5. Conclusion

« 45 » All in all, I do not think that the argumentations between Luhmann and radical constructivism or between Mitterer and radical constructivism are mere mock attacks. Consequently, the convergent reconstruction of (radical) constructivism and systems theory does not aim to get rid of unpleasant differences between both approaches. Rather, the differences can be used to clear the standpoints of inherent inconsistencies, to strengthen their arguments, and to promote their continuous theoretical development (and hopefully improvement). Reading, e.g., Schmidt's (2011) latest philosophical proposal to rewrite radical constructivism, the main criticism of constructivism made by Luhmann should have become clear. The remaining discrepancies I regard as fruitful pluralism *within* constructivist discourse.

« 46 » Ernst von Glasersfeld (1993) once responded in a very elegant way to criticism of radical constructivism with the words "not converted but refined." This should probably become a viable way for radical constructivists to cope with friendly criticism, as is made by Luhmann. Of course, not every criticism can or should be embraced in the way that I did in my argumentation – a harsh conflict will do better in some situations.

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Open Peer Commentaries

on Armin Scholl's "Between Realism and Constructivism?"

Who Observes? An Appropriate Theory of Observation is in Demand

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> Upshot • One of the key aspects of constructivism is the role of the observer. As Scholl shows in his article, Luhmann shares this perspective, and beyond that opens up the concept of observation by transferring it from the micro level of individuals to the macro level of society. Luhmann goes even further by stating that *all* autopoietic and self-referential systems, i.e., all living, psychic, and social systems, can observe, leaving an anthropological view behind. With this, the question of the "who" in "who observes" gains new insights that, surprisingly, touch on one of the central research questions in quantum physics.

« 1 » Armin Scholl convincingly showed (for instance in §14, §17, §19, §20) that in his work, Niklas Luhmann seems to oscillate between naive realism and (radical) constructivism but that all in all the differences between Luhmann's notion and the (radical) constructivist perspective are "mere mock attacks" (§45). One of the key aspects that tie (radical) constructivism and Luhmann's notion together is the strong role of observation (§12) (understood in the specific sense of distinction and indication) as well as the effort to include and at the same time enhance a theory of observation. In this commentary, I will focus on the role of observation, since Luhmann uses some confusing but nevertheless very specific and convincing examples that are difficult to address with concepts of realism or anti-realism. I will argue that an appropriate theory of observation is still missing, one which could include such seemingly paradoxical phenomena.

« 2 » When reading Luhmann's work, I always wondered about some of the examples he uses for what he calls "the operation of observation" (Luhmann 1992a). He argues that *all* autopoietic and self-referential systems can observe,[1] i.e., all living, psychic, and social systems. This statement is quite easy to comprehend for psychic systems (individuals) – and is more or less the argument of (radical) constructivism. How social systems observe, and what consequences come from such a perspective on interaction, organizations, groups, and (world-) society itself, was one of the main contributions of Luhmann's theoretical endeavor (cf. Luhmann 1986b, 1992a, 2004). For all this, there is no need to depart from an anthropological perspective on observation: one can imagine that there is always

1| Observation is understood as the operation of distinguishing and indication at the same time. A certain distinction is applied to be able to determine something within this distinction and to mark one side of a thing (and not the other) as the starting point for further operations (cf. Luhmann 1986a: 112, 1988b: 52).

someone or at least some idea of *consciousness* involved, even if we think of social systems as being based on communication rather than on individuals. In this perspective, the quest for differences and similarities in the argumentation between (radical) constructivism and Luhmann's understanding is reasonable and surely will promote the discourse of constructivism.

« 3 » But what about the first category of autopoietic and self-referential systems: living systems? Thinking of animals, the understanding of observation for psychic systems might be transferred and we might quite easily imagine an understanding of what this could mean (pet owners would probably deny any differences anyway). But Luhmann gives some examples, such as the following, to illustrate the difference between "observation" and "understanding" (this difference is of no further interest for us, but the example itself is of relevance):

> "The stomach, for instance, can observe since it digests only food but not itself; but it cannot understand what the food is or how the food is affected when being digested, and it probably would be confusing for the stomach to understand this and to deal with these differentiations." (Luhmann 1986a: 91, my translation)[2]

« 4 » Going forward from this point, a further argument can be drawn (cf. Egner 2008: 62): living systems, such as the chemical, biological or physical systems of our body, can not only distinguish but can also describe and thus learn. This occurs, for instance, when the physical defense reaction against high-strength spirits (the hangover) gradually diminishes through regular use or when the efficacy of pharmaceuticals declines over time.

« 5 » How can an example like this be understood in terms of realism or constructivism? I, at least, cannot decide on this. I rather assume that we simply do not have an appropriate theory of observation available to include such phenomena. Surprisingly, this finding coincides with the considerations within quantum physics, a branch in physics that is also in need of an appropriate theory of observation to explain the paradoxical phenomena of their experiments. There, the materialization of quantum objects depends on *whether* they are observed and *how* they are observed, i.e., with what "theory" or "expectation" the result of the materialization is interpreted (in the case of light, for instance, whether it is considered as a "wave" or "particle")..

« 6 » Although these striking contributions were already made in the early 20th century in physics, their disturbing consequences and their irritations for our traditional epistemologies and the philosophy of science, for instance, are not yet well developed. The quantum physics experiments support *neither* realist *nor* (radical) constructivist positions (cf. Egner 2012) since they seem to be "new kind" of phenomena that violate our intuition and traditional understanding deeply. In this, they equal the stomach example above. So far, the experiments in quantum physics only show the central role of observation and the exposed position of the observer while the explanations for the paradox emergences are still open. Most recently, quantum physicists are in search of a theory of measuring and observation, mainly to reject the Copenhagen Interpretation of the experiments mentioned above (cf. Gell-Mann 1995: 212ff.; Schlosshauer 2007: 329ff.): They quite easily provoke the radical conclusion that the *materialization* of the world is a result of our observation and, thus, the world is a product of consciousness (cf. Schrödinger 1959, Zeilinger 1996).

« 7 » Furthermore, there is now evidence that the laws of quantum physics not only apply to the micro level but also to phenomena in the macro world (cf. Ansmann et al. 2009, Aspelmeyer 2010, Aerts et al. 2011 and Walther et al. 2006). Thus, the development of an appropriate theory of observation is required even more.

« 8 » Within physics, some researchers even assume that the concept of observation is not only applicable to autopoietic and self-referential systems, but indeed to all "complex adapting systems": in short, most of the world. It is due to these systems that the world seems (or proves) to be solid even if there is no (human) observer to hold it stable and in its place by observation. Thus, Murray Gell-Mann and Jim Hartle see these systems as "actors" that can observe. They call them "Information Gathering and Utilizing Systems" (Gell-Mann 1995:155f., Gell-Mann & Hartle 2012). However, there is no consciousness whatsoever involved and this seems to me to be a crucial point in the argumentation of (radical) constructivism. Are there any concepts of constructivism without consciousness? As far as I know, no. Luhmann tried to expand the concept of observation to *all* autopoietic and self-referential systems, resulting in the discrepancies with (radical) constructivism Scholl so thoroughly describes.

« 9 » Scholl states that the notion of epistemological agnosticism (§30, 31), condensed in the quote "the world is as it is," is a common ground for (radical) constructivism and Luhman's approach. Moreover, he states "there is no escape from the observer or from the observing system when obtaining knowledge" (§44). With this, I guess, quantum physicists would also agree. Taking this as common ground might be a good starting point for the further development of a theory of observation. For now, all we can state seems to be that "the world is as it is and the observer observes what she/he observes." There is lot to be done to gain a deeper understanding of the "who" and "how" in observational processes.

2| Original: "Der Magen zum Beispiel kann beobachten, denn er verdaut nur Speisen, nicht aber sich selbst; aber er kann nicht verstehen, was es den Speisen ausmacht, wenn sie verdaut werden, und es würde ihn vermutlich verwirren, wenn er dies verstünde und entsprechende Unterscheidungen handhaben müsste."

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