Gesture in Discourse

Article · April 2014

DOI: 10.1002/9781118584194.ch12

3 authors:

David Mcneill
University of Chicago
158 PUBLICATIONS **16,120** CITATIONS
SEE PROFILE

Elena T Levy
University of Connecticut
41 PUBLICATIONS **1,147** CITATIONS
SEE PROFILE

Susan D Duncan
The University of Chicago Medical Center
46 PUBLICATIONS **2,707** CITATIONS
SEE PROFILE

Gesture in Discourse

David McNeill†, Elena T. Levy‡ & Susan D. Duncan*

†Departments of Psychology and Linguistics, University of Chicago

‡Department of Psychology, University of Connecticut, Stamford

*Department of Psychology, University of Chicago

Abstract

In this chapter we provide evidence that speech-synchronized gestures are major sources of discourse cohesion. The evidence comes from a range of gesture types, including representational, beat, and pointing gestures. Our analyses suggest that gestures mark information that is *newsworthy* relative to what has come before, and thus that synchronous, co-expressive gesture-speech units are equally discourse units; they have absorbed meaningful context as a matter of their formation. Of special importance to our analyses are *catchments*, threads of visuospatial action imagery that run through a discourse, and are embodied in gesture features such as space, handedness, and hand shape. Catchments provide a gesture-based window onto discourse cohesion, and our analyses of particular instances suggest they are a locus around which discourse is organized. We conclude by exploring the origins of speech-gesture integration—early gestural catchments—in a young child's spontaneous discourse.

Key words

Discourse, cohesion, gesture, narrative, prosody, metaphor

"Inside the utterance, we will find information, and if we know how to unpack the utterance, we will find discourse" – anonymous reviewer of Levy & McNeill (1992).

1 Introduction

Our thesis is that speech-synchronized gestures are major sources of discourse cohesion. The gesture-to-cohesion relationship is more than an empirical correlation although it is that also. The gestures we mean are actual components of speech, not accompaniments or 'add-ons' (Kendon's 2008 term), but integral parts of it. They are the opposite of "body language"; not a separate "language of gesture" but gestures that are actually part of language, of speech. Much evidence supports this idea, but its full implications are not

To appear in Deborah Schiffrin, Deborah Tannen & Heidi E.Hamilton (eds.), Handbook of Discourse Analysis, Second Edition. Blackwell.

always recognized. The speaker in Figure 1 had just watched a cartoon and was describing one of the events to a naïve listener. A character climbed a drainpipe on the inside and the gesture depicts this event. The gesture also carries discourse information. In its form and motion it highlights the interiority of the ascent, presenting this as not predictable, as newsworthy, and as contrasting to exteriority (and indeed, the immediately preceding cartoon event showed the character climbing the same pipe on the outside). This one gesture thus has both denotative and discourse content. For the producer of the gesture, the "equivalence principle" (Jakobson 1960) of a contrast within an equivalence (which we will call a field of meaningful oppositions), drives the story forward, generating a trail of cohesive linkages as it goes. And for us, the analysts, this same principle enables us to find the discourse structure the speaker has created. Such a discourse contribution is hidden from view in orthographic transcripts. A gesture-based and a text-based analysis are both needed to uncover the discourse structure of a given corpus.

FIGURE 1

What are gestures? Adam Kendon (2004) defined gestures as "actions that have the features of manifest deliberate expressiveness." We adopt his definition with one qualification and one proviso. The qualification is that gesture cannot be deliberate. As we regard them, "gestures" are unwitting and automatic, anything but deliberate (Kendon may have meant by "deliberate" non-accidental, and with this we agree; but the word also conveys, "done for a purpose," and with that we do not agree: they are unwitting, inadvertent, unself-conscious, part of thinking itself). The proviso concerns "action". We regard gestures as movements orchestrated by significances other than pragmatic actions, created by the speaker him- or herself to embody significant imagery, not to attain goals, social or physical. To see the difference the proviso makes, the Figure 1 gesture looks like the action of lifting something in the hand, but it is not lifting at all. It is an image of the character rising, of the interior of the pipe through which he rose, and of the direction of his motion upward, all in a single symbolic form, in none of which a lifting-hand plays a part.

So our definition is this:

> A gesture is an unwitting, non-accidental, non-goal-directed action, orchestrated by speaker-created significances, having features of manifest expressiveness, that enacts imagery (not necessarily by the hands or hands alone), and is generated as part of speaking.

These gestures are not exotic or special. They are everyday occurrences. In conversations, route directions, narrations, etc. speech-synchronized gestures are by far the most frequent kind. They are so much a part of speaking that one is often unaware of them, but if you look around and watch someone talking in informal terms you are likely to see the hands and arms in motion. These are the gestures we mean.

2 Chapter plan

A thread running through our examples is metaphoricity. The gestures conveying discourse units are presenting themselves as something else, a definition of metaphor

close to Lakoff & Johnson's 1980) – the hand as "rising-hollowness", the hand in space as a storyline, as an opposition, as a shared topic, surprise, denouement, etc. These metaphoric gestures create an opening for text-focused discourse analysis to seek linguistic form indexes that correlate with the gesture-based cohesive devices. We know of some such already, and mention a sample here as a kind of down payment. The correlation of gesture-based discourse segments, or catchments, with prosody and purpose level is one in order to give it a locus in space, not the space of an action but a metaphoric space. Another is when a speaker refers to a new unit of discourse, for example when new episodes are introduced into narratives. Then gestures tend to occur, pointing with each repeated attempt to define a mutual topic of conversation. Another theme, in storytelling, is illustrated in example (1), which shows that the gestures (indicated by brackets) occur both with a reference to the character within a scene-changing device (1.1), and with the first reference within the episode proper (1.2):

(1.1) so the next main scene you see with [Sebastian] is

.2) um [Sebastian] and some of his friends are carousing in a courtyard…

This distribution of gestures supports the conjecture that gestures participate in the creation of discourse units. Gestures help mark elements as high in communicative dynamism, and thus as the presupposable units of discourse that follow.

We see a rich line of study arising from the joint consideration of these gestures and the correlated linguistic form indicators of discourse cohesion.

An overview of our chapter is the following:

Section	**Topic**
1	Introduction
2	Chapter plan
3	Communicative dynamism and the psychological predicate
3	Space as discourse
4	Catchments and prosody
5.	Beats
6	Viewpoints and subjectivity – a new look
7	Pointing
8	Mimicry and social interactive discourse
9	In children
10	Conclusions

3 Communicative dynamism and the psychological predicate

As noted, the Figure 1 gesture does not denote just "rising-hollowness". The speaker was also differentiating what she felt was significant and newsworthy in the immediate context of speaking. The gesture and the synchronous speech jointly formed a peak of communicative dynamism. "Communicative dynamism" is the extent to which a given

spoken or gestured form "pushes the communication forward" (Firbas 1971). The material form of reference not only registers existing degrees of communicative dynamism, but each form is also an active signal – signaling that the degree of communicative dynamism at that moment is being maintained or changed. With respect to the second, in the narration in (1), the speaker's use of gesture – her use of "more coding material" – *serves as a signal* that the existing degree of communicative dynamism is being changed, and this is one possible discourse analytic cue.

Gesture and speech, melding into single discourse units, relate to communicative dynamism in the same direction (Figure 2). It is not that gesture expands as speech shrinks. The most elaborate linguistic units are accompanied by the most developed gestures, the least with the least. The use of gestures to mark elements as high in communicative dynamism is not restricted to plot-line narratives. A similar phenomenon occurs at responding-to-interlocutor points in conversation. As Figure 2 shows, the more discontinuous an utterance is from the previous context, the more probable a gesture, the more internally complex it will be, the more complex the synchronous speech, and the greater the communicative dynamism. In keeping with this positive relationship, both speech and gesture in the Figure 1 utterance had extra coding material – the gesture an interiority feature in the open hand, and speech, co-expressively, prosodic emphasis on "thr**ou**gh".

FIGURE 2

The gesture, with its synchronous speech, also formed what Vygotsky (1987) termed a *psychological predicate*. In a psychological (as opposed to a grammatical) predicate, newsworthy content is differentiated from a field of meaningful oppositions.[1] One of Vygotsky's examples is a crashing clock (1987, p. 250): There is a crash in the next room – someone asks: "What fell?" (the answer: "The clock"), or: "What happened to the clock?" ("It fell"). Depending on the context – here crystallized in the questions – the newsworthy reply (the psychological predicate) highlights different elements. The same logic applies to gesture and speech as they differentiate newsworthy content in the immediate context of speaking.

A psychological predicate:

- Marks a significant departure in the immediate context; and
- Implies this context as background.

Combining gesture-speech into a psychological predicate implies that *every synchronous, co-expressive gesture-speech unit is equally a discourse unit*. It has absorbed a meaningful context as a matter of its formation (see McNeill 2005, 2012).

Communicative dynamism and the psychological predicate are connected. From the latter flows a causal force creating the former. A psychological predicate, with more (or less) discontinuity from the preceding context, summons greater (or lesser) effort, realized as more (or less) complex linguistic forms and gestures, providing the positive relationships with communicative dynamism in Figure 2.

A natural experiment shows this correlation. In our cartoon stimulus, as we mentioned in passing earlier, the character Sylvester (an ever-pursuing cat) uses the

drainpipe to reach Tweety (his preternaturally protected Canary prey) twice. His first attempt is to climb it on the outside, like a ladder. The result, obligatory in the genre, is catastrophe. His second, as in Figure 1, is on the inside, a stealth approach. Describing the first attempt, the field of meaningful oppositions or "equivalents" would be something like WAYS OF USING THE DRAINPIPE (this being the first mention of the pipe) and the psychological predicate differentiation something like CLIMB IT. With the second attempt, climbing itself is no longer newsworthy. It has become background and the field of meaningful oppositions updated to something like WAYS OF CLIMBING THE DRAINPIPE. In this field interiority is newsworthy: ON THE INSIDE.

If a speaker recalls both attempts, in the correct outside-inside order, the psychological predicate relating to the second attempt should thus focus on interiority. This follows from the psychological predicate concept; in the updated field of meaningful oppositions, interiority has become the newsworthy feature.

However, if a speaker recalls only the inside attempt and fails to recall the outside attempt, or recalls both attempts but reverses their order, interiority should not be newsworthy when the second ascent is described. It lacks an equivalent to which it can contrast. The discourse context for such a speaker is not WAYS OF CLIMBING but WAYS OF USING A DRAINPIPE. This also follows from the psychological predicate concept. Interiority, lacking a field of meaningful oppositions, should thus not be included in either gesture or speech, even though the speaker has perceptually registered it and knows that Sylvester did indeed climb the pipe on the inside. This is so because interiority does not contrast with exteriority in an inside-only or inside-outside context. The field of meaningful oppositions would be about climbing, and interiority would be just another detail without discourse significance (no one in any experiment has ever recalled only the outside attempt).

Of the six original subjects in McNeill and Levy (1983), two recalled only the inside attempt. For them, interiority had no newsworthy significance and their gestures did not contain it, even though they went on to describe how Tweety dropped a bowling ball into the pipe and its aftermath (Sylvester swallowed it), demonstrating that they had in fact registered that he was inside the pipe. Three speakers recalled both attempts in the correct order. In each case, their second gestures highlighted interiority but their preceding outside gestures showed ascent alone, without anticipation of the inside feature. The sixth speaker, the proverbial exception that proves the rule, also recalled both attempts but incorrectly remembered how Sylvester climbed the first time – she invented a non-existent ladder but for the second attempt did recall the pipe. So this speaker's second-ascent psychological predicate formed not on contrasting paths (inside versus outside), but on contrasting *grounds* (ladder versus pipe: her equivalents). And indeed her gesture depicted upward motion but not interiority.

This natural experiment suggests that the gesture-speech unit in Figure 1 (one of the three who recalled both ascents) was about ascent but also was, in itself, a whole discourse unit, something like INTERIORITY-RATHER-THAN-EXTERIORITY-IS-THE-NEXT-WAY-OF-USING-THE-PIPE -TO-GET-TWEETY.

3 Space as discourse.

Space itself, where gestures are made, embodies discourse themes. Gestures are of course spatial but the spaces in which they appear are not filled at random. In cases like pointing at something they may have significance, qua space, but often the significance is something not space; space then is more a metaphor for something else. In story narrations several narrative lines can unfold at once, and each will have its own space. In our example, a speaker recalls the moment in a full-length film that he is retelling (Hitchcock's 1929 *Blackmail*, his fist talkie) where a shady character is blackmailing the female character. In the film she has already, in self-defense, killed a sexual attacker and is now anxiously revealing her crime to her boyfriend, who happens to be the very Scotland Yard detective assigned to solve the murder. The blackmailer had secretly observed the crime and now appears, attempting to extort hush-money. Her boyfriend-detective decides to pin the crime on the blackmailer instead. In this fraught situation, heroine and hero face an impossible dilemma: submit to blackmail or find some dishonest means to avoid it. The narrator in Figure 3 is commenting on this moral quandary. In (a) he is saying "everyone's morals are very ambiguous 'cause [they're sup]posed to be the good guys", and gesturally indicates the space to his left (right hand rises left from lap). In (b) he continues with "[but she] really did kill him", and points into his front space. The space contrast (front/left) has metaphorized the abstract contrast of the ascribed versus the actual moral values of the female character. The opposition is continued in (c), with the central space again indicated but now for a different character, the blackmailer, and with ascribed rather than actual moral meaning, as he says "and s[he's a] bad guy". Then concludes indicating the left space for the blackmailer's real morality in (d), "[but he really] didn't kill him".

FIGURE 3

The example is of interest because it shows how spaces stand for fields of oppositions for different storylines (Bahktin's 1981 *chronotopes*). The speaker had a choice of two fields of oppositions. One would have had a moral storyline or chronotope: set up actual moral quality (she killed him, the blackmailer didn't) versus apparent moral quality (she was of the "good guys", he was not). We could recognize this, because the speaker's gestures would have consistently differentiated center-left as Real-Apparent. But he a chose instead a character chronotope, Hero versus Wicked. Within each pole he opposed Real-Apparent. Presumably due to mechanical constraints, keeping the hands in the central space for (b) and (c), this opposition happened to be different for the two characters but since it was limited to one pole, Heroes and Wicked, it did not undermine the storyline. Our point is that different storylines have different spatializations, and by them we can tell which the speaker is using. Behind it all was a use of space to dichotomize – the concept of opposition itself as opposition in space.

4 Catchments and prosody.

The field of meaningful oppositions a psychological predicate differentiates can be discovered directly in the gestures themselves. We then uncover yet another form of gestural discourse cohesion. *Catchments* are when space, trajectory, hand shape, etc.

recur in two or more (not necessarily consecutive) gestures. Catchments show the effective contextual background and provide an empirical route to the discovery of the discourse context.

- A catchment is recognized from recurrences of gesture form features over a stretch of discourse.
- It is a kind of thread of consistent visuospatial action imagery running through the discourse and provides a gesture-based window into discourse cohesion.
- The logic is that discourse themes produce gestures with recurring features; these recurrences give rise to the catchment.
- Thus, reasoning in reverse, a catchment offers clues to the cohesive linkages in the text with which it co-occurs.

Adam Kendon, in 1972, published a detailed analysis of a filmed conversation, and identified and correlated three hierarchies – kinesic, prosodic, and discursive. We can follow up on Kendon's analysis making use of the concepts of a psychological predicate and catchment. In our study, subjects were asked to describe their living quarters to an interlocutor. In one case, describing her house, the following occurred:

(1) so you're in the kitchen

n' there's a sss-

the back starc*

oh I forgot to say

when you come though the*

when you enter the house from the front

and you open the door with the*

the glass in them

there's a* the front staircase runs right up there on your left

so you can go straight up stairs to the second floor from there if you want

but if you come around through the kitchen into the back

there's a back staircase that winds around like this

and puts you up on the second floor

FIGURE 4

The following 4 catchments can be identified covering this passage:

C1 consists of right hand gestures elevated above the right knee; all are associated with **the kitchen** at the back of the house. See Figure 4.1

C2 consists of two-similar-hand gestures; all are associated with the theme of **the front doors** of the house. See Figure 4.2.

C3 consists of left hand gestures made with the arm extended and lifted up; all are associated with **the front staircase and second floor**. See Figure 4.3.

C4 consists of right hand gestures where the hand rises and turns in a spiral motion, while the left hand remains in an elevated hold; all are associated with **the back staircase and its relationship to the second floor**. See Figures 4.4 and 4.5.

Each catchment is distinctive in form, location and/or movement, and has non-consecutive occurrences. The **C2** "front door" catchment links back to a much earlier description of the front doors of the house. The centerpiece of this discourse is the back staircase (**C4**) and its location at the back of the house where it connects the kitchen to the second floor. The first mention of the back staircase is immediately aborted ("oh I forgot to say") and is replaced by **C2** "front door" and then **C3** "front staircase". **C3** is held as the kitchen **C1** and back staircase **C4** catchments resume. **C3** is hierarchically dominated by **C1**/**C4**, as we infer because it is motionless. One interpretation of the discourse is that the speaker aborted the first mention of the back staircase when she recalled that she had yet to mention another way to reach the second floor of the house that was linked to the front entrance. A repair was undertaken by introducing **C2** (the front doors, going back to the beginning of the house tour) and from there presenting the front staircase and second floor (**C3**). At the end of this repair, an overlap of catchments took place when the elevated left hand from **C3** was held, now representing the second floor, and the back staircase **C4** resumed and connected to it. The two-different hands gesture thus created an overlap of the **C3** and **C4** catchments.

TABLE 1

The arrangement in Table 1 shows a hierarchy of *discourse purposes* as revealed by the Nakatani et al. (1996) query procedure. Position in the hierarchy is indicated by indentation; gesture location is shown with boldface. The text is broken up so that each line is a single prosodic phrase. The numbers refer to the hierarchical level of the purpose, as determined by the procedure, which consists of asking and answering with a purpose why each line was uttered (the procedure applies only to statements that fulfill a purpose, which is not always the case; however, in this discourse the assumption evidently applies). Table 2 compares the hierarchy to the discourse's catchment structure; they correspond closely– indeed, 100%!

TABLE 2

Each catchment has its own purpose level or levels, not shared by the other catchments. At this degree of delicacy, there is a perfect mapping of the discourse structure onto gesture and the speaker apparently created discourse segments on the basis of consistent WHY-purposes. Gestures are thus here accurately accounted for as presenting information that is relevant to the WHY? questions of the purpose hierarchy. For example, the answer to purpose 1.1 is 'in the kitchen,' and a gesture was performed that conveyed this content (the hand held in a space identified as the kitchen). Predicting gestures from purposes suggests that the WHY? hierarchy was guiding the speaker by defining what was newsworthy at each point, hence her psychological predicates, and that

gestures expressed this content. The catchment is the base from which the communicative weight of the gesture is formed. Each gesture is simultaneously shaped by its semantic content and its relationship to a catchment.

Thus several dimensions converge: The catchment determines the form of the gesture; the utterance purpose defines the communicative weight; the gesture provides the content.

The third leg of Kendon's triad is prosody. To access this dimension, we make use of the ToBI (Tone-Break-Index) analytic system. Following Beckman & Hirschberg (1994), a ToBI transcription occupies 4 tiers: (1) orthographic transcription (as above), (2) a tone tier in which phrasal tones and pitch accents are marked, (3) a break-index tier in which juncture degree is rated between each pair of words and after the final word, and (4) a miscellaneous tier (comments by the coder). We focus on tiers (2) and (3).[2]

Table 3 summarizes the tone tier (2). The more deeply embedded a segment in the discourse, the higher the final boundary tone, conveying a 'more is to come' meaning. The more dominant the segment, correspondingly, the lower the final tone, reflecting a declarative pattern. This contrast evidently reflects a general characteristic of intonation contours with independent and dependent content.

TABLE 3

Prosodically, each catchment had its own distinctive boundary tone. The **C1** (kitchen) and **C4** (the back staircase) catchments, which come together at the end of the discourse in terms of the spatial layout of the house, were Low. **C2** and **C3** were preponderantly High. Catchments thus exhibit distinct prosodic features.

What factors influence the boundary tone of a given catchment? Two seem important. One is the discourse embeddedness of the content, noted above, in which embedded content tended to have high final tones and main-line content low final tones. Iconicity is a second factor. The high and low tones seem to show semantic motivation (cf. Bolinger, 1986) in that phrases having to do with the base of the stairs tended to end Low and those with the second floor High. Thus aspects of intonation behave like gestures themselves, and are predictable from knowledge of both semantic content and position in the discourse structure.

TABLE 4

The Break Index code shows the degree of phonological distinctiveness at each 'break' point in the speech stream, ranging from 0 for the highest degree of phonetic reduction to 4 for a full intonation phrase boundary. Table 4 shows that the **C4** catchment (the back staircase) had a high level of phonetic reduction (Level 0), reflecting more internal continuity of speech. In a seeming paradox, **C4** also had the highest proportion of full intonation phrase boundaries (Level 4). The paradox is only apparent, however, and makes sense if we consider that the back staircase was the dominant catchment of the

full discourse. This central position yielded tightly configured gesture-prosody packages – internal boundaries glossed over while external boundaries were maximized.

Our general conclusion is that the organization of discourse is inseparable from gesture and prosody: the three components are different sides of a single mental-communicative process. A purely text-based approach, as in the narratology tradition, is blind to two-thirds of this discourse structure. Indeed, the principal themes of the living space discourse were *gestural* – the four catchments embodied the speaker's intentions and were the foundations of the discourse purposes of successive utterances. The utterance hierarchy grew out of these images but only partially encoded them (as we see in the greater delicacy of discourse information in gesture). It was to present catchment themes that the discourse, at each moment and step by step, was organized. Prosody, the other component of the triad, is gesture in spoken form, as in Bolinger (1986). The psychological predicate is the basis for integrating all these components. It provides the co-equal generation of gesture and speech from the same semantic intent. The catchment is the locus around which this integration proceeds.

5. Beats

Beats can be regarded as miniaturized versions of other gestures, even when the other gesture is concurrent – making it a sort of double exposure – a conception based on Tuite 1993, who argued that every gesture contains a rhythmical pulse, a beat, on which iconicity and metaphoricity build; here, we say that every beat is a distillation or miniaturization of a more complex or larger gesture. It is called the "beat" after the musical beat or the idea of beating a surface of some kind – the hand(s) moving up and down or back and forth in short strokes. However, this rhythmicity may be effect rather than cause. The function of the beat (either concurrent or successive) is like that of yellow highlighter – the beat emphasizes that something else, speech or other gestures than the beat itself, is important in some larger context. It is this expansion to context the beat signals. Just as gesticulations absorb their context, beats explicitly index it. This function explains why beats coincide with prosodic emphasis, since prosody performs a similar function; that is the true co-expressivity of the beat: prosodic highlighting. Thus beats move with the speech rhythm but this rhythm is not the source; rather, both beat and rhythm have a shared source in contextual highlighting. Bressem (2010) has tracked different hand shapes and orientations of beats in shadings of this function.

The beat's formal simplicity belies its semiotic complexity. Of gestures, beats stand among the more complex semiotically. One can see this complexity in the at least 4 kinds of beat that capture different relationships to the larger context:

1) Beats alone highlight that content (otherwise not imaged) is new in the context. An example (another example from the narration of Hitchcock's *Blackmail*) is enumerating successive features of a newly introduced character in the story:

(2) "his girlfriend, Alice, Alice White"

with a beat accompanying each stressed increment of new (non-repeated) information – respectively, her functional role, first name, and last name. Again, prosody is a factor, the stress peaks performing the same function. The beats are co-expressive with this

prosodic marking. Together they add extra effort and this highlights the increments of content.

Two analyses (Levy and McNeill, 1992) of the distribution of beats relative to the episode structure of spoken narratives – one in English and one in Georgian – shows the tendency of beats to occur at the start of new episode units (the present case 1). The narrations were segmented into episodes on the basis of explicit scene-changing devices that made reference to the film itself, as well as clue words (Reichman, 1978), such as "at any rate" or "anyway." Table 5 shows the distribution of gestures that accompanied full noun phrases, relative to the position of the reference in an episode unit.[3]

TABLE 5

2) Beats following another gesture. An example is "the weight came down (with a large downward iconic gesture) and he got clobbered (a beat)." The beat, a miniaturized version of the first gesture, synchronizes with a stress peak but its function is not to tap out this rhythm but to indicate the point in speech that relates to the first gesture semantically (the effect of the weight's falling on the character).

3) Beats in advance of another gesture – the reverse of 2). Such a sequence indicates a shift of discourse level, from the metalevel (about the structure of the discourse), with the beat, to a descriptive level (the content of the discourse), with the following full gesture; the beat is a miniaturized anticipation of the larger gesture. For example, "so the next thing he does (metanarrative with a beat) is go in the front door" (narrative with an iconic for motion). The beat indicates a structural feature of the story – its temporal sequence – to which the iconic gesture for entering that follows relates.

Finally, 4) a beat superimposed on an ongoing representational gesture. The beat signals that the gesture (and its concomitant speech) has a significance beyond itself, in the larger context. It is the all-purpose highlighter in which the other cases (enumeration, semantic linkage, discourse level shift) all may occur, and is a "double flash" of the gesture on which it is riding.

To summarize, the beat relates the moment of its occurrence to some other occurrence. Beats only exist in relation to things other than themselves.

6 Viewpoints and subjectivity – a new look

Viewpoints in gesture are of two basic kinds. Many take the perspective a detached observer, watching the event as if it occurred on a stage or screen: the hands are the whole character, the space the space in which the character resides, and the speaker's own head and body are on the outside, looking in. This is Observer Viewpoint. The other perspective is that of the participant in the action: the hands are the character's hands, their motion its, and the speaker's body is the character's in the scene. This is Character Viewpoint. Some gestures combine the perspectives, one part of the gesture being in Observer Viewpoint, another part in Character Viewpoint. The following example is of

this dual type. The effect is a kind of gestural irony. The narrator, Narrator V, is describing a complicated scene in which Sylvester has catapulted himself up to Tweety by throwing a weight onto the other end of a kind of seesaw. Shooting up exactly to Tweety's window, he grabbed Tweety and fell back down to the ground, landing on the seesaw. This launched the weight, which arced through the air and landed on him. As Sylvester comes down Viv's hand is Sylvester's, grasping Tweety – Character Viewpoint. At the same time the motion of the hand is Sylvester as a whole moving down – Observer Viewpoint.

(4) and he grabs Tweetie Bird and as he comes back down he lands on the ground and he starts running away and at this time the five hundred pound weight comes down and lands on him

The initial Character Viewpoint could have been denotative for "grab" but why did Narrator V continue a Character Viewpoint when she took on Observer Viewpoint for the trajectory? Russell (2012) points to an indirect free style in gesture, much like that in literary writing (Banfield 1993), which Character Viewpoint produces – the "new look" of this section. Indirect free style as a literary style reports thought and subjectivity rather than words: "now she had got to be bothered by that beast of a woman". This contrasts to direct and indirect quotes – "she said: 'I'll be bothered by … etc.'" or "she said she would be bothered by … etc." (which also may have their gesture counterparts). The Character Viewpoint of Narrator V's gesture captures Sylvester's subjectivity, his satisfaction with his catapult method. The Observer Viewpoint trajectory however displays (unbeknownst to Sylvester) the unfolding disaster – the weight arcing overhead to land on him. The Character Viewpoint, as an indirect free style report, gave Narrator V the feel of Sylvester's "subjectivity" (if a cartoon character has such), a necessity for the ironic contrast to the Observer Viewpoint's objective knowledge of what was to come.

Narrator V. could also have actually said, in spoken free indirect style, "he thought he had Tweety at last" but she did not. Gesture alone in this case embodied the mode, suggesting that it is, equally, a mode of thought as well as a mode of presenting someone else's thought.

Levy & McNeill (1992) observed contrasting storytelling strategies, one of which we now suspect matches this Character Viewpoint functionality. Termed "the constructive strategy", the narrator does not tend to mark the start of new episodes with beats (in other words, does not show the association with referring expressions that appears in Table 5), uses iconic gestures and "deictic" discourse markers with demonstrative pronouns or deictic verbs of motion, such as "this I didn't understand" or "he went back into the narrative," and seemingly shows a tendency toward Character Viewpoint – this narrator "created the impression of 'traveling through' the story, moving from one temporal/spatial location to another" (p. 300). In the second strategy, "the anticipatory", adopted by a different narrator, there is a strong association of beats with the start of new episode units (as in the analyses appearing in Table 5), the episodes marked primarily with "non-deictic" devices containing references to the generalized film viewer in subject position and structural components of the film in the predicate, such as "then you see the scene" or "you get a flashback"; the speaker seeming to "create the impression of the film as object [cf. Observer Viewpoint], whose components (scenes)

moved in relation to a stationary viewer." The interesting possibility this parallel with Russell's free indirect style mode of the Character Viewpoint suggests, together with the earlier supposition that the free indirect style is a mode of thought as well as of reporting thought, is that individuals form differing individual cognitive and communicative styles along these lines, some speakers being characteristically Character Viewpoint "subjective", with the free indirect style in their own thought and speech, while others are more Observer Viewpoint "objective, avoiding the subjectivity of the free indirect style. If they do any kind of reporting, "objective" speakers do it through quotes, direct or indirect (a prediction that invites test).

7 Pointing

Almost every gesticulation includes some deixis. The upward thrust of Figure 1 indicated the location of the pipe, its position relative to the character and Sylvester's position. This deixis was accomplished not with a dedicated point but was built into the gesticulation itself. A dedicated, stand-alone point on the other hand has properties that make it like an emblem. Like "OK", which must be performed with the forefinger in contact with the thumb, the other fingers extended, points have form standards – the extended index finger is standard in North American and Northern European culture; a flat hand is standard in some British Isle uses (Kendon 2004); and lip points are standard in Laos (Enfield 2001; see Figure 3). All have in common an iconic vector from a zero point, or "origo" (Bühler's 1983 term), to some target of the point.

FIGURE 5

While Figure 5 seems be a gesture whose target was an object or locus in physical space, in discourse we find pointing capturing other phenomena. Some pointing gestures are similar to beats and mark the introduction of novel events or characters (Marslen-Wilson, Levy and Tyler, 1982). The analysis in Table 6 is taken from a narration of a comic book. The narrator had a copy of the comic book resting on his lap, and he took advantage of this arrangement to point at times to pictures of the characters on its cover. These points concentrated on the first-mentions of proper names. The distribution of gestures was motivated, at least in part, by the episode structure of his retelling.

TABLE 6

TABLE 7

Many points in discourse are metaphoric. Rather than indicate a locus in space for a reference, they create a spot in space to stand for the reference that otherwise could not have a spatial locus. These metaphoric points are prominent in conversations. The gesture indicates a space but the space has a non-spatial meaning. The so-called "Mr. A. and Mr. B conversation" compellingly illustrates the force of such gestures in the flow of conversational discourse (Table 7). The conversation was recorded in the early 1970s by the late Starkey Duncan as part of a larger investigation of face-to-face interaction (see Duncan and Fiske 1977). It was named "the Mr. A - Mr. B conversation" by Silverstein (1997). The participants were previously unacquainted male graduate students at the University of Chicago. A and B were introduced, placed in front of a video camera, and

told simply to "have a conversation." As would be expected in such a situation, the participants started by exchanging academic biographies. Each already knew that the other was a graduate student and the specific school within the university the other attended, but nothing more. Mr. A, a budding lawyer, made a determined effort to uncover Mr. B's academic past, about which Mr. B was strangely unforthcoming. After several false starts, Mr. A. finally pinned Mr. B down with Q**A**8 "an' [you went to undergraduate here or …]," which elicited R**B**8 "[in Chicágo] át, uh, Loyola," the reluctant Mr. B's academic homeland (see Table 7).[4]

Pointing is the only gesture to appear in this snippet of conversation. It carried the full load of meaningful oppositions – establishing, maintaining and at two points shifting them. The stretch began with A's Q**A**6 "how do you like Chicago compared to" and Q**A**7 "did you [go to school thére] or uh", the sentences coreferential with a just prior mention by B (not shown) that he had once lived in Iowa. Mr. A's Q**A**7 was accompanied by a gesture into the space shared between A and B. B's immediate reply (R**B**7.1) also pointed into the shared space, affirming B's sojourn in Iowa as the current topic of the shared space. B then launched into a series of statements (R**B**7.2 through R**B**7.5) with a new area of deixis to the left, all having to do with a new topic, B's education in Chicago. Thus there was a shift of topic and with it a shift of space. He finished his education topic and returned to the shared space. However, it now for him had a new meaning, no longer Iowa-then but Chicago-now (R**B**7.6 "so I [came back]"). B's next statement hinted at the precise way in which the meaning of the shared space had changed. He said at R**B**7.7, "[kind of /]", and pointed to the *right*. This was the only use of the right space by either A or B in the snippet. It is significant that it occurred with a hedge. The hedge implies that he came back to one sort of Chicago but not to another sort of Chicago. He was contrasting something to the shared space with the right-space hedge, and this something was a "kind of" Chicago. Among inhabitants, the University of Chicago is often called just "Chicago", and this would be the default in a conversation between two enrolled students, seated in a University building. But B's right-space hedge signaled that the meaning of the shared space for him now was not this default but the City (for him, the University was the "kind of" Chicago in the right-hand space). It is equally clear however that A, also shifting meaning and pointing into the shared space, took it to mean the University. So, at this moment, the shared space had two meanings. A's question at Q**A**8 with an extended point into the shared space forced a clarification. B then answered, hesitantly, with a final shared-space point accompanied by speech that distinguished the two meanings in his way, in R**B**8: "[in Chicágo] át, uh, Loyola" – "in" indexing the City, "at" the university. Mr. A and Mr. B, in their fluent, active, and metaphoric uses of space were in no way unusual; indeed, were typical of face-to-face conversation.

8 Mimicry and social interactive discourse.

We have already seen gestures acting as social discourse units in the Mr. A-Mr. B conversation. Many other examples can be found. Gestures are intrinsically social. They express this quality in discourse units that are themselves comprised of interactions and

social mimicry. Schegloff (1964) used gesture to forecast what would be "in play" in the next round of conversation. We follow his lead, supplemented with the concept of a psychological predicate, and look for joint psychological predicates and fields of meaningful oppositions. A new joint discourse unit is formed, among other ways, when one person mimics the gesture of another; or when two individuals participate in one psychological predicate, one providing the linguistic side, the other the gesture.

FIGURE 6

Kimbara (2002) studied gestural mimicry as an interactive phenomenon. The example in Figure 6 is from her research. Mimicry is a process of "interpersonal synchrony," as Kimbara terms it, which creates a sense of solidarity and is prominent when the interlocutors are personally close. Figure 6 presents such a case. Two friends are having a conversation. The example begins with a gesture by the friend on the right. She is describing the chaotic scene that develops on Tokyo subway platforms during rush hour where multiple lines of waiting passengers take form but disintegrate when the train arrives into an elbow-swinging crowd. Panel a depicts the lines; panel b is their thickness and leftward direction vis-à-vis the speaker/viewer. The listener is commencing her gesture preparation during panel b as well, and panels c and d are her mimicry. The imagery is the same as the original: the same two lines, the same thickness and even the same absolute direction (this may be mimicry of the speaker's own position as the origo zero-point). From a psychological predicate viewpoint, the second speaker's idea unit included imagery from the first speaker's psychological predicate.

Joint construction goes further, to form collaborative psychological predicates wherein Mind #2 mimics the gesture and speech of Mind #1; if at the same time #2 asks (implicitly) in what context this mimicked gesture and speech could have been newsworthy, where they could have jointly been a point of differentiation, #1's field of meaningful oppositions suddenly appears. The effect is dramatic. The psychological predicate and field of oppositions rise as if by magic (but it is not magic – it is because the original gesture had absorbed this context and mimicking it recreates it at least in part). Mimicry imports the psychological predicate into one's own thought-language-hand link. Mimicry is thus a kind of *borrowed embodiment*. It recreates the other's gesture-speech unit as if it were a psychological predicate of one's own. Turntaking at such momentary overlaps of psychological predicates depends on this process, and creates yet another interactive discourse unit. Turn-taking is often analyzed as coordinated activity of one speaker authorizing the next speaker (Sacks et al. 1974). The process also involves joint psychological predicates at the exchange point, with gestures playing a critical role. A psychological predicate starts with one speaker and passes to the next speaker. Speaker A says "from what" and Speaker B, with some overlap, takes over with "from- from the way we do it". The joint inhabitance is seen in the deployment of gaze and gesture:

(5) A begins with a glance at C (a third participant), then gestures interactively toward B, followed immediately by gaze at B and an iconic gesture depicting the (object of reference).

This form of mimicry appears at turn-exchanges during conversational interactions, a kind of formation of a joint idea unit which ensures that the dialogic thread continues unbroken (see McNeill et al. 2010 for full details).[5]

Even more dramatic demonstrations of two-body psychological predicates appear in Figure 7 from an experiment devised by Furuyama (2000). The setting was one person teaching a second person, a stranger, how to create an *origami* box. In Panel 1, the learner on the left mimics the teacher's gesture, and again mimicry has social-interactive content. It occurred without the learner speaking but was synchronized with the *tutor's* speech. As the tutor said, "[pull down] the corner," the learner performed the gesture during the bracketed portion. The learner appropriated the other's *speech,* combining it with *her gesture*, as if they were jointly creating a single psychological predicate. The similarities to what Gill (2007) calls entrainment are notable.

FIGURE 7

The reverse appropriation also occurs. The learner appropriates *the tutor's gesture* by combining it with *her speech*. Again, there is inhabitance, this time of gesture, and there is again a kind of joint psychological predicate. In Panel 2 the learner takes manual control of the tutor's gesture and combines it with her speech. She says, "[you bend this down?]," and during the bracketed speech moves the tutor's hand down. As Furuyama observes, the tutor had turned in his chair so that the same left-right gesture space was available to him and the learner, a maneuver that invited the learner to enter his gesture space. It is striking that the American taboo normally prohibiting strangers from non-accidental physical contact was overridden, possibly because the hands had become symbols and were no longer the "hands", the actual body-parts, belonging to another person.

Thus we find discourse units formed by two persons, their gestures and fields of meaningful oppositions realized in common through mimicry. This can take place in conversations or during instruction or even in the kind of virtual interaction that a gesture coder has with video images of another person's gestures.

9 In children

Gestures as discourse units appear even in young children. The data we describe are taken from a longitudinal study of the spontaneous narratives of a young child, Ella, between the ages of 1 and 3 years, videorecorded and transcribed by Forrester (2002), and available on the CHILDES website. In the example we present, Ella, age 2;7, is seated at the kitchen table, engaged in conversation with both parents.

The example begins at the very start of the recording, so we do not have earlier context; where we break in the mother has introduced the topic of a child frightened by participating in a psychology experiment involving Thomas the Tank engine (in 6a). In (6b) the father comments on this topic, and in (6c) and (d) Ella responds with newsworthy information.

(6a) Mother: Brenda's daughter was saying about taking her son up there and he being really scared doing the experiment.

(6b) Father: oh yeah I know maybe they not liking Thomas the Tank what was horrible.

(6c) Ella: I like Thomas xxxxx much (Mother: mmhhmm) (Father: you do, don't you?)

(6d) Ella: mm xxxx [$_1$xxxx /$_2$ xx Trucks[6] /$_3$ on the- /$_4$ on television / (Mother: mmhhmm)

1: both hands move out (preparation)

2: both hands start to move in toward each other

3: both hands remain in midair

4: both hands, in fists, come together (stroke)

FIGURE 8

Ella's second utterance, (6d), is accompanied by a single, adult-like gesture, produced with preparation and stroke, as both hands come together on "television." This is a manifestation in both speech and gesture of the psychological predicate, watching the show on television, and the speech-gesture combination helps differentiate the newsworthy information from the earlier context of her parents' utterances (the show in an experimental setting). The utterance in (6d) is thus at the same time *continuous with* and *contrasts with* earlier utterances, in keeping with the "equivalence" principle (in part, why it seems adult-like) – in other words it both presupposes earlier utterances and yet pushes the communication forward.

The gesture has the following imagistic property. It is produced as both hands, in fists, come together in center space, and stop for an instant on the false start ("on the-") when the hands remain separated in midair, as if embodying the shape of a television. At this moment the gesture has the analytic property of combined *character* and *observer viewpoint*, embodying the child looking at a television – Ella's head is back and up, at the angle she would have if watching, with her hands embodying the size and shape of the television set. The gesture is completed as the hands come together on the rest of the utterance in the space defined by the earlier part of the gesture, perhaps embodying the collision of a train with a second train or other object, as found in various episodes of the original television show.

Ella's next utterance is a response to her father's request for clarification. It helps to push the communication forward, but only in the sense of clarifying the earlier reference.

(7a) Father: /$_5$ on the television? nor do I know what you mean/

5: Ella's hands remain still in the air while the father is speaking (hold)

(7b) Ella: /$_6$ the Trucks] (F: the Trucks yeah)

6: both hands wave in air while maintaining position (hold)

FIGURE 9

The gesture appearing in (7b) is continuous in form and position in space with Ella's earlier gesture. While her father speaks in (7a) Ella's hands remain still in the air, with fists together (a hold from the previous gesture). In (7b), when she re-articulates "Trucks"

she maintains her fists in the air and moves her hands in a wavy trajectory. The gesture takes place *within the space set by the earlier gesture*, as if the hands were entities moving on the television screen embodied in the earlier gesture. This gesture continues to assume a combined character and observer viewpoint. Both gesture and speech are continuous with earlier utterances and appears to be an early instance of a catchment.

A third gesture in this sequence appears in Ella's next utterance, again a response to her father's questions. Ella answers in the affirmative, re-using and elaborating on her father's words. Her answer, like her father's question, presupposes the fun fair, and so is semantically continuous with the utterance that precedes it. It also asserts something new, the identity of trucks observed at the fair (questioned by her father in 8a) and in this way also pushes the communication forward.

(8a) Father: d'you remember we saw those funny trucks in the fun fair yesterday, did they look like Trouble with Trucks?

(8b) Ella: the fun fair has [$_{7}$got Trouble with Trucks mum]

7: both hands come together again

FIGURE 10

Once again the gesture in (8b) co-occurs with the articulation of the psychological predicate, the new information "got Trouble with Trucks." It is formed with both hands coming together, as in the first gesture in the series, although this time with the hands open.

This is the earliest example we find in the recordings of a sequence of gestures with adult-like properties. That is, each of the three spoken utterances in the sequence is accompanied by only a single gesture, with either the entire gesture or its stroke marking newsworthy information. (Earlier, gestures segmented utterances into smaller linguistic units.)

This suggests that, at this very young age, gestures for this child have become an inherent phenomenon of the discourse level of analysis; that is, that the psychological predicate differentiating a field of meaningful oppositions is now the basic operating principle of speech and gesture. We propose that the continuity of gesturing helps the child carry presuppositions from utterance to utterance, and thus sets preconditions for the use of truly cohesive devices. In fact, an early use of the sequencer *then* in an inter-utterance, monologic context appears soon after the passages above. Ella and her parents are still on the topic of the fun fair:

(9a) Father: what else did you like in the fun fair?

(9b) Ella: em [$_{10}$one horsey] [$_{11}$I liked a geen horse on a big fair]

10: right hand beat

11: small gestures hidden by table

(9c) Mother: did Eva and Kelly go on as well go on the horses up and down?

(9d) Ella: mmmmmm then it will [$_{12}$stop] (M: then it stopped)

12: right hand holding shirt, moves down

Other instances of *then* in an inter-utterance, monologic context occur several minutes later, when Ella and her parents continue to discuss the fun fair (at 4:57 on CHILDES video):

(9a) Ella: I went on a caterpillar

(9b) Mother: oh was it good fun? (Ella: mmhhmm)

(9c) [$_{13}$yellow (cup?)] (Mother: sorry?)

13: left hand iconic depiction of cup shape moving downward; shakes head, as if shaking head no; comes to rest with chin resting on hand]

(9d) Ella: [$_{14}$…/$_{15}$ then /$_{16}$it up?/stop?]*

14: left hand moves out from chin (preparation)

15: left hand moves up in cup shape, palm up

16: left hand moves down

(9e) Ella: [$_{17}$then /$_{18}$ put the /$_{19}$ seatbelt] [$_{20}$on…]

17: left hand straight, moves up (preparation)

18: left arm bends at elbow and moves across chest, as if putting seatbelt on

19: left hand remains at rest near R shoulder (hold)

20: left hand moves forward, palm up, as if in a communicative, "shrugging" gesture; then retracts

*transcription differs from CHILDES transcript

It is impossible to know whether the temporal coincidence of the first gestural catchment and the early temporal connectives (*then*) is motivated or merely accidental, but it nevertheless helps us to make our point: that the imagistic properties of gestures can contribute to continuity of meaning, and then the production of gestures is an activity on which the acquisition and use of discourse cohesive devices rest.

10 Conclusions

We have shown several ways in which gestures convey discourse information – the point of highest communicative dynamism as it is differentiated in psychological predicates, space, beats, and social interaction. We find cross-linguistic similarities (English/Georgian), and a host of others – catchments, prosody, viewpoints, pointing, and the social interactive value of gesture as for example in gesture mimicry.

REFERENCES

Bahktin, M. M. 1981. *The dialogic imagination* (M. Holquist, ed.; C. Emerson and M. Holquist, trans.). Austin, TX: University of Texas Press.

Banfield, Ann. 1993. Where epistemology, style, and grammar meet literary history: the development of represented speech and thought. In Lucy, John (ed.) *Reflexive Language*, pp. 339-364. Cambridge: Cambridge University Press.

Beckman, Mary. E. & Hirschberg, Julia. 1994. The ToBI annotation conventions. http://www.ling.ohio-state.edu/~tobi/ame_tobi/annotation_conventions.html (accessed 05/11/12).

Bolinger, Dwight. 1986. *Intonation and its parts: Melody in spoken English*. Stanford, CA: Stanford University Press.

Bressem, J. 2010. Pounding the verbal utterance: Forms and functions of beats. *International Society of Gesture Studies*, Conference Talk, Frankfurt/Oder, Germany.

Bühler, Karl. 1982. The deictic field of language and deictic words, in Jarvella, R. & Klein. W. (eds.). *Speech, Place, and Action*, pp. 9-30. Chichester, UK: John Wiley & Sons Ltd.

Chafe, Wallace. 1980. *The Pear Stories: Cognitive, Cultural, and Linguistic Aspects of Narrative Production*. Norwood, NJ: Ablex.

Duncan, Starkey Jr. and Fiske, Donald W. 1977. *Face-to-Face Interaction: Research, Methods, and Theory*. Hillsdale, NJ: Erlbaum.

Enfield, N. J. 2001. "Lip-pointing: A discussion of form and function with reference to data from Laos." *Gesture* 1: 185–211.

Firbas, Jan. 1971. On the concept of communicative dynamism in the theory of functional sentence perspective. *Philologica Pragensia* 8: 135-144.

Forrester, M. 2002. Appropriating cultural conceptions of childhood: Participation in conversation. *Childhood* 9: 255-278.

Furuyama, Nobuhiro. 2000a. Gestural interaction between the instructor and the learner in *origami* instruction, in McNeill D. (ed.), *Language and Gesture*, pp. 99–117. Cambridge: Cambridge University Press.

Gill, Satinder. 2007. Entrainment and musicality in the human system interface. *AI & Society* 21: 567–605

Jakobson, Roman. 1960. Concluding statement: Linguistics and poetics, In Sebeok, T. (ed.). *Style in Language*, pp. 350-377. Cambridge, MA: MIT Press.

Kendon, Adam. 2004. *Gesture: visible action as utterance*. Cambridge: Cambridge University Press.

Kendon, Adam. 2008. Some reflections of the relationship between 'gesture' and 'sign.' *Gesture* 8:348-366.

Kimbara, Irene. 2006. On gestural mimicry. *Gesture* 6: 39–61.

Lakoff, George and Johnson, Mark. 1980. *Metaphors We Live By*. Chicago: University of Chicago Press.

Levy, Elena T. and McNeill, David. 1992. Speech, gesture, and discourse. *Discourse Processes* 15: 277-301.

Marslen-Wilson, William, Levy, Elena T. & Tyler, Lorraine. 1982. Producing interpretable discourse: The establishment and maintenance of reference. In Jarvella, R. & Klein. W. (eds.), *Speech, Place, and Action*, pp. 339-378. Chichester: John Wiley & Sons Ltd.

McNeill, David. 2005. *Gesture and Thought*. Chicago: University of Chicago Press.

McNeill, David. 2012. *How Language Began: Gesture and Speech in Human Evolution*. Cambridge: Cambridge University Press.

McNeill, David, & Levy, Elena. 1982. Conceptual Representations in Language Activity and Gesture. In Jarvella, R. & Klein. W. (eds.), *Speech, Place, and Action*, pp. 271-296. Chichester: John Wiley & Sons Ltd.

McNeill, David, Duncan, Susan, Franklin, Amy, Goss, James, Kimbara, Irene, Parrill, Fey, Welji, Haleema, Chen, Lei, Harper, Mary, Quek, Francis, Rose, Travis, and Tuttle, Ronald. 2010. Mind merging, in Morsella, E. (ed.). 2010. *Expressing Oneself/Expressing One's Self: Communication, Language, Cognition, and Identity*, pp. 143-164. London: Taylor and Francis.

Nakatani, Christine H., Grosz, Barbara J., Ahn, David D. & Hirschberg, Julia (1995). Instructions for annotating discourses. Technical Report TR-21-95, Center for Research in Computer Technology, Harvard U., MA.

Reichman, R. 1978. Conversational coherency. *Cognitive Science* 2: 283-327.

Russell, Kamala. 2012. Form and function: Character viewpoint gestures in dialogic narrative. Unpublished AB Thesis, University of Chicago.

Sacks, H. Schegloff, E., and Jefferson, G. 1974. A simplest systematics for the organization of turn-taking for conversation. *Language* 50: 696-735.

Schegloff, Emanuel A. l984. On some gestures' relation to talk, in Atkinson J. M. and Heritage J. (eds.). *Structures of Social Action*, pp. 266–298. Cambridge; Cambridge University Press.

Silverstein, Michael. 1997. The improvisational performance of culture in realtime discursive practice, in Sawyer, R. K. (ed.), *Creativity in Performance*, pp. 265–312. Greenwich, CT: Ablex.

Vygotsky, Lev S. 1987. *Thought and Language*. Edited and translated by E. Hanfmann and G. Vakar (revised and edited by A. Kozulin). Cambridge: MIT Press.

Figures, Tables

FIGURE 1. “Rising-in-hollowness” gesture with “he goe[ss **up through** the pipe] this time.” Used with permission of University of Chicago Press. Computer art in Figs. 1, 4, 6 and 7 by Fey Parrill, now on the faculty of Case Western University.

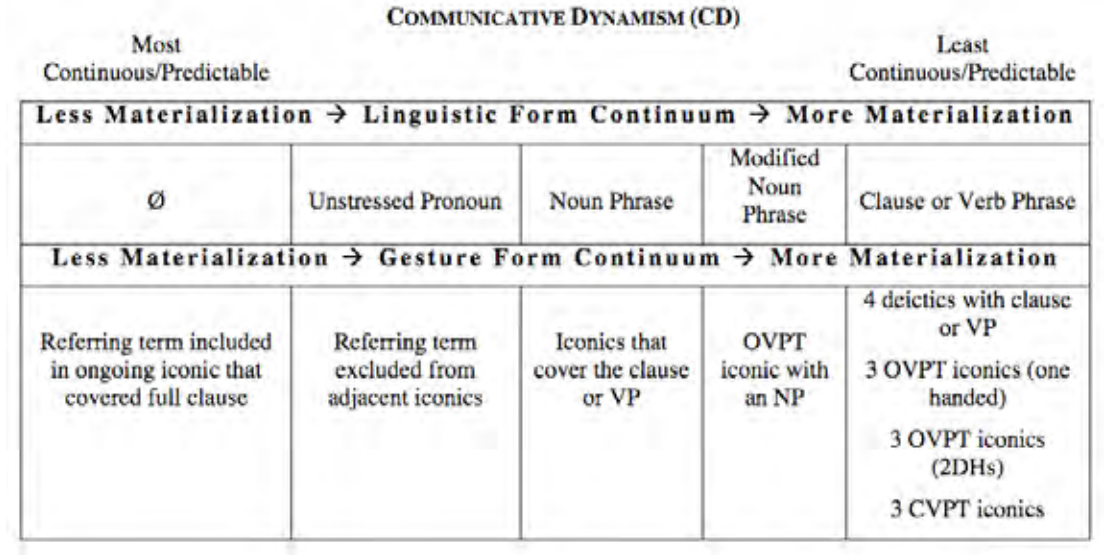


FIGURE 2. Communicative dynamism. From McNeill 2005, p. 55. Linguistic continuum based on Givón 1985. Used with permission of University of Chicago Press.

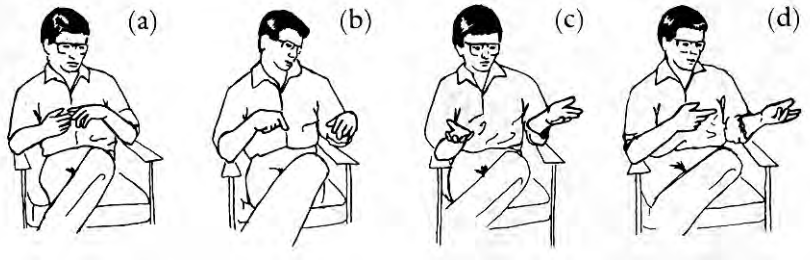
<table>
<tr><td colspan="4"> 
</td></tr>
<tr><td>“[they’re sup]posed to be the good guys”</td><td>“[but she] really did kill him”</td><td>“and [he’s a] bad guy”</td><td>“[but he really] didn’t kill him”</td></tr>
<tr><td colspan="2">Chronotope 1: Heroes</td><td colspan="2">Chronotope 2: Wicked</td></tr>
<tr><td>R = Appearance</td><td>C = Reality</td><td>C = Appearance</td><td>R = Reality</td></tr>
<tr><td></td><td colspan="2">Economy of motion: hands stay in C</td><td></td></tr>
<tr><td colspan="4">Figure 3. Spatial discourse units during a film retelling. Used with permission of University of Chicago Press. Art by Laura Pedelty, now on the faculty of University of Illinois Medical School.</td></tr>
</table>

Fig. 4.1. **C1** KITCHEN gesture with "so you're in the kitchen."

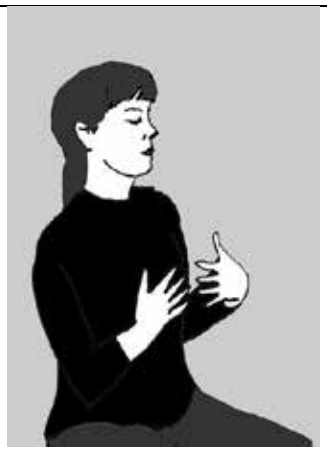


Fig. 4.2. **C2** FRONT DOORS gesture with "when you enter the house.".

Fig. 4.3. **C3** FRONT STAIRCASE/SECOND FLOOR gesture with "to the second floor.".

Fig. 4.4. **C4** BACK STAIRCASE gesture with "there's a back staircase that winds around like this."

Figure 4.5. **C3**+**C4** BACK STAIRCASE+SECOND FLOOR gesture with "and puts you up on the second floor."

Table 1. Hierarchy of purposes.

WHY? To locate the back staircase (1.1) **C1**

[so **you're in th**e kitchen]

WHY? Ways of getting to the second floor (1) **C4**
['n' then there's a **s<sss>***]
[the **back stairc***]

WHY? To note the existence of the first staircase (1.1.1)

[I **forgot to say**]

WHY? To restart the tour (1.1.1.1) **C2**

[when you come **through** the*]

[when yo**u ente**r the house from the front]

[an**nd you**<ou> **open**n the doors with t][he*]

[<uum**m> %smack /]**

[/ **the glas**][s **inn them #**]

WHY? To explain first staircase (1.1.1) **C3**

[there's a*

the **front staircas**e] [runs

right up there

o][n* on yo**ur lef**t]

[so you can go **straight up**][**stair**]

s to th**e se**][ec**ond floo**][r fro**m the**re]

[if **you wan**nt]

WHY? To locate the back staircase (1.1) **C1**

[but if **you come around throu**gh the ki]

[tch**en into t**he bac][k

WHY? Ways of getting to the second floor (1) **C4**
there's a back s sta]
[ircase th**at winds around like th**is]

WHY? To connect to the second floor (1.2) **C4+C3**

[and **putss you up on the second floor**]

Table 2. Correspondence of Catchments with the Discourse Purpose Hierarchy.

Catchment	**Purpose Level**	**% Gests answering WHY?**
C1 RH above knee <kitchen> <connect>	1.1 or 1.2	100%
C2 BHs spread apart in front of chest <front doors>	1.1.1.1	100%
C3 LH rises up and forward <front stairs> <2nd floor>	1.1.1	100%
C4 RH rises and twists <back stairs>	1	100%

Table 3. Intonation Boundaries of the Four Catchments			
Catchments in Table 1 (in order of hierarchical level)	**Discourse Level in Table 1**	**Number of Low Tone Boundaries**	**Number of High Tone Boundaries**
C4 RH rises and twists <back stairs>	1	3	1
C1 RH above knee <kitchen> <connect>	1.1 or 1.2	3	–
C3 LH rises up and forward <front stairs> <2nd floor>	1.1.1	2	5
C2 BHs spread apart in front of chest <front doors>	1.1.1.1	1	6
Used with permission of John Benjamins Publishing Company, Amsterdam/Philadelphia.www.benjamins.com.			

Table 4. Break Index Values

BREAK INDEX VALUES						
Catchment	**0**	**1**	**2**	**3**	**4**	**Number of Breaks**
C1 Kitchen	0%	82%	9%	9%	0%	11
C2 Front Door	4%	57%	17%	13%	9%	23
C3 Front Staircase	4%	68%	12%	4%	12%	25
C4 Back Staircase	19%	58%	0%	4%	19%	26

TABLE 5. Distribution of beat gestures accompanying references made with full noun phrases in narration of film

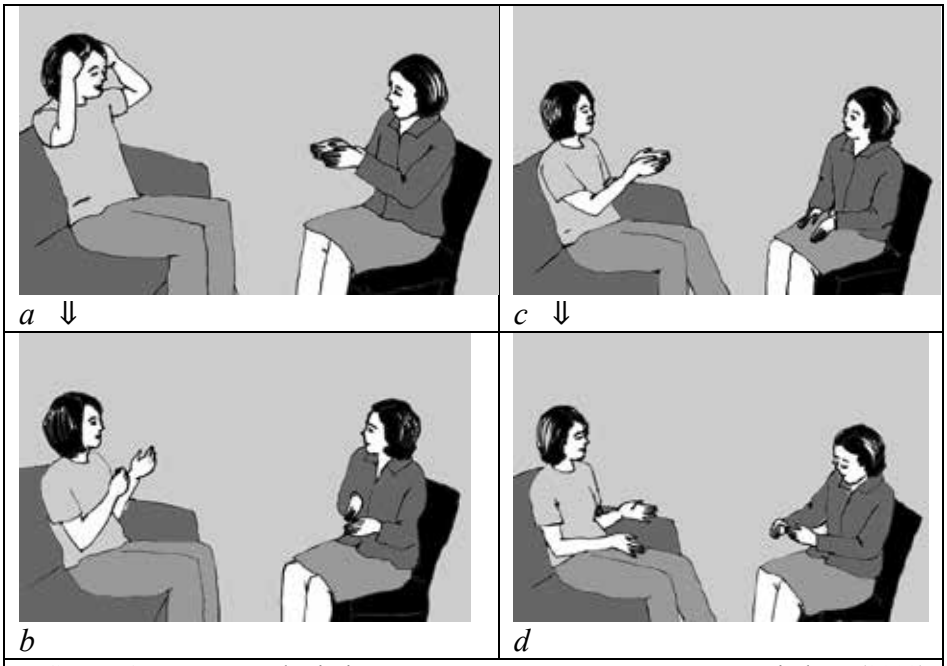
English			
Position in episode unit	+Gesture	-Gesture	Total number full noun phrases
Position 1	22	13	35
Position 2-last	17	47	63
Georgian			
Position 1	12	3	15
Position 2-last	18	78	96

From Levy & McNeill (1992). Used with permission of Taylor & Francis.

TABLE 6. Distribution of pointing gestures accompanying references made with proper names in a comic book narration (English)			
Position in episode unit	+Gesture	-Gesture	Total number of proper names
Position 1	6	1	7
Position 2-last	4	14	18
From Levy & McNeill (1992). Used with permission of Taylor & Francis.			

FIGURE 5. Jahai (Laos) lip point. From Enfield (2001). Used with permission of John Benjamins Publishing Company, Amsterdam/Philadelphia.www.benjamins.com.

TABLE 7. Mr. A - Mr. B conversation snippet.	
Mr. A	**Mr. B**
Q**A**6 how do you like Chicago compared to	
Q**A**7 did you [go to school thére] or uh	
points to shared space	
	R**B**7.1 I did go to school [there]
	points to shared space
	R**B**7.2 [I went to school hére]
	points to left
	R**B**7.3 [álso]
	circles to left
uh-huh	
	R**B**7.4 [I]
	points to shared space
	R**B**7.5 [/ um]
	points to left
	R**B**7.6 so I [came back]
	points to shared space
oh, uh-huh	
	R**B**7.7 [kind of /]
	points to right
Q**A**8 an' [you wént to undergraduate hére or ..... (A's gesture held) .....]	
points to shared space	
	R**B**8 [in Chicágo] át, uh, Loyola
	points to shared space
óh óh óh óh óh I'm an óld Jésuit Boy mysélf / / unfórtunately	
Used with permission of Cambridge University Press.	



a ⇓ *c* ⇓

b *d*

FIGURE 6. Interpersonal mimicry**.** From Kimbara (2002)

Panels a and b. Speaker on right: describing the line as 'irregular'; her gesture depicts lines of waiting passengers; the separation of her hands may depict the density of the crowding. Speaker on left: in (b), hands entering the gesture space and preparing to perform gesture in panels c and d.

Panels c and d. Continuous with panels a and b. Speaker on left mimics right speaker's two-lines gesture as she emphatically agrees ('yes, yes, yes, yes'), including absolute direction (in both figures, the hands are moving toward camera). Meanwhile, in (d), right speaker is preparing her next gesture.

Panel 1. Mimicry by learner (on left)

Panel 2. Appropriation by learner (left)

FIGURE 7. Embodiment in two bodies. Used with permission of University of Chicago Press.

FIGURE 8a**:** Ella**:** " on the-"

FIGURE 8b: Ella: "on television"

FIGURE 9a: Father : "on the television?": Ella's gesture is a hold from the previous gesture.

FIGURE 9b: Ella: " the Trucks": both hands wave in air while maintaining hold from previous gesture.

FIGURE 10: Ella: "got Trouble with Trucks mum".

Figures 8-10 from Forrester video on CHILDES. Used with permission of Michael Forrester.

NOTES

[1] Wallace Chafe (pers. comm.) suggested the term "newsworthy." We often use "field of meaningful oppositions" for the context, to emphasize the role of differentiation.

[2] ToBI coding by Karl-Erik McCullough.

[3] Another analysis (Fowler, Levy and Brown, 1997) showed a tendency for narrators to shorten expressions referring to characters when they were second mentions in an episode, and to lengthen expressions that were first in an episode and followed a mention in an earlier episode. Overall, expressions that occurred first in an episode averaged 536 ms in duration and expressions that occurred second in the same episode 495 ms; expressions that occurred last in a previous episode averaged 491 ms. The analysis was based on the four film narrations studied by Levy and McNeill (1992) and two others of the eight originally collected that also provided a sufficient quantity of word pairs to measure.

[4] Using Silverstein's notation and transcription: Q = question, R = reply; A = by Mr. A, B = by Mr. B; numerals = position in sequence in Silverstein (1997) with subdivisions of R**B**7 to indicate gesture space uses.

[5] And this offers an explanation (discovered by Liesbet Quaeghebeur, pers. comm.) of the curious phenomenon of tip of the tongue contagion – one person cannot recall a common word whose meaning is clear and you, the interlocutor, suddenly also are unable to recall it. If conversation includes "mind merging," it could also include "tip-of-the-tongue merging" through spontaneous mimicry.

[6] Trouble With Trucks from Thomas and Friends television show (Thomas the Tank Engine).