Embodiment, Perception, Consciousness, Personhood

Epigenesis and the General Sign Constituting Faculty

The preliminary sketch of the place of the brain in Saussure's theory in Lecture 6 linked this to "the general faculty for constituting a language system [*langue*]" (CLG: 26). Saussure prioritises this general faculty over and above the question of the spoken language [*le langage parlée*] per se. He is more interested in establishing the psychic basis of this supervening faculty's ability to make signs out of combinations of sounds and ideas. It is this faculty which enables the individual to "constitute" a *langue* in and through his or her participation in the practices of *parole*.

Saussure's notion of a general sign-making faculty may be seen as a precursor of the epigenetic models which were developed in twentieth century biology. According to the theory of epigenesis proposed by Waddington (1969), the organism is biologically predisposed to obtain the kind of information it needs for its further development from its environment. This information circulates in the ecosocial environment of the individual and is obtained by the individual's exchange transactions with its environment, including other conspecifics. The lower scalar trajectory of the biological organism and its subsystems is integrated into higher scalar systems which regulate the development of the individual. Epigenesis ensures that the individual recapitulates developmental type trajectories according to information that is stored at higher scalar levels in its ecosocial environment (Lemke 1995: 115). In other words, the brain-body complex is biologically predisposed to develop and function as a social being (Prodi 1977). There is no need to postulate an innate language module with genetically constrained rules for generating well-formed sentences. The

perspective I am presenting here denies Chomsky's view that all of the information required for the 'acquisition' of language is present in the individual's genes from the start.

As I pointed out in Lecture 6, this amounts to a confusion of the different scalar levels of organisation that are involved. For a start, sub-cellular properties and processes do not directly cause or determine individual behaviour for the lower scalar level at which genetic strings operate within the cell is always mediated by intermediate and higher organisational levels which constrain the lower levels in significant ways. In any case, such lower level information is not accessed by observers — language users — at the level of organisation which is significant or salient for the individuals who are engaged in social meaning-making. At the level of human social interaction, such information is to be found in embodied forms of social activity that can be accessed and construed in semiotically salient ways by participants and observers who share this same scalar level of organisation and its perspectives and viewpoints.

In Saussure's view, which is more compatible with the modern theory of epigenesis, *langue* emerges in the individual as a consequence of the individual's meshing with a higher-order social-semiological system. The latter 'contains' information which shapes and entrains the individual's development along a trajectory-in-time. The question of whether language belongs on the 'inside' or the 'outside' of the individual and the related question of nativism versus empiricism are misleading and have no real place in Saussure's theory and its further developments.

Saussure assigns a role to both brain structure and function as well as to the practices of *parole*. This has a number of further consequences. First, the general sign-making faculty is related to the evolutionary development of homo sapiens, and in particular to the emergence of Broca's and

Wernicke's areas in the brain. Secondly, the human capacity for oral language is related to the anatomy of the vocal apparatus. Thirdly, syntagmatic and associative relations, as two forms of mental activity, have lead to the development of both short- and long-term linguistic memory. Fourthly, these are, in their turn, related to the stratified nature of the linguistic sign and to the emergence of higher-order consciousness in the individual.

Saussure's distinction between a general language faculty and articulate speech echoes the distinction that Broca made between language [*le langage*], seen as a general faculty, and articulate speech [*le langage articulé*], which is concerned with the articulation and reception of articulate speech sounds. Broca's clinical research shed new light on those cases in which the general language faculty remains intact yet the patient lacks the ability to produce articulate speech sounds [*le langage articulé*]. Broca coined the term aphemia to refer to this phenomenon., which he described as follows:

Patients hear and understand everything that is said to them; they are in possession of all their intelligence; they easily emit vocal sounds; they execute with their tongue and their lips movements much more extended and muich more energetic than is required for the execution of sounds, and yet the perfectly sense response that they would like to make perfectly reduces to a very small number of articulate sounds, always the same and always made in the same way.
(Broca, undated; quoted in Ombredane 1951: 35)

that which is perished in them is not the faculty of language [la faculté du langage], it is not the memory of words, it is neither the action of the nerves and the muscles of phonation and articulation, it is the faculty of co-ordinating one's own movements with articulate speech.

(Broca, undated; quoted in Ombredane 1951: 35)

Broca argued that aphemic patients had lost their "memory of the procedure that must be followed in order to articulate words", rather than the memory of the words themselves. For Broca, the faculty which is lost is no more than a specific instance of the more general faculty for co-ordinating muscular actions. Aphemic patients have language, but lack the capacity to produce the co-ordinated muscular movements necessary for the production of articulate combinations of phonemes and syllables in the spoken modality (for a clear and eloquent exposition of this point see Whitney 1881: esp. 348-9). In other words, language is not reducible to any of the specific kinds of sensori-motor activities that are involved in the production (and reception) of the linguistic modalities of speaking, writing, signing, and braille. In my view, the critical issue here is not whether *langue* is detached from its specific modalities of emission and reception — vocal gesture (speaking), visible gesture (sign), graphic traces on a surface (writing), tactual shape perception (braille) — but of the different scalar orders which are involved and how these are connected the one to the other.

These considerations suggest that the faculty of producing articulate speech sounds (c.f. Broca's area) is not sufficient for language to be realised. Ombredane (1951: 36) points out that Broca, while not categorical on this point, inclines towards the view that aphemia is a type of locomotive ataxia confined to that part of the nervous system which governs the muscular movements — the vocal gestures — which produce articulate speech sounds. Two important observations follow from this.

First, the link with the sensori-motor activities and movements in the vocal tract that produce articulate speech sounds points to a broader link between speech and language in general as a form of gesture (see

Armstrong et al 1995). Secondly, not all of language, however, can simply be reduced to functions of the central nervous system or the sensori-motor activities of the various peripheral systems potentially involved. There also must exist a “general faculty of constituting a language system” (CLG: 26). Articulate speech sounds are but one extension in a specific semiotic modality of this general faculty. More fundamentally, this general faculty is psychic in character. It allows for the development of a number of different modalities of linguistic semiosis, such as speech, writing, sign-language, and braille. These are specific extensions and developments of the semiotic potential of the brain-body complex in its ecosocial environment. Figure 1 shows the supervening role of this faculty in relation to the specific modalities of *langue* and écriture.

Importantly, speaking, writing, and so on are not autonomous activities. For example, both visual reading and reading by tactual perception as in braille often involve phonological re-coding. The research of Susanna Millar suggests that phonological re-coding is more common in the latter than in the former (1997: 133). Phonological re-coding in the form of, say, sub-vocalisation or silent inner speech can also occur during the activity of writing and act as a guiding and monitoring function in relation to the act of writing. Speech, writing, sign and braille are specific extensions of the brain-body complex in its ecosocial environments. The psychic character of this general faculty also allows for the development of time-independent ‘inner’ speech, internal elaborations of self, and the development of personhood (Edelman 1989: 185). It is for these reasons that Saussure prioritises the acoustic image over the spoken chain, comprising phonemes, syllables, and so on, in his discussion of this general sign-making faculty (section 4).

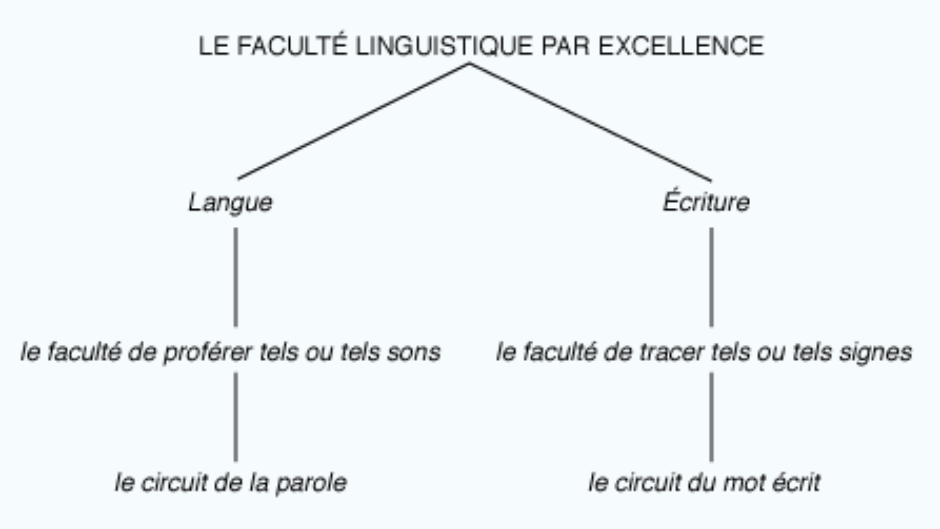

Figure 1: The supervenient role of the general language faculty in relation to the systems of *langue* and écriture and their deployments in the speech and writing circuits.

Saussure's insistence on the separation of *langue* from the physical-material properties of the neurophysiological and acoustic processes involved in its execution in acts of *parole* recognises that there can be no simple reduction of language as a system of signs to the physical-material processes that subtend this system without losing sight of the specifically social-semiological properties of language. Figure 1 illustrates this principle with reference to the spoken and written language systems. This argument also applies to language in its haptic and gestural modalities, viz., braille and sign language. This shows that there are a number of different modalities of language based on the different neurophysiological and sensori-motor processes and properties that are involved in its execution and reception. However, the essential properties of language-as-semiological-system cannot be reduced to the physical properties of any one of these. This does not, on the other hand, mean that the specific

characteristics of each modality do not also interact with and hence contribute to the meaning-making potential of language in each of its sensori-motor modalities.

The fact that one modality of language is based on the activities of the organs and muscles of the vocal tract can be reconstructed using the principle of supervenience as developed in Salthe (1993: 211). Thus, the organs of the vocal apparatus can be thought of as a **physical** system in which gaseous, liquid, and solid states of substances are conducted in conjunction with the force of gravity and changes in air pressure from one point to another. From the **neurochemical** point of view, they may be considered in terms of the electrical and chemical activity of the central and peripheral nervous systems involved. They may also be viewed as a **biological** system which allows the organism to ingest air, water, and food from the outside for its continued survival. Further, they can be seen from a **social semiological** perspective as the means whereby the gestural activities responsible for articulate speech sounds are produced. Finally, there is also the possibility of a **psychological** perspective on the individual's speech characteristics and what they indicate regarding the emotional and psychological states of the individual. Each of these perspectives is simultaneously present.

Salthe discusses the logic of this thinking, which, incidentally, goes back at least to Aristotle's great chain of being, as a series of integrative levels (1993: 66-7). This means that the most general and least specified class — that of the physical level whereby the designated object is viewed as a tube for the conduction of fluids — is a class within which the increasingly more specified levels as described above are nested within it. At each level of specification, a different discourse is used to define the object from the particular perspective supplied by that discourse. As we move from the least specified to the most specified of these integrative levels, the object

becomes more detailed. It also becomes closer to the everyday perspective of the observer (Salthe 1993: 67). In our case, this means the perspective of the language user who makes and understands articulate speech sounds. In this perspective, the language user clearly is more familiar with (a) the social significance of speech sounds in their contexts of use; and (b) the individuating characteristics of speech sounds which index a particular speaker's emotional and psychological states and personal characteristics. Typically, he or she would be less familiar with, for example, the detailed neurophysiological processes underlying articulation or the physical properties of the sound waves so produced. This level of specification will, however, be familiar to a phonetician who studies the articulatory and acoustic properties of speech sounds. Furthermore, each of the more specified levels imposes boundary conditions or constraints on the less specified levels. Thus, the speech practices of the community to which the speaker belongs will impose higher order constraints originating from the social semiotic level (cf. *langue*) on the ways in which the muscular and other sensori-motor activities involved in articulation are typically deployed by the speakers of that particular linguistic habitus. This involves the suppressing of some possibilities and the entraining of others according to the requirements of the speech community. If we range back over the entire series of integrative levels described above, we can see how emergent organisational principles on more specified levels entail the channelling and harnessing co-ordinated patterns of behaviour on other, less specified levels.

Scalar Heterogeneity and the Individual Language User

Langue and *parole* implicate radically different temporal scales. The first is the diachronic scale of the evolutionary history of the language system. The

second has to do with the phenomenological scale of subjectively felt and experienced time — both physical, or 'quantitative', and qualitative — in the ecosocial environments in which speaking takes place between individuals (see Lecture 6, Section 2). However, we have seen that **both** *langue* and *parole* intersect in the individual. The two different temporal scales are not kept apart but are brought together when individuals engage in social meaning-making. In a recent, important paper, Jay Lemke has formulated the notion of what he calls "scale heterogeneity" (1998: 9). Lemke argues that in all dynamical systems which show individuating properties, we have a situation where "elementary units on any scale interact with many others so that collective properties emerge, we rapidly reach levels of complexity of compound units for which there can be individual identity, memory, and history" (1997: 9).

Langue and *parole* are always implicated in every single act of linguistic semiosis, as Saussure showed though his formulation of the relationship between the *langue* interieure which is stored in the individual's central nervous system and the speech practices of *parole* in which individuals participate through embodied, environmentally focussed and cross-coupled sensori-motor activity. Both *langue* and *parole* are materially embodied in the individuals who are linked by a shared system of social-semiological values. As Lemke points out, meaning involves the cross-coupling of both semiotic-discursive cultural processes and physical-material ecological ones (op. cit; see also Lemke 1995: 119-20; Thibault 1998a). The point is that the here-and-now act of meaning, which has both "material consequences" and "semiotic significance", always implicates a radical intersection of the most diverse temporal and other scales such that there is no clear separation of the lower or smaller scale levels from the higher or larger scale ones. Thus, the lower scale embodied gestural activities of the individual in a given act of *parole* always implicate and are integrated with and range over much greater and higher scalar levels such as that of an

entire system of cultural practices, its history, a community's traditions and institutions, an entire geographical region, collective consciousness, the personal life trajectory of the individual, entire technological and communication networks, and so on. Figure 2 attempts to model the dynamics of this overlapping intersection of scales and levels in social meaning-making.

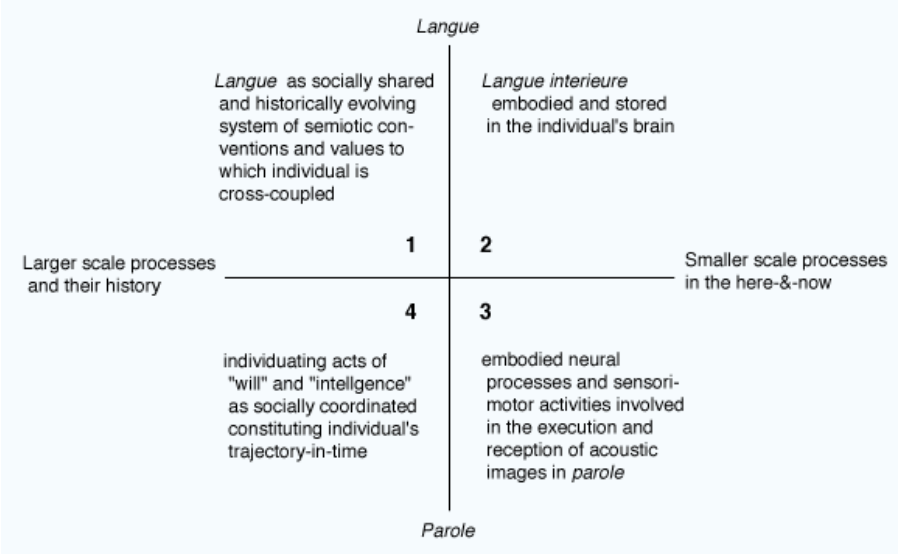

Figure 2 serves to show that individual language users encompass all four of the quadrants illustrated. In this way, diverse scales — both local and global — intersect in the individual by virtue of the fact that both *langue* and *parole* are embodied in the individual. As we shall see in the next section, this is so because of the cascading/collecting activities that individuals participate in along a life trajectory-in-time.

Langue and *Parole* and the Cascading/Collecting Cycle in the Individual

The neurophysiological processes involved in the production and reception of articulate speech sounds are an instance of the ways in which information which is stored in the organism can be focussed at a particular peripheral point in relation to the ecosocial environment. This implicates a cascading/collecting cycle: the language system (*langue*) is imprinted and stored in the individual organism through the practices of *parole*. By definition, it is *langue* rather than *parole* which is stored in the individual's long-term memory because storage in the central nervous system implicates predictability and order. *parole*, on the other hand, is concerned with activities at the periphery and is the means whereby information which cascades from the central nervous system is focussed and directed as articulate speech sounds in relation to a given ecosocial environment. Saussure's notion of the speech circuit may thus be seen as an early formulation of this principle (Lecture 5; also see Thibault 1997: chap. 6). This basic principle does not alter significantly even in the case of *parole* interieure or inner speech for this, too, is a particular, specialised deployment of the resources of *langue* (see section 9). The general sign-making faculty is stored in the individual's brain as the result of the collecting of 'imprints' of linguistic patterns experienced by the individual and then elaborated as associations of neurons in the brain. In terms of Edelman's (1989) theory of neural group selection, the sensori-motor activities at the periphery serve to stimulate some groups of neurons by virtue of the brain's selectively orienting to some patterns of activity rather than others. However, at the periphery of the organism, linguistic activity is enacted by a variety of different sensori-motor modalities of execution and reception. Transduction between the organism and its environment is characterised by the cross-modal sampling and pickup of diverse sensori-motor sources of information which derive from the outside environment

and which must, however, be converted into a single means of transmission to the central nervous system, viz. nerve impulses. The point is that the cascading activities involved in linguistic activity at the periphery — execution and/or production of speech sounds, the tracing of graphic signifiers on a surface, hand-arm gestures, and so on — are relatively less stable, considerably richer in variety, and more entropic than the socially produced patterns of meaning-making which are stored in and have contributed to the modifying and entraining of the individual's brain in the form of his or her *langue* interieure. Each of these bodily resources focussed at particular peripheral points of the organism is the means whereby information stored in individual's is cascaded into the ecosocial environment and differentiated as they exercise their "will" and "intelligence" in their interactions with others in and through the practices of *parole*. This process of differentiation and re-differentiation occurs by virtue of the constant though usually imperceptible slippages that take place between the semiotic-discursive and the physical-material cross-couplings that any act of social meaning-making necessarily and always entails (Lemke 1995: 119-20; Thibault 1997: 342-3). In turn, these may be de-coupled and re-coupled, thereby contributing to the process of differentiation referred to above. By the same token, every new act of differentiation is re-integrated as stored patterns in the central nervous system. In this way, the individual's participation in *parole* entails a trajectory-in-time along which the contingencies and consequences of the differentiating processes of *parole* — interacting with different speech habits, hearing an unfamiliar pronunciation, learning new contexts and their particular linguistic requirements, etc. — are built up and integrated into one's *langue* interieure (see Lemke 1995: 112-6 for further discussion of the notion of an individuating trajectory; also see Thibault 1998a).

With reference to *langue*, Saussure captures the duality of this cascading/collecting dialectic in the following way:

But what is langue? For us it is not confused with language [langage]; it is only a determinate, essential part of it, that is true. It is at the same time a social product of the language faculty and a set of necessary conventions, adopted by the social body in order to permit the exercise of this faculty in individuals. Taken as a whole, language [langage] is multifarious and heteroclite; it exists in various domains, at the same time physical, physiological and psychic, it also belongs to the individual domain and to the social domain; it does not allow itself to be classified in any single category of human affairs, because one does not know how to disengage its unity.
(CLG: 25)

As "a social product of the language faculty", *langue* in the individual is the social result of the fact that the individual's language faculty predisposes the individual to interact with others in and through the higher-order conventions of *langue*. We may refer to this perspective on *langue* by means of a subscript designating the individual dimension (*langue*1); the second perspective — the social dimension — is indicated by a further subscript, as in *langue*2. The individual's language faculty can be seen as the informational storage resources of the central nervous system and the neurophysiological activities which are focussed at specific peripheral points and involved in the execution and reception of cross-modal sensori-motor activity. Such a faculty presumes no specific language module in the brain just as it does not presume that the peripheral activities themselves are language-specific in function. Rather, this function is, Janus fashion, dually biological and social in function. It faces two ways: inwards to the biological resources required for the storing, executing and reception linguistic activity in the individual and outwards in so far as it equips and predisposes the individual for linguistic interaction with others. That is, the biological processes and properties of both the central and the peripheral systems are entrained and shaped by systems of cultural practices and

values so that individuals may interact and develop as social beings. The individual qua biological organism is built to develop and act as a social being.

In the quotation above, Saussure, in distinguishing the language faculty from *langue*, understands that this faculty both enables the individual to (1) cascade his or her collected *langue* interieure into the ecosocial environment in and through participation in the practices of *parole* by means of the specific bodily resources which are focussed at particular peripheral points; and (2) in interacting with others through the transindividual conventions of *langue*s, to further build up and integrate one's *langue*i in the central nervous system.

Nineteenth Century Neuropsychology and the General Language Faculty

With reference to Saussure's brief discussion of Broca's neuroanatomical findings (CLG: 26-7), Roy Harris, in his book, Reading Saussure (1987), claims that there is "nothing" in Saussure's analysis of oral communication which suggests he was influenced by nineteenth studies in the mechanisms of speech (Harris 1987: 204-5; see Thibault 1997: 146-7 for an alternative view).

It is not Saussure's intention to build a psycholinguistic or a neuroanatomical theory of language in the individual. The conceptual framework of his theory is a social-semiological one. Nevertheless, I would suggest that Saussure was deeply aware of the most important nineteenth-century research developments in the neuroanatomy, neurophysiology, and neuropsychology of language functions.

Saussure's brief discussion of Broca prompts a number of observations. First, spoken and written language disorders are closely related. This claim echoes the research findings of neurologists such as Karl Wernicke (1874), L. Lichtheim (1885) and J. Dejerine (1892; 1914). These researchers took the view that the faculties of speech and writing are interconnected and lie on a continuum. In this view, written language is more susceptible to disorders. They also argued that the motor aspects of writing are dependent on the integrity of internal language processes.

Secondly, Saussure argues that in all cases of speech disorders (aphasia) and writing disorders (agraphia) it is not so much the motor ability of uttering or tracing which is important, but the general semiotic ability to produce signs in these various modalities of linguistic semiosis. The alternative view was taken by neurologists J. W. Ogle (1869), Bastian (1898), and S. Exner (1881), who argued that speech and writing are independent language centres, anatomically determined, in the brain. Exner proposed an independent centre for graphic images on the basis of his anatomical research. It was Ogle who coined the term agraphia to designate acquired writing disorders. On the basis of his clinical studies, Ogle concluded that while aphasia and agraphia may occur together in the same patient, speech and writing are produced by distinct centres in the brain.

Saussure clearly aligns himself with the first view. As Saussure argues, this entails a "more general faculty which governs signs" (CLG: 27; see also Peng 1994). Such a faculty has no specific anatomical basis and exists "over and above the functioning of the various organs" (CLG: 27). Saussure does not deny the cerebral localisation hypotheses advanced by Broca for the articulation of speech sounds or by Exner for the tracing of visual-graphic signifiers. Both of these faculties refer to the capacity to execute specific signifying modalities through the resources of the body-brain

complex. However, the main thrust of Saussure's argument goes in a different direction.

The kind of neuroanatomical studies conducted by Broca and Exner concerned the physiological and psychological aspects of brain function. On the other hand, the general sign-making faculty of which Saussure speaks is, as I have repeatedly emphasised, psychic. The psychic character of the sign means that this cannot be reduced to specific signifying modalities and the neuroanatomical capacities which constitute their substrate. Nor can the semiological relation which unites 'sound' and 'idea' as a sign-form be reduced to either neurophysiological or psychological states and processes, taken separately. Saussure points out, on the other hand, that specific signifying modalities, such as those mentioned above, are made possible by this general faculty. It is only through this faculty that the semiotic potential which is afforded by these signifying modalities is cross-coupled with the higher-order social-semiological systems of *langue*, écriture, and so on. The psychic nature of the sign may be translated into modern accounts of dynamic open goal-seeking systems. It is not just the individual signifying act in the speech circuit which is psychic. Goal-seeking is also systemic and thus belongs to the higher-order system of *langue*. It is more than a question of the intentionally directed character of 'individual' signifying acts in the speech circuit. This is the psychic process of the association of acoustic images and concepts in the brains of the individuals involved. At the level of *langue*, goal-seeking manifests the system's desire of the Other or the non-self (Wilden 1980 [1972]: 148).Thus, the psychic process of associating acoustic images and concepts (signification) in the speech circuit is a process of digitalisation which is separate from and at a higher level of logical typing with respect to the semantic richness of the analog realm of 'thought' and 'sound' towards which it is oriented and which constitutes its goal (see Wilden 1980 [1972]: 150). This means that the

ground for all intentional signifying acts is not simply located in the heads of the individuals concerned. Instead, it is constituted by the individual's open relationship to the various scalar levels of the ecosocial environment. *langue* is not reducible to the matter-energy base of the various sensori-motor activities which are deployed in *parole* because that would amount to the reduction of *langue* to the status of an object or instrument to be used just like any other object in the world. Instead, the basis of the individual's cross-coupling to the Other is meaning.

The question of the exact localisation of specific brain functions to specific cerebral centres no longer enjoys the same favour that it did in the late nineteenth century. Throughout much of the twentieth century the localisationist theories of language function were supplanted by the "globalist" and "mass-action" theories of cerebral function. Those who uphold these theories argue that there is no differentiation in the cortex for specific brain functions. The globalists stressed the overall unity of brain function, rather than its division into sub-components (for further discussion see McCarthy and Waddington 1990: 15-6).

More recently, theorists of cognitive neuropsychology have shown renewed interest in the independence of various types of brain function (e.g., McCarthy and Waddington 1990: 17). These theorists base their evidence for this on the dissociation of brain functions which was first identified by nineteenth century researchers such as Broca and Wernicke. Broca and Wernicke described patients who manifested a dissociation between the speech production and the speech comprehension systems, respectively. The concept of dissociation is once again central in neuropsychology. The chief difference between the research carried out in the nineteenth century and this modern research lies in the reluctance of modern cognitive neuropsychologists to assign distinct neurological functions to specific cerebral centres. Cognitive neuropsychologists are interested in

establishing the dissociations between cognitive skills. The independence of such functions appears to depend on distinct neural systems. However, the question of distinct neurological systems does not necessarily correlate with a specific anatomical substrate in any straightforward way. Overall, these recent developments in cognitive neuropsychology lend qualified support to the nineteenth century research on dissociation of brain functions that Saussure's claim concerning a general sign constituting faculty implicates.

Saussure's claim that there exists a general sign constituting faculty is also supported by recent neuropsychological experiments reported by Corina et al (1992). These neuropsychologists draw attention to the controversial nature of the claim that the left-hemisphere of the brain is specialised for language. They divide the main rival claims into two main camps. These are: the left-hemisphere of the brain (1) is uniquely designed for language processing irrespective of modality of language use (speech, writing, sign-language); and (2) it derives from a more general specialisation based on motor control or symbolisation. The experiments reported by Corina et al lend support to the thesis of "left hemisphere specialisation of sign and spoken language in deaf and hearing persons skilled in the language" (1992: 1260). This contrasted with the dissociation of sign language and symbolic gesture (pantomine), emphasising "the functional separability of sign language and gesture after left hemisphere lesion" (1992: 1260; see also Jakobson 1980).

Saussure comes to the conclusion that "the faculty — natural or not — of articulating words is only exercised with the aid of the instrument created and provided by the collectivity" (CLG: 27). The ambivalence in Saussure's attitude towards this faculty — natural or not — is worth commenting on. Saussure does not pit a purely biological language faculty against the social character of *langue*. The relationship between the two is not

dichotomous. There is no dualism between the individual biological organism and the social, seen as external to the individual. Instead, the individual's language faculty is organised by the individual's participation in and adaptive responses to the social-semiological relations and practices of *langue*. It is the latter which function to organise and to modify the individual's biological predisposition to learn language. This can only occur through the individual's participation in social activity. The language faculty of the individual is an integral part of the overall social-semiological system. Such a faculty does not arbitrarily vary from individual to individual. Rather, it presupposes a set of internal regulating principles which enable the language system to emerge in the individual and, therefore, for the individual to participate in the transindividual structures and relations of *langue*. The language faculty is, then, the result of social-semiological processes which are subject to both species specific (evolutionary) and individual developmental constraints. These provide for the individual's integration into and adaptation to a given social-semiological system. The individual's use of the language faculty necessarily entails a process of interaction with his or her ecosocial environment. That is, the language faculty operates on representations of social-semiological relations provided by *langue*, and without which the individual qua social individual could not develop. In other words, the individual is a complex intersection of both biological and social-semiological relations and processes.

The intersection of these two domains in the individual provides a conceptual basis for talking about the relationship of homology which unites speech and writing and other modalities of linguistic semiosis at some deep level along the whole range of the work which is entailed in the social production, individual execution, individual reception, and social consumption of these two modalities of linguistic semiosis. The ground of this homology is the brain-body complex. The basis of the proposed homology may be summarised in points (1) to (4) below:

- A general sign constituting faculty predisposes the individual to extract — sample and pickup — though his or her interactions with the the ecosocial environment the representations that are needed for the development and deployment of speech and writing;
- This general faculty in the individual meshes with the transindividual structures and relations of the higher-order social-semiological systems of *langue* and écriture in and through the exchange transactions that take place between individual and social-semiological system. The latter extends over much greater spatio-temporal scales than that of the individual's accumulated interactions with its environment;
- The psychic basis of the sign is a consequence of the emergent and self-organising properties of the speech circuit as a whole. It does not refer to the goals, intentions, and purposes of individuals in a reductively psychologistic way. It is the emergent and self-organising properties of the circuit as a whole which drive the psychic processes of closing the gap between signifier and signified (c.f. Wilden 1980: 148 on goal-seeking). Linguistic signs are not pre-given, but emerge as the result of the cross-coupling of the two orders of difference — phonic and conceptual — in *langue*. Importantly, the psychic in Saussure refers to the socially organised and mediated ways in which this occurs within the individual. In this way, the participants in the circuit can selectively and jointly orient to both internal and external states in and through a shared system of social-semiological relations and categories that are stored in long-term memory. In this way, the fundamental ontological distinction between self and non-self has a dually biological and social-semiological basis;
- The cross-coupling of the individual brain-body complex with the higher-order social-semiological system always takes place at the intersection of the speaking or writing subject's body with the higher-order systems of *langue*, écriture, and so on in acts of *parole* and/or

le mot écrit. The two scales — individual and social-semiological — intersect through our capacity for memory, which enables us to dynamically activate previous experiences and to make them relevant to here-&-now interactions in *parole*. However, memory is not to be understood simply as the storage and replication of fixed images or imprints in the brain. Rather, it involves the entire body's active participation in very many acts of meaning-making along a trajectory-in-time. It is this which provides the ground for the accumulated dispositions and capacities of the individual.

I shall explore some further implications of these points in the next section.

Transactions Between the Body-Brain Complex and the Ecosocial Environment: Proprioception and Exteroception

The distinction that Gibson (1986 [1979]: 115-6) and other psychologists make between proprioception, or self-perception, and exteroception, or perception of the external environment or non-self, provides a point of entry into the homology between speech and writing. Gibson claims that information is contained in the ambient flux of matter-energy that surrounds potential points of observation in some ecosocial environment. Information is said to specify the environment relative to an observer at some point of observation.

Gibson's specificational model of perceptual information refers to macroscopic patterns of matter-energy distributions whose topological qualities specify both change and persistence in the environment of the observer. These patterns of information specify information both about the environment of the observer (exteroception) and about the observer's own internal states (proprioception). In Gibson's model, the organism's

activities, relative to its environment, are stable and predictable, but this is not the result of ambient energy acting directly and causally on the organism. Instead, the organism is actively oriented to extract the information which the environment affords. The information so extracted provides the basis for the organism's activities in the environment. In short, information, rather than external mechanical forces, provide the basis for the organism's activities.

Gibson's epistemology is realist. Perception is direct (non-inferential) and the information is, according to Gibson, objectively there in the ambient matter-energy flux. Gibson's theory provides a model of the way in which the organism is cross-coupled with its environment at the level of macroscopic matter-energy patterns, or morphologies. Two things are missing in Gibson's theory. First, there is no account of the way in which in-built biological constraints at the level of the phenotype constrain the emergent informational properties that the organism perceives. Secondly, there is no account of the ways in which systems of cultural values cross-couple with these processes and entrain them in culturally specific ways.

How does language further elaborate perceptual categorisation? Saussure's stratified model of semiosis represents the beginnings of a theoretically unified approach to this question. In part, this is so because the system of associative values which is stored in long-term memory provides a rich basis for the kind of semiotic elaboration which occurs whenever syntagms are assembled in the short-term memory of some real-time discursive context. It is the lack of a semiotic dimension in Gibson which leads him to postulate a relation of causal correspondence between environmental events and the information which specifies these to the observer. That is, material event a in the environment causes change b in the ambient array of optical, acoustic, etc. information. Yet, this causal model does not adequately explain the role of Gibson's observer.

A better solution is the semiotic notion of metaredundancy proposed by Lemke (1984; see also Thibault 1997: 213). This is also the basic principle underlying Saussure's notion of signification whereby signifier and signified are related to each other in the making of signs. There is a redundancy relation between signifier and signified in this sense: given signifier x we can predict signified y, and vice versa. 'Redounds with' is a way of expressing the two-way or reciprocal link between signifier and signified. In other words, signification means both 'signifies' and 'is signified by'. Signification is a psychic process. It is not objectively given in the world. Signification always takes place relative to the psychic orientation of the participants in the speech circuit. It is a psychically oriented signifying act which 'faces two ways', i.e., to the self and to the environment, or non-self. Signification necessarily relates self to non-self through the mediating effects of *langue*.

As an explanation of this process, Gibson's causal or correspondence model of direct perception remains incomplete. In the absence of a stratal account of the semiotic processes which recursively link self to non-self through the sign relation, Gibson's theory of direct perception cannot explain how the individual is prised apart from the here-and-now of what Edelman calls primary consciousness. That is, Gibson's model of direct perception does not free us from the tyranny of the causal correspondences between material events in the environment and the informational variants and invariants that these correspond to. This brings us to the role of Saussure's notion of associative values in formulating a more adequate solution to this question.

The Cross-Modal Character of Conceptual-Semantic Categories

In response to the question I posed above as to the way language re-elaborates categorial perception, I shall refer once more to the work of neuropsychologists McCarthy and Warrington (1990). McCarthy and Warrington claim that impairments in specific sensory modalities (visual, auditory, tactile, olfactory, and taste) resulted in category-specific dissociations in the individual's understanding of the meaning of linguistic items (1990: 146-7). To explain this phenomenon, these neuropsychologists argued that semantic categories should be classified on the basis of an initial distinction between the sensory and functional properties of phenomena. In the further development of this hypothesis, McCarthy and Warrington went back to the view of nineteenth neurologists such as Wernicke that concepts are stored in the 'association cortex', which McCarthy and Warrington define as "regions of the brain which in turn received their input from the primary sensory analysis systems" (1990: 147-8). In other words, the associations on the basis of which lexical meanings were built up derive from different sources of sensory-motor information about the ecosocial environment of the individual. That is, from the various kinds of environmental information which the different sensory modalities pick up.

In this view, the building up and further elaborating of a concept is based on the relative weighting or salience of the various sensory, motor, and functional sources of information that are available in the ecosocial environment (McCarthy and Warrington 1990: 148). As McCarthy and Warrington argue, the information derived from these various modalities is "associated" in the learning process. Such information constitutes "a central semantic representation of a concept" (1990: 148). This presupposes the building up of metaredundancy relations across cross-modal — sensory-

motor, functional — patterns of association. The so called ‘concept’ is a meta-level representation of the redundancy relations that are involved.

The importance of these arguments lies in the link which is established between the meaning of language forms and the “finer and finer differentiation of the physical world in which we live” (McCarthy and Warrington 1990: 148). All of the sensory modalities may play a role in the learning of “concrete concepts”, though their relative weightings will vary in specific cases. On the other hand, “the acquisition of abstract concepts is likely to be very different and perhaps dependent on actions, emotions, and contextual cues as well as verbal information” (1990: 148-9). Semantic meanings which are based on the functions of objects in the ecosocial environment relate to such factors as the co-ordinated relation the object has to the self (c.f. proprioception), its integration into specific cultural activities, and the environmental affordances it has for potential users. McCarthy and Warrington summarise their distinction between “sensory” and “functional” sources of environmental information as follows:

In acquiring the concepts of small manipulable objects such as a knife and fork it is important to coordinate information gained from proprioception and vision in addition to contextual (e.g., used in eating) and functional (e.g., for cutting vs. for picking up food) information. By contrast, in learning the distinction between large man-made objects such as a bus and a train proprioceptive information is less salient although visual and functional knowledge is important.
(McCarthy and Warrington 1990: 149)

The research of McCarthy and Warrington serves to demonstrate that lexical (and other) meanings — cf. ‘concepts’ — are built up on the basis of the multi-modal integration of sensori-motor, functional and other kinds of information. This definition shows that meanings are built up on the basis of

embodied participation in both social and material activity. Word meanings are not, then, uniquely linguistic in character. Instead, the patterns of association ramify across diverse sensori-motor, functional, and semiotic modalities.

What has all this got to do with Saussure's theory of associative relations in *langue*? I shall now attempt to answer this question. In doing so, I shall argue that the networks of associative values that the individual stores in long-term memory provide an important link in our understanding of the relations between the language system, the world, and higher order consciousness.

Value and the Building Up of Networks of Associative Connections

The conceptual and phonic terms that belong to the two orders of difference in Saussure's theory of *langue* are pure values. They have no phenomenal status as such. Indeed, the notational conventions used to label conceptual terms such as [PLURAL], [FEMALE], and so on, or phonic terms such as [+ NASALITY], [+TENSE], and so on, are, in reality, no more than linguistic glosses on pure values in an analogue continuum of differences. It is important not to equate these values with the sensori-motor information about environmental phenomena. As a system of contextualising relations, the values in *langue* provide the social-semiological resources whereby sensori-motor information about phenomena in the world may be re-elaborated as specific linguistic categories, now viewed cross-modally. The phonic and conceptual terms in *langue* do not, therefore, stand in a causal relation of correspondence to environmental information. Instead, contextually weighted associations of

values provide speaking subjects with a means for selectively attending to, intentionally modulating, and co-ordinating their responses to the phenomena of experience. The system of pure values in *langue* occurs at a very high level of abstraction, below the level of conscious awareness. Phonic and conceptual terms provide the means of connecting the body-brain complex to the environment without, however, being locked into an eternal here-&-now as in primary consciousness. Rather than a causal correspondence, this relation is a historically and culturally constructed one of **complimentarity.** In Gibson's theory, the causal relation between environmental event and information is pre-given by virtue of its objective character. Complimentarity, on the other hand, is a constructed relation between environmental information and an interpreter who endows this information with meaning. I follow Wilden (1980 [1972]: 233) in distinguishing information from meaning. Information is a purely quantitative measure of the amount of pattern or organisation in some system of relations. It does not account for the meaning which this has for the participants who make meaning together in and through these patterns. Meaning is always dependent on a participant-observer perspective of potentially shareable viewpoints and perspectives at some scalar level in the overall system of relations. The psychic orientation of participants to the speech circuit and their mediation by *langue* entails the contextualisation of patterned information as meaning relative to some shareable system of viewpoints.

Edelman (1989: 153) points out that there are biologically in-built value-category relations which interact with exteroceptive perceptual categorisations. These values constitute in-built evolutionary constraints on the behaviour of the phenotype. Such values are concerned with "the assignment of salience to events in terms of adaptive values" in short-term memory (Edelman 1989: 186). They belong to primary consciousness.

The system of pure values in Saussure's *langue*, on the other hand, is social-semiological in character. They are 'imprinted' in the brain and 'stored' in long-term memory in virtue of the individual's participation in the cultural practices of a given social-semiological system. This means that the individual, rather than possessing a pre-wired language program in his or her head, encounters signs in *parole* and learning occurs. In this way, the individual extends and develops both the social-semiological resources and the sense of self which is founded on these. Society is not an epiphenomenon to which the individual is the prior, more foundational reality. The individual develops only because he or she enters into and participates in a historically specific and socially shared system of meaning-making practices. Learning a *langue* is, then, a process of discovering and inferring this system through participating in and interpreting acts of *parole*. This whole process is possible from the outset because of a higher-order system of *langue* which makes this process of interpretation possible. In time, the associative networks of phonic and conceptual that are so stored shape the individual's behaviour in culturally salient, though not necessarily conscious, ways. That is why, as Saussure points, the linguist's analysis of the terms comprising the various associative groups in the language system tends to push beyond the conscious awareness of speaking subjects. The system of values in *langue* belongs to higher-order consciousness. The fact that an individual's *langue* interieure is established on the basis of *parole* emphasis that this is an active process. Further, the dually physiological and semiotic character of acts of *parole* shows that the processes of 'imprinting' and 'storing' of *langue* in the brain are not simply the result of the brain receiving perceptual data from the outside. The sensori-motor dimension of *parole* as articulatory gestures (see Lecture 3) draws attention to the active and exploratory character of the individual organism, who interacts with the environment of which it is an integral part, rather than passively receiving data from it. Further, this orientation to the environment is selectively channelled and entrained by the system of

social-semiological values of a given community so that the organism is equipped to respond to, recognise, and learn the semiotically salient patterns in that community. Individuals stand in a 'passive' relation to *langue* in the sense that they cannot directly intervene in and change such higher scalar levels of organisation.

Higher-order consciousness entails an emerging psychic, rather than merely adaptive, orientation to self and environment (non-self). The system of associative relations which is stored in long-term memory provides the individual with a social-semiological resource for semiotically construing and intervening in self/non-self transactions. Thus, in the practices of *parole*, speaking subjects selectively re-weight the selection probabilities of the system of pure values in response to sensori-motor information which is picked up in the environment. We see here a striking commonality with Aristotle's psychic theory of the five senses. According to Aristotle, sense is **psychically** 'correlated' with its 'object of sense'. In *parole*, such re-weightings are invariably cross-modal. For example, the semantic subcategory of question which has the feature [CONFIRM; CHECK] in English selects and co-patterns the following features from, respectively, the grammatical system of MOOD and the intonation system: [MOOD; DECLARATIVE] and [INTONATION; TONE 2/RISING]. Questions of this kind seek confirmation of something that the interlocutor has previously said, rather than constitute a request for information.

Different weightings of conceptual terms in a given linguistic form selectively foreground different functional modes of its overall meaning potential. Take the case of *little,* which we considered in the previous lecture. The three associative series which I argued may be linked to the contextualised meaning of this single morpheme word can be related to different modalities of sensori-motor information, as proposed by McCarthy and Warrington.

To recapitulate, the three associative series that I proposed in Lecture 7 were glossed as [PHYSICAL SIZE], [AGE + COMPARISON OF AGE] and [LOW DEGREE]. Thus, the conceptual term [PHYSICAL SIZE] is more likely to derive from the sensory modality of vision, though other senses such as the auditory and haptic (tactile) systems clearly may also be involved. By contrast, [AGE + COMPARISON OF AGE] seems likely to derive from abstract logical criteria of quantification and chronological sequence. Finally, [LOW DEGREE] will have more to do with information which is concerned with the intensity of perceptual experience, affective states, and subjective feelings towards some phenomenon. Such information is most likely to derive from proprioception.

As I said in Lecture 7, the three terms specified here are not mutually exclusive in any given use of *little.* Rather, there will be different contextual weightings of these in response to different patterns of association of sensory-specific modalities and the semiotic values assigned to these in particular discursive practices. The extended analysis of *little* in the previous lecture suggests how modality specific sensory-motor information deriving from diverse modalities is re-elaborated by the values that constitute a particular language system. This suggests that different functional modes that are intrinsic to language form may have their basis in the kind of information discussed above. For example, the conceptual term [PHYSICAL SIZE] would relate to the semiotic classification of pre-semiotic ecosocial processes as belonging to particular classes of participants, objects, events, and so on, and the qualities that pertain to these in some cultural system. Semiosis is categorial in this sense. Phenomena of experience are classified as instances of culturally salient linguistic, visual and other semiotic categories.

Secondly, the conceptual term [AGE + COMPARISON OF AGE] relates to cultural systems of abstract logical relations which have to do with cause,

consequence, temporal sequence, comparison, quantification and so on. This area of semantic potential relates to higher-order abstract reasoning (Walkerdine 1988).

Thirdly, the term [LOW DEGREE] relates to the orientational or interpersonal function of semiotic forms. This function is concerned with evaluative stances towards and affective investments in semiotic categories and participants. It is concerned with the interaction between participants and its regulation through a system of axiological values, moral commitments, and socially enacted emotional performances.

None of these three areas of the word *little*'s meaning potential is a fixed and literal property of the word. Instead, there are shifting and overlapping relations among these according to the discursive practices in which the word is inserted. The point of this brief and informal analysis has been to show that the system of values which is internal to *langue* does not constitute a formal and autonomous system. *langue* is about the material ecosocial environment in relation to which it has co-evolved, though this does not mean that this relationship is a direct or representational way (see Thibault 1997: chap. 7). The system of values represents a social-semiological resource whose intrinsic categories and relations have been shaped by the history of the systems transaction with its environment in *parole*. Given such a resource, as neuroscientist Gerald Edelman eloquently expresses it:

… an animal is no longer linked to events in an immediate time frame. The otherwise ineluctable link to real time can be snapped because the storage of communicated gestures can be correlated with internal states in terms of stable categorizations of "self" and "nonself" acquired through affective gratification. Categorizations of this kind can emerge only in terms of social transmission. The development of linguistic memory allows a

recategorization of acts related to the "self" in terms of sentences, a recategorization no longer necessarily tied to present ongoing events. Because of its dependence on the conceptual system [in nonlinguistic primary consciousness, PJT], however, such an emerging higher-order consciousness can be tied to primary consciousness and its contents. Meaning and reference can relate to objects and events by this tie. (Edelman 1989: 190)

Edelman is not explicit as to how language as a social system of signs relates to the brain and to brain function though he clearly indicates that such a theory of language would be semantically based and functional in character rather than formal. This perspective has been further developed in Halliday (1994); see also Peng 1995). Edelman also leaves unexplained how the higher scalar level social-semiological systems such as *langue* constitute boundary conditions which entrain and organise the emergent self-organising neural groups in the brain. It is the correlation of internal states with the stored system of *langue* which enables the individual to view his or her own sense of self as other's view him or her, i.e., as an other or non-self. That is, higher-order consciousness is based on the way in which language enables individuals to internalise the social perspectives and viewpoints of the community — its system of social heteroglossia, as Bakhtin (1981) would call it — and on this basis to form their own subjective viewpoints. Self-consciousness and self-awareness can only emerge when the individual is able to view and reflect on his or her own actions from the point of view of how others in the same community view them. This is only possible on the basis of a shared system of social meanings. The secondary structure is thus built up and further elaborated on this basis (see Lecture 6, Section 5). The memories which are accumulated along the individual's trajectory-in-time in virtue of his or her participation in very many acts of *parole* is necessarily social in character. That is, socially shared systems of meaning enable memories

not only to be shared and extended over many different spatial and temporal scales beyond the here-&-now, but also to be collected, stored and distributed in a form that is useful to the long term survival of the community as a whole.

Language in the Brain

Sound and thought are proto-meanings, to use Peng's (1994) term. The cross-coupling of the phonic and conceptual orders of difference occurs on the basis of the fact that *la langue interieure* is stored in the brains of each of the members of a given speech community. The process of cross-coupling is necessary for the speaker's construction of meanings as well as for the listener's re-construction of these in his or her brain. This process of cross-coupling means that the pre-semiotic domains of 'thought' and 'sound' are selectively re-contextualised as semiotically formed thought-substance and sound substance through the association of acoustic images and concepts in the body-brain complex of the speaker-listener. Language exists globally in the brain; it is not localised in any specific centre. Nor does the speaker 'transmit' a meaning to the listener. Instead, the latter re-constructs in his or her brain the meaning by a further act of cross-coupling of the two orders of difference. This is possible because both speaker and listener are linked by a shared higher-order system of interpretance — e.g. *langue*. This means that speaker and listener can cross-couple the two orders of difference in ways which are constrained by the shared system of *langue* which mediates their transactions. The possibility of alternative cross-couplings is not unlimited. Thus, *langue* is not a system for the pairing of signified with their signifiers; it is not a code-and-transmission model of communication in which pre-existent messages are encoded by a sender and then de-coded by a receiver in the same form

that they existed prior to their encoding. Rather, it specifies the higher-order meta-rules which tell us which signifiers combine with which signifieds, and in which higher-order contexts in the joint making and negotiating of meanings.

The fact that signs arise or emerge from the cross-coupling of the two orders of difference means that the relationship between a given signifier and its signified is neither fixed nor pre-established. There are, of course, typical, socially stabilised combinations. My point is that the two strata of the sign relation are not causally linked by mechanical rules of combination. The same may also be said of the relationship between the sign and the pre-semiotic domains of thought and sound which are construed as thought-substance and phonic substance, respectively. In this way, the sign may be seen as the interface or that which mediates between the phenomenal-material world and the semiotic-psychic domain.

Saussure explicitly rejects the view that ideas are simply predetermined either in the human mind or in the world independently of and prior to the existence of the values of the language system (CLG: 155, 161, 166). From the point of view of *la langue interieure,* which exists globally in the brain of each individual, 'thought' and 'sound' are not simply raw materials which are subsequently transformed into signifieds and signifiers. In rejecting a representational model of language as nomenclature, Saussure suggests another possibility. Instead of simply re-presenting an already pre-labelled world, the brain actively and selectively intervenes in and contextualises the world on the basis of the phonic and conceptual values which are stored in the language user's brain as *langue*. Thus, Saussure's amorphous "nebula" (CLG: 155) of 'thought without the aid of signs' no longer appears as an already given, pre-defined domain unto itself. Instead, it is seen as a field of potential action, perception and experience — a background of pre-semiotic potentialities — which the act, as

Saussure puts it, of linking an acoustic image to an idea allows to emerge in determinate ways. The same also applies to the “realm of sound”, separated, as it were, from ideas.

The act of combining the two orders of difference is a psychic activity. Saussure does not say that there are pre-established combinations of signifiers and signified on the basis of which thought is elaborated through mechanical processes of combination. The basic unit in Saussure’s theory is not, then, the sign but rather the phonic and conceptual terms of the system of pure values. In their respective orders, these are hierarchically organised as networks of elementary terms which are connected to each other by processes of association. This does not mean that all terms combine with all other terms with equal probability. Instead, terms are organised into particular hierarchies of contextualising relations, or associative groups, in Saussure’s terminology. The terms which belong to a particular associative group are highly co-ordinated amongst themselves. In other words, the relations of connectivity among them are high with respect to those in some other distinct group.

The associative networks of phonic and conceptual terms is a system of values. As Bateson pointed out, a system of values is “organized in terms of preferences, [it] constitutes a network in which certain terms are selected and others passed over or rejected” (1987 [1951]: 176). The sign, for Saussure, is a psychic act in which perception, bodily process and value meet. Meaning is an emergent property of the selective re-contextualisation of the global system of values. Thus, the psychic activity of making signs is not a question of generating linguistic forms. As Peng (1994: 34) points out, the process of re-contextualizing proto-meaning (cf. thought and sound) as linguistic meaning consists in the creating and altering of the connections among the terms in the system of values.

Language, from the point of view of *la langue interieure* in the individual's brain, is not organised on the basis of already made signs which are produced and received by the motor and sensing brain functions, respectively (see Broca's and Wernicke's areas). Rather, the great mass of neurons belong to the central activities which function on the basis of massive global interconnections, rather than being localised in specific compartments in the brain (language centres). Rather than pre-given or already made signs, language is based on elementary units of information — conceptual and phonic terms — which are densely interconnected by the neural activities of the brain. A given term occurs in or is assignable to one or more associative groups in the overall system of values. But in the system as a whole, the principle of solidarity among all the terms in the system means that, when required, and according to quite specific contextual requirements, there emerge contextually appropriate connections on the basis of the kind and degree of connectivity among some selections of terms rather than others from the two orders of difference. In this way, language in the brain does not depend on a centralised brain function. Rather, the various associative groups constitute a heterogeneous and distributed mosaic of subsystems which co-operate amongst themselves in varying ways and in varying degrees in the contextualised making of signs. Signs emerge in a self-organising manner which does not depend on a prior principles or rules which control the end state.

Thus, language in the brain functions on the basis of contextually appropriate connections among the terms. This is the task of that form of mental activity which Saussure called *syntagmatic.* Thus, the dialectic between freedom and typicality of syntagmatic combination and integration is the means whereby the connections among terms may in time change. Syntagms activate and co-ordinate particular connections of terms in the overall system of values. This may happen in ways which are more or less

typical or more or less creative, and depends on the dialectic of what Salthe calls “predictable irreversible change” (development) and the “irreversible accumulation of historical information” (individuation). That is, the accumulation of information based on environmental contingencies and fluctuations which define one’s individual historical-biographical experience (Salthe 1993: 147-8). In other words, connections among the terms in the system are not fixed or unchanging. Nor are they organised on the basis of some central unity or governing principle. From the point of view of *la langue interieure*, the networks of semiotic values and their interconnections take on individuating characteristics which are a consequence of the individual’s historical-biographical trajectory and the experiences he or she accumulates along this.

Higher-order Consciousness and Personhood: The ‘Inner’ and ‘Outer’ Dimensions of *Parole*

Introspection or self-observation of one’s own mental activity is founded on a principle of inner dialogue in which the self adopts the attitude that the self is an other with whom it can conduct a conversation. However, the means for carrying out this inner dialogue do not belong to separate and epistemically private mental realm. Instead, the inner conversation makes use of the social-semiological resources of *langue* and may better be described as a specialised ‘inner’ deployment of these same resources. In the following passage, Saussure shows that inner dialogue is shaped by and emerges in and through the social resources of the language system:

The psychic character of our acoustic images appears clearly when we observe our own language activity. Without moving either the lips or the tongue we can speak to ourselves or mentally recite to ourselves a piece of

verse. This is because the words of the language system [langue] are for us acoustic images so that it is necessary to avoid speaking of the "phonemes" of which they are composed. This term, which implies an idea of vocal activity, is only suitable for the spoken word, for the realisation of the interior image in discourse. In speaking of the sounds and the syllable of a word, this understanding may be avoided so long as it is borne in mind that it refers to the acoustic image.
(CLG: 98)

The acoustic image is, as Saussure says in the paragraph preceding this one, "the psychic imprint" of the material sound (CLG: 98). It is not only the relationship between acoustic image and concept which is psychic. So, too, is the relationship between acoustic image and the material sound which is uttered in speech. In making this claim, Saussure separates the acoustic image from the materiality of speech sounds per se. Words that are actually uttered in discourse are the 'externalisation' of the "interior image" of the word. It is necessary that one orients to the heard stream of sounds in an intentional and linguistically mediated way. The sounds perceived in outer speech constitute organised patterns of information relative to a material event — articulation — in some ecosocial environment. Such information is **quantitative**. It is only through the mediating effects of *langue* that meaning arises relative to the shared viewpoints of the participants. Meaning, in contrast, implicates a **qualitative** orientation to the sounds heard (see also Parret 1994 [1993]: 23; Lecture 6, Section 2). However, this does not mean that something which is 'interior' is causally prior to external speech. We have already seen that *langue* is 'imprinted' in the individual's brain in and through the practices of *parole*. Saussure does not, therefore, claim that there is some sort of inner mental representation or program that functions as a central co-ordinator and controller of external speech. Instead, the acoustic image, which is psychic rather than physical in character, belongs to both the 'inner' and 'outer' manifestations

of *parole*. Nor is it a matter of some simpler ‘inner’ principle causally explaining more complex ‘outer’ behaviour. The acoustic image belongs to both the ‘inner’ and ‘outer’ domains, in the same way that *parole* itself does.

The psychic nature of the acoustic image has a number of important characteristics. These may be summarised as follows. First, rather than a physical sound, it is a relation between the speaking subject and the ecosocial environment. Secondly, it stands in a functional relationship to the articulatory environment. This is so from the points of view of both the ‘inner’ and ‘outer’ manifestations of *parole*. Thirdly, the psychic character of the acoustic image means that it has semiological value. In other words, it is intentional and, for this reason, able to modulate both externalised vocal activity as well as the neural activities which underlie inner speech (see below).

The psychic properties of the acoustic image are a good demonstration of the emergence of simplicity from complexity. A highly complex system — the articulatory apparatus in the vocal tract — entrains flows of matter-energy in the body of the speaker in order to enact specific semiotic functions. The acoustic image functions as a higher-order constraint of the non-holonomic sort which acts as a boundary condition or a causal context for the specific interpretation of the considerably more complex matter-energy flows that underlie such constraints in the act of articulation. The assignment of a semiotic value to the articulatory act selectively ignores many details of articulation in order to achieve a simplification in semiotic function. In doing so, it specifies information both about the environment of the speaker at the same time that it specifies information about the self. In this sense, the acoustic image is ‘neutral’ both with respect to the speaker and listener perspectives and to the inner and outer dimensions of language in the individual.

In the above passage, Saussure looks at the question of 'inner' speech in order to distinguish the physical-material sounds of 'outer' speech from the psychic character of the acoustic image as clearly as possible. However, it is important to pay careful attention to his use of pronouns here. He says we can talk to "our selves" [*nous-mêmes*] and we can recite verse to "ourselves" [*nous*]. There is a danger that the value we attribute to the English word *self,* in the sense of a substantive inner entity to which the word refers, may be carried over into our understanding of the French word *nous-mêmes.* The French expression does not have this English sense. It is a reflexive pronoun which reflexively indexes the personhood of the speaker. Saussure is not saying that we converse with a substantive 'inner' entity, the 'self', in the Cartesian sense. Instead, we can reflexively converse with our own person as an addressee, or we can mentally recite a piece of verse to our own person in the same way. This is a crucial point: Saussure is not talking about the Cartesian cogito, but about the capacity of speaking subjects for self-awareness and self-consciousness.

If, on the other hand, we take Saussure to be referring to an inner substance, the 'self', after the fashion of Descartes, this would imply no more than a self-perception of this 'inner' substance as a thing in a world of other things. In such a world, some things belong in the 'inner' domain world of *res cogitans,* others in the 'outer' domain of *res extensa.* Saussure is talking about something very different from this. He is referring to the intentional awareness that one has of oneself as a person in a world of other persons. Such a notion of personhood carries with it an assumption of internal complexity. That is, reflexive capacities for self-awareness, self-consciousness, and self-monitoring, which do not apply to persons seen as a thing or a substance per se (Harré 1983: 154). This dual capacity for the representation of the object of consciousness and the representation of the representing self is shown in the inner dialogue between nous1 and nous2. This shows how the two representations are "produced by the same

operation" (Battacchi 1998: 11). In *parole interieure,* the speaker/perceiver perceives him- or herself as both the addressee/object of perception (*nous2*) and the speaker/perceiver (*nous1*). (See Battacchi 1996, 1998 for further discussion of the relationship between self-knowledge and self-consciousness and its ontogenesis).

The points I have made in the previous paragraph may be illuminated by a consideration of the experiential semantic structure of the two clauses in question. For example, the clause *nous pouvons nous parler à nous mêmes* is a clause of general type known as verbal processes. In contrast to material processes, in which Actors materially act on Goals, which have the semantic status of 'thing' (Davidse 1991: 374), verbal processes are concerned with **symbolic interaction** between a Sayer, the source of the interaction, and an Addressee. Further, many, though not all, verbal processes may create linguistic projections (cf. quoted and reported clauses in traditional terminology) of linguistic metaphenomena.

Typically, the symbolic source of the verb process — the Sayer — has the feature [+conscious]. The verb *parler* ('speak', 'talk') does not project metalinguistic phenomena as quotes or reports. Semantically speaking, verbs like those just mentioned are closer to behavioural processes such as *smile, kiss, hug,* and so on, rather than to verbal processes which can project, e.g. verbs such as *tell, say, report,* and so on, as in *He said he would not come)*. Verbs like *say, talk, gossip, chat* belong to a semantic domain, or associative group, concerned with verbal-behaviour-as-observable-social-interaction, rather than with physiologically oriented verbs of saying such as *gasp, stutter,* and so on. The clause mentioned above may be analysed as in Table 1.

$nous_1$	pouvons	$nous_2$	parler	à $nous_2$ mêmes
Sayer	Modality: Capacity	Addressee	Process: Verbal: Social Interaction	Circumstance: Range: Addressee

Table 1: Experiential semantic structure of clause of symbolic interaction in Saussure's text.

Verbal processes are concerned with symbolic interaction between Sayer and Addressee rather than with material interactions between an Actor and a thing. Clauses such as *my watch says its five o'clock* do not change this point. The point is that verbal processes semantically construe such interactions as symbolic or semiotic rather than material. Like the closely related mental processes — viz., verbs of sensing, etc. — verbal processes are concerned with the semantic domain of the conscious and/or symbolic processing of phenomena (Davidse 1991: 374). The analysis presented in Table 1 serves to show that in what I shall call *parole* interieure as a logical extension of Saussure's discussion, as cited above, the semantic Sayer (the Addresser) can address him- or herself not as a thing, but as an addressee with whom he or she can engage in symbolic interaction. In Saussure's clause, the prepositional phrase *à nous mêmes* functions, semantically, to define the Range or the semantic scope of this symbolic interaction between *nous1* (Sayer/Addresser) and *nous2* (Addressee) as being inwardly directed. Importantly, the use of the modal *pouvons* ('can') construes such acts of *parole interieure* as permanent and intrinsic capacities of language users.

The distinction that Saussure makes between *nous1* and *nous2* is parallel to the one that Mead (1934) made between the 'I' and 'me' who engage in inner dialogue in the individual's mind. In terms of the distinction made by Battacchi (see above), the 'I' is the individual perceiver/observer who has consciousness while the 'me' is the individual perceived/observed as an object of consciousness. The 'me' emerges as a result of the viewpoints or perspectives which others have of the self. In this way, the 'I' is able to see

and contemplate itself as others do. In this way, the 'I' learns to adopt a subjective attitude of self-reflection towards itself by observing itself as 'me' and its responses to itself in inner dialogue. The 'I' is the point of action from which acts of consciousness emerge whereas the objects of this consciousness — thoughts, memories, desires, and so on — belong to the 'me'. In other words, the 'I' constitutes the principle of unity around which the diverse voices of the 'me' are synthesised as a unified sense of self. Thus, the 'me' corresponds to the many different subject/agent positions that the 'I' has experienced in the different types of social activities, the diverse networks of connections, and the varied use of meaning-making resources along the individuating trajectory-in-time that are the ground of its sense of identity. It is through being able to contemplate and reflect on these that the 'I' is able to fashion a sense of identity and its continuity in time. Consciousness is not, therefore, an epistemically private affair but is dependent on the dialogic interaction between shared viewpoints or perspectives relative to some scalar level of organisation. In effect, it disrupts the potentially infinite regress of recursive levels by assigning a point of action from which the agent interacts with other viewpoints and reflects on the consequences of its interactions as well as the viewpoints of others. The point of action of the 'I' constitutes an organised field of effects that are attributable to the 'I' and for which the 'I' may be held responsible along its trajectory. Consciousness is not reducible to physical brain processes. The view that I have put forward of the brain as a repository of social meanings accumulated along an individuating trajectory-in-time means that the separability of scales — biological organism, social-semiological system, and so on — no longer holds. The currently fashionable view that consciousness is reducible to physical processes in the brain fails to see that our theories and descriptions of phenomena at this level are in actual fact models of what Lemke (1998: 12) refers to as "our human-scale relationships" to phenomena at this level. These phenomena emerge in human theories and discourse, which means that

the scale on which humans interact with others and with their ecosocial environment through their systems of cultural practices and values, their technologies, etc. is of fundamental importance and has consequences for the observed lower scalar phenomena such as physical brain processes. Thus, the dialogic interaction of 'I' and 'me' in the individual's mind is a consequence of this scalar heterogeneity whereby the very different scalar levels of the individual biological organism — the brain-body complex — and entire systems of cultural practices and meanings intersect. The emergence of a point of action and consciousness centred on the 'I' means (1) that boundary conditions at the human-scale level impose constraints on lower level physical processes at the same time that (2) consciousness entails the agentive disruption of the regress of levels with respect to a dialogically co-ordinated system of social viewpoints that are internalised and which enable the agent to create meta-perspectives on and models of its relationships to other levels in the overall system of scalar levels.

Mind is a result of the scalar heterogeneity discussed above. It is a result of the ways in which higher scalar systems of meaning-making practices and cultural values intersect with the body-brain complex of the individual organism. Rather than an arena for mental predicates — beliefs, desires, intentions, decisions, and so on — which stand behind and cause human action, mind is an emergent system of meanings which results from what Salthe (1993: 147) the irreversible accumulation of historical information along an individuating trajectory of cascading/collecting acts. Mind, thus, functions as the interface between the individual biological organism and the higher scalar orders of the ecosocial environment. However, we do not simply take in information from the outside. A system of meanings constitutes a theory about the world and the individual's place in it. This is a way of achieving a degree of functional closure and, therefore, of 'autonomy' for the individual organism. This is not the same as the reduction of consciousness to physical brain processes, which aims to

discover the lower scalar mechanisms that explain and cause consciousness. If the relationship between organism and environment is an open and complex one, then mind can be seen as the individual's internalised elaboration of meanings along an individuating trajectory. It is a means of achieving a relative functional closure through its encounters with and selective re-elaborations in discourse of the world of the non-self. These encounters are always mediated by higher scalar orders of social and cultural practices in which the individual is nested and which necessarily act on the individual. The emergence of mind does not occur *sui generis;* the achievement of closure always occurs in relationship to something in the world.

The Acoustic Image in Inner and Outer Speech

Saussure's psychic conception entails the recognition that speaking subjects speak to other persons *qua* persons, rather than as substantive things or objects. The acoustic image is oriented to this reality of intentional signifying acts between persons whose claims to awareness of 'self' and 'other' are based on the assumption of publicly shared criteria of "will" and "intelligence" in their jointly constructed acts of *parole* in some shared interpersonal moral order. Saussure's term 'psychic' does not mean for Saussure an 'inner' homunculus who controls 'outer' behaviour from the inside. It means, instead, the self-reflexive awareness of self and other as persons in a world of other persons. Inner speech, in this view, entails the capacity of the person to self-reflexively converse with oneself as a person in the inner domain. That is, the 'mental' is the domain of *parole* inflected inwards. It, too, no less than external speech, is a consequence of the individual's participation in the transindividual structures and relations of *langue*.

To sum up: both the motor image and the acoustic image may participate in the realisation of an 'outer' event of actually uttered speech sounds. From the speaker's point of view, the motor image produces a motor or articulatory response. The physical sound which is so uttered is said to be peripherally connected to the motor image. On the other hand, the motor image may not produce an actual motor response. In this case, the speaker may evoke the motor image 'in thought', but without actually implementing the required articulatory movements so as to produce the physical sound. That is, the motor image of a given speech sound may be 'imaged' by the speaker without actually being spoken aloud.

In the second case, I would prefer to say that the motor image is realised internally by neurophysiological processes that are not manifest to the outside observer and which are still little understood. Nevertheless, they do clearly have a phenomenal status in the consciousness of the speaker. This 'inner' process is no less semiotic and material in its own way than is its counterpart in 'outer' speech. This follows from the fact that *parole* always entails the cross-coupling of physical-material and semiotic-discursive processes. For the purposes of the present argument, this leads to two main possibilities: (1) the motor image is cross-coupled with neurophysiological activities in the act of executing and receiving a spoken sound in 'outer' speech; or (2) it is cross-coupled with internal neuroanatomical processes in the brain of the executor and these are not available to the outside observer.

From the listener's point of view, he or she may (1) actually hear a given sound sequence and in the process of extracting acoustic information from this categorise the sound as an instance of this or that phoneme-type; or (2) operate without the stimulus of the ambient acoustic array in the sense that the listener 'imagines' hearing an instance of a given phoneme category in 'inner' speech. In both cases, the acoustic image orients the

hearer to the sound — real or imagined — in either the 'inner' or the 'outer' domains. Saussure is quite clear on this point. He says that the spoken word is "the realisation of the interior image [the acoustic image] in discourse". However, it would be wrong to say that the spoken word is simply the material manifestation of the acoustic image in the spoken chain. The acoustic image is a higher-order principle which regulates both 'inner' and 'outer' manifestations of *parole*. It does not, however, depend on peripheral feedback. Rather, it is the principle which intentionally modulates and orients acts of *parole* in relation to self/non-self transactions, irrespective of whether these are enacted in the 'inner' or 'outer' domains. That is, it links motor programs and the behavioural sequences that the former may or may not generate to signifying acts between persons in either domain — inner or outer.

According to the standard cognitive-representational explanation of the phenomenon of 'inner' speech, motor image and acoustic image may be evoked or imagined in an autonomous 'inner' realm of consciousness which is disconnected from peripherally connected stimulus events. This is the view espoused by Langacker (1987: 112), for example. In this view, there is a separate realm of mental experience. Saussure, we have seen, quite clearly views 'inner' speech as acts of *parole*. It is *parole* specialised to the 'inner' realm. It is important to point out that inner and outer speech do have their own characteristics. However, there is no autonomous mental domain in Saussure's account. Gibson's explanation of "nonperceptual awareness" (198: 256) is a more helpful starting point. Gibson's argument is concerned with visual perception, but the argument is also valid for other sensory modalities:

… a perceptual system that has become sensitized to certain invariants and can extract them from the stimulus flux can also operate without the constraints of the stimulus flux. Information becomes further detached from

stimulation. The adjustment loops for looking around, looking at, scanning, and focussing are then inoperative. The visual system visualizes. But this is still an activity of the system, not an appearance in the theater of consciousness.
(Gibson 1986 [1979]: 256)

It is, however, also necessary, as I argued in section 5, to go beyond the limitations of Gibson's theory of direct perception. The extraction of invariants from the stimulus flux means that the semiotic activities of 'inner' speech and 'inner' listening — inner dialogism — are differentially cross-coupled with the material-phenomenal domains of the body of the speaker/listener with respect to the observable qualities of actually uttered speech sounds. 'Inner' and 'outer' acts of *parole* do not correspond to the distinction between non-linguistic 'thought' and outwardly perceptible linguistic activity. Both are forms of language activity in higher-order consciousness. If 'thought' is to have a place, then this is in the realm of specialised brain processes concerned with pre-semantic concept formation to do with physical situations, objects, space, time, corporeal schemas, and so in in primary consciousness (Edelman 1989: 141). To avoid the supposition that 'speech' and 'thought' are constitutively different activities in higher-order consciousness it is necessary to understand that they are differentially specialised deployments of the social-semiological resource system of *langue*. The fact that 'inner' acts of *parole* may be freed from the control of peripheral stimulus events (Langacker 1987: 111-2) does not mean that such 'inner' acts correspond to an autonomous 'mental' realm. It would be a confusion of basic principles to assume that the absence of peripheral feedback equates with context-independent 'mental' or cognitive processes. 'Inner' speech always requires a context even in those cases when it is most abstracted from the here-and-now of specific situations. This context includes the wider context of culture, the language system, the history of the autobiographical individual's participation in

specific discursive practices, and the microcontext of the dyads which are enacted ‘inside’ the head of the individual on any given occasion.

Language and Thought: Some Suggestive Parallels Between Saussure and Vygotsky

The system of *langue* functions to further elaborate and mediate pre-semiotic thought. Saussure’s discussion of the relationship between *pensée* and *son* shows that these are not so much devoid of meaning but rather they constitute a kind of proto-meaning (Peng 1994) ‘before’ their further semiotic elaboration by *langue*. Thought as such is psychological rather than psychic. In Saussure’s terms, the psychological refers to the pre-semiotic and the subjective — that which has not been mediated by signs and, hence, psychically directed towards the other. The cross-coupling of the phonic and conceptual orders functions dually to elaborate thought as psychically directed and channelled meaning as well as to project it into the ecosocial environment of the speaker through processes of bodily articulation. Thought is always mediated and elaborated as meaning and as embodied activity, simultaneously. It may surprise some to suggest that there are striking and suggestive convergences between the Soviet psychologist Vygotsky and Saussure on this relationship. Consider the following passages from Vygotsky, then compare these to Saussure’s statement about how values emerge in *langue*. First, Vygotsky:

Even at the outset, then, thought and word are not cut from a single mold. In a certain sense, one can say that we find more opposition than agreement between them. The structure of speech is not a simple mirror image of the structure of thought. It cannot, therefore, be placed on thought

like clothes off a rack. Speech does not merely serve as the expression of developed thought. Thought is restructured as it is transformed into speech. It is not expressed but completed in the word. Therefore, precisely because of their contrasting directions of movement, the development of the internal and external aspects of speech form a true unity.
(Vygotsky 1987: 251)

and

Thought is always something whole, something with significantly greater extent and volume than the individual word. What is contained simultaneously in thought unfolds sequentially in speech. Thought can be compared to a hovering cloud which gushes a shower of words.
(Vygotsky 1987: 281)

Secondly, Saussure on the relationship between *langue* and 'thought' and 'sound':

The characteristic role of the language system [la langue] vis-à-vis thought is not to create a material phonic means for the expression of ideas, but to serve as the intermediary between thought and sound, in conditions such that their union necessarily leads to a reciprocal delimitation of units, Thought, chaotic by nature, is forced to become precise in being decomposed. There is then neither the materialisation of thoughts nor the spiritualisation of sounds, but it is a matter of the in some ways mysterious fact that "thought-sound" implicates divisions and that the language system elaborates its units in being constituted between two amorphous masses.
(CLG: 156)

Both Saussure and Vygotsky see thought as global, non-linear, and topological-analogical, whereas the semantics of language is

predominantly local, linear, and typological-digital or analytical. Both Saussure and Vygotsky emphasise the plasticity or lability of thought, which is not simply expressed or re-presented by language. For both Saussure and Vygotsky, the semiotic nature of language functions to mediate thought in and through a socially shared system of signs. In re-elaborating and completing thought as meaning, the former is made explicit, social, and dialogic. It is intentionally or psychically directed towards the other in a social context of symbolic interaction between self and non-self.

Saussure does not talk about the world as such but about 'thought'. Furthermore, we have seen that both Saussure and Vygotsky see language as acting on, intervening in, and completing thought. Saussure's arbitrariness principle primarily serves to explain how the system of *langue* functions to reduce the ineffable diversity and richness of thought to a more manageable and standardised set of categories which are shareable with others. In the process thought is objectified and made 'other'. In this perspective, higher-order consciousness may be see as a dialogic and psychic process of orienting to and completing the phenomena of experience. There are a number of points that are pertinent here. These are summarised as follows:

- the material world impacts on consciousness creating friction (difference) between self and non-self that needs to be resolved in some local way;
- the self orients to the source of this impact as a specific object of consciousness;
- the process of semiotically construing it through the symbolic possibilities of some system of interpretation means that the material is semiotically completed;
- the significance so attached to the material event is located in the social domain as knowledge.

In Table 2, I have suggested some interesting and useful parallels between the two thinkers.

Language	Thought
local	global
analytic	synthetic
typological	topological
linear, sequential in time	simultaneous
digital	analogue
defined, precise	vague, chaotic

Table 2: Language and thought compared: some complimentarities between Saussure and Vygotsky.

In actual fact, Table 2 presents a too sharply dichotomised view of the relationship between thought and language. The main reason for this is that not all aspects of the semantics of language fit the above characterisation. As Kenneth Pike (1967) has shown, language form is particle, wave, and field. These three perspectives on the structure of language are complimentary to each other rather than mutually exclusive. More precisely, it is the experiential dimension of linguistic meaning which analyses and interprets phenomena into configurations of discrete parts or particles which are linearly segmented. Even here, these relationships are not simply or exclusively based on part-whole and part-part constituent hierarchies, but also exhibit relations of dependency which are not, strictly speaking, linear in character. It does not follow from the linear unfolding of language in time that all aspects of linguistic meaning are linear.

David McNeill's work on the relationship between language and spontaneous gesture has revealed how the two semiotic modalities are integrated in speaking as complimentary yet different dimensions of a single meaning-making process (1992: 24). Gesture is specialised towards the global and synthetic while the semantics of language is specialised to the discrete and the analytical. McNeill argues that language and gesture together synthesise different aspects of thought. McNeill writes:

My own hypothesis is that speech and gesture are elements of a single integrated process of utterance formation in which there is a synthesis of opposite modes of thought — global-synthetic and instantaneous imagery with linear-segmented temporally extended verbalization. Utterances and thoughts realised in them are both imagery and language.
(McNeill 1992: 35).

In actual fact, it is the semantic or conceptual stratum of language which most readily corresponds to McNeill's characterisation. This is the stratum that Saussure called the signified. However, language is also embodied sensori-motor activity with respect to the stratum that Saussure called the signifier. I have already discussed this gestural dimension of language in Lectures 3 and 4 (see also Armstrong et al 1995). As embodied sensori-motor activity, language, like gesture, is predominantly topological rather than typological in character. Indeed, it is this sensori-motor dimension of language which enables it to be integrated with gesture in the real-time of meaning-making activity.

Further, thinking is a higher-scalar activity with respect to the neural processes that subtend it. This does not mean that it is transcendent with respect to the lower scalar physical processes. Rather, it is emergent with respect to these lower scalar process, as discussed in Lecture 6, Section 2 in relation to Edelman's theory of degenerate reentrant mapping. The fact

that thinking is a higher scalar activity of the brain in relation to the body's sensori-motor activities and samplings of its environments entails that a certain amount of energy is expended in the activation of these lower scalar processes as a kind of thermodynamic overhead with respect to the purpose to hand — thinking (Salthe 1993: 97). Thought itself is purposeful or psychic in character. In 'completing' or further elaborating thought, the system of *langue* integrates and entrains it into higher-order patterns. Lower level neural processes alone cannot explain the emergence of these higher level patterns. Nor do the former cause the latter.

Langue provides a system of boundary conditions which constrain the ways in which human agents engage in meaningful activity at lower levels. Those theorists who privilege efficient causes in the form of the lower level mechanisms — the neurochemical processes — in the physical brain as the locus of theoretical explanation fail to comprehend on account of the radical split between individual and society that informs their thinking that there are always higher scalar levels of organisation with respect to the individual organism. The emergence of mind as a kind of interface between individual and ecosocial system may be seen as an intermediate level which arises as a consequence of the initially vague and ill-defined nature of the relationship between the individual biological organism and the higher scalar levels which pre-exist the organism. I remarked above that mind is an interface between these two levels. This means that it is an emergent and self-organising level of organisation between the biological subsystems of the individual and the higher scalar ecosocial ones. Mind does not arise as a result of the bottom-up assemblage of neural activity. Nor is it transcendent with respect to these.

As far as individuals who engage in specific acts of *parole* are concerned, their actions may appear unconstrained. This is so because the system of boundary conditions is by and large implicit and, hence, unconscious as far

as individual participants are concerned. When Saussure says that thought is “chaotic by nature” (CLG: 156) until it is cross-coupled with a system of signs, he is pointing out that *langue* functions to complete thought, to give it a determinate meaning by inserting it into a higher level system of interpretation. By the same token, thought is provided with a self-reflexive connection to the higher level system which interprets it. This fulfils the requirement that a model of thought also has a model of the thinker. This self-reflexivity provides a way of breaking with the potentially infinite regress of ever higher levels. As Salthe (1993: 51) argues, this is done by “allocating agencies” with respect to some order of relations. The fact that individuation takes place along a trajectory in and through acts of *parole* means that the order of relations specified by this level is brought about by the interactions between agents who have perspectives or viewpoints (Salthe 1993: 51). In this order of relations, individual features — cf. “will” and “intelligence” — come to the fore for this level privileges agency and individuality. The linguistic and gestural resources that are deployed in *parole* are the means whereby thought is transformed into a more highly specified social discourse. To say that language is the tool whereby thought is socially mediated should not, however, lead us to think that language is separate from thought. Both Saussure and Vygotsky emphasise the inseparability of the two. My point is that language is not simply a tool for communicating individual thoughts (see Thibault 1998b: 2-6). That would be to separate individual from language as if they were separate components in a functional system. Instead, the tool is the person speaking; language is not an external tool which the individual simply uses and then puts down, so to speak.

We have already seen that ‘inner’ acts of *parole*, no less than their ‘outer’ counterparts, entail a dialogic orientation to an addressee. Further, the ‘imprinting’ of *langue* in the individual’s brain is a consequence of *parole*. The stimulus invariants of which Gibson writes are, in actual fact, no more

than potentially salient patterns of similarity and difference which speaking subjects can appropriate to a specialised ‘inner’ realm. To these patterns, we assign social meaning through our ability: (1) to perceive stable patterns of information in the ambient flux; and (2) to connect these patterns to other patterned relations ‘above’, ‘below’ and ‘beside’ it in the hierarchy of processes and relations, both material and semiotic, whereby the social meanings of a community are enacted and sustained. ‘Inner’ acts of *parole*, no less than ‘outer’ ones, entail exchanges of matter, energy, and information with their immediate environments in order to ensure their continuity and further development. That is, both ‘inner’ and ‘outer’ acts of *parole* are contextualised acts of meaning-making specialised to different domains in relation to the body-brain complex.

Table 3 suggests how both inner and outer acts of meaning-making are self-organising processes that are emergent and context-dependent. It is through our participation in the social meaning-making practices of a community that we learn to assign meaning to the initially vague and not well defined connection between individual and environment. In participating in discursive activities with others, the gestural potential of our sensori-motor activities is entrained in some ways rather than others such that some typical patterns of connections between, say, vocal gesture, the other’s reaction, and the perceived effects on one’s own body lead to the forming of a system of stable and shareable distinctions which are the ground of all acts of meaning-making.

Contact / Orientation	Articulatory Contact: Phonation Motor Image	Auditory Contact: Audition Acoustic Image
Egoreception; *Parole interieure;* Stimulus flux absent	Self to Self-as-Other (= i → c): Speaker activates articulatory routine independently of the execution of speech sounds as in outer speech. That is, the speaker imagines implementing the articulatory routine in order to evoke acoustic image in thought. The motor image is cross-coupled with internal neurophysiological processes not accessible to the external observer.	Self-as-Other to Self (= c → i): Hearer activates the acoustic image independently of the reception of actual speech sounds in the stimulus flux. That is, the speaker-listener imagines hearing an auditory image of the sound in thought. The acoustic image is cross-coupled with internal neurophysiological processes not accessible to the external observer.
Exteroception; *Parole exterieure;* Stimulus flux present	Self to Other (= i → c): Speaker activates articulatory routine and executes the perceivable speech sound in the acoustic flux. That is, the speaker actually implements articulatory routine to produce heard sound. The motor image is cross-coupled with stimulus information that the listener picks up from the stimulus flux.	Other to Self (= c → i): Listener extracts stimulus information from the stimulus flux and cross-couples this with the acoustic image in the process of construing this information as speech sounds. That is, the listener actually hears the speech sound and construes it as an instance of a given auditory image. The acoustic image is cross-coupled with externally perceived stimuli which the listener's ear picks up.

Table 3: Levels of processing in the execution and reception of 'inner' and 'outer' acts of *parole*; (i = image acoustique; c = concept).

In Table 3, we see that the relationship between acoustic image and concept may be construed from two main perspectives. First, the movement from acoustic image to concept (i –> c) — cf. phonation — entails that the speaker embodies an active orientation to the other, who is required to assign a semiotic value to the speaker's embodied act. Secondly, the movement from concept to acoustic image (c –>i) — cf. audition — entails the listener's active and embodied reception of the meaning which he or she assigns to the speaker's activity. In the first case, the speaker must find a suitable embodiment for a given semiotic value; in the second, the question centres on the listener's assigning an appropriate value to the speaker's embodied activity. Both perspectives implicate an active, embodied orientation of speaker and listener to each other.

Table 3 also shows that two distinct levels of processing are involved in the execution and reception of both 'inner' and 'outer' acts of *parole*. With reference to 'outer' acts of *parole*, Saussure referred to these two levels as phonation and audition. This distinction corresponds to the modern one between kinetic and phonemic levels of speech production. The Saussurean distinction is based on the work of nineteenth century neurologists such as Broca (1861) and Lichtheim (1885), who showed that disorders of speech may occur in either the domains of production or comprehension. Recent research confirms this view, but goes further in showing that disorders in speech production fall into two main subclasses, viz. (1) disorders in the sequencing of phonemes even when the speaking subject is capable of producing the individual sounds, and (2) disorders in the complex of co-ordinated muscular activities which are necessary for the production of speech sounds. These two types of speech production disorders — the phonemic and the kinetic — have been identified by modern neuropsychologists and confirm the distinction made by Saussure (McCarthy and Warrington 1990: 195-6).

The motor image constrains and integrates both the complex muscular and articulatory movements which are involved in the kinetic level of speech production and the imaginary implementation of the articulatory routine in silent inner speech. However, the motor image does not have the status of an a priori central program of stored information which directs or prescribes the temporal patterning of muscular movements in the articulation of speech sounds. For example, Langacker makes a distinction between:

… autonomous and peripherally connected cognitive events. The sensation directly induced by stimulating a sense organ is an instance of a peripherally connected event; the corresponding sense image, evoked in the absence of such stimulation, is an autonomous but equivalent event. […] A serious parallel is thus drawn between, on the one hand, the activity

of the receptor organs and the cognitive events that directly induce it. Having made this analogy, we can reasonably speak of a motor image, an event equivalent to one that elicits a motor response but which in actuality fails to do so. By virtue of this failure such an event remains peripherally unconnected and is therefore autonomous.
(Langacker 1987: 112)

This is the cognitive-representational view. In this view, the motor image is a central program which may direct either 'autonomous' events in the mind or 'peripheral' events as motor gestures in the execution of perceptible speech sounds. However, this way of formulating the problem retains the idea of an autonomous mental domain which is distinct from the external speech. In Langacker's account, the motor image has a causal status. It mentally 'directs' and 'executes' the motor event. What is curious about this line of reasoning is that mental events that are not available to external observation are presumed to behave according to the same kinetic observables that cause orthodox Newtonian interactions. In Langacker's description, the motor event is caused by some antecedent command which issues from the motor image. Further, the motor image is also assumed to belong to a separate domain of mental experience. Langacker uses the language of orthodox mechanical interactions which has become standard in the theoretical language of much cognitive science to describe events which are not adequately describable in this way. The reliance of this view on an autonomous mental domain does not solve the following two problems. First, how does the motor image get on the inside in the first place? Secondly, what is the relationship between 'inner' speech, which is not controlled by the ambient stimulus flux, and 'outer', which is?

These problems do not arise in Saussure's account. Saussure does not assume a separate and autonomous mental domain which causes articulatory and perceptual events. Langacker takes the view that

articulation and perception may or may not causally correspond to stimulus events. When they do, the latter are so called peripheral or observable events in the public domain of speaking and listening. In Saussure's account, *parole* cuts across the dichotomy of 'inner' and 'outer'. Stimulus invariants in the stimulus flux may be specialised to either domain, as suggested above. There is no dichotomy here. Instead, there is a graded continuum of possibilities. The continuity of the relations involved is illustrated in Figure 3.

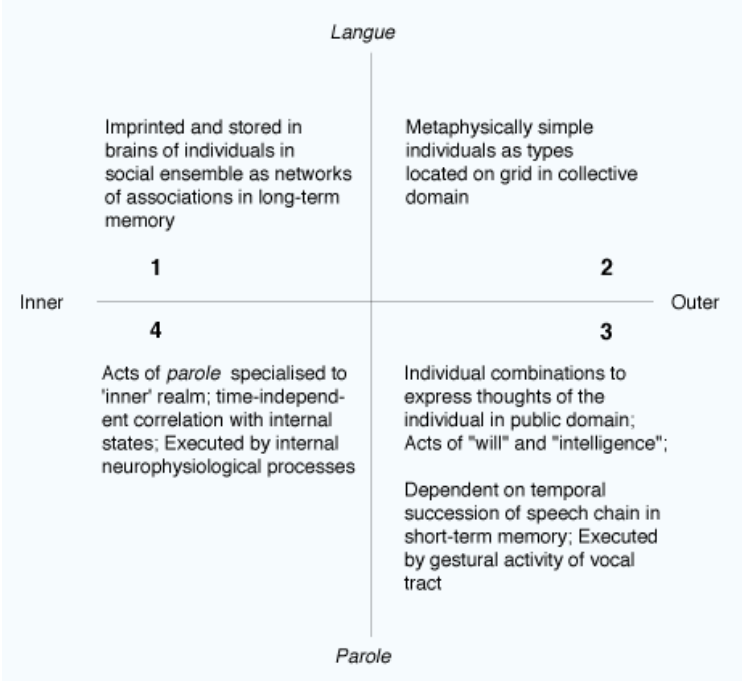

Figure 3: Inner and outer dimensions of *langue* and *parole*.

From the point of view of the signifier, what is common to both domains along the entire range of the social work which has produced them are: (1)

the cross-coupling of the individual with stimulus invariants in the stimulus flux by means of the entire sensory system which is in operation; and (2) the psychic character of the cross-coupling of (i) the motor image with the organs of articulation and (ii) the acoustic image with the organs of hearing.

From the point of view of audition, the acoustic image constrains and integrates the stimulus invariants in the acoustic array. That is, it simplifies the microscopic detail of the array into macroscopic sound-categories. The Ear, as I showed in Lecture 6, is intentionally directed to re-organise the information which is extracted from the array. There is no objective perception of information. The acoustic image functions as a non-holonomic constraint which re-construes the macroscopic patterns and flows of the array and its transformations. It does so in ways that are specific to the properties of the material source of the sound and its location in the ecosocial environment. The acoustic image, in other words, is psychically oriented to extract and modulate semiotically salient information.

The perspectives of both phonation and audition illustrate the psychic orientation to the other in the speech circuit. The motor image constrains and directs the muscular activities of phonation. It does so in ways which are oriented to the other. The acoustic image performs the same function from the reverse point of view. The acoustic information perceived by the Ear of the listener is recognised as information about the speaker. This reciprocity of functions rests on the fact that acoustic information in speech sounds affords a response from the other. The speaker, in projecting information about him- or herself into the environment, affords the possibility of interaction with others. This also depends on the reciprocal capacity of the listener to orient him- or herself to the acoustic information which is co-perceived. Such acts of co-perception presuppose a dialogically oriented higher-order consciousness the emergence and

completion of which depends on the transindividual structures and relations of some higher-scalar system of social meaning-making practices into which it is integrated.

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