

Philosophical Foundations
of
Neuroscience:
on the power of mere words

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am 29.1.2008

overview

I. philosophy and neuroscience

II. mislead language in (neuro-)science

III. importance for experiments

IV. discussion

philosophy and neuroscience

4 accusations against philosophy by neuroscientists:

- simply irrelevant to the concerns of neuroscience
´...consciousness is a scientific problem´ (Crick)
- a priori methods worthless:
´one of the temptations of having a mind is to try to use it alone to solve the mystery of its own nature´ (Edelman)
- does not deliver scientific hypotheses
- ´poverty of results in terms of understanding our brains and their mental constitution´ (Zeki)

? **these accusations result from unclarities about the relationship between neuroscience and philosophy (Bennett/Hacker)**

domains and tasks

analytical philosophy

matters of meaning

sense and nonsense

logical clarification;
identify transgressions of
the bounds of sense in:

- formulation of problems
- proposing of solutions

(neuro-)science

matters of facts

empirical truth or falsehood

devise and confirm ever
more powerful *theories*

→ philosophical and neuroscientific investigations are *complementary*

* example: consciousness

philosophy: elucidate defining features (a priori nature),
concept of consciousness, connections with
adjacent concepts (attention, perception, thoughts..)

- esp. : dissolve conceptual confusions (‘redness of red’)

- neuroscience: investigate empirical nature of consciousness,
neural conditions

- *presupposes concept of consciousness as given!*

methods: language and the connective analysis in philosophy

- how can philosophers investigate the logical character of a concept and of its connections with adjacent concepts?
 - logico - grammatical analysis of the use of words associated with the concept(s)
- * this is not just nitpicking, because facts can be stated only by the use of words and (most of) our thinking depends on verbalization
- the network of concepts is exhibited in the web of words;

conceptual puzzlement often results from mislead use of language (´tangles in the web of words´)

methods: language and the connective analysis in philosophy

connective analysis:

tracing the logico - grammatical web of connections between the problematic concept and adjacent ones

- dissolving conceptual puzzlement by careful examination and description of the use of words
- insights in logical character of the concepts by logico- grammatical investigation of the use of language

II. mislead language in (neuro-)science

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mislead language in (neuro-)science / biology

´less severe cases´ (simply harmless nonsense)

biological vs. biotic

´the biological activity of bacteria is immense´

´severe cases´ (misleading)

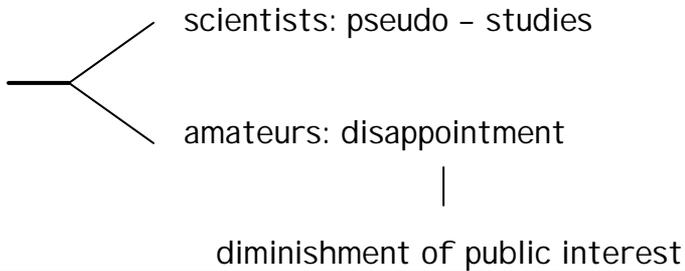
´firepatterns in V1 represent the object seen by the brain´

- no representation, just inductively correlated indication
- brain neither able to see nor blind; neuronal activity in the brain necessary accompaniment of the event ´the person sees something´

mislead language is misleading language : consequences

mislead use of words → pseudo - understanding

pseudo - understanding → pseudo - questions
(per se not answerable!)



example: evolution

mislead use of words → pseudo - understanding

Evolution invented this camouflage- coloration to protect the species from predators.

Evolution *invents* biotic characteristics to *protect* (*certain ?*) species

→ pseudo - questions
(per se not answerable!)

* how does evolution... decide which species to privilege, identify it's predators, know what to change for protection, cognize success of it's invention

example: Zeki's confusions of the concept of 'color' .

- in general: secondary qualities of (material) objects
 - * Zeki: 'objects have no colors'
- implies that all objects are *colorless, not visible* (like transparent, colorless window panes)
- rather, it is *meaningless* to ascribe colors to material objects – they *could not* be colored (logically impossible)
- * Zeki: 'colors are properties of the brain'
 - well, THE BRAIN is white to grey in color
- most material objects appear to us to have a color due to the functioning of our brains

counter-arguments of neuroscientists .

- *Everybody knows exactly what is meant !*
 - * amateurs and beginners don't know and get misled
- *Problematic expressions are used in a special sense, as homonyms, analogical extensions of the customary use or in a metaphorical or figurative sense.*
 - * most often they're not:
 - final authority in judging the words' sense are the inferences / conclusions drawn by neuroscientists based on the way of using expressions they use

* Crick: 'what you see is not what is really there; it is what your brain believes is there'

→ 'believe' used in normal sense,

as Crick regards the brain's belief as the outcome of an *interpretation* based on previous *experience* and *information* (each of these used in common sense)

- 'information' is used in a semantic sense – but in this sense, it is a sequence of true statements, which cannot be found in a brain

* Young: 'maps' in the brain

- if Young means that certain features of the visual field can be mapped on to the firings of groups of cells in the 'visual' striate cortex, it would be misleading but innocuous to speak of maps

- but: Young goes on and says that the brain makes use of its maps in formulating hypotheses about what is visible

→ common use, not metaphorical

* Frisby: 'symbolic representations' in the brain

- innocuous assumption, if 'symbolic' signifies only 'natural meaning' and not 'semantic meaning'

- Frisby: 'symbolic description in the brain of the outside world, a description cast in symbols which stand for the various aspects of the world'

→ obviously semantic use of 'symbol'

'symbolic representations': the 'fire and smoke' analogy

'smoke means fire':

smoke is a sign **of** fire (inductively correlated indication),
not a sign **for** fire

→ the firings of cells in V1 may be signs of a figure with certain line orientations in the animal's visual field, but they do not *stand for* anything, are not symbols and do not describe anything

III. importance for experiments

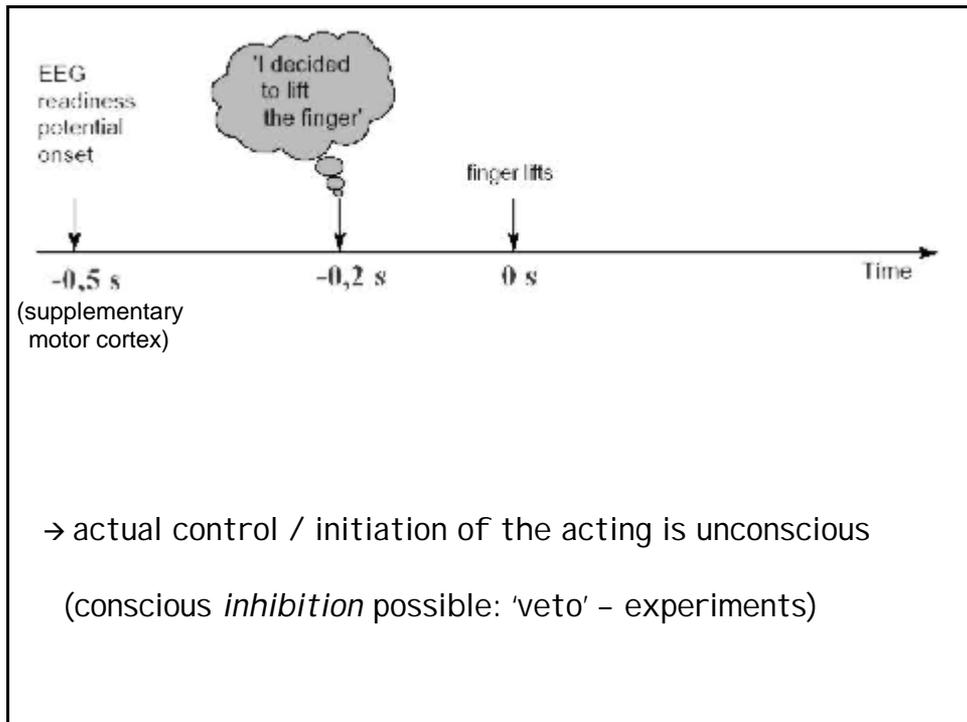
example: 'the' Libet - experiment (1983)

Libet et al. (1983): Time of conscious intention to act in relation to onset of cerebral activity (readiness potential): the unconscious initiation of a freely voluntary act. *Brain* 106, 623–642.

task:

- push button spontaneously
- keep in mind point of time of 'conscious drive' to push (clock)

* EEG: recording of motor readiness- potential



criticism:

- * scientific:
 - dating: averaging – errors ('smearing')
 - real decision? (alternatives?)
 - unclear instruction ('urge' to push)
- * philosophical:
 - misconception of voluntary movements
 - acting in response to a felt urge is NOT voluntary
 - voluntarily *not to act* is not to feel an urge not to act
 - feelings of volition are neither necessary nor sufficient for voluntary actions

consequences of these logico- grammatical reflections

→ not necessarily to affect the next experiment,
but to understand the last experiment !

- some experiments should be abandoned

(Libet - voluntary action)

- some should be redesigned

(mental imagery)

- some questions underlying experiments
should be rephrased

- some results might need to be described
in different ways

IV. Discussion

* personal experience:

- these fallacies and mistakes are common (every neuro-scientific book I read so far)
- saying it precisely and correctly makes things complicated (translations!), constantly reflecting your own language use may handicap participating in discussions
- colleagues usually don't take you seriously

* What do you think?