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Imagining: Embodiment, Phenomenology, and  
Transformation

Imagination is one of the quintessential qualities of life and our being. Its central attribute is the manifestation of vivid, lived mental content that does not refer directly to a perceived world but to an absence that it evokes. It is fair to say that imagination is emblematic, in fact, of a *cluster* of human abilities: imagining proper, or mental imagery, remembrance, fantasy, and dreaming. Imagination is an inexhaustible source in all these dimensions, explored and praised by human cultures throughout the world, a witness to its centrality.

Our purpose in this essay is to let imagination be a guiding thread in a journey of exploration of its *inextricably nondual* quality, making it possible to travel from its material-brain basis to its experiential quality without discontinuity. That is, we are not going to propose a “bridge” between a scientific view of imagination and its place in the Buddhist discipline of human transformation. Our purpose is to embrace the entire phenomenon in all its complexity and weave it as a unity with its many dimensions, which need and constrain each other without residue—in the body and brain, in its direct phenomenological examination, and in its pragmatic mobilization for human change. Only such weaving can be called a meeting of Buddhism and neuroscience on a new phenomenological ground.

## 1. MENTAL IMAGERY: EMBODIMENT

### 1.1 SEARCHING FOR THE MIND'S EYE

Let us first start from the empirical side, considering what can be said about the explicit embodiment of imagining. This means to start from results in modern cognitive neuroscience, before we expand that to a broader biological framework. Now, as a scientific topic of study, imagination appears very sharply in modern research not as a general topic but in one of its most central aspects: visual mental imagery, the capacity for experiencing, evoking, and examining images in the mind's eye. Mental imagery has a long history that goes back to the Greeks, such is its ease of access and compelling nature. Clearly imagining and perceiving seem to be, at face value, not the same acts. However, most people can make a (more or less sharp) picture of my room, which is not only as vivid as perception but also preserves the spatial properties of the scene they represent, and it is often difficult to separate one from the other. As we shall briefly investigate in this section, with few exceptions, there is a wide consensus in current research that the ability to produce and manipulate imaginary objects can be naturally explained as the endogenous mobilization of the very same neural capacities involved in high-level vision and cognition in general, which requires the participation of memory, language, anticipation, and movement, depending on the nature of the imagery task.

In its time-tested manner, research on the brain basis of imagining thus far has focused particularly on a voluntary mental imagery in carefully controlled laboratory conditions. Only in such conditions can one bring into play the use of modern techniques of global brain study, especially the non-invasive methods of using position emission topography (PET) and functional magnetic resonance (fMRI). Let us turn to a quick tour of some of the most important results and questions (see Kosslyn 1994 and Mellet et al. 1998 for review).

*The mind's eye: The debate on primary visual areas* One of the most dramatic questions in this field has been whether the so-called primary visual areas (PVA) are necessarily involved and activated in producing mental imagery as they are during a visual perception. In fact, a major result of modern neuroscience is the discovery that the primary visual areas (area V1 in particular) are topographically organized with respect to the visual field. In other words, its component neurons can be mobilized by showing a stimu-

lus in a small region placed in a precise location of the visual field. Given that the distinctive character of mental images is their topographical veracity, a central question is whether the PVA are active to a comparable degree while looking at an image as opposed to imagining it. This has been a thorny debate for science and philosophy alike.

A recent study blocking PVA reversibly by transcranial magnetic stimulation (rTMS) has given the best direct response so far (Kosslyn 1999). Blockage of rTMS actually renders subjects unable to visualize striped patterns, suggesting very strongly that, at least with regard to tasks of this kind, V1 is indispensable. In this sense perception and imagination can be said to share their spatial characteristics because they also share the same primary basis for the emergence of an image, vividly present to experience. This study is the most recent in a series of other converging evidence. For instance Bisiach, Luzzatti, and Perani (1979) found that subjects with hemilateral neglect not only ignore objects on one side during perception but also ignore objects on that side during imagery!

But mental imagery research has gone further in trying to study subjects performing a number of different mental tasks. For instance, subjects were presented with a visual map of an island and were compared when imagining this same map. The comparison revealed significant activation under PET in the occipito-temporal regions but not in the PVA. In fact, about half of the mental imagery studies do *not* show an active involvement of PVA (Roland and Gulvas 1994). This might seem paradoxical at first glance. But the answer probably lies in the fact that it is the *type* of mental imagery involved that determines an important PVA activation or not. Simply put, visual imagery requires a topographically organized area, whereas spatial mental imagery involving an imagined bodily displacement (such as following an island's map with the mind's eye) does not.

But this is still much in exploration, and the precise role of PVA is still open. It is known, for instance, that schizophrenic hallucinations do not induce an increase in V1, but that visual association areas were so activated (Silberswieg et al. 1995). Instead of demanding a yes/no answer to this ancient conundrum, researchers are now focusing on defining more precisely the kind of visual images and acts of imagination that are involved in various tasks. This again highlights the fact that the neural basis of mental imagery does not seem to be a network of circuits but rather a *pattern of dynamic interactions* between multiple candidate subregions subserving various cognitive capacities.

***Involvement of multiple areas*** In contrast to the heated issue of the primary areas, there is a large consensus that associative areas are constantly present in imagination. Beyond PVA, visual activity is structured, as is well known, in two concurrent streams, the ventral, or occipito-temporal, and the infero-temporal cortex. These are involved in the perception of form and its figurative aspects (such as face recognition) and the intentional content of the percept (the “what?” of seeing; Sargent, Ohta, MacDonald 1992). The occipito-parietal route goes up to the superior parietal region. This subcircuit is quite multifaceted, for it is involved in localization, shift of spatial attention and spatial working memory, and is thus involved in the spatial location (the “where?” of seeing). Several studies have revealed that the dorsal route is active when imagining in the absence of any visual presentation, for example, in subjects who had to mentally navigate a route previously walked. In contrast, the ventral route is easily detected in mental images either visually recalled or named, such as letters and unusual objects. In brief, these results, taken together, clearly underscore the kinship between visual perception and mental images. This was clearly the case with PVA, but the kinship becomes fuzzier for nonprimary regions: a number of brain regions involved in perception are not systematically involved in imagery.

***Imagery and language*** Interestingly, a mental image is not only a recall of a previous perception but can be generated starting from a *verbal* description.<sup>1</sup> Such language-evoked images are quite comparable to those sensorially induced. In particular, mental scanning and distance comparisons are comparable to those effected on images recalled from previous presentations.

This underscores again the important idea that visual images can be mobilized by extravisual brain circuits. For instance, constructed cube assemblies following auditory instructions activate the dorso-lateral route discussed above. Thus, although visual and verbal activities are quite distinct cognitive entities, there is coherent cross-modal activation that works in imagery just as well as in actual cross-modal perception.

***Memory*** It stands to reason that episodic memory recall and imagery very closely complement each other. Oftentimes a mental image is generated through a recall, and, conversely, a recall often results in a vivid mental image. This has been observed in various protocols concerning episodic mem-

ory. This observation will be especially relevant in light of what will follow later in section 3.

There seems to be a differentiated participation of object and spatial memory and imagery. In fact, it has been shown that at least both types of memories can be differentiated as to the regions they mobilize. The first circuitry is frontalized and seems to be active when the image is dynamic (i.e., spatial transformations of the image). The second is more ventrally located in the middle frontal gyrus and is better related to figurative working memory. This distinction also holds for mental images.

*Motor imagery* Finally it should be said here that the mental rehearsal of simple or complex motions is also a human capacity. Although such imagery has some resemblance to visual imagery, a distinction can be made with motor images that allow us to imagine an external or third-person perspective representing actions or an internal or kinesthetic first-person perspective in which we execute the movement ourselves.

Interestingly, in this field the question of whether motor images share the same basis for preparation and execution of actual movements has been hotly debated (Jeannerod 1994) and is still in full development (Berthoz 1998). The functional equivalence between motor imaging and motor preparation has been supported by physiological correlates of motor imagery, which follow closely the activation of areas involved in actual movement or even while seeing someone else executing the same movement: the famous “mirror-neurons” (Decety et al. 1989, 1994). Brain-imaging studies have uncovered a plurality of regions, for instance in finger movement or during saccades (the very rapid eye-movements that accompany normal vision). But, again, not all the regions that are active during overt hand and eye coordination are also involved in mental imagery as well, according to various studies that are sometimes contradictory.

In conclusion, the idea that perception and imagery share common mechanisms has been repeatedly postulated since the time of Aristotle, but the recent evidence just discussed gives a fresh angle on this question. By specifying that this common ground is the cooperative working of a multiplicity of cognitive capacities (including memory, language, and motion), the difference between them is also stressed. Kosslyn (1994:74) lists three such distinctive differences: 1. mental images fade rapidly—in perception the sensory presentation helps to maintain the image, 2. mental images are created from remembrance and association, thus they do not have a veridi-

cal relation to their contents, 3. images, unlike perception, are remarkably changeable.

Thus, the same capacities working on an endogenous basis, unconstrained by the sensorimotor embodiment of the organisms, make imagination come to the fore; perception then can be seen as constrained imagination. The far-reaching import of this conclusion should now be examined in more detail.

### 1.2 IMAGINATION AT THE CORE OF LIFE AND MIND

*The organism as an enactive imaginary being* To explore further the consequences of these insights from recent cognitive neuroscience, we wish to pause to place them in the broader studies of the natural history and biology of the brain and mind. In fact, it is still common to regard the cognitive life of an organism as a “representational” coping, where perception is primary and the main source and drive for any valid cognition. A miscognition is thus a misrepresentation, such as mistaking a rope for a snake. However, this view of mind as an accurate or “equate” representation of the world is problematic, and to see why we need to take a broader look at how cognition can be understood.

Varela’s overall approach to cognition is based on situated, embodied agents. He has introduced the name *enactive* to designate this approach more precisely. We cannot expand this overall framework extensively (see Varela 1992 [1989]; Varela, Thompson, and Rosch 1991), but its core thesis can be expressed as two complementary aspects:

1. On the one hand, there is the ongoing *coupling* of the cognitive agent, a permanent coping that is fundamentally mediated by *sensorimotor* activities.
2. On the other hand, there are the *autonomous* activities of the agent whose identity is based on emerging, *endogenous* configurations (or self-organizing patterns) of neuronal activity.

Enaction implies that sensorimotor coupling modulates but does not determine an ongoing endogenous activity that it configures into meaningful world items in an unceasing flow. Enaction is naturally framed in the tools derived from dynamic systems, in stark contrast to the cognitivist tradition that finds its natural expression in syntactic information-processing models. The debate pitting embodied-dynamics versus abstract-computa-

tional as the basis for cognitive science is very much alive (Port and van Gelder 1997).

From an enactive viewpoint it follows that mental acts are characterized by the concurrent participation of several functionally distinct and topographically distributed regions of the brain and their sensorimotor embodiment. It is the complex task of relating and integrating these different components that is at the root of temporality from the point of view of the neuroscientist. For example, for high-level vision this large-scale integration would draw from all its necessary components, mobilizing not just perceptual abilities but motivation and emotional tonality, attention, memory, and motion. In brain topography this covers a largely distributed set of regions and circuits such as those encountered in the brain-imagining studies related to mental imagery.

A central idea pursued here is that these various components require a *frame or window of simultaneity that corresponds to the duration of the lived present*. This is important for us here, for it places imagination in its factual dimensions: as a transitory nature of an image or a content with a flow of consciousness. In this view the constant stream of sensory activation and motor consequences is incorporated within the framework of an endogenous dynamic, which gives it its depth or incompressibility. This idea is not merely a theoretical abstraction: it is essential for understanding a vast array of evidence and experimental predictions. These endogenously constituted integrative frameworks account for perceived time as discretized and not linear, since the nature of this discreteness is a horizon of integration rather than a string of temporal pulses (Varela, Thompson, and Rosch 1991; Dennett and Kinsbourne 1991; Pöppel and Schill 1995; Varela 1999). Our cursory impression of linearity comes from the fact that in this living present memory will bring a sense of past and continuity.

Within this enactive framework it follows that the self-produced activity from the organism's side is as central to mental/cognitive life as the more traditional idea that the world provides some form of "input." Stated bluntly, the brain mostly relates to its own activity constantly engaged in the organism's maintenance and regulation. This endogenous, self-constituting activity is based on its extensive interconnectivity, but it also occurs because the brain, being part of the organism, never ceases in its self-regulation. This engenders ongoing levels of activity that constantly give rise to dynamic patterns, even in the absence of any world input. And one of the most dramatic manifestations of this fact is the flowery imaginary life that mani-

fects during dreaming (or less naturally when one is put into a state of sensory deprivation). Ordinary perception is, to an essential degree, sensorimotor constrained imagination. Imagination is central to life itself, not a marginal or epiphenomenal side-effect of perception.

### 1.3 SELF-EMERGENCE OF IMAGINATION

*Large-scale integration and synchrony* What we just said does not make it clear *how* such large-scale self-organization happens in the brain. Although cognitive neuroscience knows an enormous amount about the multiplicity of areas involved and their various specific contributions (cf. Gazzaniga 1999 for review), it knows much less about how these regions can work in concert together. There are two general principles that we wish to emphasize in this respect that seem to emerge from recent work: *reciprocity* and *synchrony*.

Reciprocity refers to the fact that, contrary to the classic idea based on information processing, cognitive operation can hardly be described as a linear flow: from raw sensory input, to interim processing, to an output of action. Both anatomically and physiologically the so-called low level and high level regions are interconnected in a *reciprocal* fashion. When a visual image is shown to the eye, it encounters as it enters into the brain in PVA (i.e., in a bottom-up direction), a highly structured neural context provided by the multiple regions that connect to PVA (top-down direction). Thus the sensory flow can modulate but not directly drive the ensuing cognitive state. Perception is demonstrably constrained and shaped by the concurrent higher cognitive memories, expectations, and preparation for action. For us, here, this means that what is endogenous (self-activated memories and predispositions, for example), and hence the manifestation of the imaginary dimensions, is always a part of perception. Conversely the generation of the imaginary is not a different, or separate, stream but constitutive of the normal flow of life. It follows that one cannot hope to find a naturalized account of imagination as some sort of cognitive module or brain region. It must necessarily correspond, instead, to a dynamic, emerging global pattern that is able both to integrate the body/brain activity at a large scale and subside rapidly, for the benefit of the next moment of mental life.

Synchrony refers to the growing evidence that the actual process by which the reciprocity is carried out is by a back-and-forth fine-tuning of



neural activity throughout the brain (cf. Varela 1995; *Neuron* 1999 for review). It provides the basis for the unified experience during any mental act, instead of being simply a juxtaposition of distinct modules that do not cohere with each other. The basic hypothesis that we follow here is that for every cognitive act there is a singular, specific cell assembly that underlies its emergence and operation. The emergence of a cognitive act, as we have said, requires the coordination of many different regions allowing for different capacities: perception, memory, motivation, and so on. They must be bound together in specific groupings appropriate to the specifics of the current situation the animal is engaged in (and are thus necessarily transient) in order to constitute meaningful contents in meaningful contexts for perception and action.

How are such assemblies transiently self-selected for each specific task? The basic intuition that comes from this problem is that specific cell assemblies emerge through a kind of temporal *resonance* “glue.” More specifically, the neural coherency-generating process can be understood as follows: a specific cell assembly (CA) is selected through the fast, transient phase-locking of activated neurons belonging to subthreshold, competing CAs. The key idea here is that ensembles arise because neural activity forms transient aggregates of phase-locked signals coming from multiple regions. Synchrony (via phase locking) must *per force* occur at a rate sufficiently high so that there is enough time for the ensemble to “hold” together within the constraints of transmission times and cognitive frames of a fraction of a second. (For a recent example see Rodriguez et al. 1999.)

*Upward causation* Accordingly, when brain-imaging techniques reveal a brain with multiple sites that are lighted during mental imagery tasks, the broader implication of this can now be drawn out. First, to see that imagination is indeed not an added human detail but at the very core of cognitive/mental life altogether. Second, that this imagination works because the autonomous working of the organism operates on the basis of a large-scale integration of multiple concurrent processes. Third, the nature of this nonlinear emergent process (plausibly through nonlinear synchronization) is a dynamic and transient process that occurs in pulses of lived temporality.

Accordingly, mental imagery (like other basic functions of mental life) appears, from the point of view of cognitive neuroscience, as a global dynamic pattern that integrates multiple concurrent activities. This nonlinearity and multiplicity is, we surmise, the very source of the creative and

spontaneous nature of imagination. We shall refer to it as the process of *emergent* or *upward causation*. As we shall discuss later on, of equal importance is the converse, or *downward causation*, to which we will return in sections 2 and 3.

## 2. IMAGINING: THE PHENOMENOLOGICAL EXAMINATION

### 2.1 IMAGINATION IN THE PHENOMENOLOGICAL TRADITION

At this point in the journey that this essay proposes it is time to pause and return to square one. We have been examining imagination in its brain/bodily basis as a natural phenomenon and finding a number of important observations concerning the commonalities and differences with perception and the embodiment of its emergence. However, the fact remains that imagination is, most strongly and directly, a *lived experience*. People through all times have experienced, used, delighted, and feared what the mind's eye displays, in vivid colors and with the clarity akin of the "real," perceived image. As already said, this concern goes back to the very roots of the Western tradition with Plato and Aristotle, continuing uninterrupted until the essential contributions of the *phenomenological* approach to mind since Husserl and James, but also with Sartre and Merleau-Ponty.

Phenomenological investigation has brought to the fore some of the basic components of imagination.<sup>2</sup> Two main points that we need to retain here are the following. First, contrary to common sense and the empiricist tradition (namely, Hume), imagination belongs to the very core of human consciousness, in close relation with memory and remembrance, fantasy, dreams, and perception itself. Second, imagination is grounded on a prereflexive (or prenoetic, unconscious) level of consciousness from which it shines forth. Both these points will be important for us in this context, and we need to look at them in some detail.

*The intertwining of perception and imagination* The ancient quandary that the omnipresence of imagination presented to the new discipline of phenomenology at the end of the nineteenth century is quite direct: is the consciousness of an image that is presented to the eyes comparable, in its essential aspects, to a visualized image or a memory that is recalled in an image? Husserl examined this issue in great detail in various forms. Already

in 1904–1905 Husserl came to the conclusion that these represented really two different *kinds* of consciousness. And he drew this conclusion for two interlinking reasons: 1. The categories that are needed to account for the constitution of perception fail when applied to imagination and 2. the discovery that imagination is founded on the temporal character of inner consciousness.

Let us begin with the way we apprehend these acts within our natural attitude (what we can also call common sense) by providing an example coming from a first-person perspective (namely, Depraz's):

When I am perceiving a pear tree in the garden and its gradually blossoming during early spring, the tree is here in front of me. I can touch it if I stretch out my hand, I can sense its perfume and listen to the noise of the wind in its branches. I am attending to the whole situation in flesh and bone, directly and concretely. If, on the contrary, I close my eyes and try to get a mental image of the tree and its surroundings, I might be able to accurately describe the just-lived scene if I have been quite attentive to its developing. But most probably I will forget some features of the experience and will add some others.

In short, we feel quite spontaneously how different it is to attend to a scene in its immanent immediacy and to recall it by way of mental images, let alone to fancy a similar scene years afterward. Moreover, the difference between imagining a scene based on an initial primary perception and freely fancying a scene that is composed of different features of different fragments of perceptive experiences, but one that has not been lived as such, is crucial.

*Varieties of mental images* In his early writings Husserl takes as a motivational lead clue the natural experience we have of such a heterogeneity. He underlines the lived phenomenal contrasts between these different kinds of conscious acts and goes even further: he makes a strong distinction between two main acts of imagination, which he calls on the one side *Bildbewusstsein* (image consciousness) and on the other *Phantasie* (imagination). We will distinguish both in terms of the linguistic distinction between *imaging* (the production of mental images) and *imagining* (the fancying of a radically new world). Thus Husserl offers a more systematized and more gradual differentiation between perception and imagination than that of naive common sense, but he nonetheless follows the trail (if we may say so) of the natural attitude.

Now for the early Husserl (and the early Merleau-Ponty) perception is *the* basic intentional act through which we are able to gain primary access to the world:

When I am perceiving the pear tree in the garden, I am able to detail its main features. While so observing it, it appears not only as having a meaning but also as having a real and factual existence for me.

Husserl calls perception the primary “*positional act*” (*Setzungsakt*), because it furnishes its intended object with a mode of givenness as being effectively here in front of me.

As far as imagining is concerned, a few paragraphs in *Ideas I* (111–112) present us with a clear account of the distinction between perception and imagination with regard to their reference to factual reality. Whereas perception is a positional act, imagination is defined as an act of consciousness that *neutralizes* every factual existence of the imagined object. Husserl therefore calls imagination a *nonpositional act*. The imagined pear tree does not have any real existence for me: I am just acting *as if* it had such an existence. In this regard Husserl comes to the same conclusions as recent studies in cognitive neuroscience that took as their starting point the topographical organization of primary visual areas that make it possible to have a (nonpositional) image as an endogenous activation of topographical visual areas that is nevertheless presented topographically but without a compelling facticity. (There is here an interesting convergence between the empirical and the phenomenal analysis that would need to be pursued further).

***Imagining and remembering*** Now, such a sharp discrepancy between acts of perception and imagination becomes more complex when the act of remembering comes to the fore. Like perception, remembrance is understood by Husserl as being a positional act: the remembered object is endowed with factual reality because, in order to remember it, you *must* have perceived it before, whether just now or a few years ago. Your remembrance will be quite fresh or more diffuse, but it is grounded on a primary perception; unlike perception (and like imagination), remembrance therefore is a founded act. But, unlike imagination, remembrance is a singly founded act (upon perception), whereas the former can be either directly based on perception, based on a remembrance (itself founded on perception), or as a novel emergence, as in the case of free fantasy and daydreaming. In the first

two cases we have to do with an act of imaging: we produce a mental image of a perceived object or of the remembered one. In the third case we'll speak of imagining as a relatively unfounded act, because it does not simply follow the trace of a perceived or remembered situation but produces a new synthetic imagining experience based on multifarious perceptual and remembered features.<sup>3</sup>

Next in line in the phenomenological tradition stands the pioneering study of J.-P. Sartre during the war. Sartre strengthens the opposition between these acts, and Husserl's distinctions become sheer dualism. In *L'imaginaire* (1948; originally written in 1936) Sartre criticizes the tendency, common to the natural attitude and to psychologists and philosophers, to confuse the image of an object for the object itself, in the sense of identifying the mental image with an object within consciousness. Now, contrary to such a static apprehension of imagination as a state endowed with internal contents (images), and along with Husserl's analysis of intentionality, Sartre apprehends what he calls the imaging consciousness (*conscience imageante*) as a kind of dynamical and open intentional consciousness, the intended object of which is an image and not a perceived object.

Based on such a justified criticism, Sartre's whole project then lies in strengthening the difference between perception and imagination. Insofar as the confusion between the transcendent object of a perceiving act and the image understood as an immanent thing inside consciousness is his main criticism, he will do his best to avoid any overlapping between perception and imagination. While taking into account Husserl's distinction between position and neutralization, he therefore enlarges the gap between both acts. He even goes further than Husserl does, since he describes the image as enveloping a kind of nothingness (*néant*) and, at the same time, he endows the act of imagining with a radical freedom. Contrasting with perception, which is dependent on the real existence of the object, imagination is totally free. Passivity therefore determines perception, whereas imagination provides consciousness with a complete spontaneous activity.

What can we conclude from Sartre's analysis? We can say that his critical (we could say antinaturalizing) angle is justified: producing mental images does not amount to statically producing immanent things inside consciousness. Imagination is a dynamic intentional act (Husserl) and not an abstract faculty, the objects of which are mental images that we spontaneously describe as "within the mind." Of course, in light of the previous discussion, it is necessary to actualize both Husserl's and Sartre's view of

mental images as “inside consciousness,” through its naturalization (Petitot et al. 1999), as true but obsolete in its expression. Instead of being “inside,” images emerge from a complex underlying network of multiple cognitive dimensions.

Sartre’s contention is that perceptive consciousness and imaging consciousness are thoroughly different, so that the gap between them cannot be bridged, for the discrepancy disqualifies perception as passive, in contrast to imagination, which is a totally free and spontaneous consciousness. This gap seems to have been overemphasized in these early phases of phenomenological research up until the 1940s. Even if the Husserl of *Ideas I* makes a distinction between both acts, he acknowledges the dimension of activity that makes of perception a primary act and does not devalue it as a purely passive experience. In short, Sartre’s (nonnaturalized) dualism leaves us still more frustrated with regard to the possibility of understanding what is at stake in the empirical result of an identity (or at least a great commonality) of both neural processes (see also Casey 1976 on this matter).

*Nature of the intertwining between perception and imagination* Although Sartre produces an accurate analysis of dreaming and hallucinating consciousness as particular cases of imaging consciousness, such analysis does not lead him to question the strong duality he claims between perception and imagination. Now, we all have had such experiences at least of visual illusions (if not limit experiences of drug-induced hallucinations):

You are waiting for a friend in a cafe and you are transitorily deluded by the appearance of a person who looks very much like him. You are about to greet him and suddenly discover that he is not the person you are waiting for. (For a more detailed phenomenological account, see Depraz 2001a)

Such limit experiences have been explored as well in great detail in the now classic studies initiated by Perky (1910). This is even more striking in hallucinations people have under varying conditions. In both cases the point is the same: these visual illusions or hallucinations are full perceptions, in flesh and bone, and we experience such delusions as being actually perceived. Still, they lead to imagined objects that are nonexistent, with regard, at least, to the compelling requisite of positionality.

This already allows us to see that one way out of the Sartrean dilemma is to introduce a more detailed examination of imagining, instead of the Sartrean strategy of an a priori rationalistic account. In this sense James’s

pragmatic contention in his *Principles of Psychology* about visual imagination, mental imagery, and visualizations (vol. 2, chapter 18) opens the possibility for a very close intertwining, and even merging, of perception and imagination. In many accounts he gives of people able to access mental images (very few scientists, according to him!) there seem to be a great continuity between perceiving and imaging. The use of the expressions “visual imagination” and “visualizations” is telling about the potential merging of both acts in James’s analysis, even if he refuses to take the imagery too literally. All in all, James’s argument is founded on *empirical* psychological accounts, and thus he represents an ideal bridge between the phenomenological approach and modern brain-imaging accounts.

But even the Husserlian advocate of positionality and nonpositionality would be able to reply in two different manners to the contention that, in spite of appearances, imagination and perception do not merge. Such visual paradoxes remain within the realm of perception. However, the appearance of a deluded object is not entirely false merely because it enters in conflict with our habitual perception of objects. As appearance it has its own right to exist, to be real and true. Here Husserl questions the theory of truth underlining classical theories of imagination (Plato, Descartes) as false illusions and claims the truth of images that appear *as* images, endowed with their own intentional mode of givenness that is not the one proper to perception. In that respect the Buddhist Madhyamaka view also concurs on this point.<sup>4</sup>

Thus, the existence of visual illusions requires us to *expand* our concept of perception. In that respect Husserl suggests in many places (*Hua* XVI and *Hua* XXIII) a distinction between *Wahrnehmung* (a narrow positional perception) and *Perzeption* (a perception that includes its own modalizations: doubt, probability, even negation and mental illusions). Such an expanded concept of perception allows us to understand how perception may be permeated by imagination, destroying or at least diminishing the basic difference established in *Ideas I*.

Now, the permeation between the acts of perception and imagination belongs to the late Husserlian investigation (late 1920s, but not published until recently). If one insists upon the enlarged scope of perceptions provided by its inner variants and not on the narrow act of perception reduced to its positionality of the real existence of an object, then perception refers to a far more multiple reality than positionality. It includes our doubts, our confusions, our illusions, and our hallucinations. Perception is not a sheer

normative positionality of the object but covers quite different experiences, from very common ones to more liminal ones. In short, perception is a multiform act, not reducible to positionality, which also implies that imagination is in no way reducible to neutrality (cf. mainly Husserl 1939: 20b; see also Depraz 1996a).

It is interesting to notice that among the dimensions that have reemerged into view is the phenomenological (Morley 2000) and psychological (Singer 1964, 1966) study of daydreaming. Daydreaming plays the role of an intermediate condition between dreaming as such and everyday perception, which again indicates the loose boundary between imagination and perception. The unique characteristic of daydreaming is that it manifests as *imagined emotional meaning*. Most of human life in the flow of consciousness is, in fact, such ongoing daydreaming, a point that did not escape Freud's notice (Bernet 1996), and it is also fundamental to the practice of mindfulness and meditative quiescence (*samatha*) in the Buddhist tradition, as will be discussed. Morley (2000) has recently shown that daydreaming is amenable to a first-person analysis by self-report and interviewing, revealing a complex network of relations between self-world relationships, while contributing a useful example of the application of phenomenological method to the analysis of human consciousness.

Such an extension of the perceptive act on the basis of phenomenological investigation and its consequent mixing with imaging implies that the two acts are not fundamentally different. Now the distinction between positionality and neutralization belongs to the so-called early, or static, phenomenology, which emphasized a stratification of different acts of consciousness. Instead of maintaining a sharp and static opposition between perception and imagination, Husserl's later view offers an account of the dynamic constitution to their relationships. The question then is not, which are the features that distinguish perception from imagination, but rather, how does perception *become* an imaginary act, and, conversely, how does imagination *become* a perceptual one? The emphasis here is on the mutual transformation of one act into the other and vice versa (cf. *Hua* XXIII; see also Depraz 1996b, 1998). In this respect Merleau-Ponty very clearly pointed out the merging between perception and imagination, at best in *The Visible and the Invisible*. All this opens a rich common ground with Buddhism where dialogue will surely prove to be productive.

Through illusions and hallucinations one can analyze how perception can be enlarged to become a kind of imagination, because it goes beyond



the common limits of what we usually call perception. Dreams provide us with the reversed process: the dreaming consciousness is an imaginary consciousness that produces images that look very much like perceptions, and are sometimes even more intense. Thus there is a merging of perception and imagination: imagination becomes here a more intense perception. (On this matter, see Depraz 2001b, part 3).

## 2.2 IMAGINATION AND THE LIVING PRESENT

The intertwining between imagination and perception can now be explored in greater detail, in terms of the dynamic relationship at their *emergence* in any moment of experience. Husserl realized that imagining as the presence of the nonpresent is, in essence, a property of how the living, specious present is constituted. In every moment of now there is surely the just present, which is full of the perceptual content. But one of the subtleties that a careful phenomenology of the present reveals is that together with that perceptual or (as we shall say) *impressional* consciousness of inner time there is also another time consciousness that is proper to imagination, remembrance, and fantasy, which we will refer to as *reproductive* consciousness (in Husserlian terminology this is called *presentificational*<sup>5</sup> consciousness, but the term is awkward for the nonspecialist). In other words, the very core of our temporality is an inseparable mixture of these two modes of apprehension.

The mixture of these two concurrent forms of consciousness means that they are constantly (at every present moment) emerging from a background that is prereflexive or prenoetic, that is, unconscious. From this floating background a constant self-constitution shapes a living present where the impressional and the reproductive coexist. This background's capacity for such recurrent manifestations is reflected in its affective or emotive quality, rather than being a neural or mechanical process. This can be cast also as the performative nature of the memories acquired over a life of habits or intense learning (Squire and Zola-Morgan 1996; Squire and Kandel 1999) and is, as we saw, also intrinsic to the generation of imagery from a neuroscientific point of view.

However, such a dynamic view of the emergence of a lived present should not make us forget the essential ways in which imagination and memory (as reproductions) are also different from perception (as presentations). In memory an object appears in the present but as belonging to the

past. It is thus an aspect of inner consciousness that mixes the past and present without collapsing their temporal distance. Thus it is as if consciousness doubles itself, which is why remembrance, or recollection, is very close to reflection altogether. Imagination and visualization are manifestations whose relation as a reproduction of a previous perception is neutralized or suspended, as if presentification never happened. In the same sense that imagination cannot be reduced to perception, perception cannot be derived from pure imagination. But it is fair to say that any perception is codetermined by the possibility of its imaginary modification.

Thus, while memory and imagination are close cousins, they can be distinguished in inner consciousness. And what is interesting is that both equally express, in an active fashion, the prenoetic background from which they came. In other words, reproductive consciousness is the privileged place for the manifestation of unconscious, sedimented *habitus* and desires. The implications of this observation are very important (see Bernet 1996).

Once again, the conclusions of phenomenological analysis converge with those of cognitive neuroscientific analysis, for both avoid the extreme of ascertaining identity and difference and each discovers in its way their common ground with other mental capacities. This common conclusion is the result of a long history of philosophical analysis from the opposition between Aristotle (who argued for the continuity between perception and imagination) against Plato (who rather emphasized their differences), down to Husserl and Sartre, with the notable exception of Kant. The above discussion points to a converging historical resolution between the work started by Husserl in the 1920s and modern cognitive neuroscience. Casey (1976, especially p. 130) sums up very well the history of this tension.

### 2.3 RETURN TO NATURALIZATION: DOWNWARD CAUSATION

**Global to local** We are now in the position to go back and consider again what we said in section 1.3 on “upward causation.” We examined there how the brain/body could arise through large-scale synchronization to a flow of consciousness in a succession of temporal segments, a string of now moments. We discussed how an integrated moment of the present appears as a *transient coherency-generating process* of the organism. But the global nature of this emergence can also be phrased in its reciprocal sense: the large-scale integrative state that underlies a moment of nowness is capable of *accessing*

*any local neural processes*. Stated bluntly, this means that a mental state has agency and causal power over the very substrate that it needs to arise from. In other words, a unitary emergence is, by constitution, a double, or two-way, passage between two levels. This is *key* to the nonreductive type of naturalization we are examining here. This global-to-local action is constitutive because it shows up as order parameters in the dynamics and is mediated by means of the reciprocal and extensive interconnectivities in the brain and the organism itself. No extra ontological ingredients are required for this reciprocal, effective causation (see Varela 2000 for more on this point).

In this sense it is clear that the neural events accompanying any cognitive act are shaped and modified in the context of the rest of the neural events related to, say, limbic and memory activation, bodily posture, and planning. This is what we mean by “neuronal interpretation”: the generation of a mental-cognitive state corresponding to the constitution of an assembly, which incorporates or discards into its coherent components other concurrent neural activity generated exogenously or endogenously. In other words, the synchronous glue provides the reference point from which the inevitable multiplicity of concurrent potential assemblies is evaluated, until a single one is transiently stabilized and expressed behaviorally. This is a form of neural hermeneutics, since the neural activity is “seen” or “valuated” from the point of view of the global emergence that is dominant at the time. Dynamically this entire process takes the form of a bifurcation from a noisy background to form a transiently stable, distributed structure bound by synchrony.

The neural events that participate in this process of synthetic interpretation via synchronization are derived indistinctly from sensory coupling and from the intrinsic activity of the nervous system itself. Whatever the mental state thus produced, it will ipso facto have neural consequences at the level of behavior and perception. For instance, if a visual recognition is interpreted in the context of an evasive emotional set and in conjunction with a painful memory association, it can lead to a purposeful plan for avoidance behavior, complete with motor trajectories and attention shifts to certain sensory fields. This illustrates once again the key dimension of the view of mental states we are offering here: there is a level-crossing reciprocity in that a mental state as such (i.e., as a global interdependent pattern) can effectively *act* on neural events (that is, it can have downward causation, as the phrase goes). For this to be more than a simple dualistic rehash, it is es-

sential that the dominant interpretation be itself an emergent neural event, hence the odd-looking part of the theory that requires neural events to be the basis of interpretation of another class of nonsynchronous, less coherent neural events appearing at another level.

*Downward causation* By their very nature, mental states make reference both to our own experience (and thus require a phenomenological account) and to our biological makeup (and thus require a fully scientific account). Now we are in a position to ask the central question that animates our inquiry here: How are these two accounts related to each other? What is the specific nature of their circulation?

Cognition is not only enactively embodied but is *enactively emergent*, in that technical sense that we just tried to sketch. Some people might call that by various names: self-organization, complexity, or nonlinear dynamics. The core principle is the same: the passage from the local to the global. It is a codetermination of neural elements and a global cognitive subject. The global cognitive subject belongs to that emergent level, and it has that mode of existence.

Now this principle of emergence is normally interpreted with a rather reductionist twist underlining only its upward causation (section 2.2). What we mean is that many will accept that the self is an emergent property arising from a neural/bodily base. However, as we have been arguing, the *reverse* statement is typically missed. If the neural components and circuits act as local agents that can emergently give rise to a self, then it follows that this global level, the self, has direct *efficacious actions* over the local components. It is a two-way street: the local components give rise to this emergent mind, but, vice versa, the emergent mind constrains and affects directly these local components.

To avoid thinking this is merely descriptive, let me provide an example. We have been working with epileptic patients who have electrodes implanted in their brains for future surgery. Thus, we have access to very detailed electrical signals of the brain of a waking human. This makes it possible to also analyze the moments that precede the crisis and, in fact, to predict its occurrence some minutes before it takes place (Martinerie et al. 1998). This is of course a good example of local properties (the local currents) leading to a global state (the crisis) in a lawful manner. But we were also able to find evidence for the converse: if a patient engages in purposeful, cognitive activity (such as recognizing a visual form), we could see changes in the de-

tailed attributes of the local epileptic dynamics. This means the global state has downward effects over local electrical activity in a very precise fashion (Le van Quyen et al. 1997).

In brief, cognition is enactively emergent and is the codetermination of local elements and the global, emergent cognitive subject. Mind is pervaded by imagination and is not just about representing an “external world.” The mind is about constantly generating a coherent reality that constitutes a world through the dynamics of local-global transitions. Perception is as imaginary as imagination is perception based, by now a familiar theme that we recover from its dynamic grounds as nonlinear causality.

### 3. THE TIBETAN TRADITION OF MENTAL IMAGING AS TRAINING AND THE PHENOMENOLOGICAL IMAGINATIVE SELF-TRANSPOSAL

We are finally ready to address our last point where the contributions of the Buddhist tradition are highlighted. The intertwining of the neurobiological accounts of the living present and imagination and the phenomenological discoveries set the background from the Western tradition for the rich terrain of imagining. A missing element in both science and phenomenology, however, is a thorough exploration of the *pragmatic* consequences of such observations, that is, on how such human capacities are also a means for human change and *transformation*.

It can be said that this dimension of imagining does not really need the Buddhist tradition, since there is significant literature on imagery and learning, for example, in sports training. Since memory is integral to imagery from neuroscience’s point of view, it follows that learning can be brought to bear on stabilizing imagined contents, and thus to produce a desired learning by repetition and coaching. It is also well known that many structures (including the limbic system/mesial temporal lobe) participate in so-called procedural memory. These are memories manifested in performance and not conscious recall, as is the case of declarative memory (Squire and Zola-Morgan 1996; Squire and Kandel 1999). Procedural memory is at the center of acquired habits and sedimented ways of life, particularly in the emotional domain. This context makes it even more plausible to follow the Buddhist tradition in its discoveries for learning through imagery that do not attempt a specific intentional result but rather a shift in human traits in the entire range of social and individual life. It is precisely

this hands-on, broad-based approach where one can learn from the Buddhist tradition because it cannot be conceived apart from an effort directed toward human transformation to unfold its full potential. For centuries we know they have excelled in these pragmatic efforts and sustained a treasure chest of methods and experience pertaining to human change. This is the topic of this last section.

The role of mental imagining in the practices of the Buddhist tradition, and especially in the Tibetan tradition of mental development upon which we focus here, is all-pervasive. In fact, the entire tradition can hardly be understood at all unless one carefully analyzes the multiple effects and sources of imagination as symbolization and of visualization as active imagining. Recalling the discussion above, this tradition has thus exploited in great detail the downward changes made possibly by the very constitution of the living body as a unity of global and local influences, as something that is both conscious and organic. Although at first the elaborate visualizations and techniques might appear as an idiosyncratic or folkloric content, in view of what the scientific and phenomenological analysis reveals this is a very superficial understanding. Before we return to this point let us briefly provide a sketch of practices and methods where explicit imagery figures explicitly.

*A variety of visualization methods* The varieties of visualization can be basically described in the traditional three-fold distinction between Theravāda, Mahāyāna, and Vajrayāna approaches of Tibetan Buddhism. This roughly corresponds to the basic foundation practices dealing with

1. cultivating the basic skill of mindfulness and nondistractedness as an antidote to the core ignorance of human life (Theravāda),
2. the extension of a renewed awareness extended to the concerns for others in our intersubjective constitution (Mahāyāna),
- 3a. the so-called preliminary practices (*ngöndro*), intended to reconfigure one's psychophysical constitution, preparing or purifying one's psychophysical ground for Vajrayāna, and
- 3b. the "advanced" methods of the Vajrayāna tradition dealing with a radical transformation of one's psychophysical reality.

Here we will concentrate on the Mahāyāna practice of exchanging self-for-others, but for the sake of context I will briefly touch on other imagery practices in the Hīnayāna and Vajrayāna schools.

*Śamatha sitting meditation* The very basis of the training of mind is, first and foremost, grounded on cultivating the stability of attention. The exercise of *śamatha* (pronounced “sha-ma-ta”), figuratively rendered as mindfulness practice (Skt. *śamatha*; Tib. *zhi gnas*; Eng. “quiescence”),<sup>6</sup> is based on an examination of the nature of our mind and the origin of habitual patterns by paying meticulous attention to every moment of appearance. In other words, using the activity of mind to go beyond mind, looking at the givenness of experience with a fresh, inquiring glance.

A *śamatha* meditation session is a highly structured event. We focus here on what can be called the daily routine of cultivation for *śamatha*. This is done regularly, during more or less prolonged sessions and over a long period of time (at least a few years). The practice is carried out according to an explicit method or technique, which has variants over different schools in the Buddhist tradition, but for our purposes here I will deal as well as I can with the common core they share. More precisely, I follow here the kind of training I have received from various Kagyü-Nyingma schools. For a very detailed description in a classical setting see Tashi Namgyal (1984), and for a succinct modern presentation Trungpa (1995). Although unique in its own way, this background shares much common ground with most other Buddhist traditions.

The practice is, first of all, based on an attitude of *nondoing*, embodied in a dignified sitting (on the ground or a chair). The posture is centered on the straightness of the spine, the relaxed alignments of neck and arms, and the hands resting on the knees or over one another. The eyes are open or half-open, and the breathing is done through both nostrils and mouth. Once settled into the basic posture, one follows the injunction to “merely” follow what is going on, without engaging in it. Since breathing is ongoing, breath typically becomes a guideline, as an attentional track (in other variants, a mental image is used as support for attention). Although this does not mean that all other sensations, thoughts, and emotions stop, they are considered as if from a distance, from a position of an abstract observer, as clouds on the background of the foreground of the breathing followed into the lungs and out the nostrils.

The cultivation of this mindful presence is done with or without an explicit support of visualization but always with an attentive following of the breath. Some schools use active visualization for *śamatha*. Tsongkhapa, the founder of the Gelug school, wrote extensively on this method in *The Great Treatise on the Stages of the Path to Enlightenment*.<sup>7</sup> As he explains, the ob-

ject to be used as support for visualization can be classified as 1. a mental image (most typically, a Buddha image), the attention being focused without further analysis, or 2. a mental image on the basis of which one cultivates insight beyond stable attention, and thus it is accompanied with conceptual analysis (Wallace 1998:chapter 2). Tsongkhapa goes on to discuss the way different mental images should be used depending on the individuals' abilities and obstacles.

This is the concise manifestation of the *capacity* being cultivated: mindfulness to what is happening in the present and the breath as the point of focus. As all kinds of experiences appear within this attentive space, we explicitly redirect our attention "inwardly," *without* engaging in the examination of their contents, their arising, emerging in full form, and then their subsiding into the background again.

As distracting thoughts, emotions or bodily feelings arise, against the background of sustained attention to breathing, we can become aware of how much we waver from this focusing center. We realize that we are *not* simply following our breath but have gone elsewhere in our experience, wandering along in a chain of thoughts, fantasies, and daydreaming. As soon as we note the sudden jolt of realizing we had not been following the instruction, we simply let go of the distraction and come back to the breathing, our engaged object of attention. This calls for the necessary faculty of introspective monitoring used to see if the mind has fallen into such distraction. The Indian Buddhist philosopher Asaṅga asserts: "What is mindfulness? The non-forgetfulness of the mind with respect to a familiar object, having the function of non-distraction" (1971:6).

This practice of *śamatha* entails an intelligent, active examination and monitoring of the awareness of the breathing, not only as object of attention but as an assessment of our mental state, whether it is actually engaged or not and in what quality. It is this reciprocal engagement of mindfulness and introspection that provides the efficacy of the learning. In fact, the quality of engagement changes constantly through a practice session. It can typically become very excited (full of ideation) or very lax and drowsy. There is rich and abundant literature concerning the skillful methods, obstacles, and antidotes for this training in order that the practitioner eventually finds a balance between excitation and laxity, to a relaxed equipoise (Trungpa 1980; Wallace 1998). Through this kind of sustained training, guided by the experience of others over time, along with the accompanying



methods that provide the learning path, one achieves a degree of stability in *śamatha*.

*The Vajrayāna tradition* The depth and richness of the ways in which mental imagery is put into action reach an extraordinary degree of refinement in Vajrayāna, the tantric tradition of Tibetan Buddhism. This long-standing tradition contains an accumulation of carefully selected visualizations that are claimed to touch on the most resistant core of people's obstacles to realization. In other words, Vajrayāna exploits to its full extent the dynamic self-organization of the mind and imagination that was laid out in the beginning of this essay to encompass the local changes not only in specific brain functions but also to the full extent of the phenomenologically integrated brain/lived body. The fruition is an opening to a direct experience of the open nature of being alive.

Tantric visualization embodies the marriage of a vivid yet nonexistent presence. In spite of its imagined quality, such visualization is said to be closer to our basic nature than so-called real perception. Thus, Vajrayāna deals with a symbolic reconstruction of one's self. It follows that the mental images chosen are not arbitrarily selected; the tradition has concentrated on their detailed efficacy for inducing a transformation in the individual. This know-how goes back to the tradition of Indian *mahāsiddhas*, and its detailed sources are hard to establish with historical accuracy. However, as pragmatic tools, they are available to examination by all those who are willing to engage with the discipline. Each visualization, directed to a specific mode of transformation, corresponds to a particular imagined gestalt, typically with a central figure, or *yidam*. The visualization takes place in the setting of an entire set of procedures, or *sādhana*. At the core of each *sādhana* there is an initial phase of establishing the visualization, or "development stage" (*utpattikrama*), always followed by a "dissolution stage" (*sampannakrama*) into the open background. The development stage is understood as an instrumental approach, in that everything is included in the *sādhana's* practice: attitudes, gesture enunciation, and actions. One becomes a totality that is embodied in the *yidam's* character (Kontrul 1999).

The reader familiar with the Vajrayāna tradition will understand that we are referring to an enormous domain only pointed at by the preceding sketch for the purposes of this presentation. Given its depth and diversity, I will not even attempt to address it further here; a detailed presentation of

the relation between imagination and the Vajrayāna tradition is a major undertaking for the future. However, the overall background developed here for a renewed understanding of imagination and its role in human transformations can serve as a first step to more ambitious studies. Here, I will stay closer to a more basic practice of visualization: the tradition of mind training and the meditative technique called *tonglen*.

***Mind training and tonglen*** The visualization training I will examine here in more detail is traditionally referred to as mind training (*lojong*). The origins of this teaching date back to the coming to Tibet of a remarkable Indian teacher, Atiśa (982–1054) during the eleventh century, the period of Buddhist renaissance in Tibet. He was known at the time as Khedrup Nyiden, one who has accomplished both scholarship and realization by practice. He evidently was also a brilliant teacher who left behind a very active lineage, preserved by oral transmission. Atiśa's core text was made widely available in a compilation by his follower Geshe Chekawa Yeshe Dorje (1101–1175) as a brief root text entitled *The Seven Points of Mind Training*, a pithy summary for a path to develop the aspiration of awakened heart, or *bodhicitta*, by *cultivating* one's compassion and sensitivity to others with the releasing and letting go of self-centeredness as an automatic habit. The teaching took the form of "grandfatherly" advice: aphorisms to be applied at every moment of life and specific techniques for more formal periods for the cultivation of *bodhicitta* (Trungpa 1993; Wallace 2001). The teaching spread to many other schools in Tibet and became known as the Kadampa tradition. It is actively taught today, in particular in the Gelug order and the Kagyü order. This latter tradition has been inspired largely by the remarkable commentary written in the nineteenth century by Jamgon Kontrul the Great, known as *The Great Path of Awakening (Changchup Shunglam)* (Kontrul 1987). The lineage of transmission of these Kadampa teachings was received in the eleventh century by Gampopa, the founder of the Dakpo Kagyü lineage, and transmitted through a succession of practitioners of that order, to the contemporary teacher Chögyam Trungpa. It was from him that Varela received the oral instructions for this practice that animate what is discussed here (Trungpa 1980; Depraz received such instructions from Varela himself).

***Tonglen as practice: "Imagine all the people"*** Atiśa's root texts begins with very evocative lines:

All phenomena should be regarded as dreams.  
 Contemplate the nature of unborn insight.  
 Self-liberate the antidote.  
 Rest in the nature of basic cognition (*ālaya*)  
 In postmeditation one should consider all phenomena as illusions.

Giving and taking should be practiced alternately. That alternation should be put on the medium of the breath.

The last lines are a condensed reference to an explicit practice called *tonglen* (Tib. *gtong len*). *Tong* means sending out, letting go, and *len* means taking in. So sending and taking is the basis of this *bodhicitta* field training. Like *śamatha* and *yidam* visualization, *tonglen* is an actual practice one should conduct regularly and intensify its meaning by periods of intensive retreat. It is only after such familiarization over the years that its fruits can be recognized. A cursory exploration or a weekend trial would not do, as is true in any training in sports, music, and so on.

The practice should be done in formal sessions, lasting about thirty minutes. Here is a procedural description, in three steps.

THIS DESCRIPTION constitutes one formulation of what has been transmitted through the Kagyü lineage and should not be taken dogmatically. Such descriptions are inseparable from detailed oral instruction, and each person should pursue the practice according to one's own individuality. It is highly recommended not to engage in such practices unless the context for its refinement and progress is available.

***Mobilizing imagination in tonglen*** This traditional and celebrated practice has been cultivated, as we said, for centuries by a multitude of practitioners. These accumulated experiences provide telling evidence that such practices (done repeatedly) do lead to a progressive softening or weakening of the automatic position of the “me-first” characteristic of our cognitive ego, or self. The habit of self-interest is gradually replaced by an automatic inversion of one's position so the welfare of others spontaneously takes precedence. Needless to say, in the practice itself the visualizations have a quality of being discursive and fictitious, which they clearly are. But the key point is to regard the imagined situation as if it were real and effective; the exercise then seems to bring about an actual transformation in one's consti-

## TONGLLEN

### STEP 1: STARTING GROUND

The ground for this practice is an attitude of letting go and a light touch to one's experience, whatever it may be, as a reminder of the emptiness of phenomena as the ground.

### STEP 2

Two-stage visualization:

#### STEP 2A

Begin the practice proper by closing the eyes and, in a sort of free association, just allow any painful or emotionally charged recollections to come to mind. One can to some extent trigger, or evoke, a situation that is pressing, or focalize on some specific contents such as someone's illness and suffering or a recent personal painful event. This pain need not necessarily be physical, bodily pain. It could be moral or psychic pain such as depression, neurotic blockages, or external obstacles. The content is visualized in whatever form this comes and then stabilized and sharpened into an image. It is essential this image be very singular and precise; a "general sense" will not do. Typically this visualization is accompanied by an enhanced emotional tone that might vary in each case.

Once the situation is visualized, begin the process of *tonglen* itself, by breathing in the pain, darkness, sorrow, and heaviness of the chosen scene and breathing out from one's core openness, warmth, and release back into the person or situation. In other words "exchange" means to replace oneself in the position of the person who is suffering to provide space and relief to the other. Practice this exchange on the medium of the breath for some time so that the specific situation evoked is felt to the core.

#### STEP 2B

As the visualization in Step 2a become more or less established, proceed to extend the same exchange and felt presence beyond the singular situation to a larger field touching many other people (or sentient beings) who are in a similar predicament. Make this extension literally by visualizing the multitude of such beings, known or unknown, so that they populate the space before your mind's eye in front of you. Continue to provide release and comfort coming from your open core and absorb into that core the quality of pain and suffering before you.

When this extension has become too abstract and diffuse, interrupt the practice, make a fresh start, and cycle back to step 2a, perhaps with a different event or situation.

### STEP 3: CONCLUSION

When it is time to finish the session of *tonglen*, one dissolves the visualization into its ground and rests one's mind in free-flowing mindfulness again.

tution (physical and psychological) into further openness. Stages 2a-b play explicitly on the interdependency between memory and imagination; the distinction between the two is not obliterated but kept in active contrast. Given the findings both in cognitive neuroscience and phenomenology summarized above, the effectiveness and skillfulness of *tonglen* become much more intelligible. The road of such Bodhisattva mind training is surely long, but what's important is that it can be taken at all, and that this can be mediated by explicit practices. Thus, *tonglen* thoroughly exemplifies the skillfulness of imagining, an emotional training and moral transformation based on know-how rather than on abstract moral injunctions.

It is essential to remark that *tonglen* is eminently a practice based on the existing intersubjective nature of one's experience. The exchange is possible only because humans are already immersed in a network of empathic relations. One's cognitive identity is inseparable from this foundation, as modern research is making more and more clear (cf. Thompson 1999), and phenomenology has explored this also in great detail (cf. Depraz 1995). Thus, we are dealing neither with a private self-absorption nor with visualization akin to elaborate *yidam* symbols, as in Vajrayāna. *Tonglen* seems to exploit explicitly the fact that each person's individual life is like a hologram of human social life, with its bonds and interpersonal circulation. Through this training, which initially goes against the river of our phylogenetic heritage of self-preservation, the opposite of a "private" thing, the true nature of experience comes to the fore. In this respect the *tonglen* practice meets very closely the Husserlian imaginative self-transposal at work in empathy (*Hua* I 1950a and *Hua* XV, no. 18) that Spiegelberg developed still more concretely in his *Doing Phenomenology* (see Depraz, Varela, and Vermersch 2001; Depraz and Varela 2001).

#### 4. BREAKING NEW GROUND

*Drawing consequences* It is now time to draw some conclusions from the admittedly complex road we have followed. Perhaps the most important conclusion we want to emphasize here is that as one brings together the empirical and the experiential as corresponding mutual constraints, old dualisms disappear. The dualism of mind and matter as forever apart merges into a new conceptual space where we see that, if one gives the local to global *and* the global to local their proper role, mind and experience reveal

without any mysterious residue an effective or efficacious potential. Our minds are enmeshed in multilevel causalities in the material basis of our bodies, just as much as this organic basis is the substrate from which our mind can be said to emerge. A purely one-sided emergence view that deprives experience of its active dimensions is bound to negate its understanding as a mere epiphenomenon.

Imagination is a privileged, detailed example for such a new framework. It provides us with a unique case study where we can put into place (in an unfinished form, to be sure) all the ingredients present in this important entire phenomenon rather than a lopsided view. Let us summarize this itinerary, which is entirely cyclical:

- Brain-imaging studies of mental imagery reveal the following:
- Imagination is at the crossroads of many other mental capacities: language, memory, motor actions.
- The physiological basis of imagining can be traced to a network of many distributed circuits and sites, typically all those that are active during high-level vision in active life. The specific networks that are active are highly dependent on the imagining task being examined and the individual's style.
- The neurodynamical study of such large-scale phenomena reveals that the large-scale integration of this multiplicity of brain/body sites appears as a dynamic signature, or fleeting emergence, via synchronization for the duration of moment of experience (upward causality).
- The globally emergent configuration of the organism, however, can be reflected down as a local constraint on detailed physiological and even genetic processes (downward causality).

The phenomenology of imagination reveals that:

- Imagination is clearly different from perception, but they appear to be closely related.
- Imagination is part of a family of mental events that include memory, fantasy, daydreaming, and dreaming.
- Perception and imagination work as complementary, or codefined, modes of consciousness in any moment of the present lived moment. They modify and condition each other.
- The transition points between the purely empirical and the experiential, however, are crucial and must be analyzed at their appropriate levels of dynamic patterns that provide a passage between the experiential and the

observations from a third-person point of view. In other words, the gap between neurons and experience remains forever.

- Imagination arises out a background of prereflexive, or unconscious, sedimented habits, what paves the way for the intersubjective imaginative self-transposal.

The Buddhist tradition implicitly shares most of these conclusions, but it takes them into the realm of pragmatic implications for human transformation.

- *Tonglen* constitutes a precise case of a skill to achieve change in one's spontaneous reactions and attitudes toward the other and the world.
- The transformation is induced by carefully selected visualizations that are designed to induce changes in one's associations and emotional responses.
- This transformation can be seen as based on the pervasive interlinking between what appears in our experience in visualization (global) and the basis of the appearing (our body/brain), which is revealed by studies on brain imaging.
- The efficacy of such downward causation is evident in a long history of practitioners and their transformation (and also echoed in a number of recent studies on the brain's plasticity, as, for example, in sports training and child emotional development).

This cycle, we repeat, reveals the *entire* range and coherence of the phenomenon of imagining rather than merely one or another of its dimensions. The three dimensions of the empirical, the experiential description, and transformation practices form a coherent whole, not contradictory views. They illuminate, rather than exclude, one another. Here we have attempted to trace the phenomenon of imagining from the side of the material, never abandoning its material support, and yet explore it in such a way that it leads to the global level that manifests as first-person experience. On the contrary, one could start from the full-blown efficacy of Buddhist visualization practice and, by tracing the phenomenon without ever leaving its specificity, open up, as it were, into its most detailed empirical level. This is what can appropriately be called a *neurophenomenological* analysis, as Varela has described elsewhere (Varela 1999).

Thus imagination is a perfect example of what we wish to call (with Bruno Latour) a *mixed* object, like an alloy where the notion of "ridges" becomes irrelevant. There is only *one* phenomenon, and one can traverse it from one to another of its qualities, from experiential or organic without

rest or jump. There is no gap to bridge, only traces to follow, as we have done in this essay. In other words, once the constitution of the natural object is adequately understood in the phenomenological realm, pure experiences can also be considered as belonging to a psychological consciousness and hence belong to an organism. In this precise sense data rooted in *lived firsthand experiences are intrinsically open to a nonreductive naturalization*. This is a central thesis that animates the neurophenomenological research project, which is possible only if the central issues of embodiment are of central concern for cognitive science (such as the enactive approach), for phenomenology, and with regard to first-person methods dealing with human transformation, where Buddhism excels. In fact, it is in the lived body, broadly conceived, that one finds the “the close relationship” between experience and its grounding, both as lived body (*Leib*) and biological body (*Körper*; see Depraz 1997). It is in this realm of events that we are given access to both the constitutive natural elements familiar to cognitive science as well as the required phenomenological data.

The notion of reciprocal constraints between the brain and experience can now be more precisely presented by exploring the nature of mixed objects as such. This means that in the study of mind, any phenomenon is understood from the beginning as a mixed object, as if the real is also in delicate balance between two avenues of discourse. On the one hand, we have the avenue that seeks to naturalize phenomena (i.e., imagination) and that leads directly to the account we can glean from science. On the other hand we have the avenue that seems to make experiential, or phenomenize the empirical (i.e., the emergent patterns), by discovering in them one’s entire experience (including our social history and language), which is always already present. This balancing act of traversing the route of naturalizing and the route of experientially phenomenologizing is both possible and productive. It requires the hard work of exploring with precision and discipline the potentials in specific domains.

### Notes

1. For a Buddhist account of the distinction between experience-evoked images and language-evoked images see Gen Lamrimpa 1999:32–38. This passage also explains the distinction between the basis of conceptual designation and the designated object.—Ed.
2. *Imagination* takes its roots from Latin *imaginari*, to copy. A mimetic quality