The Brain in Social Semiosis

Langue, Parole, and the Brain

The starting point for this lecture is the way in which *langue* has both a social and an individual dimension. This dual character of *langue* is critically important for understanding the place of the brain-body complex in Saussure's social-semiological theory. The following passage makes it clear that Saussure does not ascribe a causal status to the brain in relation to social-semiological processes. Instead, the brain is directly, yet non-causally, implicated in these same processes. It is no more than one component in a still wider circuit of relations which extends beyond the individual's body and which is physical, physiological, psychic, and social in character. My reading of the place of the brain in Saussure's account suggests some fruitful links with recent developments in the neural sciences, especially Edelman's (1989) theory of neural group selection. But before discussing these, I shall turn my attention to some aspects of the following passage:

It is by means of the functioning of the receptive and co-ordinative faculties that imprints [empreintes] which manage to be perceptibly the same for everyone are formed in speaking subjects. How may this social product be represented so that the language system appears perfectly detached from the rest? If we could encompass the sum of the verbal images which are stored [emmagasinées] in each individual, we would make contact with the social link that constitutes the language system. It is a treasure deposited [déposé] by the practices of parolein the subjects belonging to the same community, a grammatical system existing virtually in each brain, or more exactly in the brains of an ensemble of individuals; for the language system is not complete in any one individual, it exists perfectly

only in the mass.
(CLG: 30)

Langue is both a "social product" and the "social link" which links all of the individuals who share the same language system. It is also "a grammatical system existing virtually […] in the brains of an ensemble of individuals". This duality of *langue* is strikingly similar to some recent developments in neuropsychology according to which semiotic-discursive activities shape brain function. Saussure does not actually say a great deal about the brain in *CLG* or elsewhere. However, it is important to point out from the outset that he is referring to the physical entity, the brain, and not the metaphysical entity, the mind. Moreover, Saussure does not have recourse to the mentalistic metaphors in terms of which notions such as 'mind' and 'cognition' are generally understood in modern cognitive psychology. This is an important distinction for the reasons I shall shortly discuss.

The above passage makes it clear that the practices of *parole* are the interface between the social and individual dimensions of *langue.* That is, *parole* is the interface between the social groups — c.f. Saussure's "ensemble of individuals" — to which individuals belong and the individual as a brain-body complex who participates in and interprets the practices of *parole* in virtue of the social-semiological resources of *langue* that are 'imprinted' and 'stored' in individuals *qua* brain-body complexes.

Saussure's perspective accords with the view that higher-order consciousness requires the emergence in the individual of a tristratal semiotic system, such as language (Halliday 1994). However, it is important to add that there are other modalities of social semiosis, such as the visual image, which also qualify in this regard. The emergence of a full-fledged grammar — whether linguistic or visual — means that social interactions freed from the here-and-now and the distinction between self

and non-self both shape individual consciousness and render it socially shareable (see Edelman 1989: 17; Halliday 1994).

The interpretation which has predominated in twentieth century thinking about the relationship between brain and language assumes that there is a little linguist in each of our heads who writes the rules of the language in the individual's brain. Chomsky's re-writing of Saussure's notion of *langue*is representative of this kind of approach:

The generative grammar internalized by someone who has acquired a language defines what in Saussurian terms we may call langue(with a qualification to be specified directly below). In performing as a speaker or hearer, he puts this device to use. Thus as a hearer, his problem is to determine the structural description assigned by his grammar to a presented utterance (or, where the sentence is syntactically ambiguous, to determine the correct structural description for this particular token), and using the information in the structural description, to understand the utterance. Clearly the description of intrinsic competence provided by the grammar is not to be confused with an account of actual performance, as de Saussure emphasized with such lucidity (cf. also Sapir, 1921; Newman, 1941). Nor is it to be confused with an account of potential performance. The actual use of language obviously involves a complex interplay of factors of the most disparate sort, of which the grammatical processes constitute only one. It seems natural to suppose that the study of actual linguistic performance can be seriously pursued only to the extent that we have a good understanding of the generative grammars that are acquired by the speaker or hearer. The classical Saussurian assumption of the logical priority of the study of langue(and the generative grammars that describe it) seems quite inescapable.
(Chomsky 1964: 915-6)

Chomsky's identification of "intrinsic competence" with Saussure's *langue* entails a radical confusion of different scalar levels of organisation. Saussure makes it clear that *langue* exists virtually in the brains of the individuals belong to a given social ensemble; it is not complete in any one individual (see above). Saussure's approach is explicitly global or top-down. *langue* is a higher-order, transindividual constraint of the kind that is not present in Chomsky's individualist and reductionist account. It is individualist because the social-semiological character of *langue* is confused with and reduced to the individual-centred notion of intrinsic competence. It is reductionist because *langue,* which functions as a higher scalar boundary condition or constraint distributed over an entire "ensemble of individuals", is reduced to the lower scalar notion of the individual's brain. *langue,* however, does not function at the individual level *per se*. Chomsky's notion of an intrinsic competence, on the other hand, does. This means that the individual brain-body complexes who use a shared language system or *langue* are entrained over time by the global nature of its transindividual structures and constraints. These are not simply there from the start as hard-wired genetically based rules or programs in the individual's brain. The transindividual nature of *langue* means by definition that individuals must participate in and experience its structures and relations in order to learn them. It is in this way that they come to be "imprinted" and "stored" in the individual's brain.

As Saussure further points out, *parole* is the agency whereby this is achieved. That is, the building up of such structures and so on as enduring patterns is historical information which has the ability to modify the individual and to contribute to his or her development and individuation. In Chomsky's account, it is as if the individual is born with a little linguist inside his or her head who writes all those linguistic rules that are the basis of intrinsic competence. In Saussure's theory, *langue* is a higher-order system of boundary conditions in which individuals are nested at lower

scalar orders such as the social dyads (cf. the speech circuit) and the individual organism itself. That is why *langue*does not exist perfectly in the individual *per se*.

Saussure's perspective allows us to think of an alternative view in which higher scalar boundary conditions are not left out of the picture or simply conflated with the lower order ones, as in Chomsky. Saussure allows for a view of self which accesses and participates in the transindividual structures of *langue*in and through the practices of *parole.* The individual is thus defined as unfolding along a temporal trajectory. It is through his or her participation in the practices of *parole*that *langue*is organised in the individual. At the same time, the individual also builds up a perspective on *langue*and its organisation though the exercise of "will" and "intelligence". Only in this way can the individual recognise pattern and meaning in the actions of others.

In Chomsky's view, the hearer's problem "is to determine the structural description assigned by his grammar to a presented utterance". The hearer's ability to do so is taken as evidence of an intrinsic competence, seen as an epistemically private mental capacity. In this Cartesian view, the hearer's ability to understand sentences is understood as standing in a causal relation with his or her epistemically private linguistic competence. Linguistic competence both causes and explains the hearer's ability to understand utterances. Notice that Chomsky says nothing concerning the hearer's response to the speaker. How does the hearer understand the speaker? In my view, such understandings are arrived at on the basis if the interactive experiences that speaker's and hearer's together enact and engage in. This means that in order to understand the other one does not read to decipher or decode sentences as representations of the other's thoughts, but rather to respond to the other in socially appropriate ways. The ability of speakers and hearers to respond to each other's utterances is

not evidence for a causally prior competence, but instead is a criterion for mutual understanding. Chomsky has nothing to say about the interactive or dyadic basis of language. The socially co-ordinated dyadic exchange is the basis on which language is developed. Research on very early proto-linguistic interaction between primary caregivers and new born infants shows that mutually co-ordinated gaze, smiling routines, and joint attending to objects within the purview of the dyad constitute a series of two-way effects whereby mother and infant mutually regulate and entrain each other's responses (Halliday 1975; Kaye 1982; Trevarthen 1994). For example, the child smiles to produce a response in the mother and this in turn leads to an affective response on the part of the mother. It is the affective- volitional basis of these exchanges, to use Vygotsky's (1988: 252) term, which provides the basis for the channelling and entraining of the individual's motivational predispositions in response to its needs and wants. Edelman has proposed that the infant's responses to the world are value-laden from the very outset. That is, the infant is biologically pre-disposed to seek out dyadic interaction with its caregivers from the very outset. In this way, it obtains the information stored in its ecosocial environment which is necessary for its further development and individuation. The mutually synchronised smiling, gaze and other activities referred to above thus function to channel the child's activities in some ways rather than others. One important consequence of the value-laden nature of the activities in the dyad is that some five sixths of the development of the human prefrontal cortex takes place in the first two years (Shanker 1996). This process is motivated and entrained by the child's joint participation in the dyadic exchanges which are crucial for its development. We may see here the beginnings of an epigenetic cycle of cascading/collecting which forms the basis of the individual's life trajectory.

The individual-centred focus of Chomsky has more to do with *parole*than with *langue.* To avoid confusion here, I should explain right away that I am

not saying that competence be equated with *parole.* Rather, I wish simply to highlight a further significant difference between the two perspectives. The point is that the individual is an agent in the process of its learning a language because the knowledge it has stored in its brain can be altered and increased in the course of experience. The individual regulates its own brain structures through its participation in *parole.* Yet, the individual cannot use its own genetically hard-wired intrinsic competence at the level of the "ensemble of individuals" where *langue*is found. This is indicative of the confusion of scalar levels that I mentioned above. Such genotokens are functions of the entire ensemble that the individual belongs to. It is only at this transindividual level — the ensemble or group — that individuals and genotypes can be altered. The individual can only kick start these processes though the deployment of its "will" and "intelligence" in acts of *parole.* Individuals participate in the dynamics of higher scalar processes though they cannot directly intervene in these or alter them. Likewise, the individual's central nervous system and peripheral sensori-motor activity can only kick start, so to speak, his or her deployment of such acts of "will" and "intelligence" in specific acts of *parole.* Yet, the ability to have a perspective on such acts and to recognise such acts in others is founded on *langue*and not *parole.* This is so because such practices are always mediated by a higher-order system of constraints such as *langue.*

A further problem in Chomsky's account is that intrinsic competence fails to make contact with or to relate to the real-world in which language users jointly make and construe meaningful acts. It is a formal and disembodied 'device' which is kept separate from that "complex interplay of factors of the most disparate sort" that Chomsky sees as characterising performance. Yet, this flies in the face of what we know about brain functions as involving complex and multiple interactions among themselves as well as with the environment of the individual. Language never exists on its own in any case. It is always multimodally integrated with other semiotic resources —

gesture, movement, etc. in the case of speech — and it is this integration which produces the meaning-making act. Further, as studies of the relation between language and gesture have shown, there is no predefined logical relationship between the two (McNeill 1992). Instead, these emerge as different yet complimentary — typological and topological — aspects of the whole during the temporal unfolding of the discursive event. Such events are dynamic and self-organising: they are assembled from the multiple relations among diverse semiotic resources on the basis of mainly **temporal** principles of organisation instead of fixed intrinsic competences located at particular spatial locations in the brain. As researchers such have David McNeill have shown, the relationship between language and spontaneous gesture is time-bound and is for this reason extremely adaptable to changing contextual demands. In the following section, I shall discuss the temporal dimension of *parole*with this in mind.

The Temporal Dynamics of *Parole*

How then does language and its multiple functions come to be “imprinted” and “stored” in the brain? How does the stored *langue interieure* in the individual’s brain regulate his or her participation in the practices of *parole*? In Saussure’s *Harvard Manuscripts*as edited and presented by Herman Parret (1994 [1993]), the role of time in *parole*emerges as an important concern.

The Qualitative Nature of Acoustic Perception

The recent publication by Herman Parret of selections from Saussure's *Harvard Manuscripts* sheds new light on the role of time in Saussure's conception of *parole.* Parret points out in his introduction to this volume that Saussure was forever concerned with the question of temporality, and in ways which transcend the linear conception of time as mere succession of elements along a line. I am not referring to the diachronic and evolutionary perspective on time which is internal to the language system, or *langue.* Rather, I am referring to the temporal dimension of *parole.*

Saussure goes to some lengths to emphasise that his semiological study of the sounds of language must be freed from any naturalistic basis in the physiology of articulation. This is the reason, as I showed in Lecture 3, that the "acoustic impression" is the starting point for Saussure's theory of the phoneme.

In the acoustic chain we determine (discern, segment) the simple moments (members, divisions), the homogeneous units (of indifferent duration) /p/a/ p/a/ (pa would be divisible). 2. Abstracting the simple acoustic moments which are obtained and comparing them, we enumerate them starting with their quality. The acoustic chain taken as an example presents to us in its 4 moments the 2 qualities p and a.
(from Fragment 24; Saussure/Parret 1994: 79)

In this passage, Saussure argues that the acoustic chain is subdivided on the basis of qualitative criteria. The act of perception of the acoustic chain takes place in the domain which Saussure calls the "acoustic sphere". The qualitative criteria referred to here can only be established when the analysis gets away from the physiological substrate of acoustic perception. Parret (1994: 22) draws our attention to two important, though neglected, aspects of Saussure's argument. First, there is the importance Saussure

places on the sensation of hearing, which Saussure sees as the basis on which the acoustic chain is determined:

An act of phonation is a set of physiological facts corresponding to a determinate phonetic fact. Since the phonetic fact is given to us in its turn through the sensation of hearing, it is only by starting from the latter that acts of phonation are established.
(Fragment 44; Saussure/Parret 1994: 85)

This means that the Ear plays a central role in Saussure's explanation:

The ear can, of course, decide only perceptual similarities, identities, and differences, …
(Fragment 32; Saussure/Parret 1994: 82)

Saussure does not, therefore, intend the Ear in the reductively physiological sense. In Saussure's account, aural perception is not a passive response to external physical stimuli. Rather, the Ear has agentive capacities whereby it attends to, explores, selects, and orients to the acoustic chain.

The 'decisions' that the Ear makes concerning that which it perceives involve processes of differentiation, comparison, and the extraction of 'invariants'.

Secondly, the perception of physical stimuli is 'quantitative'. Parret (1994: 23) points out that quantitative criteria determine, for example, the difference between a consonant and a vowel. Saussure makes, then, a distinction between the qualitative and quantitative criteria which are involved in acoustic perception. The latter refers to space-time as it is defined in the Newtonian framework of classical physics. In this framework,

space is an abstraction and time is a uniform universal flow. However, we shall see below that the abstract space and the empty time of Newtonian physics in not the world in which we perceive and orient to speech sounds. The latter is an ecosocial domain in which ecosocial events occur. Whereas physical events, in the sense Saussure defines as 'quantitative', occur with reference to abstract and mathematically defined co-ordinates, ecosocial events occur and are perceived in an ecosocial context in which the event has meaning and value for the organism. Saussure's 'qualitative' physics does not, however, replace the abstract physical space-time of his 'quantitative' physics. The latter is the necessary substrate of the former. The former constitutes the macro-physical world of morphological properties discussed in Lectures 3 and 4. It is the world of the phenomena — the surfaces, media, and substances in Gibson's sense — in which we live and move. The latter is the micro-physical world of atoms, electrons, and so on which is only available to us through the specialised techniques of observation practised by physicists.

Parret (1994: 23) points out that the 'quantitative' physics whereby vowels and consonants are distinguished is "co-perceived" as what Saussure calls the "acoustic sphere" in which the acts of speaking and listening take place. Saussure makes the following pertinent observation:

[The] difference between consonant and vowel is 'quantitative. In this way definitions are made without concern for the sphere in which one listens to speech. Physiologically quantitative, qualitative physics (sic).
(Fragment 48; Saussure/Parret 1994: 86)

Saussure makes, then, an important distinction between a "quantitative" physiology whereby acoustic stimuli are perceived and a "qualitative" physics on the basis of which the sounds perceived take on an ecosocial significance. This "qualitative" physics is not reducible to the abstract

physical criteria of the Newtonian discourse. Instead, it is based on the semiological value of the acoustic chain in the acoustic sphere in which speaking and listening take place. This acoustic sphere does not correspond to the abstract space and time described by the physicist. Rather, it refers to the ecosocial context in which speaking and listening occur. The “acoustic chain” is perceived as a sensuous event which has semiological relevance in the sphere in which it is spoken and heard.

For Saussure, the Ear does not simply respond to “quantitative” stimuli in the purely physical sense. The Ear evaluates what it hears. This involves a selective attending to acoustic stimuli in relation to the “qualitative” physical context in which the “acoustic chain” is heard. In modern terms, Saussure has a theory of aural perception which is holistic, active, selective, and ecological. Above all, it is a semiological theory because it involves the evaluation of qualitative similarities and differences in that which is heard. Overall, Saussure is less interested in the dimension he refers to as “quantitative physiology”, which entails a sensation-based theory of perception.

On the other hand, the “qualitative physics” that Saussure propounds is not something which is transmitted by the nerve cells. It is an active process whereby speakers and hearers orient to the flow of acoustic information in the ecological environment of the speech circuit. It is not, therefore, intrinsic to the physiological make up of the hearer.

The ability of speakers and hearers to discriminate significant similarities and differences in the acoustic chain is an ecosocial achievement. It entails a dialogic orientation to the acoustic chain. This necessarily implies the presence of the other. It is not a question of passively receiving external physical stimuli. The qualitative basis of aural perception requires an active and dialogic consciousness. It requires, as Bakhtin has shown, a

consciousness of the other's consciousness (1990: 89). Whenever someone speaks, this is both an event in the physical world and an ecosocial event, simultaneously.

In Fragment 44 (see above), Saussure claims that the "phonetic fact" is given to us "through the sensation of hearing". However, the acoustic environment in which the act of hearing takes place is not abstract and uniform from all points of view. The acoustic environment is reciprocal to the perceiver who is so 'environed'. The "qualitative physics" is always perceived with reference to the hearer. There is, in other words, a reciprocity of perceiver and perceived environment in Saussure's account.

The Three Levels of Time in *Parole*

In the *Harvard Manuscripts*, Saussure identifies three temporal scales in relation to the act of aural perception in its ecosocial environment. These are as follows:

TIME of identity ['identity' replaces 'homogeneity' which is cancelled] of the acoustic sensation; TEMPO of identity (idem) of the physical phenomenon; TEMPO (idem) of the number and quality of the factors [replaces "play of the organs, through the constancy …]
(Fragment 56; Saussure/Parret 1994: 90)

The three temporal scales which Saussure identifies belong to *parole.* They constitute three frames of reference in relation to which aural perception may be analysed.

The “Time of the number and quality of factors” is the mechanical level of description which is fundamental in classical and quantum mechanics. Time is associated with location in space. In this case, with the location and mechanical movement of the organs in the vocal apparatus during articulation. Thermodynamically, such processes are “symmetry breaking”. They are reversible, equilibrium processes. The alternative would be “symmetry breaking” processes that annihilate the space-time symmetries of the equilibrium state. These are irreversible, non-equilibrium processes. At this level, there are no events associated with the making or breaking of constraints. Motions are symmetrical and reversible in time and space.

The next level is the one Saussure calls the “Time of the identity of the acoustic sensation”, or “Linear Time”. This refers to the linearity of the phonetic chain. As Parret (1994: 27) points out, the *Harvard Manuscripts* draw attention to the concrete and sonorous character of the phonetic chain. This is the thermodynamic level of description. At this level, the breaking of constraints plays a key role in defining the ‘arrow of time’. The organisation of the phonetic chain proceeds in the direction of the continual breaking of constraints. Saussure argues that it is the spatial position of the sound on the line which presupposes time (see also Parret 1994: 27):

That which is equivalent to zero is not its brief duration but its identity with the time that precedes and follows it. In the same way, the fact that the space of the sound does (not) include many units does not depend on its long duration but on its non-identity.
(Fragment 57; Saussure/Parret 1994: 90)

The non-identity of a given unit of sound with respect to that which precedes or follows it breaks the symmetry of the configurational contrasts (??). The linear flow of the phonetic chain that results works irreversibly to

redistribute the energy which is conserved at the first level into a symmetrical distribution. The resulting transformational process involves the breaking of local constraints and an increase of entropy. These irreversible flows transform energy from the macro mechanical mode of the physiological level into the micro mode of the acoustic level. The instabilities associated with irreversible processes stabilise as the field's conservational distribution becomes symmetric:

Link in a chain: space of a sound, or a silence, or a sound which the ear does not judge to be identical to it. … There is no need to establish a minimum duration given that, since we are speaking only of sensations perceived, all that which on account of its low duration could not be translated into sensation is immediately excluded.
(Fragment 58; Saussure/Parret 1994: 90)

Saussure's third level is the "Time of identity of the physical phenomenon". Parret labels this the level of "environmental Time". In doing so, he takes his cue from Saussure's description in Fragment 48 that it is the "sphere" in which the acts of speaking and listening take place. In Fragment 24, Saussure describes this acoustic sphere as the domain in which speakers and listeners "move". In modern terms, this refers to the ecosocial environment of speaking and listening, rather than to an abstract physical space in the Newtonian sense.

The acoustic sphere is the domain of Saussure's "qualitative physics". The distinction Saussure makes between 'quantitative' and 'qualitative' may be linked to that between 'information' and 'meaning'. Information is a quantitative measure of the degree of semiotic freedom to choose from among the patterns. The less choice there is, the lower the information level. Information is unconcerned with the relevance it has for the participants in a given context. This is where meaning comes in. Meaning is

the significance the information has to the system that processes it (Wilden 1980 [1972]: 233). In this sense, the “acoustic sphere” is cross-coupled with the first level physiological domain mentioned above:

In the acoustic chain we determine (discern, segment) the simple moments (members, divisions), the homogeneous units (of indifferent duration) /p/a/ p/a/ (pa would be divisible). 2. Abstracting the simple acoustic moments which are obtained and comparing them, we enumerate them starting with their quality. The acoustic chain taken as an example presents to us in its 4 moments the 2 qualities p and a”. Taking a multiplicity of different chains and not only in the language system, we obtain the totality of all the basic units of diverse acoustic quality that can exist in parole. 3. Up to this point we are in the acoustic sphere. Now we establish in what physiological conditions each different acoustic unit is produced; … .
Fragment 24; Saussure/Parret 1994: 79)

The cross-coupling of the two domains gives rise to acoustic units of “diverse quality”. The physiological domain is the “efficient cause” of these acoustic units, which are the result of an “operation of synthesis of the acoustic chain”. Parret (1994: 30) makes the further observation that “Saussure does not separate the ‘sensation’ of the qualitative physics from the (acoustic) sensation of sounds. On the contrary, the link with sonority is essential”. Saussure’s third temporal level emerges from, yet is inseparable from, the sonority of the acoustic chain. This level is irreversibly connected with the “assembling” of constraints. The ‘arrow of time’ points in the direction of increasing order. This is the level associated with self-organising systems.

The sensation of the quality of the sounds in the chain emerges from their physical context, i.e., their quantitative sonority. Saussure’s third temporal dimension is the context of the linear time of the speech time. Parret calls

this “environmental time”. This has no autonomous existence. Instead, it emerges as a result of the “relationship of tension with the Time of the sound chain” (Parret 1994: 30). Parret continues: “Tension between contained and container, between the acoustic and the physical, between the sound and its aura, between the linear and the sphere, between the phoneme and its environment” (1994: 30). The “tension” Parret refers to is that between Saussure’s second and third dimensions of time in *parole.* The various sets of distinctions Parret makes each approximates in a partial way the still larger issue which Saussure seems to glimpse in these somewhat allusive, yet suggestive, fragments. The problem is that of the relationship between two distinct, though interrelated, systems of relations. It concerns the specificity of the two temporal domains with respect to each other. The relevant question is as follows: how is the Linear Time of the acoustic chain distinct from Environmental Time, and what is the line of demarcation between them? The answer to this question, as we shall see in the next section, concerns the role of the Ear in Saussure’s account.

The Contextualizing Function of the Ear

The line of demarcation between the two temporal zones is represented by the Ear. In Saussure’s account, the Ear is more than an organ of perception in the physiological sense. It is a contextualising principle (see also Parret 1994: 31). This explains why Saussure excludes from the outset his first temporal dimension — the physiological — from his semiological definition of the acoustic chain. The ear is the point of contact between the Linear Time of the acoustic chain and Environmental Time. The ear, so defined, does not perceive the physiological play of the speech organs in a direct, unmediated way. Rather, it ‘translates’ or contextualises the one in relation

to the other. The “tension” between the two domains which was identified by Parret arises from this activity of translating the heterogeneity of the sound experience into the homogeneity of the acoustic impression. By the same token, the one is not totally reduced to the other. Saussure does not lose sight of the important fact that the sensuous and sonorous qualities of speech sounds in the acoustic sense are inseparable from the qualitative (environmental) physics of sensation:

Can we consider the phoneme outside of time? Localisation of time. But one can localise only in relation to sonority, not in relation to the phoneme. (Fragment 59; Saussure/Parret 1994: 90)

In other words, the difference between the two domains is not eliminated altogether, but constitutes the basis for the ‘communication’ between the two. This process of communication takes place across the interface which both separates or demarcates the two at the same time that it mediates the exchanges of matter, energy, and information between them. This function of ‘interface’ is performed by the Ear. The contextualising function of the Ear means that there can be no perception of an objective totality as in classical physics. The Ear does not then simply re-present physical sensations as ‘raw’ data to be reprocessed as mental representations in the mind of the perceiver. There are not, in other words, two parallel realities of the ‘objective’ and the ‘subjective’ as in psychophysical dualism. The acoustic impression is not the representation or duplication in the perceiver of physical sensations received from outside. Instead, the Ear, in putting the two temporal domains into communication with each other, enables the Environmental Time of the acoustic sphere in which speaking and listening occur to emerge through the projection of the environment of speaking and listening onto the sound chain. The ear acts to bring together the two domains, without, however, eliminating the difference between them.

Saussure is careful to point out that the Ear is concerned with neither physiological nor psychological phenomena. Both of these belong to Saussure's first level of analysis. The physiological is concerned with sound in the physical sense; the psychological with ideas in some pre-semiotic sense. This is why Saussure insists on the semiological status of his phonetics: the relevant unit is the psychic, rather than psychological, association of sound and idea in a single unit (Parret 1994: 21 n. 45). If the idea, in the psychological sense, were opposed to sound, we would be talking about some pre-semiotic mental state of the perceiver. This is a purely subjective notion which is of no relevance to Saussure's analysis. It is the domain of the 'psychological' as distinct from the 'psychic'.

In so far as the ear is the permeable border or interface between the two temporal domains, it has the status of idealised interpreter. It is dually equipped to interpret objectively the information it receives from the acoustic chain as well as to interpret it semiologically according to the system of phonological categories of a given language system.

Saussure's distinction between the three levels of time in *parole,* along with his conception of the contextualising function of the Ear, constitute a remarkable anticipation of the ecosocial theory of perception developed by Gibson. Saussure distinguishes, in effect, between the 'quantitative' perception of similarities, identities, and differences in the acoustic chain and the 'qualitative' perception of environmentally salient information. The first refers to the variants which the Ear perceives in the process of auditory sensation (Fragment 44). This is linked to the Time of Identity of the Acoustic Sensation, or Linear Time, and is related to the body-relative dimension of auditory information. That is, to the quantitative variants in the acoustic chain perceived by the Ear. The second refers to the invariants whereby the Ear assigns semiological values relative to the "sphere" in which speaking and listening take place. This is linked to the Time of the

Identity of the Physical Phenomenon and is related to the perception of stable phonetic values in the environment of speaker and listener. This environment is based on phonological invariants (c.f. values) which are the basis of the stability of the environment of speaker and listener. It is ‘qualitative’ because semiological values are assigned to auditory sensations.

The ‘quantitative’ variability of auditory sensations is related to the embodied position of the meaning-making subject relative to the sensuous experience of hearing the linear acoustic chain. The ‘qualitative’ invariability of the values assigned to these sensations is relative to the multiple points of observation that are potentially available to speakers and listeners in the environment, i.e., in the “sphere in which one listens to speech” which is common to both. The stability of the values assigned to the acoustic chain is guaranteed by the changing points of observation available to speakers and listeners in the environment in which speaking occurs.

This distinction between the body-relative and the environment-relative dimensions of aural perception has nothing to do with the purely physical sensations of the physiological domain. The purely physiological Time of the Play of the Organs is subjective and pre-semiological. It is not part of the environment-perceiver pole of awareness described above. Instead, it is its physical substrate. Saussure, like Gibson, does not hold to a sensation-based theory of perception. Auditory information is not transmitted along the nerve cells leading from the receptor cells to the brain. Instead, the information which the Ear perceives and orients to is extrinsic to the perceiver. It exists in the Linear Time of the acoustic chain. It is only made relevant to the perceiver when it is co-perceived as qualitatively relevant to the environment in which speaker and listener jointly orient to the acoustic chain.

Saussure does not assign a passive role to the perceiver. The information in the sensuous experience of the acoustic chain is actively obtained by the perceiver. It is not imposed on the perceiver as external physical sensations that are to be converted into internal mental representations.

The ecosocial foundations of Saussure's theory of speech sounds is made most explicit in his insistence that the relevant unit of analysis is neither the physical sound nor the pre-semiological idea in the mind of the individual. The latter, as I pointed out above, has a purely subjective and psychological status. What interests Saussure is the semiological unit which he designates as the "sound-idea". This is psychic in status. Further, the acoustic chain is analysable as the correspondence, or the complementarity, between a physiological fact — the muscular movements in phonation — and an acoustic unit — the acoustic impression — which is based on the sensation of hearing. Saussure's point of view is that the phonic unit is comprised of the unity of these two perspectives. The analysis of the sound chain on the basis of one or the other taken in isolation would remove us from the semiological phonetics proposed by Saussure.

The acoustic chain in Saussure's account is dually quantitative and qualitative in status. This duality represents Saussure's attempt to overcome Cartesian psychophysical dualism. Saussure refutes explanations which oppose a purely physical conception of speech sounds to a psychological one. In so doing, he draws attention to the gap which divides explanations of physical events from semiological ones. The acoustic chain, for Saussure, is not reducible to the compression (sound) waves that emanate from a mechanical source in the abstract and empty space-time described by classical physics. Rather, it is an ecosocial event whose structural-functional characteristics are reciprocal to those of speakers and listeners in the "sphere" of speaking and listening. The unity

of the two perspectives in Saussure's description means that the acoustic chain "is" what it "means" relative to the speakers and listeners in the acoustic sphere. It does not have an absolute physical value as sound waves, or as physical sensations that excite the receptor cells in the ear. The acoustic chain is, then, a relational property of its environment. It potentially exists independently of the subjective psychological states of the individual.

From the perspective of Linear Time, the acoustic chain is a potential which exists for the purposes of interaction between speaker and listener in the Environmental Time of speaking and listening. The distinction Saussure makes between the two temporal dimensions represents an attempt to connect the semiological structure and function of ecosocial events to the ways of life of speakers and listeners in the Environmental Time of human speech.

The co-perception of these two temporal dimensions by the Ear shows that semiological values are not simply tacked onto physiological stimuli. Nor are they given in the sound waves that are the matter-energy substrate of speech sounds. Instead, the act of co-perception reveals the semiological values that the acoustic chain has in the qualitative sphere of speaking and listening. It is revealed by the contextualising functions of the Ear. The listener does not simply add these to a physical stimulus as some sort of optional extra. Time is crucial in Saussure's account because it is through the Linear Time of the acoustic chain that potential significances are specified in the 'quantitative' similarities and differences of auditory sensations in the unfolding of the acoustic chain. The co-perception of this as an ecosocial event is tied to the co-perception of the semiological values which are specified in the 'qualitative' invariants of the ecosocial context in which speakers and listeners "move" and orient themselves (Fragment 24).

The temporal dynamics of *parole*provides us with some important new insights into the essentially time-bound nature of these lower-scale dynamics. It is the temporal organisation and pattern of the 'movement of the organs' in articulation in relation to the overall social sphere — the speech circuit — in which speaking and listening occur which constantly occupies Saussure's thinking. Thus, it is the temporal pattern of the sounds heard, the physical sensations experienced in the course of speaking, the movements of face, hands, body, vocal apparatus, the listener's responses, and so on that are "imprinted" or, in modern terms, mapped in the brain as attractor maps during the real-time unfolding of the interaction. In turn, these real-time experiences are stored as the more enduring patterns in long term memory that constitute the individual's *langue interieure.*

Some Issues Concerning Causal Complexity and Language Development-in-Time

On the other hand, the view inspired by Chomsky and followers sees intrinsic grammatical competence as a predefined logical hierarchy of rules for assigning structural descriptions to "each phonetically possible utterance" (1964: 915). The claim that this occurs on the basis of "a limited experience with the data of speech" (1964: 915) presupposes that the brain is a storage repository for an *a priori* system of rules and their possible symbolic manipulations. The predominant metaphor which informs this view is a static and spatial one.

Saussure's dynamic and time-bound account of *parole*is in my view a better starting point. In saying this, I am not claiming that all of the answers

are present in Saussure. Rather, using Saussure as a starting point, we can investigate what form an alternative account might take. Such an alternative has no need for a mentally represented intrinsic competence whose further growth is triggered by external stimuli (Pateman 1985: 41):

Grammars are presented as things to which organisms (or minds) are liable, rather than as things of which subjects are capable. Further, Chomsky uses the term "growth" rather than "learning" because of his belief that central properties of the grammar are innately specified or limited. We do not speak of an acorn learning to be an oak, but of an acorn growing into an oak,, just because we know that the form of the oak is, essentially, specified in the acorn which consequently contains the formal cause of the oak (as a genetic programme).
(Pateman 1985: 41)

In the above account, the explanatory focus is on material causes and formal causes. Material causes are the environmental stimuli — the affordances, I would rather say, following Gibson — which in Chomsky *pace* Pateman are the "social interaction [ ] necessary to trigger off growth" (1985: 41). In Pateman's account, there is but a loose fit between social interaction-as-trigger of linguistic growth and the mentally represented grammar which has no social status. The latter is an implicit formal cause — a genetic program — which specifies the organisation of the grammar in the individual organism. This conjunction of material and formal causes is especially appropriate for an analysis which confines itself to the lower scalar levels of the individual organism and the sub-personal modules where linguistic growth takes place below the level of the organism (Pateman 1985: 41). The message seems to be that whenever material and formal causes are thrown together at these levels of analysis, language growth is likely to occur:

Chomsky does say that mentally represented grammars grow in the mind only under the triggering and shaping impact of environmental stimuli. His use of the term "trigger" is borrowed from biology, and is linked to his assumptions about a critical period. It implies a number of thins, notably freedom from stimulus-control: what determines whether a particular piece of growth is triggered simply whether the right quality of stimulus is presented at the right time. It may be that quantity of the right stimulus can make up for displacement in time, but basically the organism is to be thought of as programmed to be influenced by or to ignore presented stimuli according to a given schedule. It is not subject to classical or operant conditioning.

At a higher level, Chomsky has said that he regards social interaction as necessary to trigger off the process of growth. Here it is important to be clear what kind of social interaction is required in order to trigger particular linguistic processes. For whereas in a learning theory the match between interaction and linguistic processes must be a close one if it is to make sense to say that a linguistic form has been learned in and from interaction, in a nativist theory the fir can be much looser — and the looser the fit the more powerful the nativist claims that can be made.
(Pateman 1985: 41)

It is noteworthy that Pateman is anxious to eschew final causes in the sense of individual ends or intentions from the analysis, hence his focus on sub-personal modules rather than individuals. However, there is another sense in which final causes can be understood. These have to do with the overall boundary conditions or the higher-order scalar constraints of the ecosocial system of which the individual language user is but a part. In this view, which is inspired by Salthe's (1993: 10-2) reading of Aristotelian complex causality, the form of the oak is not essentially specified in the acorn at the outset. Rather, the individual language user incorporates more

and more information which is stored in the environment during the course of its growth and development. Thus, final causes have to do with the development of the entire system of relations and are essential for explaining the emergent self-organisation of the individual through his or her participation in the dynamics of the system as a whole. In this view, the focus is on formal and final causes rather than on formal and material causes. The latter view (Chomsky, Pateman) privileges essential information seen as already contained in the organism as some sub-personal level. The fit between these formal causes and the material ones of social interaction is “loose” because the latter are reduced to the status of stimuli which can be attended to or ignored “according to a given schedule” (Pateman 1985: 41). What triggers the system simply implies a homeostatic principle of that which impinges on the system. There is no doubt that genetic constraints do constitute a set of initiating conditions for the further development of the organism. However, the Chomsky-Pateman view that the organism is programmed to attend to or ignore stimuli according to a predetermined schedule does not explain how each developmental stage is accessed on the basis of the newly emergent practices and behaviours that are acquired on the basis of newly stored information whenever a new level of organisation is reached. This means that newly acquired repertoires of dynamic transformations enable the organism to tune into newly discovered regularities in its environment. Both Pateman and Chomsky are anxious to free the organism from “stimulus control” (Pateman 1985: 41) in the external environment, which is seen as an efficient cause whereby things are pushed and pulled around according to the laws of mechanical physics. Thus, stimuli are random fluctuations which simply facilitate irreversibility (Salthe 1993: 219). In such a view, the environment is not a source of structure, regularity and information which is stored in the supersystem as a whole and which, rather than being pre-programmed in the organism from the outset, constitutes the historical information — its principles of final causality as Salthe (1993: 219)

expresses it — which ensures that each developmental stage arrives at the right time. That is, time is intrinsic to the dynamics of the system as a whole at each moment along its trajectory rather than being established right from the start.

The act of *parole* is assembled from the multiple interconnections among various factors on different levels of temporal organisation. Further, the individual's *langue interieure* is based on patterns and structures of varying flexibility and stability that are built up and altered in the course of the individual's experience of the language, rather than on the hard wiring of pre-defined rules. It is certainly not the fixed inventory of re-writing rules as characterised by Chomsky (1964: 916-7).

In Saussure's description, the brain is not a species of universal Turing machine on which any effective procedure may be executed. That is, he does not talk in terms of the mental states of the individual as functions that can be computed in a standard and automatic fashion without reference to individual variability in *parole* or to the particular instantiations of the system in, say, phonic or graphic substance. The whole point of *parole* is to show that (1) socially shareable subjective experiences or consciousness are psychic in nature; and (2) the brain is a repository of **potential meanings,** rather than formal algorithms, and that the meaning potential 'imprinted' and 'stored' in individuals is defined in reference to the dynamic and open environment of the practices of *parole.* The meanings so stored in the brain are not formal propositions that are seen as isomorphic with computational states in the brain.

Saussure and Edelman's Theory of Neural Group Selection

Saussure's account of the brain is informed by the developments in evolutionary theory and neuroanatomy and neurophysiology that took place in the second part of the nineteenth century. It is a progenitor of more recent attempts to link the biological basis of the brain-body complex to the macroscopic ecosocial environment of the individual. That is why it is morphogenetic (Lecture 4). Saussure's account of the 'imprinting' and 'storing' of *langue* in the individual's brain through the practices of *parole* calls for an explicit account of the place of the brain in his social-semiological theory. He draws on contemporary theories of neuroanatomy and neurophysiology and clearly considers the psychic basis of individual acts of *parole* as having a basis in brain structure and function. However, he does not push this awareness beyond a mere sketch of the way specific brain functions are connected to individual linguistic activity. What strikes me about Saussure's account is the resemblance it shares with some of the most recent developments in the brain sciences (Edelman 1989). In a period of renewed emphasis on physical and biological reductionism, it is important to see how Saussure's thinking about language can be connected to these recent developments in the brain sciences in order to see how this can contribute to the development of an alternative to such reductionisms.

In Saussure's account, the brain is not pre-wired with explicit formal rules, genetically based, that constitute a program or set of instructions for well-formed linguistic 'outputs'. Saussure's morphogenetic perspective is not based on the input-output models of information-processing of the kind that have been dominant in cognitive science in the past several decades. Instead, his account of the constant synchronic and diachronic dialectic

of *langue*and *parole*in both the collective and individual dimensions suggests some striking affinities with the recent research of American neuroscientist, Gerald M. Edelman (1989), which is an explicit challenge to the computational model of the brain as a species of Turing machine. Edelman's account is what he calls a "population theory" of neuronal group selection. With respect to this theory of neuronal group selection (TNGS), he explains that:

… brains operate by selection upon variance at several levels. Such a process leads to differential modification of synapses and the selection of particular neuronal groups on the basis of individual experience in an open-ended world or environment […]. Selective systems such as those embodied in the TNGS involve two different domains of stochastic variation (world and neural repertoires). The domains map onto each other in an individual historical manner […]. Neural systems capable of this mapping can deal with novelty and generalize upon the results of categorization. Because they do not depend on specific programming, they are self-organizing and do not invoke homunculi. Unlike functionalist systems, they can take account of an open-ended environment.
(Edelman 1989: 31)

Saussure entirely lacks any specification of the neural level. This is consistent with the fact that the brain sciences were only in their infancy when Saussure presented his lectures in Geneva. Therefore, no conclusions concerning the neural level can, or, indeed, should, be drawn on the basis of Saussure's discussion of the brain. In the first instance, Saussure's is a theory of social-semiological phenomena. It is not a brain theory. However, Saussure's discussion of the way in which *langue*is 'imprinted' and 'stored' in the brains of individuals is strikingly analogous in its broad outlines to Edelman's biologically founded account of the way in which the world is selectively mapped onto neural repertoires. It is the

duality in Saussure's definition of *langue*as both social and individual which makes this analogy possible. Within the limits of the neuroanatomy and neurophysiology of his day, Saussure at least attempts to assign a place to the neuroanatomical and neurophysiological processes that underlie, say, the peripheral activities of phonation and audition and in ways that attempt to close the gap between the biological, the psychological, and the social-semiological levels in a unified way. The further possibilities inherent in such an enterprise will be explored in this lecture. The first step is to define more precisely the basic criteria which will such an inquiry to be conducted.

Edelman's notion of "selection upon variance at several levels" on the basis of individual experience suggests a fruitful link with the ways in which individual agents in and through the speech practices of *parole*can enact new configurations which leave their mark on the individual during the course of its individuation. Categories are thus emergent and self-organising properties in the real-time individual historical experience. The co-ordination of neural and world repertoires suggests an interesting parallel with Saussure's notion of the receptive and co-ordinative faculties whereby linguistic patterns come to be stored in the individual's brain. This is so in two ways. First, the sensori-motor activities of reception entail the sampling and pickup of environmental information and its transmission to the central nervous system. Secondly, different sources of information, derived from different sensory modalities, are co-ordinated in the time-bound making of a category. In Lecture 8 I shall further discuss this process in relation to Edelman's theory of reentrant mapping. Finally, Edelman recognises the role of novelty as encountered in *parole*(see above): on this basis the individual's *langue*may be generalised, built up and further elaborated.

The arguments I have sketched out in the preceding paragraphs impose a number of criteria on a social-semiological account of the way the brain-

body complex of the individual meshes with the higher-order social-semiological system of *langue.* First, the brain is not a species of Turing machine. Secondly, the individuality of each person's brain-body complex is not inconsistent with the psychic properties of consciousness. Thirdly, the phenomena of experience, both inner and outer sensations (c.f. Dewey's *qualia),* emerge on the basis of semiological values that emanate from *langue.* Fourthly, the system of associative and syntagmatic relations in *langue,* seen as dually social and individual, enable individuals to construe and categorise phenomena of experience without recourse to any species of pre-programmed linguistic or other modules. Fifthly, the system of *langue*which is 'imprinted' and 'stored' in each individual defines the meaning potential which the individual has developed in and through his or her participation in the practices of *parole.* Sixthly, the open and dynamic character of these practices means the individual's meaning potential is not static and unchanging, but dynamic and adaptive, and in ways that bring about changes in self and individual consciousness. Seventhly, the psychic or intentional nature of acts of *parole*means that individuals can act upon the world in teleologically efficacious ways.

In this lecture, I will be concerned with exploring and further developing the implications of this perspective. But first a few more words about the mentalistic models of mind that I mentioned above.

Mind, Mentalism and Discursive Activity

The exponents of mentalism posit the existence of a 'grammar' of thought which both lies behind and exists independently of, though is causally related to, semiotic-discursive activity. The supporters of this view

presuppose the existence of a central program 'in the head' — i.e., a grammar of thought — which controls and regulates observable linguistic and other discursive activity. Generally speaking, the currently dominant technological metaphor is that of the computer program. According to this view, there exists 'in the mind' of the individual language user an *a priori* representation of discursive activity in the form of an atemporal and context-free program or system of rules which causally controls or generates the individual's language activity. Such 'grammars' have a formal status in so far as they represent the 'inner' workings of the mind. The problem remains as to how such mental programs are translated into context-sensitive activity. A number of solutions have been proposed. However, these problems are not directly relevant to the present discussion and I shall not deal with them here (see Harré and Gillett 1994: chap. 4 for further discussion).

Saussure's theory of the linguistic has sometimes been seen as a mentalistic one. The language of concepts and acoustic image which he uses to discuss the sign-relation in the speech circuit has been seen in this light. It is worthwhile considering the implications of this view in some detail in order to show that it does not readily apply to Saussure's theory. In the mentalist paradigm, concepts in the mind are mental representations which represent objects, events, etc. in the external world. In this view, concepts represent the categories which exist in the world outside the mind. The purpose of mental representations is to build up correct representations of the categories which re 'out there' in the world. It is a correspondence view of the relationship between internalised mental representation and external reality. It should be clear that such a view stands in stark contrast with Saussure's refutation of the notion that language is simply a nomenclature for labelling an already pre-defined world. Saussure's view of mental activity and the role of language in this assumes, on the contrary, that the world is not pre-labelled. Instead, his social-semiological view of language

assumes that language users construct their perceptions and categorisations of the world in *parole*through the supervening role of a higher-order system of *langue.* Further, there is no contradiction between the claim that *langue*has an individual dimension in so far as it is 'imprinted' and 'stored' in the brains of the individuals who share a given language system and a social or collective dimension (see below).

In my view, Saussure's conception of the mechanism of the language system provides a basis for understanding the diversity and adaptability of real-time processes of categorisation in acts of *parole.* To see this more clearly, we shall re-examine the role of syntagmatic and associative relations as the two forms of mental activity which are conjointly involved in the making of linguistic signs. In doing so, I shall suggest some useful connections between these notions and Edelman's dynamic theory of category formation. First, Edelman argues that categories are **degenerate.** That is, they comprise multiple disjunctive patterns of connection between perceptual categories. The anatomical basis for degeneracy lies in the multiple and branching connections between neurons in different parts of the brain and nervous system. The result is a ramifying network of neural connections which is potentially enormous in dimensions. Secondly, Edelman postulates the notion of **reentry** in order to explain the co-ordination of perceptual and motor responses that are derived from diverse modalities. Our experience of phenomena are almost always multimodal, involving the co-ordination of information from various perceptual and motor sources. This co-ordination is founded on the temporal correlating of all the incoming information as a single event in the real-time unfolding of the event. In the uttering of a particular word, one set of neural firings from the sensory neurons in the muscles of the lips and face provides information about the movement of the skin and muscles in these areas, another set provides information about the deployment of the

organs in the vocal tract, another set receives and abstracts information from the organs of hearing concerning the sounds produced, and so on.

All of the stimuli detected by disjunctively separate sensory systems are abstracted as patterns of features which are sent to sets of degenerate maps. The neural connections between these maps enable these disjunctive sources of information to be reciprocally correlated with each other. In this way, the various motor and perceptual modalities and their relations to the world are co-ordinated in time as a single, overall event. Re-entry is the means whereby separate and disjunctive sources of information are integrated as a single, higher-order pattern. Importantly, the repetition of similar patterns over time means that information disjunctively generated by the haptic, auditory, and other modalities in our example along with their consistent correlation assumes a stable association on account of the real-time cross-modal links that are consistently perceived.

On the basis of this consistency of association, groups of synapses are selected for the building up of perceptual categories. In this way, our perception of the haptic, auditory, and other information involved and our perceptions of how the word relates to the world and to other speakers, enables a stable perceptual category to be built up in memory in relation to the use of the word. Further, the degenerate character of the connections means that the category can be invoked though many different pathways as well as allowing for new associations to be built up in as the individual uses and encounters the word in ever varying contexts throughout his or her life. Rather than pre-programmed rules, language is built up and integrated into the individual on the basis of the emergent and self-organising connections among diverse sensory-motor, semiotic, and functional modalities (Lecture 7, Section 9; Lecture 8, Section 6). Far from being secondary happenstances which are relevant to performance as in Chomsky (see above), these cross-modal couplings of associative relations

are intrinsic to the self-organisation of semiotic categories mentioned above.

I shall now propose some suggestive parallels between Saussure's account of the workings of the 'mechanism of the language system' and the observations made above. Of associative relations Saussure observes:

Whereas a syntagm immediately calls up the idea of a sequential order and of a determinate number of elements, the terms in an associative family present neither a definite number nor a determinate order. If one associates désir-eux, chaleur-eux, peur-eux, etc., one could not know in advance what will be the number of words suggested by memory nor in what order they will appear. A given term is like the centre of a constellation, the point where other coordinated terms converge, the sum of which is indefinite.
(CLG: 174)

We see here that associative relations are degenerate in Edelman's sense. They are made up of multiple and disjunctive series of elements that jointly contribute to the meaning of the given item. There is no single or determinate way in which associative relations may be invoked. Thus, they can contribute in multiple and creative ways to the meaning of a category. Further, they are comprised of a loose and flexible 'family' of associations rather than conforming to fixed models, programs or rules. Diverse associative relations do not provide a single, fixed meaning or definition, but a flexible and adaptable resource for responding to variation and ambivalence in meaning in different, even overlapping, contextual domains. In other words, associative relations are dynamically assembled in context. Moreover, syntagmatic and associative relations are not independent of each other:

They reciprocally condition each other. In effect, co-ordination in space contributes to the creating of associative co-ordinations.
(CLG: 177)

Co-ordination in space refers to the domain of syntagmatic relations. I see this notion as suggesting a link to Edelman's notion of reentry. The syntagm is the means whereby choices from diverse associative series are co-ordinated as a single syntagm in space-time. It is the means for correlating the associative choices in a structure which has spatio-temporal contiguity and coherence. That is, the syntagm brings together diverse associations as a single structured event in space-time-

Our memory holds in reserve all types of more or less complex syntagms, no matter of what kind or duration, and at the moment of using them, we bring in associative groups in order to fix our choice. When someone says marchons! ('let's walk!'), he unconsciously thinks of diverse associative groups at the intersection of which is found the syntagm marchons!. This figures as a part in the series marche! ('walk!' — 2nd Person Singular), marchez! ('walk!' — 2nd person Plural), and it is the opposition of marchons! with these forms which determines the choice; on the other hand, marchons! evokes the series montons! ('let's go up'), mangeons! ('let's eat!'), etc., within which it is chosen by the same procedure; in each series one knows what has to be varied in order to obtain the differentiation which is appropriate to the unit which is required. If the idea to be expressed is changed, other oppositions will be necessary in order to bring about another value; one will say, for example, marchez!, or else montons!
(CLG: 179)

In the above, Saussure shows how elements from diverse series are mapped onto the one syntagm (see also Lecture 7, Section 7). The

principle of classification and comparison that is applied to the various associative series must identify and select the appropriate element from each series. Further, it must then correlate the elements so selected with each other by reciprocally and functionally relating them to each other in the syntagm that results. This means that the specific elements which are abstracted from a given associative series are 'reentrantly' mapped onto a higher-order syntagm which synthesises the information deriving from diverse series into a functional whole.

Importantly, Saussure sees the simultaneous functioning of these two types of relations as constituting the very basis of the mental activity which gives rise to language in the individual. Further, memory, as the above quotation shows, is flexible and associative rather than based upon the storage of fixed rules and programs for representing the external world. The emergence of a particular sign is the product of the ways that both syntagmatic and associative relations dynamically adjust to the basin of one attractor rather than another according to the context or context-type that is in operation. Syntagmatic and associative relations simultaneously function in the real-time of meaning-making.

The activities described above do not take place on the basis of purely disembodied and abstract meanings (*CLG*: 189). The point is that syntagmatic and associative relations simultaneously work on the given physical-material unit (1) to analyse it into its constituent parts and to assign values to these; and (2) to assign a global meaning or sense to the physical-material unit on the basis of the values that are assigned to the various parts that are ordered or arranged in a certain way:

But if word order is incontestably an abstract entity, it is no less true that it only owes its existence to the concrete units which contain it and which flow in a single direction. It would be a mistake to think that there a

disembodied syntax outside of these material units distributed in space. In English the man I have seen ("l'homme que j'ai vu") shows a syntactic fact which appears to be represented by zero, whereas the French renders it with que. But it is just this comparison with the French syntactic fact that produces this illusion that nothing can express something; in reality, material units, arranged in a certain order, alone create this value. Outside of a set of concrete terms one would not know how to reason about a syntactic matter. Moreover, for the sole fact that one understands a linguistic complex (for example the English words cited above), this sequence of terms is the adequate expression of thought.

A material unit only exists though its sense, the function with which it is endowed; this principle is particularly important for the knowledge of restricted units, because one is tempted to think that they exist in virtue of their pure materiality, that for example aimer owes its existence to the sound alone which comprises it. Inversely — as we shall see — a sense, a function only exists through the support of some material form; if this principle has been formulated with regard to more extended syntagms or syntactic types, it is so because one is induced to see in them immaterial abstractions gliding above the terms in the sentence. These two principles, in completing each other, agree with our claims relative to the delimitation of units (see p. 145).
(CLG: 191-2)

The material units that Saussure speaks of are necessary so that the given unit can be processed by our motor and perceptual apparatus. This physical-material stimulus is simultaneously processed by the associative and syntagmatic dimensions of contextualisation in order to construe it as a meaningful act or sign. Both dimensions are necessary and may be said to stand in a relation of complimentarity to each other. Associative relations both constitute a network of possible choices as well as provide information

about the component features of the structure; syntagmatic relations analyse it in terms of its overall form and structure. In Edelman's terms, the two kinds of relations can be said to be degenerate: multiple and redundant processes apply to the same unit. They are also disjunctive because the two kinds of analytical operation that are entailed by associative and syntagmatic relations are not reducible the one to the other, but are distinct. Associative relations assign the component parts of the unit to one or more associative series. Syntagmatic relations map selected features from the relevant associative series onto the given structure. As forms of mental activity, the two types of activity take place in the real-time of speaking itself — 'at the moment of uttering the sentence' — that is, in the short term memory in operation in *parole:*

This principle applies to syntagms and sentences [phrases] of all types, more or less complex. At the moment of uttering the sentence: "que vous dit-il?", we make an element vary in a latent syntagmatic type, for example, "que te dit-il?" — "que nous dit-il?", etc., and it is in this way that our choice is fixed on the pronoun vous. In this way, in this operation, which consists in mentally eliminating everything which does not bring about the desired differentiation at the desired point, associative groups and syntagmatic types are both in play.
(CLG: 179-80)

At the moment of uttering the sentence in *parole,* a latent syntagmatic type in *langue*is selected in relation to a whole cluster of associative relations that constitute the environment from which the specific choice is made. In the above example, the sentence *que vous dit-il?* instantiates a more abstract grammatical schema — cf. Saussure's latent syntagmatic type — in relation to a series of possible alternative selections in, for example, the associative series comprising the pronouns *te, vous, nous,* and so on. By the same token, the associative series that are relevant to the specific

selection which is made at each point in the syntagm function to classify that choice as being assignable to a given class of associative relations.

The two activities are time-linked yet disjunctive processes that apply to the same perceptual stimulus — the physical-material unit — such as a given sequence of sounds. Further, they each act upon and condition each other. In other words, they are correlated activities in the real time of speaking (or understanding) a linguistic utterance. This means we can both relate the given utterance to a given syntagmatic type as well as specify its own particular features according to the particular associative series from which they were selected. All this occurs on the basis of resources which are internal to *langue*itself. There is no external process of instruction for the social-semiological treasure of *langue*is stored in the brain of the individual. It is the simultaneous and interdependent working of the two forms of mental activity that enables linguistic forms to emerge. In modern terminology, it does not seem inappropriate to claim that Saussure had already understood the self-organising character of this mental activity. This means that it is the correlation of the two activities that gives rise to a reentrant map whereby a higher-order linguistic form is generated. Saussure's example may be re-cast as shown in Figure 2:

Figure 2: Correlation of associative and syntagmatic relations in the realisation of the sentence que vous dit-il?

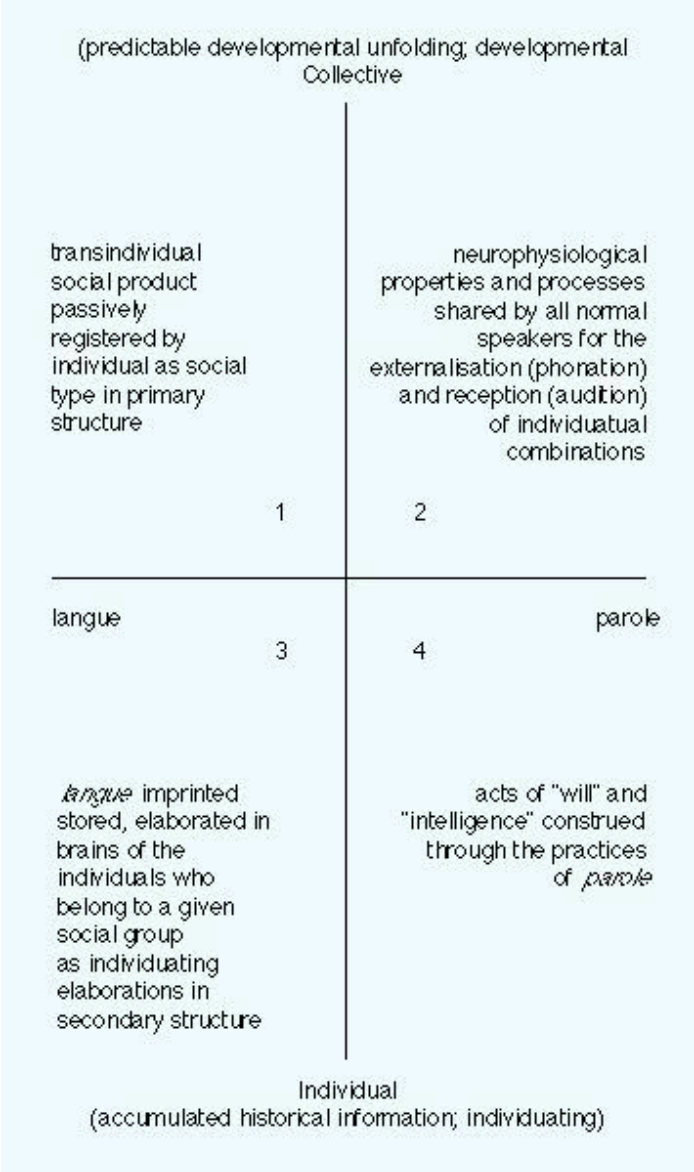

Figure 2 illustrates both the associative series relevant to the sentence *que vous dit-il?* as well as the latent syntagmatic type of which the sentence is an instance. In the case of the associative series, three have been presented here. These are (1) the French personal pronoun system, which is shown in a truncated form here; (2) the grammatical choice between the presence or absence of Q elements such as *que, quand,* and so on in first position in interrogative clauses; and (3) the grammatical choice between inversion or non-inversion of the Subject and the verb Predicator. The latent syntagmatic type specifies the type of syntagm selected in terms of the combination of structural elements which typically realise grammatical structures of this type, where the carat sign '^' means 'is followed by'.

Significantly, Saussure claims that the two forms of mental activity — syntagmatic and associative — are deployed at the moment of uttering the given sentence. He does not claim *pace* Chomsky that *langue* is an internalised grammar that generates the set of well-formed sentences that we call the English, Hindu, Japanese, etc. language. Rather, he makes the point that language users enact these two forms of activity at the moment of speaking. *langue* does not generate or produce sentences; speakers do in the activity of speaking. This accords with Saussure's view of speaking as a psychic or intentionally directed activity that takes place in relation to an interlocutor in the speech circuit (see Lecture 5). *langue* is not therefore causally generative in the Chomskyan sense. It is not a pre-existing program that governs linguistic performance. The fact that it is "imprinted" and "stored" in the brains of individuals does not imply this. Nor is it necessary to specify it in neural terms. My point here is that the neural processes underlying linguistic activity are not the same as the linguistic activity. *langue* may better be seen as the language user's stored knowledge as to how to **use** the language in relation to specific contextual requirements. It is not an abstract and autonomous grammatical competence *per se* for *langue* has both co-evolved and is co-deployed in relation to other semiotic resource systems and the material world. It follows, therefore, that the language users stored *langue interieure* constitutes information concerning the typical co-deployments of language and other semiotic resources. In this view, the notion of language existing sui generis makes no sense and has no explanatory value. That which is stored and elaborated in the brain is not an abstract competence, but information as to how language forms relate to context in patterned, regular ways. That is, information concerning language and its functions in context.

This raises the question as to what kind of status to assign to the notion of 'mental activity' here. This will be the focus in the following section.

Social-Semiological Practices of *Parole* Shape Brain Function

The important point that needs to be emphasised is that Saussure relates *langue* to the physical entity, the brain. He does not have recourse to the representational and mentalistic metaphors of the type which have become commonplace in cognitive science over the past few decades. Cognitive psychology is itself currently undergoing an important series of changes. Many of the previously dominant orthodoxies concerning the centrality of the computer program and information-processing as explanatory metaphors of human cognition are currently being radically revised.

In the light of these changes, I should like to draw attention to the ways in which recent developments in the neuropsychology of brain functioning allow us to reassess the largely neglected place which Saussure assigns to the brain in his social-semiological theory of language. Saussure claims that *langue* is 'imprinted' and 'stored' in the brains of the individuals who belong to a particular social-semiological system. In similar ways, researchers such as Harré and Gillett (1994: 81) and Peng (1994: 122-5) draw attention to the renewed interest in the ways that social and discursive activities shape brain function. Harré and Gillett describe the brain as a "repository of meanings in that it serves as the physical medium in which mental content is realised and plays a part in the discursive activities of individuals" (ibid.). What is striking about this formulation is the way in which the semiological language of signification, or realisation, replaces the physical language of causality. The brain does not stand

‘behind’ and therefore ’cause’ acts of social semiosis: it participates directly in them (Thibault 1986; Lemke 1988: 83).

Harré and Gillett’s use of the term “realised” neatly captures the duality in the semiotic use of this term, viz. the brain is both the realisation of social-semiological processes in the specific sense that it is the product of these — i.e., it is shaped by them — and it actively participates in and contributes to their realisation. In other words, the brain has a two-way realisatory, or semiological, relationship to social-semiological processes and activities. In the Saussurean terminology of the sign, the brain is a signifier which both expresses and constructs signifieds. In Lecture 8 I shall discuss how these may have both an ‘inner’ and an ‘outer’ dimension.

The brain is a physical-neurobiological entity. However, it is not an entity in the same way that an inert and inanimate (non-living) object is. The same applies to the entire body-brain complex of which the brain is just one functioning component. Unlike inorganic objects, living beings are not simply acted upon by external forces. They have their own internal complexity and potential. Moreover, they exhibit emergent and self-organising properties and processes. The internal and external states of organic beings are linked to each other in a relationship of circular causality, viz. external –> internal –> external. But before proceeding any further with this line of inquiry, I should like to return to the paragraph from *CLG* which I quoted at the beginning of this section.

Saussure claims that it is through the individual’s “receptive” and “co-ordinative” faculties that *langue*is ‘imprinted’ and ‘stored’ in the brains of the speaking subjects who belong to a given speech community (see above). These faculties act as the interface between what is ‘inside’ and ‘outside’ the individual in the speech circuit. They also include the Ear in the specific sense discussed in section 2. This notion of an interface illustrates a

revealing duality in Saussure's conception of *parole.* That is, *parole*is jointly enacted by individual speaking subjects in the speech circuit. *parole*is also the means whereby *langue*in 'imprinted' and 'stored' in the individual's brain. *parole,* in so far as it is "accessory and more or less accidental" (*CLG*: 30) may have the status of random variation or noise in relation to the language system. It thus constitutes a potential source of variability and newness on the basis of which the individual's trajectory-in-time is marked by historical contingencies that contribute to the formation of its identity. From this point if view, *parole*has the status of 'noise' in the information-theoretic sense. As such, it is part of the material and semiotic environment of the system of *langue*and may be incorporated into this as information. In the paragraph I cited above, Saussure uses pre-information-theoretic terminology to describe precisely this process. I shall endeavour to reconstruct this process in section 9 below.

A Brief Excursus on the Place of the Brain-Body Complex in the Speech Circuit

Random variation or noise in the practices of *parole*is selectively attended to and evaluated by the receptive and co-ordinative faculties of individuals as salient patterns of difference. This information is, in turn, 'imprinted' on the brains of the ensemble of individuals who enact a particular speech community in and through the practices of *parole.* Saussure says that the "social product" of *langue*is "stored" *[déposé]* as "a grammatical system existing virtually […] in the brains of an ensemble of individuals". What interests me here is the extended spatial metaphor: *langue*is imprinted and stored 'in', and so on. In this perspective, *langue*has both a spatial dimension ('stored in') and a virtual, rather than a temporal and real, one.

What, then, is temporal and real? The answer to this question, which I take up in the remaining paragraphs in this section, brings us back to *parole.*

The first of these, the 'time of the identity of the play of the organs', refers to the macroscopic co-ordination and patterning of the speech organs which come into play in the processes of phonation. This is the level of information which exists in the ecosocial environment of the individual. Information, as defined by Gibson (1986), refers to the macroscopic patternings of lower energy fields in, say, the ambient optic or acoustic arrays. Such patternings are generated by disturbances (events) in the environment. That is, a mechanical event in the environment corresponds to a disturbance in the ambient acoustic array. Such a disturbance is equivalent to structured information about the event which may be 'picked up' by a potential observer.

Saussure's 'time of the identity of the play of the organs' is an event in this sense. In the process of articulation, the various subsystems of the vocal apparatus which come into play generate a corresponding disturbance in the ambient acoustic array. The disturbance which is so generated is equivalent to Saussure's second perspective on time, viz. the Linear Time of the acoustic chain.

The acoustic chain stands in a relation of correspondence to the play of the organs in the act of articulation. However, it is distinct from this. The acoustic information is not identical to the mechanical event of the 'play of the organs'. Rather, it provides information about that event to a potential observer. It may be said to constitute an environmental trace which provides information about that event. The information in the acoustic chain is specificational in Gibson's (1986 [1979]) sense: it specifies information about the environmental event with which it stands in a relation of correspondence.

Saussure's third perspective on time — 'the temporal sphere in which speaking and listening occur' — refers to the qualitative re-organisation or emergence of the information which is extracted from the acoustic chain as an ecosocial event. It is at this level that the macroscopic patternings of acoustic information which are generated by the 'play of the organs' are assigned semiological value. The topological forms of these patterns provide information about the speaker-listener relation relative to: (1) the ecosocial environment — the sphere — that surrounds or environs them; and (2) the speaker's internal potential as an embodied social being.

The purpose this discussion has been to draw attention to the ways in which the neurophysiological processes which underlie both phonation and audition participate directly in the enactment of social-semiological practices in *parole.* Saussure does not posit a separate cognitive domain of the mental relations that lie 'behind' and, therefore, explain these. Instead, the brain-body complex directly participates in the processes of meaning-making in the speech circuit.

Dimensions of the Individual: The Primary Structure and the Secondary Structure

On the side of the individual, *langue*is "a sum of imprints stored in each brain, somewhat like a dictionary of which all the examples, [which are] identical, are distributed *[répartis]* among individuals" (*CLG*: 38) in a given ensemble. Saussure represents what he calls "this mode of existence of langue" (*CLG*: 38) with the following formula: 1 + 1 + 1 + 1 … = I (collective model)

The comparison that he makes with the dictionary at this point is revealing. The dictionary provides a de-contextualised 'dictionary meaning' of language forms, independently of how these are combined and used in specific contexts. In my view, Saussure does not say that each individual qua historical-biographical individual is a mere replica of the same basic template, which is common to all. Such a view would directly contradict what he has to say about *parole,* as I shall show below. It is worthwhile paying close attention to precisely what Saussure means by the term "collective model" in this connection. The formalisation referred to here represents in a very general way the distribution of *langue*in the collective domain. The focus is on the individual as **social type.**

Rom Harré (1983: 76) makes a useful distinction between the primary structure where "people appear as locations for speech acts", and the secondary structure where people are not "mere locations". Instead, individuals, from the point of view of the secondary structure, are "internally complex". Individuals, from the point of view of the primary structure, on the other hand, are, as Harré puts it, "metaphysically simple, without internal structure, just as the point locations of physical space are" (1983: 76). Harré continues: "Real human beings, however, are not mere locations: they are 'internally complex'". This internal complexity is what Harré calls the secondary structure.

Harré's distinction between the primary structure and the secondary structure closely parallels Saussure's distinction between *langue*and *parole*in certain critical respects. In the 'collective model', the individuals whose brains are 'imprinted' with *langue*are metaphysically simple and without internal complexity, in Harré's sense. They are simple locations, as in a grid, over which *langue*is distributed and stored. This is the point of Saussure's dictionary analogy. Clearly, these are not real individuals, and Saussure does not say that they are. Saussure

simply says that *langue*"exists in the collectivity" in this way. Two points are evident here. First, the notions of *langue*and "the collectivity" are distinguished (see Lecture 7, Section 13). They are not synonymous, though they are related to each other. This follows from the fact that *langue*has both an individual and a social dimension to it. Secondly, Saussure says that *langue*exists in the collectivity. In other words, it is located somewhere, and this 'somewhere' is the structured distribution of *langue*across a given "ensemble" of individual brains (*CLG*: 30). The fact that *langue*has both a social and an individual shows that the individual and the social are not dichotomised or seen as separable the one from the other. *langue*is not therefore something with which autonomous individuals are seen as being equipped in order to understand utterances, as in Chomsky's account. Each individual does not possess his or her own separate *langueper se.* The point is, rather, that the individual and *langue*are not constitutively separable from each other. Individuals are intrinsically social from the outset.

These two points are very important. On illustrating his "collective model", Saussure then poses the question as to how *parole*is also present "in this same collectivity". Does *parole*also exist in the collectivity? This is a further reason as to why *langue*and the collectivity are not conflated in Saussure's explanation. Here is Saussure's answer to the question I have just posed:

It *[parole]* is the sum of what people say, and it includes: a) individual combinations, dependent on the will of the one who speaks, b) equally voluntary acts of phonation, necessary for the execution of these combinations.

There is then nothing collective in *parole;* the manifestations of it are individual and momentary. Here there is no more than the sum of particular cases according to the formula:

“(1 + 1′ + 1” + 1”’ …)”.
(CLG: 38)

*Parole*is “the sum of what people [as historical-biographical individuals, PJT] say”. Saussure’s second formulation refers to the individuals who are located in the secondary structure. In the secondary structure, individuals, in *parole,* manifest acts of “will” and “intelligence” (*CLG*: 30). Thus, they have internal complexity, and this is the ground of their acts of speaking with others. This does not mean, however, that Saussure’s conception is individualistic or solipsistic. This is implicit in the fact that in the secondary structure individuals do not simply talk. Rather, they talk to and understand other individuals through the speech practices of *parole.* This is very clear in Saussure’s conception of the sign as psychically oriented meaning-making act which connects and co-ordinates the interaction between the participants in the speech circuit.

Does Saussure’s claim that there is “nothing collective in parole” contradict this? It does not. The fact that individuals have internal complexity and that their acts of speaking and understanding are seen as the expressions of individual “will” and “intelligence” can only be so because they do talk to and understand each other. The sum of what individuals say in the secondary structure can only be interpreted by virtue of the fact that these individuals also belong to a collective dimension in which the social-semiological resources of *langue*are shared and distributed among them. There is no contradiction here because the secondary structure, as Harré (1983: 76) observes, is not simply an (imperfect) reflection of the primary structure. If this were so, the ontological hiatus between the social and the individual which I have discussed elsewhere would be meaningless (Thibault 1997: 66). Just as *langue*and the ‘collective’ are distinguished, so, too, are *parole*and the individual. *parole*refers to the observable **speech practices** of individuals, not to the individuals*per se*.

The distinctions I have made here between *langue* and the collective dimension, on the one hand, and, *parole* and the individual, on the other, along with the ontological hiatus between the social and the individual mean, as Saussure's two formulas show, that individuals in the practices of *parole* do not simply replicate the collective properties of *langue* in an automatic and unselfreflexive way. Rather, the internal complexity of individuals is a result of the ways in which the properties of *langue* in the collective domain are appropriated and then further elaborated and transformed by individuals in the secondary structure. This can only occur in and through the individual's participation in the speech practices of *parole.* It is on account of these processes in the secondary structure that the individual's sense of agency and selfhood — c.f. "will" and "intelligence" — emerge.

The primary structure is the domains of types as distinct from tokens. Any act of *parole* necessarily instantiates some token of a type. Yet, tokens, while exhibiting schematic characteristics of the type to some degree, are also heterogeneous in that they have other characteristics not specified by the type. The "collective model" of *langue* is a system of types in this sense. The system evolves because it is instantiated by tokens — acts of *parole*— yet tokens also individuate in unique ways. It is for this reason that individual acts of "will" and "intelligence" are manifested in specific acts of *parole.* No two acts of *parole* are ever the same in all respects. At some level of specificity, it is always possible to find some difference between them. On the other hand, the point of Saussure's "collective model" is that all of the very many acts of *parole* which may be observed and recorded can be grouped together as belonging to a given superordinate class along some functionally definable analytical dimension. However, in saying that *parole* is "the sum of what people say" (see above), Saussure also shows it is not the individual *per se* which is of interest here. Rather, what is relevant are the individual differences as they are made manifest in

particular acts of *parole*in which individuals participate and interact with others. Individuality does not, then, reduce to a unique essence, but is defined by the entire trajectory in historical-biographical time of the individual's participation in very many occasion-specific acts of *parole.* In this view, individual "will" and "intelligence" are not momentary properties of the individual at a given point, but are defined and develop along this entire trajectory.

Thus, the further elaboration of *langue interieure* in the secondary structure (see above) means that individual "will" and "intelligence" are capable of creating and recognising more and more differences between tokens. The schematic properties of the "collective model" of *langue*are not in themselves capable of producing the determinability of individual "will" and "intelligence". This is so because these schematic properties remain too indeterminate and hence unable to specify a specific act of *parole.* Instead, the more schematic properties of *langue*refer to a general meaning-making potential rather than to determinate and heterogeneous acts of *parole.* Thus, the schematic characteristics of *langue*are necessary characteristics that hold for all tokens of a given type without specifying all the details and individual distinctions of the tokens themselves. In this sense, they are not fully determinate. The specification that is entailed by individual "will" and "intelligence" in *parole*can only be manifested in a given context. Acts of *parole*are instantiations of *langue*yet by the same token they are never fully revealed by *langueper se*. In my view, the reason why *langue*is called the "collective model" is because its schematic properties necessarily apply to any given instance that one encounters in social life. These schematic properties are re-constructed backwards from many different instances; at the same time, "will" and "intelligence" are emergent properties that unfold along the individuating trajectory of the individual and serve further to specify the individual *qua* historical-biographical individual. The traversing of this trajectory entails an ever

decreasing set of potentialities (Salthe 1993: 65).The two notions — logical and temporal specification — converge, logically speaking, at this point. Particular acts of *parole*logically imply the schematic properties of *langue.* The latter are, however, relatively indeterminate and ambivalent until they are contexualised by other signs in discourse as being of a particular type.

Now, it must be remembered that Saussure claims that *langue*is "imprinted" on the brains of individuals "through the practices of *parole"* (*CLG*: 30). This brings us full circle. I shall recapitulate the essential points. *langue,* Saussure argues, is "a treasure which is stored by the practices of *parole*in the subjects belonging to the same community". I should like to draw attention here to Saussure's reference to the notion of **practice.** These same practices of *parole*are also the means whereby the "social product" of *langue*is produced, reproduced, and transformed. *langue*is synonymous with the linguistic values which are produced by the totality of the linguistic work which language users invest in the practices of *parole.* It is the totality of this linguistic work which makes and maintains a given language system. *langue*and *parole*are not a simple dichotomy, but represent different dimensions of the work — material and semiotic — which is invested in the making, maintaining, and changing of the social-semiological system and the embodied participants who enact this. Figure 1 represents an attempt to represent this reality.

Figure 1 presents the relations between *langue*and *parole*and the individual and collective dimensions of these as a multidimensional space.

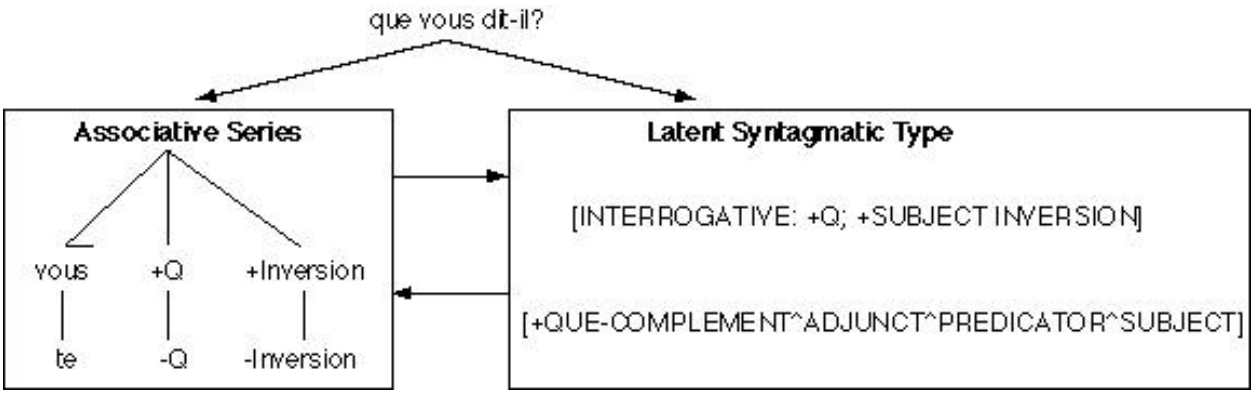

Figure 1: Multidimensional space representing collective and individual dimensions of langueand parole.

I have divided the multidimensional space represented by Figure 1 into four quadrants. This allows us to see that both *langue*and *parole*are realised along both the collective and individual dimensions. The relations among the four quadrants are best seen as a continuum. Quadrants 1 and 4 specify the collective and individual dimensions of the social-semiological resource systems of *langue.* Quadrants 2 and 3 refer to these same dimensions with respect to the cross-coupling of material and semiotic processes in acts of *parole.* The relations among the quadrants is a complex co-articulation of relations of circular causality, as discussed in section 3. Thus, an individual act of *parole*in 2 is defined and understood in and through the social-semiological resources of *langue*in 1. By the same token, acts of *parole*in 2 entail neurophysiological processes in 3, which are also the means whereby enactments of *parole*in 2 are 'imprinted' and 'stored' in the brains of the individuals as the collective 'treasure' of *langue*in 4 (seeLecture 8).

Therefore, each quadrant implies and requires all of the others for its definition. For example, quadrants 1 and 4 together designate how the individual as a social type is cross-coupled with the transindividual structures and processes of the system of *langue.* Quadrants 2 and 3, on the other hand, refer to the way in which the bodily potential of the historical-biographical individual in acts of phonation or audition is cross-coupled with the enactment of occasion-specific acts of meaning-making.

Significantly, Saussure does not subordinate the social-semiological production of values to the economic production of goods. The latter is not

in itself an ontological criterion which determines either the “social product” of *langue* or the individuals who interact in and through the practices of *parole.* There is a characteristically Aristotelian inflexion to Saussure’s formulation. In locating the starting point of the production of *langue* in the practices of *parole,* Saussure suggests that human nature is characterised by praxis, rather than by the mere production and consumption of material goods. My point is that the practices of *parole* do not produce goods, but forms of human social life. Individuals, in the practices of *parole,* do not simply and mechanically reproduce langue; they produce themselves, as well as society, as trajectories-in-time on various scalar levels of self-organising complexity.

The relations between *langue* and *parole* as presented in Figure 1 also pose a problem of scale. How do we define the appropriate scale at which to define the individual’s relationship to *langue* along both its individual and collective dimensions? In the speech circuit, Saussure shows that *langue* does not operate at the scalar level of the physical processes — propagation of sound waves from speaker to listener — and the physiological processes — the acts of phonation and audition — that subtend the psychic act of associating concepts and acoustic images in the brains of the individual participants in the speech circuit. Each of these levels — the physical, the physiological, the psychic — is a different scalar level. Now, the fact that *langue* is imprinted in the brains of the individual participants to the circuit means that these individuals have a shared system of resources for interacting with and orienting both to each other as well as to features of the world which are salient to their interaction. *langue* provides the means for this process of psychic orientation to take place. The system of values in *langue* is the means whereby analog percepts may be semiotically construed as instances of a digital category that is recognised by the given system of *langue. langue* is thus a social-semiological resource for further specifying the world.

Importantly, this always occurs relative to the point of view of some observer. The two interactants in Saussure's speech circuit diagram would fulfil this criterion. This means that the value-producing differences which each has stored in his or her brain by virtue of their having a shared *langue*constitute a resource for further specifying the analog realm of thought *[pensée].* Further, where possible, a more highly specified category will tend to override a less specified one (135). Let us now see how Saussure formulates this aspect of the problem.

Thought, which Saussure describes as "chaotic by nature" is "forced to be more precise by being decomposed" (*CLG*: 156). Saussure distinguishes thought from language; they are two distinct levels which are not conflated. The digital distinctions of the language system serve to categorise and specify the fluctuating, analog realm of thought. Thus, thought, in which "there are no pre-established ideas" (*CLG*: 156), is independent of linguistic form. However, language does not simply reproduce or re-present thought. The language system also functions to elaborate and produce ideas by further specifying that "amorphous and indistinct mass" (*CLG*: 155) that Saussure designates as thought. Thought belongs to a pre-semiotic psychological domain. In contrast, language is psychic; it is intentionally oriented both to the other and to the world and functions to render pre-semiotic thought accessible to others in the form of lexicogrammatical forms. In so doing, thought is made social and explicit, hence arguable (see also Ombredane 1951: 89).

In some respects, Saussure description of the relation between thought and language is very much in tune with discoveries in the neurosciences of his time. Arnold Pick's (1913, 1923) distinction between the conceptual and linguistic levels, for instance, is based on the subdivision of the conceptual level into a "global impression" which would appear to be purely topological in nature and a subsequent division into a conceptual schema which

independent of linguistic form (Ombredane 1951: 215-6). Before Pick, Wernicke (1874) in his work on aphasia, radically separated thought and language. This does not mean that the two do not become associated in the course of development. However, this is a long and complex process in which the two come to influence and shape each other only over a long period of time in the child's linguistic development (Ombredane 1951: 78). In Wernicke's conception, the primitive constituents of thought are founded on auditory and tactile sensations that are tied to the world. Language, on the other hand, is based on arbitrary associations between auditory impressions and ideas. It is not, in other words, necessarily bound to a specific time and place in the external world. This would appear to foreshadow Edelman's distinction between primary and secondary consciousness.

Saussure goes somewhat beyond the notion that thought and its further elaboration by language rely of the association of auditory impressions and ideas. In his discussion of the syntagmatic and associative relations that constitute the language mechanism, Saussure shows how the language user's apperception of syntagmatic and associative relations presupposes an interpretative activity which is founded on the language user's psychic (intentional) orientation to the social sphere — cf. the speech circuit — in which this activity takes place and towards which it is oriented (Ombredane 1951: 208). Rather than the mere aggregration of associations, language form works on and further elaborates the less specified conceptual categories of thought by means of the dialectical duality of syntagmatic and associative relations in *langue.*

Saussure also refers to the plastic or labile nature of the sounds which constitute the means of expression of ideas in language. The subdivision of sound into distinct parts serves not only to signify linguistic ideas, but it also

provides a means for realising the subjective attitude of the speaker as well as a rhythmic and melodic shape for the utterance.

Aristotle's Ecosocial Conception of Human Praxis

In the Aristotelian conception, praxis refers to the unity of means and ends in the self-realisation of human capacities. Saussure, I have argued above, sees the speaking subject as both active and self-reflexive. There is nothing deterministic or mechanistic in his conception. The speaking subject is one who acts on and transforms the social-semiological resources of *langue*in order to realise his or her own projects in and through the practices of *parole.* In this, Saussure is eminently Aristotelian in his outlook. That is, the "will" and "intelligence" of speaking subjects are not subordinated to the economic production of goods. Instead, it is founded on an ethics of self in which the capacities of individuals to transform *langue*in the service of their own projects is central.

The Aristotelian turn which I have identified in Saussure's thinking ties in with his psychic, rather than psychological, conception of the sign as the unity of 'sound' and 'idea'. In Aristotle, the psyche is a non-mentalistic notion. It is a dynamic concept which refers to the power of life to achieve specific ends. In other words, it has a functional basis. Aristotle sought both to understand dynamism and change as well as to overcome Plato's mind-body dualism. In Aristotle, psyche stands in a functional relationship to matter. The psyche is a functional part of a larger whole which includes the body and the environment of the body-brain complex. Psyche refers to the intentionally directed, hence functional, powers of this complex in relation to

its environment, including other social beings. Aristotle does not split mind and matter into two distinct ontological realms in the way that Plato does. Rather, the two are functionally related as part of a still more complex and dynamic whole. This perspective is clearly articulated in Aristotle's theory of the five senses in his *De Anima.* Aristotle is the first known theorist of the senses. He emphasises the functional relation between the sense in the psyche and the perceived phenomenon in the environment. Each sense, Aristotle argues, has its "object of sense". That is, the perceptual apparatus in the psyche is functionally and, therefore, intentionally directed in relation to the perceived object.

Aristotle did not, of course, have the advantage of our modern theories of neuroanatomy and neuropsychology. Nevertheless, his ecological and realist perspective provided a powerful alternative to mind-body dualism. For this reason, it still stands as an important historical point of reference as well as a precursor to the kinds of solutions we are still struggling to articulate today. According to Aristotle, sense, object of sense, and a medium are all functionally interconnected to each other in a still wider system of relations. Democritus, on the other hand, assumed a world of simple and inert elements of matter that are moved by external forces in an abstract and empty space-time of mechanical causality. In this, Democritus stands in a lineage which extends to Isaac Newton (and beyond!).

In Newton's account, nothing is intrinsically active or dynamic. Instead, external forces "excite" or "impinge on" objects and cause them to be moved about. Aristotle's conception, by contrast, emphasises complexity and the interrelations among phenomena in some environment. Newton emphasises elementary and inert particles and the forces that move them about in a purely abstract and empty space-time. The reality Aristotle refers to is the macroscopic reality of the ecological context in which organisms live. Newton, on the other hand, describes the microscopic reality of the

space-time which is described by the mathematical abstractions of the physicist. The issue is not a simple one of different domains of inquiry. The problem lies in the way Newton's model of mechanical causality and eternal natural laws has been illegitimately extended beyond the microscopic physical domain to other domains of inquiry such as the psychological, the philosophical, and the political.

The Empiricist and Psychic Theories of Association: Two Rival Accounts

Saussure's psychic conception of the sign as the unity of 'sound' and 'idea' stands in the Aristotelian tradition. In this, Saussure aligns himself with the act psychology which was inaugurated by Franz Brentano (1874) and further developed by important figures such as Carl Stumpf, James Ward, and William James (see also Battacchi 1998). The act psychology of these researchers was a reaction against the orthodox tradition in psychology which was developed in the latter part of the nineteenth century by Wundt, Helmholtz, and Titchener. Unlike the Aristotelian tradition, these psychologists dualistically opposed mind to matter. Wundt, for example, stands in a line which goes from Locke to Hume and Berkeley and Mills. It was from the British empiricist tradition that Wundt took and developed the principle of association. In the empiricist tradition, the mind passively receives elementary sensations from the external world. Wundt was a major exponent of this elementist hypothesis. Brentano and the other act psychologists opposed the view of Wundt and others that the mind combines or associates elementary mental elements such as sensations, images, feelings, and so on into Vorstellungen (representations, ideas). To quote Wundt:

The concept of association can gain a fixed, and in any particular case unequivocal, significance, only when association is regarded as an elementary process which never shows itself in the actual psychical processes except in a more or less complex form, so that the only way to find out the character of elementary association is to subject its complex products to a psychological analysis. The ordinarily so-called associations (the successive associations) are only one, and the loosest at that, of all the forms of combination. In contrast with these we have the closer combinations from which the different kinds of psychical compounds arise and to which we apply the general name fusions, because of the closeness of the union … The elementary processes from which the various compounds, the intensive, spacial, and temporal ideas, the composite feelings, the emotions, and the volitional processes arise, are, accordingly, to be considered as associative processes. For the purpose of practical discrimination, however, it will be well to limit the word "association" to those combining processes which take place between elements of different compounds. This narrower meaning which we give the term association in contrast with fusion, is in one respect an approach to the meaning that it had in older psychology … for it refers exclusively to the interconnection of psychical compounds in consciousness.
(Wundt 1965 [1896]: 400)

For the act psychologists, on the other hand, sensations are not simply placed in the mind independently of psychic activity. The epistemological stance of the act psychologists, like that of Aristotle before them, was realist. Perception is an act of the mind which is intentionally directed to and psychically correlated with the object of the perception (c.f. Aristotle's 'object of sense') in the phenomenal-material world. Brentano claimed that the distinguishing property of psychic phenomena is their intentional inexistence, or their directedness to some object. Inanimate objects do not possess this quality:

James Ward provides a further refinement of this position in his article 'Psychology', which was published in the ninth edition of *The Encyclopedia Britannica* (New York, 1886). Ward writes:

The view here taken is (1) that at its first appearance in psychical life a new sensation or so-called elementary presentation is really a partial modification of some pre-existing presentation, which thereby becomes as a whole more complex than it was before; and (2) that this complexity and differentiation of parts never become a plurality of discontinuous presentations, having a distinctness and individuality such as the atoms of elementary particles of the physical world are supposed to have.
(Ward 1965 [1886]: 608)

Saussure's use of the term association does not, then, belong to the tradition of psychological thinking which extends from the British empiricists to the structural psychologists such as Wundt, Helmholtz, and so on. In his discussion of the speech circuit, Saussure locates the "faculty of association" in the "psychic part" of the circuit. Saussure affirms that this is "localised in the brain" (*CLG*: 29). The association of concept and acoustic image is, in Saussure's conception, psychic (*CLG*: 28-9). There are two important observations to make here. First, Saussure's psychic definition entails a conception of consciousness. In keeping with the findings of Brentano and James, consciousness is, in Saussure's view, a process, rather than a state or a thing. It is an emergent property of the self which is dynamically and intentionally oriented to objects which are independent of the self. In other words, it entails: (1) a distinction between self and non-self; (2) a higher-order awareness of this distinction; (3) a capacity of the self to selectively attend to, focus on, and act towards the domain of the non-self in an intentional and unitary way; (4) an assumption that consciousness is dually related to the structure of the brain as a biological entity and to social-semiological systems and processes; and (5) the

capacity for self-reference or the ability to focus on one's own psychic activity.

Points (1) to (4) require that we distinguish between what Edelman (1989: 24) designates as 'primary consciousness' and 'higher-order consciousness'. The ability "to make correlations between behavior and phenomenal states", as Edelman puts it, is crucial to the distinction between the two forms of consciousness. Saussure's social-semiological theory of *langue*and its connections to brain structure necessarily presupposes higher-order consciousness. This is based on an awareness of self and an ability to correlate the phenomena of experience to behaviour through a socially shared language system.

In Saussure's conception, this does not mean that the association of concept and acoustic image is directed to an object *per se*. Saussure's great theoretical innovation is to understand that the association of concept and acoustic image is directed to phenomena in and through the mediation of a higher-order and transindividual system of *langue.* This means that speaker and listener in the circuit may participate in a shareable and negotiable social-semiological reality which in no way excludes conflict and contradiction. Saussure puts aside the specifically physical and **psychic** dimensions of the circuit and observes that the "origin of this social crystallisation" is to be found in *langue,* not *parole (CLG* 29).

Thus, Saussure's psychic theory of consciousness claims that the brain selectively attends to potentially salient differences in the ecosocial environment of the individual. This leads to (1) the modification and further development of the individual's psychic capacities on the basis of the individual's interactions with an open-ended environment in and through the practices of *parole.* In the secondary structure, the social-semiological and the neural domains map onto one another in unique and novel ways

that define the individuation of the historical-biographical individual; (2) the ability to deal with the variability of phenomenal-material experience depends on the ability to assimilate this experience to the categories of the system of *langue,* as well as to adapt and modify these categories in the face of changing contextual requirements in a dynamic and open ecosocial environment. Saussure's theory of language, rather than using the central-programming metaphors of the cognitive and Cartesian paradigms, is a progenitor of the view that language is an emergent and epigenetic property of the individual in relation to its ecosocial environment (Lecture 8).The child is not genetically pre-programmed with neural or other structures containing an innate linguistic competence. Rather, the phenotypic characteristics of the individual at the level of the social group place genetic constraints on the emergence of language in the individual through the child's apprenticeship in the practices of *parole*in a given speech community. Speaking of the characteristics of *langue,* Saussure comments as follows on the child's learning of the language system:

… the individual needs an apprenticeship in order to get to know the game [of langue, PJT]; the child assimilates it only gradually.
(CLG: 31)

The further implications of this argument will be developed in Lecture 7.

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