Cognitive Dynamics in Linguistic Interactions

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Edited by

Alexander Kravchenko

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FROM THE EDITOR

THE NEGLECTED DIMENSION

In June 2010, Baikal National University of Economics and Law in Irkutsk, Russia, hosted an international conference, bringing together theoretical and applied linguists from places and cultures as far apart as Europe and South-East Asia. The theme of the conference was "Cognitive Dynamics in Linguistic Interactions", and its aim was to pursue dialogue between applied linguists and theoreticians about the conceptual-theoretic foundations of linguistic education.

In the era of globalization, when political and administrative borders in the educational sphere are brought down, issues of international and intercultural communication in different professional areas become even more acute. There is a growing demand to increase the efficiency of higher learning educational programs called upon to enhance second or foreign language communicative competence of would-be specialists. Yet it is no secret that the existing methods of teaching a foreign or second language are far from being satisfactory in terms of expected efficiency. This is symptomatic of a general methodological problem: we lack holistic understanding of how natural language shapes the cognitive domain of human interactions. The conference, therefore, aimed to contribute to the ongoing discussion of the problem in the cognitive/linguistic community.

This volume is an outcome of such discussion and includes selected talks given at the conference, which have been developed into full research articles. While not pretending to reflect the entire scope of the problems that were in the focus of the conference, this selection gives a fairly good idea of the general spirit of the entire event. Despite, sometimes, quite different approaches to the problem of linguistic education as such, there was evident consensus among the conference participants on one major point: the sad situation found in the classrooms at various levels (from schools to colleges and universities), when the efficiency of currently employed teaching methods seems to be more than modest, stems from the fact that language educators use strategies based on the concept of language handed down by theoretical linguistics of the mainstream. However, this concept lacks an important dimension.

Modern orthodox linguistics views language as a fixed code which depends on determinate forms with underlying meanings; these forms (linguistic signs) are exchanged in the process of communication, which itself becomes exchange of information. In contrast to this, the linguistics of mainstream cognitive science (Chomsky 1966) treats the mind as akin to a von Neumann computer and views language as a special symbolic system for translating thought. In this version of the code view, thinking is computation: symbol use is governed by a set of rules that predict what possible sentences can be generated in a given language. Instead of positing a parallel with an external code that is learned, in generativism it is supposed that a built-in universal code enables each human being to acquire their native language.

Thus, theoretical linguistics tells educators that natural language is a tool ("system of signs") for the exchange of thoughts that individuals have in their heads. Linguistic education, therefore, must consist in teaching how to "express" thoughts with the help of linguistic signs (words, phrases, sentences, texts) either as material things which are "out there" (external code model), or as abstract symbols which are in the head (internal code model). In either case, to be able to do this individuals must have knowledge how to use words by combining them into phrases and sentences, that is, they must know the lexicon and the grammar. This is the cornerstone of linguistic education on which various teaching methods are built. Yet, despite the intuitive appeal of this initial assumption, the fruit borne by linguistic education built on the code model is sour. Undoubtedly, something is amiss with the code model itself.

While some attempt to amend or refine the code model (cf. Götzsche & Filatova, this volume), others argue that both versions of the code view focus on rarefied abstractions that have little to do with living language or human experience (Cowley & Love 2006; Cowley 2010; Kravchenko 2011). In assuming that languages resemble a fixed code, mainstream linguistics sustains the *language myth* – the doctrine that languages consist in sets of determinate forms used to "send" messages from sender to receiver (cf. Harris 1981; Love 2004). This encodingism misconstrues language as an empirical phenomenon.

Today, many researchers of language and cognition agree that language is not a thing; it cannot be "acquired". Neither is it an invisible "mental organ" that grows and develops with the growth and development of a human organism – a central tenet of generativism (Anderson & Lightfoot 2002). Language is not verbal patterns, it is something more (Kravchenko 2010); it does not exist as a thing in the "objective" world, nor does it reside solely in the heads of individuals. Yet the label "lan-

guage" used by orthodox linguistics refers, first and foremost, to verbal patterns as such, in keeping with Saussure's notorious maxim "language in itself and for itself", and the crucial dimension of dynamics which characterize linguistic behavior, or languaging, is neglected. So, the conference in Irkutsk was an attempt to make up for this oversight, offering a venue for the discussion of various aspects of interactional dynamics of languaging.

In elucidating the nature of language – not as a mental organ, but as values realizing activity – Stephen Cowley (this volume) emphasizes *cognitive dynamics* – measurable physical events bodies use to control how they coordinate with the world over different time scales: "Cognitive dynamics can be measured in brains, across bodies, in relationships, across (and within) social groups and between (or within) cultural traditions" (p. 8). This approach extends the notion of distributed cognition (Hutchins 1995); language as interactive cognitive activity also becomes radically distributed, challenging the orthodox view of language as essentially symbolic (Cowley 2011). Hierarchically organised verbal patterns are simply an aspect of languaging as specific interactions of humans, or *language flow* whose dynamics are culturally constrained. Lived experience and integrating action-perception are of central importance to language teaching and learning. As multi-scale co-ordination – and this is especially important for the ideology of linguistic education – "language drives a cycle of perception and action that shapes the human ecology" (p. 11); thus language becomes ecological.

Raymond Jennings and Joseph Thompson (this volume) continue this general theme, focusing on the biological centrality of talk. They argue that the property of being linguistic is an inherited biological property of human organisms, which develops into a social skill, namely, the *colloquy* (participation in talk). Taking colloquy as a property of a population of human organisms, they argue for a biological approach to language which takes into account many orders of populations and as many orders of change. Although they don't speak of language as being "distributed", the framework they develop for a biological study of language builds on a similar concept when they say: "novelty of linguistic production is to be explained by the manner in which available resources were exploited in its production" (p. 56). In this, they depart from traditional views of language and its properties (such as mentalism, compositionality etc.), emphasizing the need for a new metatheory that would recognize the inherent dynamics of colloquy: "change changes", or, "using a language changes the language" (p. 58).

Seiichi Imoto (this volume), paying tribute to the Japanese linguists Motoki Tokieda and Tsutomu Miura, traces parallels between their study of the cognitive mechanism of recursion in Japanese and Maturana's (1978) concept of languaging as the process of recursion in the consensual co-ordinations of consensual co-ordinations of behavior. Drawing on Maturana's notion of structure determined system as a composite entity that exists simultaneously in two domains (the processes domain of internal dynamics of its components and the products domain of interactions of the system as a totality with its niche of the medium), he emphasizes that linguistics as a science should deal with both domains as a total system. Depending on which domain the emphasis is laid, our living in language can be taken either as virtual or real, although "our practical linguistic life is actually situated as various spectral mixtures between the two poles" (p. 77).

Hans Götzsche and Ksenia Filatova (this volume), while admitting that linguistic phenomena exist in two domains – internally, as mental structures, and externally, in human interactions with each other and the world – and that "languages are essential in any kind of human activity" (p. 82), tackle the issue of ontology and cognitive processing of language by focusing on linguistic mechanisms as cognitive systems run by the human neuronal systems. Subscribing to the representational model of mind in the general framework of generativism, they claim that "a syntactical formalism… may be used as a blueprint of the mechanical functions of syntax as a cognitive system in most humans" (p. 84). The linguistic cognitive systems, they argue, may be best described as spatial topological structures, and, adopting a kind of physicalistic structuralism, they elaborate a theory of languages which, in their opinion, may have important implications for language acquisition, learning and teaching.

A contrary view on the nature of language – one that seems to resonate with Cowley's concepts of distributed language and language flow – is presented by Per Linell (this volume), who contrasts formal approaches with dialogical approaches. Historically, linguistics as a science has been dominated by the written language bias (cf. Linell 2005), when disembodied writing and embodied speech have been viewed as standing in one-to-one correspondence. Because of this category mistake, formalisms built on analyses of written texts have little to do with languaging as interactional activity in real time-space. By contrast, dialogical theory "takes sociocultural contexts and the interactions with others as basic preconditions of language, communication and the mind" (p. 107). Unlike in formal – particularly, generativist – approaches, which view cognition as based in individuals and their (largely mental, or neuronal) capacities, dialogism

stresses the role of others (cf. Linell 2009); it is in the co-actions and interactions with others and external artifacts that cognition is brought forward. Thus, dialogism constitutes "a transdisciplinary approach to the mind, one which emphasises sense-making in the world" (p. 112).

The inadequacy of modern written-language-biased linguistic orthodoxy in understanding the nature and function of language is further discussed by Alexander Kravchenko (this volume), who focuses on the concept of grammar. Taking as a starting point the concept of *languaging* as coordinated semiotic behavior of humans in a consensual domain of interactions, he describes current mainstream approaches to grammar as incoherent, since language as dynamically complex recursive behavior is confused with language as a system of written signs. Stressing the orientational function of language (Maturana 1978), he criticizes orthodox (internalist and externalist) views on grammar rooted in the code model of language (Kravchenko 2007) as both biologically and epistemologically implausible. Instead, he proposes a semiotic approach to grammar, contrasting semiotics of languaging with semiotics of writing. Emphasis is laid on the dynamics of sign relations, which are different in text and talk, and this difference should be taken into account in teaching and learning a language.

Continuing the discussion of how language is mythologized by modern linguistic orthodoxy and of the consequences such mythologizing has for teaching languages, Eugene Rivelis (this volume) focuses on traditional lexicographic practices, when dictionaries exclude from language use any cognitive dynamics. In pursuit of their particular goals, lexicographers ignore the speakers as meaning-makers and thus the mechanisms determining the limits within which they can exploit the concepts of lexical units. This makes language teaching "unnecessarily formal and unintuitive, as if our speech interactions were … an exchange of codes rather than a cognitive effort" (p. 154). Rejecting the idea of language as a denotational sign system underlied by the conduit metaphor, and offering a very insightful analysis of a Russian adjectival concept, he outlines an approach to structuring an adjective entry in a dictionary (cf. Rivelis 2007) that supports theories of the agentive nature of language rooted in human activities and reciprocal behavior. "Lexicography with a human face" facilitates a description of the way senses are created; it recognizes that "meaning does not inhere in the linguistic units, but results from a cognitive effort of the speaker" (p. 181).

The importance of this "cognitive effort", as well as the need to integrate theoretical approaches to language offered by biologically oriented third-generation cognitive science into the teaching/learning process in a

classroom setting, are discussed by Igor Arkhipov (this volume). While rejecting the code model of language on which linguistic education is built, he speaks of the necessity to take the first step to changing teaching practices by "smuggling new ideas into the classroom" (p. 186). Because of the inertia of traditional thinking, new ideas – e. g. that all prerequisites of languaging are in the bodies of socially-oriented individuals – take time to grow through the concrete of prejudice, but it is important that a new linguistic metalanguage be worked out. New textbooks and teaching aids are needed to present language as joint behavior between and among interlocutors orienting each other to create meaning.

In today's world of intensive cross-cultural communication, with more and more people using two or more languages on a daily basis, the cognitive mechanisms underpinning biulingualism and multilingualism become especially important in understanding and facilitating second (third, etc.) language "acquisition". Ekaterina Protassova (this volume) discusses experimental findings in a study of writing skills among bilingual children describing pictures, stressing the relationship between the level of literacy acquired in bilingual surroundings and socialization in a community. The experimental data showed a tendency to balance languages available to the subjects: those capable of writing longer sentences in one language tended to do the same in their second language, and most of the subjects mentioned similar details of the pictures in both texts. At the same time, their writing was constrained by language-related experience which affected how they organized material in (virtual) space and practiced cultural-historical connections. This is indicative of a dynamic relationship between bilingual literacy and general cognitive ability.

This relationship was in the focus of another experiment conducted by Ksenia Filatova (this volume), who applied the idea of dynamic interaction between individual languages and lived experiences to the bulk of theories on multilingual lexicons. Starting with an assumption that the functional unity of languages based on simple referential logic allows one to consider them as complex systems of synonyms, and that mechanisms of coordination and segregation that govern these systems and account for their autonomy are primarily social (cf. Protasova's findings), she designed an experiment aimed to provide some empirical support to the claim. While the results of the experiment may not be definitive and further exploration of the dynamics of multilingualism is necessary, there seems to be enough proof of the existence of a "linguistic continuum" constituted by native and foreign languages as macrocategories, and multilingualism on an individual level is the result of systemic interplay between these macrocategories that are teased apart through syntactic mechanisms.

Along with language "acquisition", translation is another major area of applied linguistics which is definitely dominated by the code model of language adopted and practiced by orthodox linguistic science. However, translation is not a mechanical process of moving a specific meaning "expressed" in one form, such as a word in the source language, to another form in the target language (as the name "translation" suggests); it is a process aimed at achieving dynamic equivalence of the source and target texts when the translator ensures that the product of his cognitive activity has the same (or almost the same) effect on its addressee as the source text has on its direct recipients.

In her paper, Slávka Janigová (this volume) addresses the cognitive dynamics of translation, comparing English legal texts with their Slovak translations. Focusing on the nature of translation as specific cognitive activity which involves perception, interpretation and meaning construal based on the translator's own experience of two legal systems as cultural artifacts, she convincingly shows that translation as a process can hardly be described in terms of a code-based approach, and the "encoding-decoding" schema does not work as an explanation, because the cognitive essence of translation as a process consists in the translator's cognitive interactions with his own cognizing self and – in the case of the translations of legal texts described in the paper – with his knowledge of, and experience with, two legal language environments. This inference calls for a new agenda in working out effective methods for training skilled translators, when knowing an inventory of linguistic items in two different languages doesn't equate with an ability to translate a text from one to the other. Translation is, basically, a problem-solving activity characterized by a high complexity of judgments the translator must make to "set out a domain of consensus where the writer of the source text and the reader of the translation product should finally meet" (p. 279).

The papers presented in this volume show that cognitive dynamics affect all aspects of human co-action and interaction as our living in language. Prioritizing the study of this dimension of human communication must become the objective of language sciences, transforming them from often scholastic enterprises to pragmatically driven projects (cf. Cowley et al. 2009) that can really make a difference in our changing world. The Irkutsk conference was just a step in this direction.

References

Anderson, S. R. and Dadid W. Lightfoot (2002). *The Language Organ: Linguistics as cognitive physiology*. Cambridge: Cambridge University Press.

Chomsky, Noam (1966). *Cartesian Linguistics: A chapter in the history of rationalist thought.* New York: Harper & Row.

Cowley, Stephen J. (2010). Linguistic cognition: implications for human communication. Paper presented at the conference "*The Status of Language in Human Cognition and Communication*". October 11-12th, 2010, St. Petersburg, Russia

—. (ed.). (2011). *Distributed Language.* Amsterdam; Philadelphia: John Benjamins.

Cowley, Stephen and Nigel Love (2006). Language and cognition, or, how to avoid the conduit metaphor. In Anna Duszak and Urszula Okulska (eds.), *Bridges and Walls in Metalinguistic Discourse.* Frankfurt/Main: Peter Lang. 135-154.

Cowley, Stephen J., João C. Major, Sune V. Steffensen, Alfredo Dinis (eds.) (2010). *Signifying Bodies: Biosemiosis, Interaction and Health*. Braga: Catholic University Press.

Götzsche, Hans and Ksenia Filatova (this volume). On the ontology and cognitive processing of languages: a tentative approach. 81-106.

Harris, Roy (1981). *The Language Myth*. London: Duckworth.

Hutchins, Ed (1995). *Cognition in the Wild*. Cambridge, MA: MIT Press.

Jennings, Raymond E. and Joseph J. Thompson (this volume). The biological centrality of talk. 33-63.

Kravchenko, Alexander (2007). Essential properties of language, or, why language is not a code. *Language Sciences* 29(5). 650-671.

—. (2010). Native speakers, mother tongues, and other objects of wonder. *Language Sciences* 32(6). 677-785.

—. (2011). How Humberto Maturana's biology of cognition can revive the language sciences. *Constructivist Foundations* 6(3). 352-362.

Linell, Per (2005). *The Written Language Bias in Linguistics: Its nature, origins, and transformations*. London: Routledge.

—. (2009). *Rethinking Language, Mind, and World Dialogically: Interactional and contextual theories of human sense-making.* Charlotte, NC: Information Age Publishing.

Love, Nigel (2004). Cognition and the language myth. *Language Sciences* 26(6). 525-544.

Maturana, Humberto R. (1978). Biology of language: The epistemology of reality. In G. Miller and E. Lenneberg (eds.), *Psychology and Biology of Language and Thought.* New York: Academic Press. 28-62.

Rivelis, Eugene (2007). *Kak vozmožen dvujazyčnyj slovar'* ["How is the Bilingual Dictionary Possible?"]. Stockholm: Acta Universitatis Stockholmiensis.

Alexander Kravchenko

COGNITIVE DYNAMICS: LANGUAGE AS VALUES REALIZING ACTIVITY

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1.0 From mental organ to intelligent practice

Whilst the ancient Chinese traced intelligent behaviour to the heart and the Greeks favoured the brain, physiology has provided little support to either view. As both conceptualizations came to seem simplistic, Descartes (1988) ascribed human thinking to a *mind* or *mental organ*. Though vague, this idea not only came to dominate folk psychology but, during the 20th century, proved robust enough to beat off the behaviourist challenge. By the new millennium, anthropogenic logic had been reabsorbed into scientific writings. As in folk psychology, most claimed either that mind *supervenes* on the brain (see, Kim 2006), or that brains *realize* intentional states in consciousness (e.g., Searle 2004). Minds were viewed as processors whose neural networks function by using input to sustain mental phenomena. As Descartes had proposed, internal processes were taken to allow people to represent the world. Recently, in spite of the power of symbolic and connectionist models, there has been growing scepticism about representational theories (e.g. Varela et al. 1991; Clark 1997; Thompson 2007; Chemero 2010). Accordingly, this paper pursues what the ecological alternative offers to applied linguistics.

The challenge to mentalism comes from how bodies function. Organisms evolved to act and perceive in changing environments. In spite of the fact that this can be *described* as tracking or representing aspects of the world, there is no reason to think that the events use what are representations *for a brain* (e.g. Steiner 2010). The central nervous system deals in the body-world relations that sustain flexible, adaptive behaviour. Bodies use measurable physical events or *cognitive dynamics* to control how they coordinate with the world. Humans extend this general capacity by cooperating in cultural settings. Using resources that constitute our perceived worlds, biology becomes enmeshed with history. In acknowledging this, cognitive science and linguistics increasingly take a *biogenic* (Lyon 2006)

or biologically plausible view of minded behaviour. By implication language teaching and learning cannot afford to ignore either lived experience or how this is integrated with action-perception. In contrast with mentalism, experience is neither "subjective" nor based on knowledge of *abstracta* like *redness* and *flying*. Rather, such approaches overlook why encounters with the world are meaningful (Gibson 1979). Far from relying on the subjective or the abstract, cognitive dynamics are public events that use perceived opportunities and threats. Social activity realizes values that motivate inhibition, thinking and communication (Gibson 1950; Hodges & Geyer 2006; Hodges 2007). In language, successes and failures arise as we mesh *wordings* with experience of items that serve in a (partly) shared social world. Using this perspective, I focus on pedagogical design and signs of writing to consider how applied linguistics can be enriched by viewing language as values realizing activity.

1.1 Beyond representationalism

Even though symbolic and connectionist models can simulate anything that can be described by algorithms (see, Wells 2006), brains lack bistable circuits or mechanisms that flip-flop between two states.[1] For the same reason, the body-world relations of robot worlds cannot be fixed by pure algorithmic models. Equally, they are inadequate for capturing the agency of living systems: to survive or get things done, bodies and environments must self-sustain. Even cognitive processes that an observer describes as "representational" derive from a history of action-in-environments. For example, Mark Bickhard (2009) argues that the ontology of intelligent behaviour just *is* situated interaction. He challenges *encodingism* which, by necessity, overlooks situated, embodied and cultural experience. Neither living in the world, nor social interaction, nor use of norms can be reduced to (or can be simulated by) operations on input. Self-evidently, it might be said, ecological questions also arise for behaviour by agents who make use of linguistic and cultural resources.

To shift attention from operations within minds or brains to how bodies coordinate is to regard cognition as *situated* (see, Robbins & Aydede 2009). Even those who find Bickhard's process ontology too radical can use this framework to re-examine phenomena modelled by rules and representations – e.g., perception, categorization, sentence production/ processing. Far from relying on *abstracta*, such processes depend on timing how bodies function in a partly shared environment. Cognition pertains to bodies (and can be simulated by robots) that use material entities to unite physical events with human practices. Although neural networks (and liv-

ing brains) are crucial, cognition is *grounded* (see, Barsalou 2010) or, in other terms, embodied and embedded. Like robots, living bodies are interdependent with material structures. It is because of these reciprocal relations that robots can link bodies and computation to simulate, for example, how multi-agent systems categorize light (e.g. Steels & Belpaeme 2005). Where system-environment interaction is supplemented by learning from language games, the machines categorize what we (but not they) *see* as colours. Every simulation gives different results as coordination prompts devices to learn categories that derived from the history of a population. In parallel, people control action by linking brain activity with material context. Like robots, we draw on previous body-world encounters. Thus, situated approaches reject anthropogenic appeal to a cognitive sandwich "in-between" action and cognition. By invoking, not internal processes, but conditions that enable complex behaviour, one can reject cognitive internalism and, in its stead, focus on body-world engagement. Cognition becomes that which makes behaviour flexible and adaptive. On this ecological view, language and cognition centre on public events that are most suitably examined from a biogenic perspective.

While human life is embodied and embedded, as emphasized in Russian tradition, it is historical too (see, Wertsch 2002; Linell 2009). Though actions have a robotic aspect, culture, activity types and circumstances all influence how people act and collaborate. During feeding, hunting, or seeking to impress a potential mate, we draw on cultural practices, conventions, social roles, and talk (verbal and nonverbal expression). For many, therefore, a species specific *cognitive niche* (see, Clark 2008) links evolutionary history and coordinated activity. Though many species draw on affect and sense-making, humans also reach agreements in judgements. We come to use wordings and, as a result, experience the world as featuring types of (nameable) objects. Later, with literacy, inscriptions give systematicity to shared modes of perception that can call up forms and paraphrases (or *meanings*). These associations give rise to certainties that sustain customs, religion, law and education. They permit persons to embark on collaborative projects where shared ways of speaking and thinking lead to viable ways of acting. Though based in sense-making, human practices contribute to our capacity for collaborative activity. In spite of folk psychology, the results depend on values realizing. Just as with learning colour names, we need neither objective properties nor subjective impressions but, rather, ways of linking biology with a history of coordinated action. In our peculiar niche, cultural constructs enable us to use wordings, social roles and relationships to imbue experience with meaning. Although

based in nature, our doings are inseparable from the history of a cultural world.

In bringing culture to cognitive science, Edwin Hutchins (1995a; 1995b) used ethnography to describe, for example, how people fly planes. Challenging cognitive internalism, he traced out how flying depends on persons who encounter each other in the world (Hutchins 1995b). As they coordinate, they draw on instruments and practices that propagate (public) representations of, say, speed, weight and height. Since these can be described by goals and reasons, the functional or robotic aspect of action co-occurs with values realizing. As living systems, we experience physical aspects of the universe as eliciting concern. Typically, Hodges (2009) argues, these draw on *clarity*, *complexity*, *coherence* and *comprehensiveness*. When acting on our behalf, Steels and Belpaeme's (2005) robots use such features to clarify long debated issues about colours. Remarkably, they do so without seeing: mindless systems can simulate judgements by constructing partly shared categories. This highlights a contrast between robots and living systems. Whereas machines rely on statistical output, even bacteria survive by *using* perceptions of a changing environment to act in viable ways and, by so doing, realize values. Although we too are viable, like robots, we also exploit *shared* aspects of the world. Statistically-based learning links action and experience with formal indices of how others, for example, categorize and perceive colours. Though neural processes are needed, *seeing* links shared experience with cultural and non-cultural domains (e.g. quantum physics). Humans live feelings and preferences – some implicit and others drawn from 1st, 2nd and 3rd person perspectives – in a values heterarchy (Hodges 2009) that shapes how we live social, physical and cultural realities. In spite of its subjective aspect, language exploits the time-scales of history as people manage situations. In moving away from computational models of mind, we can therefore turn to how human agency is affected by language and, conversely, how language skills derive from human performing, acting and living. On this distributed view, cognitive dynamics and how we time what we say and do matter greatly to language, teaching and learning.

2.0 Distributed cognitive systems

Culture matters for cognitive science because, as Hutchins (1995a) shows, functional outcomes often depend on, not individuals, but *Distributed Cognitive Systems* (DCS). People act to shift the locus of control beyond the body in, for example, landing a plane. In such a case, the DCS includes instruments, modes of organization and bodily resources used in

making sense of what lies beyond the plane (e.g. *hearing* the radio). Cognition is defined, not by computation, neural networks, or dynamical systems, but by the *results* of actions.[2] Rather than take an *a priori* view, outcomes are defined as *cognitive* when they are intelligent (see, Giere 2006). In making a sauce, performing an experiment, asking a question, or landing a plane, local enabling factors ensure behavioural flexibility. Although at least one person must be involved, much depends on external resources. The same evidence ("input") can prompt many judgements. In a simple psychological experiment, a person may be invited to compare lines of about 2 cm in order to ascertain when their lengths are identical. By contrast, at a crime scene, a similar line may set off complex inferences. Whereas the experimental subject makes a judgement and presses a button, the crime scene investigator may make an abduction about, say, a suspect's shoes. By investigating how results are achieved when a DCS connects observable processes with collaborative events, it becomes possible to track how parties manage a *general project* (Galosia et al. 2010). Even button pressing depends on judging a "stimulus" in the context of a project. Just as with the inference about shoe size, the action is like putting the last piece in a jigsaw puzzle (Järvilehto 2009). Since the brain is necessary (but not sufficient), the results link an organism's history, skills and action readiness. Thus a functioning DCS uses action-perception in making judgements (in both experimental and crime-scene settings). Cognitive processes use parts, operations and modes of organization (see, Bechtel 2008) that distribute control over systems that sustain flexible adaptive behaviour. Building on Hollan et al. (2000), the central aspects of a DCS can be redefined as follows:

1. Cognitive results depend on activity by at least one person; however, even if the results are organism centred, culturally-derived skills presuppose a general project (e.g. deciding whether one line is the "same length" as another).
2. Cognitive results link neural and world-side resources: action and perception function as living bodies explore the world perceived.
3. Cognitive results integrate organic and external memory in ways affected by the DCS's current (and, often, future) activity.

Living beings achieve results by using material and cultural resources in solo and collaborative action. Over time, history will reconfigure their ways of perceiving local resources as persons gain (some) responsibility by learning to act and inhibit as they perceive changes in the world. Whether talking, flying planes, or working in health care, decisions depend on values realizing that links thinking, feeling and cultural artifacts.

In a physical environment, history influences what are blithely called the *agents themselves*. Biogenic events show rationality that, always and everywhere, depends on evaluating circumstances in relation to one or more general projects. In judging lines, an experimental subject uses an apparatus to co-operate with the experimenter. Pressing a button that means "same" realizes values: the person behaves in ways that do (or do not) conform to expectations. Indeed, classic experiments on social conformity can be re-examined as values realizing (Hodges & Geyer 2006); the general project (e.g. driving or caring for baby) shapes how we act and perceive in the circumstances (see, Hodges 2007b). Values realizing permeates all of language – including how we make or return (or fail to return) a greeting. Attention is given, and attributed, to displays of self and who we (think we) are greeting. Human life arises within an extended ecology (Steffensen 2009) where species-specific values realizing is refined by material and cultural products. As we move in and out of DCS, we live in ways that have been transformed by language and culture.

2.1 From mental organs to lived relations

Having rejected representationalism, we can reconsider logical behaviourist critique of *mind*. As Ryle (1949) saw, the *concept of mind* matters to individuals and society. Propositional attitudes and folk psychology (or "theory of mind") are used both to interpret behaviour and exert control over one's own action. In spite of what some argue (e.g. Churchland 1981), folk psychology cannot be *eliminated*. Rather, because of its value in predicting human action, much can be gained from examining *how* we ascribe mental states to values realizing behaviour. As Ryle also argued, there is no reason to reify mind as a system whose hypothetical functions explain reasons or actions. In Dennett's (1987) terms, we can ask how people come to take an *intentional stance*.

A biogenic take on distributed cognition challenges the Rylean line that action depends on neurally-based dispositions (and learning). Rather, human action is multiply constrained by bodily and neural events that draw on history or the previous results of acting in the ecology. Where intelligent outcomes draw on a DCS, human agency uses connections across the skin. Though the brain serves human values realizing, this occurs in a physical and cultural environment. In beginning the descent of a plane, for example, a pilot uses trained gaze to link what his instruments show with what is "in his head". Together, the pilot and co-pilot grasp facts about altitude, the plane's load, current speed and so on. As Hutchins (1995b) shows, salient *relations* serve in, for example, deciding to extend the flaps.

Specifically, a pilot relates movements of an air speed indicator to a salmon-coloured marker that obviates the need for complex calculations. Acting like a robot, he lowers the flap when the needle reaches a given point. Although folk psychology can describe the events, his dispositions integrate neural events, action and perceptual skill. Environmental or local *eco-centred* skills connect material, human and historical resources. The cognitive dynamics of the DCS connect the ecology with utterances, thinking, and seeing inscriptions as wordings.[3]

2.2 Cognitive dynamics and language

Distributed Cognitive Systems act, learn and explore opportunities that are detected in perceived environments. As we achieve, or fail to achieve, results, dispositions change. For example, a pilot who ignores or misreads instruments may crash or, perhaps, be challenged and corrected. No folk description can clarify how we *hear* phonetic gestures or *see* the air speed indicator. Since conscious processes are taken for granted, folk psychology overlooks how practices are grounded in activity by human bodies. It takes values realizing for granted: in fact, just as with communication (Bateson 1972), we cannot *not* realize values. Even the cognitive dynamics of inaction (or indecision) demand evaluation. Action and the ecology are reciprocally constituting in that, as the perceived world changes, actions recalibrate. Unending bodily coordination uses processes of measurable time evolution. The pilot who lowers the flaps judges a *relation* between a salmon-coloured marker and the air speed indicator. What matters is *when* he moves the control to lower the flap. The pilot gains from tracking what is happening such that, in unusual settings, he can pick up on how (and whether) his instruments are working. However, material resources often presuppose cultural expectations that will connect action with what a situation requires. Even an exchange of greetings attunes to factors like the setting, time of day, mood, feelings and, just as crucially, how one orients to the person greeted while drawing, perhaps, on hoped for and/or feared future meetings. Multi-scale dynamics move dyads to feel, think and act. As one person controls and hears, others perceive the speaking, gesturing, play of expression, shifts in posture etc. that constitute the cognitive dynamics. As shown below, this extends Maturana's (1978; 1988) view of structural coupling by stressing that human action is both situated and subject to historical constraints. Realizing values across the skin is culturally constrained neuro-behavioural coordination.

Phenomenal experience shapes one scale of coordination. Thus, as I write, I seek to make the text readable by introducing thoughts clearly. In a

computational metaphor, I seek to evoke "real-time" sense-making. However, whereas machines depend on *real time*, living beings exploit various temporal scales. The reader, for example, may seek clarity by choosing to look back to the previous page and, by so doing, integrate phenomenal time with action-perception and memory. We should therefore be wary of the view that how we *describe* wordings maps onto function (or vice versa). Hierarchically organized sentences are merely an aspect of language or languaging. Humans do not rely exclusively on recurrent acts and organized linguistic features or *what is said* but, as shown below, also draw on *language flow* (Cowley 2009). During talk prosodic movements prompt hearing that imbues events with a particular sense that is anticipatory and interindividual (Steffensen et al. 2010). Further, the dynamics of speaking are culturally constrained. How we speak, just as much as what we say, falls under the influence of the sociocultural patterns that characterize both individuals and social groups. Language thus exploits wordings, the dynamics of voice and gesture, and ways of linking linguistic features to an *interaction order* that has many features common to "the social life of other species" (Goffman 1997: 237). In Linell's (2009) terms, *double dialogicality* connects embodied activity with wordings, utterances, voices and possible meanings. Action uses what we perceive and, especially, note. In phenomenological time, we modulate vocalizations as we evaluate our presentation of a topic, self, how the audience appears, and how *we think we are heard.* As we address those present, we orient to an *anonymous third* or, in other terms, treat utterances as utterances of forms that evoke general meanings. In tracing double dialogicality to how wordings affect cooperation, Linell emphasizes that language is situated and sociocultural (see, Vygotsky 1978; 1986) or, in other words, cognitive dynamics give rise to wordings and other audible patterns that produce what Bakhtin (1981) describes as *polyphonic* effects.

Cognitive dynamics can be measured in brains, across bodies, in relationships, across (and within) social groups and between (or within) cultural traditions. Sensorimotor activity has statistical properties that link culture with biology. Indeed, Donald (2001) suggests that hominid culture took off when, 4 million years ago, our ancestors began to use culture in honing skills and re-enacting events. With *episodic cognition*, actions added form to meaning. Ancient cognitive dynamics, Donald argues, led to *mimetic* activity as hominids extended the affordances of artifacts. As they began to practice, judge results and develop skills, joint activity became important. Mimetic communication thus gradually gave way to ways of acting that were constrained by a species specific *cultural-cognitive network* (Donald 2007). As valuable practices accumulated, human inter-

actions became further differentiated with speech, oral culture and, later, writing systems. Human life fell increasingly under the constraints of structures derived from different (historical) time-scales. Although animals rely on organism-centred experience, humans came to use how communities construe events produced by DCSs that criss-cross time and space. In a partly shared world, perception uses historically derived structures that link the individual and collective. In historical time, this engendered the arts, religion, science, sport and so on. We use the experience of others as we collaborate and coordinate. Human lives unfold within projects that transcend individual experience (for example, I write this on a computer at an airport in Moscow).

3.0 Humans are ecologically special

Humans become differentiated within cultural environments because, among other things, we proceed through more stages of development than do chimps or bonobos (Locke 2009). Alongside infant, juvenile and adult phases, human ontogenesis also features childhood and adolescence. Though genes and brains matter, living bodies are affected by physical and cultural structure. Development also occurs as, in historical settings, we become adult persons. Even if folk psychology stresses autonomy, this is only part of the story. Earthworms, chameleons and cats are more autonomous than communicators like bees, dogs and bonobos. Like eusocial insects, we use collective resources even if, as social mammals, we act, feel and perceive in individual ways. Eusocial structures enrich learning that draws on historically based practices. As a result, DCS enable us to realize values that presuppose the constraints of a cultural meshwork (Thibault 2011). As we collaborate, we contribute to unfolding events by, among other things, commenting on what people say or using language about language (Taylor 2000). Linguistic cognition has inherent reflexivity that allows events to be seen from many perspectives. Not only are there many ways of acting, but the available modes of description contribute to beliefs, expertise and expectations. At times, more is gained by high levels of conformity and, at others, from novel ways of feeling, thinking and acting. In rejecting organism-centred cognition, language is conceived in terms of relatively static patterns that anchor how, in various time-scales, we are likely to coordinate. Like Steels and Belpaeme's (2005) robots, humans can draw on echoes of the past to orient to partly shared situations. However, unlike robots, we can use both external markers and coordination to evaluate our own acting, come up with novelties and, thus, create semantic spaces within which to self-organize.

3.1 Encodingism and its aftermath

For a hundred years, linguistics was dominated by synchronic models of language-systems or regular, standard and decontextualizable entities (forms) that map onto semantic features (see, Lyons 1977). Wordings become assemblages of structures anchored by semantic meanings (and vice versa). Once seen as "like" inscriptions, the meanings of forms are pictured as referential or denotative. On this view, verbal language is a discrete "object" that can be studied independently of cultures, people and the environment. Just as happened with diachronic linguistics, the perspective changed the world. Not only did synchronic models shape 20th century views of language, mind and society, but information technology grew from structural linguistics. Without inscriptions that, like digits, establish timeless reference, institutions could not have grown up around the view that the object we call *language* can give propositions objective validity.[4] In short, structuralist rigour has linked with logic to shape many aspects of our contemporary world. It should not be thought that there is anything wrong with synchronic *models* of languages: just as with manipulating numbers, these afford ways of realizing values.

Problems arise when synchronic descriptions are co-opted for *explanatory* purposes. By privileging the said, they overlook the communicative, cognitive and affective consequences of coordinated movement and vocalizing. As a result, we lose sight of how third parties and contingencies influence our thinking; overplaying how we hear utterances as utterances *of* forms (Love 2004), theorists seek to ground the language sciences in naïve realism (Lyons 1977). Leaving aside cognitive dynamics, phenomenology, and values, individuals become producers and processors of forms. Even theories that avoid mentalism and behaviourism tend to reduce language to Hjelmslev's (1954) "planes" of content and expression. Encodingism thus leaves aside measurable physical processes by making the gratuitous assumption that mere *analysis* identifies linguistic units. The *locus* of language becomes a system that enables living beings to produce and process utterance-types. Linguistic activity reduces to "input" identified by theories of utterances, sentences, distinctive features, discourse and so on. For those adopting situated and cultural approaches, such views scandalously overlook time-scales that are faster or slower than lived experience. They ignore coordination, interaction, relationships and changing sociocultural practices. As applied to languages, they ignore the niche within which we evolved. Instead, they invoke linguistic items that are said to occupy space-time. Whether these units are viewed as mental states or an organism's habits, linguists are liable to fall foul of what Whitehead (1926) calls the *fallacy of simple location* (see, Steffensen et al. 2010). They are likely