as to whether such gestures accurately convey information in everyday communication. After all, people might not be attuned to gesture. The information might be too vague, or it might be too complex to combine information from visual and auditory modality in real time. To test this, I carried out a number of experimental studies (Beattie, *'Visible Thought'*, Routledge, 2003), where various encoders narrated stories, edited clips of their communications were played to decoders (showing speech/gesture only/speech and gesture), and these decoders were then interviewed about what they had learned. The overall conclusion was that decoders process gestures quickly and effortlessly. Below are some examples of the clips we played and the information (described in terms of specific semantic or meaning-based features) they conveyed.

'[she's eating the food]'

Iconic: fingers on left hand are close together, palm is facing body, and thumb is directly behind index finger. Hand moves from waist level towards mouth.

(character-viewpoint gesture)

'Billy going [sliding along] and causing all sorts of mayhem'

Iconic: Fingers of left hand are straight and close together, palm is pointing downwards. Hand makes a rapid movement to the left.

(observer-viewpoint gesture)
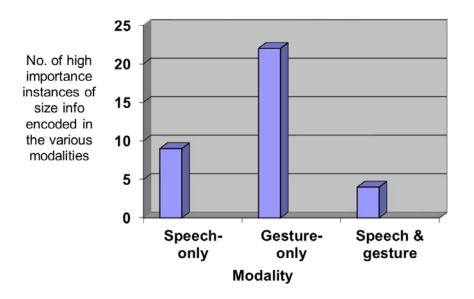**'Semantic features' and viewpoint**

Character-viewpoint gestures were particularly effective at communicating:

- Size
- Relative position
- Direction
- Movement
- Identity
- Description of action

Observer-viewpoint gestures were particularly effective at communicating:

- Speed
- Shape

So gestures do convey significant information. But how important is this information? We scored all of the different bits of 'size' information in a number of stories and found (somewhat counter-intuitively) that 'high importance' size information was more likely to be encoded in gesture only rather than in speech or in speech and gesture.

I want to suggest that there are a number of important applications of the work including:

i.   Reading hidden thoughts.
ii.   Detecting deception: forensic implications.
iii. Identifying 'dissociation' in attitudes.
iv.   Advertising.

(i)   **Reading hidden thoughts**

David McNeill (1992) in his book *'Hand and Mind'* had argued that 'Gestures exhibit images that cannot always be expressed in speech, as well as images the speaker thinks are concealed…People unwittingly display their inner thoughts and ways of understanding events of the world.' We may edit our speech but not our unconsciously generated gestures. Thus, we may find cases where our gestures and speech do not match, and when we do these gestures will tend to be a more accurate indicator of underlying thoughts. I will illustrate this here with a number of examples (from Beattie *'Rethinking Body Language'*, Routledge, 2016).

(ii)   **Deception**

Darwin (1872) had written that nonverbal behaviours 'reveal the thoughts and intentions of others more truly than do words, which may be falsified.' Some movements 'will be partially repressed by the will…those least under separate control of the will should be highly expressive.' When people are trying to deceive there is a contest between control and nonverbal leakage. A recent meta-analysis of published studies on deception found that only three forms of behaviour were reliably associated with lying: nodding, foot and leg movements and hand movements. Interestingly, all three tend to *decrease* in frequency in deception (contrary to much popular belief which is that people move more when they're lying). I will show some examples here of this control in action.

But I was also struck by how crude the analysis was in much of this published work. For example, 'hand movements' is a very broad category. This led to the following study described in detail in my book *('Rethinking Body Language'*, Routledge, 2016). Briefly, participants were asked to give an accurate account based on something they had seen in a 'truth' condition, or asked to 'lie' and change three specific critical details of a story

in a 'deception' condition. Firstly, we analyzed what happened to the frequency of the iconic gestures in the two conditions, and found half as many of these gestures occurred in the deception condition when people were talking about these critical details. Secondly, we found a change in the length of the stroke phase of the gesture (the meaningful phase of the gesture) and in the probability of a post-stroke hold (a temporary hold after the stroke phase) in the deception condition.

Gesture phase	% of time this occurred in truth condition	% of time this occurred in deception condition
Preparation	96.8	90.9
Pre-stroke hold	9.7	9.1
Stroke	100	100
Post-stroke hold	38.7	18. 2
Retraction	67.7	68.2

Gesture phase	Mean duration in truth condition	Mean duration in deception condition
Preparation	498 ms	441 ms
Pre-stroke	506 ms	450 ms
Stroke	830 ms	372 ms
Post-stroke hold	1380 ms	605 ms
Retraction	459 ms	399 ms

We also made some interesting observations about the precise form of the gestures. For example, here is a gesture accurately describing someone being pushed into the boot of a car. The gesture and the speech both match.

Matching **speech/gesture (truth condition)**

'So Ivy like [slams him into the boot of his car]'

But in the deception condition, the participant had to say that the person had been pushed into the side door of the car. But the 'true' gesture is still displayed by the speaker and it no longer matches the accompanying speech, thus producing a gesture-speech mismatch.

Mismatching **speech/gesture (deception condition)**

'She like pushes the DJ into the side door of the car and like [slams it shut]

(iii)   **Explicit and implicit attitudes**

Gesture-speech mismatches also occur, on occasion, when people are reporting their attitudes. Explicit attitudes are what people report ('I care strongly about the environment'; 'I prefer low carbon to high carbon lifestyles'). However, in many domains, there is a 'value-action' gap between what they say and what they do. We need, therefore, to differentiate explicit and underlying (and unconscious) *implicit* attitudes. Implicit attitudes can be measured using an Implicit Association Test (IAT), which is a computerised classification task (based on reaction times) to measure underlying *associative connections*. Research (Beattie '*Why Aren't We Saving the Planet?'*,

Routledge, 2010) has shown that in the case of implicit attitudes to carbon footprint there is no significant correlation with self-reported attitudes. Explicit and implicit attitudes to carbon footprint are 'dissociated'. Implicit, but not explicit, attitude predicts visual attention to carbon labels, and choice of low carbon products under time pressure. But there are many 'surface greens' in society, positive in terms of explicit attitude, but negative in implicit attitude. The question is how can we identify these 'surface greens'? Could unconscious gestures hold the clue? Here are some examples which suggest that this may indeed be possible. The gesture-speech mismatches were only found when there was a clash between implicit and explicit attitudes.
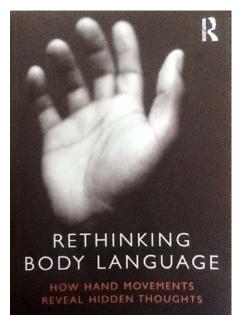
(iv)   **Advertising**

But if our brains have evolved to decode speech and spontaneous imagistic gesture simultaneously, can we make TV ads more effective by incorporating these gestures into the ads. We made two versions of a TV ad for 'F' – 'a fresh fruit juice drink for everyone', 'with your five daily portions of fruit in one small bottle'. The communication objectives were the product name – 'f', the 5 portions of fresh fruit, the freshness of the fruit, the fact that it's for everyone and the small convenient size of bottle. Two commercials were made - one 'speech and image', showing the fruit and product but using no imagistic gestures. The other was 'speech and gesture', showing no fruit specifically, but using three imagistic gestures to convey core properties. We played both versions to independent groups of decoders (and other ads as well) and found that the speech and gesture variant was indeed the more effective. Given that speech evolved in the context of or possibly through imagistic gestures our evolutionary past may thus have profound implications for the design of the most modern advertisements.

The conclusions that I want to draw, therefore, are as follows:

- Bodily communication does reveal emotions, relationships *and* thoughts (particularly hand movements).
- The hands make thoughts visible.
- We often inhibit the hands in deception for good reason.
- We may be able to identify both deception and dissociation in attitudes by analysing gesture-speech mismatches.
- We can make messages more effective (and more persuasive) by putting key components into the 'unconscious' gestural channel.
- Our evolutionary past has enormous implications for our present day communications (and possibly for our future survival).

And finally, I perhaps should add that I have recently explored the world of the 'body language expert' in a novel just coming out called *'The Body's Little Secrets'* (published by Gibson Square), just to show that when you have this new knowledge, it is not all plain sailing!

RETHINKING
BODY LANGUAGE

HOW HAND MOVEMENTS
REVEAL HIDDEN THOUGHTS

GEOFFREY BEATTIE

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Expecting contentment in a job at the local university, Matt instead finds himself sucked into the murky world of the city's night life and its shifty inhabitants, as well as the arms of Adele. He needs to use everything he has learned in order to survive, and much more….

Geoffrey Beattie writes gritty part-autobiographical crime fiction with dark psychological twists. He grew up in a Protestant working-class family in North Belfast at the height of the Troubles and his novel on the period was shortlisted for the Ewart-Biggs Literary Prize. He was Channel 4's on-screen Big-Brother psychologist and is regularly asked for news comment as one of Britain's leading psychologists.

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