

The Individual in Radical Constructivism: Some Critical Remarks from an Evolutionary Perspective

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> Context • Ernst von Glasersfeld's radical constructivism (RC) develops two positions that are, for the founder of RC, necessarily linked: (1) all accessible realities are perceived realities, (2) perceived realities are "constructed" by "individuals." **> Purpose** • Von Glasersfeld refers quite often to the theory of evolution. Despite this frequent referring, he uses an evolutionary approach primarily when discussing the viability of constructs. Furthermore, although this use of evolutionary thinking is already restricted, it plays an even smaller part in the reception of RC. The first goal of this paper is to show that as a result of this restriction, individuals as "constructors" do not have enough properties to explain the production of behaviors that we observe. The second goal is to open a perspective on the much richer picture of human cognitive activities that results from the abolishment of this restriction. **> Approach** • Starting with the difference between the interest of philosophers in the problem of "reality" and the problems that organisms have to solve in coping with their needs in varying environments, it is argued that, from an evolutionary perspective, only the perceived or "constructed" realities matter because they are the ones that allow organisms to survive, find partners, cooperate, etc. Hence, both the position of RC and the perception of the environment from an evolutionary perspective are compatible, as claimed by von Glasersfeld. Looking then at the individual, it is argued that RC mainly looks at the construction of realities as ontogenetic processes. **> Findings** • As a result, the constructing individuals do not have enough properties to explain observable behavior or to predict the results of their cognitive constructions. Taking von Glasersfeld's references to evolutionary theory seriously, it is argued that all organisms, and of course humans, have an evolutionary history that influences their construction of realities. Due to this broadly common background, all humans share an important number of inherited dispositions that influence the constructive processes of individuals. As a result, communication is possible, though not perfect, and there are transcultural (near-)universals and individual dispositions for solving reoccurring problems of social life, as shown by references to current research. **> Implications** • The construct of the constructing individual in RC needs conceptual and interdisciplinary enrichment. **> Key words** • Autopoiesis, communication, evolution, individual, regulation of social systems, universals.

Introduction

Ernst von Glasersfeld has been a highly esteemed reference, colleague and friend for more than 30 years. In the context of many discussions during academic meetings, while we were travelling together or when he came to visit us at home, we talked again and again about human perception, how to conceive of it as a process, how it is influenced and what status has to be attributed to its results. Ernst belonged to the founder generation of cybernetics; he knew Heinz von Foerster, Humberto Maturana and other members of this "inner circle" for much longer than me. Ernst had a wide interdisciplinary experience and contributed

to all exchanges his profound knowledge of the history of philosophical epistemology and, last but not least, of the work of Jean Piaget. Furthermore it was a pleasure to discuss ideas with him because he was aware that every participant in a discussion has to deal with the problem that his utterances do not transmit an intersubjective, clear, defined meaning but trigger constructive processes in the minds of the addressee (cf. below).

Despite our far reaching agreement on the basic positions of radical constructivism (RC), there are some points that I believe deserve further development and possibly modifications. Taking a scientist seriously means looking at his theoretical and em-

pirical arguments and testing their "viability," a concept dear to Ernst. Therefore, in this contribution in memory and honor of Ernst von Glasersfeld I will argue that there are serious shortcomings in his concepts of "the individual" and hence of "individual construction." These shortcomings are due to the fact that the concept of the individual as constructing agent used in von Glasersfeld's RC is not only a methodological but also a theoretical concept. It characterizes individuals such that some important observations of the behavior of individuals and social groups remain unexplained. It will be argued that this deficit results from a restricted use of evolutionary theory in RC. Whereas evolutionary concepts serve to

explain modifications of reality constructs, they are neglected with respect to genetic (evolved) and ontogenetic properties of the constructing individuals. In contrast to this line of reasoning, it can be argued that these properties influence the constructions of realities, making them less “freely” conceived (less individualistic), more predictable, and hence more social. Although von Glasersfeld quite often refers to biology and to the theory of evolution as an essential influence on radical constructivism, this context is mostly treated selectively by authors referring to RC.¹ This attitude started at the very beginning of RC, as von Glasersfeld explains.

- 1 | Whereas Piaget, who started his work as a biologist, assumed a genetic factor in the reflexes he analyzed, this line of thinking was given up by von Glasersfeld for reasons not really explained, as far as I know. He apparently understood any genetic influence as deterministic and not allowing for learning. Hence he concluded that Piaget’s model “only needed the removal of the genetic fixedness in order to be applied to cognition” (Glasersfeld 1995: 64). As a consequence, adaptation became a dominantly cognitive and ontogenetic issue largely independent of the evolved dispositions of the cognizing system and the organism into which it is integrated.
- 2 | If we look at authors discussing radical constructivism, we frequently find that they cite the theory of autopoiesis as well as other results from brain research whereas evolutionary theory is mostly ignored.

To diminish some of the ambiguities mentioned, this contribution will focus on the constructing individual in radical constructivism from an evolutionary perspective.

Taking up the comments of an anonymous reviewer a short outline of my own position as reflected in this contribution seems required.

1 | To illustrate this point: among the 21 peer commentaries to von Glasersfeld’s target article, “Who conceives of society?” (Glasersfeld 2008), only 6 referred to “evolution” and most of those pointed to the shortcomings of RC from this perspective.

- 1 | The contribution, though a critique of the concept of the individual in RC, is written from what I see as a radical-constructivist position (independent of the question of whether I like the term “radical” or not).
- 2 | My intention is clearly not to address all varieties of constructivism or constructionism but radical constructivism as mainly proposed by Ernst von Glasersfeld.
- 3 | Certainly not independent of my being a social scientist, I am nevertheless convinced of the importance of culture, social learning, and social interactions in explaining why and how individual actors construct what is real for them and hence relevant for their behavior. But given the dense network of evolution-related descriptions and explanatory propositions of human nature from various disciplines, I am far from being convinced that human realities are exclusively socially constructed during the *lifetime* (ontogenesis) of those who hold them. What we construct as “beautiful”, “right” or “wrong”, “interesting”, “behavior worth imitating”, “female” or “male”, etc. is certainly to a varying degree influenced by our experience.² But this experience needs, from a logical point of view, criteria that have to be conceived as existing prior to the learning they influence.³ Whereas RC is “not social and not evolutionary enough”, social constructivism suffers from “near-sightedness” insofar as it excludes the evolutionary perspective, with the concomitant danger of advocating a social “anything goes” (cf. below).

Cognition as adaptation

In his *Radical Constructivism. A Way of Knowing and Learning*, where von Glasersfeld summarizes the development of his thinking, he states:

2 | In this point I clearly contradict von Glasersfeld on the importance of evolved constraints or preferences and dispositions.

3 | Given the limited space, the “blank slate” argument can merely be mentioned. Cf. Pinker (2002).

“From all this, with the help of Piaget’s theory of cognitive development ... radical constructivism formulated its fundamental principles:

1. ■ Knowledge is not passively received either through the senses or by way of communication;
 - knowledge is actively built up by the cognizing subject.
2. ■ The function of cognition is adaptive, in the biological sense of the term, tending towards fit or viability;
 - cognition serves the subject’s organization of the experiential world, not the discovery of an objective ontological reality.

The last of the four points seems the most difficult to accept.” (Glasersfeld 1995: 51)

Here we have an “official statement” of the fundamental principles of radical constructivism. The first proposition of part 2 says very clearly that cognition is “adaptive, in the biological sense of the term” and that its function is to contribute or to increase the “fit or viability” of the cognizing organism. If this is accepted, the last principle, which von Glasersfeld qualifies against the background of his experience as the “most difficult to accept,” is nevertheless evident from an evolutionary perspective.

The struggle for the discovery of the “objective ontological reality” is probably a prime concern for *philosophers*. Most humans – just like most organisms in general – are probably not interested in “the truth” about reality.⁴ Most organisms – and of course humans – were confronted during their evolution, just as they still are during their individual life-time, with much more down-to-earth questions. Examples are: What is good to eat and what not? Where can I get food? How can I protect myself, my offspring and other group-members against danger from the environment or from enemies? Who would be the best available partner for reproduction? Who is to cooperate with and how can cheaters be detected? To answer questions of this kind – and these are just some examples – one needs knowledge

4 | RC does not at all deny the existence of reality, as some interpreters claim. Cf. “Radical Constructivism does not deny a world beyond our experiential interface, but it denies the possibility of knowing it.” (Ernst von Glasersfeld in Kenny 2011: 206, this issue).

and criteria that are easy⁵ to obtain and to use and helpful in most cases for solving the problem at hand. Organisms are normally not confronted with the problem of knowing the ontological status of reality but with the quite different problem of orienting themselves with respect to their perceived reality⁶ such that they can survive and “feel good” (cf. below).

The terminology used to explain the adaptive function of cognition expresses the relation between the cognizing system and the perceived reality of the system. The adaptive function is said to “tend towards fit or viability.” There are two referents for this viability that can be distinguished analytically. The organism has to behave such that it survives in its almost constantly changing environment. Hence, there is an adaptation of the organism. But of course, the environment can be used as the ensemble of entities and processes to which the organism adapts behaviorally only as a *perceived* environment or reality. As the ultimate function of cognition is survival of the organism and reproduction, the perceived reality has to be modified if actions based on it are evaluated by the observer as less beneficial than possible. If, on the contrary, the perceived reality functions in a satisfying way, it will be stabilized and maintained as viable. The viability of the organism and the viability of the perceived reality are interdependent. If, for example, something happens outside the perceived reality, hence in the ontological reality (e.g. in what *human observers* construct as the “world climate”), with the effect that “predicted” events do not occur – or that they occur differently – in the perceived

reality (e.g. seals, fish, etc. that polar bears “predict” they can get from the arctic sea ice become more difficult to catch), the organism will necessarily behave in a less efficient way (e.g. polar bears have been reported to drown because of excessively long distances between ice-fields, and their mean weight is decreasing as well as their number). If the organism can modify its perceived reality, it might change its behavior as well (e.g. polar bears have been reported to move onto land and to eat land animals occasionally, Gardiner 2008). In this case, there is an adaptation that has increased the viability of the organism through a modification of the perceived reality and hence of the corresponding behavior adapted to it.

While this second part of the definition seems perfectly clear to me, this is not the case with the first part. The problem is how the nature of the “cognizing subject” is understood. The “cognizing subject” or “the individual” is of course a central concept of radical constructivism. But in my view this concept is too undifferentiated if not even a “blind spot” (Foerster 1981: 288ff). As already mentioned, von Glasersfeld looks, with respect to the acquisition of knowledge, nearly exclusively at *ontogenetic* learning of individuals.⁷ Although he continuously refers to biological concepts and discussions, and despite his use of the term “evolution” and his reflections on what “adaptation” refers to, he widely neglects the evolved nature of individuals.

Of course, this approach is not a particularity of RC. Especially in the social sciences we find a large factual consensus with respect to the practically exclusive importance of ontogenetic factors in explaining human behavior. But any *ontogenetic* analysis of behavioral or cognitive processes encounters the same systematic problem. It has to explain why the described and explained phenomena are not adaptations of evolved genetic dispositions to a given physical or social context and/or to characteristics of the actors, the constructing individuals in RC. If this is not done, the analyzed processes are just *declared* “ontogenetic”.

7| This seems to be partly due to the influence of Piaget’s work, cf. Glasersfeld (1995: 58).

How unique are constructing individuals?

Let us look at the problematic concept RC shares with the theory of autopoiesis: that of the autonomy of individuals resulting from what Maturana calls their “operational closure.” As is well known, the basic argument is that living systems – organisms – are functionally (not energetically) closed systems. The reason is that only such an organization allows the system to interact with its environment such that it can maintain its existence as a functional entity, which is a basic criterion for organismic life. Living systems perceive as their environment cognitive representations (in the sense of *Vorstellungen*, von Glasersfeld 1987) of the objects, events or processes that influence (modify, perturb) the sensory components involved in the internal generation of representations of their outside world. Events in the environment that do *not* modify sensory components do *not* enter the representation of the environment that the system generates either. This is why all realities are perceived realities (“constructions”).

Two main conclusions have been drawn from this conceptual change from “open” to “functionally closed” systems:

- 1 | Communication between such systems – and we humans are, like all organisms, part of this class of systems – does not function as a conveyor belt transporting informational entities from one communicator to the other. What a communicator says or writes or produces in whatever medium is just a “communicational offer” (in the sense of Siegfried J. Schmidt). Those constituting the audience will invariably process it according to their own dynamic, i.e. relate it to their constructs of reality and evaluate it according to their preferences, etc.
- 2 | Operationally closed systems cannot be regulated because regulation requires an input that determines the subsequent activity of the systems. Being “autonomous,” they will process regulatory efforts from the environment according to their own dynamics.

Both conclusions follow the same logic: the autonomy that characterizes living systems, because of their functionally closed

5| Cf. the work on heuristics that are “quick and dirty” to use in Gigerenzer & Todd (1999) and Brandstätter, Gigerenzer & Hertwig (2006).

6| In German one could use “Wirklichkeit” to designate the perceived reality and “Realität” if one refers to the concept of an “objective ontological reality.” From an etymological perspective (Drosdowski et al. 1963: 767f), the German “Wirklichkeit” is related to “Werk” and the verbs “wirken,” “bewirken:” in English, “to bring something about,” “produce,” “work.” The “perceived reality,” the “Wirklichkeit,” is not a standalone concept because it necessarily presupposes a perceiver and/or the idea that the perceived reality affects the perceiver or other entities.

organization, confers on them a specific property: they are individuals (actors characterized by uniqueness) able to construct autonomously their perceived realities.

What are the objections to this position, which I of course have presented in an extremely abbreviated form? I see one major problem with several consequences.

If I look at reports published around 1980 of conferences in which I was involved (Hejl, Köck & Roth 1978; Benseler, Hejl & Köck 1980; Roth & Schwegler 1981), I remember a very strong interest in "autonomy." And I remember discussions where some of the younger participants – and Heinz von Foerster! – tended to be very interested in the logic of the mechanics of operationally closed systems whereas other participants, mainly from the humanities and social sciences, were drawing conclusions that – from the vantage point of the present – foreshadowed a more "postmodern" perspective.⁸ Looking at this logic it became clear (Hejl 1992a: 204ff, 1992b: 124) that the operational closure of living systems certainly confers on them an autonomy but that this autonomy in fact depends entirely on the cognitive or behavioral capacities of the environment (mainly other actors). If, e.g., a regulator (a communicator, a politician, etc.) is able to produce or to select events or communicative offers that – due to the mechanisms of the system(s) addressed that are working at that particular time – trigger the desired behavior, the system is, of course, regulated. But as such a regulation does not use pressure or force but "manipulates" the mechanisms of the "regulated" individuals, they might, if asked, well confirm that they have produced their behavior autonomously as an expression of their individuality and freedom! What is called "autonomy" resulting from operational closure by no means excludes regulation. On the contrary, the dependence of systems on their mechanisms⁹

8| A somewhat programmatic treatise – though quite often read in an over-generalizing way – was Feyerabend (1975). Cf. as a critical reference, von Glasersfeld (2008: 64).

9| Cf. on explanations referring to mechanisms in sociology, Schmid (2006) and with respect to regulation and "autonomy" at the individual and social level, Hejl (2011).

(and their actual states) for the generation of any behavior *is* the crucial condition for successful regulation. This is demonstrated by medical interventions as well as by political propaganda or sales promotions, where the "success" consists in our accepting deadly dangers, as we all know from agreement to wars, smoking, or buying cars we do not really need, etc.

Though cognitive systems and the social systems they form can be regulated in principle, the complexity of humans and of social groups is such that potential regulators very often operate inevitably with oversimple or inadequate models of the systems to be regulated¹⁰ and hence remain unsuccessful.

At this point it becomes important to understand why cognitive systems, together with the organisms they are functional parts of, can be called "individuals." If "individual" is understood in the straightforward sense of "unique,"¹¹ probably all organisms are individuals.¹² This is certainly the case for humans if we look at the level of the exact shape and functioning of organs or of the brain. In addition to genetic variations between organisms we have differences that result from external influences starting during the fetal period and continuing afterwards. The question is of course: Are these differences so important that they justify the strict theoretical (not methodological!) individualism of RC with respect to cognition and communication as the central means of behavioral coordination?

Here are two observations that convinced me that these differences, although existing, are not so strong as to justify the

10| Though their complexity can become problematic, the problem does not normally occur with technical systems (machines, software programs). As these systems are designed and produced by their users, they possess the knowledge necessary for their regulation.

11| The definition of "individual" in Merriam-Webster Online (2011) is, "a particular being or thing as distinguished from a class, species, or collection: as (1): a single human being as contrasted with a social group or institution ... (2): a single organism as distinguished from a group."

12| Even monozygotic twins are not completely identical, cf. Segal (1999) and Wolf, Spinath & Angleitner (2003).

denial of the relevance of "vertical" (genetical) and "horizontal" (ontogenetical) influences on the behavior of individuals and hence on the construction of perceived realities by them.

1. The communication of emotions, intentions, observations, or complex cognitive models of our physical or social environment is demanding for all participants and far from being fast and easy to obtain. But communication does not work as badly as one would expect from the concept of autonomous individuals. This is not only demonstrated by our, on the whole, positive experience of nonverbal and verbal exchanges with family and friends but also by the already mentioned success of sales promotions, the demand for relatively few topics in mass entertainment by "individual" consumers all over the world,¹³ and of course by the working of indoctrination (Eibl-Eibesfeldt & Salter 1998).

2. Our world is populated by many societies and there are even more distinguishable cultures. Despite their differences, we have available a rich literature on human universals or near-universals.¹⁴ It shows that there are many human behavioral patterns "which occur, so far as the author's knowledge goes, in *every* culture known to history or ethnography" as George Murdock already wrote in 1945 (Murdock 1945: 124). The theoretically interesting point is that this includes not only societies from very different ecological contexts but also societies not much in contact with each other, so that "transmission" by intercultural learning can be excluded.¹⁵ However, all societies have human members who are genetically related because of their common evolutionary history (the "vertical" influences).

13| Cf. for news, Shoemaker & Cohen (2006) and for cinema movies, Uhl & Hejl (2010).

14| Cf. Murdock (1945), Brown (1991), Bar-kow, Cosmides & Tooby (1992), Weingart et al. (1997), Boyd & Silk (2003), Buss (2004), Wuketits & Antweiler (2004), Antweiler (2009), and on the relation of constructivism-universals, the contributions to Hejl (2001).

15| As far as I know, social constructivists have not yet explained these observations either.

The evolution of reality-constructing individuals – some basics and effects

If we accept the evidence biologists and anthropologists have accumulated to substantiate the single-origin hypothesis¹⁶ or, more popularly, the Out-of-Africa hypothesis, we can draw a much richer¹⁷ picture of what characterizes human individuals and at the same time a more structured picture of social groups. The widely accepted hypothesis postulates that all living humans evolved from a population of already modern predecessors existing in East Africa approximately 100,000 years ago. Parts of this population migrated from their original site to all other parts of the world.

If individuals are genetically related they share not only the same anatomical structure but also a substantial set of cognitive and behavioral *dispositions*. This reference to dispositions is important. What an organism inherits¹⁸ from its parents are (in addition to a relatively fixed level of, e.g., anatomically-fixed, behavioral patterns) not inflexible readymade mechanisms that are active all the time but domain-specific as well as domain-general mechanisms.¹⁹ They function as more or less basic tendencies to do certain things, prefer certain tastes and feelings, enjoy some visual perceptions, etc. Whilst growing up and during adult life these dispositions are – as part of our ontogenetic history – triggered by perceived events in the environment (the “horizontal influences”) and developed and attuned to other mechanisms to fit and modify the needs of the actors (Buss 2004: 19).

From an evolutionary perspective one has to realize that today’s inherited dispositions increased on average the fitness of those (always socially living) individuals who showed these traits, given the environment in which they evolved (“Environment of evolutionary adaptedness,” EEA, cf. Buss 2004: 40f). The increased fitness of these group-members made them more attractive, triggered imitation, made them preferred partners for reproduction and – if the traits were or became biologically heritable – made these traits spread so that they became part of human nature in the sense that they were present in the human gene pool. Using them was successful for everyone, hence shared and expected by other group-members. These evolution-based cognitive constructs and the corresponding behavior received what von Glasersfeld called “second-order viability” (Glasersfeld 1995: 120).

Let us look at a domain that – not surprisingly – turned out to be particular interesting to students. If we look at the “attractiveness” of women and men in the media, and in daily life as well, we encounter patterns of what makes a woman or a man attractive or beautiful. From a constructivist position that sees beauty as an exclusively individual construct and hence assumes that individuals do not share more or less common features, one would have to predict that such patterns should *not* exist. But they do and they do not differ much between cultures.²⁰ In addition, if we ask why we are attracted by the beauty of females or males it becomes clear that it is, in most cases, not the disinterested Kantian beauty that matters but its indicator function. Although we just desire to “feel good” with someone who has the typical features of a beautiful female partner²¹ or a “nice looking” male partner,²²

the criteria we generally use evolved to answer questions relevant for family life and reproduction. Hence “beauty” is a construct that we may generate and enjoy. But in order “to see” something (Richter 1999; Volland & Grammer 2003; Volland 2005) or someone as “beautiful,” we use (sometimes) criteria that often serve goals we are not – and must not be – aware of. Especially with respect to the attractiveness of romantic partners, these criteria are widely shared across cultures and age groups (Marlowe, Apicella & Reed 2005; Singh, Renn & Singh 2007). They vary in a predictable direction if, e.g., female resource control increases (Moore et al. 2006) or if the time perspective of sexual partnerships changes (more short encounters instead of long-term partnerships, Waynforth, Delwadia & Camm 2005).

What holds for beauty holds as well for other aspects of individual and social life. During recent years economists, evolutionary psychologists, and anthropologists have studied intensively human decision behavior with respect to cooperation and competition. Numerous studies have used game theory inspired designs. Here is, of course, not the space to present the results in any detail. But it became clear that humans evolved a number of behavioral strategies and deeply rooted values to help them deal with the dilemma of social cooperation. As is well known since the work on the “prisoner dilemma” (Axelrod 1984), in social cooperation the best results for all participants are achieved by general cooperation. But individually the highest benefit results from not cooperating while others cooperate (hence from cheating). This type of problem is of course very basic and we can safely assume that it was part of the social EEA (see above) of our ancestors. To deal with this, it is assumed that we evolved mental mechanisms for cheater-detection (Cosmides & Tooby 2005) and the punishment of cheaters (Fehr, Fischbacher & Gächter 1992), as well as mechanisms that make some participants in such games, and in real life, inclined to punish non-cooper-

16| Cf. from the pioneering work of Cavalli-Sforza et al. (1988) to recent results such as Wang et al. (2007), Li et al. (2008). For an overview, cf. Tattersall (2009).

17| Compared to what is widely said about human individuals in many disciplines and theories that focus on human nature.

18| Along with more or less important (and eventually risky) modifications that give rise to another level of individualization.

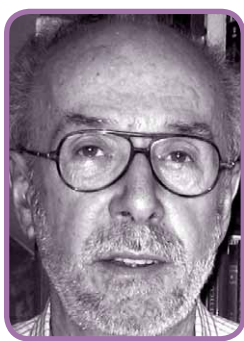
19| Cf. on domain-specific mechanisms, Tooby & Cosmides (1992) and on domain-general mechanisms, Chiappe & Macdonald (2005), Ho, Brown & Serences (2009).

20| The pioneering work on intercultural mate preferences is Buss (1989). Cf. for a systematic introduction, Buss (2004: 103ff) and recently, Puts (2010).

21| Facial symmetry and resembling the scheme of childlike characteristics, a waist-to-hip ratio (WHR) at about 0.7 for normal weight females (Singh 1993: 302f).

22| Signs of health (height: Buunk et al. 2008, strength, athletic abilities, facial masculinity: Feinberg et al. 2008 and Gangestad, Thornhill

& Garver-Apgar 2010), success (good economic prospects: Goodman & Koupil 2010, social status: Barkow 1989 and Hopcroft 2006) and readiness to invest in a partnership and children (Buss 2004: 104ff).



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ative behavior even without an individual benefit ("altruistic punishment," Shinada, Yamagishi & Ohmura 2004). Such behavior goes, of course, with sentiments that push us and help us to behave prosocially without individual benefits (Price, Cosmides & Tooby 2002; Fehr & Gächter 2002).

All these goals, preferences, cognitive, and behavioral mechanisms are more or less shared by all human beings. It is important to realize that "more or less" is not used as a mere phrase. Seen from modern evolutionary theory, both inherited and acquired traits are present in populations in varying frequencies. Hence group members are not identical with respect to all traits that characterize them: they are individuals. But, and this is also part of our equipment, we are aware of these differences and we are disposed to use various strategies to deal with them: individuals are social. Here is just one example. As part of the development pattern that our ancestors evolved, we normally construct "theories of mind," i.e. we imagine how others see "the world," what they want, and how they think. Fortunately, the capacity to produce and use theories of mind is not an all-or-nothing phenomenon. But those who are really unable to put themselves in the place of others suffer from autism, a serious and lifelong handicap (Baron-Cohen 1997).

These more or less shared domain-specific and domain-general mechanisms are part of our cognitive system and influence its constructions of realities. This happens from a logical point of view both consciously and unconsciously. The argument is that the I or Me is, at least from Piaget on, con-

sidered to be a construct developed during ontogeny. This I or Me is perceived by itself (or by the neuronal processes that *produce and are* this perception, as, especially, neuroimaging techniques demonstrate, e.g., Zhu et al. 2007) as an acting, deciding, suffering, etc. center. What are absent from these and other perceptions are normally the physico-chemical mechanisms required not only to process perceptions but to keep the whole organism working as well – a fundamental precondition for any reality construction. From a biological perspective, cognition is a "serving" process, as von Glasersfeld also says in the statement cited above (part 2). This corresponds with current discussions in the brain sciences (Roth 2009; Engel & Singer 2008) about the relation between conscious and unconscious decision making. There are apparently decisions generated first at an unconscious level that are perceived afterwards as taken consciously. If these findings are confirmed, von Glasersfeld's statement "knowledge is actively built up by the cognizing subject" refers to a much more complicated process than signaled by the wording of the phrase. Therefore, and from this perspective as well, it is difficult to accept the role of master-builder attributed to the "cognizing subject." The emphasis is even more astonishing as von Glasersfeld is well aware of the difficulties that result from using the concept of a conscious actor without a theory of consciousness:

"Given that, ... , we have not even the beginnings of a model of consciousness or awareness, it may seem odd to insist that awareness lies at the

very root of the concept of self as an entity. Yet, no attempt to construct a viable theory of knowing, can avoid acknowledging the fundamental mystery of awareness." (Glasersfeld 1995: 122)

But instead of accepting the individual as an evolved, socially interacting, and individualized organism with a highly developed brain serving the organism by generating successful ("viable") behavior and producing in this context system dependent interior models of both the organism's environment and the organism as a center of various activities (both as constructs), von Glasersfeld restricts evolutionary concepts to the fitness/viability problem of the constructs.

Conclusion

Complementing the ontogenetic perspective of existing RC by enlarging its evolutionary basis leads to the modeling of constructing individuals as more complex than the current concept. A result from such a widened view would be an opening of RC to various fields of research that focus on the observation and analysis of human behavior in both social and natural environments. It would allow RCs inherent dualisms such as cognitive-physical or individual-social to be overcome.²³ In addition, despite such an in-

23| Cf. with respect to this dualism an early contribution of Piaget (1928) who, like Durkheim, held for some time a chair in both sociology and psychology but who, unlike Durkheim, rejected the dualism.

crease in conceptual complexity, it can and has to be assumed that the constructing individuals share many cognitive and behavioral dispositions, including numerous tendencies to prosocial behavior. Due to and depending on their analogical functioning, individuals can be expected to produce numerous reality constructs of high similarity.

If an RC approach is used for a methodologically controlled analysis of reality constructs, produced in various contexts and by different actors, a body of theoretical assumptions and empirical results is required that allows the generation of testable predictions of what might be the *content* of the constructs under analysis and which *behavioral consequences* they might have. This requires a modeling of the constructing individuals (including the awareness that any such model is a construct) that allows for combinations of widely distributed dispositions and more restricting (individualizing) factors.

Independent of the fact that numerous scientists use evolutionary concepts in a realistic way, I hope that the few arguments and results presented in this short contribution have substantiated the claim that complementing the evolutionary basis of RC by constructing the (observing and observed) individual as an evolved actor is perfectly compatible with RC's epistemological position. I further hope that the proposed enlargement will contribute to transforming RC from a largely philosophical attitude to a field of activities drawing from and contributing to numerous fields of research.

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