Formulating the Triangle of Doom

Timothy Koschmann[1], Curtis LeBaron[2], Charles Goodwin[3], Alan Zemel[4], and Gary Dunnington[1]
[1]Southern Illinois University / [2]Brigham Young University / [3]University of California at Los Angeles / [4]Drexel University

Considerable attention has been paid in the CA literature to the glossing practices through which participants in conversation formulate who they are, what they are talking about, where the things they are talking about are located, and so forth. There are, of course, gestural glossing practices as well. For any concept or category presented gesturally, there is a range of possibilities from which a particular formulation may be adopted on any actual occasion of use. Identifying alternative formulations serves as a useful analytic exercise for exploring the pragmatic consequences of a produced gesture. In our own research, we have been studying the practices through which surgeons provide instruction while performing surgeries in a teaching hospital. We describe here a particular anatomy lesson produced during a surgery. The attending surgeon uses his hands and arms to gesturally construct a representation of a specific anatomic region ("the Triangle of Doom") for the benefit of two medical students viewing and participating in the surgery. Employing the structure of Schegloff's analysis of place formulations, we conduct an analysis of the attending's gestural formulation. We will show how analyzing a particular gesture in this way illuminates both the intricate ways in which the gesture is tied to its context of production and the exquisite specificity of the gesture itself.

Keywords: glossing practices, Conversation Analysis, ethnomethodology

> [A]long with whatever else may be happening in conversation it may be a feature of the conversation for the conversationalists that they are doing something else; namely, what they are doing is saying-in-so-many-words-what-we-are-doing (or what we are talking about, or who is talking, or who we are, or where we are). We shall speak of conversationalists' practices of saying-in-so-many-words-what-we-are-doing as *formulating*.
>
> Garfinkel & Sacks (1970, p. 351)

In treating formulations as a class of glossing practices, we do not intend to foster the impression that we regard formulations as somehow less than

> adequate. We regard the issue of adequacy of formulations as one which is exclusively decidable by members on each occasion upon which formulations are produced and monitored.
>
> <div align="right">Heritage & Watson (1979, p. 160, n. 11)</div>

Considerable attention has been paid in the CA literature to the glossing practices through which participants in conversation formulate who they are, what they are talking about, where they are located, and so forth. Sacks (1972) and others (e.g., Cuff, 1993; Watson, 1997), for example, have explored how references to persons are formulated in conversation ("who we are").[1] Earlier, in his lectures, Sacks (1989) discussed how matters get quantified in talk, using what he referred to as "measurement systems." Pomerantz (1986) described how specific types of characterizations (i.e., "extreme case formulations") are used in the service of various kinds of social action (e.g., selling, defending, complaining). Goodwin (1994), examining expert testimony in the Rodney King trial, described methods of formulating observed behavior. Heritage and Watson (1979) took up what might be termed meta-linguistic formulations, that is, they examined how speakers formulate aspects of their own ongoing conversation ("what we are talking about"). Finally, in a frequently-cited chapter, Schegloff (1972) documented the artful ways in which places are signified, negotiated and otherwise managed in talk. His chapter extended Sacks' (1972) earlier work on speakers' use of membership categories to the analysis of location formulations ("where we are").

Schegloff described the glossing practices for specifying location in the following terms: "[I]f one looks to the places in conversation where an object (including persons) or activity is identified (or as I shall call it, 'formulated') then one can notice that there is a set of alternative formulations for each such object or activity, all formulations being, in some sense, correct (e.g. each allowing under some circumstance "retrieval" of the same referent)" (p. 80). He went on:

> For any location to which reference is made, there is a set of terms each of which, by a correspondence test, is a correct way to refer to it. On any actual occasion of use, however, not any member of the set is 'right.' (p. 81)

Schegloff clarified that a "correct" formulation is not the same as a "right" formulation, for the following reason:

> "Right" formulations need not be drawn from the set of "correct" formulations; it is not a set-subset relationship. When one office worker says to another at the end of a coffee break, "Well, back to the salt mines," the rightness of the formulation is not precluded by the "incorrectness" of the term as a description of his work place. (p. 432, fn.)

This distinction can be productively employed in analyzing other forms of social action. For any action observed, a search can be made for alternative "correct" formulations. Posing such alternatives serves as a useful analytic exercise for exploring the pragmatic consequences of the produced formulation, highlighting both what it does and does not do.[2]

As an example, Schegloff described how, in a call to a police dispatcher, the caller, when asked for a location, did not provide the name of the city in which she was currently located. He observed, "The failure to formulate the city leads [the dispatcher] to hearing that the caller is in the city (co-present in it with the police …)" (p. 83). We see in this example how the selection of a formulation serves as a resource for speaker and listener alike. Schegloff described how such formulations provide for an analysis of the conversationalists' locations, their identities as members of particular categories in society, and their orientation to "the topic being built up or talked to [and] the activities being enacted in the utterance" (p. 96).

Schegloff examined how location formulations are accomplished lexically. Locational formulations (and other sorts of formulations as well) can and do have gestural elements, however. Further, for any concept or category presented gesturally, there is also a range of possible 'correct' alternatives from which a particular realization may be produced on any actual occasion of use. Following on the prior discussion, we might refer to these as a *gestural formulations*. Our interest is in how such formulations work as meaning-constitutive structures within particular semiotic environments. We will examine here, therefore, how Schegloff's approach to studying lexical formulations of place might be extended to the analysis of certain types of gestures. We will show how analyzing a particular gesture in this way illuminates both the intricate ways in which the gesture is tied to its context of production as well as the exquisite specificity of the gesture itself.

Data

Preliminaries

The data to be presented here come from a corpus of materials gathered as a part of the Deixis Project. The name comes from the Greek δεῖξις, meaning to show directly. The project is specifically concerned with how understanding is directly revealed through the very practices of its production. We have been studying such practices in a particular applied setting, the operating room of a teaching hospital.

To become a competent surgeon not only involves mastery of a professional vocabulary, but, more crucially, a mastery of the embodied practices required to
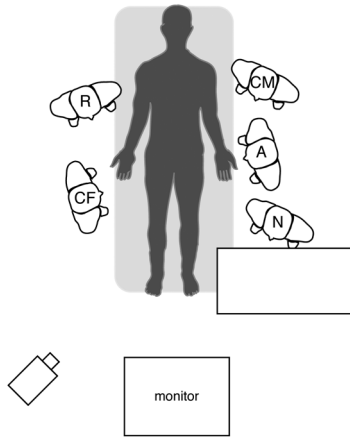
Figure 1. Layout of the surgical workspace revealing the positions of the five participants.

locate and constitute the objects referenced by that vocabulary in an environment that is both complex and consequential. To a surgeon, the interior of each patient's body is a space with its own distinct and relevant particulars. Knowing how to map abstract structure to that which is available to sight and touch in an unfolding surgery represents a form of "professional vision" (Goodwin, 1994). Surgeons rely upon surgical atlases and texts as guides in negotiating the interior spaces of the patient's body. We are interested in how practitioners, novice and skilled, use their bodies through gesture and other forms of embodied action to make these mappings explicit.

The case analyzed in this report was a laparoscopic, bilateral inguinal hernia repair. Laparoscopic surgeries are minimally-invasive procedures. Rather than make a large abdominal incision, laparoscopic surgeries are performed using a fiber-optic camera and other special tools inserted through small "ports." Participants, in the case under study, consisted of an attending surgeon (A), a resident (R), a scrub nurse (N), and two clerkship students (CF and CM). As our analysis begins, the surgery is being conducted by the resident under the close supervision of the attending. They are positioned around the table as shown in Figure 1. All orient to a video monitor placed at the foot of the table which displays the view captured by the endoscopic camera inserted in the patient's body. As we enter the scene, R is performing a dissection using a pair of grasping tools inserted into the patient's inflated abdomen, CM is operating the camera, and A is engaged in a didactic dialog with CF.

A frequently encountered topic in surgical talk, particularly in teaching settings, focuses on post-surgical complications, both their characteristics and how they might be avoided. Such complications may be general (e.g., wound infections, complications owing to the use of anesthetic, etc.,) or procedure-specific. In the surgical

correction of hernial defects, care must be taken to avoid injury to the vessels and nerves present, but not always visible, in the region of the repair. The lesson began, therefore, with a question to CF, "((CF's given name)) what nerves are at risk with ((R's given name)) repair here?" A transcript for the full lesson along with a summary of the transcription conventions are included as appendices to this report.[3]

The beginning exchange followed the familiar pattern of classroom recitation — teacher asks a "known information question" (Heap, 1979), the student responds (or fails to respond), the teacher assesses the student's response (or doesn't, see Koschmann, Glenn, & Conlee, 2000) or offers a clue or pursues a new line of questioning (Fox, 1993). Employing this recognizable structure, the attending and CF collaboratively produced the names of two nerves at risk of injury.

In the exposition that followed, the attending surgeon offered several pieces of information. First, that the two nerves just discussed lie within a region known by surgeons as the "Square of Doom" (lines 51–52); second, that "If you place staples in that region [you're] really at risk of putting a staple through one or both of those nerves creating just horrendous post-operative paresthesias and anesthesias and pain" (lines 55–56, 58, 60–62); and third, that the nerves are never located by "tedious dissection" but are instead avoided by staying out the aforementioned region. This can be seen as the first formulation of the region of interest. It relies upon a presumed shared knowledge of the named nerves and their anatomical location.

This formulation defines the region as a square, but acknowledges that there is some debate within the surgical community as to whether the cautionary region should be defined this way or less conservatively as a triangle (lines 75–76). In the exchange that followed, both the attending and resident registered their respective positions with regard to this controversy:

```
(Excerpt 1, #02–008)
77  R:  I call it triangle=
78  A:  Well I call it square
79  R:  Ye:⌈ah
80  A:     ⌊I'm not gonna allow you to place a staple
81      anywhere in the square of doom
82  R:  Oh thas thas ⌈that's where I was gonna put my
83  R:  first staple
84  A:              ⌊The triangle is the uh
```

The attending asserted his authority and left no doubt (lines 80–81) with regard to where staples would be allowed in the surgery in progress. Left unstated up to this point, however, was precisely where either of the two contested regions were to actually be found. The attending began to address this in line 84, but broke off in mid-sentence to shoot a glance at R.

Formulating the Triangle of Doom gesturally

The interaction described in the previous section set the stage for the attending's gestural formulation of the Triangle of Doom that serves as the centerpiece for this analysis. His gesture was a complex one that began by defining the triangular region of interest and then immediately transforming it into a rectangle. He began this formulation by restarting the demonstration begun at the end of Excerpt 1.

```
(Excerpt 2, #02–008)
85      (1.3)
86  A:  The triangle is the spermatic vessels (0.4) and the
87      va:s (0.4) creating a triangle like this
88  CF: Mm mhm
89  A:  And what we do is we keep that lateral one but go
90      all the way up to iliopubic tra:ct (0.8) and
91      make it a square instead of a triangle
92  CF: O⌈kay
93  A:   ⌊So everything below iliopubic tract
94  R:  ((performs blunt dissection))
95  A:  and between the vas and the vessels (.)
96      ⌈n::o  ⌉ staples go in that region
97  CF: ⌊Mm mhm⌋
```

The gesture of particular interest to us was produced in conjunction with the attending surgeon's utterance in lines 86 and 87.

```
86  A:  The triangle is the spermatic vessels (0.4) and the
87      va:s (0.4) creating a triangle like this
```

Prior to this utterance, Attending had his arms crossed on his chest. As he began his turn at talk, he raised both forearms before him. His forearms were angled
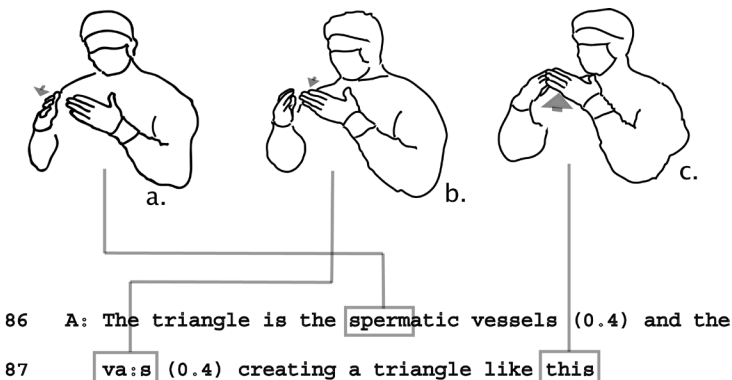


```
86   A: The triangle is the spermatic vessels (0.4) and the
87      va:s (0.4) creating a triangle like this
```

Figure 2. The coordination of talk and gesture in formulating the Triangle of Doom.

slightly away from his body and his flattened hands projected toward a point of convergence. CF shifted her gaze from the monitor toward him. As he began to articulate "spermatic vessels," he produced a slicing motion with his right hand (see Figure 2a). The motion was repeated with his left hand while he continued with "and the" but was abruptly terminated with the enunciation of "va:s." His hands at this moment were left about chest-high, with the tips of his fingers just touching (see Figure 2b). As he continued with the phrase, "creating a triangle like this" he slowly raised them together maintaining the angled orientation of his arms (see Fig. 2c). This upward movement stopped on the enunciation of *this*, presenting the gestural assembly as a completed demonstration. This embodied performance not only evoked the shape of the described structure, but also had the effect of associating his right and left arms with its two defining elements (i.e., the spermatic vessels and vas, respectively).

As the attending completed "And what we do is keep that lateral one" (line 89), he twitched his (right) hand previously associated with the spermatic vessels. He then raised his left arm, his left hand eventually coming to eye-level with his forearm assuming a horizontal orientation, while continuing with "but go all the way up to iliopubic tract" (line 90). This position was held through "and make it a square instead of a triangle" (line 91). As he produced "So below the iliopubic tract" (line 93), he swept his left forearm downward to the level of his chest maintaining its horizontal orientation. With the re-enunciation of "the vas" (line 95), however, he rotated his left forearm, swinging it out to the left so that both arms were held vertically in front of him. As before, the timing of this movement visually associated his left arm with the structure being named. He continued with "and the vessels no staples" (lines 95–96), while his arms retained their vertical orientation. During this interval he executed a series of rhythmic chopping motions with both hands that were synchronized with the unfolding talk. As he concluded with "go in
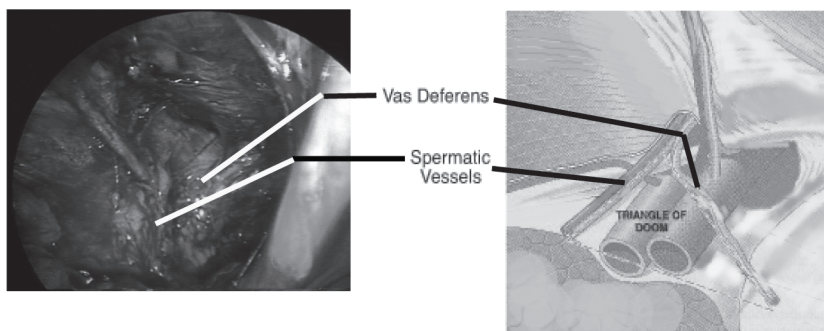

Figure 3. Locating the Triangle of Doom within the scene displayed on the endoscopic monitor. The illustration on the right is adapted from Feldman and Wexler (2004) and is used with the permission of the publisher.

that region" (line 96), he shifted his gaze back to the monitor and clasped his hands in a resting position. CF nodded and also returned her gaze to the monitor.

Completing the lesson

Shortly thereafter the discussion returned to the topic of the region to be avoided. This, then, resulted in the production of the third and final formulation of the cautionary region. The exchange began with a directive from the attending:

> (Excerpt 3, #02–008)
> ```
> 123 A:  ⌊Show 'em your triangle there ((R's given name))
> 124 R:  This is (0.3) right here
> 125 A:  Kay
> 126     (0.9)
> ```

The resident, at this moment, was operating two grasping tools. Using these as prosthetic pointing devices, he associated the named structures in the space viewable on the video monitor as shown in Figure 3. With "This is (0.3) right here" (line 124), he made three strokes with the tip of tool held in his right hand along a line that might approximate one edge of the triangle defined by the location of the spermatic vessels. After a few moments, the attending prompted him further:

> (Excerpt 4, #02–008)
> ```
> 133 A:  And the vas?
> 134 R:  °so:::°
> 135     (3.0)
> 136 A:  's: gonna be somewhere in there
> 137     (2.0)
> 138 R:  The vas should be going right in here
> ```

Heritage and Sorjonen (1994) have described how "and-prefacing" can serve as a device for linking related utterances. Here, the attending's and-prefaced query exhibits the relevance of the projected action to the prior talk and demonstration. The requested demonstration of the vas deferens had consequence not only to the lesson, but also for the surgery in progress. In producing this demonstration, the resident was being called upon not only display where the structure could be seen, but also to demonstrate, by implication, what counted as the permissible boundary for staple placement.

The lesson was concluded with the following exchange:

> (Excerpt 5, #02–008)
> ```
> 139 A:  Nkay () so that's the two vessels
> 140 CM: N'kay
> 141 A:  The (two) structures like this
> ```

As the attending delivered these two utterances he reproduced the triangle gesture (two hands brought before his chest) and turned his gaze to CM, who nodded. The gesture works as a local convention for referencing the Triangle of Doom. In line 141, the attending repaired "two vessels" to "(two) structures." The referent of "structures," however, was potentially ambiguous, since there are numerous recently mentioned candidates (e.g., the vas, the femoral vessels, the rectus sheath, Cooper's ligament). It was the accompanying gesture that provided the cohesive link (McNeill & Levy, 1993) back to the prior talk and made evident that the intended structures were the vas and the spermatic vessels. Interestingly, the spermatic vessels were never explicitly identified by the resident though he marked their approximate location with his three strokes of the surgical tool. The ostensive demonstration is only completed retrospectively, therefore, through the attending's summative statement (line 141) and its affiliated gesture.

What we see is that the lesson was carried out through a succession of formulations, each resourced in different ways. Early in the lesson, the Square of Doom was formulated as the place where certain nerve branches could be encountered. This formulation relied solely on the medical student's assumed prior knowledge of these nerves and their anatomical locations. Having formulated the Square in this way, the attending was able to subsequently reference it as a previously-established, known and understood place ("that region" in lines 55, 70). He then produced the second formulation, this time of the *Triangle* of Doom, described lexically and gesturally in terms of the two structures that define its borders. Having thus represented the Triangle, the attending was able to re-specify the Square, with reference to it. Finally, together with the resident, a third formulation was produced, one that ostensively demonstrated the boundary structures within the visual scene afforded by the monitor. These sequentially-produced formulations exhibited a progression that went from the abstract to the more concrete.

Analyzing a gestural formulation

For the purposes of the discussion that follows, we will focus our attention on the attending surgeon's gesture produced in association with lines 88–89 and depicted in Figure 2. Our interest is in examining how this gesture in its production exhibits attention to what Schegloff referred to as the "this-one-here-and-now-for-us-at-this-point-in-it" within the context of use. Schegloff divided his analysis of place formulations into three components: *location analysis*, *membership analysis*, and *topic/activity analysis* which we take up in turn as the "where-we-know-we-are" (p. 115), the "who-we-know-we-are" (p. 115), and the "what-we-are-doing-at-this-point" (p. 115).

Where-we-know-we-are. Schegloff described how the "selection of a location formulation requires of a speaker (and will exhibit for a hearer) an analysis of his own location and the location of his co-conversationalist(s), and of the objects whose location is being formulated" (p. 83). In the setting within which the attending produced the gesture, the speaker and listener are facing each other from opposite sides of the table, the patient is positioned on the table between them, and the region referenced as the "Triangle of Doom" is situated within the body of the patient. It is, therefore, not available to direct inspection. Instead its visibility is mediated by the endoscopic surgical equipment (i.e., fiber-optic camera, video monitor). In this way, the region has a dual status, as a space viewable on the video monitor and as a projected, but not directly viewable place within the body before them.

How would one reference such a region? One simple practice for ostensive demonstration described by Goodwin (2003) is to perform a "trace" using elements of the visible scene as a semiotic backdrop. Effective delineation of a fine structure within a complex visual scene, however, requires that the trace be performed in close proximity to the object or surface being employed to render it sensible.[4] Repositioning himself to perform such a trace in this situation would have been difficult for the attending surgeon for various practical reasons.[5] By formulating the region in the way that he did, the attending displayed an orientation to the physical objects in his environment and the position of his own body and that of his listener.

Another feature of the attending surgeon's gesture relevant to a location analysis can be seen in the way in which it was mapped visually to the scene portrayed on the video screen. The Triangle of Doom is a bilateral structure — regions so
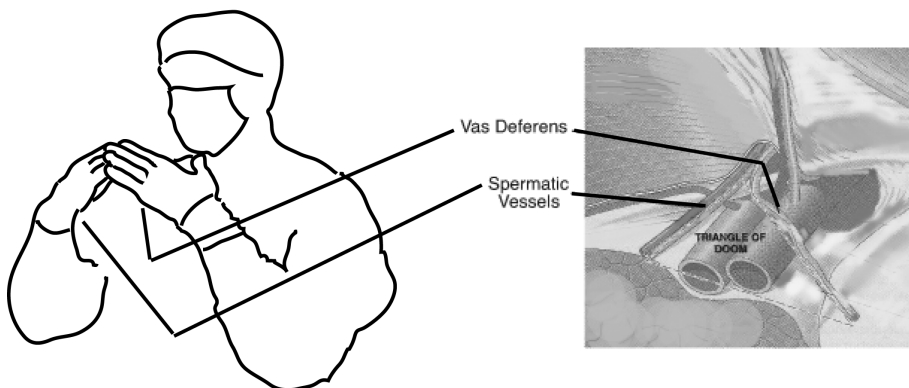

Figure 4. Aligning the attending's gesture with an image of a left Triangle. The illustration on the right is adapted from Feldman and Wexler (2004) and is used with permission of the publisher.

signified can be found on both sides of the patient's abdominal floor. The right and left regions are identical, but are mirror images of each other. The view captured by the camera at the moment that the attending produced his gesture revealed a left-side triangle. For a left-side triangle, the vas deferens which is always positioned medially to the spermatic vessels, would be seen entering the internal ring from the right side. By associating his right arm with the spermatic vessels (see Fig. 4) and his left with the vas, a representation is produced from the listener's perspective (but not the speaker's) of the proper orientation of the two relevant structures as they can be found in the scene displayed on the monitor. In this way, the attending displays an orientation to how his gesture would be viewed by someone observing its performance from the opposite side of the table.

Who-we-know-we-are. The second component of a formulation analysis proposed by Schegloff was what he termed a *membership analysis*. By this he meant an analysis of "the categories of members of the society of which the hearer(s), in the first instance, but also the speaker, are members; that is, there are relationships between the identifications made (by the parties) of the parties of the conversation, on the one hand …, and the selection and hearing of [the] locational formulation, on the other" (p. 88). In Schegloff's analysis of membership and locational formulations he was centrally concerned in "the locally-organized knowledge attributable to territorially-based membership classes" (p. 111).[6] A gestural formulation may implicate membership in other ways, however.

In a teaching hospital, talk is dual-purposed — it works both to advance the ongoing clinical work, but also has an important instructional component. We will address the first aspect later in the analysis of topic/activity. The second, however, is also highly relevant to the analysis of this fragment. CF, CM, and the resident were all engaged in training at different levels and this has crucial implications for how the talk is organized. It also has implications for how the attending's triangle gesture was formulated. The gesture reveals evidence of careful recipient design work and reflects an orientation to what his interlocutor (CF) might reasonably be expected to know. That is, his formulation, both in its lexical and gestural production is tailored to be sensible for a surgical clerk. What would count as "right" for a surgical clerk might be seen as inappropriate for an advanced resident, however. By even producing a gesture at all, the attending was constituting CF as a person for whom a gestural illustration of the region might be necessary. The gesture, in its design, therefore, reflects the attending's ongoing assessment of the recipient's relevant experience and her knowledge and understanding of the surgery and the relevant anatomical structures. In this way, the attending's membership analysis informs the referential work and the organization of the interaction while simultaneously serving to constitute the participants' "categorial incumbencies" (Watson, 1997, p. 52).

In other settings[7] we have seen how participants engaged in discussions of body parts might use their own bodies or the bodies of others as props for demonstrating the matter under discussion. Another feasible alternative formulation for the Triangle of Doom, therefore, would be to produce a gesture employing the patient's body and, in this way, represent the scale and location of the region in question. One downside of such a formulation, however, is that it would leave as an exercise for the listener the task of translating the defined region from the physical space of the patient's body to the virtual space of the video monitor. Beyond this, however, the attending's triangle gesture revealed an orientation to the kind of work they were doing and, by extension, the kind of workers they themselves were constituting themselves as by participating in this work. Open surgeries involve dissecting layers ("tissue planes") from the outside-in. Laparoscopic hernia repairs, on the other hand, begin from the inside and work out. By organizing the gesture with regard to what is visible on the monitor instead of the patient's body, the attending surgeon displays an orientation to what counts as "professional vision" in laparoscopic surgeries, making being a laparoscopic surgeons a relevant membership category.[8]

What-we-are-doing-at-this-point. Schegloff's third and final approach to the study of place formulations had to do with how participants display through a formulation an orientation to "what-we-are-doing-at-this-point" (p. 115). By way of a topic/activity analysis of the attending's triangle gesture and the utterance that accompanied it, the question might be asked, why this and why here? Specifically, how is the timing of this gesture related to the unfolding sequence of the surgical procedure? One might observe prosaically that the demonstration is timed to correspond to the appearance of the region in question on the video display. While it is true that the attending's triangle gesture was designed to render the scene on the monitor sensible, it should also be observed that the sensibility of this scene depended crucially on its sequential development.[9] The gesture, therefore, builds its sense on the displayed scene, but the scene itself was an achievement of the advancing procedure. The gesture, therefore, can be said to have not only been occasioned by the unfolding procedure, but informed by it. At the same time, however, the anatomy lesson could also be said to inform the procedure. Recalling the controversy concerning Squares vs. Triangles of Doom, the demonstration, in its placement before the actual application of staples, not only provided a contextualized tutorial on surgical anatomy for the two students, but also a practical warning to the resident. By asking the resident to demonstrate the region for the medical students, the attending surgeon made concrete the area in which no staples would be allowed, closing any further debate about squares and triangles. In this way, the gesture, in its timing, displays an orientation to its place in an unfolding and consequential procedure.

Discussion

Within the lesson described here, the participants could be observed working together to constitute a complex structure employing the resources at hand. The analysis revealed how a relatively simple gesture can be precisely formulated to both exploit the semiotic affordances of the material environment and to address the communicative needs of the moment. We demonstrated how gestures performed in the service of sense making are ordered at a detailed level.

Schegloff never suggested that his analysis of location, membership, and topic/activity represented an exhaustive treatment of the phenomenon. Rather, his three-part approach was offered as a preliminary framework for analyzing one kind of glossing work selected from a larger set of investigatable conversational practices. We believe that a his method could be profitably extended to the task of better understanding a particular, occasioned gesture and provided the analysis here as a demonstration. No representations are made, however, that all gestures can be analyzed in precisely this way and further work will be required to determine just what kinds of gestures lend themselves to this sort of treatment. Our example had to do with formulating a particular region and, as a result, lent itself to being analyzed using Schegloff's analysis of formulations of place. New analytic strategies may need to be developed in order to analyze other types of gestural performances.

Analyzing gestures as formulations has a number of benefits. First, instead of engaging in conjectures about intending meanings, this approach explores how the performance of a gesture serves to advance the conversation and ongoing work. In this way, it links the gesture performance to the members' ongoing work of developing topic, location, and membership. Further, it demonstrates how any given gesture is just one candidate from a set of possibly "correct" gestures.

Its "rightness" is an analyzable and situation-bound property. Such an analysis directs attention to the ways in which interaction is both shaped by and shapes context. As Schegloff stipulated, "To say that *interaction* is context-sensitive is to say that *interactants* are context-sensitive, and for what and how that is so is an empirical matter that can be researched in detail" (p. 115). Through the use of place formulations, participants "particularize their contributions so as to exhibit attention to the 'this-one-here-and-now-for-us-at-this-point-in-it' character of the interaction" (p. 115). He argued that such formulations particularize "at least for location, composition (at least with respect to those membership categories relevant to the selection of place formulation) and place in conversation (topic, activity)" (p. 116).

We demonstrated here how a relatively simple gesture could, in its elaborate interconnections to the semiotic environment in which it was produced, also

exhibit attention to the 'this-one-here-and-now-for-us-at-this-point-in-it' character of the moment. By carefully documenting how the gesture displayed sensitivity to the "where-we-know-we-are," the "who-we-know-we-are," and the "what-we-know-we-are-doing" of the occasion, we have attempted to illuminate the exquisite specificity with which it was produced. It also must be kept in mind that, though these three aspects of the 'this-one-here-and-now' were analyzed separately, they ultimately work together to produce the emergent sense of the gesture.

The three formulations analyzed here cumulatively construct what might be described as an *instructed understanding* of the topic under discussion, a particular anatomic region relevant to the surgery in progress. Our proposal to examine gestures as formulations, therefore, may lead eventually, not only to a new way of studying gestures, but also to a new way of thinking about and describing instruction in interaction.

Acknowledgements

Notes

1. Within the CA literature, the methods for specifying persons are often discussed in terms of "Membership Categorization Devices" (Sacks, 1972). Formulations in general are also sometimes taken up as instances of "Word Selection" (see, for example, Schegloff, Koskik, Jacoby, & Olsher, 2002).

2. The projection of alternative formulations does not imply, however, that any of the projected alternatives were evaluated or even considered by the actors.

3. The transcript employs standard CA transcription conventions as described by Psathas and Anderson (1990) and Jefferson (2004).

4. See, for example, Norman's demonstration of the hypothalamic region in Exhibit 1 of Koschmann and LeBaron (2002) or the professor's presentation of the "long bent" shape in LeBaron and Streek (2000).

5. Direct access to the monitor was cut off both by the scrub nurse and the tool table. Furthermore, the attending was tethered to his spot by a microphone cable.

6. Schegloff observed that persons who live or work in a particular place, "may be expected to be able to recognize place names in it or near it, and they may offer current or former proximity, or territorially based category membership, as evidence, warrant, or account for their recognitions" (pp. 92–93).

7. Examples, in Koschmann and LeBaron (2002), might include Maria's demonstration of the location of the hypothalamus in Exhibit 1 or Susan's demonstration of a thrill in Exhibit 3.

8. A related example of how professional attention is developed as an aspect of membership is the practice of training airline pilots to rely on their instruments by having them fly "under the hood."

9. We have seen evidence of this in interviews with participants after the surgeries. Even highly-experienced surgeons sometimes have difficulty orienting themselves in a still frame. To understand what they are seeing, they must reconstruct the procedure that produced the occurrent scene.

References

Cuff, E. C. (1993). *Problems of versions in everyday situations.* Lanham, MD: University Press of America.

Feldman, Liane S. & Marvin J. Wexler (2004). Laparoscopic hernia repair. In Wiley W. Souba, Mitchell P. Fink, Gregory J. Jurkovich, Larry R. Kaiser, William H. Pearce, John H. Pemberton, & Nathaniel J. Soper (Eds.), *ACS surgery: Principles and practice 2004* (pp. 567–585). New York: WebMD.

Fox, Barbara (1993). *The Human Tutorial Dialogue Project: Issues in the design of instructional systems.* Hillsdale, NJ: Lawrence Erlbaum Assoc.

Garfinkel, Harold & Harvey Sacks (1970). On formal structures of practical actions. In John C. McKinney & Edward A. Tiryakian (Eds.), *Theoretical sociology: Perspectives and developments* (pp. 337–366). New York: Appleton-Century-Crofts.

Goodwin, Charles (1994). Professional vision. *American Anthropologist*, 96, 606–633.

Goodwin, Charles (2003). Pointing as situated practice. In Sotaro Kita (Ed.), *Pointing: Where language, culture, and cognition meet* (pp. 217–242). Mahwah, NJ: Lawrence Erlbaum.

Heap, James (1979). What time is it, Denise? Asking known information questions in classroom discourse. *Theory into Practice*, 18, 285–294.

Heritage, John & Marja-Leena Sorjonen (1994). Constituting and maintaining activities across sequences: And-prefacing as a feature of question design. *Language in Society*, 23, 1–29.

Heritage, John & D. Rodney Watson (1979). Formulations as conversational objects. In George Psathas (Ed.), *Everyday language: Studies in ethnomethodology* (pp. 123–162). New York: Irvington Publishers.

Jefferson, Gail (2004). Glossary of transcript symbols with an introduction. In Gene Lerner (Ed.), *Conversation analysis: Studies from the first generation* (pp. 13–31). Amsterdam, Netherlands: John Benjamins Publishing.

Koschmann, Timothy, Phillip Glenn, & Melinda Conlee (2000). When is a problem-based tutorial not a tutorial? Analyzing the tutor's role in the emergence of a learning issue. In Dorothy H. Evenson & Cindy E. Hmelo (Eds.), *Problem-based learning: A research perspective on learning interactions* (pp. 53–74). Mahwah, NJ: Lawrence Erlbaum.

Koschmann, Timothy & Curtis LeBaron (2002). Learner articulation as interactional achievement: Studying the conversation of gesture. *Cognition & Instruction*, 20, 249–282.

LeBaron, Curtis & Jurgen Streeck (2000). Gestures, knowledge, and the world. In David McNeill (Ed.), *Language and gesture* (pp. 118–138). New York: Cambridge University Press.

McNeill, David & Elena Levy (1993). Cohesion and gesture. *Discourse Processes*, 16, 363–386.

Pomerantz, Anita (1986). Extreme case formulations — a way of legitimizing claims. *Human Studies*, 9, 219–229.

Psathas, George (1990). The 'practices' of transcription in conversation analysis. *Semiotica*, 78, 75–99.

Sacks, Harvey (1972). An initial investigation of the usability of conversational data for doing sociology. In David Sudnow (Ed.), *Studies in social interaction* (pp. 31–63). New York: Free Press.

Sacks, Harvey (1989). On members' measurement systems. *Research on Language and Social Interaction*, 22, 45–60.

Schegloff, Emanuel A. (1972). Notes on a conversational practice: Formulating place. In David Sudnow (Ed.), *Studies in social interaction* (pp. 75–119). New York: Free Press.

Schegloff, Emanuel A., Irene Koshik, Sally Jacoby, & David Olsher (2002). Conversation analysis and applied linguistics. *Annual Review of Applied Linguistics*, 22, 3–31.

Watson, D. Rodney (1997). Some general reflections on 'categorization' and 'sequence' in the analysis of conversation. In Stephen Hester & Peter Eglin (Eds.), *Culture in action: Studies in membership categorization analysis* (Vol. 4, pp. 49–76). Washington, D.C.: University Press of America.

Authors' addresses

Timothy Koschmann
Southern Illinois University
Department of Medical Education
P.O. Box 19681
Springfield, IL 62794–9681

E-mail: tkoschmann@siumed.edu

Curtis LeBaron
Brigham Young University
Marriott School of Management
Department of Organizational Leadership
and Strategy
Tanner Building 590
Provo, Utah 84602

E-mail: lebaron@byu.edu

Charles Goodwin
University of California at Los Angeles
Department of Applied Linguistics
3300 Rolfe Hall
Los Angeles 90095–1531

E-mail: cgoodwin@humnet.ucla.edu

Alan Zemel
Drexel University
Department of Culture & Communication
3141 Chestnut St.
Philadelphia, PA 19104-2875

E-mail: arz26@drexel.edu

Gary Dunnington
Southern Illinois University
School of Medicine
Department of Surgery
P.O. Box 19638
Springfield, IL 62794–9638

E-mail: gdunnington@siumed.edu

About the authors

Timothy Koschmann is an Associate Professor in Medical Education at Southern Illinois University. His research focuses on the ubiquitous and typically taken-for-granted practices through which participants in joint activity, routinely and accountably provide instruction to each other. Koschmann has been studying these practices for the last several years in the surgical facilities of teaching hospitals (for further details pertaining to his work, see: http://www.siumed.edu/call/).

Curtis D. LeBaron is an Associate Professor and Warren Jones Fellow at the Marriott School of Brigham Young University, where he teaches graduate courses in organizational behavior, leadership and strategy. He conducts video-based research of human interaction within organizational settings, focusing on topics such as collaborative work, organizational knowledge and learning. His research and publications explore a variety of organizational settings and practices, including police interrogations, group therapy sessions, doctor-patient interaction, architectural planning, surgical teams, employment interviews, top-level and mid-level management teams, and more. His work has appeared in academic journals, including: *Journal of Communication*, *Research on Language and Social Interaction*, *Human Studies*, *Cognition and Instruction*, and *Computer Supported Collaborative Work*. See also a recent book, *Studies in language and social interaction* (edited with Phillip Glenn and Jenny Mandelbaum; Mahwah, NJ: Erlbaum, 2003).

Charles Goodwin is Professor of Applied Linguistics at UCLA. His interests include video analysis of talk-in-interaction (including study of the discursive practices used by hearers and speakers to construct utterances, stories, and other forms of talk), grammar in context, cognition in the lived social world, gesture, gaze and embodiment as interactively organized social practices, aphasia in discourse, language in the professions, and the ethnography of science. He has done fieldwork analyzing family interaction in the United States, the work of oceanographers in the mouth of the Amazon, archaeologists in the United States and Argentina, and the organization of talk, vision and embodied action in the midst of surgery. As part of the Workplace Project at Xerox PARC he investigated cognition and talk-in-interaction in a complex work setting (ground operations at a major airport). With Marjorie Harness Goodwin, he has analyzed the interaction of children in the playground, and interaction in the home of a man with severe aphasia. Publications include *Conversational organization: Interaction between speakers and hearers* (New York: Academic Press, 1977), *Rethinking context: Language as an interactive phenomenon* (edited with Alessandro Duranti; Cambridge: Cambridge University Press, 1992), *Conversation and brain damage* (editor; Oxford University Press 2002), Professional vision. *American Anthropologist*, 1994, Co-constructing meaning in conversations with a man with Severe Aphasia. *Research on language in social interaction*, 1995, Seeing in depth. *Social studies of science*, 1995, Transparent vision. In Elinor Ochs, Emanuel A. Schegloff, & Sandra Thompson (Eds.), *Interaction and grammar*. Cambridge: Cambridge University Press, 1996, Practices of color classification. *Mind, culture and activity*, 1999, Action and embodiment within situated human interaction. *Journal of pragmatics*, 1999, *Il senso del vedere: Pratiche sociali della significazione*. Melterri Editore, 2003) (see http://www.sscnet.ucla.edu/clic/cgoodwin/).

Alan Zemel is an Auxiliary Professor in the Department of Culture and Communication at Drexel University. His research focuses on learning and instruction as interactional phenomena. Zemel has been studying these phenomena in the surgical facilities of teaching hospitals and in the interactions of students engaged in doing mathematics collaboratively in online chat environments.

Gary Dunnington MD is Professor and Chair of the Department of Surgery at Southern Illinois University. His research focuses on improvement in skill acquisition and evaluation practices in surgical education. He is past president of the Association of Surgical Education.

Appendix A: Transcription conventions

Timing		
Brackets	[ ]	Marks the beginning and end of temporal overlap among utterances produced by two or more speakers.
Equal sign	=	Indicates the end and beginning of two sequential 'latched' utterances that continue without an intervening gap.
Timed silence	(1.8)	Measured in seconds, a number enclosed in parentheses represents intervals of silence occurring within (i.e., pauses) and between (i.e., gaps or lapses) speakers' turns at talk.
Micropause	(.)	A timed pause of less than 0.2 sec.
Delivery		
Period	No.	Indicates a falling pitch or intonational contour at the conclusion of a turn constructional unit (TCU).
Question mark	No?	Rising vocal pitch or intonational contour at the conclusion of a TCU. An inverted question mark (¿) represents a half rise.
Exclamation point	No!	Marks the conclusion of a TCU delivered with emphatic and animated tone.
Comma	no,	Indicates a continuing intonation with slight upward or downward contour, as in the enunciation of an item in a not yet completed list, occurring (generally) at the end of a TCU.
Hyphen	yup-	An abrupt (glottal) halt occurring within or at the conclusion of a TCU.
Colon(s)	no:	A colon indicates sustained enunciation of a syllable vowel, or consonant. Longer enunciation can be marked using two or more colons.
Greater than/ Less than signs	> < < >	Portions of an utterance delivered at a noticeably quicker (> <) or slower (< >) pace than surrounding talk.
Degree signs	°no °	Marks speech produced softly or at a lower volume than surrounding talk.
Capitalization	NO	Represents speech delivered more loudly than surrounding talk.
Underlined text	yes	Underscoring indicates stress on a word, syllable or sound.
Arrows	↑ no	Marks a rise (↑) or fall (↓) in intonation.
Breath sounds	hhh	Audible expulsion of breath (linguistic aspiration) as in laughter, sighing, etc. When aspiration occurs within a word, it is set off with parentheses.
	•hh	Audible inhalation is marked with a preceding dot.
Other		

| Parentheses | ( ) | Text enclosed in parentheses marks transcriber doubt. |
| Double parentheses | (( )) | Transcript annotations. |

Appendix B: "Triangle of Doom"

#02–008A

```
1    A:    ⌈((CF's given name)) what nerves are (0.5) at=
2    R:    ⌊So this is
3    A:    =⌈risk with ((R's given name)) uh repair here
4    R:     ⌊This is your inferior epigastric up here
5          (0.6)
6    CF:   u::hm (1.0) Well I know runs in the
7          spermatic chord is da gental branch of
8          ⌈gental femoral nerve? (0.5) Run outside of it
9    R:    ⌊S- s- (0.4) so eventually what we're gonna do is
10   CF:   ⌈is a    ⌈ ilioinguinal nerve? ⌉=
11   R:    ⌊look how ⌊nice that's gonna be=
12   CM:                            =Right]
13   A:    =⌈°okay° so i'ru::ns                          ⌉
14   R:     ⌊>We're gonna we're gonna put⌉our piece of mesh<⌋
15   CM:    ⌊Right just pull it back up  ⌋
16   R:    (0.4) and ⌈boom
17   A:              ⌊runs sortuv with the chord probly it's greatest
18         risk is when you're tryin ta () dissect the chord. ⌈The
19         genital branch may be there
10   R:            ⌊So I'm pretty much (     )
21         (1.0)
22   R:    ⌈see we're done with the dissection
23   A:    ⌊and there'⌈s one other one
24   CM:            ⌊Mm mhm
25         (0.8)
26   CF:   U::hm ⌈da ilioinguinal?
27   R:          ⌊You know so we're gonna put our piece of mesh .hhh
28         We're gonna putta
29   A:    No::↑ that's pretty much at ri:sk in an open hernia repair
30         ⌈it's not so much in this operation
31   CF:   ⌊Mm mhm
32   A:    it's more anterior (0.5) we don't usually see that one
33         here
34         (2.5)
35   CF:   Mm:⌈::::::m
36   A:       ⌊It's one nerve that runs way out there la:tterly
37         (2.5)
```

```
38   A:    Near the spermatic vessels
39         (4.2)
40   R:    So see you gotta be careful=
41                             =⌈with those vessels ⌈right there
42   CM:                        ⌊ [Mm mhm
43   CF:   [Mm::::::::::::::::m
44         ()
45   A:    It's the lateral femoral cutaneous nerve
46   R:    °u:h°
47   CF:   °nkay°
48         (0.7)
49   R:    Okay () U:hm let me irrigate this and see if it
50         ⌈helps a little bit
51   A:    ⌊Most of those are in the area called the
52         (.) ⌈square of ↑d↓oo↑m
53   R:        ⌊.hh How 'bout it hhh
54   CF:   Mm mhm
55   A:    Where if you place staples in that region you (0.4) you
56         really at ⌈risk of putting a staple
57   R:              ⌊°Okay so come o::ve::r↑°
58   A:    through one or both of those nerves
59   CF:   Mm mhm=
60   A:          =creating just horrendous post
61         operative paresthesias (0.4)
62         anesthesia⌈s (0.2) and pain
63   R:             ⌊Come out a little bit so I can find myself
64   CF:   Mm mhm=
65   R:          =There we go
66         (0.5)
67   A:    So it's not (0.5) often possible to identify them we
68         wouldn't want to do the tedious dissection (0.8) that
69         would be necessary to identify them we:: (0.4) stay out of
70         that region knowing that those nerves are in that region
71         (0.4)
72   CF:   Mm mhm
73         (6.4)
74   A:    The argument has been over the triangle of doom versus the
75         (.) square of do::om
76   R:    I call it triangle=
77   A:    Well I call it square
78   R:    Ye:⌈ah
79   A:      ⌊I'm not gonna allow you to place a staple
80         anywhere in the square of doom
81   R:    Oh thas thas ⌈that's where I was gonna put my
82   R:    first staple
83   A:                 ⌊The triangle is the uh
84         (1.3)
```

```
85   A:   The triangle is the spermatic vessels (0.4) and the va:s
86        (0.4) creating a triangle like this
87   CF:  Mm mhm
88   A:   And what we do is we keep that lateral one but go
89        all the way up to iliopubic tra:ct (0.8) and make it a
90        square instead of a triangle
91   CF:  O⌈kay
92   A:    ⌊So everything below iliopubic tract
93   R:   (blunt grasp)
94   A:   and between the vas and the vessels (.)
95        ⌈n::o   ⌉ staples go in that region
96   CF:  ⌊Mm mhm⌋
97        (0.5)
98   R:   So um
99        (1.5)
100  R:   ((N's given name)) is this clean enough for ya?
101       (0.5)
102  N:   It looks great
103       (6.0)
104  R:   Come in a little bit (now turn)
105       (1.2)
106  R:   So this 's your defect
107       (1.1)
108  A:   Show them the rectus (.) sheath up above (0.2) which is
109       wh⌈ere you're gonna put staples in.
110  R:     ⌊Right up there
111       (0.4)
112  R:   ⌈Mmm
113  A:   ⌊So you're perfectly safe there
114       (0.3)
115  R:   Now this area this is where you get into trouble
116       (0.9)
117  R:   So I'm gonna put a staple he::re .hhh in Cooper's
118       ligament .hhh then you could come up here and put staples
119       here (0.5) you could put a staple down here but this area
120       (0.8) is where you don't wanta put staples
121       ⌈(this is over)
122  A:   ⌊Show 'em your triangle there ((R's given name))
123  R:   This is (0.3) right here
124  A:   Kay
125       (0.9)
126  A:   You don't even want to push too hard in there and get ⌈the
127       femoral vessels
128  R:                                                        ⌊Right
129  A:   ⌈B::ig vessels there
130  R:   ⌊°right°
131       (0.9)
```

```
132  A:   And the vas?
133  R:   °so:::°
134       (3.0)
135  A:   's: gonna be somewhere in there
136       (2.0)
137  R:   The vas should be going right in here
138  A:   Nkay () so that's the two vessels
139  CM:  N'kay
140  A:   The (two) structures like this
```