

Gesture beyond conversation

Jeff Bezemer

Draft chapter for the Handbook of Multimodal Analysis, edited by Carey Jewitt (Second edition).

Introduction

Gesture has received ample scholarly attention, some of it dating back to Classical Antiquity. Most of this work is focused on the use of gesture as an accompaniment of speech in conversational interactions. For instance, some of the most widely cited contemporary scholars of gesture, including Adam Kendon and David McNeill, have looked extensively at gestures produced by story tellers in informal gatherings or in interviews with a researcher. In this chapter, I look at the use of gesture in a different type of social encounter, namely in the interactions between health care professionals during surgical operations. In Goffman's (1981) terms, surgeons not only engage in 'conversations', but also in 'coordinated task activity'. The chief concern of participants in a conversation is 'talk'; in a coordinated task activity, it is a 'practical' task. Goffman uses the example of mechanics fixing a car, and that activity is very similar indeed to what surgeons do in an operating theatre.

By focusing on a coordinated task activity I aim to shed a different light on gesture. I will move beyond the common separation made between actions performed "for the purposes of expression" and those made "in the service of some practical aim" (Kendon 2004:15), showing that these purposes go hand-in-hand: a surgeon's manipulation of objects serves clinical, as well as communicative purposes. Put differently, surgeons attach meaning to the actions they perform in the course of an operation. Therefore their 'practical' actions must also be treated as gestures. My focus will be on their hand gestures, as they are the focus of the attention of any surgical team. That includes the gestures they make with their hand-held instruments.

In the chapter I will present and discuss examples of the use of gesture during operations and render visible a different side of gesture, a different range of forms and meanings than what studies of conversations have demonstrated to date. The examples will show that during operations gesture is not the occasional accompaniment of speech, rather speech is the occasional accompaniment of gesture. By moving beyond the conversation as a context for studying gesture I highlight the need to investigate multimodality across different contexts, that is, across different types of social activity. I draw my examples from an ethnographic study of a surgical department in a London hospital for which we collected audio- and video-recordings of 20 operations. Ethical approval was granted by the Research Ethics Committee of the National Health Service. All staff in theatre and all patients involved have given informed consent to collect the data. A detailed methodological account can be found in Bezemer et al. (2011).

Gesture in two types of social activity

Compare two snapshots of gatherings in an operating theatre during an operation. Figure 1 is a gathering of an anaesthetic team. From right to left, you can see a consultant anaesthetist, an anaesthetic registrar and an anaesthetic

fellow seated at the head end of the patient, and a medical student standing on the left. Figure 2 is a gathering of a surgical team. Here you can see the medical student in the background, to his right a researcher, a scrub nurse, a consultant surgeon, a registrar and a senior house officer. I treat these two snapshots as illustrations of two different kinds of social activity: the anaesthetic team is engaged in a conversation, and the surgical team in a coordinated task activity. I do not want to suggest that anaesthetists converse more than surgeons; had I taken snapshots an hour earlier then we would have seen anaesthetists in a coordinated task activity and surgeons in a conversation. Teams can and do also shift between the two during a gathering, and engage in a conversation and a coordinated task activity at the same time, as we shall see in Example 1. Here I make the distinction between a conversation and coordinated task activity on the basis of observations in three areas: the bodily orientations of the team members, the resources they have available to make gestures, and the transcontextual relation between the two activities.

Orientation

The fronts of the members of the anaesthetic team all face the same centre point, enabling them to make their bodily actions visible and audible. The three doctors are seated on stools, having arranged themselves triangularly, and the medical student stands just outside that triangle, displaying a more peripheral participation in this activity. All team members maintain a certain interpersonal distance (Hall, 1969), and their gaze patterns suggest that the consultant is exercising his right to speak: the other three members gaze at his eyes.

The surgical team have arranged their bodies differently. Their bodily comportment and gaze patterns are oriented to the hands of the surgeon who is making an incision in the abdomen of the patient. If someone speaks they are not expected to look into the speaker's eyes, defying expectations of people in informal conversations (Goodwin 1981). Indeed they often don't talk at all, as in the moment that the snapshot in Figure 2 was taken. While not immediately visible in this snapshot, they also often defy conventional expectations in relation to interpersonal distance, standing shoulder-to-shoulder, or head-to-head –too close for comfort if the activity had been defined as a conversation. As in the anaesthetic gathering, their bodily arrangements mark divisions in the group: the surgeon stands on one side of the operating table, and his assistants on the other side. The scrub nurse stands just outside this huddle, so that her view of the operative field is not as good as that of the surgeon and his assistants. Her peripheral position also means that she may not be able to hear what the surgeon and his assistants say.

Resources

The snapshot of the anaesthetic team illustrates that in conversations the semiotic resource that is most readily to hand is one's own body. Conversations are often held while the team members remain at the same place. These circumstances shape the kinds of gestures people make and the functions they serve. Indeed, the gestures made by the members of the anaesthetic team depicted in Figure 1 are very similar to the ones described in detail by Adam Kendon (2004) and others. For instance, they can use gesture for 'representational' purposes, using their hands as 'models' for objects or actions,

or as specifiers of the shape or size of a named object. For instance, the consultant could demonstrate how to intubate a patient, using one hand to act as a model of a patient's trachea and another to act as a model of the tube and of the action used to insert it. Or they might point at the top screen of the anaesthetic machine while talking about the patient's heart rate.

In contrast, in coordinated task activity, people usually (though not necessarily) manipulate objects (in our case, the patient's body), often using specially designed instruments. They also often move about, reconfiguring their bodies. Thus they have a much wider range of resources available to make gestures with: their bare hands, the instruments they hold (which then become prosthetics, or extensions of their body), and the object they work on, and they can use these resources in different bodily positions. In this context, gesture becomes the mode which is in constant operation, while speech is used only occasionally. Compare this to the conversation, where speech is in constant use (with pauses of typically no more than a few seconds), and where gesture is sometimes used to accompany that speech. One could say that the multimodal configuration of a coordinated task activity is the inverse of that of a conversation.

Recontextualisation

As in the example we just described of the consultant anaesthetist giving a demonstration using his hands people often reconstruct objects and actions they observed in a different time and space, where the resources of the original site are not available. With his hand gestures the anaesthetist can reconstruct what he did, say, a hour before in the anaesthetic room, on the patient lying next to him now undergoing surgery. Here, in the operating theatre, seated at the head end of the patient, he does not have access to the same resources. That is, the gestures used for the demonstration are part of a recontextualisation of anaesthetic activity: a coordinated task activity has become a conversation, and gestures are re-made using different resources. Similarly the surgeons may well re-make some of the gestures they are making during the operation when they hold a debriefing in in the coffee room some time later, when their instruments are no longer to hand.

Gesture at the operating table

I will now present three examples of gestures made by surgeons or surgical trainees at the operating table. The examples are taken from 'open' and 'laparoscopic' operations focused on removing the gallbladder or a part of the colon. The difference between open and laparoscopic surgery has implications for use of gesture. In open operations the abdomen is opened up. In laparoscopic surgery surgeons gain access to the abdomen through small incisions through which they insert a camera and other instruments. In open operations gestures can be made with bare hands or with instruments, but not all participants co-present have an equal view of these gestures. For instance, in Figure 2, the first assistant has a better view over the surgeon's actions than the second assistant, who has a better view than the scrub nurse. In laparoscopic operations gestures can only be made with instruments, but all participants have equal view of these gestures as they are captured by the laparoscopic camera and projected on screens around them (surgeons can make 'extracorporeal' gestures during

laparoscopic operations, but these are usually not visible to others unless the participants shift the framing of the activity to a conversation).

Example 1 (Figure 3) is taken from an open operation (an anterior resection). The patient has been opened up. The surgeon has just tied a knot and is now holding the suture between the thumb and index finger of his left hand, bringing the suture under tension. The second assistant, who holds scissors in her right hand, is about to cut it. The first assistant holds a big retractor in his left hand. The surgeon is talking to the first assistant about some organisational issue in the hospital. Here the act of holding the suture tight is interpreted by the second assistant as a request to cut it; and judging from the subsequent actions of the surgeon that is what the surgeon aimed to communicate with this gesture. It is a gesture which is accompanied by speech, but the two are semantically unrelated; they are part of two different activities (a conversation and a coordinated task activity). (see also Bezemer et al., 2011).

Example 2 (Figure 4) is taken from a laparoscopic procedure (a cholecystectomy). The surgeon makes a sweeping movement with a closed grasper behind what is taken to be the cystic duct. This structure has been rendered visible through dissection; at the start of the operation it was still hidden behind layers of different kinds of tissue. The cystic duct joins the gall bladder to the common bile duct. Before the gall bladder can be removed surgeons staple and cut the cystic duct. Surgical guidelines warn of the danger of mistaking the common bile duct for the cystic duct. Accidentally stapling and cutting the common bile duct causes significant complications. Therefore, surgeons are taught to ensure that they correctly identify the structure before they staple and cut. Textbooks suggest that surgeons need to obtain the 'critical view' (Nagrál 2005). This is done by creating 'windows', i.e. by continuing to dissect around what is taken to be the cystic duct until it is completely freed up. The surgeons we observed always made the sweeping movement visualized in Figure 4 before they proceeded to staple and cut. In most cases they would make the sweeping movement and say, "Are you happy?" Thus by making a sweeping movement at this point in the operation the surgeon communicated to the other surgeons co-present (including trainees) that he believed he had obtained a critical view, and, by implication, that: the structure touched by the grasper is indeed the cystic duct and that it is therefore safe to staple it and cut it.

Example 3 (Figure 5) is also taken from a laparoscopic procedure (a subtotal sigmoidectomy). The registrar is separating tissue that connects parts of the colon to the abdominal wall. For that he uses a grasping instrument which is connected to the diathermy machine, a device that he can activate with a foot pedal. Upon activation an electric current runs through the instrument so that it can be used to cauterize and separate tissue. The figure shows the point where the registrar has grasped a bit of tissue and lifted it up. The surgeon, who is supervising this registrar, then says, "Yeah, that looks fine". The registrar then separates the tissue. Thus the sequence of actions performed by the registrar is not only a preparation for a cut, it also communicates to the supervising surgeon where he is intending to cut. What's more, he waits for the surgeon to 'ratify' his proposal before he acts on it; that is, the registrar intends to communicate something as he held the tissue up, and that gesture is not accompanied by speech.

All these gestures are performed and responded to frequently, by surgeons as well as by surgical trainees: they are part of a repertoire of surgical gestures that newcomers develop as they increase their participation in surgical activity. Some of these gestures are probably used across different hospitals and cultures (for instance, Example 1); others may be more typical of surgical practice in the UK, of the surgical department in the hospital where we did our research (Example 2), or even of certain surgeons (Example 3). Indeed, it may be useful to think of gestural variation as linguistic variation, with different, socially and culturally shaped gestural varieties. Developing this repertoire, that is, learning to make meaning with, i.e., produce and read, gestures in these contexts, is an essential part of becoming a recognized member of the surgical community.

I will now draw out four interrelated insights in the use of gesture from a comparison of these examples.

Gestures display and direct attention

All three examples are 'pointing gestures' in that someone displays and draws attention to or 'highlights' a particular point or area in a visible space. Pointing gestures in conversations have been well-documented. Speakers often point at objects or actions around them to identify the referent of a deictic element in their speech. My examples show, first, that an object can be identified in the absence of speech. For instance, in Example 1, the surgeon draws attention to the suture without speaking about the suture. In Example 2, the surgeon draws attention to the cystic duct without referring to it in the speech that accompanied the gesture. In Example 3, the registrar draws attention to a specific bit of tissue without speaking about it.

The respective referents of the gestures in Example 1 and 2 are known, recognizable, named objects, which are 'worked into being' through gesture (a suture, the cystic duct). In contrast, the referent of the gesture in Example 3 has no name; it is 'just tissue'. Indeed, surgeons cannot always fall back on conventional anatomical names (such as 'cystic duct') for the structures they need to refer to. Goodwin commented on the impossibility of having names for every object that professionals construct in the context of his study of archeologists: "If each different shape encountered in an excavation had to be categorized semantically, the vocabulary of archaeology would quickly become unmanageably large – indeed, useless." (Streeck et al. 2011:2) Thus gestures allow surgeons to construct objects, to highlight them and to display engagement with them. Some of these objects can be named (such as the referents in Examples 1-2), but need to be identified in the patient, whereas others can only be constructed and made into an object of joint attention through gesture (Example 3).

The examples also show that when drawing attention through gesture there need not be a distance between the gesture articulator and the referent. In all three examples surgeons touch, hold, manipulate an object, displaying direct engagement with that object (occasionally they do also point 'in the air', without touching the referent, for instance to indicate where they want the camera holder to move the camera to). The three illustrative gestures differ in terms of the 'pointing' action, or the way in which the gesture articulator draws attention. In some cases they *manipulate* the referent (a gentle stroke in Example 2), in other cases they *freeze a manipulation of* the referent (holding thread and tissue

up in Examples 1 and 3, respectively). In other examples from open surgery I noticed how a surgeon used his fingers to draw attention to a bit of tissue which he wanted the assistant to cut. He 'wrapped' the tissue around the index finger of his right hand, and used the index finger and thumb of his left hand to 'frame' (and freeze) the bit of tissue at the tip of his right index finger. These examples show that 'pointing' is only one of many different forms of gesture used to draw and display attention: a stroke, a freeze, all do similar semiotic work.

Gestures operate in sequences of action

In all three examples the gesture of one person is followed by another action, performed by another person. In other words, the gestures are embedded in sequences of actions. Gestures can prompt or be prompted by other gestures (in Example 1, the holding of the suture is followed by the cut of the suture), or they can prompt or be prompted by a spoken utterance (in Example 3, the holding up of the tissue is followed by a ratification of the proposed next move).

The sequential ordering of gesture and other forms of social action has been highlighted by work that applies the theory and methods of conversation analysis to multimodal interaction in workplaces. For instance, one of Lorenza Mondada's (2011) analyses of surgical work is focused on the interaction between a surgeon and his assistant. The surgeon holds an instrument that is attached to the diathermy machine. Unlike the registrar in Example 3, the surgeon holding this instrument does not operate the foot pedal that is used to activate the diathermy himself; he lets his assistant do that. Mondada shows how they accomplish this joint task through paired actions: "the first action sets up the 'conditional relevance' for the second action (Schegloff, 2007, 20)." (p. 213). The surgeon approaching tissue with the instrument is taken by the assistant as a sign to activate the diathermy. Only if the surgeon deviates from this pattern, that is, when he approaches tissue with the instrument that he does not want to cauterize does he use speech ("no co-ag", meaning, do not activate the diathermy). In other words, gesture is the preferred mode of communication of this surgeon. Indeed, this points to an 'economy of modes'; if all instructions given during an operation were always to be articulated in speech then operations were likely to take much longer.

Gestures are not always accompaniments of speech

The holding of the suture in Example 1, and the lifting of the tissue in Example 3 show that gesture can operate independently of speech. Example 2 shows that if they do operate in an ensemble with (simultaneously performed and semantically related) speech (sweeping movement accompanied by "Are you happy?") the two modes do different kinds of semiotic work. Here gesture is used to construct the object pointed at as the cystic duct, while speech is used to prompt acknowledgement from other surgeons co-present that it is indeed the cystic duct and thus safe to clip and cut. That is, if used simultaneously by one surgeon, as an ensemble, gesture and speech are in a 'reciprocal' relationship (Kendon 2004: 174).

Gestures are shaped by the affordances and distribution of resources

The illustrative gestures are made with different resources: with the surgeon's bare hands, and with different kinds of instruments. Each of these resources

have certain potentialities and constraints. For instance, for the purposes of drawing attention, different degrees of precision can be achieved with hands and laparoscopic instruments. As for the hands, Example 1 shows that while the surgeon gives instructions about what needs to be cut, he does not specify where he wants the assistant to cut. Similarly, in the additional example just mentioned, the surgeon who 'framed' a piece of tissue on his finger did not specify exactly where he wanted the assistant to cauterize. As for laparoscopic instruments, when a registrar performs a laparoscopic operation, as in Example 3, the consultant holds the camera, and he or she uses the camera to direct the registrar's attention. However the camera cannot be used to point at a specific point within the frame. To do that one needs access to an instrument such as the one held by the registrar. Thus these gestures can be said to be less precise than, say, the gesture in Example 3, leaving more (semiotic) work to the assistant (it may be that the principle of centrality applies here: one targets the centre point of the area that is framed by fingers or camera). This is in part the effect of the material qualities of human fingers.

In conversations, the bodies of the participants are often the only resource used for gesture; and as all participants have access to their own body, access to resources is equal (but see, e.g., conversations involving a participant with aphasia, Goodwin et al. 2009). Typically, in operations, the (access to) resources for gesture are unequally distributed among the team members. For instance, in Example 3, the registrar holds a grasper that he uses to point precisely, whereas the consultant can only use the camera to point, which is relatively imprecise (he can also point at the screen with a grasper, but that's not as precise and tricky as the sterile grasper must not touch the non-sterile screen). This often results in the team member with access to resources which afford precise pointing to point 'on behalf of' the team member with no access to such resources. For instance, imagine if the snapshot in Figure 5 was taken just after the consultant had said, "I would go for that bit there". In response, the registrar grasps the bit of tissue he holds up in Figure 5 and says, "this bit here?" and the surgeon says, "that bit there yeah". In this example gesture and a spoken comment operate as an 'interpersonal' ensemble, i.e. it is produced by different people.

Gestures are identity markers

The examples show that surgical work is team work. Thus surgeons always perform their actions, including hand gestures, in the presence of others and therefore also always *for* others. That applies all the more to laparoscopic operations, as it is in these contexts that the surgeon's gestures are made 'public' on screens.

In Example 1, a surgeon makes a gesture for one of his assistants (without verbally nominating her). In Example 2, a surgeon makes a gesture for those who are co-present – probably the registrars (again without nominating them). In Example 3, a registrar makes a gesture for his supervising surgeon. All these gestures are produced with a view to their audience. For instance, in Example 1, the consultant assumes that his assistant will recognize his gesture. Had it been a third year medical student standing in her place, the consultant might well have used speech in his instruction, saying something like, "can you cut this please." Indeed, the ability to *read* gestures is seen an important marker of competence.

The surgeon in Mondada's (2011) example referred to above said to his assistant, "very well you go on without me telling you anything since *you know* Anna don't you?" (p. 213).

In Example 3, the registrar expects the surgeon to read his gestures- indeed to assess them. Such assessments can also take on a more formal form. For instance, the *Objective Structured Assessment of Technical Skill* (Martin et al., 1997) describes surgeons' instrument handling as "Repeatedly makes tentative or awkward moves with instruments", "Competent use of instruments although occasionally appeared stiff or awkward", and "Fluid moves with instruments and no awkwardness". Such assessment scales highlight that surgeons attach meaning to every (extended) hand movement. Surgeons are aware of these constant forms of assessment: Consultants assess trainees in these terms, and trainees assess consultants in these terms. This applies to gestures which are part of a 'curriculum', such as the sweeping gesture in Example 2, but also gestures which are 'unofficial' markers of professional identity. For instance, the second assistant featuring in Example 1, after she cut the thread, withdraws her scissors while flipping it over on her finger, as if to 'show off' expertise.

The gesture in Example 2 is used to mark agreement between surgeons. In that sense, it 'stands for' notions of 'joint decision making' and 'patient safety'; by making this gesture the surgeon can align himself with these discourses.

Conclusion

On one occasion, at a research seminar for surgeons, a colleague of mine, a surgeon, talked about our research and mentioned that gesture was one of its foci. That caused a bit of a stir. What does gesture have to do with surgery? Why would a surgeon do research on gesture? This chapter might be read as an elaborate answer to those questions. I have proposed that for surgeons a 'manual' or 'practical' action of a surgeon is not just a practical action, it is loaded with meaning, accumulated since they first observed operations as medical students. Surgeons draw on a repertoire of gestures to make meaning. These gestures play a crucial role in their clinical work. I have presented examples showing that they use gesture to display and direct attention to anatomical referents and to construct unnamed and named anatomical entities; and to prompt and respond to other actions. I have also shown that their gestures can but need not be accompanied by speech; that their gestures are shaped by the affordances and unequal distribution of different kinds of resources, including hands and instruments; and that gestures mark their professional identities.

My account of the examples bring out the centrality of the body as an embodied, socially and culturally -that is, historically- shaped resource for multimodal communication. Indeed, it is shaped by theoretical frameworks that draw attention to precisely that. Social semiotics has drawn my attention to the availability, materiality and meaning potential of hands and hand-held instruments. Anthropology has drawn my attention to the appropriation of these semiotic resources through participation in social activity: how they learn to make and read gestures and how gestures mark their professional identities. Ethnomethodology has drawn my attention to situated knowing and seeing: how surgeons organise their gestures, pairing them with other actions, allowing them to anticipate what is expected to happen next.

By looking at coordinated task activity and comparing it the conversation, i.e. the context for gesture which has been studied more widely we have shown how the social and material contexts of interaction shape the availability and use of different modes of communication and their relations. Indeed by looking at a context where gesture is the 'default' mode, gesture gains an entirely different semiotic status. When surgeons operate, they make meaning through gesture, and sometimes talk at the same time. Compared to the role of gesture in conversations, this is an 'inversion of semiotic power' (cf. Kress 2001, who used this phrase to refer to the shift from writing to image). That inversion reminds us that only when we look at multimodality across different contexts can we expect to grasp the meaning potential and the constraints of different modes and multimodal configurations more fully.

Captions

Figure 1: An anaesthetic team conversing

Figure 2: A surgical team operating

Figure 3: Example 1: Consultant surgeon holds a suture up

Figure 4: Example 2: Consultant surgeon makes sweeping movement along the cystic duct

Figure 5: Example 3: Registrar holds tissue up

Acknowledgements

This chapter draws on research funded by the Economic and Social Research Council ('Digital Technologies in the Operating Theatre', ES/I02445X/1) and the London Deanery ('Mapping Educational Activity in the Operating Theatre', Simulation and Technology-Enhanced Learning Initiative). The research was conducted in collaboration with Gunther Kress, Alexandra Cope, Ged Murtagh and Roger Kneebone.

References

- Bezemer, J., Murtagh, G., Cope, A., Kress, G. and Kneebone, R. (2011). "Scissors, Please" The Practical Accomplishment of Surgical Work in the Operating Theatre. *Symbolic Interaction* 34, 3, 398-414.
- Goffman, E. (1981). *Forms of Talk*. Philadelphia: University of Pennsylvania Press.
- Goodwin, C. 1981. *Conversational Organization: Interaction between Speakers and Hearers*. New York: Academic Press.
- Goodwin, C., M. H. Goodwin, and D. Olsher (2009) Producing Sense with Nonsense Syllables: Turn and Sequence in Conversations with a Man with Severe Aphasia. *Language in Use: A Reader*. P. Griffiths, A. J. Merrison and A. Bloomer. London, Routledge (p. 272-285).
- Hall, E. (1969). *The Hidden Dimension*. Garden City, NY: Doubleday.
- Kendon, A. (2004). *Gesture. Visible Action as Utterance*. Cambridge: CUP.
- Martin JA, Regehr G, Reznick R, MacRae H, Murnaghan J, Hutchison C, Brown M (1997). Objective structured assessment of technical skill (OSATS) for surgical residents. *British Journal of Surgery* 84 (2) 273-278.
- Mondada, L. (2011). In Streeck, J., C. Goodwin & C. LeBaron (eds). *Embodied Interaction. Language and body in the material world*. Cambridge: CUP.

- Nagral, S. (2005). Anatomy relevant to cholecystectomy. Journal of Minimal Access Surgery 1, 2 53-58.
- Streeck, J., C. Goodwin & C. LeBaron (2011). Embodied Interaction in the Material World: An Introduction. In Streeck, J., C. Goodwin & C. LeBaron (eds). Embodied Interaction. Language and body in the material world. Cambridge: CUP.