

Mental-states and their transformation by mindfulness

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<p>Title page</p> <p>Better to use 'mind/body-states' than 'mental-states' or 'states of consciousness'. The states that are intended in this talk are from the psychological point of view 'action tendencies'. Those may be conscious and unconscious; moreover, they may be conceptualized (or even observed) in the body or in the mind. A conscious state occurs when seeing someone we (dis)like, with a resulting tendency of approach (or avoid). One could say that this state is in the mind. A conscious state like hunger seems to be in the body. Actually it is not clear whether it makes sense to distinguish here between body and mind: hunger is coming from a combination of conditions in body and mind. An unconscious state results when we are primed without knowing it. Flashing pictures to us subliminally in an experimental setting does modify the reactions we make. Although the eyes are involved, one may be tempted to consider this as a pure 'mind-state'. Finally some hormones may influence our behavior. Here the tendency could be to call it a body-state. Summarizing, this talk is about the modification of mind/body-states, conscious or not. Best to just call them 'states'.</p> <p>Overview page</p> <p>Methodology. The paper is based on 1. experience, 2. Buddhist psychology (the Abhidhamma, see Bodhi [2000]) and 3. cognitive neuroscience. It uses the scientific method: to be open to criticism and be willing to change one's position. On the other hand it uses cultivated phenomenology: first person experience trained by the 'deconstructing' power of insight meditation as source of inspiration, to be investigated scientifically.</p> <p>A highly successful example of this method is the discovery of the mechanism of color vision based on a simple phenomenological observation by Goethe. I heard the story from colleagues, but see Duck (1988), Ribe and Steinle (2002) and Sepper (2007).</p>	<p>Around 1800 physicists knew after Newton that colored light forms a one-dimensional (1D) phenomenon. Light comes in various wavelengths and a particular one determines the color of the light.</p> <p>In 1810 the poet Goethe, who was also interested in perception, suggested another theory. He claimed that colors form a 3D phenomenon for the following reason. When we have, say, 125 cubes, each one colored evenly in a different color, then it is not possible to put them in a linear row such that the colors change "smoothly"; also it is not possible to do this in a plane. But in a cube of 5 x 5 x 5 of it is possible to arrange the colors such that in all directions they change smoothly. This observation is phenomenological: it is based on direct perception, independent of rational considerations.</p> <p>At first physicists maintained their position that colors form a 1D phenomenon. But then the physician Young (1773-1829) and later the physicist Helmholtz (1821-1894) tried to reconcile the observations of Goethe with those from physics. They coined the hypothesis that the human eye has three different receptors for color vision. If this is the case, then a single wavelength induces a triple of reactions in the retina and in the rest of the brain. This implies that colors are 1D at their physical formation, but 3D at their perception. The Young-Helmholtz hypothesis was finally proved as late as 1960, that is 150 years after Goethe's observation. In the meantime the multi-billion industry of color photography and color TV-monitors had started, all based on the fact that we have three receptors for color perception. Today in 2009 the idea is still going strong in digital cameras, flat-screens, and video-projectors. Politicians should be happy: fundamental research does lead to economic growth. But in this case one had to wait about 150 years for the spin-off. This is longer than the re-election term, so politicians do not notice it.</p>
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<p><i>Reductionistic vs holistic</i></p> <p>Good science (and life) is both, looking at the details and the whole.</p> <p>I.1 If one will not pay proper attention to the notion 'right mindfulness', then it may be lost in 2100 and the teaching of mindfulness, both for MBI and insight meditation will have come to an end. Using the right mindfulness we may hope to obtain a better insight in the functioning of mind/body. And one may hope to improve the teaching of mindfulness. Persons that have had at least three periods of depression are having a chance of 90% to fall back in it. After following an MBCT course this percentage drops to 45%. It would be nice to improve this number.</p> <p>One needs to be clear what is</p> <p>(i) the scope, (ii) the definition, and (iii) the operationalization of mindfulness.</p> <p>As to (i), the scope of the concept of mindfulness: does it refer to the state or the trait of someone? This may have an impact on the way mindfulness is taught and trained.</p> <p>As to (ii): the definition is even more essential for its way of training.</p> <p>As to (iii): the operationalization is important for research on mindfulness and its validation.</p> <p>I.2 Consciousness consists of a stream of consciousness moments (<i>cetas</i>). Each moment of consciousness has an object (content) and a state. Each state consists of a mix of substates (<i>cetasikas</i>). Buddhist psychology distinguishes 89 states and 52 substates. It is said that there are more (sub)states, but that the ones mentioned are relevant for liberation. In daily life only 45 states are relevant, the other 44 only occur during (intensive) practice.</p> <p>A state can be seen as a set of variables in the mind/body system having a certain value. A sub-state is a subset of the relevant set of variables.</p> <p>The scope of mindfulness will be a particular mental sub-state. One is mindful if this sub-state is present. This makes it possible to have various forms of mindful states.</p> <p>Mindfulness-as-trait means that a person is</p>	<p>frequently in the state of mindfulness.</p> <p><i>Matter and consciousness</i></p> <p>Whether mind (with its being aware) can be explained from matter has been a debate since at least Plato. We will not enter the question here. During meditation we need awareness (in a focused form), but we will not worry about its ultimate nature.</p> <p>Being mindful is easy (the lecture started with a guided meditation of 12 seconds: "Please be <i>not</i> mindful now." At demand this seems to be impossible.) But the art is to be mindful often. "One moment of mindfulness is one moment of enlightenment." So the only thing is to train to have it more often. As mindfulness is often there, it seems to be an essential ingredient of consciousness; we have, what is called in Mahayana "Buddha nature".</p> <p>I.3 The definition of mindfulness in a given moment is: to be attentive at that moment in a non-judgmental way, reached by having meta-awareness. This automatically entails an anti-dose to greed and aversion.</p> <p>The definition of being mindful has a moral component. It is good to realize there is <i>duty</i> morality and <i>virtue</i> morality. At the natural moments of mindfulness virtue morality is automatically there. If one practices morality, however, one has to 'add' morality, i.e. duty morality. If one doesn't adhere to the right speech, action or livelihood, then it is more difficult to practice mindfulness. For example lying creates a burden: keeping in mind two models of the world (instead of simply one), the actual reality and the one that one pretends, i.e. lies about.</p> <p>I.4 This is a list of <i>cetasikas</i> (substates) with the understanding that one always has the universal neutral ones and has to expand either to the left or right. Both ways is impossible. One also can extend downwards, not the full class of occasionals at once, but essentially one by one. Having increased concentration (<i>vitakka</i> and <i>vicara</i>) may be combined with either greed or hatred, but then one has gone to the unwholesome class, including the four universal unwholesome ones, or with mindfulness (obtaining all other universal beautiful <i>cetasikas</i> and possibly some occasional ones as well). Therefore a <i>ceta</i> is always either unwholesome, OR neutral, OR wholesome, depending on whether there is an unwholesome <i>cetasika</i> in</p>
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<p>it, neither an unwholesome, nor wholesome in it, or a wholesome in it. It should be emphasized that the classes of wholesome and pleasant (determined by cetasika feeling, that can be either pleasant, unpleasant or neutral) states are overlapping, see table down-right on this page.</p> <p>wholesome = helpful, liberating unwholesome = leading to attachment and hence suffering</p> <p>partial enlightenment = eradication of the use of some unwholesome cetasikas full enlightenment = eradication of the use of all unwholesome cetasikas.</p> <p>Enlightenment is said to come in four steps:</p> <p>E1 (overcoming doubt and wrong view) E2 (diluting fear and greed) E3 (overcoming fear and sensual greed) E4 (= full E, overcoming amongst other things restlessness, sleepiness, pride).</p> <p>I.5 As to operationalization of mindfulness: questionnaires are not reliable (see lecture of Grossman). More interesting are the effects of mindfulness. But actual meta-awareness is measured by the method proposed by Stephen Whitmarsh.</p> <p>II.1 In daily life people (M/F) are worried about getting pleasant objects: a large/comfortable house, a beautiful/reliable partner, a fast/compact car. This in the hope to get pleasant states, which is the ultimate motivation. But the mortgage may be high, the partner demanding/unreliable, and the gasoline rare and expensive. Meditation bypasses interest in objects and goes directly to the beautiful states. There are two main classes of meditation:</p> <ol style="list-style-type: none"> 1. concentration or calmness meditation versus 2. insight meditation. <p>For the second type one needs to practice also the first type.</p> <p>Also it should be said that insight meditation starts with something very similar to an MBI (mindfulness based intervention), because most of us have some dysfunctional states.</p> <p>functional = being able to love and work dysfunctional = not functional</p>	<p>(Though perhaps one should redefine this now we enter a period with less jobs.)</p> <p>II.2 In order to understand the blue line, one should know that there are the 'jhanas', that could be called the Buddhist mystical states. These are characterized by high concentration and other pleasant cetasikas:</p> <p>vitakka (initial concentration) vicara (sustained concentration) joy, bliss compassion equanimity (non-judgmental).</p> <p>Having all five cetasikas consists of a ceta that is called 'the first jhana'. Dropping them one by one in the given order (except equanimity), results in jhana 2, 3, 4, 5. These jhanas need some attention to physical input and are called rupa-jhanas. From these one can jump to enlightenment. There are higher jhanas, the arupa jhanas that are based on concepts, of which the ceta will be fulfilled. But from the arupa jhanas one cannot enter enlightenment.</p> <p>The jhanas, although extremely pleasant, can form a 'defilement', as there can be a hidden desire to keep this state. If this greed is absent, then the jhanas form a good platform from where one obtains enlightenment.</p> <p>The three characteristics (red line) are the essential object of insight. Soon after having encountered them one is in a temporary phase of</p> <p>fear seeing danger disenchantment.</p> <p>(Possibly these 'insights' are related to the clinical phenomena of phobia, delusional paranoia and depression.)</p> <p>Continuing the practice one can domesticate these dysfunctional states. For this one needs equanimity, concentration, and joy. Moreover one needs on the one hand be determined and on the other hand be surrendering. Then the dukkha part of the three characteristics will be transformed into nibbana (nirwana, cessation of suffering).</p> <p>III.1 That all is predetermined is not in contradiction with freedom. Predetermination means that the state of the universe now determines how it will be. Freedom means that our state now determines some part of</p>
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the future state. Well, we are part of the universe. Thinking, feeling, judging will all result in a choice. To know the outcome of this choice one has to live, it is too complex to be computed by computer. And: this choice mechanism doesn't belong to us. We LIVE it. We are this process that does compute.

III.2 In this slide the stream of consciousness is depicted. All our 6 senses (5 physical senses + thinking) play their role. But we often are stuck in the 'thought-pump' (rumination, not necessarily with unpleasant feelings, just being mind-less). The actions that are performed are in the model on this page.

III.3 Now also the mind/body-states are in the model. The first Noble Truth (NT1) of Buddhism is explained:

There is suffering.

By this one doesn't intend pain (because then it would be impossible to be beyond suffering), but the possibly resulting mental pain. It is possible to be beyond this, as stated in NT3. There still is another form of suffering: the stream_of_consciousness-pump goes on and on. It determines us, but we cannot directly influence it. This sucks. In that sense

All life is suffering.

Paradoxically enough, the insight that this is the case is liberating. The reason is that one doesn't need to pretend and even less to try to be in charge.

III.4 This slide is about the three aspects of states:

1. how they feel,
2. how they are working on biological level,
3. how they influence our behavior.

As to 2, insight meditation gave me the hint that some states come in a 'fluid way'. This inspired to study the possibility that some states are implemented via volume transmission through the cerebrospinal fluid, helped by one PhD (M. Calle), supervisor E. Roubos, and a literature study with a colleague (J. Veening):

www.fluidsbarrierscns.com/content/7/1/1
<ftp://ftp.cs.kun.nl/pub/CompMath.Found/CSF.OT.pdf>
<http://www.fluidsbarrierscns.com/content/9/1/16>

As to 3, with Antonino Raffone a model was developed in which mindfulness was seen as a 'self-modifying program', known from the theory of universal machines by the well-known Alan Turing:

<ftp://ftp.cs.kun.nl/pub/CompMath.Found/TM.pdf>

In spite of this freedom, we usually cannot employ it at its full potential, because we are attached by our over-conditioning. When we break through it, we have a wider choice space.

III.5 This page provides a model of how meditation (mental development) works. By restricting input (both physical and mental; the latter by focusing on breathing or footsteps) and also the output (by sitting still) the only thing that changes are the states. With continuous mindfulness one can observe that they form a circular path. Under the right conditions one can step out of the vicious circle.

The idea of modelling mindfulness is inspired by Hofstadter's *Gödel Escher Bach* book and is described here:

<ftp://ftp.cs.kun.nl/pub/CompMath.Found/reflection.pdf>

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