

REALITY CONSTRUCTION AS PROBLEM ORIENTED DECOMPOSITION : BETWEEN (SOCIAL) CONSTRUCTIVISM AND REALISM

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ABSTRACT

By constructing realities, we try to make the stream of our experiences manageable. Reality construction thus takes place in a context of continuous problem orientation. What basically drives reality construction is not some all-compassing plan, but an unremitting flow of problem orientation. The results are not neatly ordered patterns of separable elements, but large nets of constructs, with complex interdependencies.

The construction of reality must be understood in terms of its problem orientation. We have to face the interconnectedness of the constructs, including social and temporal interconnections. We should not try to decompose the interconnections by means of prefabricated universal schemes. Only by specifying our own problem orientation in studying the construction of reality, we can come to a well-considered choice of a decomposition strategy.

INTRODUCTION : NAVIGATION WITHOUT REFERENCE

In a broad sense, the term 'constructivism' refers to the idea that what we see as reality must not be understood as an objective representation of something outside of us, but as something that we create ourselves, something for which we are ourselves responsible. Watzlawick¹ speaks of 'invented reality' (as opposed to 'discovered reality'), and elaborates this concept

¹ Paul Watzlawick (ed.) : The invented reality, 1984, Norton & Co, New York

by the following metaphor.

'A captain who on a dark, stormy night has to sail through an uncharted channel, devoid of beacons and other navigational aids, will either wreck his ship on the cliffs or regain the safe, open sea beyond the strait. If he loses ship and life, his failure proves that the course he steered was not the right one. One may say that he discovered what the passage was not. If, on the other hand, he clears the strait, this success merely proves that he literally did not at any point come into collision with the (otherwise unknown) shape and nature of the waterway; it tells him nothing about how safe or how close to disaster he was at any given moment.'²

The metaphor is related to a distinction, made in the same book by Von Glasersfeld³, between 'fit' and 'match' : in constructing a reality, one does not get a representation which 'matches' some objective world outside, but rather something that 'fits' the constructor's criteria.⁴

The captain's navigation problem convincingly portrays the lack of surveyability that characterises our existence as thinking and experiencing human beings. We are navigating in a space with no ultimate point of reference. All beacons are our own construction. Watzlawick's metaphor underlines how little we know what we are doing when we construct reality.

In many constructivist approaches, however, this basic idea tends to be narrowed down to the assumption that, even though we have no final standard to tell what 'really is the case', knowledge does result from identifiable construction processes, that can be understood in terms of formally describable operations, or even straightforward computation. Knowledge is thus understood as a result of formal operations, similar to a computer programme, or at least the results can be simulated with a computer.⁵

In this paper, I will start with Watzlawick's metaphor. I will go somewhat more deeply into what the metaphor implies, and, more importantly, why even this metaphor is still too narrow. This will lead us into an investigation of what an understanding of reality construction must comprise. In some respects, the narrow approach of formal/computer paradigms does not seem

² op. cit., p. 14-5

³ Ernst von Glasersfeld : An introduction to radical constructivism, in Watzlawick, op.cit.

⁴ As criteria for 'fitting', Von Glasersfeld mentions things like 'it stands up to experience and enables us to make predictions and bring about or avoid, as the case may be, certain phenomena (i.e. appearances, events, experiences)'.

⁵ It is not apparent that Watzlawick would see this as narrowing down the subject. E.g., at the same page where he unfolds the metaphor he makes reference to a contribution by Von Foerster (in the same volume) which is entirely based on computational metaphors, and there is no indication that Watzlawick considers this a major curtailment.

the most adequate one, at least not at the moment or for the near future. I will then sketch some elements of an alternative, broad approach.

THE NAVIGATION METAPHOR EXAMINED

Even though the navigation metaphor strongly conveys the orientation problem each human being is facing while creating his or her reality, it still tends to suggest more grip than we actually have. For the captain's criterion of success is a rather unambiguous one: to reach the open sea without hitting a rock. The criterion will be very much the same for all captains, at any point in history. For reality construction, on the other hand, the criterion of success ('fit' in the terminology of Von Glasersfeld) is often much less clear-cut. There are at least three reasons for this :

(1) Reality construction is part of human life, it is embedded in the practice of that life. The construction of reality is not some abstract procedure, located in an isolated sphere; it is entrenched in the whole complex of motives and goals of the human constructor. These goals and motives cannot be completely separated into disjoint categories for different subdomains of life. There certainly is some degree of differentiation into separate spheres, but a person is never simply an assemblage of unconnected personalities or roles; each element or aspect of a constructed reality must somehow make sense in the life of a person as a whole.

(2) A second complexification enters once we realise that reality is not constructed by individual actors in isolation, but by actors who interact with each other. This implies not only that the construction process is a social one, but also that the 'fitness' criterion is in fact a social product. In as far as actors are dependent on interaction processes for coordination and other purposes, these interaction processes put constraints on what are viable realities (obviously, this influence of social interaction on reality construction is not a one-sided effect, at the same time the constructed (social) reality has its influence on the ways of interaction).

(3) Finally, criteria for 'fitting' evolve over time. Reality construction is a continuing process. Since each element of a constructed reality has to 'fit' with the other elements of that constructed reality, any change in a constructed reality in principle leads to a change of fitting criteria. Certain new elements may expel some old ones. Actors may come to new modes of interaction which they find more satisfying, thereby changing the constraints on the process of reality construction, which in turn may lead to new constructed realities.

The picture of reality construction that emerges from these considerations is one of interconnectedness and complexity. Part of this interconnectedness is already implied in Watzlawick's metaphor itself : we cannot test singular elements of our navigation strategy, we only see the results of whole packages. All the captain knows is that the sum of his steering actions finally got him to the open sea; he is not able to evaluate the precise contribution of the steering direction at each particular moment. And when he hits a rock, it

was not necessarily the last steering choice that was the fatal one; for maybe he left the right track already a long time before, leading the ship into a dead end where it was bound to hit the rocks at some point. In constructing reality, problems are faced quite similar to those of the captain. We usually cannot test singular elements of our construction of reality, all we can test are complexes (and we must reckon with dead end streets too; I will come back to that in a later section of this article).

But as we have seen, the navigation metaphor still underplays the complexity that we are actually facing. For in contradistinction to the navigation metaphor, reality construction presents us also with connections between subdomains and roles, with social connections between different actors, and with connections over time. Even for the highly specialized domains of science, a picture of the construction of reality and knowledge must take into account the full body of social interaction that is involved, as the extensive literature in the sociology of science since Kuhn has shown. Scientific knowledge is constructed and negotiated in the social processes that go on at laboratories, in the access to scientific publication, in scientific committees.⁶ What is considered valid scientific knowledge at a certain moment bears the mark of values and beliefs in society in general, of the motives and strategies of individuals, and of the organization of the social processes involved.

It is no wonder that almost every time we try to analyze why we use certain concepts, hold certain beliefs, make certain choices, this turns out to depend on much more than one would immediately guess. We take into account many more aspects than we realise; this shows in particular when routines break down : then we see that the routine is not blind, and that our range of attention is much wider than is apparent from the routine itself.

So a very broad conception of reality construction is needed, where these multiple interconnections can be accommodated.

THE COMPUTER METAPHOR EXAMINED

Despite the large body of evidence in support of a broad view of reality construction, many constructivist approaches tend to a more or less formalistic brand of constructivism. Especially computer metaphors have proven to be very seductive. There is of course no point in denying that formal structures are an important category of instruments by which we construct reality. Instruments, however, do not dictate their own use. Whether and how one applies an instrument in a concrete situation is always a choice, be it conscious or unconscious. It could be that the way we (consciously or unconsciously) choose to apply a formal instrument in a particular situation can itself be described in terms of formal operations. But even if this were

⁶ See e.g. the classic study by Latour and Woolgar on knowledge construction in the laboratory, that closely follows the transformation processes from observations to scientific papers.
Steve Woolgar, Bruno Latour : Laboratory life : the construction of scientific facts, 1979, Sage, London

the case (and we certainly have a long way to go before we will be able to ascertain such a conclusion), the criteria by which these choices are made are likely to be of rather high complexity, since as we just saw the criteria for 'fit' are not easily decomposed.

In this context, the neural network paradigm is of some significance. It is certainly possible that it will deal the final blow to the classical idea of knowledge as representation. It seems at least conceivable that complex and interwoven judgements are somehow similar to neural networks. Right now, however, it is however far too early to tell the empirical significance of the neural network model. Today's artificial neural networks have sometimes difficulty in finding even very simple patterns, and we have hardly any insight in the behaviour of artificial neural networks of high complexity. It looks as if the main lesson that can be drawn from the experience with neural networks so far is that mental processes may actually be far more messy than we imagined.

There is not much use for a discussion about whether or not computer models are appropriate for the human brain. Neither a definite yes nor a definite no is defensible at present; it simply is far too early for such conclusions. Taking computing as a general model for reality construction is therefore premature. It can be an interesting exercise to explore the theoretical and epistemological implications of such a model⁷, but that should be firmly distinguished from providing a sound basis for furthering our practical understanding of reality construction at the present time.

If reality construction shows a great deal of interconnectedness, then a framework that erases most interdependencies just because right now we know little about them is bound to be ineffective. It would be the framework that dictates what we get to see, not because that is what we wanted to see, but because this and nothing else is what the framework makes visible. This is precisely what the computational paradigm does : if in our attempt to understand reality construction we confine ourselves to what can be understood in terms of formal operations, we will have to give up any insight that cannot be traced back to the use of these formal operations. But there is no a priori reason to dismiss anything not reducible to formal operations, nor does the present state of knowledge by any means imply that we can do without such non-formal insights. This is of course not to say that any attention for formal operations is misguided. It only suggests that the programme that often is the basis for such attention, namely the attempt to understand reality construction exclusively in terms of formal operations, is (at least for the present) not a wise strategy.

THE DECOMPOSITION OF REALITY CONSTRUCTION

What we take as reality depends upon a wide variety of motives, upon social interactions,

⁷ It is worth noting that the most sophisticated model at the moment, the neural network model, is so flexible that the only general constraint derived from it so far is that reality construction is not representational.

upon historical evolution processes; and each element of a constructed reality has to fit in with the other elements of that constructed reality. When we ask how reality is constructed, we arrive at questions like : what are viable global realities, viable worldviews, viable cultures - the latter term seems preferable, since it expresses most clearly that it is not just a matter of beliefs, but also of interaction practices; if we would take into account the temporal dimension as well, we would even have to talk in terms of cultural evolution trajectories. The decomposition problem presents itself in full state here. Reality construction is not easily decomposed into separate sectors. A reality is an ensemble of elements that fit together, and we cannot talk of the fit of one element independent of the other elements. Most of the interdependencies and complexities are not yet understood at all.

So we find ourselves caught in a dilemma : on the one hand reality construction in its full complexity is beyond our intellectual grasp, and we need to reduce this complexity somehow; but what is left out may be essential for a good understanding. It may look as if these considerations are preparing the way for some phenomenological or hermeneutical paradigm. But these paradigms are merely a restatement of the dilemma just mentioned : they warn against reductionism, and stress that we should take a more full understanding, that we should open ourselves up for all aspects of a situation; but they have difficulty in telling us how exactly how this goal is to be realised.⁸

In this paper I would like to draw attention to an entirely different potential strategy. Instead of adopting a preconceived framework that disconnects the links that make a life into a whole, and a human being into a (social) self, we could start from the problem experience that is the drive behind all reality construction. After all, studying reality construction is itself an instance of reality construction. The question then is : how do we find our direction when we construct reality? We do not construct realities as some kind of academic exercise. Realities are an attempt to cope better with our own experiences. Reality construction is not directed to one final goal; rather, it seeks for continuous improvement, improvement in coping with experiences, and improvement of constructed reality as an instrument in this coping. The measure is not in the present 'reality', framed in some absolute coordinates, but in the transition from the previous to the present one, and from the present one to the next. The drive behind the continuous process of reality construction is that the present construct is in some way problematic and that we want to adapt it. The starting point is a problem experienced by the reality constructor, that is, a diagnosis that something is significantly at variance with how one would like it to be. In short, reality construction is problem oriented. This problem orientation takes many forms; e.g., a researcher may construct and put forward certain reality claims for purely personal gains (then acceptance by others will be much more

⁸ For a somewhat more extensive discussion of the hermeneutical option, see Frans A.J. Birrer : Human science in a political world : the importance of checks and balances, 1993, Reprint 93-38, Dept. of Computer Science, Leiden University

important to him than whether these others will actually benefit from it), or he may be driven by a desire to contribute something useful for the community in general. In most cases, there will be a mixture of many different (conscious and unconscious) motivations.

Taking the notion of problem orientation as a point of departure, we must of course remain aware that problems are themselves not independently fixed. Like realities, problems are constructed. The reason to talk about problem orientedness is that it enables us to articulate the bootstrap character of reality construction, i.e. that we do not evaluate constructed realities as such, but rather the transition from one constructed reality to another (hopefully better) one.

Applied to our own enterprise, the attempt to understand the process of reality construction itself, this suggests that instead of trying to grasp the construction of an *entire* body of reality, it would make sense to concentrate on what is problematic in constructed realities, on aspects where constructed realities are actually preventing actors from coping adequately with their experience, or where they are less helpful than they could be. This would, amongst other things, put the spotlight on an important issue that is certainly underexposed in constructivism - if not entirely neglected : how the instruments that we use in reality construction can run away with us, how we may get captured by our own instruments. Reality construction can lead one into a dead end, where coping is inadequate, but where at the same time it is difficult to find a way out again. A constructed reality may not only be inadequate as such, at a higher level it can also block learning processes, and prevent a person or a group of persons from making any further progress. Our objective could then be to identify such problematic situations, to investigate how they arise, and to see what could be done about them. The decomposition could start from a typology of such problems, which seems a much more natural approach than the strategies discussed earlier.

Basing one's approach on problems, i.e. on what goes wrong, instead of trying to understand the whole process, including what is working satisfactory, has a number of significant advantages which I cannot discuss here. In particular it makes it possible to avoid a number of philosophical problems one encounters every time one tries to frame the whole process, while at the same time one does not want to impose totalitarian views upon the actors.⁹ One further aspect deserves a brief mention in the present context. The origin of things that go wrong is often more 'systemic' than that of the things that go right.¹⁰ What goes wrong often has to do with undue reduction; the actor has not taken into account all relevant aspects, he has used a heuristic that is too simplistic for the situation.

I would like to illustrate now what the alternative strategy, of which only the very abstract

⁹ Cf. Frans A.J. Birrer : Counteranalysis, in Thomas Brante, Steve Fuller, William Lynch (eds.) : Controversial science. From content to contention, 1993, State University of New York Press

¹⁰ Frans A.J. Birrer : Reflexivity as reducing distortion of judgement, *Systemica* 8 (1991), part II, 43-52

outlines were given so far, could mean at a more practical level. To this end I will focus on my own main field of research, 'Science and Society'. With the role of scientific expertise in society as its main topic, it may provide some healthy reflexive input into the study of reality construction.

SCIENCE AND SOCIETY

Science and Society is a field of research and education that is concerned with the identification and evaluation of the consequences for society of the production and use of scientific knowledge. How can inadequate coping processes be identified here? What could be understood by 'inadequate' in this context? In the following I will try to briefly answer these questions by sketching my own perspective on the field of Science and Society.¹¹

Since the evaluation component of Science and Society mainly concerns the societal level, there is an obvious emphasis on divergence of individual and common interest. In this connection, an important distinction is that between expert and non-expert; it is further useful to distinguish non-experts who finance and/or use expert knowledge; these distinctions characterize a select group of people who have primary control over the production and use of scientific knowledge. The main social 'trap' here consists in the temptation¹² that presents itself to this select group of people to use knowledge for its own benefit, rolling off some less pleasant consequences to others. Of course this need not be a calculated strategy. Actors are often not aware of temptations and the fact that they are giving in to them. Interdependencies between actions play a significant role, e.g. prisoners dilemmas.

In this context, various forms of 'distortion' of scientific knowledge may arise. To clarify the notion of distortion, let us turn for a moment to the area of risk issues, where questions of reality construction play a dominant role.

Many modern political issues have in some way to do with the notion of risk; it may be risks for the health and lives of people, it may also be risks for the environment. For a long time, the dominant approach to such risks has been a strictly technical one, inspired by the natural sciences. This proved to be inadequate for a number of reasons. First, many estimates of the technical, quantitative component of risks turned out to be very questionable, and often implicitly based on the presumption that 'everything is safe, as long as we do not have irrefutable evidence to the contrary'. Second, there was hardly any attention for social context

¹¹ Further expounded in Frans A.J. Birrer : Wetenschap, technologie en samenleving, in Jos Delnoij, Rob Pranger (eds.) : Reactie of reflectie, forthcoming. Cf also Frans A.J. Birrer : Counteranalysis.

¹² The notion of 'temptation' is very useful in avoiding the problem of social determinism : an actor may give in to an temptation, but not necessarily so. Cf. Frans A.J. Birrer : Wetenschap technologie en samenleving.

as a source of risk : although many catastrophes are not caused by technical, but by human failure, technical specialists are very much inclined to assume that people act exactly as they are prescribed to act. Finally, societal discussions about risk are not exclusively about technical probabilities, but even more about the acceptability of the risks. Risk can therefore not be reduced to chance times effect; for instance, it is very relevant for the acceptability whether a risk is a voluntary one or not.

From a strategic point of view, it is not surprising that instances whose activities pose risks to other people, have often used technical risk analysis to legitimate their activities. They stick to a one-sided technical viewpoint, and discard all other arguments as unscientific and irrational. As a consequence, societal debates about risk often become strongly polarized : proponents of the risky activity stick to a strictly technical problem definition, opponents have arguments of an entirely different nature, which are not recognized as legitimate by the proponents. Such conditions prevent any substantial debate about the acceptability of risk, in which participants would listen to each other, and would be willing to learn.

Evidently, coping here is, at least at the collective level, not as good as it could be. When we would have to formulate a more precise criterion to substantiate such a diagnosis, it seems obvious to refer to the inequality between the actors, more in particular to the fact that some actors are denied any substantial input in the decision making process. So a criterion for 'inadequate' could run something like this : outcomes that significantly and unnecessarily depart from what would have come out of a reasonably cooperative, well-informed decision process by all actors affected by the decision, i.e. when actors affected would not have been denied access, and would have an understanding of what is relevant to their situation.

BETWEEN CONSTRUCTIVISM AND REALISM

It is time now to formulate some general implications and conclusions, and indicate some directions for further research.

In the foregoing, problem orientation has been a key notion. Reality is constructed by human beings in coping with experiences. Reality construction must be understood in the context of what particular problems these human beings are trying to address. It is in the context of this problem orientation that the whole of our experiences gets decomposed into fragments, and realities get framed. Problem oriented decomposition is a process of framing and selection by which we try to arrange our experiences in such a way that they become manageable. Selection takes place along at least three lines : first, the focus is on what goes wrong; second, the specific problem under analysis suggests a demarcation of relevant/non-relevant; third, analogies between problems provide structure.

The mutual interplay between problem orientation and the construction and use of certain

frameworks, beliefs, theories, etc. is an important area for further research. There are, however, a number of caveats.

Reality construction is not an activity of mere individuals. Even though an individualistic analysis often seems more easy to make, it is imperative that the social aspect of reality construction is taken into account.¹³ Realities are constructed and acted upon in a context of social communication and interaction, and it is in this context that the constructed realities must finally prove their 'fit'. 'Constructivism' must therefore necessarily include 'social constructivism'. Frameworks operate as, often more or less invisible, regulators of discussions : they put constraints on what can be expressed. It would be a mistake to think that these constraints can be detected by analyzing frameworks as isolated cognitive entities, apart from a social process. The use of a particular framework sets in motion social processes that may modify its use over time.¹⁴

We also cannot assume that the activity of reality construction must be basically similar for all individuals. Not all individuals play the same role. Reality construction is distributed over various roles (e.g. experts and non-experts, managers and executors), and these different roles may require quite different frames or paradigms.

Another way in which the social character of reality construction may get obscured is by assuming that it is always consensual. Controversies about 'reality' are not seldom political negotiations concerning interfering interests. A perspective on reality construction must therefore be capable of dealing with conflict. Given the often political nature of reality construction, we must ask ourselves whether in the end reality construction can be anchored anywhere else but in the democratic process itself.

It is not only the constructivistic component of 'constructive realism' that is in need of further elaboration. We must also address the component of 'realism', and see how realism and constructivism can be brought together. Clearly, both extreme realism and extreme constructivism are unsatisfactory. Extreme realism leads to an inflexible demarcation of

¹³ So far, the social component of reality construction has in my opinion been strongly underemphasised in most articles on 'constructive realism', as e.g. in Cor van Dijkum, Fritz Wallner (ed.) : Constructive realism in discussion, 1991, Socrates Science Publisher, Amsterdam (with exception of the contribution by De Zeeuw, which seems compatible with many of the arguments that I have developed in this article)

¹⁴ When we continue the terminology and analysis developed in the preceding sections, the key again lies in 'temptations'; the effect is not 'inherent' in the framework understood in the abstract. To come back to a previous example, technical risk assessments do not intrinsically lead to distortion of discourse. They do so because risk assessments are produced and used in a certain way, by certain people. So we can say that the framework of technical risk assessment is prone to colonization by certain pressures of the social system, even though this is not part of the formal content of that framework. The implication is that frameworks should also be evaluated with respect to such regulative effects, e.g. with respect to the social instabilities they create in the form of temptations.

(scientific) knowledge, not open for discussion any more; it leads to a fixation of one particular reality. Extreme constructivism, on the other hand, results in a solipsism that stands too far from our own daily life experience, and, more importantly, makes it almost impossible to speak about (self)delusion. Both extremes cut off learning loops that lead to new realities, and thereby distort our view of reality construction. If we would not take at least some parts of reality momentarily as fixed, there could be no problems, and no incentive for change. At the same time we must be aware that this reality is a construction, and that at any moment we may find that it needs reconsideration.

It seems to me, that there is a lot to be clarified about the precise role of realism in 'constructive realism'. When we concentrate too much on the instruments used in reality construction, and ignore matters of content (which is one way to put all emphasis on the constructivist side) our view gets distorted. We would then no longer be able to see how instruments may run away with us, how they can lead to (self)delusion. The study of reality construction can only be a bootstrap operation, just like reality construction itself; it is unwise to limit ourselves on a priori grounds to just one aspect of reality construction (e.g. the use of formal operations) and ignore all others. The component of 'realism' must therefore get a more firm and well-defined place in our perspective on reality construction.

Together, this (no doubt very incomplete) set of observations already unfolds a very wide spectrum of questions to be explored. In these explorations we cannot ignore certain disciplines, like philosophy, or sociology of science. We must realise, however, that such disciplines have traditions that may be at considerable variance with the project of trying to blend constructivism and realism. Most traditional epistemology in philosophy, on the one hand, resists any type of sociological argument; it is therefore incompatible with the idea of reality as in some sense constructed, for the latter can in my opinion lead to no other conclusion than that epistemology can no longer be separated from sociological questions. In the sociology of science, on the other hand, the dominant methodologies are so strongly relativistic that they preclude any evaluation of the truth content of claims made in the discourse under study.

The decomposition strategy suggested in this paper transcends current disciplinary boundaries. It seems to call for interdisciplinary collaboration. Unfortunately, the word interdisciplinary is often misused. Interdisciplinary approaches are called for when each discipline on its own cannot do the job, because it cannot handle all relevant aspects, and therefore would produce a picture that would be a priori biased. But the sum of two biased pictures is not necessarily a less biased one. Instead of sticking to the familiar and easy routine of an established discipline, one has to decide each time whether to apply an instrument from one discipline or another (or even to invent an entirely new one). The internal imperatives of each discipline will have to be resisted (which once more reminds us how important it is to understand the construction of reality and knowledge as a social process).

At the moment, it is not evident to me that attempts to develop an approach that blends

constructivism and realism would lead to one singular paradigm; it could very well lead to a whole range of different paradigms. The label of 'constructive realism' does not refer to a field with already well-defined communalities. There can, however, be no doubt about the need for such perspectives. The traditional philosophies are no longer credible, and we need new framings to understand a range of practical problems (as I have tried to show for the field of Science and Society). Many mental and institutional barriers will have to be overcome, but that must not keep us away from roads that deserve further exploration.