



HAL
open science

Language as the source of human unconscious processes

Ariane Bazan, Filip Geerardyn, Veroniek Knockaert, David van Bunder,
Gertrudis van de Vijver

► **To cite this version:**

Ariane Bazan, Filip Geerardyn, Veroniek Knockaert, David van Bunder, Gertrudis van de Vijver.
Language as the source of human unconscious processes. *Evolution and Cognition*, 2002, 8 (2). hal-03445494

HAL Id: hal-03445494

<https://hal.science/hal-03445494>

Submitted on 24 Nov 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Language as the Source of Human Unconscious Processes

Introduction

Major advances in the understanding of language dynamics have been achieved the last ten years and continue to come to us each day, originating from disciplines as diverse as medicine, neuroscience, evolutionary biology and phenomenological research in language development. The present contribution has no claim in the further elaboration of these domains, but proposes a more clinical or psychological approach to language dynamics. In clinical work, as in everyday psychopathology, the acute concern is not so much the exact neuronal trajectory of language, but far more the way a subject's emotional experience is influenced by or has influence on his or her particular language dynamics. The focus is therefore precisely this emotional language processing and the way it is proposed to be at the origin of the typically human unconscious mind.

Abstract

A neuropsychanalytic framework is proposed for the study of unconsciously determined human behavior as expressed in psychic symptoms and dreams. First, some clinical observations are operationalized in an analytical FREUDO-LACANIAN perspective. In particular the notion of the human unconscious as a linguistically structured dynamic system is presented. Second, these psychoanalytical notions are integrated with current neuroscientific insights on language. This framework essentially conceives human language as the one object of two evolutionarily radically different neurological processing circuits, acting partially in parallel. The oldest pathway processes the "objective" or phonemic qualities of language input subcortically while the second and typically human pathway processes language neocortically on its semantic qualities. The affective processing of raw phonemic material therefore is thought to operate in relative autonomy from the semantic processing and thereby able to induce so-called "false connections". It is further proposed that (1) meaningful access to language is essentially a(n articulatory) motor event, (2) imagined speech also induces this motor activation and (3) unspoken phonemes give rise to "linguistic phantoms". In final, a structural hypothesis for the FREUDO-LACANIAN unconscious is proposed conceiving this system as a raster of latent phonemic phantoms, eventually functioning as "attractors" for the subject's affective attention.

Key words

Language, unconscious, phonemes, emotion, signifier,

Problem Presentation

Clinical observations

There has been, since FREUD (1960, 1975) and in particular with LACAN (1957), a particular interest and attention paid to the literal language patients use when talking about themselves or their problems in consultation. This is illustrated in Freud's clinical oeuvre from the start with, for example, his illustrative cases presented in the "Psychopathology of Everyday Life" (FREUD 1960). The forgetting of the name "Signorelli" for example seemed not to be motivated by some conflicting semantics connected with the painter "Signorelli", but, curiously, with the semantics of a phonological variant of the word "Signorelli", in this case *signor* or "master". In "The interpretation of dreams" FREUD (1975) introduced the concept that dreams are frequently to be taken literally and that these literal transcripts are subsequently to be

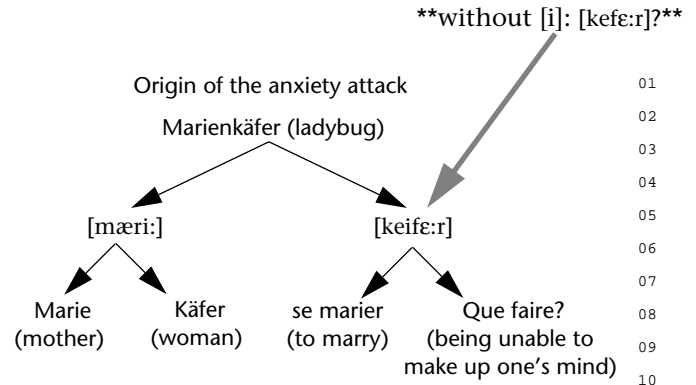
01 read as rebuses. That the same principle also per-
 02 tains to symptoms, as FREUD proposes, is clearly il-
 03 lustrated in a letter to Fliess (FREUD 1897 **NOT IN
 04 REFS**, pp316–331) which is given here as a para-
 05 digmatic example:

06 “A little interpretation came my way... Mr. E. had
 07 an anxiety attack at the age of ten when he tried to
 08 catch a black beetle... The meaning of this attack had
 09 thus far remained obscure. Now, dwelling on the
 10 theme of “being unable to make up one’s mind”, he
 11 repeated a conversation between his grandmother
 12 and his aunt about the marriage of his mother...
 13 from which it emerged that she had not been able to
 14 make up her mind for quite some time; then he sud-
 15 denly came up with the black beetle, which he had
 16 not mentioned for months, and from that to lady-
 17 bug [Marienkäfer] (his mother’s name was Marie);
 18 then he laughed out loud... Then we broke off and
 19 next time he told me that before the session the
 20 meaning of the beetle [Käfer] had occurred to him;
 21 namely: que faire? = being unable to make up one’s
 22 mind... meschugge!

23 “You may know that here a woman may be re-
 24 ferred to as a nice “beetle”. His nurse and first love
 25 was a French woman; in fact, he learned to speak
 26 French before he learned to speak German”.

27 As is made clear in the scheme on Figure 1, it
 28 seems that the literal forms of the words function as
 29 carrier of affects, more or less independently of their
 30 semantics.

31 In the neuropsychanalytic research unit at the
 32 University of Ghent a number of clinical observa-
 33 tions of this kind were systematically recorded in
 34 collaboration with diverse clinicians. Three typical
 35 examples of this phenomenon are presented briefly:
 36 (1) a dream: a woman dreams that she is sitting in
 37 front of her therapist and that their feet are touch-
 38 ing; the meaning of the dream becomes clear when
 39 she formulates its content as “we sat sole to sole”; (2)
 40 an anxiety: a woman gets an anxiety attack when her
 41 friend, promising her a hot time together, whispers
 42 to her: “Je te montrerai les sommets de la merveille”
 43 (“I will show you the top of the record”); upon anal-
 44 ysis, it seems that the phonological carrier [læ
 45 merve:j] was for the young woman also referring to
 46 “la mère veille”: i.e., mother is watching; (3) a dream:
 47 a pregnant woman dreams she is driving a big Mer-
 48 cedes down a spiral driveway; while she is driving the
 49 car, the driveway gets narrower and at one point her
 50 car gets stuck; upon analysis, it seems that the pho-
 51 nological carrier [læ mɛ:rsɛ:des] was for the woman
 52 also referring to: “la mère cède” (i.e., “the mother
 53 fails”). The woman was at that moment preparing



11
 12 **Figure 1.** “The inability of mother to make up her mind con-
 13 cerning her marriage” = origin of the (current) anxiety.
 14
 15

16 for the presentation of her Ph.D. thesis and therefore
 17 experiencing some conflict between this energy con-
 18 suming achievement and her imminent mother-
 19 hood. Constant in these examples is that the origin
 20 of the symptom or dream is phonologically—and
 21 not semantically—related to the actual form in
 22 which the dream or symptom presents itself.
 23

24 **Psychoanalytical framework**
 25

26 In a FREUDO–LACANIAN framework the reference to a
 27 human unconscious refers to the idea of an uncon-
 28 conscious that is structured like a language (LACAN
 29 1972–1973; VAN BUNDER et al. 2002), and to the dy-
 30 namic system thought to be at the origin of signifier
 31 mediated affective “mismatches” as illustrated in the
 32 aforementioned examples. For FREUD (1978), the
 33 word form or “word-representation” implicates an
 34 acoustic component, “the acoustic image” and a
 35 motor component or “speech movement represen-
 36 tation”, the kinesthetic incoming information of the
 37 articulatory system. This word-representation level
 38 has therefore a finite number of components and is
 39 as such to be distinguished from the “object-repre-
 40 sentation” level. This object-representation level has
 41 an infinite number of components, including e.g.,
 42 visual, acoustic and tactile recordings of the object.
 43 The similarity of this model with the model of DAM-
 44 ASIO et al. (1996) and CARAMAZZA (1996) is remark-
 45 able. The word-representation level can be consid-
 46 ered as corresponding to the lexical level, to be
 47 situated in the left basal temporal lobe, while the ob-
 48 ject-representation level obviously corresponds with
 49 the semantic level, to be situated distributed over the
 50 temporo-parieto-occipital areas of both hemi-
 51 spheres. For LACAN (1957), the word form or “signi-
 52 fier” is a phonemic carrier in the Saussurian sense,
 53 without any predetermined signification. The signi-

01 fier is an “empty” lexical position depending on the
 02 context for its conscious signifying. In his later seminars (LACAN 1972–1973; see also VAN DE VIJVER
 03 2002), the signifier is not any longer this empty or
 04 neutral but is carrier of an unconscious sense
 05 through its phonemic articulation with the body.
 06

07

08 **Two Evolutionary Pathways**
 09 **for Language**
 10

11 The idea that language is also a carrier of sense *apart*
 12 *from its semantic sense* is implicit in these clinical ex-
 13 amples above: it seems to be carrier of affect, in par-
 14 ticular of anxiety or arousal, independently of its se-
 15 mantics, i.e., the phonemic carrier induces bodily
 16 changes on an affective level, apart from the access
 17 to semantics. Language therefore seems to be the
 18 carrier of two more or less independent levels of sig-
 19 nification: a semantic one and an affective one.

20 The possibility of relative independence between
 21 the affective and “scenic” (or “declarative”) content
 22 of the same input material is actually central to
 23 LEDOUX’ theory on emotional processing (LEDOUX
 24 1993, 1994). Central to his view is the wedge-like
 25 splitting of the neuronal trajectory of a single input
 26 train into two categorically different pathways, one
 27 subcortical or limbic and the other at the level of the
 28 neocortex. The limbic trajectory is both phylogeneti-
 29 cally old and ontogenetically early: the systems are
 30 functional from birth on (and probably earlier) and
 31 immediately start establishing an emotional mem-
 32 ory on the basis of conditioning of raw input materi-
 33 al (LEDOUX 1993, 1994). The neocortical trajectory
 34 is both phylogenetically more recent and ontogenet-
 35 ically late: cortical maturation is not achieved until
 36 six to ten years after birth. Therefore, it is only with
 37 some delay that an articulate mature “cognitive”
 38 analysis of the input material can be fully achieved
 39 and stored in the semantic fields.

40 LEDOUX’ scheme has some remarkable similarities
 41 with FREUD’s idea of the “splitting of consciousness”
 42 as he formulates it in “The neuro-psychoses of de-
 43 fense” (FREUD 1961, p51–52): “If someone with a dis-
 44 position [to neurosis] lacks the aptitude for conver-
 45 sion, but if, nevertheless, in order to fend off an
 46 incompatible idea, *he sets about separating it from its*
 47 *affect*, then that affect is obliged to remain in the
 48 psychical sphere. *The idea*, now weakened, is still left
 49 in consciousness, separated from all association. But
 50 *its affect*, which has become free, attaches itself to
 51 other ideas which are not in themselves incompati-
 52 ble; and thanks to this “false connection”, those
 53 ideas turn into obsessional ideas”.

The notion of the “splitting of consciousness” 01
 thus implies the splitting of an idea or experience in 02
 its content on the one hand and its affect or excita- 03
 tion sum on the other. The sum of excitation is in- 04
 vested in body innervations in conversion hysteria, 05
 or into other ideas in obsessional neurosis. The prin- 06
 ciple, however, remains the same: one and the same 07
 experience can psychologically be conceived as a 08
 “complex” of separable elements, with different dy- 09
 namic characteristics, different fates and different 10
 output systems, which, without being completely 11
 independent from each other, nevertheless possess a 12
 relative autonomy. 13

14 It is therefore tempting to explain the above illus-
 15 trated signifier mediated mismatches in a similar
 16 manner. Language is as appropriate an input stimu-
 17 lus as another (a non-language auditory or a visual
 18 stimulus) and is therefore also considered to be sub-
 19 ject to “emotional conditioning”. This emotional
 20 conditioning is relatively independent from seman-
 21 tics, which is considered an operation of the higher
 22 associative neocortical areas. At the level at which
 23 language is thought to be emotionally conditioned,
 24 clinical work teaches us that there is no difference
 25 between “soul” and “sole”. Language is at that level
 26 not treated as a fundamentally ambiguous system
 27 that has to be contextually interpreted, but as any
 28 other object, i.e., unambiguously or objectively. Like
 29 other objects, the language object automatically ac-
 30 tivates a number of proper sensory and motor asso-
 31 ciations correlated with its particular phonemic
 32 form (and not with its semantic meaning) and the
 33 emotional activation is thought to be effective at the
 34 level of these, most probably, motor associations. 35

36 **Incoming Phonemes Are**
 37 **Motor Programs**
 38

39 **“Affective mismatch”**
 40 **operates at the phoneme level**
 41

42 Clinical work teaches us more than that. First, it
 43 seems clear that the substratum for emotional acti-
 44 vation is not the raw acoustic material of language,
 45 but obviously its phonemic transcription. What is
 46 effective in eliciting an emotional activation does
 47 not seem to be necessarily endowed with some par-
 48 ticular acoustic qualities; apparently, what does
 49 seem important, however, are the phonemic in-
 50 variants of the message. Second, it appears that this
 51 emotional processing mechanism does not seem to
 52 respect word boundaries. In “*la merveille*” e.g., the
 53 relevant activating substratum ([la mer veij]) can ei-

01 ther be packed in one word or in a complete sen- 01
02 tence. 02

03 These indications help us to speculate on the ex- 03
04 act nature of the physiological language substratum 04
05 responsible for the emotional activation. In a com- 05
06 prehensive model for the neural basis of auditory 06
07 sentence processing FRIEDERICI (2002) situates the 07
08 process of identification of phonemes as the second 08
09 step, immediately after the primary acoustic analy- 09
10 sis. In her scheme, this identification of phonemes 10
11 involves a projection from the left temporal Brod- 11
12 mann area 42 (adjacent to HESCHL's gyrus or the pri- 12
13 mary auditory cortex) to the left prefrontal Brod- 13
14 mann area 44 or BROCA area and is completed within 14
15 the first 100 ms of auditory processing. Immediately 15
16 after this step, a number of lexical operations are 16
17 then exerted on the phonemic material, implying 17
18 between others the identification of word form and 18
19 of word category. As neither word form, nor word 19
20 category, nor, *a fortiori*, any semantic identification, 20
21 is relevant in the described signifier-mediated affec- 21
22 tive mismatches, I speculate that emotional process- 22
23 ing responsible for these mismatches takes place af- 23
24 ter phonemic processing but before lexical 24
25 processing of language, i.e., during the first 100 ms 25
26 after presentation. 26

27

28 **Phoneme identification involves motor activation**

29

30 Even if in the literature there might be some confu- 30
31 sion about the exact extent of implication and 31
32 about the exact brain locus of interest (for a review, 32
33 see BURTON 2001), there seems to be large agreement 33
34 that phonemic identification does involve motor 34
35 areas situated either prefrontally in the BROCA area 35
36 (HICKOK/POEPPPEL 2000) or subcortically, i.e., impli- 36
37 cating basal ganglia and/or cerebellar pathways 37
38 (IVRY/JUSTUS 2001). This observation therefore gives 38
39 weight to LIBERMAN's motor theory of speech per- 39
40 ception" (LIBERMAN et al. 1967; LIBERMAN/MAT- 40
41 TINGLY 1985). This theory, based on phonological 41
42 research, holds that the basis of speech perception is 42
43 not the actual sound of speech, but rather the "artic- 43
44 ulatory gestures" made by the speaker. It argues that 44
45 listeners identify spoken words through using that 45
46 information to access their speech motor system. 46
47 This is supported by the fact that the speech 47
48 phones, the smallest units we can hear in words, 48
49 link to articulatory and not auditory-related invari- 49
50 ants. Phoneticians classify and characterize phones 50
51 nearly entirely in terms of how they are articulated 51
52 and not in terms of how they sound. The theory 52
53 thereby accounts for our ability to perceive the in-

variant articulatory events that form the speech 01
stream, in spite of the great variability in the acous- 02
tic signal. 03

04 There has been a more recent neural instantia- 04
05 tion of this motor theory by RIZZOLATTI/ARBIB 05
06 (1998). These researchers report that in monkeys a 06
07 part of the premotor cortex (F5) contains neurons 07
08 that discharge both when the monkey grasps or ma- 08
09 nipulates objects and when it observes the experi- 09
10 menter making similar actions. Recent studies sug- 10
11 gest that a similar system exists in humans. FADIGA 11
12 et al. (1995) reported evidence for motor activation 12
13 when human subjects merely observed an action, 13
14 and the muscles activated were those that would 14
15 have been used had they performed the action 15
16 themselves. RIZZOLATTI/ARBIB (1998) also show that 16
17 there are neurons in F5 in the monkey's brain that 17
18 respond both when the animal makes lipsmacking 18
19 movements and when it observes them in others. 19
20 Of particular importance is the fact that these au- 20
21 thors note that area F5 in the monkey is the proba- 21
22 ble homologue of BROCA's area in humans. ZATORRE 22
23 et al. (1992, 1996) have indeed argued that the map- 23
24 ping of the incoming speech stream onto the lin- 24
25 guistically relevant units, which are thought to be 25
26 the corresponding articulatory gestures, activates 26
27 BROCA's area. There is some parallel argumentation, 27
28 especially coming from CORBALLIS (1999), that the 28
29 origins of human language might be situated in 29
30 manual gesture rather than in vocalization. Re- 30
31 cently, CALLAN et al. (2002) have shown that the 31
32 presence of such mirror neurons in speech motor 32
33 areas of the brain may explain why lip-reading en- 33
34 hances the intelligibility of what a person is saying. 34
35 This finding adds strength to the argument that hu- 35
36 man speech evolved from a primitive gestural sys- 36
37 tem of communication, rather than from simple vo- 37
38 calizations. For all these reasons, RIZZOLATTI/ARBIB 38
39 (1998) propose that the development of the human 39
40 speech circuit is a consequence of the fact that the 40
41 precursor of BROCA's area was endowed, before 41
42 speech appearance, with a mechanism for recogniz- 42
43 ing actions made by others. 43

44 This idea of perception-action linking already 44
45 stood central in FREUD's "Project for a scientific psy- 45
46 chology" (FREUD 1995, pp333-334): "While one is 46
47 perceiving the perception, one copies the movement 47
48 oneself—that is, one innervates so strongly the mo- 48
49 tor image of one's own which is aroused towards co- 49
50 inciding [with the perception], that the movement 50
51 is carried out. Hence one can speak of a perception 51
52 having an *imitation-value*. (...) Thus judging, which 52
53 is later a means for the *cognition* of an object that may

possibly be of practical importance, is originally an associative process between cathexes coming from outside and arising from one's own body—an *identification of information or cathexes from [the perception] and from within*". More generally, this suggests that external stimulation only makes sense for the brain if reprocessed into something self-initiated (GEERARDYN 2002). In his study on aphasia, FREUD (1978, pp91–92) then suggested that in language this movement might be thought of as articulation: "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 for understanding, the function of verbal association is stimulated from the acoustic elements at the same time, so that *we more or less repeat ourselves the words heard*, thus supporting *our understanding with the help of kinaesthetic impressions*. A higher measure of attention in listening will entail a higher degree of transmission of speech heard on to the tract serving the motor execution of language".

A comprehensive framework for the mechanism of "affective mismatches"

In summary, I suggest that in the signifier-mediated affective mismatches as illustrated above, the phonemic transformation of the incoming linguistic material is the effective substratum and that this phonemic transformation involves language motor pathways, and therefore that the significant "affective mismatch" is to be situated at the motor–limbic interface. The full mechanism of these affective mismatches is understood as follows. Any time affectively colored phonemes are actualized in the ongoing discourse, be it not in the right original semantic context, affect is nevertheless aroused and may be falsely connected to the actual semantics (e.g., the anxiety aroused by the beetle is falsely attributed to the appearance of the beetle). The selection process for the pertinent semantic interpretation can be conceived as an active inhibitory process, which "represses" contextually non-valid semantic alternatives (cf. SIMPSON/KANG 1994; FAUST/GERNSBACHER 1996; GORFEIN/BERGER/BUBKA 2000). Since, however, affective activation is thought not to be subject to this cortical inhibition process (cf. the automaticity of affect, DE HOUWER/ELEN 1998; FAZIO 2001), it may be the case that this irrepressible affect is experienced in the "wrong" semantic context and therefore gives rise to falsely connected symptoms in psychopathology.

Hypothesis: The Unconscious is Affect Aroused by Phonemic "Phantoms"

Imagined speech is motor activation.

Speech motor areas are not only activated in case of speech production or active speech perception, but in a number of other conditions where speech is imagined but not effectively produced, including inner speech (MCGUIRE et al. 1996), auditory verbal imagery (MCGUIRE et al. 1996) and hallucinations in schizophrenia (LIDDLE et al. 1992; CLEGGHORN et al. 1992; MCGUIRE/SHAH/MURRAY 1993). As imagining movements leads to increased cerebral blood flow in motor areas concerned with their execution (DECETY et al. 1994; STEPHAN et al. 1995), the activity in regions which control speech motor systems may be due to imagined speech in these conditions.

DECETY/GRÈZES (1999) define motor imagery as a dynamic state during which the representation of a given motor act is internally rehearsed within working memory without any overt motor output. It has been proposed that such a simulation process corresponds to the conscious counterpart of many situations experienced in everyday life, such as watching somebody's action with the desire to imitate it, anticipating the effects of an action, preparing or intending to move, refraining from moving, and remembering an action (JEANNEROD/DECETY 1995; DECETY 1996).

All of these tasks involve motor representations that recruit neural mechanisms specific to action planning. GEORGIEFF/JEANNEROD (1998) and DECETY/GRÈZES (1999) remark that comparison of brain activation during several modalities of action representation (including observation and imagining) reveals a common network to which the inferior parietal lobule (area 40), part of the supplementary motor area (SMA), the ventral premotor area, the cingulate gyrus and the cerebellum contribute. The ventral premotor area corresponds to a crossroads between the ventral part of area 6 and areas 44 and 45 (BROCA's area), a cortical zone which bears some homology with the monkey ventral area 6 where mirror neurons are recorded (RIZZOLATTI et al. 1996). For all these reasons, it is expected that, similar to what is proposed for the signifier mediated affective mismatches, the substratum for speech imagery also involves the phonemic motor pathways.

Imagined motor activation induces phantoms

The phantom limb syndrome refers to the strong perception that a missing limb is still there, to the sense of being able to move it and to reported feelings arising from it such as intense pain. RAMACHANDRAN (1994) suggests that the relevant signaling maintaining the phantom are the sensations arising from reafference signals derived from the motor commands sent to the muscles of the phantom. Pain could especially be linked to the missing of the corresponding sensory feedback that would confirm the movement execution. The concepts of “efference copy”, as introduced by HELMHOLTZ (1995) suggests that a copy of one’s *intended* movement is used every time a voluntary action is planned, such that the sensory consequences of the action can be anticipated and eventually cancelled (BLAKEMORE et al. 1998). Most contemporary accounts of efference copy have claimed that it is unconscious, or acts to cancel percepts rather than generate them. Nevertheless, some clinical and experimental observations suggest that this information, in particular the state of the motor system, can influence subjective perception of the body. In deafferentiation, people still gesticulate while talking, even when the sight of these gestures is blinded to them and their interlocutor (COLE/PAILLARD 1996). It is suggested that, in agreement with MERLEAU-PONTY (1945) and IVERSON/GOLDIN-MEADOW (1998), the gesticulation when talking is for the subject’s own linguistic-thought processes and not just for communicative purposes and that the informative signals here are not the (absent) somatosensory signals but, remarkably, the efference copies of the hand muscles. MCGONIGLE et al. (2002) recently report the case of E. P., a right-handed female stroke patient with a right frontomesial lesion who sporadically experiences a supernumerary “ghost” left arm. Their results suggest that areas traditionally classified as part of the motor system can influence the conscious perception of the body and they propose that, as a consequence of her injury, E.P. is aware of the position of the phantom limb in its “action space” on the basis of the efference (motor) copies while also continuing to be aware of the true position of her real limb on the basis of afferent somatosensory information. Focusing on the desired goal of an ac-

tion, JEANNEROD (1994, p201) suggests that neurons encoding the “final configuration” of the body would continue firing “until the goal has been reached”. If the goal were not reached, “the sustained discharge would be interpreted centrally as a pure representational activity and give rise to mental imagery” (JEANNEROD 1994, p201). In the case of E.P. sustained activity in a traditionally motor area of the brain (the SMA) correlates with her perception of a phantom arm (MCGONIGLE et al. 2002). All these observations suggest that phantoms arise when motor commands are consistently given, and that phantom pain could especially be linked to the missing of confirmatory sensory feedback.

Hypothesis: A linguistic unconscious

As a hypothesis, it is therefore proposed that recurrent unspoken phonemes, the motor circuitry of which is regularly activated, either by directed speech perception, by linguistic imagery or by refraining from speaking them (“repression”), could similarly create “phantom” phonemes in a linguistic “action space”. These “phantom phonemes” which would be often or lastingly internally rehearsed in the phonological loop of working memory, would, if not spoken (enough), be interpreted centrally as representational activity, giving rise to mental imagery. This mental imagery then is not to be conceived as primarily semantically structured, but would rather have a primarily phonemic structure.

It is difficult to further speculate on the nature of such a phonemic mental imagery, but as phonemes were proposed to be affect-carrying substrates, it makes sense to conceive that although executing the motor plan is subject to inhibition, the associated affective activation is not. In this perspective, it is interesting to note that motor imagery activates heart and respiration control mechanisms in proportion to the actual effort that would be required for the real action (DECETY et al. 1991; DECETY et al. 1993; WANG/MORGAN 1992). Such an autonomic response in a situation where no muscular work is produced can only be attributed to a central influence similar to that observed during motor preparation. As the autonomic system is by definition independent of voluntary control and cannot be held under inhibition, central influences on this system become recordable at the periphery (JEANNEROD 1994).

Author’s address
<p><i>Ariane Bazan, Psychiatric Center, Sint-Amandus, Beernem, Belgium, and Research Unit in Neuro-Psychoanalysis at the Department for Psychoanalysis and Clinical Consulting, University of Ghent, Belgium.</i> <i>Email: ariane.bazan@rug.ac.be</i></p>

01 In conclusion, I propose the following structural
02 hypothesis regarding the FREUDO-LACANIAN uncon-
03 scious: phonemes of particular importance in one's
04 personal history (e.g., the proper name) need not to
05 be actualized per se in the ongoing discourse but

01 have formed throughout the individual's particular
02 history a raster of phonemic "phantoms", that are
03 continuously functioning as "attractors" for the sub-
04 ject's affective attention.

08
09
10 **References**

11 **Blakemore, S. J./Wolpert, D. M./Frith, C. D. (1998)** Central
12 cancellation of self-produced tickle sensation. *Nature Neuro-*
13 *sciences* 1:635–640.
14 **Burton, M. W. (2001)** The role of inferior frontal cortex in
15 phonological processing. *Cognitive Science* 25:695–709.
16 **Callan, D./Jones, J./Munhall, K./Kroos, C./Callan, A./Vatiki-**
17 **otis-Bateson E. (2002)** Mirror neuron system activity and
18 audiovisual speech perception. Presented at the 8th Inter-
19 national Conference on Functional Mapping of the Hu-
20 man Brain, June 2–6, 2002, Sendai, Japan. Available on
21 CD-Rom in *NeuroImage* 16(2).
22 **Caramazza, A. (1996)** The brain's dictionary. *Nature*
23 380:485–486.
24 **Cleghorn, J. M./Franco, S./Szetchtman, B./Kaplan, R. D./**
25 **Szetchtman, H./Brown, G. M./Nahmias, C./Garnett, E. S.**
26 **(1992)** Towards a brain map of auditory hallucinations.
27 *American Journal of Psychiatry* 149:1062–1069.
28 **Cole, J. D./Paillard, J. (1996)** Living without touch and pe-
29 ripheral information about body position and movement:
30 Studies upon deafferented subjects. In: Bermudez, A. M./
31 Eilan, N. (eds.) *The body and the self*. MIT/Bradford Press:
32 Cambridge, MA, pp. 245–266.
33 **Corballis, M. C. (1999)** The gestural origins of language.
34 *American Scientist* 87:138–145.
35 **Damasio, H./Grabowski, T. J./Tranel, D./Hichwa, R. D./Dama-**
36 **sio, A. R. (1996)** A neural basis for lexical retrieval. *Nature*
37 380:499–505.
38 **Decety, J. (1996)** Neural representations for action. *Reviews*
39 *in Neurosciences* 7:285–297.
40 **Decety, J./Grèzes, J. (1999)** Neural mechanisms subserving
41 the perception of human actions. *Trends in Cognitive Sci-*
42 *ences* 5:172–178.
43 **Decety, J./Jeannerod, M./Durozard, D./Baverel, G. (1993)**
44 Central activation of autonomic effectors during mental
45 simulation of motor actions in man. *Journal of Physiology*
46 461:549–563.
47 **Decety, J./Jeannerod, M./Germain, M./Pastene, J. (1991)**
48 Vegetative response during imagined movement is propor-
49 tional to mental effort. *Behavioral Brain Research* 42:1–5.
50 **Decety, J./Perani, D./Jeannerod, M./Bettinardi, V./Tadary,**
51 **B./Woods, R./Mazziotta, J. C./Fazio, F. (1994)** Mapping
52 motor representations with positron emission tomogra-
53 phy. *Nature* 371:600–602.
54 **Declerq, F. (1995)** De paranoïde logica van de betekenis: Psy-
55 choanalyse en communicatie. *Psychoanalytische Perspek-*
56 *tieven* 27:87–101. **NOT IN TEXT**
57 **De Houwer, J./Eelen, P. (1998)** An affective variant of the Si-
58 mon paradigm. *Cognition and Emotion* 12:45–61.
59 **Fadiga, L./Fogassi, L./Pavesi, G./Rizzolatti, G. (1995)** Motor
60 facilitation during action observation: A magnetic stimula-
61 tion study. *Journal of Neurophysiology* 73:2608–2611.
62 **Faust, M. E./Gernsbacher, M. A. (1996)** Cerebral mecha-
63 nisms for suppression of inappropriate information during

64 sentence comprehension. *Brain and Language* 53:234–
65 259.
66 **Fazio, R. H. (2001)** On the automatic activation of associated
67 evaluations: An overview. *Cognition and Emotion* 15:115–
68 141.
69 **Friederici, A. D. (2002)** Towards a neural basis of auditory
70 sentence processing. *Trends in Cognitive Sciences* 6:78–
71 84.
72 **Freud, S. (1960)** The psychopathology of everyday life. In:
73 Tyson, A. (ed) *The Standard Edition of the Complete*
74 *Works of Sigmund Freud, Volume 6*. The Hogarth Press,
75 London, pp. **PAGES**. Originally published in 1901.
76 **Freud, S. (1961)** The neuro-psychoses of defence. In: Stra-
77 chey, J. et al. (ed) *The Standard Edition of the Complete*
78 *Works of Sigmund Freud, Volume 3*. The Hogarth Press,
79 London, pp. **PAGES**. Originally published in 1894.
80 **Freud, S. (1975)** *The Interpretation of Dreams* (J. Strachey,
81 translator). In *Standard Edition IV-V*. The Hogarth Press,
82 London, pp. **PAGES**. Originally published in 1900.
83 **Freud, S. (1978)** *On aphasia: A critical study* (Translated by E.
84 Stengel). International Universities Press: New York. Orig-
85 inally published in 1891.
86 **Freud, S. (1986)** *Briefe an Wilhelm Fließ 1887–1904* (Un-
87 gekürzte Ausgabe). Fischer Verlag: Frankfurt am Main.
88 **NOT IN TEXT**
89 **Freud, S. (1995)** *A Project for a Scientific Psychology* In: Stra-
90 chey, J. (ed) *The Standard Edition of the Complete Works*
91 *of Sigmund Freud, Volume 1*. Hogarth Press: London, pp.
92 **PAGES**. Originally published in 1895.
93 **Geerardyn, F./Van de Vijver, G./Knockaert, V./Bazan, A./Van**
94 **Bunder, D. (2002)** "How do I know what I think till I hear
95 what I say": On the emergence of consciousness between
96 the biological and the social. This issue.
97 **Georgieff, N./Jeannerod, M. (1998)** Beyond consciousness of
98 external reality. A "Who" system for consciousness of ac-
99 tion and self-consciousness. *Conscious Cognition*
100 7(3):465–77.
101 **Gorfein, D. S./Berger, S./Bubka, A. (2000)** The selection of
102 homograph meaning: Word association when context
103 changes. *Memory and Cognition* 28:766–773.
104 **Helmholtz, H. (1995)** *Science and culture: Popular and philo-*
105 *sophical essays* (Edited and translated by D. Chahan). Uni-
106 versity of Chicago Press: Chicago.
107 **Hickok, G./Poeppl, D. (2000)** Towards a functional neu-
108 roanatomy of speech perception. *Trends in Cognitive Sci-*
109 *ences* 4:131–138.
110 **Iverson, J. M./Goldin-Meadow, S. (1998)** Why people gesture
111 when they speak. *Nature* 396:228.
112 **Ivry, R. B./Justus, T. C. (2001)** A neural instantiation of the
113 motor theory of speech perception. *Trends in Neuro-*
114 *sciences* 24:513–515.
115 **Jeannerod, M. (1994)** The representing brain: Neural corre-
116 lates of motor intention and imagery. *Behavioral and*
117 *Brain Sciences* 17:187–245.
118 **Jeannerod, M./Decety, J. (1995)** Mental motor imagery: A

01 window into the representational stages of action. *Current* 01
02 *Opinion in Neurobiology* 5:727–732. 02

03 **Lacan, J. (1975)** *Le séminaire, livre XX. Encore (1972–1973)* 03
04 ***??***. Seuil: Paris. 04

05 **Lacan, J. (1999)** *L’instance de la lettre dans l’inconscient ou la* 05
06 *raison depuis Freud (1957)**??*** In: *Ecrits I* (2ième ed. de 06
07 poche). Seuil: Paris, pp. 490–526. 07

08 **LeDoux, J. E. (1993)** Emotional memory systems in the brain. 08
09 *Behavioural Brain Research* 58:69–79. 09

10 **LeDoux, J. E. (1994)** Emotion, memory and the brain. *Scien-* 10
11 *tific American* 6:32–39. 11

12 **Lieberman, A. M./Cooper, F. S./Shankweiler, D. P./Studdert-** 12
13 **Kennedy, M. (1967)** Perception of the speech code. *Psy-* 13
14 *chological Review* 74:431–461. 14

15 **Lieberman, A. M./Mattingly, I. G. (1985)** The motor theory of 15
16 speech perception revised. *Cognition* 21:1–36. 16

17 **Liddle, P. F./Friston, K. J./Frith, C. D./Hirsch, S. R./Jones, T./** 17
18 **Frackowiak, R. S. J. (1992)** Patterns of cerebral blood flow 18
19 in schizophrenia. *British Journal of Psychiatry* 160:179– 19
20 186. 20

21 **McGonigle, D. J./Hänninen, R./Salenius, S./Hari, R./Frackow-** 21
22 **iak, R. S. J./Frith, C. D. (2002)** Whose arm is it anyway? An 22
23 fMRI case study of supernumerary phantom limb. *Brain* 23
24 125:1265–1274. 24

25 **McGuire, P. K./Shah, G. M. S./Murray, R. M. (1993)** Increased 25
26 blood flow in Broca’s area during auditory hallucinations 26
27 in schizophrenia. *Lancet* 342:703–706. 27

28 **McGuire, P. K./Silbersweig, D. A./Murray, R. M./David, A. S./** 28
29 **Frackowiak, R. S. J./Frith, C. D. (1996)** Functional anat- 29
30 omy of inner speech and auditory verbal imagery. *Psycho-* 30
31 *logical Medicine* 26:29–38. 31

32 **Merleau-Ponty, M. (1945)** *Phénoménologie de la perception.* 32
33 Gallimard, Paris. 33

34 34
35 35
36 36
37 37
38 38
39 39
40 40
41 41
42 42
43 43
44 44
45 45
46 46
47 47
48 48
49 49
50 50
51 51
52 52
53 53

Ramachandran, V. S. (1994) Phantom limbs, neglect syn- 01
02 dromes, repressed memories, and Freudian psychology. *Inter-* 02
03 *national Review of Neurobiology* 37:291–333. 03

Rizzolatti, G./Arbib, M. A. (1998) Language within our grasp. 04
05 *Trends in Neuroscience* 21:188–194. 04

Rizzolatti, G./Fadiga, L./Gallese, V./Fogassi, L. (1996) 05
06 Premotor cortex and the recognition of motor actions. 06
07 *Cognitive Brain Research* 3:131–141. 07

Simpson, G. B./Kang, H. (1994) Inhibitory processes in the 08
09 recognition of homograph meanings. In: Dagenbach, D./ 08
10 Carr, T. H. (eds) *Inhibitory processes in attention, memo-* 10
11 *ry, and language.* Academic Press: San Diego CA, pp359– 11
12 381. 12

Stephan, K. M./Fink, G. R./Passingham, R. E./Frith, C. D./ 13
14 **Frackowiak, R. S. J. (1995)** Functional anatomy of the 13
15 mental representation of hand movements in healthy sub- 14
16 jects. *Journal of Neurophysiology* 73:373–386. 14

Van Bunder, D./Knockaert, V./Van de Vijver, G./Geerardyn, 15
16 **F./Bazan, A. (2002)** The return of the repressed. Anticipa- 15
17 tion and the logic of the signifier. *International Journal of* 17
18 *Computing Anticipatory Systems.* Forthcoming. 18

Van de Vijver, G./Van Bunder, D./Knockaert, D./Bazan, A./ 19
20 **Geerardyn, F. (2002)** The role of closure in a dynamic 19
21 structuralist viewpoint of psychic systems. This issue. 20

Wang, Y./Morgan, W. P. (1992) The effects of imagery per- 21
22 spectives on the physiological responses to imagined exer- 21
23 cise. *Behavioural Brain Research* 52:167–174. 22

Zatorre, R./Evans, A./Meyer, E./Gjedde, A. (1992) Lateraliza- 23
24 tion of phonetic and pitch discrimination in speech pro- 23
25 cessing. *Science* 256:846–849. 24

Zatorre, R./Meyer, E./Gjedde, A./Evans, A. (1996) PET stud- 25
26 ies of phonetic processing of speech: review, replication 26
27 and reanalysis. *Cerebral Cortex* 6:21–30. 27

28 28
29 29
30 30
31 31
32 32
33 33
34 34
35 35
36 36
37 37
38 38
39 39
40 40
41 41
42 42
43 43
44 44
45 45
46 46
47 47
48 48
49 49
50 50
51 51
52 52
53 53