Luhmann and the Constructivist Heritage
A Critical Reflection
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> Context • Luhmann’s theory of autopoietic social systems is increasingly receiving attention in the scholarly dis- pute about constructivism. > Problem • The paper explores the transition from Kant’s “transcendental/empirical” to Luhmann’s “system/environment” distinction to provide a deepened understanding of Luhmann’s constructivist approach. > Method • Luhmann’s construction of reality via the system/environment distinction is discussed with respect to preceding concepts provided by philosophical and system/cybernetic scholars such as Kant, Husserl, Piaget, von Glasersfeld, von Foerster, and Maturana & Varela. The innovativeness of Luhmann’s approach is then critically evaluated. > Results • Luhmann’s contribution to constructivism is innovative only in the context of his stringent theory architecture of autopoietic meaning-based systems. > Implications • The text is a contribution to the positioning of this approach as part of the philosophical and systems/cybernetics constructivist heritage. > Key Words • Theory of social systems (TSS), observation, autopoiesis, self-reference & hetero-reference, meaning.

Introduction

1 “A reality that remains unknown”: this is part of the title of an article by Niklas Luhmann that deals with constructivism. In it he summarizes epistemological considerations scattered in his voluminous work on social systems theory, which he developed over three decades. His approach is not the denial of reality but a “de-ontologization” (Luhmann 1990b: 67) (ontology understood in the philosophical meaning of dealing with whether or not a certain thing or entity exists).

2 Unsurprisingly, for those who are familiar with his work, Luhmann sees his contribution to constructivism in the elaboration of the system/environment distinction. At least since the so-called autopoietic turn (in which he re-conceptualized the idea of social systems by including notions such as meaning and self-reproduction as constituting features), issues such as openness/closure, re-entry, and observation have become pivotal. Thereby he aims at overcoming Immanuel Kant’s transcendental philosophy. That is, the transcendental/empirical distinction has to be replaced with the system/environment distinction (Luhmann 1990b: 66). Luhmann argues that the concept of environment, as well as the corresponding concept of system, was not available at Kant’s time. Instead, the transcendental/empirical distinction was developed to overcome a self-referring circle in which everything is the object of knowledge.1

3 Kant’s work and his detailed epistemological mapping is an important starting point in constructivism – not only for Luhmann, but also for philosophers such as Edmund Husserl and constructivists such as Jean Piaget and Ernst von Glasersfeld. Husserl, for example, criticizes Kant’s conceptualization of the a priori, of understanding, and of reason (Husserl 2001a: 135), and aims at a “radical transcendental subjectivism” (Husserl 1992a: 101). Piaget argues against Kant’s concept that space and time are pre-given (Piaget 1973: 70ff).

1 Although Kant used the term “system,” Luhmann is right because Kant defined a system as a unity of the manifold cognitions under one idea and was concerned with its a priori determination and not with environmental relations (Kant 1998: B860). Instead, he shows on the basis of his investigations that space and time are concepts that evolve in the course of the development of the child (Piaget 1954). Von Glasersfeld likewise does not agree with Kant’s assumption that there exists something beyond the bounds of possible experience. But he is nevertheless convinced that Kant’s transcendental philosophy provides a model that is in many ways fundamental to constructivist approaches (Glasersfeld 1995: 39, 1989b). Kant’s work – together with the work of others such as Plato, Descartes, Vico, Locke, Berkeley, and Wittgenstein – represents a philosophical constructivist heritage that allows “seeing further by standing on the shoulders of giants” (Merton 1996: 237). Besides the philosophical heritage, there exists a constructivist heritage including the scientific community that emerged around the Macy-Conferences and the BCL (Biological Computer Laboratory) from the 1940s to the 1970s (Müller & Müller 2007; Pias 2003) and further proponents mentioned below.

4 Luhmann is committed to the idea of building on this scholarly heritage. He observes that constructivism has very much profited from philosophy (from Descartes, via Berkeley, Buffier, and Hume, to Kant) (Luhmann 1990c: 495), from research “in biology, neurophysiology, and psychology
(Maturana, Varela, Piaget, von Glasersfeld)” (Luhmann 1990b: 78), and from further constructivists such as Hugo Dingler, Paul Lorenzen, Paul Watzlawick, Ross Ashby, Heinz von Foerster, Ranulph Glanville, and George Spencer-Brown (Luhmann 1990c: 511–518). Although Luhmann remarks that he does not intend to integrate all these constructivist concepts, his work is characterized by a tension between a somewhat kaleidoscopic character on the one hand and a most stringent theory development on the other. That is, he takes advantage of an impressive number of existing concepts and fits them into his precisely built-up theory architecture. Since the concepts and terms in his theory are already strictly defined, his adoption of them is sometimes not exactly in the meaning of the originator (see for a discussion, e.g., Lohmann 1994: 214 and Habermas 2007: 368–385). Luhmann refers to the relevant literature, but he only seldom goes into detail. As a consequence of this and of the inherent interdisciplinarity of the constructivist approach, it is challenging to evaluate his scholarly position and the innovativeness of his constructivist conception.

5 To provide a deeper understanding of Luhmann’s constructivist approach, a few philosophical/constructivist state-of-the-art concepts will be characterized in the first part of this paper. The second part of the paper will then deal with Luhmann’s conception of the construction of reality via the system/environment distinction. The aim of this paper is to exemplify in which respect Luhmann benefits from the philosophical/constructivist heritage and how innovative these adoptons are.

Kant’s transcendental/empirical distinction

8 Kant applies both terms – “transcendental” as well as “empirical” – to cognition (Erkenntnis). Cognition is in his conceptualization quite a complex process. It is located in the mind (Gemüt) and can be described by the three faculties of sensibility (Sinnlichkeit), understanding (Verstand), and reason (Vernunft). “All our cognition starts from the senses, goes from there to the understanding, and ends with reason…” (Kant 1998: B355).

9 Although cognition starts with empirical experience (i.e., the awakening of the cognitive faculty through objects that stimulate our senses, Kant 1998: B1), these three faculties are bidirectionally interrelated. In one direction, the senses provide the raw material (i.e., data) for cognition that is processed in the understanding on the basis of integrating rules. The other direction is that the reason provides integrating principles as a basis for the use of the rules: “If the understanding may be a faculty of unity of appearances by means of rules, then reason is the faculty of the unity of the rules of understanding under principles.” (Kant 1998: B359)

10 The reason therefore never applies directly to empirical experience. Instead, it applies to the understanding in order to give a priori principles to the understanding’s manifold a priori rules. The well-known terms “a priori” and “a posteriori” are hereby defined as follows:

11 Kant’s transcendental philosophy deals with a priori cognitions in reason and in understanding, which are mostly labeled “pure” in the elaboration of his “Critique of pure reason.” He explores how “pure understanding” and “pure reason” make cognition possible in allowing for empirical experience (Kant 1998: B25). This includes quite sophisticated considerations and differentiations. One of them is the distinction between intuition and concept (see Figure 1), which gained prominence because of his postulate that space and time are pure intuitions.

12 Space and time belong to sensory intuition (sinnliche Anschauung) as its pure forms. That is, space and time guide as “pure intuitions” the subordinate “empirical intuitions.” But note that the empirical intuitions are subordinated only from the perspective of transcendental philosophy – actual cognition starts with sensation: objects stimulate our senses and we have empirical intuitions and corresponding empirical concepts (e.g., an object is soft or hard).

13 Empirical intuitions and concepts (i.e., empirical intuitus vel conceptus) as well as pure intuition and concepts (i.e., pure intuitus vel conceptus) are manifold and require organization. First, the senses allow for the synthesis of the manifold a priori. Second, the imagination (Einstellungskraft) allows for the synthesis of this manifold (intuition-synthesis = synthesis speciosa, concept-synthesis = synthesis intellectuâlis). Synthesis in accordance with concepts takes place as an action in understanding (as self-activity of the subject and not given through objects) whereby the pure concepts of understanding are called categories (i.e., quantity, quality, etc.). Third, the apperception (i.e. self-consciousness) allows for the unity of this synthesis. If it changes with the stream of inner appearances, it is called empirical apperception. If it is unchanging (pure, original), it is called transcendental apperception. (Kant 1998: A78ff, B104ff, A95, A107, B130) But how can such an unchanging self-consciousness, such a transcendental apperception be maintained?
To complete the organization of the manifold, an ultimate containment is necessary. This is provided by the "subject." The manifold is related to the identity of the subject, which is possible because of the "transcendental unity of self-consciousness" (Kant 1998: B132–134). Whereas empirical consciousness that accompanies different representations is by itself dispersed and without relation to the identity of the subject, the transcendental unity of self-consciousness produces the representation “I think” as thoroughgoing identity.

Note for the sake of clarity that the transcendental/empirical distinction is different from the transcendental/immanent distinction. The latter is defined by Kant as follows (Kant 1998: B383): pure concepts of reason are always transcendent whereas pure concepts of understanding are always immanent, because understanding bridges to experience.

Kant’s conceptualization of cognition a priori has been extensively and controversially debated in epistemology. Jean Piaget’s investigations added a rich body of empirical evidence to this debate. He explains how space and time are constructed in the course of the development of intelligence in the child. Also, Kant does not argue that the a priori space and time are innate. Instead he uses the method of elimination in declaring that one can never imagine “that there is no space” and that an a priori representation is a condition of possibility that “grounds outer appearances” (Kant 1998: B38).

Luhmann’s claim to have overcome transcendental philosophy by the introduction of the system/environment
Husserl on meaning

Husserl feels himself generally close to Kant's critique of pure reason. Nevertheless, he sees in it some "obscurities," because from his point of view, Kant lacked the phenomenologically correct conceptualization of the *a priori*, of perception, of experience, and of understanding (Husserl 2001b: 318f, 2001a: 28f). Although Husserl concentrated later in his work on transcendental subjectivity/inter-subjectivity and aimed at a "radical transcendental subjectivism" (Husserl 1992c: 138ff, Husserl 1992a: 101), he did not appreciate what he called "Kant's confusing, mythic concepts of understanding and reason" (Husserl 2001a: 135). Instead, Husserl elaborated his method of phenomenological analysis. It starts with psychic acts, by which subjects represent the object world within their consciousness.

Piaget on intelligence development and environment

In his book *The Construction of Reality in the Child* (Piaget 1954) Piaget presents a six-stage model of the development of the object concept in connection with space, causality, and time on the basis of sensorimotor intelligence. Whereas in the

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first two stages no special behavior related to vanished objects can be observed, this changes gradually and results in the representation of invisible displacements in the sixth stage. His investigations include the repeated (time) placement and displacement (space) of objects in front of children. Piaget concludes that the elaboration of the concepts of object, space, and causality goes together with the development of intelligence. It starts from a state in which accommodation to the environment is undifferentiated. Later on, the universe is built up into an aggregate of permanent objects connected by causal relations. This universe of connected objects is perceived as independent from the child and is placed in space and time. In Piaget's observations, an “a priori” such as space or time does not exist.

« 27 » The development of sensorimotor intelligence is conceptually captured with the terms “assimilation” and “accommodation” (Piaget 1954: 350ff). Assimilation tends to subordinate the environment to the organism whereas accommodation is the source of changes and bends the organism to the successive constraints of the environment. In the beginning, assimilation means the utilization of the external environment by the subject to nourish his/her hereditary or acquired schemata (sucking, sight, etc.). As the schemata are multiplied and differentiated in the course of the development, assimilation is differentiated from accommodation. The development progresses from an integral and unconscious ego-accommodation. The development progresses assimilation is differentiated from accommodation in the course of the development, as the schemata are multiplied and differentiated in the course of the development, assimilation is differentiated from accommodation, or acquired schemata (sucking, sight, etc.).

« 28 » Luhmann adopts Piaget's notion of assimilation/accommodation in the course of his elaboration of the structural coupling between psychic and social systems (Luhmann 1995b). In TSS, this structural coupling is provided by the form “person,” which is constituted for the sake of ordering behavioral expectations. It helps the psychic system to develop adequate schemata/structures to accommodate various social situations or to interpret (assimilate) the behavior of other psychic systems according to his/her existing schemes/structures. Luhmann describes this as the transformation of irritations (disturbances, ambiguities, disappointments, inconsistencies, etc.) into workable forms.

« 29 » Although von Glasersfeld appreciates Kant's transcendental philosophy as a model that is in many ways fundamental to constructivist approaches, he judges Kant's “transcendental enterprise” as belonging to the realm of poetic metaphors and mysticism (Glaserfeld 1995: 39). For von Glasersfeld, it is rationally unconvincing that something that allows experience can be captured with concepts and language that were derived from experience.

« 30 » Piaget's constructivist theory of knowing is far more convincing for von Glasersfeld than approaches such as the transcendental conception of cognition. He observes in this context (Glaserfeld 1989a) that the theory of evolution was unfortunately not available for Kant, but that later authors already used it. For example, besides Piaget (assimilation/accommodation), Georg Simmel had dealt with the adaptive function of cognition. That is, cognition does not produce a “true” picture of a “real world,” but rather aims to enhance an organism's management of experience. Also, authors such as Maturana, Varela, von Foerster, and Claude Shannon considered adaptation as important.

« 31 » Based on these and further approaches – see for an overview of “thirty years radical constructivism” (Glaserfeld 2005) – von Glasersfeld formulated his principles of radical constructivism (Glaserfeld 1989a):

- Knowledge is not passively received (neither through the senses nor through communication) but actively built up by the cognizing subject.
- The function of cognition is adaptive (towards fit or viability) and serves the subject's organization of the experiential world (not the discovery of an objective ontological reality).

« 32 » Luhmann discusses radical constructivism and especially considers the concept of “viability” together with the notions of adaptation and fitness (Luhmann 1990c: 521 and 555, Luhmann 2007: 236). But in distinction from radical constructivism, he does not opt for viability/adaptation/fitness. In TSS, meaning-based selection operations of psychic and social systems do not serve the “fit” between system and environment, but rather the maintenance of the system's reproduction (Luhmann 1990c: 576f).

« 33 » Von Foerster was already interested from early on in the question of the way in which a system and its environment are interrelated. In a paper published in 1969 (Foerster 2003a), he referred to Gordon Pask's network considerations as a basis for discussing a system's utilization of environmental order. This is done using the “order from noise” principle. No order is “fed” into the system; only those components of the noise are selected that increase the order in the system. Later on, von Foerster spoke of states that are generated purely internally (i.e., “self-states” or “eigenstates”), which permits each incoming signal to be referred to its own self. He describes this as the establishment of self-reference with respect to the outside world (Foerster 2003a: 110).

« 34 » Luhmann uses exactly this notion in his conception of resonance (Luhmann 1989: 15ff). In TSS, there is no direct input from the environment into the system. Instead, resonance occurs when the system is stimulated by its environment. The stimulation can be registered by the system if it possesses a corresponding capacity, i.e., if the stimulation becomes data (and not noise). This ability is because the data can be included in the system's own operations. The system distinguishes itself from the environment and establishes the system/environment difference to be able to observe the environment in respect to itself.

« 35 » According to Ludwig von Bertalanffy, an important question in classical systems theory was “how systems are realized at various levels of the world of observation” (Bertalanffy 1969: xxi). Neither von Bertalanffy nor other system theorists denied the existence of a real world. But it was argued that systems are entities either perceived in or inferred from observation, or conceptual systems such as logic, mathematics or music, which are symbolic constructs. Therefore, a system is not something presented to the observer, but recognized by
him. This means that the "construction" of a system depends on the observer, on his/her knowledge, interest, ability, etc.

A observer dependence is the position from which Stafford Beer judges the introduction of the term "autopoiesis" by the neurobiologists Humberto Maturana and Francisco Varela. Beer argues that this is a remarkable contribution, and expresses his conviction that the autopoietic concept offers a theoretical framework that helps to overcome the unsatisfactory state that one has to cope with the confusion that arises from the question of observation and the subjective recognition of systems (Beer 1980: 68). Maturana & Varela's well-known definition of "autopoiesis as the organization of the living" emphasizes autonomy, diversity, and the maintenance of identity (Maturana & Varela 1980b: 73f). In his article "The early days of autopoiesis" (Varela 1996), Varela observes that from the 1970s, in twenty productive years this conception was developed and explored and that the interaction with Heinz von Forester and the scientific community linked to the BCL (Biological Computer Laboratory) played therein an important role.

In a pedagogical approach, Maturana and Varela use the idea of machines to clarify what autopoietic organization in biological systems means as opposed to allopoietic organization. To illustrate the specific characteristics of biological autopoietic machines, they are distinguished from allopoietic ones by the features of input/output, unity, individuality, and autonomy (Maturana & Varela 1980b: 80f, Maturana & Varela 1998: 75f):

- Autopoietic machines are autonomous in subordinating all changes to the maintenance of their own organization, whereas allopoietic machines are subordinated to the production of something different from themselves (e.g., cars).
- Autopoietic machines possess individuality because they maintain an identity through their continuous production independent of their interactions with an observer, whereas allopoietic machines have an identity that depends on an observer.
- Autopoietic machines are unities only because of the operations that specify their own boundaries in the process of self-production, whereas the boundaries of allopoietic machines are defined by an observer.
- Autopoietic machines do not have inputs or outputs but can be perturbed by independent events and undergo internal structural changes to compensate for such perturbation. Interactions between two or more autopoietic entities will therefore result in reciprocal perturbations. If there is a history of recurrent interactions leading to the structural congruence between them, there will be a structural coupling.

Luhmann adopts the biological concept of autopoiesis in all of these four characteristics. In TSS, autonomy of self-regulation is acquired by the system's indifference to its environment (Luhmann 1995a: 183); individuality and identity is maintained through reflection and self-observation/self-description (ibid: 34, 266); unity is a unity of reproduction of the system's elements (and must be distinguished from the unity of difference, which is related to self-observation) (ibid: 35); and system environment relations are irritations that make the system resonate (i.e., react only in accordance with its own structures) and that can be intensified by structural coupling between systems (Luhmann 1995b, 1989: 145, 1995c).

System/environment: operational closure and the construction of reality

Meaning-based self-reference is a central notion in Luhmann's theory and therefore in the explanation of the construction of reality as well (Luhmann 1990b, Luhmann 1990e, Luhmann 1983). It is the notion of meaning-based self-reference that provides the ground for the conception of operational closure and subsequently allows the internal reconstruction of the difference between system and environment. In the logic of Luhmann's theory, only this enables the system's continual reference to itself by distinguishing itself from the environment.
Meaning as a basic concept

- In Luhmann’s conception of meaning, Husserl’s notions of a universal meaning horizon, object reference (intention), and inactivity/activity are linked with Maturana’s/Varela’s ideas of circularity, maintenance, and reproduction. This results in the notion of circular organized meaning, which has the following features (Luhmann 1995a: 37, 59, 263, 1990a: 12):
  - Meaning refers to meaning and never to anything else. The only way to escape this circularity is negation. But negation, too, has meaning and meaning is, therefore, a non-negatable category.
  - This tautology is solved on the level of the system by the possibility of “re-entry,” a concept adopted from George Spencer-Brown. That is, a meaning-based system is able to represent the difference of system and environment within the system (Spencer-Brown 1994: 72ff).
  - Meaning is also defined as a referential structure in the form of a surplus of references (horizon). Something stands in the focal point, at the center of intention, and everything else is indicated as the horizon that guarantees the accessibility of the world.
  - Meaning is further characterized by temporality. Meaning references always operate in the present and are, therefore, of only minimal duration.

- Because of temporalization, there is a continuous need for reference maintenance. Every reference must either be repeated (selected again) or, if not, other references must be selected. Meaning therefore exists only if meaningful references are made; otherwise it ceases.

- Luhmann indicates two categories of meaning-based systems: psychic systems and social systems (Figure 2). These two can be distinguished according to whether they use consciousness or communication as a mode of meaning-based reproduction. Luhmann defines psychic systems as constituted on the basis of a self-referential (unified) nexus of conscious states, and social systems as constituted on the basis of a self-referential (unified) nexus of communications (Luhmann 1995a: 59 and 271).

- Although psychic and social systems are different categories of systems, they are inherently connected; i.e., they have evolved together (Luhmann 1995a: 59). This co-evolution has led to a common achievement, namely meaning. In summary, it can be said that since both systems are ordered according to meaning, they are a necessary environment for each other to allow for the continuation of their auto-poiesis.

Modes of self-reference and operational closure

- Psychic systems consist of “thought elements” and social systems of “communication elements” (Luhmann 1995a: 138 and 262). Both kinds of elements are defined as being themselves complex events. This is a conceptualization following Whitehead’s elaborations that an event is a nexus of actual occasions (actual occasion = entity diverse from any entity in the “many” that it unifies) (Whitehead 1979: 21 and 80).

- Therefore temporalization and complexity require the ongoing identification and establishment of the elemental unity. In the case of psychic/social systems, the elemental unity is constituted as an element in relation(s) (and not ontologically given). That is, elements acquire unity only when they are related, i.e., when they refer to other elements. The formation of the elemental units is explained as a “constitution from above” (and not an “emergence from below”) and is based on three interrelated levels of self-reference (Figure 3):
  - First, in the course of basal self-reference, an element refers to itself (self = element of a certain category; distinction = element/relation). That is, thoughts refer to thoughts and communications refer to communications.
  - Second, in the course of processual self-reference, an element refers to another element and forms a “chain of elements-in-relations” over the course of time (self = process; distinction = before/after). This is possible because of accompanying self-reference: i.e., a process is possible on the basis of accompanying meaning, which allows for the transition from event to event.
  - Third, in the course of reflective self-reference, an element refers to the system because system-reference and self-reference coincide. This is possible because the system indicates itself – i.e., its own elements – in contrast to its environment (self = system; distinction is system/environment).

- Based on this terminological clarification, operational closure can now be defined simply as a system characteristic that presupposes elements of the same category. As mentioned above, closure as such would not be sufficient. In the case of psychic and social systems, additional meaning must be incorporated to enable the transition from event to event (and each event itself incorporates meaning).

All openness is based on closure, and this is possible because self-referential operations do not absorb the full meaning, do not totalize but mere-
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Distinguished from hetero-reference. But of social systems, self-reference has to be conceptualized as reference within the theory of the system and the environment is constituted on the basis of the presence of individuals. For example, the economic system disposes of programs such as "pay/unable to pay" (economy) or "true/false" (science). Programs enable a bank to control the impression it receives of the situation (Goffman 1959: 15). Luhmann adopted these ideas and introduced the concept of the "form person" that navigates between the psychic and the social (Luhmann 1995b: 142). The form person includes the body because of the structural coupling between the psychic system and its physical basis and therefore gains duration beyond the psychic reproduction. It is not a system, but a social-psychological attribution with the function of reducing uncertainty in social interaction by representing individualized behavioral constraints.

Reflective self-reference, self-observation, and self-description

Not all systems achieve the level of reflective self-reference. For example, interaction systems (as one specific social system, see Figure 2) do not usually reflect their unity. They are constituted on the basis of the presence of individuals (criterion: presence/absence) and structured by centering along the theme(s) of communication. For other systems, such as psychic, organizational, and societal systems, reflective self-reference is common (Luhmann 1995a: 266ff, 456ff). Reflection requires self-observation and self-description (Luhmann 1995a: 457, 1997: 879–893). Self-observation uses the system/environment distinction and therefore the difference between self-reference and hetero-reference. Self-descriptions use self-observations, but beyond that, self-description intends to have at least some duration and should represent identity.

In the case of psychical systems, this can result in a self-description in the form of "person," i.e., personal identity. The function of the "form person" is well-described in the psychology of Carl Gustav Jung and in the social psychology of Erving Goffman. In the ancient Greek theatre the "persona" was a mask, which nowadays can be seen as a compromise between individual and society: what someone should appear to be (Jung 1992: 158) or how an individual tries to control the impression he/she receives of the situation (Goffman 1959: 15). Luhmann claimed that with this "intervention of systems theory," a "de-ontologization of reality" is achieved (Luhmann 1990b: 64). The external world remains unknown but can nevertheless be treated within the system.

Luhmann claims that with this "intervention of systems theory," a "de-ontologization of reality" is achieved (Luhmann 1990b: 67). Thereby, only the epistemological relevance of an ontological representation of reality is doubted. This is not an answer to the question of whether a world exists or not. Of course, if a system does not have an entry to its external world, it can be denied that such an external world exists. But this is not intended here. Equally well, it could be claimed that an external world exists. And the latter is preferred by Luhmann, although he sees no way of deciding in favor of the one or the other of these two options. What he suggests instead is the use of the system/environment distinction in the analysis of the problem.

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In the case of social systems, a substitute for the body of the psychic system is required. This can be found in the form of texts that are either orally provided or written down (Luhmann 2000: 422). In the case of organizational systems, texts are documents such as organizational charts, internal rules (responsibilities, job descriptions, etc.), process/product descriptions, and annual reports. In the case of societal systems (i.e., functional systems such as an economy and a science), self-description is possible because of their specific codes and programs. On the level of coding, a system is differentiated by means of a binary scheme such as "pay/unable to pay" (economy) or "true/false" (science). Programs enable a "concretizing" or "operationalization" (Luhmann 1989: 45) of the requirements that a function system has to satisfy. On the program level, a system can change structures without losing its code-determined identity. For example, the economic system disposes of programs such as market oriented capi-
tual expenditure programs (Luhmann 1988: 240) and the science system of programs related to theories and methods (Luhmann 1990c: 403ff).

**Operational closure, observation, and resonance**

"57" It is one of the consequences of operational closure that information in meaning-processing systems is a purely system-internal quality. Such a system disposes of each individual distinction and grasps on this basis “the states and events that appear to it as information” (Luhmann 1989: 18). The environment contains data or noise (see von Foerster above) that proves to be useful for the operations of the system. This is not conceptualized as a system’s reaction in the meaning of a simple stimulus-response pattern. Instead, it must be seen as a process of individual operations within the system according to the system’s internally circular patterns. Resonance is therefore defined as the constraint that a system can react to environmental events only in accordance with its foundation for the reality of the system, whatever the contours of its own meaningful observations might be (Luhmann 1990b: 70).

**Innovativeness of Luhmann’s adoptions**

"60" Luhmann takes advantage of a great number of existing scientific approaches and integrates them into the strictly defined architecture of his theory of social systems. This is true for the absorption of smaller conceptual parts as well as of (more or less) complete approaches. An example of the first is the notion of assimilation/accommodation, which is part of Piaget’s theory of intelligence development. An example for the latter is the integration of Maturana & Varela’s neurobiological theory of autopoiesis, an undertaking that became so prominent that it has been labeled as the “autopoietic turn” of Luhmann’s theorizing.

"61" Since Luhmann’s integration efforts are quite interdisciplinary, it is challenging to evaluate his scholarly position and the innovativeness of his approach. The related questions are: Are these integrations crude fittings into his sociological theory or do they result in significant theoretical advancements? Does Luhmann work out “new combinations” of existing concepts and provide therefore innovation, i.e., innovation in the meaning of Joseph Schumpeter? In an attempt to formulate answers to these questions, the conceptual adoptions that were identified and described in this text will be used. Table 1 provides an overview of them (a selection that is exemplary and not exhaustive and follows primarily Luhmann’s own evidence) by indicating the original concept as well as Luhmann’s adoption.

"62" The first answer on the basis of these examples is somewhat reserved. Although the individual concept adoptions do have the character of innovativeness (i.e., they are not only “transferred” but also “translated”), their degree of newness remains more or less in the range of standard scientific reasoning and progress. The adoption of Husserl’s phenomenological analysis is backed by classical sociological approaches (e.g., Max Weber, Georg Simmel, and Talcott Parsons); the adoption of Maturana & Varela’s theory of autopoiesis of living systems has more the character of a variation than of innovation; and the integration of the concepts of assimilation/accommodation, viability, and eigenstates is somewhat eclectic.

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**Table 1: Examples of Luhmann’s adoptions of existing concepts.**

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<th>Original concept</th>
<th>Luhmann’s adoption</th>
<th>Reference</th>
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<tr>
<td>Husserl meaning</td>
<td>meaning processing systems</td>
<td>(1990e; 1995a: 145ff, 262ff)</td>
</tr>
<tr>
<td>Maturana &amp; Varela autopoeisis</td>
<td>autopoietic social/psychic systems</td>
<td>(1995a: 31ff, 22, 264; 1990a)</td>
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<tr>
<td>Piaget assimilation/accommodation</td>
<td>“person” as structural coupling</td>
<td>(1995b)</td>
</tr>
<tr>
<td>von Glasersfeld viability</td>
<td>system maintenance</td>
<td>(1990c: 521, 555, 2007)</td>
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3 Innovation theory is still related to the name of Joseph Schumpeter, an economist that popularized the term innovation together with the notion of “creative destruction” in the first half of the 20th century. He defines innovation as any “New Combination,” e.g., in the form of new commodities, new forms of organization, newly opening-up markets, etc., but excludes those minor and day-to-day adaptations that are “part and parcel of the most ordinary run of economic routine within a given production function” (Schumpeter 1989: 621).
The second answer to the above-mentioned questions is quite contrary to the first, because of the widening of the scope of the consideration. The innovativeness of Luhmann’s approach is given by the incorporation of these concepts in an overall framework. What appears “kaleidoscopic” as long as individual concept-adoptions are considered becomes “stringent” as soon as the complete architecture of the theory with its circular character is viewed. It is especially the intertwining of Husserl’s meaning and Maturana & Varela’s “autopoiesis” and their transformation into “autopoietic meaning based systems” that deserves the label innovation. This provides the basis for Luhmann’s distinction between psychic and social systems, which eventually indicates further concept-adoptions such as the “form person” and “resonance” as innovative.

As far as the system/environment distinction is concerned, the same is true for the evaluation of Luhmann’s contribution to constructivism. Dealing with system and environment and the overcoming of the notion of input/output relations is already state-of-the-art. Only the re-conceptualization of the system/environment distinction as a properly defined constituent of different forms of autopoietic meaning-processing systems (i.e., forms of self-reference, hetero-reference) should be called innovation.

Conclusion

Niklas Luhmann sees his contribution to constructivism in the exploration of the system/environment distinction, aiming at the replacement of the classical transcendental/empirical distinction. Thereby, he benefits from a rich body of philosophical and systems/cybernetic constructivist heritage that supports his differentiated and elaborated contribution. The resulting approach obtains its originality and innovativeness from the freedom of the adoption of the philosophical and system/cybernetic constructivist heritage, although exactly this makes it difficult to evaluate the explanatory power of his overall theory. Nonetheless, one can enormously profit from following Luhmann’s constructivist approach on the one hand, and from tracing back his conceptual adoptions to their respective sources on the other.

In conclusion, it can be said that Niklas Luhmann’s contribution to constructivism is doubtless original and quite inspiring. Although – or maybe because – it tends to raise more questions than answers, it has started to become a valuable ingredient in the scholarly dispute about constructivism and enriches it significantly.
tion to constructivism is doubtless original and quite inspiring although – or maybe because – it tends to raise more questions than answers” (J61). Since I share this general assessment, I would like to develop three specific contexts where Luhmann acted or acts as a question-generator, producing more new questions than solving old ones.

**More questions for the inventors of constructivism**

«3» The first context stresses the peculiar nature of the Luhmannian adaptations and accommodations of constructivist frameworks on the one hand and the reactions by the originators of these frameworks on the other hand. Looking at Table 1 in Buchinger’s article, one finds five major Luhmannian re-inventions of which four come originally from the group of radical constructivists. Given the adequacy of Buchinger’s transformation table, how the group of radical constructivists reacted to their “great transformation” becomes an interesting issue. Maturana, for example, was and is still very explicit that the autopoietic framework should not be transferred outside the realm of biological cells, and should not be utilized for individuals or for the societal arena in general. The same holds for Varela. Von Foerster remained rather skeptical as to whether the Luhmannian notions of recursive closures or resonance were in line with his formalism for eigenforms. His talk for Luhmann’s 60th birthday culminated in the phrase “communication is recursion” (Foerster 2003b: 321) but it remains very questionable whether von Foerster and Luhmann shared the same semantic territories with respect to the concepts of communication and recursion. Bateson, like Piaget, died four years before the publication of Soziale Systeme in 1984, so they had no chance to react to Luhmann’s reconfiguration of their work. While everyone among the core group of radical constructivists might have agreed on the originality of Luhmann’s explorations after 1984, it would have been difficult to reach a consensus as to whether the Luhmannian approach would lead to a theoretical dead-end or to a vital radical constructivist research trajectory for societal analyses in general. Thus, for the radical-constructivist group of first-order inventors, Luhmann, with his second-order inventions of first-order radical constructivism, definitely created more new questions than answers.

**More questions for constructivist interpreters**

«4» The second context addresses the radical and counter-intuitive organization and structure of the theoretical framework of TSS II and its many unintended consequences. Whenever one wants to take Luhmann’s definitions or explorations at face value, one ends up with a massive amount of new sets of questions.

«5» For example, as everyone in favor of Luhmannian systems theory knows, different systems operate on different binary codes such as payments/non-payments (economic system), truth/falsity (science system), and the like. What looks appealing at first sight becomes rather complex and labyrinthine at second sight and a lost cause at third sight.

«6» Taking scientific communication as our starting point, probably the most important selective operations occur with respect to the choice of new data, hypotheses, theories, models, research-programs, and the like. But where does the binary code for the science system lead us with respect to these crucial selections?

«7» Initially, we all are perfectly aware that much of the observable communication by scientists and researchers is situated beyond truth/falsity-claims. Gossiping, making jokes, telling anecdotes, asking questions, needing help with or making exchanges on everyday problems, messaging on social media, requesting more funds from a science administration, etc., clearly fall outside the realm of true or false scientific propositions or the search for true knowledge in general. But maybe science as a Luhmann-communication system deals directly and only with truth and falsity claims and a Luhmann science system becomes, thus, highly selective with respect to its own communications. But restricting the science system to its true/false communication only creates an immediate follow-up problem because normative sciences such as mathematics, logic, statistics, ethics, welfare economics, and the like are not built on truth and falsity claims. Do these areas fall out of the realm of the science discourse? If not, can one still uphold a binary code for the science system in general or must one live by two binary codes, namely true/false for the empirical sciences and valid/invalid for the normative sciences? Luhmann suggests a differentiation between codes and programs so that one can build a general binary t/f code on top and have a differentiation into a t/f code for empirical and a v/i program for normative science? But with a binary t/f code on top and a special program or programs below, a host of new conceptual problems arises.

«8» Philosophers of science remind us again and again that truth issues turn out to be of minor or very marginal importance for the evolution of science or for actual decision procedures with respect to new theories, models, etc. New theoretical frameworks are hardly ever discussed on their truth merits, but on other criteria such as simplicity, generality, problem-solving effectiveness, and the like. If, for example, problem-solving effectiveness as a PSE program (Lauden 1977) or a variant of it, such as P*, becomes crucial for theory or model selection on historical or empirical grounds, then the following trilemma arises.

«9» First, one could develop a hierarchical binary true/false code T/F and a PSE program for program-solving effectiveness. But then one is confronted with a general binary code with T/F on top, which is almost irrelevant to accounting for the most important selections in its own domain. The necessary PSE selective program operates in complete independence from the top level binary code because it is based on a very different scale of varying degrees of problem-solving effectiveness that, by themselves, are grounded in different dimensions of PSE.

«10» Second, one can develop a hierarchical ordering between a T/F binary code and a program such as PSE, where code and program can be applied to common communicative domains. The problem here is not only that the binary code and the program will differ significantly in their selection results, but that the selections from the PSE program will dominate the potential selections from the binary coding. New theories, models, research programs

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or research traditions have been and will be selected irrespective of the truth/falsity code allocations, but in line with the PSE-grounded results, which are based on different dimensions and degrees of problem solving effectiveness.

11 Third, one can stick to a T/F binary code on top together with a program pool that contains, aside from PSE and other PSE variants, a suitable program for the binary true/false differentiation as well. In this case, the truth/falsity-program will select theories, models, research frameworks, research traditions, etc. according to its program rule set. But the program that relies on PSE problem-solving effectiveness or its variants will select specific theories, models, research programs or research traditions as well. As a consequence, an intra-systemic program competition scheme must be organized in order to select theories, models, research frameworks or research traditions. But the idea of such a competition scheme runs counter to the Luhmannian framework and undermines the initial idea of a binary code completely.

12 In the end, one is left with a big bag of new questions once the journey along a particular line of systemic thought in the Luhmannian tradition has been started. One could repeat this type of exploration with many other Luhmannian notions, which in the end provoke more questions than they are able to solve in the first place.

More questions for constructivist readers

13 But there is also a third context where Luhmann raises more questions than answers. And the third context is populated by groups who look for interesting and fruitful hypotheses, trends, conjectures, aphorisms, and the like in the fields of language, evolution, society, etc. Furthermore, the third group will profit strongly from Luhmann’s work because they will usually find a particular aspect or an enlightened guess that is worth pursuing, producing many new and challenging questions for their future research. Why? Because Niklas Luhmann was an original and inspiring thinker and because it … can be generally stated that Luhmann was able to synthesize Parsons’ systems theory … (and so ad infinitum)

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On Reading and Critiquing Luhmann

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> Upshot – I acknowledge the value of Buchinger’s contribution to my understanding of Luhmann’s theory of social systems and seek some clarification and elaboration concerning specific issues. In particular, I raise some questions about the concepts of meaning processing and of psychic systems and persons, with reference to related ideas developed by Gordon Pask and myself. I also question how Luhmann uses the term “autopoiesis.”

Introduction

1 From what I have managed to understand of Niklas Luhmann thus far in my reading, I am persuaded that his social systems theory is a remarkable achievement. I am also persuaded that it has immoveable flaws. Luhmann’s vision of what a “super-theory” (his term) of social systems should be is inspirational. I believe he is firmly on the right track in basing his theorising on the theory of self-referential systems, developed as part of what has become known as second-order cybernetics. Here, I can only indicate the few ways in which the theory could perhaps be better founded on or aligned with other work in cybernetics.

2 First, I will briefly comment on Eva Buchinger’s article. I will then raise questions about some aspects of Luhmann’s theory that I find troublesome or contentious in the hope that this will lead to further debate and clarification. My questions concern (i) the concept of a meaning-processing system (ii) the concepts of psychic systems and person (iii) Luhmann’s use of the term “autopoiesis.” I conclude with some comments on the value of a super-theory such as Luhmann’s.

Buchinger’s achievement

3 Luhmann describes his theory of social systems as “non-linear” and with a design like a “labyrinth” (Luhmann 1995a: lii). I believe Buchinger has done a magnificent job of setting out before the reader major parts of the architecture – the skeleton as it were – of Luhmann’s theory, a theory she herself refers to as rigorous. She has also set out the chief components of the kaleidoscopic montage of sources that Luhmann draws on and shown how they have been transmuted and woven into his theory. I believe that, as set out in her intentions, she has made the case for the innovative nature of Luhmann’s theory of social systems.

4 With respect to varieties of constructivism, Buchinger has usefully highlighted the contrast between a meaning system’s self-reproduction and Ernst von Glasersfeld’s concept of viability. Luhmann’s theory can more readily account for anomalies, such as the behaviour of the Shakers, whose beliefs (the meanings they found in the world) lead them to choose not to reproduce biologically.

Luhmann’s concept of meaning processing

5 Buchinger has helped us see how Luhmann draws on Husserl in developing his central concept of meaning-processing systems. In §21, she cites Edmund Husserl thus: “Psychic acts are meaning-processing entities in which expressions (words, sentences, etc.) are related to objects (concrete things perceptible by the senses or imagined, or facts, characteristics, categorical forms, etc.).” However, I did not find this emphasis on the role of linguistic expressions in Luhmann. Without it, one could gain the impression that, as discussed in
ethology and biosemiotics, all organisms are meaning processors.¹

¹ My concern here is that whilst a phenomenological description is useful in helping us appreciate what the underlying mechanisms must account for, such an analysis does not (and cannot) specify the underlying mechanisms. Cognitive psychology is replete with experimental studies of reaction time, recognition and recall, selective attention directing, and many other cognitive activities. The studies are accompanied by models of the processes thought to account for the phenomena. Such explanation by mechanistic modelling is lacking in Luhmann’s theory, much as he refers to “information processing” and “meaning processing.” How these processes work is as opaque as Immanuel Kant’s accounts of the workings of his “faculties.” For guidance on this question of theoretical adequacy, I refer to cybernetics, in particular to Gordon Pask’s definition: “Cybernetics is the science or the art of manipulating defensible metaphors” (Pask 1975a: 15). A metaphor is an abbreviated form of an analogy. In science, the analogy relations are between an abstraction, a model, and the aspects of the empirical world that it is intended to illuminate. For W. Ross Ashby, “Cybernetics takes as its subject matter the domain of ‘all possible machines’” (Ashby 1956: 2). Ashby uses “machine” as a synonym for “system,” where a machine is something that persists. He wants us to ask how something persists. What are the mechanisms? Thus, we can ask what are the mechanisms that account for a meaning system and its persistence? There is a more extended discussion of “cybernetic explanation” in Scott (2000), with particular reference to how one models the processes involved in child development (see my criticism in §8 below).

² For a sophisticated account of “cybernetic phenomenology” and a discussion of relevant explanatory metaphors (organism, mind, machine, template), see Richard Jung (2007).

² Next, I wish to question the distinction Luhmann makes between psychic systems and persons. Luhmann acknowledges that psychic and social systems have co-evolved and discussed socialisation in terms of their “interpenetration.” However, he pays little attention to the ontogenesis of psychic systems in child development and thus, I believe, fails to see that his psychic systems are constituted in person form from the outset, albeit with multiple forms that manifest in different contexts. This overlaps with how he uses the term “meaning processing.” As Buchinger tells us, Husserlian meaning processing is about establishing correspondences between experience and a symbolic representation. The human capability to process meaning in this way develops in ontogeny as part and parcel of becoming a person. That personhood may differ in different contexts does not imply there are some generic processes that take on these personae. The accounts of ontogenesis provided by George Herbert Mead, Jean Piaget, Lev Vygotsky, and others are helpful here. In Scott (2007), I attempt a synthesis where I appeal to Pask’s conversation theory (Pask 1975b) as a useful theoretical structure in which to capture the synthesis. In Scott & Shurville (2011), there is a more focussed account that addresses the question of how the “signs” in which we think emerge as shared significant symbols. Jung’s (2007) theory of psychosocial systems also includes a genetic dimension.

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⁴ For a discussion of the parallels between the theories of Pask and Luhmann, see Buchinger & Scott (2010).

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social systems is a founding predication. He specifically states that by definition the internal conversation of a single human being is not an example of one of his “interaction systems” as it only involves one human being.

Luhmann and autopoeisis

My reading is that Luhmann misrepresents Humberto Maturana and Francisco Varela’s concept of autopoeisis. I am aware this has been proposed by many other commentators and is a contentious issue. Here I merely note my own disquiet. Maturana and Varela make the important distinction between “organisation” and “structure.” In an autopoietic machine, a system’s organisation, whatever else it does with respect to its interactions with its environment and with itself (what it takes as input, what it produces as output) must reproduce itself. The system’s particular structure may change from instant to instant but the circularity or closure of its organization must be conserved. Maturana and Varela also use the term “operational closure.” Here they are referring to a network of dynamic processes (operations) whose effects do not leave that network. They lead only to further operations within the network. In Maturana and Varela’s account, operational closure is exemplified by the operations of the nervous system. Operational closure as a process is not by itself autopoietic. It requires the organisational closure of autopoeisis.

Luhmann makes a central metaphorical use of the concept of operational closure to describe the closed nature of meaning-based systems (meanings lead to meanings; communications lead to communications) but does not refer to the concept of organisational closure. My conclusion is that in invoking the term “autopoeisis,” Luhmann has carried out a partial metaphorical borrowing only. Inevitably this has lead to much confusion and debate. It would have been better, perhaps, if he had not used the term at all beyond its original biological context.

Conclusion

Finally, what is the value of Luhmann’s theory? For example, can it help us understand all that happens – or is required to happen – in the kind of critical circumstances that frequently face us now? In such circumstances institutionalised procedures have to be interpreted and followed in specific contexts, with humans learning and solving problems together in the autopoeitic activities of protecting, maintaining, and repairing the systems that support them? I believe, with some qualifications, that the answer is “yes.” The Paskian P-individual, in order to reproduce itself, must also reproduce the material fabric, the M-individual that embodies and supports it: brains, bodies, and extensions, such as dwelling places, computers, vehicles, and protective devices such as clothes and weapons. The more complex architecture of Luhmann’s supertheory may permit us to examine and analyse these activities and processes in more detail.

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Luhmann’s Legacy: Illuminating Constructivism, or III-Luhmann-ized Constructs?

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> Upshot - Buchinger’s review of Luhmann’s theoretical framework leads to a conclusion that Luhmann’s consolidation of a kaleidoscopic array of sources represents his primary innovation. However, this conclusion bypasses the question of whether Luhmann’s admirably fused result actually reflects viable – or even valid – applications of those sources he purports to integrate. I shall illustrate grounds for doubt on this question with specific regard to the construct Luhmann most centrally adopted – autopoeisis.

Introduction

Let me begin by congratulating Eva Buchinger on a notably rich and informative review of Niklas Luhmann’s work in a limited space. Her characterization of his bases as kaleidoscopic (§4, §63) is apt, insofar as they are numerous and drawn from a variety of scholarly fields. Similarly apt is her conclusion that Luhmann’s most innovative contribution relates to consolidating his selected inspirations into a coherent framework (§63), whereas his adoption and translations of the concepts he selected for incorporation were less clearly innovative (§62).

However, a kaleidoscope is a mere divertissement intended to bedazzle the viewer. As Buchinger notes (§4), Luhmann’s work is a challenge to evaluate owing to his wide-ranging interdisciplinarity and assimilation of concepts for which he offered little detailed exposition. Scholars unprepared to critically analyze Luhmann’s choices of, modifications to, and interconnections among those borrowed concepts may have little choice but to remain simply bedazzled or admire his overall theoretical edifice by default. How many among Luhmann’s original target audience (sociologists) are knowledgeable in the systems/cybernetics topics he invoked as key components of his framework, as contrasted with the relatively many who should be familiar with the philosophical and sociological topics by which he laid out his thematic settings and objectives?

Buchinger addresses these settings and objectives at the outset, and she concludes with a cautiously positive evaluation of Luhmann’s composite result in terms of its being innovative. The one reservation I have is that this exposition moves from problem statements to evaluation of Luhmann’s product without addressing something more important than how innovative Luhmann may have been – i.e., the extent to which his treatment of precedent sources was viable or even valid. I do not fault Buchinger for bypassing this topic – such discussion might well require an entire book.
Nonetheless, absent such discussion, Buchinger is on thin ice in claiming a...

Examples: Problems with Luhmann’s treatment of autopoiesis

Because it is tied to life as a mode of self-reproduction of autopoietic systems, the theory of autopoiesis does not really attain the level of general systems theory, which includes brains and machines, psychic systems and social systems, societies and short-term interactions.

At first sight it seems safe to say that psychic systems, and even social systems, are also living systems. Would there be consciousness or social life without (biological) life? And then, if life is defined as autopoiesis, how could one refuse to describe psychic systems and social systems as autopoietic systems? (ibid: 172)

Luhmann (e.g., 1986) characterizes autopoiesis as a construct (a) originating in biology; (b) initially defined with peculiar regard to biological systems; and therefore (c) requiring generalization beyond a strictly biological context to serve his purposes.

The first point is sound; the latter two are unsupportable. Varela, Maturana & Uribe (1974) seminally defined the construct quite generally and without biological specificity in terms of abstract “autopoietic machines,” of which living systems are a specific instance. This supra-biological abstraction is reflected in both Luhmann’s (1986) quotation of Maturana’s definition and his own cursory explanation of its implications. Nonetheless, Luhmann amplifies upon this bio-specific fiction to argue,

“[w]e immediately get into trouble in defining precisely what the components of psychic and social systems are whose reproduction by the same components of the same systems recursively defines the autopoietic unity of the system.” (Luhmann 1986: 172)

Even though Luhmann proceeded to define communications (on his terms) as the relevant components in a social system, he never deigned to go back and demonstrate their autopoiesis via the prescribed procedure. As such, there is no clear basis for concluding either (a) Luhmann assimilated anything beyond the concept’s label or (b) his own connotations for that label necessarily correlated with its seminal specification.

Even at this very general and initial stage in engaging Luhmann’s theorizing, we confront questions of viability and validity. Are self-serving misrepresentation, special inference, and avoidance of correlating one’s work with the precedents allegedly employed “in the range of standard scientific reasoning and progress?” (§62)

Such issues are not confined to this very general level of reference. Having misrepresented autopoiesis, Luhmann proceeded to exploit the construct in little more than name alone. I concur with Bernard Scott’s OPC (this issue) that Luhmann only partially adopted the canonical autopoiesis construct. However, I would go farther and indict Luhmann for distorting both (a) those elements he selectively used and (b) the degree to which his theorizing innovatively applied them. Let me illustrate the grounds for these claims with some selected examples.

Luhmann’s stated motivation for revising the autopoiesis construct on the grounds of insufficient generality is vacuous. The foregoing passage suggests his actual motivation was to find a way to apply autopoiesis to psychic and social systems – a goal justified by surprisingly circular reasoning.

At first sight it seems safe to say that psychic systems, and even social systems, are also living systems. Would there be consciousness or social life without (biological) life? And then, if life is defined as autopoiesis, how could one refuse to describe psychic systems and social systems as autopoietic systems? (ibid: 172)

Luhmann recasts autopoiesis with primary regard to a sense of closure that clearly reprises Maturana and Varela’s operational closure, absent acknowledgement that he is simply repeating them. Operational closure connotes that the operational effects of interest are manifest wholly within the bounds of the system/unity to which they are attributed. Maturana and Varela applied this construct to the nervous system alone, to illustrate that its internal operations (e.g., electro-chemical transactions) pertain only within the nervous system itself. Operational closure has no requisite relationship with autopoiesis nor with Varela’s autonomy, of which autopoiesis is a subset (cf. Varela 1979). The form of closure definitive of autonomous (and hence autopoietic) systems is organizational – not operational – closure. Invoking this solely appropriate form of closure would have obligated Luhmann to address the key distinction between organization and structure (in Maturana’s terms) and attend to the defining issues specified in Varela, Maturana & Uribe (1974) – both of which he evaded.

Luhmann repackaged multiple points made by Maturana and Varela, sometimes using new labels justified by (at best) minor glosses. For example, his “resonance” (cf. §41, 57) is a straightforward reprise of structural determination (cf. Maturana & Varela 1980a), given the appearance of novelty by redirected allusion to von Foerster (Table 1 in Buchinger’s article). Similarly, it is unclear whether or how Luhmann’s “irritation” differs from Maturana and Varela’s “perturbation.” Buchinger notes (§48) that for psychic and social systems, “...the elemental unity is constituted as an element in relation(s) (and not ontologically given).” Maturana originally characterized an ob-

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server’s operations as being conducted solely in terms of “pure relations” (Maturana 1970). Maturana’s explanations for language (and hence social) behaviors are explicitly relational in this same sense (as coordinations of coordinations … of behaviors; cf. Maturana 1988).

> Upshot • The three OPCs are instructive and inspiring, in particular for their pursuing of the question-generating function of Luhmann’s approach. Whereas Müller elaborates three broad perspectives (inventors, interpreters, and readers of constructivism), Scott concentrates on three specific socio-psychological issues (meaning, person, autopoiesis) and Whitaker addresses especially autopoiesis. In the response I first deal with specific issues and then with Müller’s three perspectives.

Questions about “meaning,” “person” and “autopoiesis”

> 1 Bernard Scott’s questions concerning meaning aim at its dependence on linguistic expressions (§5), the modeling of information in meaning processing (§6), and the stability/instability of meaning systems (§7). He doubts the adequacy of Luhmann’s approach in this respect. I share only some aspects of these doubts; for example those that lead to the suggestion that an enrichment of Luhmann’s theorizing on the basis of empirical investigations would be beneficial. Generally, I think that Luhmann was successful in interlinking meaning, language, and information in his theorizing. First, although language is not absolutely necessary in certain situations and meaning is defined pre-linguistically as referential context), it is valued as a “secondary specialization of the communication process” (Luhmann 1990e: 32), which is a precondition of all higher evolution of meaning and allows for a more or less unlimited number of types of behavior that can be used in interaction. Second, only the internal meaning-processing stability of systems allows for their openness to the environment. Third, the “production” of information in this context is “modeled” as a specific selection; i.e., as part of communication as a three-part unity (whereby utterance/corporeality, thematic centering, and expectation/nexus play an important role). In an interdisciplinary approach, I collaborated with physicists in elaborating a mathematical model to explore some of these “mechanics” in Luhmann’s theorizing (Barber et al. 2006).

> 2 Next, Scott questions Luhmann’s conceptualization of “psychic systems” as distinguished from “the form person” (§§8–10). Here I agree completely with Scott’s remark that Gordon Pask provides an enlightening theoretical framework with the P-individual/M-individual scheme. Especially, the potential of M-individuals for embodying and supporting the processes of P-individuation (Scott 2009: 153) deserves attention.

> 3 Third, Randall Whitaker (§§5–15) and Scott (§§11–12) criticize Luhmann’s adoption of the biological concept of autopoiesis (and especially the notion of operational closure). This is a widely disputed issue whose relevance is not least confirmed by the originators’ discomfort with this...
adoption. My understanding is that the dominating labeling of Luhmann's theorizing with the term "autopoiesis" is overdrawn. Of course it is clear that Luhmann himself provided for this domination by prominently and repeatedly using the term "autopoiesis." But he also repeatedly insisted on the difference between living and psychic/social systems and claimed much more than an adoption, namely a paradigm change. As far as I can judge, autopoiesis was, for Luhmann, a conceptual vehicle like other conceptual vehicles. In the introduction to his well-known Social Systems, he chose a different setting of priorities. It is general systems theory that should be tested in an encounter with sociological material and in this way concepts from other disciplines (including the concept of autopoiesis) could be made useable in sociological research:

"One of the most important results of this encounter, from which I hope both sides will profit, resides in the radical temporalization of the concept of element. The theory of self-producing, autopoietic systems can be transferred to the domain of action systems only if one begins with the fact that the elements composing the system can have no duration, and thus must be constantly reproduced by the system these elements comprise." (Luhmann 1995a: 11)

"4" In this conceptualization, systems would cease if they could not equip their temporalized elements with a capacity for connection that allows reproduction. Here, the capacity for connection is provided by meaning; i.e. meaning structures withstand the dynamics of the immediate (and not merely gradual, entropic) dissolution of the elements.

"5" In my understanding, the cornerstones of Luhmann's theorizing are "temporalization" and "meaning." In this respect, he benefited mostly from the work of Edmund Husserl (I elaborated this viewpoint earlier in Buchinger (2006) and repeated and complemented it in my main text). In accordance with this, I do not object the critique of Whitaker and Scott, although I do not believe that Luhmann's work should be characterized as phantasmagoria. I can follow their observation that Luhmann repackaged several of Matrana & Varela's notions under new labels whereby he only partially adopted them, and that this might turn out as misinterpretation from the perspective of the originators. Therefore I will not insist here on the justification of the adoptions (I would be happy to be able to contribute to such a discussion in the future). Instead I would like to draw attention to another area of critique that seems even more fruitful, namely Luhmann's appropriation of the philosophy of the subject. Jürgen Habermas - an experienced observer and critic of Luhmann's developments over decades - started a discussion about this issue in the 1980s (Habermas 2007). He remarks that Luhmann's system theory presents itself as the successor to an abandoned philosophy (whereby I disagree, i.e. that the philosophy of the subject from Kant to Husserl is abandoned), and that Luhmann's conceptualization of system relations is modeled after that of the subject (whereby I agree). In this context I find Habermas' critique of Luhmann's adoption of Husserl's concept of meaning as indicative for the ongoing discussion.

Questions concerning “inventors,” “interpreters” and “readers” of constructivism

"6" Karl Müller chooses a different starting point from Scott and Whitaker but comes to a similar conclusion as far as the inventors of constructivism are concerned (§3). He refers to Matrana & Varela's reservation that their biological concept of autopoiesis could be used in other disciplines as well as to von Foerster's skepticism that Luhmann's notions of recursive closure/ resonance could be an adequate adoption of his notion of Eigenform. I share his guess that for these and for other proponents of constructivism, such as Gregory Bateson or Jean Piaget, it would have been difficult to reach a consensus about whether Luhmann's work would lead to a dead-end or to a vital research trajectory: as long as this issue is unsettled, Luhmann's theory of social systems functions perfectly as question-generator.

"7" Concerning the interpretation of constructivism, Müller questions the relevance of Luhmann's approach for users (§§4–12). He especially scrutinizes the binary coding and the respective programs of societal systems (i.e., function systems). This is indeed a challenging point for those who aim at the practical application of the theory of social systems. In my understanding, Luhmann's elaboration of the complex "codes & criteria & programs" on the level of societal systems is somewhat sketchy and I agree that the theoretical elegance of the notion of binary coding does not accordingly result in empirical applicability. I would say that Luhmann progressed in this issue on the level of organization systems. In his book on organization and decision (Luhmann 2006), he distinguishes between premises of decisions (Entscheidungsprämissen) and programs of decisions (Entscheidungsprogramme). Whereas decision premises provide for general orientation (a functional equivalent at the level of organizational systems to codes at the level of societal systems), decision programs guide specific decisions (if–then decision programs, purposive decision programs). This conceptualization on the level of organizations could possibly inspire the further elaboration of the "codes & criteria & program" complex on the level of societal systems.

"8" Concerning the readers of constructivism (§13), Müller expresses his conviction that they will benefit from fruitful hypotheses, trends, conjectures, etc. This is a conviction that is definitely congruent with my own point of view.

Conclusion

"9" It seems to be generally agreed that Luhmann's theory of social systems is challenging as well as inspiring. The complex theory architecture and the partial recklessness in the treatment of the scientific heritage have to be accepted because they go together with the provision of a fruitful theoretical framework.

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The ethos of science.


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