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**GRAMMAR, GESTURE AND COGNITION:  
INSIGHTS FROM MULTIMODAL UTTERANCES AND APPLICATIONS  
FOR GESTURE ANALYSIS**

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The spontaneous gesticulation that accompanies speech is an integral part of the linguistic system. Movements of the body are made in conjunction with speech to produce meanings and perform a number of essential discourse functions. Gesture is 'gestural action' and gesture symbolism is dynamic, schematic and imagistic. Gestures don't just 'depict' but actually 'do things': they shape ideas and fuel thought; they describe or report scenes; they give directions; they expose, report, and sum up arguments; they achieve textual cohesion and regulate communicative interaction. Gestures are a window into the mind. As gestures are made, visible kinetic form is given to invisible mental representations and hidden cognitive mechanisms. As hands move within the gesture space, objects of conception are created, and cognitive processing is 'acted out,' using symbolic acts of pointing and manipulation. Key cognitive abilities are revealed in the process: the ability to construe ideas and events as objects and substances (conceptual reification); the ability to form image-schematic representations of 'things' and movements, and to use these iconically or metaphorically; the ability to make symbolic uses of space. Gestures are also found to play a central role in the expression of grammatical meanings and mechanisms. Thus grammar and gesture are clearly integrated in the expression of temporal dimensions, aspectual notions and modal stances. Gesture activity is also shown to be involved in the expression of concession and comparison. Finally, technical and methodological dimensions of gesture-analysis are discussed. The case is made for a new, creative approach to gesture watching – the 'language and gesture workshops' – where students may observe and physically explore co-speech gestures, develop their own choreographic variations, and work on sound, gesture and meaning correspondence.

*Key words:* gesticulation, discourse functions, mental representations, cognitive mechanisms, grammar.

**Introduction.** «The human infant», once wrote Birdwhistell, «is an amoral mass of wriggings and vocalizing» born into «a milieu of moral speakers and movers» [2, c. 8]. As language is acquired, the range of «noises» is restricted to a conventional repertoire of articulated sounds, while «body-motion communicational behavior» develops into culturally marked facial, gestural and postural expressions. Both the *kinesic system* and the *vocal system* seem to work together: spontaneous speech is synchronized with spontaneous movements of the body (*gestural action*). Speech and gesture are not only «co-expressive» [31], they are produced together «and must therefore be regarded as two aspects of a single process» [23].

This simple observation raises a number of issues. What is the precise contribution of gesture to speech? What is the function of gesticulation? Are gestures just *facilitators* that give a «helping hand» to verbal messages? Or do they play a crucial role in the construction of utterances? Do gestures add, bring out or emphasize elements of meaning that would otherwise be left unmarked? What are their *representational* properties? Are gestures made

for the benefit of others or for the benefit of the gesturer? What then are their *interactional* properties?



Fig. 1. Co-expressiveness of speech and gesture  
Multimodal negation in «NOBODY is trusting anybody!»<sup>1</sup>

Different lines of investigation may be pursued, bearing in mind that, although all gesture researchers work on «the relationship between speech and bodily movements» [21], most tend to look at matters from two distinct angles: a «cognitive-psychological» angle and a «functional-communicative» angle [13]. Broadly speaking, the cognitive approach looks at the way gestures *reveal* and *fuel thought* [32], while the functional approach looks at how gestures are used to perform *communicative acts* and to «regulate the organization of [conversational] interaction» [20]. Both lines of analysis may be combined into a single cognitive-functional frame [13], which looks at the *representational* and *discourse pragmatic* functions of gesture.

Whichever perspective is chosen, some description of *gestural form* is necessary. Most of the gestures that come under scrutiny are «the movements of the hands and arms that we see when people talk» [31]. The head movements, facial expressions and posture shifts that occur in conversational interaction have received far less attention, for practical rather than theoretical reasons<sup>2</sup>. When hand movements are analyzed, transcriptions normally include an identification of *hand presence* (right and / or left); an indication of *location in gesture space*; a description of *trajectory* and *movement patterns* (straight, curved, looped, circular, spiraling...), and a specification of *hand-shapes* (palm orientation, spread hand, pointing digits, etc). When gestures of the head are described—typically *head nods*, *head tilts* and *head tosses*—it is usual to indicate direction of movement (horizontal, vertical), iteration of movement (single, repeated), speed and fluidity of movement [13].

Also included in the study of gesture form is the division of gestural action into *phases*. Gesture units are best described as *gesture phrases* [19; 20] having peak structure: an *initial rest position*, a *preparation phase* leading up to a perceptually marked *stroke*, a post-stroke *hold*, a phase of *retraction* and a *final rest position*. The stroke is the central formal and meaning component of the gesture<sup>3</sup>. The word on which the stroke falls is conventionally marked in bold type. The phrasing of gesture is thus related to the phrasing of speech.

<sup>1</sup> CNN interview of financial expert Suzan Orman by Melissa Long (07.10.2008).

<sup>2</sup> Head nods; eye blinks; mouth, chin, nose, neck, brow activity; forehead expressions, etc. are less open to formal characterization. Birdwhistell [2, c. 8] notes «that the human face alone is capable of making some 250,000 different expressions». A small collection of «placement symbols» is deemed insufficient «to record the significant positions of the faces [he has] seen».

<sup>3</sup> In narrow transcriptions of gesture phrases, *onset*, *peak*, *duration*, *hold* and *end* are normally specified.

As can be surmised, gesture studies are concerned with an extremely wide range of phenomena, so practical choices have to be made. For present purposes, it seems appropriate to focus on the *manual gestures* that occur in conjunction with spoken language<sup>4</sup>. Although such gestures are *multidimensional* and *multifunctional*, priority will be given to their *cognitive dimension*. We will first examine how gestures mark «inner mental processes» [31], how they *give shape* to abstractions, how they allow speakers to make a symbolic use of hands and space. We will then consider the way in which grammar and gesture work together. Finally, we will show how the perceptual skills necessary for the study of gesture may be acquired in the digital age.

### 1. Gesture and conceptualization.

«The gestures that speakers produce along with their talk are symbolic acts that convey meaning» [12: 13]. The hand movements are «symbolic» in that they represent something else than just hands. The space in front of the speaker is also used symbolically: it represents something else than the speaker's space – «a fictional space, a narrative space that exists only in the imaginary world of the discourse» [31, c. 1].



Fig. 2. Symbolic use of hands and gesture space  
«If you're IN A SITUATION where you own stocks...»

As gestures are made, visible kinetic form is imposed on invisible thought processes and abstract mental representations [31]. This makes gesticulation a prime revealer of human cognition—a window open onto thought. Interestingly, gesture activity increases when the tasks of describing, reporting, explaining become more difficult, so «gesturing helps»: not only does it «reflect thoughts» but it «plays a role in shaping them» [12]. Gestures are not just «companions of spoken language» [5], they are also companions of thought<sup>5</sup>. «Joint realizations» of meaning—verbal and gestural—are performed in multidimensional space [32].

<sup>4</sup> The culturally marked gestures that may be used as utterances on their own are not included in this presentation («emblems»). Neither are the gestures used in alternation with speech.

<sup>5</sup> Gestures may also be revealers of developmental aspects of cognition and language acquisition. J.-M. Colletta, C. Pellenq [6] thus show how the use and distribution of co-speech gestures by French children aged 3-11 changes over time, as they engage in activities of «reporting», «describing», «explaining» or «arguing.»

Cognitive approaches to gesture owe much to McNeill's studies of the relationship between «hand and mind» [30] and «gesture and thought» [32]. Shifting the focus from the rhetorical and discourse pragmatic functions of gesture to the *conceptualizing* functions of gesticulation provides new insights into gesture symbolism. Gesture researchers are invited to consider the way gestures represent mental processes and salient «aspects of utterance content» in *schematic* form. The emphasis placed on the image-schematic properties of gesture [1; 4] has brought the questions of *iconicity* and *metaphoricity* to the fore. When the visual imagery produced bears a striking resemblance to physical form, what aspects of content are imitated? When imagery is transferred from a concrete source domain to a more abstract target domain, how does the *gestural metaphor* operate<sup>6</sup>, how is the metaphoric imagery physically enacted, how are postural and gestural images of abstractions created?

### 1.1. Gesture classification: the «Iconic-Metaphoric-Deictic-Beat Quartet»

Many schemes have been proposed to categorize gestures. McNeill and Levy's classification into *iconics*, *metaphorics*, *deictics* and *beats* [31; 33] is now solidly established among scholars working within the cognitive linguistics framework. It is important to stress that these are not «categories» in a strict sense, but rather «dimensions» of gesture symbolism which combine, since most gestures are «multifaceted» [32].

As their name suggests, the form of *iconic gestures* is evocative of content. *Iconics* are particularly frequent when concrete objects are described, directions given (with an indication of path of movement), physical actions explained or reported. Still, their «pictorial» quality is never such that it provides a detailed representation of content. Only salient or meaningful aspects of the referent are selected and schematized. Interestingly, iconic and metaphoric dimensions often combine. For instance, the manual symbols of compression that occur with «economic recession» or «contraction of trade» are both iconic and metaphoric. The construal of wealth and trade as masses of substance whose «amount» or «volume» may «expand» or «contract» is clearly metaphoric. Yet, the shadow manipulation of substance by the speaker-gesturer is iconic. The same can be said of the hand movements that accompany «investing» or «putting in money» in Suzan Orman's interview: an invisible container—which metaphorically stands for the economy, the stock exchange, a bank account, etc. — is iconically filled with an invisible substance (money).

*Metaphoric gestures* «construct homologies between abstract content and concrete imagery». As movements of the hands are made, «images of space, form and movement» are created that «become abstract concepts» [4, c. 178-179]. In the CNN interview, Suze Orman makes repeated metaphoric uses of finger counts, pointing gestures and hand sweeps. Different loci for times, states and events are established in different areas of the gesture space. *Changes* (of time, topic, focus, condition, etc.) are represented as *movements* from one point / area to another. The added modalities of speed, scope, orientation, are also used metaphorically to integrate a variety of meanings: suddenness, magnitude, impact, increase,

<sup>6</sup> A. Cienki, C. Müller [5] define gestural metaphors as «movements of the hands that represent or indicate the source domain of a metaphor.» Their discussion includes a description of a sculptured representation of Lenin's outstretched arms, metaphorically pointing ahead towards the future. They note that «verbo-gestural metaphors» may be «semantically co-expressive with speech but temporally detached from the verbal metaphor.» In some cases, the gestural metaphor comes alone, «which offers further support for the psychological reality of conceptual metaphors independent from the existing data based of spoken and written examples».

decrease, temporal distance (from now), past, present or future circumstances, return to normal, leaps into the unknown, etc. Interestingly, there is often «an iconic component» in the gesture form [32]: as «the stock market goes up» or share indexes «slide», Sue Orman's hands accompany the metaphoric moves. Obviously, this is a form of imitative behavior: the speaker-gesturer enacts the spatial metaphors CHANGE IS MOTION, STATES ARE LOCATIONS, MORE IS UP, LESS IS DOWN [24].



Fig. 3. Combining iconic, deictic and metaphoric dimensions ...  
even though you may see interest rates CONTINUE TO GO DOWN...

A great deal is to be learnt about cognition and symbolic activity from the study of *deictic gestures*. Gestures with a pointing component are extremely frequent in speech. Although extended index fingers are typically used to point to places and things in the concrete world, other extendable body parts may be involved: arms and elbows, hands and fingers, heads, noses, chins, feet, etc. More importantly, pointing often has a more «abstract» quality [31]: fictive objects of conception (ideas, events, processes) are located and designated in the surrounding space as if they were present to the senses. This often occurs in narrative, expository or argumentative discourse. Kendon [20] aptly sums up the cognitive and functional properties of pointing:

What is pointed to can be actual objects in the world that surrounds the participants (actual object pointing), objects can be pointed to that can have a physical location, and do, but are not immediately present (removed object pointing), objects that can have real locations in space, but which are not present but which are given locations for the purposes of current discourse (virtual object pointing), and then there can be pointing to things that cannot in fact have any sort of object status at all and can have no location (metaphorical object pointing).

Finally, *beat gestures* are « flicks of the hand(s) that seem to 'beat' time along with the rhythm of speech» [32]. Their meanings are multiple and complex.

### 1.2. Gesture and the symbolic use of space

Iconic, metaphoric and deictic gestures invest the speaker's «gesture space» with «conceptual significance» [31]. Technically, the *gesture space* is the limited area in front of the speaker where most of manual gestures are produced. That area is the locus of conceptualization. It is the place where *invisible objects of conception* are formed and referred to, where cognitive processing is equated with manual activity, where concepts are reified and turned into blobs of substance or bounded entities, where the abstract domains

of time, experience, meaning, etc. receive extensionality and location. But most of all, the gesture space is *multidimensional*. It is the *social/communicative space* where speaker interaction takes place, the *temporal and narrative space* where events can be placed, linked and pointed to. It is the *cognitive space* where construal operations are performed, epistemic stances taken, points of reference and mental spaces set up [42] in a mixed manual-verbal mode. Finally it is the *discourse space* where boundaries are set, cohesive links established, oppositions created (to distinguish between direct and reported speech, topic and comment, participants and settings, etc.).

**Conclusion.** Gesture symbolism arises out of gestural action performed in multidimensional space. The verbal-gestural process that enables speakers to construct and present meanings is both dynamic and imagistic, concrete and abstract, content-oriented and function-based. Visible gestural action is taken to create schematic images of concepts, to move metaphorically along the «lines of thought,» and to weave the invisible «threads of discourse». Although gesticulation does not reduce to conceptualization, it does reveal (or confirm) some essential cognitive abilities, such as the ability to schematize, to entify, to reify, to spatialize, to project conceptual structure, to establish relationships [27]. But more than anything else, the evidence provided by gesture firmly establishes that our conceptual systems are not just embodied but literally manifest themselves «in the flesh» [25].

## 2. Grammar and gesture

What is the relationship between gesture and grammar? How do the recurrent hand, arm, and head movements that we observe during speech correlate with grammatical form and meaning? Are the gestures routinely used to *express content* or *negotiate interaction* [42] also used for the *multimodal expression* of grammatical notions and processes [11; 13]? There are some good reasons to believe so. When negating or making strong assertions, when expressing uncertainty or tentativeness, duration, repetition or progression, when referring to past or present circumstances, when setting up causal links or reversing the course of an argument, speakers typically produce gestures. These may be regarded as *overt physical manifestations* of modal stances, aspectual contrasts, deictic pointing<sup>7</sup>, causality and concession, etc.

Are the co-expressive gestures fully or partly grammatical? What is their exact contribution to grammar? Do the gestures *add* new dimensions of meaning or just *bring out* existing features in grams? Are the features central or peripheral, unidimensional or multidimensional? Is gestural imagery merely *depictive*—its gives shape to hidden dimensions of the speaker's mental grammar? Or is gestural action *performative*—it actually «does something,» it «performs» vital communicative and representational functions [23]? The issues are challenging. They challenge mainstream conceptions of gesture, which tend to rule out the existence of a *grammar-gesture nexus*. They challenge linguists to revisit their conceptions of grammar.

**2.1. Convention vs. idiosyncrasy.** From a cognitive linguistics perspective, grammar is inherently *symbolic* [26; 28] in that it provides semiotic means for the *conventional*

<sup>7</sup> E. Sweetser [42] discusses gesture in relation to viewpoint and deixis. She notes that «speech is evidently lacking in indexing precision compared to gesture; *this one* and *that one* may need a supplementary gesture of pointing, but the point does not need a supplementary *this* or *that*».



Fig. 3. Deixis

«What should they do RIGHT NOW then?»



Fig. 4. Concession

«... eventually you're going to be ok. HOWEVER...»

*symbolisation of experience* and the codification of *construal* [26; 27; 28]. The means are clearly verbal *and* non-verbal, phonological *and* gestural [10]. The perspective is integrative: both voice and gesture operate jointly in the articulation speech and the construction of meaning. Yet, integration and co-activation should not mislead us into thinking that the verbal and co-verbal coding systems operate under similar rules. Whereas the speech community exerts tight control over the articulatory rules of speech production and the morphosyntactic rules of utterance formation, greater freedom of expression is tolerated in the field of gestural expression. True, different grams and syntactic arrangements are available to code different dimensions of grammatical meaning. Yet, «standard» patterns and morphemes are routinely used by speakers to express established grammatical notions, categories and processes, such as «negation», «positive assertion», «aspect» (perfective or imperfective), «uncertainty / tentativeness», «necessity», «deictic reference», «comparison», etc. The standard grammatical code functions as the *common social code* [40], allowing little interpersonal variation among its educated users. This makes grammatical form rule-governed and highly predictable. No such norms apply to gesture. Various gestures may synchronize with a single grammatical construction. No rule seems to be the rule, since constant interpersonal variation can be observed everywhere. There appears to be no one-to-one correspondence between gram and gesture, no simple isomorphism, *no established*

*gestural repertoire for grammar*. Even more perplexing is the fact that, in a given conversational setting, the same speaker may synchronize a given grammatical construction with different gestures. So, assuming that grammar finds some kind of semiotic expression in gesture, the characterisation of the interplay between grammar and gesture remains elusive.

Yet, none of these contradictions and impracticalities should deter linguists from *cracking the grammar-gesture code*. For the truth is plain: there are observable gestural manifestations and realisations of grammatical processes. And there is more regularity in *grammar-gesture interplay* than first meets the eye—regularity that transcends variation and idiosyncrasy. Thus, English speakers are often seen pressing on an invisible flat surface when making (strong) positive assertions. Sometimes too, speakers are seen pressing on their fingers (when counting or enumerating items), usually with combined forehead, eyelid and eyebrow activity. Hand shape and orientation, finger movements may indeed vary and defy classification, yet pressing (fingers, hands) firmly against a base or surface constitutes a recurrent feature of assertion. When the hand movements are repeated in close rhythmic succession, the visual effect produced is that of «hammering down» some truth, of «anchoring» something invisible in visible reality. As already suggested in 1., the invisible flat surface where truth is established as «solid fact,» might be dubbed the «table of reality» [29]. The metaphoric placement of objects of belief or certainty before the speaker-gesturer is exactly what the Latinate term «proposition» codes, if one agrees to take it literally<sup>8</sup>.



Fig. 5. Plain assertion  
«... he just NEEDS to be careful...»

Building on Calbris (1990), Webb [43] and Kendon [20; 21; 22], Harrison [13] has convincingly argued that some degree of consistency and regularity may be observed across speakers, that gesticulation is less idiosyncratic than commonly assumed, and that it is wrong to believe that there are as many gestural patterns as there are speakers. In this, Harrison validates Kendon's claim that individual speakers «are far more consistent in what they do gesturally» than the «idiosyncrasy claim would lead one to imagine» [20]. There are, Kendon adds, «inter-individual similarities in the patterning of gestural action». The patterns are «socially shared» and some degree of conventionalization can be observed «affecting all kinds of gesturing» even though «different social groups, different cultures, have rather different patternings». Harrison [13] adopts both Kendon's concept of «gesture

<sup>8</sup> Lat. proponere «to display», from pro- + ponere «to place».

family» [22] – «a group of gestures that have in common certain kinesic features» – and Müller's functional definition [36] – «a formally and functionally homogenous group of gestures» – to show that there are more regularities and commonalities in gesture form than is usually assumed. His study of multimodal negative utterances establishes that *grammar and gesture are integrated* on three levels: syntactic, functional, and conceptual<sup>9</sup>. «Gesture families,» he demonstrates, are divided into identifiable groups and sub-groups, common to all speakers, with individual and contextual variants occurring along such variables as shape, speed, scope, repetition. The claim is extended to other grammatical domains: aspect (families of «cyclic gestures» correlating with progressiveness), epistemic modality (families of «wavering» gestures co-expressing tentativeness). In short, gesture form is not systematically and univocally related to grammatical expression. Still, gesture families may be identified that are involved in the expression of grammatical notions and processes.

**2.2. Schematic dimensions of gesture and grammar.** At the most general level of characterisation, *gesture imagery* appears to be essentially *selective* and *schematic*. Only salient features of perceptual experience are *abstracted away*, and only contextually relevant functional dimensions are enacted. The representation is achieved through *gestural action*, which makes *gesture imagery* fundamentally *dynamic*. Arnheim [1] provides the following characterisation of the schematicity of gesticulation:

(...) the portrayal of an object by gesture rarely involves more than some isolated quality or dimension, the large or small size of the thing, the sharpness or indefiniteness of an outline. By the very nature of the medium of gesture, the representation is highly abstract (...) The abstractedness of gestures is even more evident when they portray action. One describes the head-on crash of cars by presenting the disembodied crash as such, without any representation of what is crashing. One shows the straight and devious path of a movement, its smooth rapidity or heavy trudging. Gestures enact pushing and pulling, penetration and obstacle, stickiness and hardness, but do not indicate the objects thus treated and described» [1, c. 117].

Abstraction, Arnheim writes, is «the art of drawing essentials from a given kind of entity» [1, c. 173]. It is our innate ability to grasp «the structural features of a complex thing» and arrange them to form «a simplified representation» [1, c. 190]. The «complex things» are both *physical objects of perception* and *non-physical objects of conception*:

The properties of physical objects and actions are applied without hesitation to non-physical ones by people all over the earth, although not always in exactly the same fashion. The bigness of a surprise is described with the same gesture as the bigness of the fish, and a clash of opinions is depicted in the same way as a crash of cars [1, c. 117].

The *schematicity of gestural expression* correlates with what cognitive grammarians believe is the *schematicity of grammatical meaning* [26]. When Sue Orman is asked «How *worse* can it get?» she answers «There is no reason for it to get any *better!*» The comparative form of «good» is accompanied by a shift in hand position: both hands move to the right, with palms and fingers pointing to a slightly higher level. The combined gestural and grammatical markings (-*er*) schematically encode comparison as change from a lower reference position to an upper position.

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<sup>9</sup> S. Harrison [13] examines some of the gestures performed by native English speakers when they negate. He shows that after going through a preparation phase, speakers usually synchronize the stroke with the negative form and «perform a post-stroke hold throughout the scope».



Fig. 6. Comparison  
«You see, there is no reason for it to get any BETTER»

The gestural expression of comparison is not only schematic but global-synthetic: it aggregates various notions and combines multiple dimensions into a single gesture phrase. To express a shift of fortune, the hands iconically and metaphorically shift from a lower to a higher position, along an invisible diagonal line. To distinguish between the present economic turmoil and the brighter future that is to be hoped for, two *mental spaces* are set up, one factual and the other counterfactual [9]. The base space (deictically located in front of the speaker) corresponds to what is considered real at the moment of speaking. It is kinaesthetically marked by the rest position of the hands at the onset of the gesture phrase. The counterfactual space (up there somewhere) is a wish space that is considered to be pure fiction, as indicated by the syntactic negative and facial expressions.

**2.3. Viewing in gesture and grammar.** Langacker [26, c. 12] contends that «grammar provides for the structuring and symbolization of conceptual content, and is thus imagistic in character». By «imagistic» he means that, when using particular constructions, speakers «select a particular image to structure the conceived situation for communicative purposes». Speakers are thus «conceptualizers» that behave like «viewers» observing «scenes» (events) from a given «perspective» [27, c. 204]. Spatial and temporal «vantage points» are established, landmarks and reference points set up, positions and distances calculated, areas delimited, primary and secondary figures distinguished, divisions between «setting» and «participants» made, etc. The many «viewing effects» found in the conceptual organization of grammar find visuo-kinetic coding in gesture. Angles and viewpoints, distance and extensionality, scope and (information) focus, role assignment, deictic shifts, to name but a few, receive explicit visuo-kinetic coding through gesture, as demonstrated by McNeill [30] in his work on the contribution of gesture to spontaneous narrative (and metanarrative) discourse:

Storytelling is not just a succession of events or episodes, one after the other. It is structured on multiple levels, with subtle shifts of time and space, perspective and distance between narrator and narrated, and integration of the sequential with the nonsequential—these are its fundamental dimensions. Gestures track these dimensions [30, c. 184].

**Conclusion: grammar as «bodily activity».** A variety of gestures may be observed that occur in conjunction with the expression of essential discourse functions (like intro-

ducing / ending, including / excluding, foregrounding / backgrounding, connecting, indexing) and key grammatical processes (like deictic anchoring, spatio-temporal reference, aspectual or modal marking). Grammar thus appears to be both a *mental* and a *physical* phenomenon. The inner, rule-governed activity responsible for the formation of utterances receives overt semiotic expression through the verbal and non-verbal channels. As words are uttered and structures formed, *sounds are articulated* and *gestures made*. Vocal activity is coordinated with gestural activity in such a way that gestures may be regarded as *co-articulators of speech*. The coupling of gesture, sound production, stress and intonation is an unavoidable linguistic *fact*, which strongly suggests that grammar is embodied. This may sound like a trivial statement, but few language scholars seem willing to relate grammatical form and symbolism to bodily activity. This is all the more surprising as all sorts of «bodily movements,» like posture shifts, hand and shoulder movements, head nods, eye blinks, etc. accompany the expression of grammatical notions and processes. The «bodily movements» include pitch and loudness, as insightfully noted by Bolinger [3]:

We READ intonation the same way we read gesture. (...) The fluctuations of pitch are to be counted among all those bodily movements which are more or less automatic concomitants of our states and feelings and from which we can deduce the states or feelings of others. (...) To be sure, intonation is of critical importance in making certain grammatical distinctions, as the two communicative lines intersect. But then, the same is true of gesture: a shift in posture may be our best signal for a shift in topic and turning away the most conclusive sign that a discourse is ended [3, c. 157].

The vocal and gestural inflections that accompany the expression of grammatical notions strike to the core of grammar. They are not marginal but central ingredients of the conceptual and functional organisation of grammar. In no way should they be treated as *paragrammar*. The case may be taken even a step further. «Bodily movements» actually do something: they play an active role in the formation of utterances [11]. Movements are «an integral part of the activity of utterance production» [22] and grammar, like the rest of language, is best understood as «a constructive and manipulatory activity».

### 3. Observing gesture

Although «gesture, tone of voice and other theatrical techniques» may be controlled «with the aim of creating persuasive or effective discourse» [22], most of the manual and facial gestures that accompany speech are *unconsciously produced and processed*. Speakers might be asked to *repeat word for word* what they have just uttered or heard, and proceed with relative ease and success. Yet, few will be able to recall, let alone interpret, *gestural action*. This makes the scholarly investigation of gesture production not only «special» but challenging: an awareness of the existence and meaningfulness of gesture-phrases has to be developed first, before any kind of enquiry into gesture form and gesture symbolism may proceed. All the more so as the metalinguistic instruction provided in Western education, through grammar and discourse analysis, does not normally include the study of gesture (outside «non essential» dance or drama classes). As a result of this, conscious gesture-watching must be learnt «from scratch», as students are encouraged to watch the interplay between gesture and speech in conversational interaction.

**3.1. An eye for gesture.** It is of vital importance that students of linguistics should be allowed to develop their own *sensitivity to gesture*. This means acquiring the ability to

*observe motor behaviour in relation to speech* and the capacity to *analyse gestural action perceptively and creatively*. Introductory sessions should be focused on the perception of posture shifts, facial expressions, and hand movements alone. Scholarly «introductions to gesture» are useful but are best postponed until the time is ripe for formal instruction on *gesture categories, gesture phases, and gesture transcription systems*<sup>10</sup>.

Advanced video technology is readily accessible, at little or no cost. High definition recordings, made in naturalistic settings by professional TV crews or amateur cameramen, can be downloaded from various web sites (including YouTube, CNN News and Sledge) using free versions of RealPlayer. The videos selected for gesture analysis must show hand and arm movements clearly. Speakers are typically seated and engaged in two-party conversational interaction. They do not move around. Alternatively, experimental conditions may be created and filmed by students using a digital camera and a tripod. For PC users, the digital recordings can be cut and edited with Windows Movie Maker, while screen captures can be made with the open source VLC media player. Only advanced students should be advised to use ELAN<sup>11</sup> to transcribe<sup>12</sup> and annotate speech-gesture synchrony, to categorize and subcategorize what they see: *manual gestures*, but also *gaze and posture shifts, facial expressions* and *head movements*. The evidence collected is useful not just for gesture analysis in context: it also serves as an encouragement to work with *multimodal data*, whenever such data is available or obtainable (e.g. filmed interviews or conversations). Observing gesture opens a window onto the broader issues of communicative behaviour and conversational interaction in dyadic discourse, broadening the perspective on *intersubjectivity* [15]. For those willing to embrace the teaching profession, the study of gesture is a useful reminder of the centrality of the human body in communicative behaviour [2] as well as an invitation to reflect on the relevance of body-motion to second language acquisition [39; 18; 30]. Since all speakers are *gesturers*, developing oral skills in a foreign language should not be confined to verbal fluency alone: the regulation of co-speech gestures is part and parcel of the learning process. Ideally, the gestural action of non-native speakers should gradually align with the gestural action of natives, bearing in mind that *gestural codes* allow for greater *contextual and interpersonal variation* than verbal codes. Also, special efforts should be made to reduce *interference from L1 gestures in L2 acquisition*, since many learners use an unusually high number of L1 gestures in L2 to «elicit words; clarify problems of co-reference; and signal lexical searches, approximate expressions» [41].

**3.2. Dynamic approaches to gesture-watching: «language and gesture workshops».** Gesture watching does not have to be static. An experiment is currently under way at the University of Bordeaux, France, to develop a more active and creative approach

<sup>10</sup> For a presentation of recording procedures and a discussion of transcription methods, see Mittleberg [34]. The following remarks in this paragraph are largely based on her survey of standard devices and current methodological approaches.

<sup>11</sup> ELAN is a linguistic annotator designed to be used by advanced language scholars working on multimedia corpora. It was developed by the Max Planck Institute for Psycholinguistics in Nijmegen.

<sup>12</sup> Discourse-transcription raises serious methodological issues discussed in Mittleberg [35]: should gaps and pauses, special stress or prosodic phenomena be coded or discarded? Otherwise stated, should the transcription be broad or narrow (i.e. limited to the actual speech content)? Although established transcription conventions exist [7; 16], the answer is often practical rather than theoretical, since it largely depends on the scope and purpose of the study.

to the observation and interpretation of *speech-gesture relationships*. So far, results have been quite encouraging: student interest and motivation have been considerably enhanced by the introduction of «language and gesture workshops» as a supplement to the «applied linguistics» seminar listed on the master's course in English and Education. The workshops are held in gymnasium, and jointly taught by a professor of linguistics and a choreographer. Participants are invited to develop an «embodied awareness» of the *form* and *use* of co-speech gestures, by watching and imitating the movements of real speakers in real life, before developing their own idiosyncratic versions and stylised variations.

In a recent session, a short excerpt from a CNN interview of Suzan Orman<sup>13</sup> was projected onto the wall. In this interview, Suzan Orman—a personal finance expert—discusses the negative impact of the credit crunch on US pension funds and family savings. The topic of the interview was not disclosed to anyone and the voices were turned off, so participants could focus on gesture form. Students were first asked to sit on the floor and «just watch». The video was shown again. This time, students were told to lie, sit, stand, or walk around while *copying* as many movements as they could. Eventually, students were asked to pick three independent gesture phrases and work on *form and manner of motion*. At this stage, a number of *constraints* and *variables* were introduced that had to be «explored»:

- Distance : imitation in proximal or distal mode
- Size : bigger or smaller, «compressed» or «enlarged»
- Speed: quicker or slower, «fast» or «slow motion»
- Location: outside the normal gesture space, higher up, lower down, on the side, around in space
- Stylistic variation: «literal» or «stylised»
- Transmission: «giving», «showing», «teaching» selected gestures to someone else (pair work)

Once this was done, gesture phrases were strung together in a sequence and performed as a short choreographed piece, individually then as a group. Not only was the result aesthetically pleasing, but it was obvious that students had reached a remarkable degree of perception and (artistic) control. Barely noticeable gestures that had formerly gone unnoticed, were now perceived as salient manifestations of human symbolic activity. Yet, what the hand movements stood for was still in need of clarification: pure gesture form had to give way to actual gesture symbolism, through the pairing of gestural form and verbal meaning. So the video was played one last time, with the sound now turned on. *Word-gesture correspondence* was instantly established and «form» was at last reunited with «content». Students expressed amusement or bewilderment, having ascribed private meanings to the gestures, in sheer ignorance of what the original hand movements and facial expressions truly meant. Yet, within seconds, word-gesture connections were spontaneously set up, and students unanimously declared that the connections between verbal and gestural expression not only «looked natural» but «made good sense».

Having secured a safe «grasp on gesture,» students now found themselves in a much better «position» to reflect on the role played by gesture in the *co-articulation of speech*—since both vocal *and* gestural means were used to «talk». Interestingly, work on stress placement, vowel quality and the articulation of diphthongs was carried out with remarkable

<sup>13</sup> S. Orman was interviewed by Melissa Long in NYC, for CNN news (07.10. 2010).



Fig. 7. Gesture-watching: static observation of gestural action<sup>14</sup>



Fig. 8. Gesture-watching: synchronous imitation of gestural action



Fig. 9. Exploring gesture form

efficiency when prosody and gesture were highlighted. For example, the prosody and iterated hand movements that accompanied the utterance of «Wrong, wrong, wrong!» by Susan Orman were used, in a slightly exaggerated version, to improve the phonetic realisation of

<sup>14</sup> The *language and gesture workshop*, University of Bordeaux, France.



Fig. 10. Stylised variations on gesture



Fig. 11. Choreographing co-speech gestures: final performance

/ɔŋ/ in «wrong». Elsewhere, an iconic hand sweep proved extremely helpful to articulate the diphthong in «out!» properly. Finally, some palm down and stretched digit gestures, which were respectively associated with «granted» and «however» in the interview, were used for pronunciation practice but also for grammatical work on the syntax and pragmatics of concession.



Fig. 12. Concession

GRANTED...



Fig. 13. Logical linkage  
THEREFORE...!



Figure 14. Follow up work on the syntax and pragmatics of *therefore*

### Conclusion

The spontaneous gesticulation that occurs with spoken utterances is an essential component of linguistic form [19; 31]. This being said, the semiological status of co-speech gestures is still in need of clarification. Do gestures constitute a distinctive semiotic code, ruled by its own internal logic? In Saussurean terms, how do gestures «signify»? How constraining are the «social codes»?

Pragmatically, gestures are involved in the production, packaging and conveyance of meaning, the control and negotiation of interpretation, the expression of stance and viewpoint, the internal and external regulation of discourse. How co-speech gestures relate to communicative circumstances and how they contribute to the utterance act, need yet to be clarified and, most of all, formalized. Cognitively, gestures reveal important aspects of human cognition – they are windows into the mind – while facilitating the formation and the expression of thought – they «help us think» [12]. Gestures offer image-schematic representations of mental images and thought processes, thus making invisible patterns and mechanisms visible. Experience is «entified» [31, c. 154] through the creation, designation and manipulation of discursive objects in gesture space. Abstract meanings are held or pointed to, as if they were concrete bounded objects or masses of substance. The creation of manual symbols for concepts reveals the centrality of conceptual reifica-

tion<sup>15</sup> in human cognition. The «gestural reification of experience» is proof enough that the human mind is constantly engaged in the conversion of notions and events into objects and substances, as well as in the creation of conceptual spaces where such objects and substances might be located and manipulated. The prevalence of metaphoric and metonymic modes in gesture [34] also confirms the reality of metaphor and metonymy as cognitive phenomena [24; 38]. Finally, some degree of interplay exists between grammar and gesture that calls for serious investigation, as proposed by Harrison [13] and Fricke [11].

One last point needs to be made regarding *gestural action*. As Kendon [22] rightly claims, gestures are part of «an action system». Movement is action, and gesticulation is «an integral part of the activity of utterance production». As speakers move, they form utterances, they build sentences, they construct meanings, they take up stances, they engage in interpersonal manipulation. Kendon convincingly argues that the existence of gestural action is evidence enough that the elaboration of speech is a «fabrication activity»:

When speakers use gestures, whether these are depictive, indicative or 'pragmatic', they are engaging in actions on, or in relation to, objects and spaces in a virtual environment. The actions of gesture are derived from the uses of the body, mainly the hands, in making things, arranging things, operating things, acting on things or on other actors [22, c. 360].

Kendon's final remarks are an invitation to adopt a truly *active*, and possibly anthropological, approach to speech and gesture *production*. «The human species is the fabricating species», he notes, and ordinary talk is just everyone's little piece of linguistic *creation*.

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<sup>15</sup> Conceptual reification (Langacker 1991) is a general cognitive process that uses a variety of means—gestural, lexical and grammatical. Lexical means typically include «stuff», «matter», «substance», «things» used with reference to activities, ideas, topics, etc. Grammatical means include nominalization (Langacker 2000, 2008).

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**ГРАМАТИКА, ЖЕСТИ І КОГНІЦІЯ:  
ЩО НАМ ПІДКАЗУЮТЬ МУЛЬТИМОДАЛЬНІ ВИСЛОВЛЮВАННЯ  
І ЯК МОЖНА ЗАСТОСУВАТИ АНАЛІЗ ЖЕСТИВ**

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Спонтанна жестикуляція, яка супроводжує мовлення, є невід'ємною частиною мовної системи. Рухи тіла, що супроводжують мовлення, продукують значення/сенси і виконують важливі дискурсивні функції. Жест є «жестовою дією», і жестовий символізм є динамічним, схематичним і образним. Жести не просто «зображають», але насправді «роблять речі»: вони формують ідеї і думки, вони задають певний напрям, вони показують, описують сцени і підсумовують аргументи, вони сприяють текстовій когезії і регулюють комунікативну взаємодію. Жести – це вікно у свідомість. Жести надають кінетичну форму невидимим ментальним репрезентаціям і прихованим когнітивним механізмам. Рухи рук у жестовому просторі відтворюють об'єкти концептуалізації, і когнітивні процеси унаочнюються через символні і вказівні маніпуляції. Основні когнітивні здатності виявляються в процесі: здатність конструювати ідеї та події як предмети і речовини (концептуальні уречевлення); здатність формувати імідж-схеми репрезентацій «речей» і руху, а також використовувати їх образно або метафорично; здатність використовувати простір символічно. Встановлено важливу роль жестів у вираженні граматичних значень і механізмів. Таким чином, граматики і жест інтегровані у вираженні часових вимірів, видових понять і модальних позицій. Жестова активність залучена також до вираження порівнянь. Обговорюються технічні та методологічні аспекти жест-аналізу. Запропоновано новий, творчий підхід до спостереження жестів «мова жестів і жестові семінари» де студенти можуть спостерігати і досліджувати жести, що супроводжують мовлення, розвивати свої власні хореографічні варіації, а також працювати над співвідношенням звуку, жесту і смислу.

*Ключові слова:* жестикуляція, дискурсивні функції, ментальні репрезентації, когнітивні механізми, граматики

**ГРАММАТИКА, ЖЕСТЫ И КОГНИЦИЯ:  
ЧТО НАМ ПОДСКАЗЫВАЮТ МУЛЬТИМОДАЛЬНЫЕ ВЫСКАЗЫВАНИЯ  
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Спонтанная жестикуляция, сопровождающая речь, является неотъемлемой частью языковой системы. Движения тела, сопровождающие речь, производят значения/смыслы и выполняют важные дискурсивные функции. Жест является «жестовым действием», и жестовый символизм есть динамичным, схематичным и образным. Жесты не просто «изображают», но на самом деле «делают вещи»: они формируют идеи и мысли, они задают определенное

направление, они показывают, описывают сцены и заключают аргументы, они способствуют текстовой когезии и регулируют коммуникативное взаимодействие. Жесты – это окно в сознание. Жесты предоставляют кинетическую форму невидимым ментальным репрезентациям и скрытым когнитивным механизмам. Движения рук в жестовом пространстве воспроизводят объекты концептуализации, и когнитивные процессы представляются через символичные и указательные манипуляции. Основные когнитивные способности проявляются в процессе: способность конструировать идеи и события как предметы и вещества (концептуальные овеществление) способность формировать имидж-схемы репрезентаций «вещей» и движения, а также использовать их образно или метафорически, способность использовать пространство символично. Установлено важную роль жестов в выражении грамматических значений и механизмов. Таким образом, грамматика и жест интегрированы в выражении временных измерений, видовых понятий и модальных позиций. Жестовая активность привлечена также к выражению сравнений. Обсуждаются технические и методологические аспекты жест-анализа. Предложен новый, творческий подход к наблюдению жестов «язык жестов и жестовые семинары», где студенты могут наблюдать и исследовать жесты, сопровождающие речь, развивать свои собственные хореографические вариации, а также работать над соотношением звука, жеста и смысла.

*Ключевые слова:* жестикуляция, дискурсивные функции, ментальные репрезентации, когнитивные механизмы, грамматика