REPRESSIVE BORDER CONTROL BY SENSORIMOTOR INHIBITION AND RETURN OF THE REPRESSED AS PHONEME PHANTOMS

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OBJECTIVE DETECTION TRESHOLD (ODT)

• separate detection task: *did you see something or nothing?*
  stimulus = unconscious WHEN COMPLETE ABSENCE OF CORRELATION between
  – forced-choice responses of participant
  – actual blank-or-stimulus presentations

  ‘is it there (or not)?’ requires
  – no content information
  – distinction between perception and imagination
    • definition of consciousness
    • indications of reality (Freud, 1895) – tags (Shevrin, 1998)

• Freudian indication of reality ≈ modern efference copies
I. INDICATIONS OF REALITY ≈ EFFERENCE COPIES
II. SENSORIMOTOR INHIBITION ≈ REPRESSSION
III. PHANTOMS
IV. DEFENSE DYNAMICS CONSTITUTIVE OF THE MIND
I. INDICATIONS OF REALITY ≈ EFFERENCE COPIES
both the Freudian and the neuroscience tradition draw from the 19th century physiologist Hermann von Helmholtz

I.   VON HELMHOLTZ, 1878

“The impulse to move, which we initiate through the innervation of our motor nerves, is immediately perceptible.”
The Efference Copy Model

- Blakemore, Wolpert & Frith, 2000
- Georgieff & Jeannerod, 1998
- Sperry, 1950
- van Holst, 1954
II. FREUD, 1891-1895

‘direct perception of the impulse to move’.

i. ON APHASIA: feeling of innervation

ii. THE PROJECT: *Abfhur Nachrichte* = indications of reality
« it is probably the \( \omega \) neurons which furnish these indications of reality »

• \( \omega \) neurons are engaged in the constitution of perception
  ➢ « excited along with perception »
  ➢ « behave like organs of perception »

**even if they are motor neurons**

➢ « it must be assumed that the \( \omega \) neurons are originally linked anatomically with the paths of conduction from the various sense organs and that they direct their discharges back to the motor apparatuses belonging to those same sense organs. »

➢ « their discharge direction is efferent, i.e. in the direction of motility»

ex. oculomotor neurons: linked with the sense organ of vision and direct their discharges to the muscles of the eye
"In the case of every external perception a qualitative excitation occurs in ω .... [this] ω excitation leads to ω discharge, and information of this, as of every discharge, reaches Ψ. The information of this discharge from ω is thus the indication of quality or of reality for Ψ.

Abfuhrnachrichte (= efference messages):
⇒ indications of reality ≈ modern efference copies
active apperception gives
efference copy/indication of reality information
to situate the origin of the content
either outside (perception) or inside (imagination)

active apperception ≈ consciousness

both the psychodynamic and the neuroscience framework
(e.g. Obhi et al., 2009) propose that
indications of reality/efference copies
are characteristic for conscious processing
• a wide variety of operations, including complex processing, can occur unconsciously because they only require content information

• 1 ms: long enough to deliver content information but not long enough for active apperception

≈ an experimental approximation of an internal activation

  e.g. mind is wandering: bump upon unconscious conflict material
• **crucial difference:** only actively grasped stimuli are submitted to an inhibition process

  _efference copy-based sensorimotor attenuation_

  – Blakemore et al., 2004: cancel the feeling of predictable effects of movements
  – Heinks-Maldonado et al., 2005; Christoffels et al., 2007: cancel the feeling of predictable articulation

• **Freud, 1895:**

  a maturating ego increasingly acquires the means to inhibit mental processes by use of the indications of reality
II. SENSORIMOTOR INHIBITION ≈ REPRESSION
efference copy-mediated attenuation mechanism ≈ neurophysiological functional principle for repression (Bazan, 2012; Bazan and Snodgrass, 2012)
psychoanalysis on psychosis

fundamental metapsychological difference between a neurotic and a psychotic structure is supposed to be the presence, resp. the (occasional) absence of repression

– De Waelhens (1978, p. 149) and Laplanche and Pontalis (1973) summarize Freud

– Lacan (1955–1956) in psychosis the unconscious is exposed for all the world to see ("a ciel ouvert ")
neuroscience on psychosis

cf. defective corollary discharge model for verbal auditory hallucinations for the voices in psychosis (Frith, 1992; Frith et al., 2000)

neuroscience on psychosis

compromised efference copy-mediated attenuation mechanism thought to explain

• hearing of voices (unattenuated feedback of proper subvocal articulation)
• intrusive feelings
• delusions of passivity
• loose thought associations in psychosis
Failing inhibition in psychosis shows what repression might be at a brain level - what I learned from Hervé

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London, UCL, 8th October 2015
the chain of events which is painful to Hervé

moving people or things in the world

a ‘fizz’ or a ‘popping’ or a ‘pinching feeling’ on his retina (‘short-circuits’)

(the only and direct cause of) an ‘undesirable image’

- a needle in the eye
- my eye swallowed
- a penis through my knife
- my viscera extirpated
- my balls unhooked or melted
- ...

to undo the image: the moving target that first caused the pinch on his retina is asked to un-do the guilty movement

if this doesn’t happen: persecution and accumulation
<table>
<thead>
<tr>
<th><strong>Hervé’s symptoms</strong></th>
<th><strong>Freudian interpretation</strong></th>
<th><strong>sensorimotor interpretation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>pinching feeling in the eye</td>
<td>/</td>
<td>dysfunction of the efference copies of the eye movements</td>
</tr>
<tr>
<td>penetrating perceptions induced by exterior moving stimuli</td>
<td>invalidation of the signs of reality associated to vision resulting in a hallucinatory type perception</td>
<td>dysfunction of the ocular efference copies induces a difficulty to grant a status of exteriority to a perception (Lenay)</td>
</tr>
<tr>
<td>proliferation of ‘undesirable’ thoughts in an associative way</td>
<td>disinhibition and predominance of primary processes</td>
<td>positive somatosensory activation (lack of attenuation): <em>a disinhibition of the identification processes in the ventral pathway?</em></td>
</tr>
<tr>
<td>back-and-forth movement to restore a bearable relationship</td>
<td>/</td>
<td>a reversible unconscious ocular movement constitutive of perception is replaced by a conscious physical movement</td>
</tr>
</tbody>
</table>
psychosis

putting the psychodynamic failure of repression together with the sensorimotor failure of attenuation:

sensorimotor attenuation

constitutive of repression
III. PHANTOMS
REPRESSION IS A SPECIAL INSTANCE OF INHIBITION FOR EMOTIONALLY THREATENING STIMULI

- action or speech fragments invested with more drive arousal pop up more frequently
- in case their execution might be emotionally threatening these require a more structural level of inhibition
sustained inhibition induces mental imagery

• Jeannerod (1994: 201):

  « If the goal [of an action plan] were not reached, the sustained discharge would be interpreted centrally as a pure representational activity and give rise to mental imagery. »
~ limb action phantoms

Ramachandran: phantom limbs
Haemodynamic activation (measured using fMRI) in the brain of E.P., a right-handed stroke patient, while she perceives a supernumerary "ghost' left arm, contrasted with periods when the ghost arm was not present. A single cluster in the right supplementary motor area (SMA) displayed a significant pattern of signal change during the presence of the ghost arm.

**Activation in motor regions of the brain may be sufficient to cause somatic phantom perceptions** like E.P.'s. D. J. McGonigle et al., pp. 1265–1274.
~ phonemic phantoms

« A presentation which is not put into words, or a psychical act which is not hypercathected, remains thereafter in the Ucs.»

(Freud, 1915, The Unconscious, p. 186)
The *structural inhibition* on these emotional fragments will induce:

1. mental imagery with formal characteristics, i.e. *phantoms*
2. spill-over effects
« Nature determines everything. Everything comes from nature. Everything has an effect. (...) Colors have an effect. (...) Metals don’t bend, inox bends. It has effects due to circumstances. A guy and a girl have an effect on each other. This is the meaning of life, the affection, this is perfect. When something is done with effect, it is very well done. The teacher says it is perfect. (...) Everything has an effect. Proteins, all of them, from one to twelve, they have an effect. To eat [in Dutch: Fretten]. Djezus To eat [Fretten]. »
the phantom of Ef

Sisters: Sofie Stefanie Steffie

Patient F.

∑ ‘effect’ ‘fretten’
the Rat phantom in the Ratman (Freud, 1919)

Frau Hofrat

Heiraten

Spielratte

RAT

the rat torment

∑
raten
«Nous portons dans nos voix des fantômes que nous transportons, le plus souvent à notre insu, de génération en génération et qui nous parlent de notre histoire, de notre descendance et de notre identité. La plupart du temps ces fantômes agissent sous couvert. Ils refont surface dans nos rêves, nos lapsus, nos anxiétés et dans nos symptômes. La psychopathologie, c’est la pathologie du fantôme, du signifiant indiscutablement transmis. Tel un bras fantôme ou une jambe fantôme, ce signifiant bien qu’absent est investi. Il est investi d’une pulsion ou d’une intention mais, pareil au membre fantôme, son action véritable, c’est-à-dire son articulation, est bloquée. Or, ce qui n’est pas possible pour un bras ou une jambe, le devient pour une séquence phonologique : on peut refaire le même mouvement exactement — c’est-à-dire réfaire point par point une même articulation — tout en changeant radicalement la signification de cette articulation. C’est là la structure intrinsèquement ambiguë du langage qui permet la survie et donc la transmission du fantôme phonémique, alors que les fantômes des membres finissent par s’étendre. C’est elle qui donne lieu à l’inconscient et à son action par-delà l’entendement conscient qu’on peut en avoir.

Ce sont ces propositions-là sur la structure linguistique de l’inconscient qui sont l’objet de ce livre.» A. B.
IV. DEFENSE DYNAMICS
CONSTITUTIVE OF THE MIND
Repression shares functional principles of efference-copy-mediated attenuation with non-defensive cognitive mechanisms, such as the suppression of activation in order

- to stop unwanted movements (e.g. Mattia et al., 2012)
- to constrain visual, movement or speech perception (resp. Hafed & Krauzlis, 2006; Haggard & Whitford, 2004; Niziolek et al., 2013)
- to consciously suppress unwanted memories (Anderson & Levy, 2009)

Neither alpha synchronization nor efference copy-induced attenuation is constituted of unique functional principles as compared to conscious or cognitive processes.
Instead, DEFENSIVE FUNCTION IS BASED ON DYNAMIC PRINCIPLES:

• the α-hose is used flexibly when needed to consciously inhibit irrelevant and interfering processes, but when it is supposed to subserve unconscious defense, a **permanent state of alertness must be assumed**.

• efference-copy mediated inhibition is used flexibly for the selection of action alternatives, but when it is subserves repression **more permanent attenuation of certain representations must be assumed**.

→ **the same functional principles, when used ad hoc subserve cognitive mechanisms, and when used with a more permanent character subserve psychodynamic mechanisms.**
### Two Brain Mechanisms for Unconscious Defense

<table>
<thead>
<tr>
<th>(PRIMAL?) REPRESSION</th>
<th>REPRESSION (PROPER?)</th>
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<tbody>
<tr>
<td><strong>Brain mechanism</strong></td>
<td>steerable targeted α synchronization pulses</td>
</tr>
<tr>
<td>initiated proximally to</td>
<td>the drive derivatives by any percolating activation of the unconscious conflict</td>
</tr>
<tr>
<td><strong>Locus of agency</strong></td>
<td>Id</td>
</tr>
<tr>
<td>target of defensive act</td>
<td>internal contents (mental wanderings)</td>
</tr>
<tr>
<td>Freud (1926, p. 93): « it exists only in regard to external stimuli, not in regard to internal instinctual demands »</td>
<td></td>
</tr>
<tr>
<td>motive of defensive act</td>
<td>prevent activation of internal conflicts and access of these conflicts to associative and <strong>executive</strong> pathways</td>
</tr>
<tr>
<td>Freud (1926, p. 141): “A repressed instinctual impulse can be activated from two directions: from within, through reinforcement from its internal sources of excitation, and from without, through the perception of an object that it desires.”</td>
<td></td>
</tr>
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<td><strong>(PRIMAL?) REPRESSION</strong></td>
<td><strong>REPRESSION (PROPER?)</strong></td>
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<tr>
<td>---------------------------</td>
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<tr>
<td>identification</td>
<td>not required since only disruption of integration into associative networks</td>
</tr>
<tr>
<td>knoweability</td>
<td><em>not knowable because defended against</em></td>
</tr>
<tr>
<td>return of the</td>
<td>?</td>
</tr>
<tr>
<td>psychosis</td>
<td>only alpha synchronization hand?</td>
</tr>
<tr>
<td>metaphor of mechanism</td>
<td>bazooka a steerable hose ‘weapon’</td>
</tr>
</tbody>
</table>

Freud (1926, p. 96): “In repression the decisive fact is that the ego is an organization and the id is not.”
~ thank you              ariane@ulb.ac.be