

# The Cover-Up Model of the Mind

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Neurophysiological foundations of (insight) meditation

Neurophysiology inspired by insight meditation

1. Methodology
2. Insight<sup>1</sup> (vipassana) meditation
3. The cover-up model
4. Neurophysiological hypotheses and evidence
5. Psychological hypotheses

<sup>1</sup> As taught in the Theravada Buddhist Tradition in Myanmar, Thailand and Sri Lanka

# 1. Methodology

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Introspection as a tool for psychology (Wundt 1879) was not successful

- Interferes with the mind
  - Not objective
- ⇒ only study behaviour

**Trained** introspection may be an inspiration for neurophysiology

## Arguments

1. Mathematics is based on [trained] introspection (Husserl, Gödel)
2. The controversy about color perception (“Newton vs Goethe”)

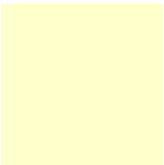
Physicists: colors are 1D, can be described by one number

Phenomenologists: colors are 3D

Goethe did interesting experiments with perception

# Colors I

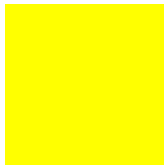
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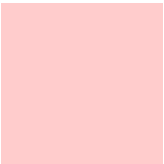


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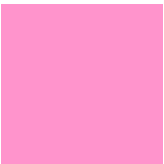
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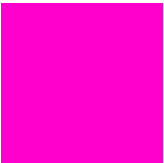
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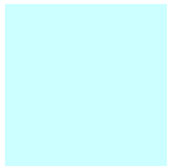
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# Colors II

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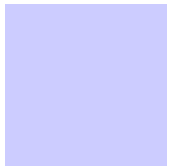
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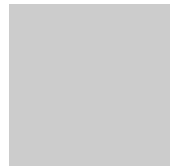
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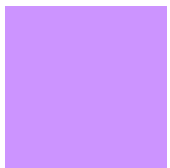
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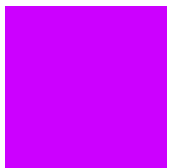
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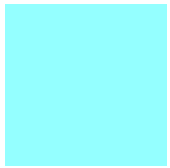
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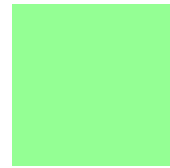
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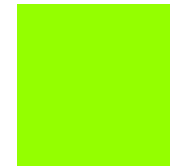
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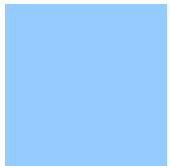
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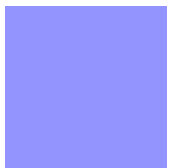
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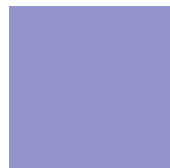
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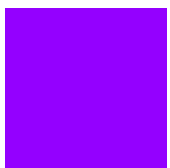
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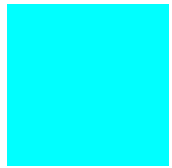
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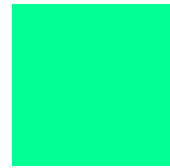
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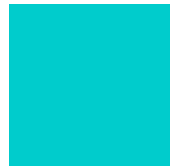
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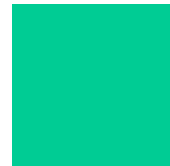
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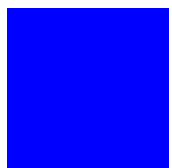
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# The color controversy resolved (Young and Helmholtz)

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The retina has rods and cones for vision

- rods for black and white vision
- cones for colorvision

There are **three** kinds of cone-cells (b-, g-, r-type)

The sensitivity for the wavelength is different

**One** wave-length creates a **triplet** of reactions in these three cells

This was later confirmed and gave rise to a multi- $10^9$ \$ industry

Moral for neurophysiology:

**Both phenomenology and science are important and should interact**



## 2. Insight meditation

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Our capacity of concentration, mindfulness can be **trained**

discipline  $\mapsto$  concentration  $\mapsto$  mindfulness/insight

Buddhagosa ( $\pm$  430 A.D.): *The path of purification* (888 pp.)

- |            |                     |
|------------|---------------------|
| ch. 1-2    | Discipline          |
| chs. 3-12  | Concentration       |
| chs. 13-23 | Insight and its use |

Insight is non-rational but **direct**

- Well-known in mathematical practise
- Also known in daily life:
  - learning to ride a bike
  - making a turn one has to bend over

## 2.1 Discipline, concentration & mindfulness

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Concentrate on observing breathing (meditation object)

If mind wanders, then come back to meditation object

If feelings, thoughts or conditionings are strong,  
then switch to them as meditation object

Right mindfulness: attention with distance

*If there is pain,  
do not consider yourself as someone that has pain,  
but as someone that sees pain*

This should be practised all the time (one uses qualia)

A process of non-interfering observation, disidentification

(Husserl: *epoche*; Varela: *bracketing*; *meta-consciousness*)

*'O, there is pain', 'O, there is sadness'*

## 2.2 Mystical experiences

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Strong pain without minding it

Also beyond desire

Strong concentration

Effortless mindfulness

Rapture & bliss

*Atman = Brahman*

Teacher: *Also dis-identify from mystical experiences*

Student: *May we not enjoy these for some moments?*

Teacher: *It is a waste of time!*

- One does not see everything
- One becomes dependent on the concentration

## 2.3 Three characteristics

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After diligent practise the meditator comes to see

*the three fundamental characteristics*

non-permanence	chaos, flux
suffering	nausea, unbearable
non-self	beyond control

In daily life seeing the 3 is avoided at all costs

It may be the cause of **war**, of **inhumane acts**

Emergency exit: strong feeling (**anxiety, depression, desire**)

Proper exit: development of more mindfulness

Continued practise: development of **Equanimity, Calm, Bliss**

this in the proximity of the three characteristics

## 2.4 Surrender

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Mindfulness is of non-interfering nature: just observing

The only interference allowed is changing the object of meditation

The meditator surrenders

When time is ripe, mindfulness becomes automatic and the three characteristics disappear

This to a certain degree:  
the purification work has to be repeated 3 more times

One becomes respectively

Streamwinner	free from <b>insecurity, belief in self</b>
Once returner	dilution of fear and desire
Non-returner	free from <b>fear</b> and <b>desire</b>
Arhat (end of the work)	free from <b>pride, sleepiness, restlessness, attachment to existence, ignorance</b>

### 3. The model

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**Axiom 1.** In our potential consciousness there is a process with 3 characteristics:

non-permanence	chaos, flux
suffering	nausea, unbearable
non-self	beyond control

**Axiom 2.** Usually the process is hidden and even unknown (ignorance)

At any price the process is covered up by feelings and thoughts

Addiction to these feelings and thoughts and corresponding behavior

**Axiom 3.** There is a proper medicine:

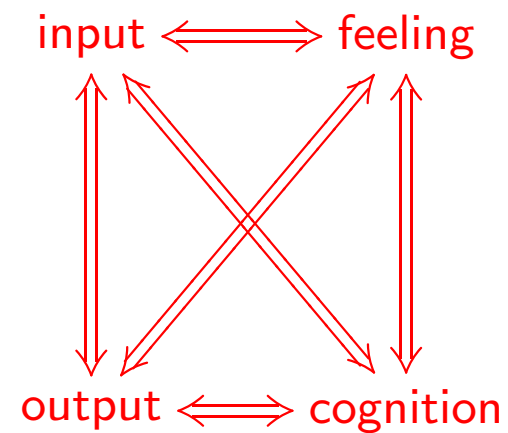
the development of mindfulness that purifies the process

## 3.1 The foundations of mindfulness

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Active contents of consciousness

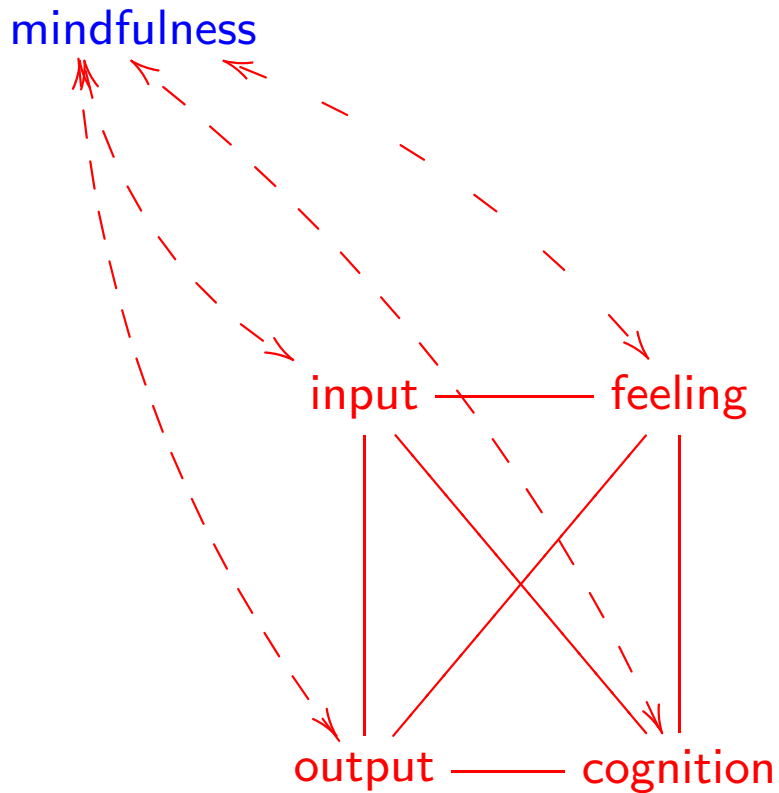
↳ *Conditioning*



## 3.2 Power of mindfulness

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↳ less conditioning  
Mindfulness is non-active

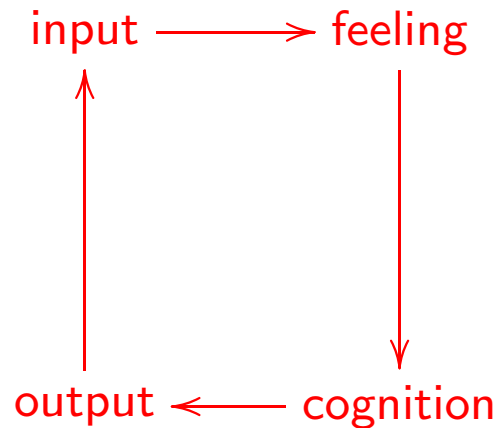


Mindfulness acts as 'chemical analyzer'



### 3.3 Dependent origination (conditioning)

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'Karma'

#### Hypothesis

One act of mindfulness per cycle:	streamwinner
Two acts of mindfulness per cycle:	once returner
Three acts of mindfulness per cycle:	non-returner
Four acts of mindfulness per cycle:	arhat

## 4. Neurophysiological hypotheses and evidence

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1. The *powerbrain*<sup>1</sup> causes the process (3 characteristics).
2. *Volume transmission*<sup>2</sup> of neuromessengers causes the cover-up.
3. EEG synchronisation (high  $\gamma$ -band) causes the purification.

<sup>1</sup> Cognition is coded as a synchronously firing subset of our neurons (von der Malsburg). Observing the action of the underlying operating system is the process.

<sup>2</sup> Next to synaptic transmission (like a telephone relais), there is volume transmission (like a radio broadcast).

## 4.1 The operating system of the mind: the powerbrain

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A data processing unit needs an operating system

The letter 'A' is caused by dancing electrons within this box

von der Malburg hypothesized that our thoughts are represented by a **set** of simultaneously firing neurons

Each such set gives rise to the next set or to feelings and behaviour

This transition may be the process with its three characteristics

## 4.2 The cover-up

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During the 'mystical' states one is beyond suffering

It still is there, but does no longer matter

Opioids in the ventricle have a similar effect

Hypothesis: the cover-up works via volume transmission

Cellular research: many liquor contacting neurons contain

- met-enkephalin      Positive/Neutral feelings
- $\beta$ -endorphin
- 1,2-endomorphin
- urocortin              Negative feelings
- CRH

This happens just streamupwards from the aquaduct

## 4.3 Purification

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Uttering the word 'snob' to someone is insulting

Right now I did not insult anyone: the word was frozen, not uttered

The right mindfulness has the same freezing (bracketing) effect

Ordinary consciousness is no longer part of it

Hypothesis:

consciousness	$\Leftrightarrow$	$\gamma$ -synchronisation	(... Crick ...)
$\updownarrow$ consciousness	$\Leftrightarrow$	$\updownarrow$ $\gamma$ -synchronisation	(Lutz)
mindfulness	$\Leftrightarrow$	$\uparrow$ consciousness	(phenomenology)

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mindfulness  $\Leftrightarrow$  high  $\gamma$ -synchronisation in EEG

## 5. Psychological Hypotheses

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**Axiom 1.** Our consciousness is discrete, consisting of atomic acts of consciousness with a beginning middle and end

Not like one pictureframe of a movie (inspired by Blackmore)

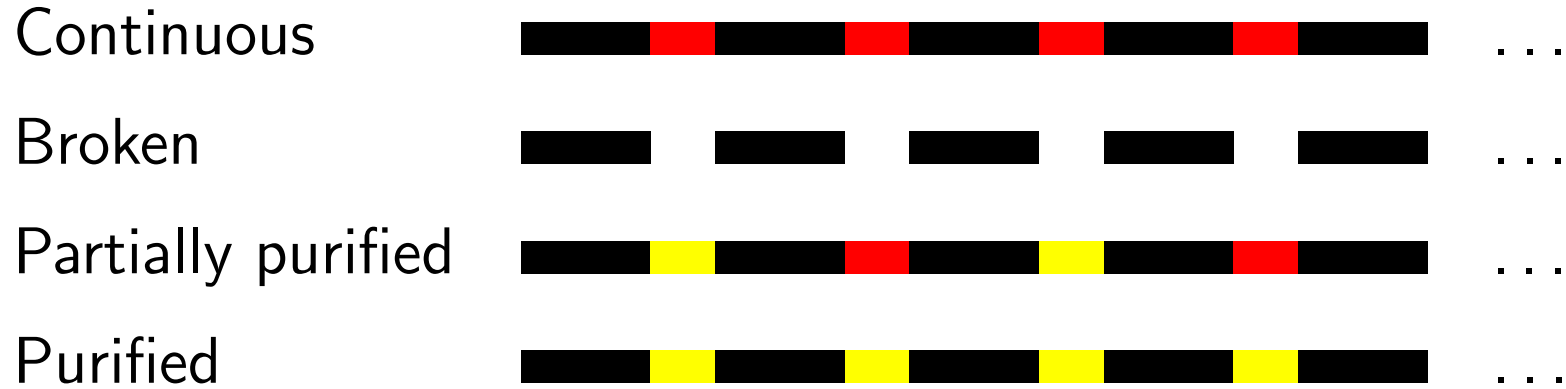
**Axiom 2.** To create a continuous consciousness we need 'glue'  
This makes us addicted to our ideas and behaviour

**Axiom 3.** Mindfulness can replace the glue and sets us free

## 5.1 Spiritual development

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### Forms of consciousness



 feeling

 mindfulness

## 5.2 Spiritual crisis vs dissociation

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Broken consciousness in vipassana similar to that in psychopathology?

Buddhagosa (430 AD): *Path of Purification*

*... impermanence does not become appparent because it is concealed by continuity. The characteristic of suffering does not become apparent because it is concealed by the postures*

*... when continuity [of consciousness] gets disrupted by discerning- because raise and fall [breathing meditation], impermanence becomes apparent in its true nature. When the postures are exposed, ... the characteristic of pain becomes apparent in its true nature.*

Broken      

Shortened    

Lehmann describes the second pattern in psychopathology





## 5.4 Types of consciousness (speculative)

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in love            ...

mystical            ...

depressed            ...

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pleasant            ...

neutral            ...

unpleasant            ...

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advanced            ...

meditator            ...

burn-out            ...

 pleasant  
 neutral  
 unpleasant      } more dimensional cover-up

# Conclusion

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## Main message

- Consciousness is discrete, consisting of meaningless fluxes
- The mechanism that builds continuous consciousness is addictive
- There is a way out, by developing mindfulness
- capable to take over

Now the floor is to the neurophysiologists