Imagery in Motion Event Descriptions: Gesture as Part of Thinking-For-Speaking in Three Languages
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IMAGERY IN MOTION EVENT DESCRIPTIONS: GESTURES AS PART OF THINKING-FOR-SPEAKING IN THREE LANGUAGES[1]

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My approach to language is via the nonverbal as well as the verbal. I start from the premise that language is more than speech; that it is also gesture, and examine the gestures that co-occur with speech. Gestures, although they may seem accidental and peripheral, are components of speaking itself. By studying gestures in conjunction with speech we gain new insights into the nature of language and communication, how we produce speech, and how we use it in thinking. Basically, we discover that language is not purely words, phrases, sentences — it is also imagery: it has a global, instantaneous component that is as defining of language as is the familiar linguistic component.

What Kinds of Gestures Do I Mean?

This can be explained by reference to a continuum of gestures originally described by Adam Kendon (1981):

Kendon's continuum:

speech-synchronized —> linguistically-indexed—> emblems —> sign language gesture

semantic-pragmatic synchrony	gesture offset	rhetorical synchrony	without speech

Gestures are not identical across this continuum. Semiotic type, relationship to language and function all differ. I will focus on one end, gesticulation, and exclude the other types; this is a strategic limitation, valid for the time being. Gesticulations are highly frequent and should be distinguished from the other types of gesture that are rare in the forms of narrative discourse that I examine and require separate treatment in any case because they line up in time with speech in different ways:

- Rhetorical gestures (so-called EMBLEMS, Morris, et al. 1979, of which 'thumbs up' and 'OK' are examples) are temporally decoupled from speech, even spanning speech and silence and speaker turns (Kendon 1995).
- Linguistic indexing (or LANGUAGE-LIKE gestures, such as saying, *it was this big* followed by a gesture) shifts the timing so that the index (*this*) precedes the gesture (rather than coincides with or follows it, as is typical of unwitting gestures; Nobe 1996).

Speech-sychronized gesture is different. The gesture and the co-expressive speech are synchronous. An example of such synchrony is the following:

(1) *he grabs a big [oak tree <u>and</u> **bends it way** <u>back</u>] ...*

right hand rises up and moves to the front, palm turned to face the right; it waits; it moves back and down; it waits again; the gesture ends.

The brackets show when the hand was in motion; the boldface shows the STROKE— the meaningful part of the movement performed with 'effort' or purpose; underlining shows HOLDs— momentary cessations of movement to guarantee synchrony, the hand held in midair prior to and just after the stroke (Kita 1993). The stroke was executed precisely with the semantically co-expressive speech content, 'bends it'.

The prestroke hold is the crucial part of this example. The speaker's hand rose upward and forward during the preparation phase (the left bracket) for no other reason than to position it for the stroke. Yet the hand waited to start this stroke while the discourse marker, the conjunction *and* (meaning here that the following continues what came before), was uttered. Then, with this linkage to the discourse encoded, and only then, the stroke occurred. In other words, the speaker withheld the stroke until it could synchronize with its co-expressive speech. Such close synchrony strongly suggests the existence of a single integrated meaning process that has two components, the linguistic categorial (found in words) and imagery (realized in gesture). (The poststroke hold has a different meaning: that the content of the gesture was still valid during the word *back*, even though the movement of the arm had ceased.)

This example also demonstrates that gestures are not semantic imitations of speech — they are 'co-expressive' rather than redundant. The gesture showed that the speaker visualized the object being bent back as fastened at one end. In speech the verb phrase *bends it way back* could ambiguously describe bending an object held at both ends. The adverb *way* may have as an implicature that the object was fastened at one end; but this is implicature, not direct demonstration, as in the gesture. Speech and gesture typically express different aspects of the same meaning unit and comprise together a more complete meaning unit than either does alone. The gesture stroke went beyond speech to provide an imagistic representation of the event.

Gestures in Motion Event Descriptions.

Using this broader conception of language, I will compare the speech-gesture systems that appear to be engaged when describing motion events (viewed in an animated Tweety & Sylvester cartoon) across three languages—English, Spanish, and Mandarin Chinese. Such a comparison sheds new light on the phenomenon of thinking-for-speaking—thinking generated, as Slobin says, because of the requirements of a linguistic code (Slobin 1987). According to Talmy (1985, 1991), each language has a characteristic way of packaging motion event components, with languages falling into two broad classes: SATELLITE-FRAMED vs. VERB-FRAMED, depending on how the PATH component is packaged. English and Chinese are satellite-framed, meaning that path is coded in a particle or adjunct to the verb, like

down. Spanish is verb-framed in that path information is bundled into the verb itself.

MANNER and how it is presented is a second important difference associated with this typology. In contrast to path, manner in satellite-framed languages is encoded by the main verb. In a verb-framed language, manner is packaged outside the verb and introduced constructionally. Slobin (1996a) has commented on one effect of this typological difference, that novels written originally in English lose as much as half of their manner coloration in Spanish language translations, presumably because including manner is highly marked in Spanish and is accordingly used sparingly (as we will see, English has its own means of achieving somewhat similar effects).

Paths in English and Spanish.

In English, path content in gesture often involves synchrony with path content with satellites. In Spanish, on the other hand, path content is timed with verbs. The following examples illustrate the patterns; first, two English-language examples:

(2) *and Tweety Bird runs and gets a bowling*

b[all and drops ***it down*** *the drainpipe]*

When there are successive path gestures, the strokes line up with path satellites whenever possible (from a different speaker):

(3.1) *[but it* ***rolls]*** *[****him out*** *]*

(.2) *[****down****]*

(.3) *[the* ***rain****spout]*

(.4) *[****out*** *into the sidewalk]*

(.5) *[****in****to a bowling] alley*

Each gesture, semantically co-expressive with the path segment it accompanied, conveyed a different step in a complex trajectory that Sylvester followed as he left the drainpipe with the bowling ball inside him, rolled down a street, entered a bowling alley, and was heard to knock over bowling pins after a short delay.

Spanish does not break complex paths into segments. Rather, a complex gesture unfolds without breaks, as in the following example. In one continuous motion the speaker traces the curvilinear route that Tweety followed escaping from his cage:

(4) *y* ***[sale volando]***

and [exits flying]

'and flies out'.

hand moves back, down, arcs left and curves upward and forward, all in one continuous movement.

This contrasts with the highly segmented route shown in the English-language example.

Manner in English and Spanish.

We also see manner in the English *rolls him out down the rainspout* example. The hand rotated and the fingers wiggled while the hand also was moving outward to convey the path component. Thus, both path and manner appeared in synchrony with the manner verb.

In the next example, on the other hand, there was the same verb, but the gesture lacked any manner content and did not synchronize with the verb. The gesture, rather, coincided with the path element *down* and the GROUND element *the drainspout* (via the hold), but skipped the verb:

(5) *[and he rolls ... **down** <u>the drain</u> spout]*

loose A hand plunges straight down: path content only.

Thus the situation in English appears to be the following: English speakers seem to use gesture to highlight manner in the verb or to downplay it. In this way, manner can be highlighted with ordinary FIRST TIER manner verbs, verbs of minimal inherent marking whose manner component is brought out via the gesture.

In Spanish, we find somewhat the opposite picture — cases where gestural manner blankets a whole motion event description like a FOG. Although Spanish speakers tend to omit manner from their speech, as observed by Slobin and illustrated in the following example[2], in their gestures manner are present throughout the description of an entire episode.

(6.1) *e entonces busca la man[era **Silent Pause**]*[3]

and so he looks for the way

'and so he looks for a way'

Gesture depicts the shape of the pipe: ground.

(.2) *de entrar [**se mete por el**]*

to enter REFL goes-into through the

'to force himself into the'

Both hands rock and rise simultaneously: manner and path (left hand through *mete*).

(.3) *[**desague** ... si?]*

drainpipe ... yes?

'drainpipe ... right?'

Right hand continues to rise with rocking motion: path + manner.

(.4) *[desague entra]*

drainpipe enters

'enters the drainpipe'

Both hands briefly in palm-down position (clambering paws) and then rise with chop-like motion: path + manner.

Manner in gesture (a climbing motion) appeared throughout this description. A line-by-line transcription cannot reflect the continuity of the manner coloration. Basically, the hands displaying a clambering style of ascent never stopped their motion. This flexible application of manner in gesture is a widespread pattern in the Spanish narrations we have recorded.

It is likely that the existence in English of verbs with obligatory manner content sets the stage for a speech-gesture system focused on lexical manner. The 'problem' that English speakers face is when manner is not highlighted in their semantic intentions but they still find themselves using a manner verb, like "rolls". Verbs like "stumble" or "plod", verbs of the kind that Slobin calls Tier 2 verbs, are strongly marked for manner. If such a Tier 2 verb is selected in speech it almost certainly reflects the speaker's semantic intention. But Tier 1 verbs, those like "rolls and "climbs", are less marked. Less marking means such verbs also could also be used just for their motion content. One might say "rolls" and really only mean that something is moving. At other times, though, manner content may in fact be intended. With Tier 1 verbs, therefore, there is a problem of using a manner verb when manner is not intended and distinguishing it from when manner is intended.

This problem is solved by gesture. If semantic intention includes manner, a manner gesture reinforces the manner verb (as in the first "rolls" example). If intention doesn't include manner, no manner gesture is performed; rather, there is a gesture highlighting some other motion event component -- path, for example (as in the second "rolls").

Unintended manner is not a problem for Spanish speakers. For them the 'problem' is intended manner and how to incorporate it, since it is not usually built into the verb. A Spanish speaker may intend manner but steer clear of introducing it for stylistic reasons. It may be complicated and/or infelicitous to add it to speech. But, just as in English, when manner is part of the semantic intention it can emerge in gesture. However unlike English, Spanish need not focus gestural manner on linguistically encoded manner.

Imagery with respect to manner can thus move in opposite directions in English and Spanish —in English, gestural manner highlights manner in speech by focusing on the verb; in Spanish, manner can spread (diffusely) over an entire episode. Thus the typological contrast between English and Spanish influences how manner imagery is formed and related to language in thinking for speaking.

The English example in (3) involved one verb, *rolls*, applied to an entire path. This verb extended over the path regardless of several implicit boundaries—Sylvester leaving the pipe, entering the sidewalk, and entering the bowling alley. As is characteristic of satellite-framed languages, according to Slobin, boundaries, although signaled by prepositions, do not penetrate deeply into the formulation of English sentences—as, indeed, this ability to cover different boundaries with a single overt verb displays. In Spanish a new verb would be required after each boundary crossing. Thus another aspect of moving along paths is what occurs at boundary crossings. Gestures also signal BOUNDARY crossings. They do so by adding movements or changing rhythm and/or direction when the boundary is crossed. When do speakers of English and Spanish do this? Speakers of both languages register boundary crossings in gesture form, but there seem to be differences in when and how they do it.

In the following English-language example (from a different speaker) the first gesture indicated rolling, the two hands circling around each other in opposite phases. The second broke this pattern, the two hands rising up and moving forward together in phase. The effect was hopping over an imagined barrier even though no such barrier appeared in the stimulus:[4]

(7) *[and he **rolls on down**] [into **a bow**<u>ling all</u>]ey*

(1) (2)

1. hands circle alternatingly around each other (opposite phase).

2. hands move in unison and rise upward (in phase).

Note that the in-phase boundary gesture at (2) synchronized with *a bowl-ing*—the object entered—not with *into*, the preposition indicating movement toward a goal. This same speaker had previously described Sylvester leaving the pipe and before that had described the bowling ball entering Sylvester—two other boundary crossings. However, only the bowling alley was marked as a boundary gesturally. Arguably, it temporarily became for this speaker both a locus and a designated bar-rier. Why should this be so? A clue is that the preposition *into*, which also might have indicated the boundary, did not get the gesture; it conveyed goal orientation but not the boundary crossing as far as the gesture was concerned. The implication of this clue is that the goal of reaching the bowling alley itself created the idea of a boundary to be crossed. That is, the idea of the boundary was not primary, but was dependent. To the speaker, these were distinguishable concepts ordered temporally and causally. The gesture marked the dependent boundary and not the licensing goal. The two previous boundary crossings did not include reaching a goal—they were way-stations—and there was no gestural marking of a boundary with either of them.

This situation of a dependent boundary differs from the status of boundary crossing gestures in Spanish. In this language, boundary information seems to be regarded as more primary and is more widely present in gesture form. Rather than restriction to final goals, we observe examples in which gestures differentiate the

phases of boundary crossings—suggesting a considerably more elaborated system for thinking about boundaries. In the following, the speaker depicted in his gesture Sylvester entering the drainpipe. The gesture showed, in typical unbroken fashion, the curvature of the path as Sylvester entered the pipe, but there was first an initial dip of the hand that appeared to convey both crossing the boundary and the idea of Sylvester effortfully wadding himself into the pipe:

(8) *pe[ro se mete* **por** ***dentro*** ///]

b[ut REFL he-puts **through inside** ///]

'but he goes inside'.

hand first dips down and then moves across body and up, for the ascent.

This was immediately followed by a second description in which the hand again moved up but with, this time, a reduced dip for the boundary:

(9) *[o sea* ***él va*** ***así*** ***adentro*** *]*

[or it-is **he goes** **like-this** **in**side]

'I mean, he goes like this inside'.

flat hand, fingers pointing diagonally up dips down slightly then up.

The difference between (8) *se mete por dentro* and (9) *él va así adentro*, as described to me by two fluent Spanish speakers,[5] is that the two descriptions and their gestures reflected two phases of the boundary crossing—first passing through, and then having passed by the boundary. One gets the hint here of the salience of boundaries for speakers of Spanish, as distinguished from their more dependent importance for speakers of English.

Summary of English and Spanish.

The typological differences between satellite-framed and verb-framed languages have implications for the linking of gestures with the linguistic code. These effects show a linguistic influence on the imagery (visual, actional) generated during speech:

- Path is visualized as increments in one language, as nearer to an approximation to actual motion in the other. Paths are broken into segments correlated with path particles and prepositions in English. They are undivided wholes correlated with verbs in Spanish.

- Manner is concentrated at specific points in one language, is a coloration capable of being diffused over entire episodes in the other. Manner is used focally in English. It can form a manner 'fog' in Spanish.

- The visualization of boundaries is less elaborated in one language than in the other. Boundaries in gesture are dependent in English, linked to goals that may have already been introduced. Boundaries in Spanish may be more nearly universal and differentiate phases of boundary crossings.

Motion in Chinese.

Finally, we reach Chinese and find yet another thinking-for-speaking pattern involving imagery.[6] While English and Spanish motion event gestures focus on predicate elements (*rolls out, drops down*, etc.), we find in Chinese examples in which the gestures depicting motion events are synchronized with constituents not normally regarded as part of the predicate. An example is the following:

(10) *lao tai-tai [na -ge* ***da bang hao]*** *-xiang gei ta da-xia*
old lady hold CLASSIFIER big stick seem CAUSE him hit-down
VERB-SAT

'The old lady apparently knocked him down with a big stick'.

The gesture showed a downward blow but the blow accompanied the phrase meaning a big stick, not the phrase meaning hit-down. The hand then fell to the rest position, the gesture clearly over, and the verb-satellite (*da-xia*), when reached, was destressed, as if its semantic content had been already presented. As Duncan observes, it is as if the gesture had moved forward in the surface speech stream, toward the position characteristic of the TOPIC setting in Chinese speech, although no formal marking of topic was present. Alluding in this way to the typological distinction of topic- versus subject-prominence (Li & Thompson 1976, 1981) Duncan and I have called such combinations 'topic-like.'[7] We take this pattern to be a possible thinking-for-speaking mode available to Chinese speakers. In this mode, we imagine, the speaker thinks in terms of a frame that we can gloss something like, 'as for the blow given with a stick', and then move on to articulate this frame in the actual verb phrase, *da-xia* 'hit-down', destressed. In this case, the verb-satellite construction articulated the same content as the gesture but this does not mean the gesture+big stick combination was not topic-like (it means that the speaker did not follow through with fresh content about this speech-gesture 'topic'[8]). Other examples, moreover, do include explicit topic indicators while, like the above example, having gestures that appear in advance of the predicate. The following is an illustration (from McNeill & Duncan to appear):

(11) ***[mao ne*** ***/] [zai da jie shang] / gun-dong***[9]
(1) (2)
cat TOPIC-MARKER / at big street top / roll-move
'as for the cat, he / rolls around / on the roadway'.
1. Gesture shows rolling.
2. Gesture shows sweeping back and forth.

The gesture in (1) with *mao* 'cat' depicted Sylvester rolling; that is, showed an action not yet described in the speech flow. In this case, the reference was explicitly marked as a topic, glossed as 'as for the cat'. The hands made a second gesture in (2) with the reference to the roadway, and this combination was semantically co-expressive. The hands then returned to rest and the predicate *gung-dong* was uttered in destressed form. Thus, either with explicit indication of topic or without it,

gestures in Chinese can appear in topic-like locations and establish frames for later predications.

In English, too, gestures depicting events yet to be expressed in speech occasionally occur synchronized with other linguistic elements in the flow of speech, but when this occurs it is seemingly regarded by the speaker as an error to be repaired. Something like a minimal pair between English and Chinese exists in these examples. The following example from an English speaker does not show a speech-gesture combination being treated as a coherent topic-like package but rather as a combination in need of repair (despite the semantic appropriateness of pairing cause with effect):

(12.1) *[so it hits him on* ***the hea][d***

shows Sylvester sweeping to the right.

(.2) *and he winds up* ***rolling down the stre]et***

shows Sylvester sweeping to the right (larger).

The gesture in (12.1) showed Sylvester moving down the street and was paired with a description of the cause of this event (the bowling ball hits him on the head). The verb describing Sylvester's moving down the street, however, was not reached until (12.2). The pairing therefore was quite similar to that in the Chinese examples. The difference between the languages is apparent at the next step. Unlike the Chinese speaker, this English speaker, when she got out in front with her gesture and faced a violation of subject-predicate transformative semantics, held and then repeated the gesture in a larger version, as if reasserting the gesture when an improved placement for depicting a motion event had arrived in the speech stream with the predicate. Thus, an important difference between Chinese and English utterance dynamics is exposed by this contrast between seemingly similar speech-gesture combinations. Chinese speakers have available a thinking-for-speaking framework in which a speech-gesture combinations like stick-hit-down or blow-on-the-head-roll-down-the-street can be assimilated and be regarded as topic-like frames, but an English speaker had no comparable thinking-for-speaking framework.

Such examples suggest that English (and Spanish) speakers are committed to predication in the sense that they appear to feel a need to focus their motion event thinking onto the formal structures of predicates. Chinese in contrast, with its topicalizing style, provides a way to construct meaning packages that is lacking in English. This is to see the motion event itself as a discourse frame, with the verb-satellite structure relegated to afterthought status.

Possible mechanisms.

Gesture is geared to language and can thus be different in different languages. This is explained by positing a unit of mental processing in which linguistically categorized content and visuospatial content are related in the process of thinking and speaking. In this view of linguistic processing, we form mental units consisting of both visuospatial cognition and linguistic content. The speaker thus thinks in two forms of representation at once, linguistic and imagistic, and the thinking-for-speaking process brings these two kinds of representations together.

When languages differ in their structural and lexical possibilities, there is, in such an interactive system, the potential for an influence of language on realtime visual thinking. The nature of this simultaneous thinking in two modalities can be explicated from different points of view. Kita (to appear) has proposed that the function of representational gestures is to help get the 'organization of complex information into a message that can be verbalized within one formulation cycle' (p. 11). According to this hypothesis, the realtime influence of language on visual thinking arises from the adaptation of such thinking to the specific linguistic system in which gesture is performing its organizing function in utterances: the gesture is shaped 'so as to make its informational content as compatible as possible to linguistic encoding possibilities'.

A different slant on the mechanism takes the perspective in which an utterance is the outcome of a developmental process not unlike mental growth. This process begins in a GROWTH POINT and extends over the interval of time the utterance takes to be formed (centiseconds). A growth point is a type of idea unit encompassing both imagery and linguistic content and is proposed as the theoretical starting point of thinking-for-speaking (McNeill 1992; McNeill & Duncan to appear). The mixture of imagery and linguistic categorial content induces the development that results in both utterance and gesture. Kita's FORMULATION CYCLE appears to map onto this developmental process. According to the growth point hypothesis, the influence of language on thinking is via growth points. These differ across languages, implying different starting points of thinking-for-speaking.

Kita's hypothesis and the growth point hypothesis appear to be different perspectives toward the same underlying mechanism. In one (Kita), the perspective emphasizes the function of spatial-actional cognition while, in the other, it emphasizes that speaking, imbued with imagery, is a developmental process (a view based on Vygotsky's 1987 concept of microgenesis). In both perspectives, there is the idea that language is more than linguistic coding; that it includes visuospatial-actional representations—imagery—as an integral part.

Gestures as Material Carriers.

I will conclude with a further implication of this view: that gestures *themselves*, their performance as means of expression, is part of the speaker's meaning. If we entertain the broad question of why we perform gestures, several possibilities can be mentioned:

- Gestures are remnants of an early stage of the evolution of language capacity in our species (Armstrong, et al. 1995; Donald 1991).
- Gestures have communicative effectiveness (Kendon 1995; Streeck 1995).
- Gestures are an essential part of thinking. This explanation does not exclude the other two and I'd like to expand on it a bit.

To make a gesture is to bring a new idea into being on a concrete plane, just as writing out or speaking a word seems to have a similar effect. A Heideggerian echo in this statement is intended (Dreyfus 1994). Gestures are themselves thinking in one of its many forms — not only expressions *but components of thought, i.e.,*

cognitive being, itself. The greater the felt departure of the thought from the immediate context, the more likely its materialization in a gesture, because of this contribution to being, and thus to greater being. Thus gestures are more or less elaborated depending on the importance of material realization to the existence of the thought. The speaker who created a gesture of bowling ball going down was, according to this interpretation, creating a material carrier of her idea in gesture. This action — her thought in action — was a component of her cognitive being at that moment. There are deep and hitherto unexplored issues here, and possibly some contradictions, but considering gestures as material carriers of meaning, what we see through the gestural 'window' is the *creation* of meaning; a contribution in movement and space to actually bringing the meaning into being. Gestures as a window onto the mind thus offer new insights into the nature of human thinking with language.

Notes.

[1] The following individuals have collaborated on much of what is described in this paper: Susan Duncan, Karl-Erik McCullough, Lisa Miotto, Asli Ozyurek, Shuichi Nobe, and Nobuhiro Furuyama. The gestures in motion events research project is supported by a grant from the Spencer Foundation.

[2] Example provided by Gale Grubman-Stam and transcribed by her with further transcription by Karl-Erik McCullough.

[3] The stroke phase takes place in a silent pause. The pause marks a boundary between main and subordinate clause, and this is one possible source of this timing. Another possible source could be pragmatic, speech halting in part so that the listener may especially attend to the gesture that the speaker produces. Kendon (personal communication) believes that when speech halts like this, listeners have a tendency to shift their gaze to the speaker, and this could be such an occasion.

[4] I am grateful to Sue Duncan for this example.

[5] I am grateful to Lisa Miotto and Glenda Miranda for this description.

[6] This section is based on McNeill and Duncan (to appear).

[7] Chafe (1976) stated the sense of topicalization to which we allude: "What the topics appear to do is limit the applicability of the main predication to a certain restricted domain ... the topic sets a spatial, temporal, or individual framework within which the main predication holds." (p. 50; also quoted by Li and Thompson, 1976).

[8] We might have expected the speaker to continue on with additional predications within the blow-with-a-stick frame. But she interrupted her narrative immediately after our example, realizing that she had confused the order of events in the cartoon story. She broke in with an explicit self-correction: "wrong!", and then went on to straighten out the narrative.

[9] Transcription and translation by Susan Duncan.

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