The unconscious is structured as a language:

evidence from the lab in support of clinical practice.

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Abstract

Starting from Freud's model of primary and secondary processes and from Lacan's concept of the signifier, we propose a series of measures for these mental processes, which can be mobilized independently of psychoanalytic training. The GeoCat 1.3 is a non-linguistic tool based on forced similarity choices between geometric figures, with good psychometric characteristics for the assessment of primary and secondary processes. Based on this model we devised a linguistic version of this type of forced similarity choices, the WordLists. In these lists, the phonological and the semantic alternatives behave as primary, respectively secondary process parameters. However, the unrelated alternatives in the control lists turn out to be measures of their own right. In particular, the unrelated choices, in competition with phonological choices, behave as a measure of defensiveness. A study of subliminally administered WordLists has shown that defensive participants unconsciously shy away from phonological ambiguity; the perplexity when faced with ambiguity was observable in their subliminal N320 phonological mismatch negativity. Primary and secondary process parameters also turned out to explain up to one third of the variance in the production of laboratory induces parapraxes. Finally, we have also shown that people solve rebuses unwittingly. This empirical research demonstrate that it is possible to test psychoanalytic positions in a falsifiable way, and the results give empirical grounding to these principles, when called upon in the clinical setting. Especially the signifier is an important clinical tool which enables to reveal etiological strands unsuspected to the patient, as shown in the clinical excerpt.

Key words

primary process – psychoanalysis – Freud – Lacan – signifier – ambiguity

Introduction

In his *Project for a Scientific Psychology*, Freud draws the architectural lines of the human mental apparatus. The primary process is essentially characterized by its associative tendency and connects mental items through superficial links: Freud (1900/1958, p. 597; 1901/1978, p. 278), resp. Holt (1967, p. 354), qualify the primary process associations as 'superficial', 'external' and 'non-essential'. The secondary process, by contrast, opposes this associative tendency by a top-down inhibition (e.g. Freud, 1895/1966, pp. 326–327; 1900/1955, p. 601, 603), especially when the associations are not coherent with the contextual configuration and/or the supposed intention of the situation. Saraga and Gasser (2005, p. 111) qualify inhibition as the "essence itself of the secondary process". Both processes are two (neocortical) modalities of acting and thinking (Bazan, 2023) and both can function consciously and unconsciously, though the gravity point shifts towards secondary process mentation in conscious life. These processes are essential for clinical understanding: e.g., there is a large consensus that primary process mentation is exacerbated in psychotic conditions (Freud, 1900/1953, p. 568; Freud, 1915/1957, p. 197; Fenichel, 1945, p. 422; Holt, 2002, p. 474; Robbins, 2002), especially when decompensated (Bazan et al., 2013). Bergeret (1974, p. 46) strikingly described a personality in terms of a "rather invariant reciprocal play of the primary and secondary processes". A surge in primary process mentation is also characteristic for pathological conditions, such as high anxiety and trauma, but high primary process is also typical for some non-pathological situations, such as in children up to six or in pregnant women in their last trimester (Bazan, 2023 for review). Clinically, primary process breakthroughs can therefore on some occasions be indicative either of change in the usual mental equilibrium or of structural psychopathology. Importantly, this couple of concepts has also been deemed crucial for psychoanalytic theory (see e.g. Klein, 1967, p. 130; Jones, 1953, p. 389), and is situated at the interface with other psychological approaches (e.g. the S1/S2 distinction of Kahneman, 2011), as well as with neurosciences (Carhart-Harris & Friston, 2010; Bazan, 2023). In this way, primary and secondary processes present themselves as a key for clinical understanding in an interdisciplinary exchange.

Both processes are also *linguistic* modalities of acting and thinking. Indeed, concerning the details, upon which primary process' associations are made, Freud (1900, p. 530) also includes phonological characteristics such as "associations based on homonyms and verbal similarities" (Freud, 1900, p. 596) and "assonance, verbal ambiguity, and temporal coincidence, without inner relationship of meaning; in other words, (…) all those associations which we

allow ourselves to exploit in wit and playing upon words". For example, Freud (1900, p. 560) qualifies the homophony dysenteria/diphteria in one of his dreams (« Irma's injection ») as a « paraphasic assonance ». Phonological ambiguity is also a favourite masking mode of the return-of-the-repressed. For example, in the case description of the Ratman (Freud, 1909), the patient presents himself with a debilitating obsession concerning a torture by ways of a rat. It seems through Freud's analysis that this symptom did not find its origin in a traumatic event, implying a rat, but in highly emotional childhood situations implying his nanny (*Frau Hof*rat in German) and the marriage of his parents (*hei*rat*en*). Lacan (1955) identifies in his precise reading of Freud's texts the importance of the mental effectiveness of the 'word presentation' which, in line with the structural linguistics of de Saussure (1915), Lacan (1957/1966, p. 120) calls the signifier distinct from the signified, the semantic meaning of the word. The Lacanian signifier is indeed the phonological word form: "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). Lacan (1966, p. 868) attributes to this signifier a mental efficiency in its own right, summarized by 'the unconscious structured like a language' and in a previous theoretical work we proposed an interdisciplinary neuropsychoanalytic framework for this hypothesis (Bazan, 2007). In a Lacanian psychoanalytic approach, much attention is therefore given to the precise wordings of the patient, especially when phoneme groups insist through different meanings or if they are in any way 'indexed' by the patient, e.g. through pauses or parapraxes. The Lacanian analyst Patrick Gauthier-Lafaye (2017, p. 80) gives us a telling example. He hears an unusual pause in a sentence of a patient: "Ma mère n'était pas parvenue…" ("My mother did not succeed in…"), where the patient pauses in the middle of the word "par-venue" ("succeed"). This slight pause isolates for a suspended moment the embedded phrase "papa revenu" ("daddy has come back"). The analyst simply repeats "pas par'venue," opening up a new world of meanings. It appeared that the patient's father left the family without explanation. It had always seemed the minimal duty of the then young woman to be loyal to her mother and to her outrage. Thereby, she could never express her own longings for her father to come back, save for this moment in her analysis 40 years later. Signifier indications can help uncovering new etiological strands, so far consciously unsuspected by the patient. Psychoanalysis in general, and the Lacanian linguistic approach in particular, are often qualified as non-scientific or, at the least, as non-falsifiable. In this paper we present several empirical methods to measure primary and secondary process mentation, as well as to measure the mental effectiveness of the signifier, independently from psychoanalytic methods. We present a series of findings, including new findings for the

WordList-research, in order to show that psychoanalytic hypotheses can be tested in falsifiable ways. This is important for psychoanalytic - including Freudolacanian - psychoanalytic practice, as it provides for rational, testable support of some of its important functioning principles. It also gives a rational grounding to the psychotherapeutic use of the signifier, a use which is most regularly scolded as non-scientific.

The GeoCat, a non-linguistic measure of primary process mentation

First, Linda A.W. Brakel, Howard Shevrin and their colleagues at the University of Michigan have developed a non-verbal index of primary and secondary process mentation independent of the psychoanalytic clinical method, the GeoCat (Brakel et al., 2000), and Bazan has made improvements to the original instrument, resulting into the GeoCat 1.3 (Bazan & Brakel, 2023). The GeoCat is a forced-choice measure contrasting two types of similarity between geometrical figures. The instrument consists of six items presenting three compositions of geometrical elements per item; participants must choose which of the two alternatives at the bottom of the square they find is "most similar" to the master composition on top. The *attributional* alternative (abbreviated ATT) consists of the same components as the master figure but in a different configuration. By drawing on associative operations to attain perceptual identity, attributional choices are proposed to index primary process mentation. Indeed, Rapaport (1951, p. 708) points out that in primary process associations are made on the basis of common 'attributes' and, before him, Freud (1905/1960, pp. 88-89) had proposed that superficial characteristics in primary process function as an 'indirect representation' or as 'an allusion' . Clearly, this is a frequent operation in common conscious thinking: by seeing its tail, we know the cat is behind the chair; by seeing only a corner of the table, we 'see' the whole table, etc. In the GeoCat, the so-called configurational alternative (abbreviated 'REL' for *relational*, its former name) is made up of different components but arranged in the same configuration as the master composition and is therefore similar to the master figure in a configurational way. Configurational similarity is only accessible through spatiotemporal orientation and orientations in space are rendered possible through secondary process inhibition which creates distance to the percepts (Bazan, 2023; Bazan & Brakel, 2023). Without this perspective, primary process mentation is characterized by spatiotemporal confusion (A. Freud, 1936/1966, p. 7; Lacan, 1964/1979 [1973], p. 31). For this reason, the configurational alternative is thought to index secondary process mentation. Accumulating research on the validity of the GeoCat 1.3 shows good psychometric qualities, including internal consistency, inter-list variability, and both construct and convergent validity, with preliminary data showing high correlations with

projective instruments; as a research tool, it has proven pivotal in a variety of studies, from fundamental metapsychology and psychopathology to psychotherapy research (for review, see Bazan & Brakel, 2023). As an example of an interesting clinical result, we found a substantial negative correlation between the number of attributional choices and the articulateness of delusional speech, suggesting that the more the delusion of the psychotic subject is elaborated, the less the thought processes operate in a primary process mode (see also Bazan & Brakel, 2023).

The WordLists, linguistic measures of primary and secondary process mentation

Following the GeoCat principle, I devised a similar linguistic measure: the WordLists, which is also a forced-choice similarity measure contrasting two types of similarity. Each list (see further) is composed of twenty triads. Again, one of the two target items in the triad consists of the same components as the master item but in a different configuration; however, the components here are *phonemes*. The different configuration here is, specifically, a phonological inverse such as in e.g. *caught [kɔ:t]* and *talk [tɔ:k],* and *fox [fɒks]* and *scoff [skɒf],* whereby it is clear that the 'attributional' alternatives are phonemic inverses, without being graphemic inverses. Freud (1900/1958, p. 406), indeed, says about primary process mentation in dreams: « We shall not be surprised to find that (…) the spelling of words is far less important than their sound.» Moreover, in everyday life, ambiguities in wordplays, psychopathology, slips of the tongue, dreams, and symptoms we see that phonological similarity takes precedence over orthographic similarity (see also the example "*Käfer/Que faire?*", further on in this paper, which is very dissimilar in orthography, while phonemically similar). Finally, a word, presented in its written form, activates its phonology by default, even when it is not invoked by the current task (Frost, 1998). For all these reasons, the phonemic target alternative is supposed to index primary process mentation in the printed WordList tool. The other target item in this WordList is similar to the master with regards to its meaning or semantics (hence, it is abbreviated S). The semantic alternative is supposed to index the secondary process as the phonemes here need to be read contextually and are processed in function of the communicative intent (see Bazan, 2007, pp. 117-122). The principle used is that of the synonym, including in the broad sense, of the same type as might be found in a crossword puzzle, such as *door* and *gate*, *nut* and *seed*, or *rice* and *oats* (for the full list, see Bazan et al., 2019). However, associated couples are avoided (e.g. *day* and *night*) as associations are primary process-connections. In addition to a list in which the participant must choose between the phonological and the semantic alternatives, there are also two control lists. First, there is a control list in which the semantic item competes

against an item with no intended similarity to the prime (hence it is abbreviated N), and this controls for the ability to recognize semantic similarity. Second and in parallel, there is a control list in which the phonological item competes against an item with no intended similarity to the prime, which controls for the ability to recognize phonologic similarity. Empirically, the three lists (hence, 60 items) are mixed together and presented in a randomized order.

We have explored the behavior of these lists in function of two personality traits, which are important in the psychoanalytic clinical setting, namely anxiety and defensiveness. Indeed, in accordance with Freud, we consider that both primary and secondary process mentation have at their essence a defensive nature. Psychopathology emerges either from unbound anxiety, which induces primary process defensive activity, or from the consequences of defending against free floating anxiety, namely secondary process defense, repression in the first place. Note that this in agreement with Erdelyi (2006), who considered two kinds of defenses: elaborative and inhibitory defenses, which correspond well to primary and secondary process defenses respectively. Using the WordLists in supraliminal or conscious research, we find a small but significant correlation (with correlation coefficients r between .1 and .3 on a scale from 0 to 1) between self-reported anxiety (measured by the State-Trait Anxiety Inventory) and the number of phonological choices when they are in a forced choice similarity competition with semantic alternatives. This is coherent with the number of phonological choices as a potential measure of primary process, as anxiety is thought to enhance primary process mentation (Freud, 1895/1966, p. 357). In (strictly) subliminal research (with the tachistoscope), effects are considerably higher with correlations (r) around .5 (see further, Bazan et al., 2019), showing that indeed, the margin of sensibility to primary process dynamics consciously is reduced as opposed to what happens unconsciously. Nevertheless, primary process tendencies also discretely pervade conscious mentation, and the instrument picks up small supraliminal variations in primary process mentation. For example, a 10% increase in primary process mentation was shown on the phonological-semantic WordList by simple closing the eyes (Bruxelmane et al., 2020).

Defensiveness is measured by the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960), with representative items asking participants to respond to typical shortcomings (e.g., “I’m always willing to admit it when I make a mistake”). This scale is considered to measure defensive inhibition when confronted with unacceptable truths about oneself (Crowne & Marlowe, 1964; Paulhus et al., 1998). In supraliminal research, there is a weak, but significant correlation between increased defensiveness and the number of semantic choices, both when in competition with phonological choices or when in competition with

unrelated choices (r is ca. .2). This seems to confirm the number of semantic choices as a potential measure of secondary process, since inhibitory type defensiveness follows secondary process principles.

The major empirical surprise with the WordLists is that the unrelated alternatives in the control lists revealed to be proper measures of their own right. When competing with semantic choices, the unrelated choices appear to reflect idiosyncratic choices. For example, in a triad with *carte* (map) followed by the semantic alternative *plan* and the unrelated choice *jazz*, a participant indicates during debriefing that he chooses *jazz* rather than *plan* because his favorite program is called *'jazz à la carte*'. Since idiosyncrasy is a form of primary process associativity (Gabbard et al., p. 473), the unrelated alternatives become, when competing with semantic choices, an unanticipated measure of idiosyncratic primary process mentation of their own right. However, this does not mean that a tendency to be in primary process manifests itself in a majority of unrelated choices when competing with semantic choices. Indeed, out of a total of 20 possible choices, people typically make 18 or 19 semantic choices and 2 or 1 unrelatied choices. However, there is a higher probability for these few decisions in favor on the unrelated items, to be based upon idiosyncratic associations (of the type: "*jazz à la carte*"). Therefore, when participants make 17 or 16 semantic choices (and exceptionally substantially less, as low as 12) and, in consequence, 3 or 4 (resp. up to 8) unrelated choices, this is indicative of higher idiosyncratic primary process functioning, an exacerbated ability to see original or intimate connections between words, which were not intentionally implied. Interestingly, the number of such unrelated choices correlates with other primary process measures, such as the number of phonological choices in the phonological-semantic WordList (with a correlation r of .6) and very slightly with the number of attributional choices in the GeoCat (see also, Müller & Lopes-Pinto, 2021).

For the unrelated choices competing with phonological alternatives in the second control list, frequently and surprisingly, they do not correlate with the number of unrelated choices competing with semantic alternatives, and in that case, they should be understood as indicative of another mental logic, as is proposed in the following paragraph.

Defensiveness betrays neural reactivity, and predicts an unconscious avoidance of phonological ambiguity

In the only subliminal study with the WordLists so far (Bazan et al., 2019), 31 participants were submitted to a subliminal priming experiment, with the prime master word (e.g. *door*) on one card and the two alternatives (e.g. *gate* and *road*) above and below the fixation center on the

following card, both presented at 1ms, this is one thousandth of a second. This was done through a tachistoscope, a mechanical device for the brief exposure of visual stimuli, thereby assuring a strictly unconscious presentation without the use of a mask. The experimental task was to pick the choice most similar to the prime by saying "1" respectively "2" for the upper, respectively the lower alternative. However, as the participants couldn't consciously see either prime or targets, they had the impression to make these choices ("1" or "2") completely at random. Nevertheless, the results showed a tendency to pick the non-related choice subliminally, while the same WordLists administered supraliminally showed of course a clear choice for the phonologically similar words. However the revealing result was the significant and moderate positive correlation of the number of unrelated choices with defensiveness ($r=-.51$; $p<.005$). The results show that the more the participants were defensive, the more they subliminally picked the unrelated choices. As there is no similarity between this unrelated word and the prime word, the choice for the unrelated alternative is possibly a non-choice for the phonological equivalent. This would mean that the more defensive, the more the participants avoided phonological similarity – without being aware of this. We interpreted this finding by proposing that unresolved phonological similarity corresponds to phonological ambiguity, and that this ambiguity "may upset a freight train of conversation" as the poet Oliver Wendell Holmes (1891, p. 11) says strikingly, comparing language ambiguity to railway sleepers. The train of conversation might by these sleepers move into unknown new areas, where surprises may await – a perspective which is threatening for defensive people.

In this same study, we also measured Event Related Potentials with a focus on a negative potential c. 320 ms after the presentation of the targets, the so-called 'Phonological Mismatch Negativity' or N320 which is known to react selectively to phonological mismatch in supraliminal visual word presentations (Connolly et al., 1995, 2001). In such supraliminal research, phonological similarity – the resolution of ambiguity - leads to a less negative N320-component (Grossi et al., 2001). Importantly, in our subliminal set-up, we observed that the less negative the N320 became upon target presentation, the more the participant indeed picks the phonological choice. In other words, the N320 amplitude-effects, potentially indicative of an unconscious recognition of phonological similarity, significantly predicted the participants' choices more than half a second later. In contrast, the more negative the N320 becomes – possibly testifying of a perplexed reaction upon this ambiguity – the more the participant picks the unrelated choice. The overall correlation between the N320 amplitude and later subliminal choice of unrelated alternatives was $r= .43$ ($p=.01$). This means that, amazingly, the brain reacts on the subliminally presented triad, and that this reaction predicts the subsequent behavioral

choice, while the subjective experience of the participants is one of complete arbitrariness. Moreover, there is also a direct correlation between defensiveness and the amplitude of the N320, especially on midleft electrodes (r=−.49; p=.005). In other words, defensiveness betrays neuronal reactivity: in lowly defensive participants the phonologically similar target induces an expected reduction of N320 while in contrast, highly defensive participants have a perplexed brain reaction upon the phonological target, with a negatively peaking N320. We concluded that defensiveness might also manifest itself as a defense against the (energy-consuming) ambiguity of language. This research shows that personality, understood as a singular mental organization in terms of primary and secondary process defense mechanisms, is at the same time a way of processing language – and specifically, language ambiguity – at a totally unconscious level, as corroborated independently by objective brain measures.

Up to a third of the variance in the production of parapraxes is explained by primary and secondary process defensive readiness as personality factors

Having established the GeoCat and the WordLists as measures of primary and secondary process mentation, we have used them to explain specific psychodynamic phenomena, such as parapraxes and rebuses. First, we launched a fully experimental psychoanalytic study by inducing parapraxes in the lab and studying their occurrence (Thieffry et al., 2023). A total of 55 subjects participated in a French adaptation of the *Spoonerisms of Laboratory Induced Predisposition* or SLIP-technique (Motley & Baars, 1976) including 32 'neutral' and 32 taboo spoonerisms. A spoonerism is a parapraxis in which corresponding consonants (in the present case) are switched between two words. The participants had to read sequences like the following, the last pair of which would be susceptible of spoonerism:

louche sure - doute pure - douze muse - douche mur (mouche dure)

but clair - pub nerf - puce chèque - chute père (pute chère)

The 55 participants produced a total of 37 slips, with no significant difference in the number of so-called 'neutral' and taboo slips. This distinction was proposed by Motley and Baars (1978), who found that participants made significantly fewer taboo parapraxes and therefore concluded that a so-called 'prearticulatory editor' ensured the censorship over taboo parapraxes. However, Freud (1916–1917/1966, p. 66) proposed that slips of the tongue, including apparently simple ones, always have a sense and constitute « a half-success and a half-failure » compromise resulting from defensive mechanisms. Therefore, our hypothesis was that the occurrence of parapraxes should be explainable both in terms of primary and secondary process parameters. Indeed, we found that the number of attributional choices in the GeoCat and the number of

unrelated choices in the WordList, which presents a competition between the phonological and the unrelated alternative, together explained up to 30% of the variance in the production of parapraxes, confirming the defensive logic underlying slips. Moreover, when dividing the population into lowly and highly defensive participants, primary process mentation appears as a baseline default defense in all participants, while it is only highly defensive participants that mobilize an additional inhibitory secondary process type of defense, indicated by the number of unrelated choices in the WordLists. In other words, with the current measures, we only catch 30% of the variance at best. This is not amazing: with the present measures we catch personality-type variables (namely, the primary-secondary process mental economy) but we must suppose, based on Freudian theory and on clinical observations, that idiosyncratic factors tied to the particular word pairs for each participant catch a large part of the variance. This is not to say that it is impossible to work experimentally with idiosyncrasy: by having random (non-clinical) participants interacting with random word pairs, we a priori induce by chance idiosyncratic 'encounters'. However, it is not the singular encounters as such which can be induced nor measured, but we can induce their probability in using a variety of word stimuli and we can measure the openness of the participants to react to them. This, however, is in its principle not different from other sciences. When doing a saturation experiment, in biochemistry, for example, we do not either induce or measure the singular binding of a protein receptor with a ligand, but by choosing ligands with certain molecular characteristics, we induce the probability of binding *(idiosyncratic 'encounters')* and what we measure is the probability of the receptor proteins to bind the ligand. Nevertheless, the universal tendencies for ways of operation – mental ways for the parapraxes research, biochemical for the ligand research – do play a significantly measurable role. We believe experimental psychoanalytic research is possible as it is for other types of scientific research – which might contribute to establishing psychoanalytic theory as a science.

As a further result, when we consider Motley and Baars' (1978) a priori difference between taboo and 'neutral' parapraxes, highly defensive participants made 2.7 times more taboo parapraxes than lowly defensive participants. However, the occurrence of the taboo parapraxes specifically did not at all react to our primary and secondary process parameters and thus, these measures had no contribution at all to explain their occurrence. Therefore, we propose that Motley and Baars' prearticulatory editor is an external instance of inhibition, proximal to uttering and equivalent to the censorship between the systems Preconscious and Conscious in Freud's metapsychology. Taboo parapraxes are filtered preconsciously, i.e. cognitively, depending on social considerations, but are not regulated unconsciously. By contrast, the

defenses upon 'neutral' parapraxes are internal, intimate control systems, reflecting the censorship between the systems Unconscious and Preconscious, this is, showing repression. This study thus supports a psychodynamic explanatory model for the production of parapraxes.

People solve rebuses unwittingly: empirical evidence for the mental effectiveness of the signifier

Hitherto we have seen that Freud understands the unconscious as an associative mycelium with linguistic (primary process) connections. We also saw that phonological ambiguity enables an effective masking which paves the way for the unsuspected return of the repressed, such as in parapraxes. In this study, we establish empirical evidence for the mental effectiveness of the signifier or phonological word form. Indeed, clinical case material shows that the emergence of (psychopathological) symptoms is sometimes linked to their etiological cause in a phonological way: this is precisely what Breuer (1895, p. 216) means when he says: "there arises a somewhat complicated irrational 'symbolic relation between the precipitating cause and the pathological phenomenon', which (…) is often based on the most absurd similarities of sound and verbal associations.". A little case study illustrates this principle (Freud, 1897/1985). In a letter to his friend Wilhelm Fliess, Freud describes the case of Mr. E. This patient recalls his panic attacks as a ten-year-old trying to catch a black beetle, or *Käfer* in German. It is Mr. E himself who, during the session, reveals the mental meaning of this black beetle, by shifting the phonological reading from *Käfer* to the French *Que faire?* which, pronounced with a German accent, sound pretty much the same. Mr. E had learned French before learning German from his French nanny. For Mr. E, however, *Que faire?* is a key expression that reflects both his current symptom – his indecision – and one of the likely etiological origins of his distress, namely his mother's inability to choose a husband, which relates, of course, to Mr. E's father, a choice most existential to the patient. In this case, the black beetle is supposed to have induced anxiety in Mr. E. not only by the black and erratic appearance of the beetle, but also (and above all) by the linguistic structure of its name, *Käfer*, which refers to the ambivalent choice of Mr. E.'s mother: *Que faire?* This signifier logic thus assumes that the surrounding world, even when we do not specifically summon it linguistically, nevertheless exerts a mental influence on us through its specifically linguistic structure. The principle at heart of the autonomy of the signifier is that the manifestation of the mental phenomenon takes place in a specific semantic domain (here, the black beetle), but its etiology relates to a radically different semantic domain (here *Que faire?*, equivalent to the ambiguous reading of the *name* of the beetle) and the link between the two domains is made by tilting the semantic domain on either side of the ambiguous

phonological equivalence (*Käfer/Que faire*). This is also the principle at heart of rebus reading: the rebus images (e.g. the image of a *pen* and of a *knee*) seem to refer to certain semantic domains (such as the image of the beetle), but they can be tilted to a radically different semantic domain when read on the phonological signifier level (forming the rebus *penny* in this case). A rebus is thus made up of images designating things, which, translated to their names and placed side by side, form a new word or a new sentence, with a radically different meaning.

We now tested one aspect of this theory, namely that there is an influence of the ambiguous phonological translation of the world upon our mental processing without us being aware of this influence. For the rebus priming paradigm (Olyff & Bazan, 2023), we designed 14 French rebuses, composed of two images representing monosyllabic names of easily identifiable objects, such as for example the image of a peacock (*paon* or /pã/) and the image of the earth (*terre* or /tɛr/), together forming the rebus '*panthère'* (/pãtɛr/) or panther. These images were followed by a target word semantically linked to the resolution of the rebus, e.g. *félin* or 'feline'. 788 participants were asked to look at the images for four seconds and then write the first six associations to the target word. These same target words were also preceded by two images forming an unrelated rebus, with the same instruction, which constituted the between-subjects control situation. If we count more rebus resolutions among the associations on the target words, when preceded by their respective composing rebus images than when preceded by an unrelated rebus, we may suppose an influence of the phonological reading of the images on the participant's productions. At no time before or during the experiment were the participants told that the images form rebuses. After the experiment, they were subjected to a funnel debriefing probing their naivety; of the 788 participants, 436 (or 55.3%) remained totally naive to the principle of the rebus throughout the experiment: for these participants, who nevertheless produced more rebus solutions when the target word was preceded by the rebus images ($p=.02$), the rebus resolution was completely unwitting. A by rebus-analysis confirms the experimental vs. control effect ($\chi2=5.1$, $p=.023$), and the difference in percentage of rebus resolution in the experimental vs. the control condition has a medium effect size ($Z=81.0$, $p=.03$; $r=.54$). In other words, our results show that people solve rebuses unwittingly, thereby constituting empirical evidence for the mental effectiveness of the signifier.

This type of 'passive' phonological priming by images is corroborated by psycholinguistic research (e.g. Morsella & Miozzo, 2002; Navarrete & Costa, 2005; Huettig & McQueen, 2007, Roelofs, 2008; Humphreys et al., 2010; Zwitserlood et al., 2018): these studies show the effect of image priming, through the phonology of their name, in naming, association or visual tracking tasks, supporting the idea of "automatic language activation during visual processing"

(Chabal & Marian, 2015, p. 548), even when language is not introduced into the task. Only one study involved the re-emergence of the full name of the represented object in the subject's speech with a radically different meaning: Meyer and Damian (2007) show that people are quicker to name, for example, a baseball bat when superimposed on a drawing of the animal bat. This study is the closest to the clinical situation, where similar reversals of meaning are observed. In other words, current psycholinguistic research, using other protocols, show phenomena which are in line with our rebus results, even if they go not as far as showing an unwitting rebus resolution, which is spontaneously thought of a complex cognitive operation.

Clinical Implications

There is knowledge intrinsic to the domain of psychoanalysis about the intimate functional principles of the mind, which lends itself to independent empirical testing, as we have shown, and by doing so, it seems the empirical results support the psychoanalytic propositions tested so far. This, in turn, gives empirical grounding to these principles, when called upon in the clinical setting. But even more so, it contributes to forging a full scientific status to the domain of psychoanalysis. For example, if an interpretation on the principle of the signifier is no longer a Lacanian fad, or worse, a scam, but if it has both a rational explanation in agreement with adjacent fields such as cognitive neuroscience and psycholinguistics (Bazan, 2007) and experimental corroborating evidence (Olyff & Bazan, 2023), then the literal listening to the patient might gain more general support and would constitute a progress in the field of mental care. To end this paper, I propose a clinical excerpt illustrating analytic work at the level of the signifier, clarifying its value in the clinical setting.

When Paul knocks on my door that night for his session, he is all sweaty and short-breathed. He lays down on the coach and tells me he has taken an unusual route to come to me today. While walking to my cabinet, he suddenly decided to make a detour through the park, even if this would delay him and even if the darkness that was already falling was not reassuring. “No problem, I will run for once”, he thought and that’s what he did. However, once deep into the trees, he had the impression that a man was following him and so he set up running harder, which caused him to stumble over a tree root. Quickly back on his feet, he “ran for his life” and so arrived at my doorstep. I considered that Paul was setting on stage some message he could not put into words and/or which I failed to hear. His sweaty appearance and the possibly violent-erotic undertone of his adventure suggested the message was indeed probably erotic-violent in nature. While freely associating, Paul spoke about the trees, and the woods. When he was a child and a youth, he adored to spend hours in a nearby wood, he squatted a hut, and it was

even there that he had his first sexual intercourse. All this had a sad, not a conflictual, undertone. Then he mentioned that *Into the woo*ds had long been one of his favorite musicals – "and so it was for my brother", he adds. "Funny", he says, "now that I think of it, my street is called: 'Forest Avenue'." Bingo, now I heard it. "Forest", I repeated, "Forrest…". Forrest was the name of Paul's brother, almost 15 years his elder. Forrest came back to live with his parents, and hence with Paul, after his divorce at 21. He was utterly depressed and the only thing which gave him entertainment was Paul, who then looked up at this elder, accomplished brother, who gave him the attention he missed from his parents. But there was also a darker side to this attention, which only now came to the fore: Forrest was also a vaguely threatening, intrusive presence. Paul now recalls his intrusive glances and his way of looking through the crack of the bathroom door. Hence, Paul was indeed chased by Forrest after all, but it took a signifier-staging for him to express it, and for me to read it – as I would have read a rebus.

Limitations and future perspectives

The most important limitation is that the presented research is not in the culture of psychoanalytic clinicians, who are not accustomed or even sceptic as towards laboratory research. Such research may seem very much artificial, also happening largely out of transfer. However, the different results of these studies do not claim to say anything about a particular person or subject but claim to contribute to an empirical testing of psychoanalytic hypotheses as it comes to the universal laws for the mental architecture. Therefore, our hope is that by showing the outcomes, listener will grow more interest, and even enthusiasm, for this kind of empirical research. Another important limitation is that only very few other colleagues are invested in this type of experimental psychoanalytic research. Therefore, it is up until now difficult to compare the produced outcomes with those of other groups. We have nonetheless cited the different research results the closest to the ones proposed here. We are confident that new generations young scholars will take up this approach and soon there will be a variety of research outcomes to compare ours with.

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