Chapter 5

Lacanian neuropsychoanalysis

On the role of language motor dynamics for language processing and for mental constitution

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In the first volume of *Clinical Neuropsychoanalysis*, Kaplan-Solms and Solms (2001) compare a patient with a Broca-type aphasia, Mr. J, and one with a Wernicke-type aphasia, Mrs. K. Broadly speaking, the authors find that Mr. J's 'ego functioning' is 'normal', i.e. that he can reappraise and adjust to changed realities, even if he has enormous difficulties expressing himself verbally, while Mrs. K's speech production is fluent but she often 'goes blank' mentally, being unable both to understand non-idiomatic speech and to bring her own speech intentions into execution. The authors conclude that (1) "The motor aspect of the word, then, and therefore the motor component of the speech apparatus – Broca's area – (…) is little more than an output channel for the ego's complex workings; its role in verbal *thinking* is superfluous." (p. 89; their italics) and (2) "the auditory-component of word presentation does participate in some way in the executive functioning of the ego." (p. 114). In what follows we will spell out how, to the contrary, in our view the motor component of the speech apparatus is actually constitutive of access to symbolic language (and hence of ego-functioning), while the auditory component is no more than an auxiliary for this access. Having done so, we provide an alternative explanation for Mrs. K's mental failures and Mr. J's mental robustness, in terms of dorsal and ventral language pathways, and of secondary and primary processing, in place of the traditional framework of Broca's and Wernicke's aphasias.

The Lacanian viewpoint on psychoanalysis serves as the main background for this chapter. This implies basically two things in this context. Firstly, in line with Lacan, its focus is first and foremost on the signifier in its constitutive relation to the subject. The Lacanian signifier is a phonemic form, the determination of which depends on its relation with other phonemic forms. Even if we will not mobilize this concept directly in the present chapter, the Lacanian background further implies that the subject, then, is "what is represented by a signifier for another signifier". This means that the subject is an effect of the interplay between signifiers. Secondly, a Lacanian viewpoint also questions the possibility and the validity of a metalanguage: as a signifier cannot signify itself, a subject cannot signify itself

either. A detour via the other, via language and via the Other is needed. This detour via the Other and the signifier as an articulate motor pattern are central to the present chapter.

1 The motor component of speech is constitutive for the understanding of language

1.1 Word forms have autonomous mental (and clinical) effects

In *On Aphasia*, Freud (1891) presents his well-known 'word presentation/thing presentation' model (see Figure 5.1). Mental representations are formed through the perceptual and motor experiences we have of things in the world: this is the object presentation level. A word, however, is no less an object, inasmuch as it is encoded through its own perceptual and motor characteristics – namely, through its sound image and its articulatory program. This material substrate is the word presentation according to Freud. The linguistic reference function of language is constituted by the connections between the word- and object presentation levels. Using the structural linguistics of de Saussure, Lacan (1957) formalizes Freud's concept of word presentation into the concept of signifier, which is the form of the word, given by the motor (articulatory) and acoustic properties of its phonology. Crucially, the signifier is not to be understood as just another attribute of

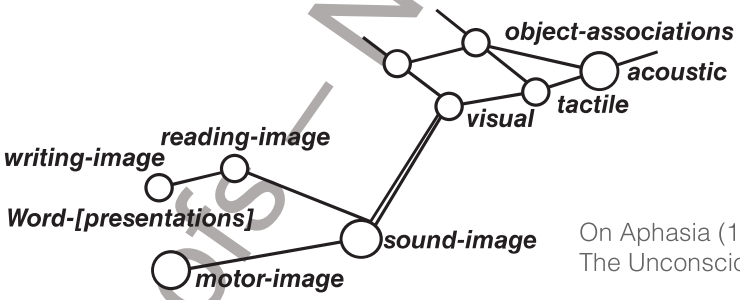

Figure 5.1 Freud (1891, pp. 77–78): "The word, then, is a complicated concept built up from various impressions, i.e., it corresponds to an intricate process of associations entered into by elements of visual, acoustic and kinaesthetic origins. However, the word acquires its significance through its association with the "idea (concept) of the object" (*Objektvorstellung* or object presentation), at least if we restrict our considerations to nouns. The idea, or concept, of the object is itself another complex of associations composed of the most varied visual, auditory, tactile, kinesthetic, and other impressions."

the thing -presentation at the same level as the visual, auditory and other characteristics of the thing. The signifier is, in the first place, consistent with Freud's model, in itself a thing, which only secondarily acquires its linguistic dimension in relation to something it may denote.

Lacan (1957) subverts de Saussure's classical model of structural linguistics ~~by~~ proposi~~ng~~ that the operator that organizes mental life is not "the signified" (the meaning of the word), but rather the signifier. In so doing, Lacan formalizes Freud's intuition from *On Aphasia* that word forms are relatively independent of their meaning and produce mental effects of their own. This is obvious throughout Freud's entire oeuvre. In the famous forgetting of the word 'Signorelli', Freud (1901) recalls that he intentionally pushed away the signifier or word presentation 'Herr', because it was the beginning of a phrase with a scabrous theme, involving sexuality and death. However, Freud has pushed away 'Herr' so efficiently that the inhibition spilled over to the associates of the word, including its Italian translation 'signor'. Subsequently, Freud can't find the word 'Signorelli', which is related to 'Herr' not on a (direct) semantic basis (which would involve the idea of a painter) but on a phonological basis – 'signor' being (no more than) the first two syllables of 'Signorelli'. Instead of 'Signorelli', one of the substitutes that pop up in Freud's mind is 'Boltraffio', the name of another Italian painter. At that point he realizes that he had recently received the news that a patient, for whom he had made a big effort, had killed himself in Trafoi for reasons of sexual dysfunction. Freud elegantly demonstrates how the repressed theme 'death and sexuality' makes displacements along phonemic (Herr/Signor[1] – traffio/Trafoi) to produce mental symptoms; these elements are Lacan's signifiers.

1.2 Humans have a mental lexicon, independent of semantics and phonological in structure

The models of Freud and Lacan have found corroboration in the neurobiological observation that the mental representation of word forms is relatively independent of semantic representations. Hannah Damasio and colleagues (1996) combined neuropsychological data and brain imaging to show that language has specific, organized circuitry in the left basotemporal lobe, organized along lexical principles distinct from the distributed bilateral hemispheric fields encoding object properties. This relative independence shows itself most strikingly in the dissociation between stroke aphasic patients who lose the ability to name pictured objects without losing knowledge of their meaning and patients with progressive fluent aphasia (semantic dementia) who lose meaning but retain access to the word forms (Suárez-González et al., 2014). In other words, there is a word level, the lexical level, which is as such materially present in the brain and which is to be distinguished from the object level or the semantic fields.[2]

A common characteristic of Freud's word presentation, Lacan's signifier and Damasio's lexical unit is that they are phonologically encoded. Lacan (1957, p. 120) explicitly refers to motor articulation in defining phonemes: "Now the structure of the signifier is, as it is commonly said of language itself, that it should be *articulated*. This means that (…) these elements, one of the decisive discoveries of linguistics, are *phonemes*." (our italics).

In other words, Lacan's signifier is first and foremost a *motor* structure.[3] Importantly, psycho- and neurolinguistic studies have well established now that there is no such thing as a purely acoustic registration of language (see also Hickok, 2014). For instance, attempts to map the minimal spectrographic acoustic elements that would permit the classification of phones unambiguously to particular classes of phonemes have been inconclusive (for review, see Cutler & Clifton, 1999). Liberman, Cooper, Shankweiler and Studdert-Kennedy (1967) and Liberman and Mattingly (1985) have therefore proposed the 'motor theory of speech perception', which supposes that the listener does not try to trace the information needed to recompose the acoustic record, but rather the information that would permit the reconstruction of the articulatory *motor intention* of the speaker. Upon hearing the other speak, a subject activates its own articulatory apparatus and by means of mirror neurons tries to find the articulatory movements which, were he himself to execute them, would lead to the same perceptual result (Rizzolatti & Arbib, 1998). The McGurk[4] effect (1976) shows how much we rely on visual lip-reading cues, which inform the listener about the movement made by the speaker, not about the sound uttered, to enable *hearing* the identity of the uttered sound.

Chomsky and Halle (1968) also define phonemes in terms of articulatory feature clusters. Actually, the very essence of what makes a sound a linguistic sound is its being articulated. For example, the phonemes /r/ and /l/ have neighboring acoustic characteristics, and it is possible to artificially produce sounds which vary in a continuous way between /r/ and /l/. If language were first and foremost sound, we would be able to hear these variations, but research shows that people do not hear a gradual change: for a whole variation of /r/ acoustic sounds, we judge they are the result of the /r/ articulatory movement, i.e. we *hear* /r/, until when the acoustic parameters come too close to /l/, and then we judge they are the result of the /l/ articulatory movement, i.e. we *hear* /l/. Speech perception, therefore, is categorical (Liberman, 1970). Neurolinguistic data have confirmed the implication of Broca's area in listening (e.g. Ojemann, 1979, 1983, 1991; Price et al., 1996).

There are also many indications that Freud considered the articulatory motor aspects as constitutive for language. Based on his observation of 'echolalia', Freud (1891/1978, pp. 91–92; our italics) defended the idea that

> understanding of spoken words is probably not to be regarded as simple transmission from the acoustic elements to the object association;

> it rather seems that in listening to speech with understanding, the function of verbal association is stimulated from the acoustic elements at the same time, so that we more or less *repeat to ourselves the word heard, thus supporting our understanding with the help of kinaesthetic impressions.*

Earlier in the same study (1891/1978, pp. 73–74), he had proposed that "we learn to speak by associating a 'word sound image' with an 'impression of word innervation'" and "by endeavoring to equate the sound image produced by ourselves as much as possible to the one which had served as the stimulus for *the act of innervation of our speech muscles*".

Here Freud introduces an enigmatic new element, namely, that of 'the impression' of 'the language innervation'. It is highly improbable that this is the proprioceptive feedback of the articulation, which he clearly refers to as the 'kinaesthetic word image' (p. 73). An alternative interpretation is that of the 'efference copy' which feeds back to the neocortex whenever an efferent motor command leaves the motor cortex (see Figure 5.2). The modern efference copy or so-called internal models are derived from von Helmholtz (1878/1971, p. 123) who first proposed the idea of a direct sensation of the motor command: "The impulse to move, which we initiate through the innervation of our motor nerves, is immediately perceptible." This idea reappeared in motor physiology as the 'corollary discharge' by von Holst (1954) and Sperry (1950). More recently it has become reintegrated as the efference copy model (Blakemore, Wolpert & Frith, 1998; Jeannerod, 1997, 2001; Wolpert, 1997).

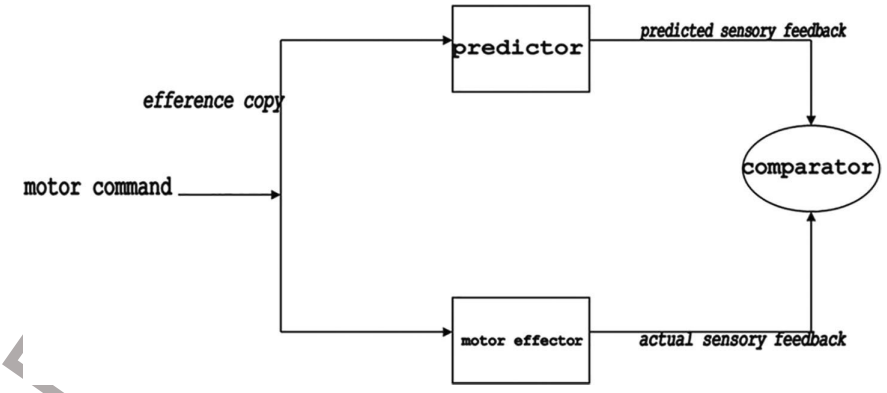

Figure 5.2 The efference copy model (Blakemore, Wolpert & Frith, 1998; Georgieff & Jeannerod, 1998; Sperry, 1950; van Holst, 1954).

Freud adhered to the views of the late 19th-century physiologist, von Helmholtz. The historical, neuroanatomical, and even semantic closeness of Freud's concept of 'indications of reality' and the modern sensorimotor concept of 'efference copies', then, is remarkable (see Bazan, 2007a, 2007b, for a detailed discussion). The efference copies inform the neocortex that a motor command has been sent out, while the proprioceptive feedback informs the neocortex that a motor command has been executed. According to Freud, phonemic access is gained whenever a motor innervation impression reaches some level of identity with a perceptual acoustic image in line with what was laboriously learned through association during infancy. Precisely this was recently proposed by the neurolinguist Gregory Hickok (2014) who specifies:

> In motor control terms, [the] phonological level is the 'internal model', which is divided into two representational components, a motorphonological component (the internal model of the motor effector) and an auditoryphonological component (where the auditory consequences of actions are coded).

We thus conclude that there is a high coherence between psychoanalytical clinical and neuroscience empirical observations.

2 The ventral and dorsal language pathways

To explain the cases of Mr. J and Mrs. K, it is important to reappraise language dynamics, not so much in terms of the contrast between Wernicke's and Broca's aphasias, but rather between ventral and dorsal language pathways. There is now consensus that just as there are dorsal versus ventral pathways for visual, visuomotor, and auditory processing, so this distinction applies also to language processing (Hickok & Poeppel, 2000, 2004, 2007; Rauschecker & Scott, 2009; Saur et al., 2008; see Figure 5.3). In each of these domains, spatial stimulus processing and sensorimotor integration – the so-called ~~where~~ stream – are subserved by a dorsal pathway, whereas stimulus perception and recognition – the so-called ~~what~~ stream – are transmitted via a ventral pathway. The language model assumes that the ventral stream is largely bilaterally organized and that the dorsal stream is strongly left-hemisphere dominant.

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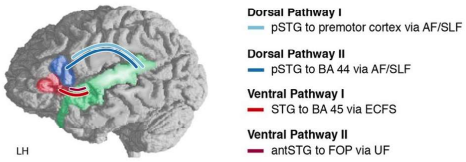
2.1 The ventral pathway

The ventral pathway connects the frontal and temporal cortices ventrally and subserves "phonology-to-meaning" mapping (Hickok & Poeppel, 2004, 2007; Rauschecker & Scott, 2009), i.e. processing speech signals for comprehension, sometimes described as "the relation between phonological words



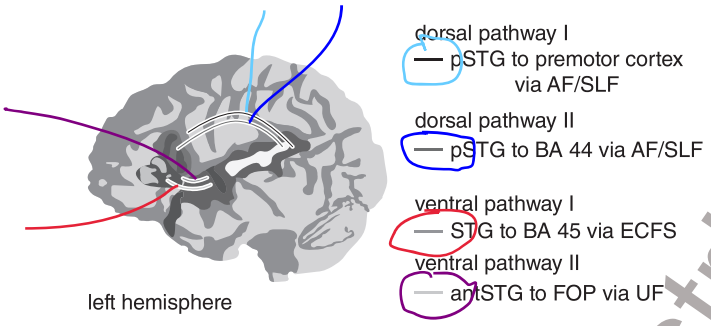


Figure 5.3 Schematic view of two dorsal and two ventral language pathways. Ventral pathway I, the ECFS (the red bold line), also named the inferior fronto-occipital fascicle, connects BA 45 and BA 47 (the ventrolateral prefrontal cortex) and the temporal cortex. Ventral pathway II, the UF (the purple bold line), connects the FOP and the anterior temporal STG/superior temporal sulcus (STS). Dorsal pathway I (pale blue bold line) connects STG to *the dorsal* PMC (BA 6) via the AF and the SLF. Dorsal pathway II (dark blue bold line) connects the STG (Wernicke's area) to BA 44, i.e. the posterior portion of Broca's area, via the AF/SLF.

and conceptual representations" (Hickok & Poeppel, 2000, 2004, 2007; Rauschecker & Scott, 2009; Wernicke, 1874/1977). First, *the extreme capsule fiber system* (ECFS) connects BA 45 and BA 47 to the superior temporal gyrus (STG), the middle temporal gyrus (MTG) and the occipital cortex (Saur et al., 2008, 2010; Sarubbo, Benedictis, Maldonado, Basso & Duffau, 2013; Turken & Dronkers, 2011). This fiber system is seen as the major pathway supporting semantic processes (Saur et al., 2008) and is activated during auditory comprehension. Second, *the uncinate fascicle* (UF) connects the frontal operculum (FOP) and orbitofrontal cortex to the anterior STG. Friederici et al. (2006) suggest that this route may be involved in the building up of local phrases through which adjacent elements are combined syntactically. Interestingly, the UF is also considered a limbic pathway mainly connecting the amygdala and hippocampus in the medial temporal region with the prefrontal lobe (Schmahmann et al., 2009). Thus, the ventral pathway, with its subcomponents, supports elementary semantic processes and local phrase building processes.

2.2 *The dorsal pathway*

The dorsal pathway was initially described as emanating from the planum temporale in the posterior superior temporal region running through the *inferior parietal lobule to the dorsal premotor cortex* (PMC; BA 6): this pathway is involved in establishing the relation between speech gestures

and the sounds they produce (Hickok & Poeppel, 2000, 2004, 2007; Rauschecker & Scott, 2009). It has a sensorimotor mapping function (Saur et al., 2008; through the efference copy system, see further), and functionally, it is involved in speech repetition, i.e. in the production and articulation of perceived speech sounds (Hickok & Poeppel, 2000, 2007). A second major dorsal fiber tract terminates in *BA 44* and connects this area directly *with the posterior temporal cortex* (Wernicke's area). One proposed function for this arcuate fascicle (AF)/superior longitudinal fascicle (SLF) to BA 44 route is that it is particularly involved in processing syntactically complex sentences (Friederici, 2015). Interestingly, this fiber bundle is not myelinized in newborns (Perani et al., 2011).

2.3 Ventral and dorsal syntax

Note that, for syntactic processes, a differentiation is made between local phrase structure, which recruits a ventral fiber tract, and the structure of hierarchical syntactic dependencies in grammar sequences, which involve a dorsal pathway (Friederici, 2015). Concerning local phrase structure, Saur and colleagues (2008) proposes the following:

> an iterative exchange with the prefrontal cortex, which is involved in executive aspects of semantic processing (Bookheimer, 2002) – e.g., controlled semantic retrieval (Thompson-Schill, D'Esposito, Aguirre & Farah, 1997), semantically based analysis of grammatical structures (Dapretto & Bookheimer, 1999), and application of cognitive rules (Musso et al., 2003).

This is complementary to Friederici (2015; see also Friederici et al., 2006; Grodzinsky & Friederici, 2006) who proposes that processing of simple grammatical structures (e.g. computing local phrase structures) was found to involve the ventral pathway connecting the anterior STG and the FOP.[5] The dorsal pathway (AF/SLF), however, is needed for the processing of sentences with hierarchical syntax (Brauer, Anwander & Friederici, 2011; Wilson et al., 2011). Thus, both the ventral and the dorsal pathway are involved in syntactic processes, albeit in different ways (Griffiths, Marslen-Wilson, Stamatakis & Tyler, 2013).

2.4 The primary and secondary modes of language processing

We have argued before that there is a parallel between ventral processing and primary process mentation, and between dorsal processing and

secondary process mentation, respectively (Bazan, 2007a, 2007b; Bazan & Snodgrass, 2012).

2.4.1 Primary and secondary language processes

The primary process (Freud, 1895, 1900) is essentially an associative functioning modus that connects representations on the basis of their (superficial) attributes. It is typically described in psychoanalytic literature as being the mental mode characteristic of the unconscious, but it is present in *any* mental life, since it is the modus that furnishes positive content elements. However, the proliferation of associations is much more unconstrained in unconscious mental life, while it is mostly very much constrained by secondary processes in conscious mental life. Secondary processes are both the fact, in and of itself, of the constraining of primary processes and its result. These processes essentially draw their ability for inhibition from the aimed-for end result of the action (which is the only way to counteract strong associative links); for this reason, secondary processes take into account both the intentionality of the subject and the environment. Secondary processes, therefore, are said to follow the reality principle: their support base is at the end point of the arrow. Primary processes, in contrast, follow the pleasure principle: their support base is at the start point of the arrow.

2.4.2 Primary versus ventral and secondary versus dorsal processing

In the previous work (Bazan, 2006, 2007a, 2007b, 2012), we have argued that the associative proliferation of content elements of the primary process is subserved by the ventral pathway, which allows for identification and solving of the "What?" question. In this perspective, it is interesting that the UF is connected to the hippocampus: we might speculate that whenever primary process associates are disinhibited, the search for other meanings involves this memory structure. However, there are neither spatial nor temporal coordinates in this pathway; these are provided by the dorsal "Where?" pathway, which involves a construction of reality on the basis of external perceptual information as well as of the intentionality of the subject in his or her environment on the basis of interoceptive information. This processing of both the intention of the subject and the context is also the mental mode of the secondary process. In addition, only the dorsal pathway has the means to exert inhibitory influences, thanks to the efference copies dynamics. If, as we have argued before, there is equivalence between the efference copy and Freud's 'indications of reality' (see also below), and if only the secondary process has access to the 'indications of reality' (Freud

1950/1966, p. 325), this further confirms a logical coherence between the secondary process and the dorsal pathway.

2.4.3 Primary versus ventral and secondary versus dorsal language processing

Speculatively, we propose that what happens at the level of the ventral route, described as the resolution of 'local syntactic phrases through which adjacent elements are combined syntactically' (Friederici, 2015, p. 184), is the local restriction of possible interpretations of a given phonological 'chunk'[6] (a group of phonemes, a word or a phrase). This, we propose, happens by means of what we previously called 'lexical labels' (Bazan, 2007a, 2007b) – be these labels of a grammatical nature (subject versus verb versus object, substantive versus pronoun, etc.) or of a more strictly lexical nature (person versus man-made object, etc.; see Damasio et al., 1996). For example, the phrase "Mary pours …." anticipates a 'substantive' with the property of being 'liquid'.[7] Whatever the word will be that completes this phrase, the search for it will be narrowed down by the preorientation given by these lexical labels 'substantive' and 'liquid'.

We propose now to see the dynamic tension as follows: the ventral pathway is always (structurally) ready to proliferate with possible candidates for language chunks; this is the primary processing of language. It is then the involvement of prefrontal structures (Broca) – strictly speaking a dorsal structure – which cuts short this proliferating search. This, then, is one level of the secondary processing of language corresponding with the 'ventral' syntactic pathway, which operates the selection of the contextual meaning by means of lexical labels, but needs involvement of the dorsal Broca area to be able to do so.

However, local phrase structure resolution is not always enough: when the phrases are complicated, or – we speculate – when their structure is novel or surprising and unanticipated, it might be necessary to refer back to the intention of the speaker. These processes, then, would involve the posterior STG and BA 44/45 (Grozinsky & Friederici, 2006), areas connected via the dorsal pathway (Friederici et al., 2006). The role of the dorsal syntactic pathway, we speculate, would be to reactualize the original linguistic grasp we were trying to deploy upon the world (or which we attribute to another) or, in other words, to reactualize the linguistic action intention. This would need to be the case when the intended utterance cannot sufficiently rely upon idiomatic – i.e. automatic, thoughtless, ready-made – phrase components. This aspect might also be important in understanding language, when the local phrase information is not sufficient to decide between competing interpretations.[8] Again, this would correspond to secondary process mentation, though maybe of a much more fundamental kind than the 'ventral'

secondary process, with its aim to resolve local syntax: this kind of secondary process would reactualize the aimed-for end result as the target for the action of the subject in the world, i.e. his or her (unconscious) intentionality. The dorsal syntactic pathway also involves prefrontal brain structures (BA 44/45); therefore, its mode of operation is also thought to be through inhibition. However, it might be less the kind involving the inhibition of competing meaning candidates, but rather the kind of cutting that would be at the service of creative recomposition: indeed, the dorsal pathway would go in search of novel handles to grasp by cutting short the existing ones and thereby eliminating competition in favor of the ones that are sometimes only very poorly invested, i.e. very weakly present in mind. It thereby is the kind of cutting that is thought to have a revelatory power. Speculatively, we propose that these syntactic operations are strategically crucial for the access to, and the making of, symbolic language.

3 The linguistic and paternal metaphors: constituting the mental

In 1957, inspired by the work of Jacobson, Lacan introduces both the formula of the linguistic metaphor and that of the paternal metaphor. The metaphors truly formalize the logical dynamics of how primary and secondary processes interact for targeted action. If we keep in mind that the secondary process has the asset of holding on to the wished-for end configuration and the primary process has the asset of a wide range of handles to direct action, then the formula of the metaphor shows how the secondary process is able to open the primary process valve in an attuned, controlled, measured way so as to pick up from its associative stream the one handle that is best targeted for the wished-for end configuration. What is thereby dug up is the metaphorized result, an original subjective creation.

3.1 The linguistic metaphor: grasping language

3.1.1 Mental dynamics of the linguistic metaphor

Metaphorization is an operation whereby a current (associative) meaning of a signifier is put into an unusual lexical position which then enforces the reading of the signifier (Bazan, 2007a, pp. 47–62): in essence, then, it is secondary processes getting hold of primary process language associativity. For example, the phrase "did you see her walking hand in hand with [this wardrobe]?" grammatically speaking anticipates a substantive, and lexically speaking a person (Bazan, 2007a: 58). When the word 'wardrobe' appears, which is commonly (i.e. associatively) known as a piece of furniture, this lexical determination (furniture) is ripped from the signifier. New ones, predetermined

by the other signifiers in the sentence – namely, substantive and person – are imposed on it. This is an operation by which new meaning arises: here 'wardrobe' comes to signify 'a burly man'. Lacan (1955–1956: p. 218; italics added) says: "Metaphor presupposes that a meaning is the dominant datum and that it deflects,[9] commands, the use of the signifier to such an extent that *the entire species of pre-established, I should say lexical, connections comes undone*." Adding: "And yet it's clear that the use of a language is only susceptible to meaning once (…) the meaning has ripped the signifier from its lexical connections." He thereby gives the formula of the metaphor[10]:

$$\frac{S}{\$'} \cdot \frac{\$'}{x} \rightarrow S \cdot \frac{1}{s}$$

$$\$' \times s$$

with S = signifier 1, $' = signifier 2, x = an unknown signification, and s = the emerging signified, induced by the metaphor.

Concretely,

$$\frac{\text{a person}}{\sout{\text{wardrobe}}} \cdot \frac{\text{wardrobe}}{\text{(big, large)}} \rightarrow \text{a person} \cdot \frac{1}{\text{burly}}$$

a person . ~~wardrobe~~ ~~wardrobe~~ a person. 1 (big, large) burly

In other words, for a metaphor "pin a signifier to a signifier and see what that produces. But, in this case, something new is always produced which is sometimes as unexpected as a chemical reaction, namely the emergence of a new signification" (Lacan, 1957, p. 141).

Note that it is only at the end of the metaphor operation that it becomes possible to pinpoint, in hindsight, which of the attributes of the object will have 'delivered' the excitations that were discharged – e.g. here, 'burly' pinpoints 'big, large' in the wardrobe, and the wardrobe reveals 'burly' in the person indicated. It is the symbolic structure of language and, specifically, the metaphor, which endows humans with a structurally open potential to endlessly reveal new aspects of reality.[11]

3.1.2 Physiology of the metaphor

As indicated earlier, only the motor – i.e. dorsal – dynamics have the means for targeted inhibition through the efference copy-attenuation principle. Indeed, Hickock (2014, p. 8) reminds us that motor control models

> assume a kind of cancelling operation as the basis for comparing motor predictions with overt sensory feedback, with the motor prediction implemented as an inhibitory signal. If the prediction (−) and the overt

sensory input (+) cancel, then this indicates an accurate prediction. Prediction error, then, is sensory activation that is not cancelled.

Even if this mechanism may seem merely technical, we have argued elsewhere (Bazan, 2012) that its role may be properly constitutive. Following Hickok (2014, p. 7[12]), we would like to venture a comparison between the movement of language and grasping: if the dorsal pathway has pre-calculated the right grasp towards the thing-to-grasp, then there is no prediction error, and further processing of the thing-to-grasp is efficiently stopped. In language terms, if the word-to-be-said or to-be-understood was sufficiently predetermined by the surrounding signifiers, that is, if that word (or that chunk) was already adequately predefined by the sum of the lexical labels gathered by the sentence so far, then there is no prediction error, and further (associative) processing of the word is efficiently stopped. However, if, once arrived at the spot where the word has to be grasped, the lexical labels are unusual or surprising – as in the example of person-wardrobe – then there is a prediction error. Consequently, the further associative (semantic) processing is not stopped, and primary process-mode associations are disinhibited in a continued search for identity: this is a good thing, because another way, besides the usual one, has to be found amidst the freed associations to grasp the word anew. The handle 'person' obliges us to look beyond furniture associations for those associative meanings of wardrobe, which could also apply to a person. Here, the associations found are 'big, large'. We see, now, how metaphorization crucially depends on the dorsal route-mediated motor organization of language. The motor aspect of language is by no means "little more than an output channel" (Kaplan-Solms & Solms, 2001, p. 89).

3.2 The paternal metaphor: grasping intentions

The metaphor, as we have just discussed, is an instantiation of a more basic, constitutive metaphor, which Lacan (1957, p. 456) calls the "Name-of-the-Father", the character and function of which we will now outline.

3.2.1 From drives to discharge

When thrown into life, a newborn is subjected to a chaos of inner body excitations for which, in order to survive, it will be important to find ways to discharge. The first other, often the mother, is a recipient of these excitations, but she unavoidably also induces them in the child. This is expressed in the second term of the father-metaphor 'Mother's Desire/Signified to the Subject': what has to be processed are the excitations, signified to the child by the coming and going of the mother, inducing a first distinction between more or less excitation (see Figure 5.4). But since outbursts of excitations are also induced in the child through the interaction with the mother, the

$$\frac{\text{Name-of-the-Father}}{\text{Mother's Desire}} \bullet \frac{\text{Mother's Desire}}{\text{Signified to the Subject}} \rightarrow \text{Name-of-the-Father } \frac{0}{\text{Phallus}}$$

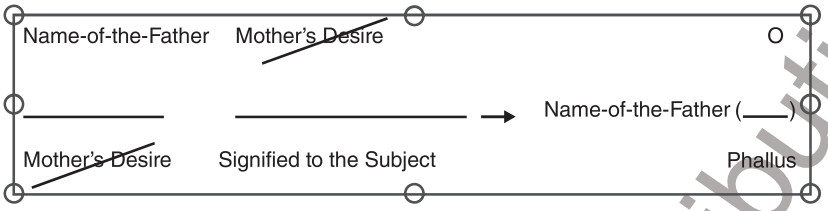


Figure 5.4 Schematic representation of the Name-of-the-Father metaphor. See text for explanation.

mother cannot offer an effective means of discharge to the child. Without such means, the child cannot acquire a perspective on or a limit to these excitatory outbursts.

But the child and the mother are not alone. A second other – who is the actual other – interferes between the child and the first (m)other, on the condition that there is also desire between this first and second other. Indeed, only on that account the desire of the mother is also eliciting excitation in the father, an excitation, however, to which he will in some way respond, for which he has, in some way, however partially, the means of discharge. These means of discharge fall under the term the 'Name-of-the-Father', according to Lacan the constitutive and fundamental metaphor.

The father will name, i.e. give words to the desiring interactions between the mother and himself. This is expressed in the first term of the father-metaphor 'Name-of-the-Father/Mother's Desire'. Crucially, any naming or acting operation induces another type of temporality: while the coming and going of excitations is diffuse, any naming cuts a precise – even if completely arbitrary – parcel of time out of a diffuse continuity. Thereby, the 'Name-of-the-Father' introduces a so-called *coupure*, a cut, which structures the desiring interactions between the first and the second other. What is important is that mother and father, first and second other, are *logical* positions, which do not even have to be equated to unitary physical persons as such. The logic is one whereby a primary caregiver of the child has also desire for another person, who will respond to this desire with language interventions, structuring the interaction.

The metaphor now is a transitivity operated by the child: if the child assumes that the desire of the mother, to which the father responds, is in some ways comparable to the desire induced in him by the mother, then the reactions given by the father may enable the child to grasp his own excitations in the same move. The child has no direct access to the way the mother's desire works on the father: the naming by the father, the imposition of a signifier, is an external operation. However, insofar as the naming has allowed the child to hypothesize that what it refers to is related to what he himself experiences

in relation to the mother's desire, then the naming in and by itself gives the child a means to attach the diffuse excitations he or she experiences to a phoneme structure. The Name-of-the-Father metaphor is accomplished. The Name-of-the-Father might thus be described as the device by which the drive derivatives are linked to the language discharge system (the motor component), the apparatus on the basis of which inner body excitations are transposed into outer body dischargeable forms.

3.2.2 …to the emergence of something new

What, then, is the relation between the paternal and the linguistic metaphor? The second term in our prosaic earlier example was 'wardrobe/(big large)': an object (a mother or a wardrobe) induces experiential excitations, which refer to the characteristics (attributes or affordances) of the object; these excitations are initially chaotic, i.e. unnamed. In the same way that 'the Name-of-the-Father' indicates to the subject how to grasp 'the desire of the mother', the first signifier S1 of the metaphor formula indicates how to grasp the experiential excitation, induced by the second signifier S2 – for example, 'a person' indicates how to grasp 'wardrobe'. This means precisely that S1 provides the lexical constraints to which the semantics of S2 should be submitted: in the case of the wardrobe, S1 dictates that S2 should be taken as the qualification of a person. If the semantics of 'wardrobe' is to be submitted to 'qualification of a person', then 'burly' is generated, thereby revealing in hindsight that wardrobe has induced excitations also by its large, broad dimensions. The lexical constraints are thereby equivalent to the structuring constraints imposed by the naming of the father to the excitations induced by the desire of the mother. Both types of constraints impose the regularities to which the experience has to be submitted, thereby introducing the subject to the dimension of the law.

However, the logic of the two metaphors – far from being mere discharge devices – shows how the need for discharge transforms into the generation of a new form and, more precisely, how the condition for the generation of this new form is the interplay with two 'others'. This is to say, it is only by there being two others, that we can be sure there is at least one. Indeed, if discharge is played out between the subject and a single other, then any change will be mirrored in the back-and-forth movement between the child and the first other. As a consequence, there will be neither real discharge nor the emergence of something new. The paternal metaphor intends to show how the subject, when not exhaustively taken by the interplay with a first other, uses the desiring interplay between this other and a second other, to intentionally derange and interfere in this interplay: by doing so, something unforeseen emerges (e.g. a parental response), something which properly manifests the subject, in his difference, i.e. in his singularity. The parental response here is not a simple mirroring but minimally the sign of an effect,

and even often of a surprise. The child thereby himself or herself is taken by surprise that his or her movement had an unexpected effect of making a difference, of creating an 'event'. This will be the incentive for him or her to repeat and experiment with interfering and 'disturbing'. Metaphorization, far from being an all-or-nothing operation, thus, is an open-ended dynamic.

AU: Perhaps, "and"?

The advantage of the Name-of-the-Father metaphor over simpler drive-to-intention-translation models is that it succeeds in capturing various dimensions of this transformation simultaneously: (1) the dimension, close to a biological approach, of transforming diffuse excitation into dischargeable outer body motor forms; (2) the linguistic dimension whereby it is the arbitrary naming of the Father which thrusts this transformation; (3) the oedipal dimension with a constitutive role of the desiring interaction between the first and the second other for the subjectivation of the child; and (4) the sexual dimension introduced by the sexual differentiation of the parents which, through the way this differentiation is appraised by the child, is thought to leave a mark on his or her so-called fundamental phantasy. We will for now not develop this last dimension.

4 Reappraisal of the cases of Mrs. K and Mr. J

4.1 Mrs. K

Mrs. K suffered "an acute left fronto-parietal subdural hematoma (with slight midline shift) and a left temporo-parietal intracerebral hemorrhage – a substantial hemorrhagic lesion in the mid-temporal area, extending posteriorly to include the supramarginal gyrus" (p. 92), which resulted in "fluent 'empty speech' (i.e. a stream of connected discourse that lacks substantives) with abundant verbal paraphasias (i.e. misuse of words)", a Wernicke's aphasia which "had resolved (…) into what Luria (1947) called 'acoustic-mnestic aphasia'", with as essential feature, "an inability to retain audioverbal material in working memory (i.e. in consciousness)" (p. 93). Although her speech was fluent, she had marked problems with understanding and meaningful expression, from which Kaplan-Solms and Solms (2001) conclude that the 'acoustic aspect' is central to the word presentation and a fortiori to the mental apparatus. We will come back to that acoustic aspect, but for now we propose that Mrs. K's frontoparietal and temporoparietal lesions have more crucially affected the dorsal syntactic pathways than Mr. J's, principally affecting her secondary process functioning. We propose that since it is the constraining inference of the secondary process which enables metaphorization, this leads to *a fundamental metaphorization defect in Mrs. K*. Indeed, in Mrs. K both the metaphorization principle giving access to language beyond its idiomatic use, the linguistic metaphor, and, more fundamentally, the principle by which drive excitations are grasped into action intentions, the paternal metaphor, seem to be harmed.

4.1.1 Mrs. K's linguistic metaphor

Take for example the following confusion: The therapist said that she appeared a moment earlier to have lost track of herself and the world. Mrs. K misunderstood this, and thought that she [the therapist] was speaking about international travel. The therapist explained that by 'world' she was referring to Mrs. K's experience of what was going on around her.[13] Then Mrs. K said, "Oh yes, I am in bits and pieces. I am in bits and pieces through my mind" (Kaplan-Solms & Solms, 2001, p. 101). The context of "losing track of herself and the world" should have enabled her to constrain the associative meaning of the word 'world' which would have stopped the association with 'international travel'. ~~In as much~~ the term 'world' was not taken up into an active metaphorization operation, it was released from secondary process constraints regaining primary process object status, where it *metonymically* gave rise to the association of 'international travel'.

AU: Perhaps, "Inasmuch as"?

"On a subsequent occasion", Kaplan-Solms and Solms (2001, p. 105) recount, Mrs. K

> said that she was going to visit some friends of hers in another ward of the hospital, only to realize later that these were friends who had lived in her residential hotel – they were not living in this hospital. This reduplicative error was especially interesting, because it seemed to concretize an aphasic error that she frequently made: she confused the words 'hospital' and 'hotel'.

This example again shows that when metaphorization, a secondary process, fails, words revert to a primary process mode. In this instance, 'hotel' (which etymologically comes from 'hostel') metonymically becomes 'hospital'. What is interesting here is that the primary process metonymy guides the actions (and even action intentions) of the patient (language commands the doing, and not the reverse); that is, when the secondary process fails, our drive-guided, intentional grip on what we are doing is lost in favor of a primary process mode of language over which we do not have control.

Thus, we would argue, Mrs. K's defective metaphorization underlies her inability to attach meaning to language, especially when it comes to non-idiomatic language, implying that either the associative meaning is not the contextual one, or that there is no associative meaning at all: "but here is another example of how silly I've become! You know, I just *can't* understand what you're saying. I know it's English, but I don't know what it *means*. What do you *mean*?" (Kaplan-Solms and Solms, 2001, p. 99).

4.1.2 Mrs. K's paternal metaphor

Kaplan-Solms and Solms (2001) indicate that the patient complains about an "inability to think" (p. 94) and "I know what I want to say but I can't find the words; they just aren't there. And then, before I can find the words,

the *thought* is gone. I just can't *think* anymore." (p. 104; their italics). The authors add:

> She was far from being truly unable to think. Rather, we would like to suggest, she suffered from an inability to a*ttach words to her thoughts*, resulting in an inability to *bring her thoughts to consciousness* (and to *keep* them there).
>
> (2001, p. 108; their Italics)

By this line of reasoning, then, thoughts are supposed to exist 'as such', merely awaiting language to get expressed. What we propose, in contrast, regarding Mrs. K is that what is 'broken' is not a passive attachment of thoughts to words but, the very process of metaphorization itself, the subjectification of language – that is, not only the linguistic metaphor but moreover the paternal metaphor, the fundamental function of language which allows for drive excitations to find discharge into (phonemic) motor programs: "often I can't even remember what I was trying to say, and then I just drop the whole thing and forget about it." (Kaplan-Solms & Solms, 2001, p. 101). As noted above, the metaphoric function is not simply a matter of discharge but also the device by which new forms emerge, which truly are the mark of ~~a subject that has interfered, cut, and selected in human linguistic exchange, and~~ that thereby manifests its singularity as a subject. This, then, might be a more formal, logical way to grasp what Kaplan-Solms and Solms (2001, p. 113) indicate by saying that "her ego operations were being undermined".

4.2 Mr. J

Mr. J suffered an "infarction of the left inferior frontal and anterior temporal lobes of the brain, and the involvement of the underlying white matter" (p. 75), which resulted in "a severe, non-fluent aphasia", which

> conformed to the classical syndrome of Broca's aphasia. Mr J's spontaneous speech was sparse, severely telegraphic, and agrammatical. His repetition (…) was only slightly superior to his spontaneous output. (…) Comprehension was essentially preserved (…) the main feature of Mr. J's clinical presentation (…) [was] the striking integrity of this ego functioning. He was fully aware of the difficulties that he was having in communicating, and he spared no effort in overcoming these difficulties. (…) The content of his communications, too, revealed, the same intactness of his ego functions. (…) this high degree of ego integrity in a case of severe Broca's aphasia was indeed remarkable. This fact provides us with a first important clue as to the role that this region of the brain

> plays in the deep psychological organization of the mental apparatus in general. Whatever this role, it certainly cannot be too central to what the ego does on the whole.
>
> (p. 76)

In light of the previous, it is indeed amazing how little Mr. J is affected by the lesion.

To help us out here, we go back to Hickok (2014) who reminds us that it has been shown before how well speech perception can be accomplished with a damaged, deactivated, or undeveloped motor speech system (Bishop et al., 1990; Eimas, Siqueland, Jusczyk & Vigorito, 1971; Hickok, Costanzo, Capasso & Miceli, 2011; Hickok et al., 2008; Kuhl & Miller, 1975; Rogalsky, Love, Driscoll, Anderson & Hickok, 2011). However, as Hickok (2014, p. 10) adds, even with a damaged dorsal route, a "modulatory contribution of the motor system to speech perception remains a possibility", provided that what crucially is preserved is that "*activation of motor speech units generate[s] a forward prediction for their corresponding auditory speech units*" (Hickok, Houde, et al., 2011; our italics), i.e. the generation of the efference copies of the articulatory motor commands.

Returning to the question of the 'acoustic aspect' of language, we propose that what is important is not the perceptual, acoustic aspect as such of language but rather, as we have argued here, *the contribution of the motor dynamics to the understanding of language*. Hickok and colleagues' prescription is that the minimal function needed from the motor pathway is the generation of a forward prediction: indeed, as we have seen, the contribution of these efference copies is constitutive precisely, if paradoxically, for the hearing of language (see 1.2 and the McGurk effect), which explains the apparent importance of the acoustics. These efference copies might also be crucially involved in prefrontal working memory (Jacobs & Silvanto, 2015). For example, Kaplan-Solms and Solms (2001, pp. 107, 93) qualify Wernicke's aphasia as a "loss of memory for words", i.e. "an inability to retain audioverbal material in working memory (i.e. in consciousness) (…) she kept forgetting what it was that she was intending to say".

Moreover, the efference copy dynamics are also what is at the heart of the secondary process: it is through these efference copies, or indications of reality, that the constraining effect upon the primary process (and, by extension, the metaphor function), is realized. In other words, as long as the efference copy generation is preserved dorsally, the metaphorization – and thus, speculatively, what Kaplan-Solms and Solms call the 'ego-functions' – is preserved, even if the pathway to execute articulation, further downstream, is damaged (such as in the case, probably, of Mr. J). Moreover, since efference copies are not implied in motor execution as such, the reverse is also true: if this efference copy-generation mechanism is damaged or disturbed,

the metaphorization – or what would be called the 'ego-functions' – is jeopardized, even if the execution of articulation is preserved (such as, probably, in Mrs. K). So, in sum, we speculate that Mr. J's capacity for metaphorization was kept intact, due to the intact functioning of the efference copy-generation mechanism, with, however, the impossibility to come to the motoric expression of this intact functioning. This could explain the fact that Mr. J witnesses to an intact situatedness in space and time, due to the correct dorsal inhibitory functioning of language ~~(we gather this amount to what Kaplan-Solms and Solms refer to as intact 'ego-functions')~~. Mrs. K, on the other hand, suffers precisely this: the absence of a properly functioning metaphorization, leading to an incapacity to find herself ~~somewhere~~ 'in the world' and 'in time'.

~~4.2.1~~ *The mental is not the physiological*

The linear equation of Mrs. K's and Mr. J's symptoms to their deficits, broadly speaking a Wernicke's and a Broca's aphasia, had resulted in what we might qualify as 'overly general propositions' – such as, e.g. a 'normal ego-functioning'. Instead, what we have proposed is first and foremost an understanding of the mental logics of language in and by itself, developed through the mechanics of the linguistic and the paternal metaphor. This has resulted in proposing a single line of interpretation of Mrs. K's symptoms, in terms of a metaphorization deficit, which is at once able to explain all her various difficulties – not only her understanding of language but also her functioning in the primary process mode, her self-function difficulties, her working memory problems, her inability to think, etc. Moreover, it leads us to interpret Ms. J's case in terms of an inability to motorically express an otherwise correctly functioning metaphorization function. This explains the capacity of Mr. J to comprehend his subjective situatedness in space and time, being meanwhile in the inability to have the motoric linguistic expression correspond with this experience.

What we wish to underscore, then, at the end of this exercise, is that the most proximal interpretation lines for 'disorders of the mental, of the psyche' is *a mental interpretation line*. Indeed, we venture that metaphorization might have instantiated somewhat differently in the anatomy or in the physiology of the brain, depending on the subject, and thus predict that, whatever the precise locations of the lesions, if the metaphorization function is attained, we will find symptoms which are logically similar – and the other way around, whatever the brain deficits, if the metaphorization function is not damaged, essential linguistic mechanisms constitutive for mental functioning will be preserved. In other words, what we propose epistemologically is that from the brain to the symptoms the connexion is not linear, but articulates over the mental: the mental principle – here the metaphorization function – could well succeed in explaining the symptoms

better than the physiological. This gives weight to the idea that the mental is an autonomous organization level, not reducible to the brain dynamics.

Moreover, in the spirit of Hickok's suggestion, we would conjecture more generally that an attained brain function common to all subjects with metaphorization deficits would involve the the function of generating forward predictions for the activation of motor speech units. This function, then, is the crucial contribution of the dorsal pathway to the language dynamics. It would, of course, be relevant to attempt to substantiate this hypothesis on the basis of more clinical cases. However, what has been revealed in the present exercise through the careful clinical analyses of the speech and understanding of these singular cases ~~supports us in the conviction~~ that the heuristic revelatory direction for the neuropsychoanalytical endeavor is from the mental to the brain, far more than from the brain to the mental.

Notes

1 One might object that Herr/Signor is a semantic, not a phonological, bridge structure. However, it must be remembered that what Freud pushed away was 'Herr' in the meaning of 'Sir'. By doing so, he pushes away all the primary process associates to 'Herr' – some of which are phonological, some of which semantic. One of the semantic associates, undergoing inhibition, is 'Sir', but it is by a phonological association with 'Signorelli' that the symptom arises, namely, the forgetting of the painter's name. This shows that even the semantic bridge associations are not secondary but primary processes. But the existence of this associative 'mindless' dynamic is revealed by the phonological, not the semantic associates (as for semantic associations, one can always propose that they are the result of secondary 'mindful' dynamics).

2 Words, therefore, even if they are no less objects than other objects, are still a particular kind of objects: besides having (motor and perceptual) characteristics of their own, they are also constituted by the fact of referring to other objects – those other objects being themselves either words or ~~not~~.

3 Even if many Freudian, and even Lacanian, psychoanalysts still refer to the word presentation, the signifier, as an 'acoustic' element.

4 The McGurk effect is often called 'an illusion'. However, this would imply that the acoustic trace is the 'real trace' and that hearing speech is hearing the acoustic trace of speech. This, we think, is fundamentally mistaken: when it comes to language, what we hear is structured by the sensorimotor feedback of the recognized speech movements matched with the acoustic information (Hickok, 2014). Therefore, in the McGurk effect, seeing the mouth movements of 'ga ga ga' together with hearing the acoustic trace of 'ba ba ba', results in the effective hearing of 'da da da', and not in its illusion.

5 Therefore, in contrast with Saur, Friederici indicates the ventral unicate fiber bundle as the prime player for this.

6 "sequences of phonemes that form the syllables or words of a language might be efficiently coded as motor chunks, a mental syllabary to use Levelt's term" (Hickock, 2014, p. 5).

7 Savage-Rumbaugh (1986) trained chimpanzees to use the combination of the lexigrams 'give' and 'banana' if they wished a banana and 'pour' and 'juice' if they wished juice. The teaching of these separate combinations was easy, but

when they received the four lexigrams at the same time, they perseverated in making random, including impossible, combinations (e.g. 'give give', 'pour banana'). In order to make a logical use of the lexigrams, the chimpanzees needed extra sessions to *unlearn* the impossible combinations. Deacon (1997, p. 85) interprets these observations by concluding that the unlearning sessions correspond to the acquisition of linguistic rules such as, here, 'a verb asks for a substantive' and 'the object of 'to pour' is liquid'.

8 In this perspective, it should be logical that this route has some connection to brain centers gathering inner body, i.e. drive, information.

9 In this the question remains whether it is the semantics that commands the signifier: in the present text we propose, inversely, that it is the lexical position that commands the semantics.

10 Lacan's first presentation of the signifier can be found in "The agency of the letter in the unconscious or reason since Freud" (Lacan 1977 [1966], pp. 146–178).

11 In the example used by Lacan (1957), Boaz, a major figure in the Book of Ruth in the Bible, is described as "*His sheaf was neither miserly nor spiteful*.", pinpointing not-so-commonly stressed attributes of a 'sheaf', namely, 'opulent, giving, feeding', and thereby revealing the person so qualified (Boaz) as 'generous'.

12 "if you reach for the same cup in the same location repeatedly, you will need to rely less and less on sensory information for achieving a successful reach. In general, there is an inverse relation between familiarity with the action-object pairing and the need for sensory involvement in the action: the more familiar the situation, the less you need sensory guidance (…). The same is true in speech, I suggest. Articulating less familiar words will require more input from the auditory-phonological component of the network than articulating highly familiar words."

13 Here, we feel, the therapist was acutely mindful in picking up something important.

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