

Mental states
and their transformation by mindfulness

Better: Mind/body-states

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- I. Characteristics and operationalization of mindfulness 5p
- II. Mindfulness based intervention versus vipassana 2p
- III. Towards a model of mental development 5p

Summary

References

Methodology: the scientific one, open to criticism & revision

Origin: some vipassana experience, ratio, and previous knowledge

reductionistic & wholistic

matter & consciousness

I.1 Characteristics and operationalization of mindfulness

What is the importance of a characterization and operationalization?

- Preservation How will it be taught in 2100, 2200?
 - Investigation How can we understand better the mind-body?
 - Developing How can one improve the style of teaching?
- * Being engaged (with **urgency**)

Questions

- (i) What is the scope of the term 'mindful'? **state? trait?**
- (ii) How is it defined? **intentional? open monitoring?
emotional regulation? ethical component?
by or for insight meditation? with compassion?**
- (iii) How is it operationalized? **questionnaires? behavioural effects?
neurophysiological signature??**

Proposed answers inspired by vipassana, the Abhidhamma, and science
(Abhidhamma: Buddhist psychology)

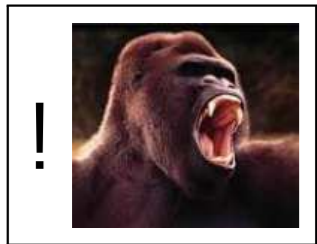
I.2 As to (i) Scope of definition of mindfulness

Example 1. The notion 'prime' has as scope numbers, not people
Primes 2, 3, 5, 7, 11, 13, 17, ...; non-primes 1, 4, 6, 8, 9, 10, ...

Example 2. The notion 'happy' has as scope people, not numbers

What is the scope of 'mindful'?

According to the Abhidhamma, experience and neuroscience models
consciousness consists of fast snapshots with content & state (*cetas*)



ceta with content 'gorilla-view'
and (mind/body) state 'fear'

the state in each ceta consists of a mixture of sub-states called (*cetasikas*)

Scope: Mindfulness is a particular (momentary) sub-state

that may be extended (for example with strengthened concentration)

having regulatory effects on emotions

I.3 As to (ii) Definition of mindfulness

Mindfulness during a ceta

- Attention
- on present phenomena (not on thoughts)
- or on predecessor state (100 ms) (according to some vipassana teachers)
- non-judgmental (equanimously)
- * with intention? (fine for purposes of practice; later effortless)

vitakka: initial directing of mind to object

vicāra: sustained directing of mind to object

there can be *vicāra* without *vitakka*: 2nd jhana (absorption)

- with mildness? (yes, even *adosa*: [anti-hatred](#) [U Ñāṇdamala])

neutralizes poison in predecessor state

- * with compassion? (no; but it helps to have the right tendencies)

compassion is there when object is a human being

should not always be there: otherwise one can't observe emptiness mindfully

- * with open monitoring? (no: is an application, Chiesa [2012])
- with an ethical component? (yes: [moral shame](#), [moral fear](#))
- with meta-awareness, 'recollecting'

I.4 Abhidhamma table of 52 cetasikas (sub-states) relevant for path

	unwholesome	variable	beautiful (wholesome)	#
universals	restlessness delusion shamelessness fearlessness (all 4)	contact volition <i>feeling</i> [(un)pleasant] concentration perception attention ... (total 7)	mindfulness equanimity anti-hatred anti-greed moral shame moral fear flexibility ... (total 19)	30
occasionals	greed hatred conceit jealousy stinginess remorse doubt (total 10)	energy joy vitakka vicāra (total 6)	compassion wisdom shared joy right speech right action right livelihood (all 6)	22
#	14	13	25	52

! Wholesome and pleasant
are not the same class
nor complementary
but overlapping

	PLEASANT	unpleasant
wholesome	LOVING-KINDNESS	deconditioning
unwholesome	CRAVING	hating

I.5 As to (iii) Operationalization of mindfulness

Questionnaires are a weak tool to assess mindfulness (Grossman [2011], Chiesa [2012])

Trained mindfulness has important concomitants:

attention, equanimity, flexibility, recollectedness: these can be assessed

Jha, Slagter, van den Hurk, Pagnoni, van Vught showed improvements

But these measure the effects of mindfulness, not mindfulness itself

Meta-awareness has been operationalized by Whitmarsh
(PhD to be defended in August 2013)

Attention to L/R hand \Rightarrow contralateral \downarrow α -EEG

Ability to correctly attend L/R provides **measure for attention**

Asking at random moments how well the attention was directed

enables **comparison between reported vs observed degree of attention**

This **provides measure of meta-awareness**, ie the core of mindfulness

Long-term meditators significantly better than novices or naive subjects

II.1 Mindfulness intervention vs vipassana

Mindfulness interventions are inspired by insight (vipassana) meditation

All living organisms are conditioned

usually enhances survival

sometimes impedes survival: over-conditioning

Domesticating (deconditioning)

dysfunctional states mindfulness interventions

functional states vipassana meditation

domestication being flexible to exit (and to enter) the state

dysfunctional state e.g. being in depression

functional state e.g. liking one's job

holding to Ego: as agency and continuity

For both one needs *discipline, concentration, insight*

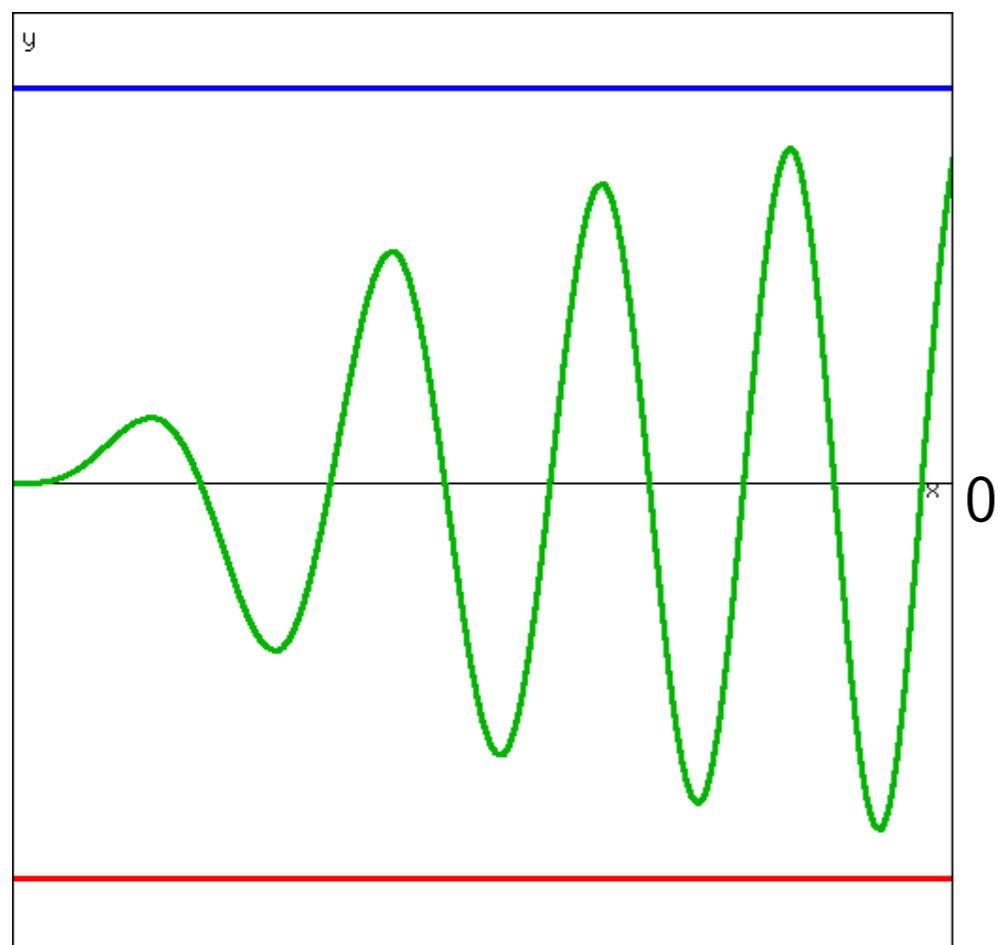
meditation	{	concentration	↑ wholesome states	temporarily
		insight	↓ unwholesome states	may be permanently

II.2 Neither MBI nor the path are techniques

These wise words mean: it is not like swallowing a pill

One needs the right view and right intention

Washingmachine model of mental development:



high point of feeling (**sublime**)

pleasant feeling

unpleasant feeling

low point of feeling (**suffering**)

→ time

mindfulness works, but then gets 'hijacked by ego', needs to be re-adjusted

One may get stuck at  by **rapture**, defilement of vipassana

At the other end  can be very unpleasant: the 3 characteristics of consciousness

insight shows it is *fluctuating*, *uncontrollable*, ~~*unbearable*~~ $\xrightarrow[\text{upekkha}]{\text{acceptance}}$ *peaceful*
anicca *anatta* *dukkha* *nibbana*

III.1 Towards a model of mental development: goal

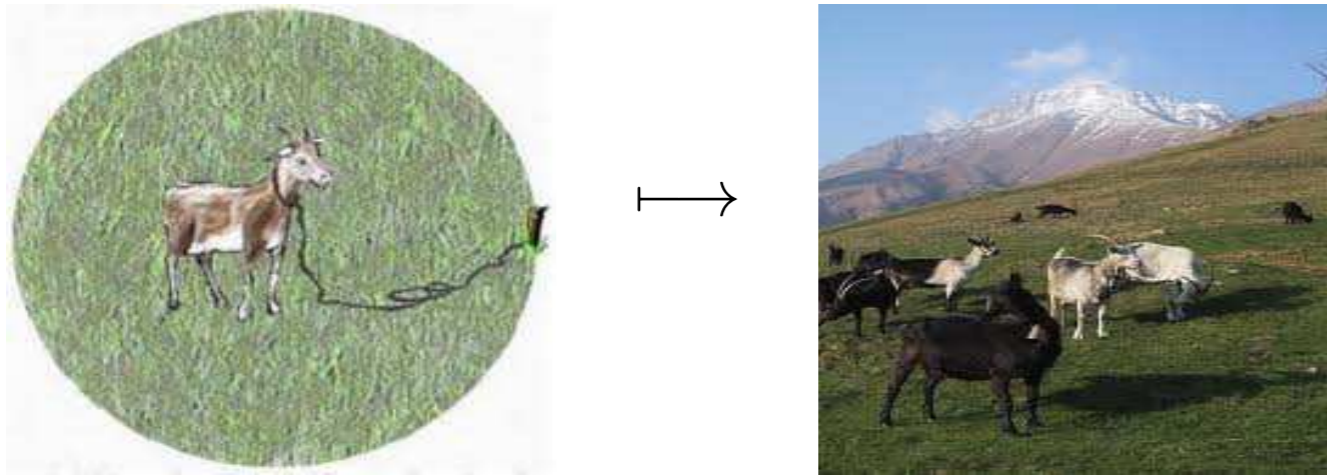
Giving various degrees of freedom within our preconditioned world:

Suppose a goat is attached with a rope to a pole

then it can walk and eat only in a circle

If the goats bites through the rope

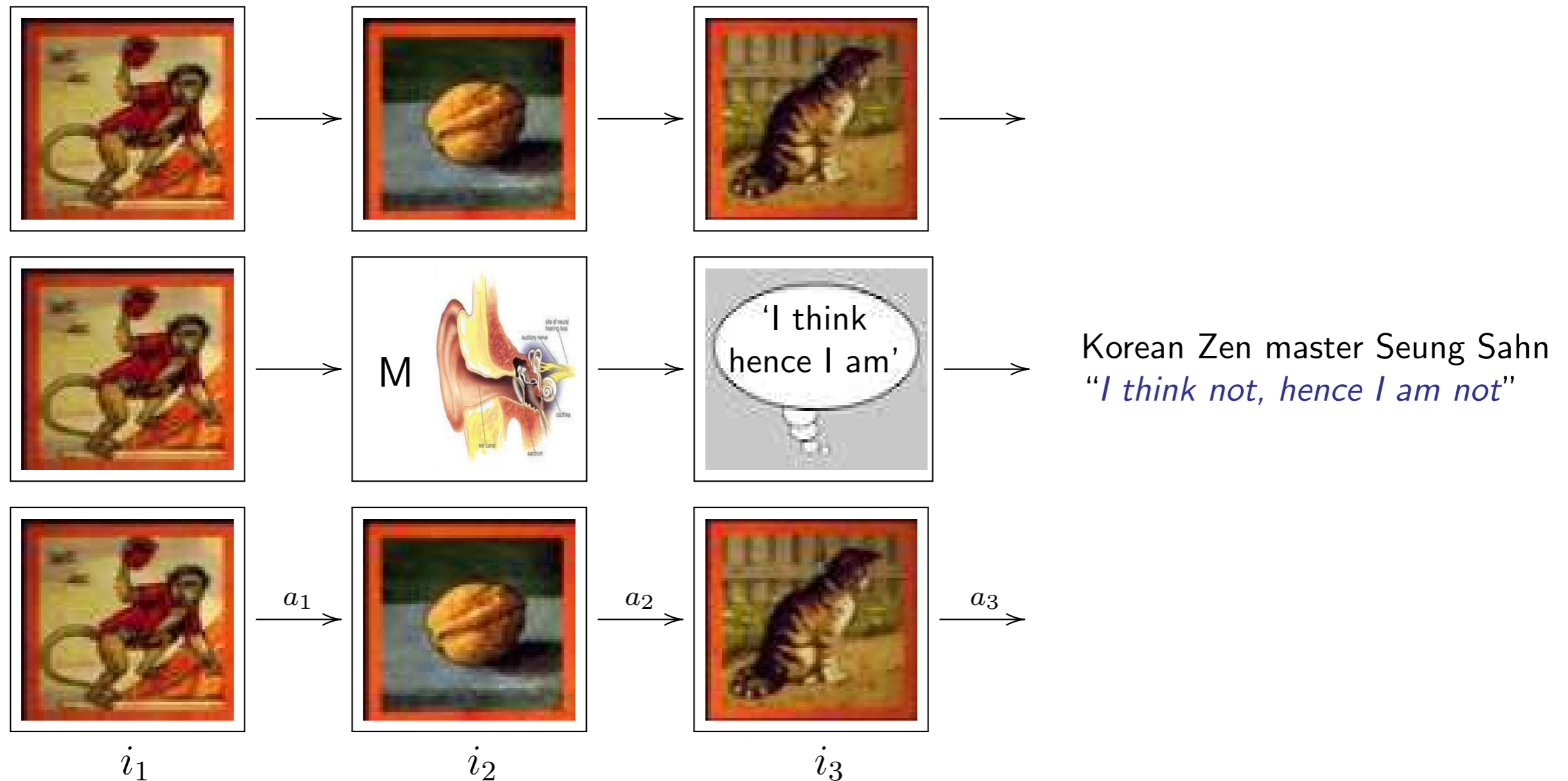
freedom is obtained (still determined to eat fresh grass)



This process will be viewed via the stream of states

with due attention to the nature of the rope

III.2 Mental development: stream of consciousness



i : input, a : action

Too much restricted (stimulus-response of behaviorism)
in this way the same input results in the same action

III.4 Aspects and implementation of states

A state has three aspects

- state {
1 phenomenological
2 neurophysiological
3 behavioural

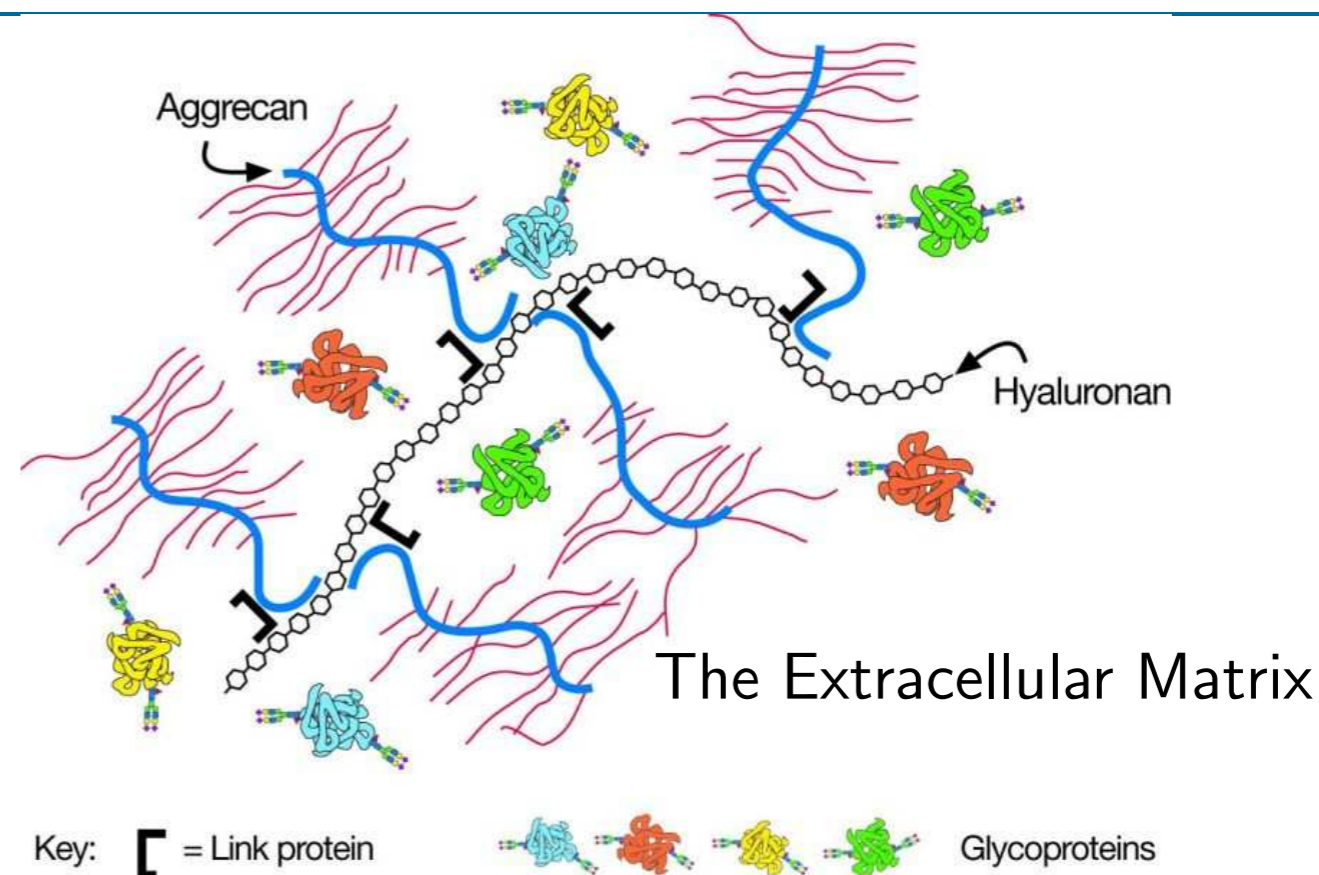
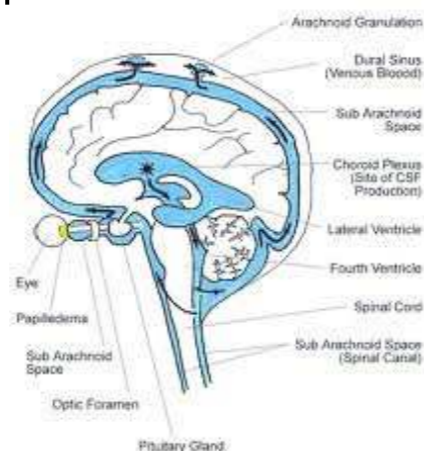
Possible functioning of states

Aspect 1. Acquired memory associations

Aspect 2. • Sustained neural activity (eg frontal-lobe-amygdala Salzman-Fusi [2010])

- Volume transmission

ventricle system



Fuxe-Agnati [2000]

(through extracellular space)

Veening-Barendregt [2010]

(through cerebrospinal-fluid)

Fuxe-Agnati [2009]

(exploiting extracellular tortuosity forming the extracellular matrix with barriers, see above)

Aspect 3. How does mindfulness modify behavior?

Hypothesis. Observing 'action code' just before it is executed

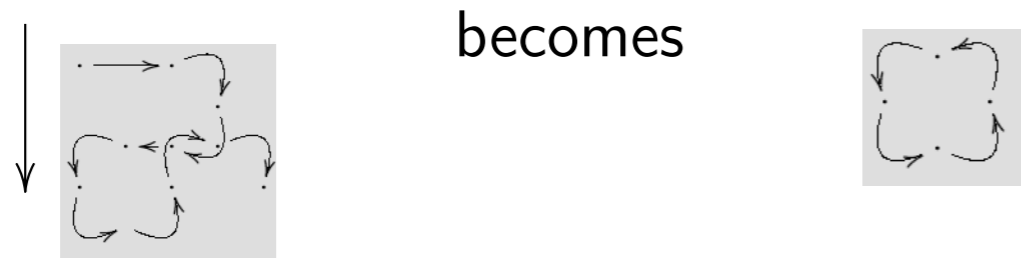
(can be overruled as in a universal Turing Machine see Zylberberg-Dehaene et al [2011], Barendregt-Raffone [2013])

III.5 Determined & free; chained or liberated

Domestication of (dys)functional states through mindfulness training/meditation

How? Needed: discipline, concentration, insight

- sensory restriction
- mental restriction: attention on e.g. breathing
- restrict action: sit still
- the (i, s, a) -chain becomes an (s) -chain



- observe reduced stream of states with continued mindfulness
- insight in vicious circles of states: stepping out (deconditioning)

Observing the same position several times, we stop (think of chess)

The attachment is caused by not recognizing that
consciousness is determined and fluctuating

Realizing it is in flux and deterministic brings relief: no more pretending

“Be an original: smoke ...”: a mean cigarette advertisement

abuses the desire to be original; they sell an illusion

Summary

Proposals have been made for

- defining and operationalizing *mindfulness*

measure: correlation reported and measured ($\downarrow \alpha$ EEG) attention-quality

- differentiating *mindfulness interventions* and *insight meditation*

domestication of dysfunctional / functional states

- modeling purification: *domestication of states*

projecting (i,s,a)-space onto (s)-space; letting go

Proposals for future

- reinvestigating mindfulness interventions and insight meditation
- finding neurocorrelates of mindfulness without need of reporting
- inviting researchers to insight meditation (retreats)
- compare MBI's with other interventions & vipassana

THE END

Musique Traditionnelle du Japon 2':56"
Kofu Kikusui: kikubue, Disque Vogue

References

- Agnati, Fuxe [2000]. [Volume transmission as a key feature of information handling in the central nervous system possible new interpretative value of the Turing's B-type machine](#), in Agnati et al (eds) *Volume transmission revisited*, Progress in Brain Research, Volume 125, Elsevier, 3-19.
- Barendregt, Raffone [2013]. [Conscious cognition as a discrete, deterministic, and universal Turing machine process](#). Alan Turing - His Work and Impact. Eds. Cooper and van Leeuwen, Elsevier.
- Chiesa [2012]. [The Difficulty of Defining Mindfulness: Current Thought and Critical Issues](#), *Mindfulness*, DOI: 10.1007/s12671-012-0123-4.
- van den Hurk [2011]. [On the practice of mindfulness meditation and associated changes in cognition, affect and personality](#) PhD thesis, Radboud University.
- Fuxe Agnati [2009]. [Cell Cell Communication Through the Extracellular Space](#), *Encyclopedia of Neuroscience*, vol 2, Elsevier, 655-664.
- Grabovac, Lau, Willett [2011]. [Mechanisms of Mindfulness: A Buddhist Psychological Model](#), *Mindfulness*, 154-166.
- Grossman [2011]. [Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's \(re\)invention of mindfulness: Comment on Brown et al.](#) *Psychological Assessment*, 23, 1034-1040.
- Salzman, Fusi [2010]. [Emotion, Cognition, and Mental State Representation in Amygdala and Prefrontal Cortex](#). *Annu. Rev. Neurosci.* (33), 173-202.
- Veening, Barendregt [2010]. [The regulation of brain states by neuroactive substances distributed via the cerebrospinal fluid. A review.](#) *Cerebrospinal Fluid Research*. 7(1).
- Whithmarsh [2013]. [Un-wobbling: non-reactivity and metacognition in mindfulness](#), PhD thesis, Radboud University.
- Zylberberg, Dehaene, Roelfsema, Sigman [2011]. [The human Turing machine: a neural framework for mental programs](#). *Trends in Cognitive Sciences*, 2011, 15(7), 293-300.