A Second Eye and Wings for the Cyclops: 
A Fractal Temporal Analogy to Hockney’s Collages

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Abstract

David Hockney has criticised the shortcomings of traditional photography, which limits the observer to a single, frozen perspective. He likened this split-second exposure to the perspective of a paralyzed cyclops – a perspective which does not correspond to our natural viewing habits. His photo collages attempt to remedy this limitation by expanding the observer perspective to a multi-focal one.

In a temporal analogy to Hockney’s cyclops model, my Fractal Theory of Time provides the observer with a second eye by adding the temporal dimension of simultaneity to that of succession. Within the framework of this theory, observer perspectives can be described in terms of their density: the number of simultaneous perspectives within a Now. The fractal temporal perspective manifests itself as an extended, multi-focal time bubble.

However, even such a time bubble still makes us a mere observer-participant. In order to become a pure participant, we also need to acquire “wings” – that is to say, create an extended sphere of influence by incorporating external delays. While both postdiction and anticipation will widen our time bubble, our Now, and provide us with a multi-focal perspective, it is only embodied nesting, i.e. the incorporation of postdiction and anticipation, which will allow us to grow the wings of a pure participant.

Keywords: frozen perspective, multi-focal vision, fractal perspective, nesting, embodiment

1. Introduction: Overcoming the Frozen Perspective

The central perspective developed during the High Renaissance provided the illusion of spatial depth on a two-dimensional canvas. However, observers still found themselves trapped in a frozen perspective, which was to influence our viewing habits for centuries to come. Only when Picasso and Braque introduced the simultaneity of temporally incompatible perspectives was it realized that perspective could be described in terms of density. This density of synthetic cubism resulted from simultaneously viewed succession – that is to say, temporally incompatible perspectives squeezed into a single observer frame.
David Hockney’s criticism of traditional photography, which limited the observer to a single, frozen perspective, emphasized the shortcomings of this limited perspective: He remarked that “photography is all right if you don't mind looking at the world from the point of view of a paralysed cyclops – for a split second” [Hockney, 1999]. His photo collages expand the observer’s perspective because he allows us to add that very special ingredient: time. This we do by arranging the individual photographs successively into a meaningful sequence, with each providing a context for another while being itself contextualized by other photographs in the collage. This can be seen, for instance, in the collage Gregory and Shinro on the Train to Nara. [Hockney, 1983] The individual pictures in the collage are perceived as a narrative, a meaningful whole. What this amounts to on the temporal level is the creation of a multifaceted perspective, which turns succession into simultaneity.

The density of a perspective can be measured in the number of simultaneous perspectives within a Now. It is a measure which reflects not only the complexity of the object under observation but also the internal range of possible responses an observer-participant has at his disposal. [West 2006, Vrobel 2011]

2. Fractal Time: Describing Observer Perspectives in Terms of Their Density

A cyclops’ one-eyed perspective limits his vision only. He may be able to use other sensory input to navigate the world. Normally, we experience cross-modal perceptions, consisting of visual, auditory, olfactory, haptic and proprioceptive impressions. We embed all those impressions into a coherent Now by nesting them in such a manner that we recognize a jigsaw puzzle as a meaningful entity. And, yes, we can go further: Our extended Now accommodates not only simultaneous impressions which are induced by our sensory perception, but also our memory of the past and our expectations of the future. Together, they create a multi-focal temporal perspective: a time bubble.

The classic example is Husserl’s description of how we perceive a tune [Husserl, 1928]. We do not hear uncorrelated notes, but a tune, because we retain the note just played in our Now and, anticipating that this was not all, we listen for the next note, which we shall also embed in our extended Now, and so forth. We thus create a nesting cascade of notes by embedding the present ones into the context of the notes which still linger on in our Now and those we anticipate to follow.

We thereby create two temporal extensions in our Now: succession and simultaneity. The nesting cascade consists of contexts embedding notes, which, again, become context for the next notes, and so forth. This creates the temporal dimension of $\Delta_{\text{depth}}$ – that is to say, simultaneity. At the same time, we could also consider the successive notes only, on a single level of description, and thereby create the temporal dimension of $\Delta_{\text{length}}$, which measures succession. Disregarding context creates succession, whereas contextualizing generates simultaneity. The resulting temporal texture is the density of time, $\Delta_{\text{density}}$, the fractal dimension of a time series. I have defined elsewhere these temporal dimensions by means of which observer perspectives can be distinguished [Vrobel 1998].

Any nesting of temporal intervals – that is to say, any contextualization – creates simultaneity and therefore increases $\Delta_{\text{depth}}$ and, in its wake, $\Delta_{\text{density}}$. This does not necessarily require interaction with the outside world. The nesting cascade could result from recursive
recollection of past events or of expected future events – both postdiction and anticipation widen our time bubble.

3. Widening our Time Bubble Through Boundary Shifts

So far, we have shown that the cyclops can be equipped with a second eye by adding the temporal dimension of simultaneity to that of succession. However, he still perceives the world through his own perspective only, within a time bubble which encompasses only that one perspective. Providing a second eye is only a necessary, not a sufficient, condition for extending his time bubble into that of a true participant. He still lacks a vital ingredient which allows him to navigate the world successfully: nested incorporated perspectives.

We can extend our time bubble by incorporating external delays. Daniel Dubois’ concept of endo-anticipation describes this phenomenon as the incorporation of a model of both the observer himself and his environment [Dubois, 2000].

It is important to note that true incorporation exceeds mere resonance or entrainment. A walker with a healthy gait can serve as a pacemaker for another individual whose range of movement is limited as a result of a neurodegenerative disease such as Parkinson’s [Sacks, 1991]. However, once the walker ceases to serve as an external stimulus, so does the entrainment effect. True incorporation requires a corresponding lasting boundary shift – that is to say, a physical change on the neural level. This happens, for instance, when neglect patients map far space to near space in their brain [Clark, 2008]. It also occurs when a delay introduced into a control loop is compensated by a “steersman”. This could be an artificially introduced delay in a response after pressing a key, or one resulting from the introduction of friction into the control loop. A well-known example is the experiment in which a macaque monkey had learned to move a cursor across a screen by means of his neural activity. When a robot arm was added to the loop, causing mechanical friction and thus a slight delay in the cursor-steering process, the monkey became confused at first (as the robot arm was not visible to the monkey). Soon, however, it compensated for the delay and continued to smoothly steer the cursor across the screen, unaware of the change in the temporal response time [Clark, 2008]. That is to say, after prolonged exposure, the external delay was anticipated and incorporated. It was unconsciously compensated and thus became undetectable for the macaque steersman.

4. Compassion Meditation Incorporates Exo into Endo

If the incorporated external delays are those of other human beings, we create a boundary shift which expands our time bubble so as to include their different temporal perspectives. Such shifts may be attained by compensating for external delays. They may also be brought about through cultivating compassion – that is to say, through our empathic ability, as Albert Einstein knew:

"A human being is a part of a whole, called by us 'universe', a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest ... a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from
this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty" [Einstein, 1954].

Empathy is achieved by mirroring the world around us. It enables us to see the world through the eyes of others. After repeated exposure to and internalization of another person’s delay times, we first tend to become entrained in those delay times and may eventually incorporate them. We know that true incorporation has occurred when we are no longer aware of those previously external delays – that is to say, they become undetectable for ourselves when we have formed a new systemic whole with them. Usually, we are not very good at noticing such changes within us – they are far easier for an external observer to detect.

Which brings us to Otto Rössler’s distinction between the endo- and exo-perspective. The endo-perspective is the view from within, which is subjected to the microscopic movements in our brain and our bodies. The endo-observer’s perspective is limited as a result of the fact that he is situated in and part of the world he is observing. The exo-perspective, by contrast, knows no such limitations. It is the idealized view of a non-participating demon – that is to say, a creature which is exterior to the world it is observing. But such a position is inconceivable, as observation necessarily implies participation [Rössler, 1998]. However, the good news is that although the endo-exo boundary may not be permeable, it is shiftable.

A way out of the endo-prison consists of incorporating, step by step, more and more external delays into ourselves, thus creating an ever-expanding systemic whole. In practice, total incorporation is an idealized goal, as we probably won’t encounter every individual’s delays during our limited lifetime. (Furthermore, we may not wish to incorporate all external delays we encounter, in particular if they are unpleasant.)

One method of widening our temporal perspective is compassion meditation. Matthieu Ricard has provided very clear introductions to this method [Ricard, 2007]. It may be described as the nested cultivation of loving-kindness, which step by step, extends outwards, first focussing on oneself, then a good friend, a neutral person, a difficult individual and gradually the whole universe. Richard Davidson has shown that compassion meditation increases our ability to change perspective – that is to say, to see things through the eyes of another individual [Davidson, 2009]. It has also been shown to increase gamma wave synchronization, which Singer correlates with states of consciousness (as opposed to states which do not correlate with conscious activity) [Singer, 2009]. It is therefore tempting to suggest that increased synchronization correlates with an expanded consciousness. However, for the time being, this is mere speculation and awaits further research.

Simulating other individuals’ perspectives through empathy will widen our time bubble through incorporated delays – that is to say, our invisible temporal compensation. Once this simulation is accompanied by lasting changes in the brain, a boundary shift will have occurred, which expands our endo-perspective. By incorporating other individuals’ perspectives, we acquire the “wings” of a true participant. This requires a gradual process of nestiing previously external delays by incorporating them. Theoretically, this process of expanding our time bubble could go on ad infinitum: by eventually incorporating the whole universe, we would reach sheer simultaneity and become a pure participant. In other words, our endo-perspective would comprise everything previously assigned to the exo-perspective.
5. Pure participants: Trust and (Spooky) Action at a Distance

Boundary shifts occur when we participate. Within ourselves, our immune system continuously creates boundary shifts, when it differentiates between self and non-self. On the social level, we do the same when we interact as systemic wholes with other sentient beings.

By mirroring other individuals, we incorporate their delays and form new systemic wholes with them. Through conditioning, such delays will continue to exist even if the original external trigger is no longer present, and the world can be accessed and interpreted via those delays long after they have ceased to exist. At this point, the cyclops will have grown wings.

How would such wings manifest themselves, apart from physical changes in the body and cortex? Two manifestations come to mind: trust and macroscopic non-locality. I believe our ability to trust is the most powerful manifestation of incorporated perspectives. Trust requires both postdictive and anticipative skills which widen our time bubble – that is to say, our sphere of influence. Or, as Niklas Luhmann puts it, trust is the reduction of social complexity [Luhmann, 1968 and 2005]. However, when acquiring new perspectives through internalizing those of others, we should avoid what Ellen Langer calls “entrapment by category”: relying too rigidly on categories we have created in the past [Langer, 1989]. Only frequent re-assessment and flexibility will allow us to re-calibrate the structure and extent of our time bubble and thus create invisible networks between internal and external delays.

Such invisible networks of embodied postdiction and anticipation may generate effects which, on the phenomenological level, may be seen as manifestations of macroscopic non-locality. As I have described elsewhere, the endo-observer is blind to the temporal interfaces he has incorporated, as he is no longer aware of the anticipated delays and his compensatory action [Vrobel, 2010]. The temporal interfaces the endo-observer has newly incorporated would only be visible from an exo-perspective. We may therefore suggest that the endo-exo boundary is not only shiftable but is located at different interfaces, depending on whether it is described from the inside or the outside.

With this in mind, what an exo-observer would describe as action at a distance may, after all, not be perceived as spooky to the endo observer: It is a direct result of his extended time bubble. If a delay is no longer perceived as such, it has become invisible and, therefore, non-existent, as the temporal distance has also ceased to exist for the endo-observer. To an exo-observer, however, that temporal distance would be real, as the temporal interfaces between the nested delays are visible from outside the system. It is important to note that both the world of the endo- and the exo-observer have the same ontological status.

6. Conclusion

As we have seen, for the cyclops to acquire a second eye would be remarkably easy. Any hermit would be capable of achieving this goal. Acquiring wings, however, requires a physical change in our body and brain which can only be attained through the incorporation (and, thereby, compensation) of the delays of other human beings. Being able to incorporate their temporal perspectives is a worthwhile endeavour, as true incorporation of other persons’ delays stretches our endo/exo boundary and allows us to experience trust as a result of participating in the world through a more extended \( \Delta_{\text{depth}} \). Dubois’ endo-anticipation, i.e. the incorporation of previously external delays, allows us to achieve a degree of simultaneity with
the rest of the world which by far exceeds the most extended time bubble generated by an isolated individual who boils in his own broth.

When new systemic wholes are created through the incorporation of environmental delays, the endo-exo boundary shifts outwards. In other words, our time bubble extends layer by layer, like concentric rings, because we have more and more compensated nested delays at our disposal. As a result, the degree of simultaneity in our Now ($\Delta t_{\text{depth}}$) increases. One positive effect of a widened time bubble is trust, another the possibility of seeing action at a distance not as spooky but home-made.

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