

The Abhidhamma Model  $AM_{0.1}$  of consciousness  
a Turing Machine with Bodhicitta

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# Overview

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## Goal

- I Methodology
  - II Meditation
  - III Models of the mind
  - IV Consequences: neuroses & psychoses & addiction
  - V Quest for evidence
- Encore: artist's impression

## Goal: program of James, Wundt, Varela, ...

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Trained introspection  $\mapsto$  research in psychology & neuroscience

Introspection tools

*mindfulness* from insight meditation (*vipassana*)  
based on developed *high concentration*

Psychology fundamental models of mind

- cover-up model (my own)
  - abhidhamma model (tradition)
- } ultimate motivation

Neuroscience verification & implementation of second model  
to be done (will take 10-100 years)

## I.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  
Watson, Skinner

Trained introspection may be an inspiration for neurophysiology

### Arguments

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

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

Phenomenologists: colors are 3D

Goethe did interesting experiments with perception

## II.1 Meditation

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Consciousness: content & state

Daily life: optimize contents

Meditation: optimize states

There are wholesome, unwholesome and neutral states

Meditation forms

Concentration meditation: obtaining wholesome states

Insight (*vipassana*) meditation: avoiding unwholesome states

Enlightenment: eliminating unwholesome states

## II.2 Discipline, concentration & insight

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

discipline  $\mapsto$  concentration  $\mapsto$  insight

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

chs. 1-2      Discipline

chs. 3-12    Concentration and its cultivation

chs. 13-23   Insight and its use

Basic exercises:

sitting      observing breathing

walking     observing foortsteps

## II.3 Mental development

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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*; Teasdale: *meta-awareness*)

*'O, there is pain', 'O, there is sadness'* Later language-less

## II.4 Defilement by 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



## II.5 The 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

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

## II.6 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</b> , <b>belief in self</b> , <b>superstition</b>
Once returner	dilution of fear and desire
Non-returner	free from <b>fear</b> and <b>desire</b>
Arahant (work finished)	free from <b>pride</b> , <b>sleepiness</b> , <b>restlessness</b> , <b>attachment to existence</b> , <b>ignorance</b>
Buddhahood	Increase <b>metta</b> , <b>karuna</b> , <b>mudita</b> and <b>upekkha</b>

## II Summary

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- Discipline, concentration and insight can be developed in parallel, using mainly concentration, effort and mindfulness

(First at conceptual level, later at absolute level)

- Mystical experiences are not providing freedom
- Developed insight with surrendering does provide freedom

### III Fundamental Models of the Mind

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Cover-up model	based on own meditation experience ('80-'86) modern version of 4 noble truths
Abhidhamma model	from canonical Theravada texts (ca 250 BC) based on deeper meditation; theoretically satisfactory but daring
Abhidharma model	from Mahayana texts (Asanga, ca 350 AD) inter human relations latent consciousness Buddha nature

## IIIa.1 Cover-up model of the mind (modern version of 4 noble truths)

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1. Process of **3 fundamental characteristics** in human consciousness:

impermanence	mental storm	chaos
suffering	'nausea'	Angst
non-self	beyond control	dissociation

2. Usually the *process* of the three characteristics is 'covered-up'  
symptomatic; process remains quite influential; the very cause of war

3. Second characteristic can be removed (purification)

As to 1. Can be the cause of inhuman behaviour: crime and war

As to 2. Feelings (hatred, greed) and thoughts cover-up the process

As to 3. Purification by developing *concentration* and *mindfulness*

Spectrum (according to degree of covering-up the process)

mystical state ————— desire/fear ————— 'nausea'  
daily life

## IIIa.2 Quotes

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### The essential characteristic of existing

Drug User	<i>infinite turbulence, lightning for microbes</i> (Michaux)
Patient	<i>as if I'm a computer going out of hand; alive but non-existent</i>
Existentialist	<i>nausea</i> (Sartre), <i>das Grosse</i> (Rilke)
Mystic	<i>dark night of the soul</i> (St. John of the Cross); <i>the abyss of the mind</i>
Meditator	<i>worse than dying; utter desperation</i>
Abhidhamma	<i>impermanent, suffering, selfless</i>

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Sensual world    *luxe, calme, volupté* (Baudelaire)

impermanent	(chaos)	vs	calme
suffering	(unbareable)	vs	volupté
selfless	(no control)	vs	luxe

## IIIb.1 The Abhidhamma model AM<sub>0</sub>

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Main thesis in physics (Feynman):

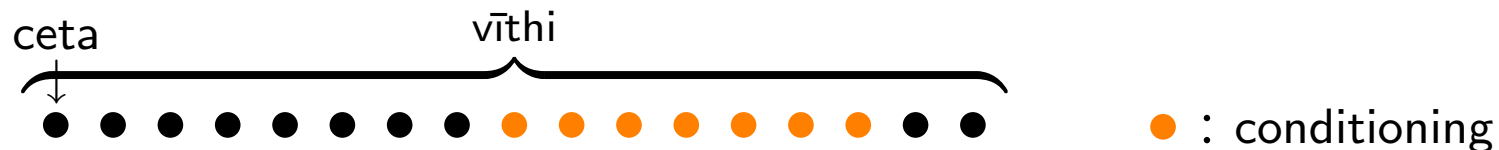
Matter is not continuous, but atomic

Main thesis of the Abhidhamma:

Consciousness is not continuous, but discrete

acting on three levels (in physics: molecules, atoms, elem. particles)

Cetas	'mental atoms'	existing in time
Cetasikas	'mental elementary particles'	acting in parallel
Vīthis	'mental molecules'	acting in a serial way



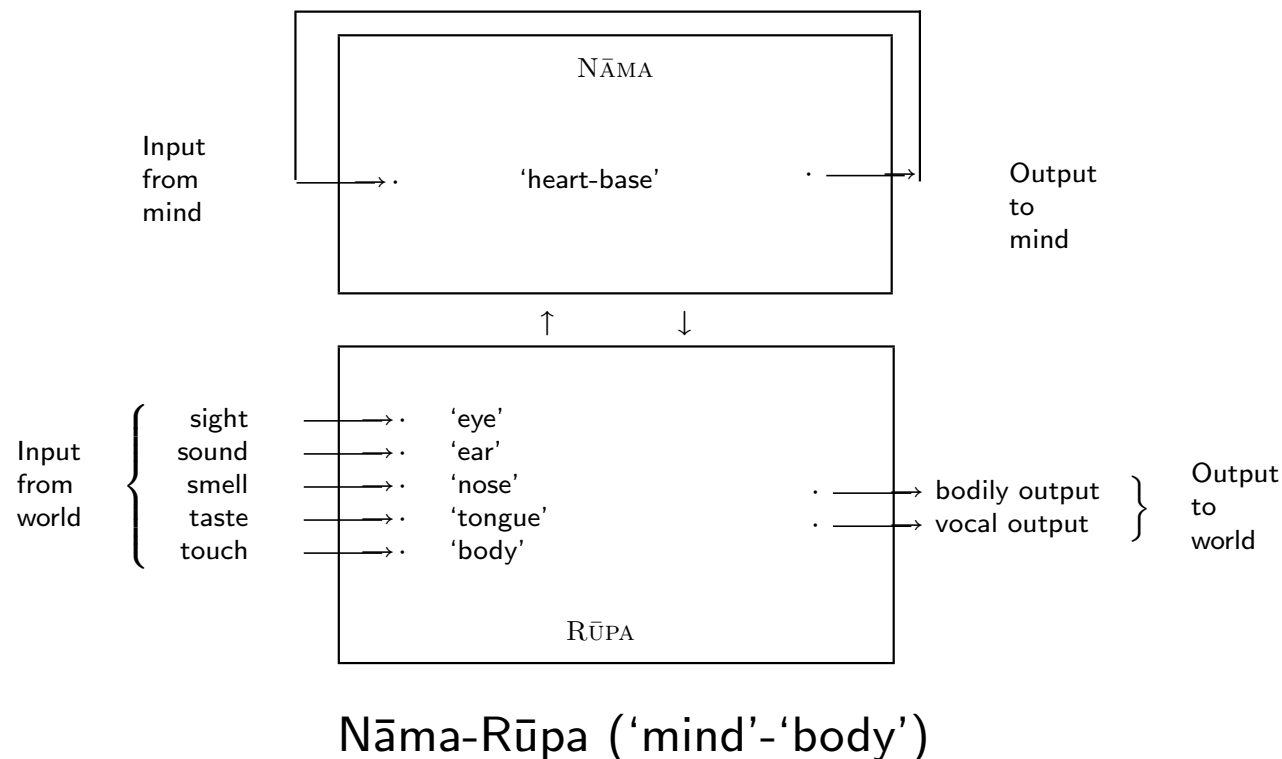
On all three levels consciousness is discrete

## IIIb.2 Cetas: objects

Each ceta is directed to an *object* (content) and has a *type* (state)

Objects are e.g. • sight of a woman; • memory of the sound of a frog jumping in a pond

Objects are 1. sensory input, 2. mental input, 3. concepts, 4. nirwana

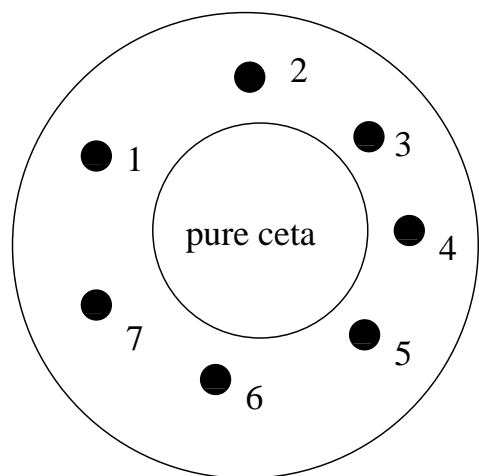


Input from the senses is influenced by the mind



## IIIb.3 Cetasikas

A ceta consists of **pure ceta** and mental factors (*cetasikas*)



1. Cooperation (synchronization)
2. Attention (choosing input)
3. Contact (obtaining input)
4. One-pointedness (focus)
5. Feeling (value judgment)
6. Perception (rudimentary distinctions)
7. Volition (motivation)

parallel input



sequence of chords

The minimal ceta consisting of pure ceta with the universal neutral cetasikas

The cetasikas act synchronously with the ceta  
**Pure ceta** gives 'awareness', the qualia

Dennett	not necessary
Stapp	explainable in quantum physics
Chalmers	explainable in extend physics
Hut	treated axiomatically

## IIIb.4 Cetasikas

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The ceta types are being determined by the cetasikas:

There are 52 cetasikas (14 **unwholesome**; 13 neutral and 25 **beautiful**)

Examples

unwholesome    greed, hatred, attachment

neutral            concentration, bliss

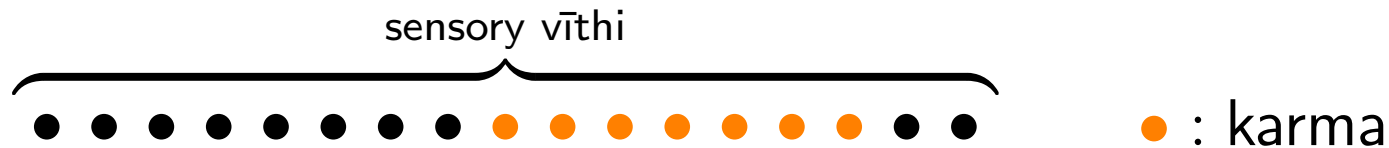
beautiful        mindfulness, compassion

	<b>unwholesome</b>	neutral	<b>beautiful</b>
universal	<b>ignorance</b> <b>restlessness</b> <b>shamelessness</b> 4	input 'feeling' concentration 7	<b>mindfulness</b> <b>detachment</b> <b>non-hatred</b> 19
occasional	<b>attachment</b> <b>hatred</b> <b>sleepiness</b> 10	energy stronger concentration ecstasy 6	<b>compassion</b> <b>shared joy</b> <b>wisdom</b> 6

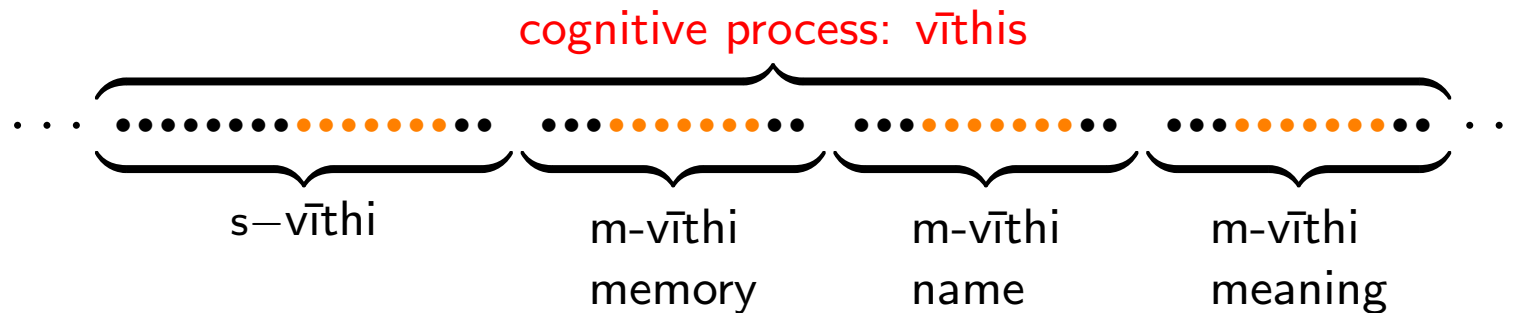
Meditation: development of neutral and **beautiful** cetasikas, avoiding **unwholesome** ones

# IIIb.5 Vīthis: 'streets' of cetas

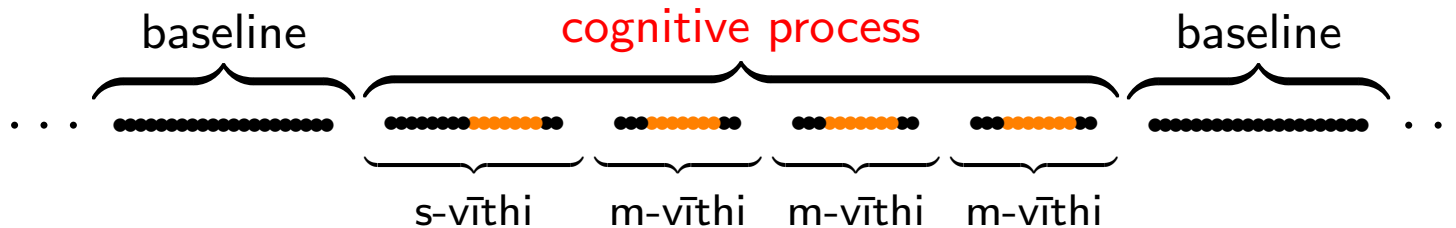
## Cognitive-emotional unit



## Cognition and emotion



## Baseline (sequence of birth cetās)



## Life-path



## IIIb.6 Karma

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The object and type of a ceta play a role like the 'configuration' of a Turing machine: present tape-content and state

The law of karma is like the transition table of the Turing machine present type and content of a ceta determine future ones

Types of karma:

- producing      one excitatory neuron
- supporting     several excitatory neurons
- obstructing    several inhibitory neurons
- destructive    one inhibitory neuron

This leads to accumulated karma over time

long term potentiation; formation of new synapses

## IIIc.1 Abhidharma notions

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Alaya	latent consciousness
Manas	tendency to reify
Paratantra	interaction between ceta lines
Bodhicitta	Buddha nature pure ceta

Alaya explains action at a distance of kamma

Manas creates self: view, delusion, pride, love

Paratantra changes the 'autistic' Abhidhamma to an interactive level

Bodhicitta can be identified with pure ceta and Nibbana

This makes the human mind like a Turing Machine

but one with Buddha nature!

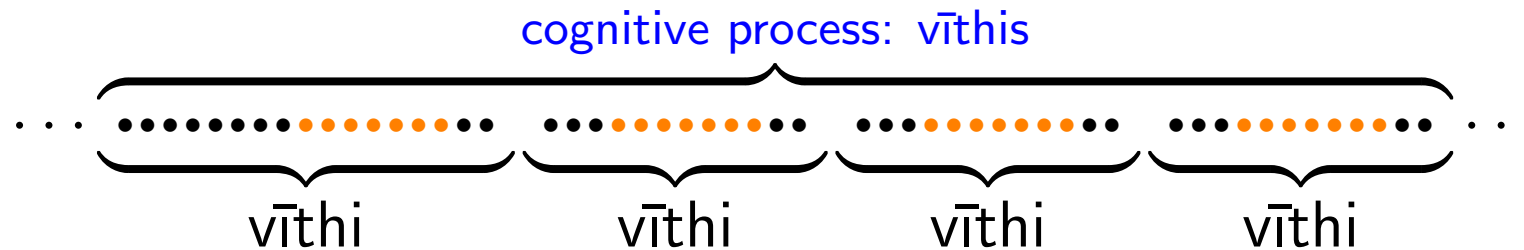
## IV.1 Consequences

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- Neuroses
- Psychoses
- Cover-up
- Purification

Thinking is encoded in the cognitive process of consecutive *vīthis*

Feelings are present as *cetasika* in a repeated *ceta* ●



These two may conflict:

the *vīthis* may suppress the *ceta* feeling

but this feeling starts to lead a life of its own

This is an implementation of Freud's notion of fight between the *id* and the super-ego

Freud's observation was that the *id* can be very stubborn

This is consistent with the Abhidhamma notion of productive karma

If cognition is composed, then it may fall apart

This is a natural explanation of dissociation

The Abhidhamma Model sees this as disidentification

A *jamais vu* is the separation of sound and meaning

Here the cognitive process is separated in a decent way

If feelings are too strong, it may collapse in a more dramatic way  
the *vīthi* may fall apart, causing secondary reactions of panic

Relatives, friends and even the medical establishment  
may not know how to deal with this properly  
causing a negative spiral often reinforced by anti-psychotic drugs

The Abhidhamma Model shows that it may be worthwhile to study the  
claim by some psychoanalysts that psychoses can be cured  
The model also shows why a psychosis is serious: it is real!



Ordinary consciousness looks stylistically as follows.

\\\\\\\\-----////////| | | |\\\\\\\\-----\_\_\_\_\_/\\\\\\\\ (1)

Broken psychotic cognition looks like (— : strong karma)

\\|/-/\_-\_/\\-- \\\_--\_/||-\\-|-//\_-| (2)

\\|—/\_-/\_—-\_/\\--—\\\_—-\_/||-\\-—|-//\_—-| (3)

Then the movie gets 'covered-up' with strong self-reinforcing feelings

\\—|—/\_—-/\_—-/\_—-/\_—-/\_—- \\—-—-—- } (4)  
 — \\— \\—-—-—-/\_—||—-—- \\

Depersonalization, derealization, desomatization  $\mapsto$  cover-up with fear

Also other ways to cover-up: angriness and desire

Has been repeatedly observed during meditation retreats

If one uses psychopharmacs or some other drugs one may obtain a similar but even more rigid state of mind

$$\left. \begin{array}{l} \backslash \text{---} | \text{---} / \text{---} - / \text{---} \_ \text{---} - \text{---} \_ \text{---} - \text{---} / \text{---} \backslash \text{---} - \text{---} - \\ \text{---} \backslash \text{---} \backslash \text{---} \_ \text{---} - \text{---} \_ \text{---} - \text{---} \_ \text{---} / \text{---} | | \text{---} - \text{---} \backslash \end{array} \right\} \quad (5)$$

Also armored personalities may be interpreted this way

Alternative possibility: developing mindfulness and equanimity. Then

\\_ | \\_ / \\_ - / \\_ - - \\_ - / \\_ \\_ - - \\_ \\_ - \\_ - / \\_ | | \\_ - \\_ \\_ (6)

becomes bearable

Surrendering one may obtain a ceta **with pure consciousness as object** taking out the poison of karma from the chaotic consciousness process

\ | / - / \\_ - \\_ / \\_ - - \\_ \\_ - \\_ - / | | - \\_ (2)

After that consciousness turns pretty soon to normal

\ \ \ \ \ - - - - - / / / / / | | | | | \ \ \ \ \ - - - - - \\_ - - - - / / / / / (1)

One becomes like an astronaut, no longer afraid for the feeling of falling

## V.1 Plausibility

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Action potential

Synchronicity

Synaptic networks

Volume transmission

MBSR-MBCT

Tests show that we are capable of parallel and serial tasks

A ceta is said to have three phases:

a beginning, an existence and a disappearing

This is consistent with the action potential in neurons

von der Malsburg postulated that objects are coded  
by sets of synchronously firing neurons

This fits with the parallelism in the cetasikas

Lehmann distinguishes mental atoms in multichannel EEG maps

There are 4 types of atoms, each of about 100ms

In schizophrenics: shorter duration and permuted order

Productive, supporting, obstructive and destructive karma are exactly the ways neurons collaborate synaptically

Accumulated karma fits with the expanding network of synapses

For the mechanism of moods to cover-up the chaos volume transmission (Nieuwenhuys) is a good implementation

Moreover, strong concentration ( $\mapsto$  one doesn't mind strong pain), has similar effects as putting opioids in the liquor

Compatible with volume transmission through the liquor

In fact opioid and stress-hormone cells are shown to contact the liquor

Calle et al. opioids in the brain electro-microscopy seems to indicate exocytosis

Other evidence: Miyan, Nabiyouni & Zendah (2002); Sowards & Sowards (2003)

Development of the brain: a vital role for cerebrospinal fluid Can J Physiol Pharmacol. 2003 Apr;81(4):317-28.

Mindfulness-Based Stress Reduction (MBSR) developed by Kabat-Zinn is used in 200 hospitals in the East-Coast

Is adopted by Cognitive Psychotherapy (MBCT) E.g. at ICCP05

Mindfulness: meta-awareness

'O, there is desire'

$$\frac{\text{mindfulness}}{\text{consciousness}} = \frac{\text{DNA}}{\text{protein}} = \frac{\text{computer program}}{\text{computable function}}$$

$$= \frac{\text{observing}}{\text{reacting}}$$

Using mindfulness one can get close to the feeling/thought/emotion without getting sucked away by it

## Summary

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Discrete consciousness acting on three levels

Parallel and serial

Selfless

Finite state

Deterministic

Neuroses

Psychoses

Cover-up

Purification

Neurons: action potential, synaptic transmission, neural nets

Synchronicity

Volume transmission

Paper on the Abhidhama model: [www.cs.ru.nl/~henk/G.pdf](http://www.cs.ru.nl/~henk/G.pdf)



## Artist's impression 1. Fulfilled love

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L'invitation au voyage

*Mon enfant, ma soeur,  
Songe à la douceur  
D'aller là-bas vivre ensemble!  
Aimer à loisir,  
Aimer et mourir  
Au pays qui te ressemble!  
Les soleils mouillés  
De ces ciels brouillés  
Pour mon esprit ont les charmes  
Si mystérieux  
De tes traitres yeux,  
Brillant à travers leurs larmes.*

*Là, tout n'est qu'ordre et beauté,  
Luxe, calme et volupté.*

Charles Baudelaire

Music: Duparc ( *L'invitation au voyage* from *Chansons* )

Invitation to the Voyage

My child, my sister,  
have a sweet dream  
Of living together there!  
Of loving at will,  
Of loving till death,  
In the land that is like you!  
The misty suns  
Of those angry skies  
Have for my spirit the charms,  
So mysterious,  
Of your treacherous eyes,  
Shining brightly through their tears.

There all is order and beauty  
Luxury, peace, and voluptuousness.

## Artist's impression 2. Broken love

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### *La mort de l'amour (fragment)*

...

*Le vent roulait les feuilles mortes; mes pensées  
Roulaient comme les feuilles mortes, dans la nuit.  
Jamais si doucement au ciel noir n'avaient lui  
Les milles roses d'or d'où tombent les rosées.*

*Une danse effrayante, et les feuilles froissées,  
Et qui rendaient un son métallique, valsaient,  
Semblaient gémir sous les étoiles, et disaient  
L'inexprimable horreur des amours trépassées.*

...

*Maurice Bouchor*

### *The death of love*

...

*The wind rolled the dead leaves; my thoughts  
rolled like the dead leaves, in the night.  
Never had the thousands of golden roses, from which  
fall the dews, sparkled so softly in the black sky.*

*A terrifying dance, and the crumpled leaves  
which gave out a metallic sound, waltzed,  
seemed to moan beneath the stars, and told of  
the inexpressible horror of the perished loves.*

...

Music: Chausson (*La mort de l'amour* from *Poème de l'amour et de la mère*)

## Artist's Impression 3. Chaos beyond control

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Drawing: Marianne Kalsbeek

Music: Boulez ( *Tombeau* from *Pli selon pli* )



## Artist's Impression 4. Purified consciousness

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Seurat: Un dimanche après-midi à l'Île de la Grande Jatte

Music: Ravel ( *Lever du jour* from *Daphnis et Chloé* )