

Liminal Consciousness: A Systemic Framework for 'Altered States of Consciousness'

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ABSTRACT

Academic psychology, both in research and theory, focuses mainly on rational consciousness. If it speaks about other forms of consciousness, these are foremost conceived of – and hence marginalized – as 'altered states of consciousness.' The term 'altered states of consciousness' consistently reproduces: 1. the positing of rational consciousness as a primal given; 2. the fixation on a (consciousness)process as a state; 3. the mistake to characterize something which is defined by constant alteration as 'altered;'; 4. a dichotomization of 'normal' and 'altered', which conceals the ongoing reproduction of rational consciousness; and 5. the suggestion that non-rational consciousness is epistemically inferior, if not deviant. This paper aims to circumvent these problems by focusing on central aspects of autopoietic systems theory and, in particular, on the fundamental term liminality, which are then combined to a new theory of non-rational consciousness. In this paper, the term 'liminal consciousness' will be used to refer to forms of psychic systems that are less defined by points of reference but instead rather converge to the limit of (temporary) omission of its autopoiesis. 'Liminal consciousness' is not conceived as one side of a dichotomous category (with 'rational consciousness' as its counterpart), but rather as a continuously increasing omission of the reproduction of self-referential structures. Three basic possibilities which can evoke liminal consciousness are identified: focussing on self-referentiality, focussing on hetero-referentiality, or a short-circuit of concentration by focusing on the occurrence of thoughts. Within this framework, many forms of consciousness, e.g. those 'invited' by ecstatic or meditative practice, can be conceptualized without relying on religious, reductionist or mystical discourses. Finally, instead of 'altered states of consciousness', the term 'liminal consciousness' is suggested in order to improve the connectivity of communication within the scientific system.

A Systemic Framework for 'Altered States of Consciousness'?

For the purpose of this paper, I suggest a pragmatic definition of consciousness as that which "vanishes every night when we fall into dreamless sleep" and re-emerges when we wake up or dream (Tononi, 2008). Already in 1901, William James, one of the founding fathers of modern psychology, inquired into our conceptions of 'altered states of consciousness' (James, 1997, 390 f). 70 years later, Fischer, in his "cartography of the variety of human experience," focused on ecstatic and meditative states (Fischer, 1971). Knowledge of such 'altered states' is widespread in many traditional cultures and they are referred to in various ways (Scharfetter & Rättsch, 1998, 9 ff). Verres and Leuner (1998, 60 f, my translation) metaphorically describe an "oceanic feeling" or "mystical ecstasy" in which the experience of differences is suspended and "the observer identifies itself with the object of its observation." While science is based on language as a sign- and thus difference- based form of communication (Saussure, 2001), which makes it, in principle,

difficult to adequately conceptualize experiences of indifference, the use of paradoxa (from the Greek *para*, beyond, next to and *doxa*, belief, common opinion) can help to overcome these limitations of language. They pave the way to observe the frames of our thinking, and we can utilize them to make evident the construction of our common sense and the notion of 'normal' and 'altered' consciousness. Luhmann (1995, 51) points out that the old European tradition, informed by medieval theology, "[...] saw no need to reflect upon paradoxes or even to retain the word." Only with mystics, such as Nicholas of Cusa, for example, "paradoxical formulations re-emerge as a form to rationally communicate ineffable experiences" (ibid.). However, in the 19th and 20th centuries, paradoxa were again banished from Western science (ibid., 1995, 40). Yet, Luhmann provides a rational and consistent framework for autopoietic systems that incorporates paradoxical formulations at its very core. The mainstream of academic psychology, however, is still in the grip of old-European paradoxophobic thought (Hofstadter, 2008, 62, 157) and thus its models and hence its research almost exclusively rest on forms of rational consciousness. Other forms of consciousness are marginalized as 'altered states of consciousness' or 'trance states,' which refer but to a vague conglomerate of consciousness processes, and this marginalization is constantly reproduced by the use of these terms. The term 'altered states of consciousness' is problematic because it positions rational consciousness as a primal given; it fixates a (consciousness) process as a state; it characterizes something as 'altered' which is defined by constant alteration; it bifurcates consciousness in 'normal' and 'altered', thus concealing the ongoing reproduction of rational consciousness; and it suggests that non-rational consciousness is epistemically inferior, illegitimate or deviant. The term 'trance' is problematic, because it is commonly used in religious, spiritual, mystical and esoteric discourses which are often excluded from scientific and, lately, even from (psycho)therapeutic¹ conversations; it is derived from the Latin word *transire*, "to cross or to pass over," which neither explains the agent of crossing nor its location or manner. The French word *transe* translates to 'fear' or 'fear of evil' which exposes a negative connotation of the term. To tackle these problems, as part of his master thesis, De Pari(2015) has formulated a concept that is based upon the general theory of autopoietic systems (Luhmann, 1987). In the first section, we will introduce the central aspects of Luhmann's theory. In the second section, we will offer a regression through forms of self-reference. Then we will conceptualize a new form of self-reference and explain why we suggest referring to it as liminal consciousness. Finally, we will outline some possible uses of this new concept.

The General Theory of Autopoietic Systems

In order to meaningfully include Luhmann's theory in this work', it is crucial to understand how he conceptualizes the 'events' that constitute consciousness. For this purpose, we will highlight how he refers to Whitehead's process philosophy, Saussure's 'linguistic sign,' Bateson's concept of 'information' and Spencer-Brown's definition of 'distinction and indication.'

The term *autopoiesis* (Greek *auto* = self, *poiesis* = production, creation) was introduced by the Chilean biologists Humberto Maturana and Francisco Varela as a way of defining living systems. In contrast, non-living systems are referred to as *allopoietic* (Greek *allo* =

¹ In Austria, for example, the Council for Psychotherapy has even come up with a guideline regarding the demarcation of psychotherapy from esoteric, spiritual and religious methods (Egger, 2015). This explicitly excludes those methods and teachings from psychotherapeutic education and practice which relate to esoteric, spiritual and religious content.

other, *poiein* = to produce), since they are dependent on production by something other than the system itself. Consider a car engine, for example: its parts have to be produced and assembled by something other than the engine, thus it is impossible for the engine to produce either its parts or itself as a whole. Now, as an example for autopoietic systems, consider any cell of your body: this cell can be defined as "a network of reactions which produce molecules such that (i) through their interaction generate and participate recursively in the same network of reaction which produced them, and (ii) realize the cell as a material unity." (Varela et. al 1974, 188)

Inspired by Maturana and Varela's work, Luhmann developed a general, transdisciplinary theory of autopoietic systems. He abstracts from biological concept and defines autopoiesis as "a general form of system-building" (Luhmann, 1986, 72). Besides living systems he also identifies psychic and social systems as autopoietic. They all use the same *form* of system-building but they differ in the operations used to construct themselves. While living systems constitute life as described by Varela and his colleagues above, psychic systems constitute consciousness by relating thoughts to each other, and social systems constitute communication by relating communicative events. At this point, I want to invite you to stop reading, close your eyes and take a few moments to focus exclusively on your breath.

So what has just happened? Perhaps you have closed your eyes. Perhaps you have been aware of your breath. Your breathing may have deepened, it may have become more shallow or it may even have stopped for a moment. Perhaps your biological system has reacted in different or additional ways (e.g. with an increased or decreased heart rate). Perhaps you thought 'that's not for me,' interesting idea' or something completely different. Perhaps you have just ignored my invitation and continued reading. Neither my psychic system nor the communicative system constituted by reading/writing this paper is in a position to predict or determine what happens in your psychic and biological system. How they continue their autopoiesis depends exclusively on their own structure. Thus, neither my thoughts nor communicative events are able to *enter* into your thought process and your cells – and vice versa. In fact, your consciousness is only able to relate its own thoughts to its own thoughts. It is unable to use my thoughts, communicative events or a cell in your body instead. In this way, autopoietic systems are *operatively or self-referentially closed*. Thus, on the level of its operations, an autopoietic system is unable to receive any direct input and its environment is not able to determine operations in the system. The communicative process constituted by reading this paper does not *determine* the thoughts currently produced in your psychic system. The following paragraphs may help to avoid three common misconceptions often associated with operative closure:

1) The notion of operative closure does not imply a closed system model or a solipsistic epistemology. Your psychic system can use the communicative process constituted with reading this paper to produce new thoughts. Autopoietic systems can *observe* or be *irritated* by their environment. They are *cognitively or interactionally open*; for example, your psychic system is currently irritated by communication.

2) Your psychic system allows for reactions to your biological system and vice versa. The same can be said for consciousness and communication; for example, your psychic system can irritate further communication on this topic. Autopoietic systems allow for reactions to important events in their respective environment, which is referred to as

structural coupling. This also means that autopoietic systems are autonomous but not autarkic or self-sufficient.

3) As mentioned above, Luhmann conceptualizes biological, psychic and social systems as autopoietic, and each of them is an environment for the other two. However, he refrains from conceptualize humans as systems. The thought or the communication of 'human' refers to a conglomerate of biological, psychic and social systems. 'Niklas Luhmann' is constituted by two words that form a name. Thoughts and communications can refer to it as a specific conglomerate of biological, psychic and social systems that have ceased their autopoiesis in 1998 (with the death of Luhmann). Since this may be contrary to everyday intuition and to many scientific opinions, Luhmann clarifies that his concept:

"...does not mean that the human being is estimated as less important than traditionally. Anyone who thinks so (and such an understanding underlies either explicitly or implicitly all polemics against this proposal) has not understood the paradigm change in systems theory. Systems theory begins with the unity of the difference between system and environment. The environment is a constitutive feature of this difference, thus it is no less important than the system itself." (Luhmann, 1995, 212)

As evident from this quote, Luhmann's concept does not marginalize humans or biological, psychic or social systems, and neither the system nor its environment or their difference are regarded as more important or as independently existent (Luhmann, 1999, 243 f). This conceptualization has an important advantage: it allows us to take each of these systems very seriously and to analyze them in their own right. It allows us to focus on one of the systems without regarding the others as less important.

Element and Relation

Luhmann introduced many important modifications to systems theory and to the concept of autopoiesis. The most radical difference to the original concept of autopoiesis lies in the constitution of elements in psychic (and social) systems. The elements of biological systems are conceptualized as chemical molecules, which are relatively stable. They only need to be reproduced or replaced from time to time. In contrast to chemical molecules, thoughts are conceptualized as extremely unstable and temporalized events. The thoughts you have while reading this line of text arise and cease in this current moment. You may never have the same thought again. In fact, to reread the same line would constitute another unique thought (Brown & Stenner 2009, 28). The same principle holds true for thinking about how you read these lines of text. Thus, you can see that a thought is neither stable nor changeable. Luhmann defines *thoughts* as the basic 'elements' or 'events' that constitute psychic systems. He (1999, 74, 393 ff) builds this definition on Whitehead's (1929) term "actual occasion." Essentially, you can imagine a number of 'potential events,' e.g. thoughts. In any given moment, one of these potential thoughts may be realized as an actually happening event, thus called an 'actual event' or 'actual occasion.' You potentially could have many different thoughts right now. In this very moment, a specific or actual thought is realized. As soon as you constitute an actual thought by relating it to some other thought you can use that 'actual thought' to relate future thoughts to it (Brown & Stenner, 2009, 11-36, 141 ff). To explain how exactly such elements are produced by psychic systems, we will elaborate on the foundations of Luhmann's concepts of observation and difference and in the next paragraph.

Observation of Difference

Luhmann states that instead of identity, unity or ontological existence, his theory focuses on questions of difference (vgl. Luhmann, 1999, 112, 243). Ferdinand de Saussure is recognized as the pioneer of such thought. He formulated the linguistic concept of 'signs' (first known as "signe linguistique" and later as "sème"), stating that "Language is a system of signs that expresses ideas." If you look at a sheet of paper, you can distinguish between the front and the back of the sheet, however, neither its front nor its back or even this distinction is a primal given and neither of these can exist without the other two. Similarly, a sign is constituted by two aspects: the signifier (or designator, i.e. the phonetic picture) and the signified (or designated, i.e. the content of the sign). The signified is not conceptualized as a 'real object,' and it is constituted by the act of signifying. Signs, on the other hand, are constituted by the cooperation of signifier and signified (Luhmann, 1999, 112; Saussure, 2001). Thus, imagine you are looking at a blank sheet of paper: even though there is no 'actual' difference (e.g. printed vs. blank), you can still refer to one of the two sides. Thus, to signify something as different, the signified does not need to be different in fact; the difference is constituted simply by the power of language. This metaphor is applicable for understanding the concepts of 'signs' as well as for those of 'elements' and 'relations'. In an autopoietic system, neither its elements nor its relations or their difference are a primal given. None of them exist as separate 'parts' and they only emerge through their dynamic constitution. The separation into relations, elements and differences serves only analytical purposes. Keeping this analytical distinction in mind is very important for an understanding the theory of autopoietic systems. This distinction is a difference that makes a difference. The following paragraph will elaborate on why the previous sentence is no mere tautology.

Luhmann (1999, p. 68, 112 author's translation), in direct reference to Bateson (1985), defines information as "nothing else but an event that causes a conjunction of distinctions – a difference that makes a difference" (ibid. p. 112). We can take this article as an example for deepening our understanding of this concept. While writing this article, we have made distinctions regarding the importance of different aspects of Luhmann's theory for our arguments. Thus, we have included the most important ones and excluded many other interesting topics, such as, for example, more specific social systems. By excluding topics from this article, we have made distinctions, and the distinctions we have made in the past now make a difference for you in the present. For example, reading this article will not allow you to make distinctions regarding the position of specific social systems in Luhmann's theory. The act of distinguishing determines the differences implicated in this article. Distinctions essentially serve the purpose of reducing complexity, for example limiting the possible number of thoughts or communications. Which information your psychic system generates by reading this paper – that is which distinctions it constitutes – depends exclusively on its own internal structures: it is the distinction that *makes* the difference. Luhmann (ibid.) argues that only systems that are operatively closed and cognitively open are able to make distinctions that make a difference. In this sense, he integrates Bateson's approach in combination with the laws of form by Spencer-Brown (1972), who explains how to use a single sign – the 'mark' or 'cross' – to perform mathematical operations while also carrying universal and philosophical aspiration as stated in the very first sentences in his book:

"The theme of this book is that a universe comes into being when a space is severed or taken apart. The skin of a living organism cuts off an outside from an inside. So does the circumference of a circle in a plane. By tracing the way we represent such a severance, we can begin to reconstruct, with an accuracy and coverage that appear almost uncanny, the

basic forms underlying linguistic, mathematical, physical and biological science, and can begin to see how the familiar laws of our own experience follow inexorably from the original act of severance." (Brown, 1972, V)

To understand how our experience follows from acts of severance, let us take his example of a circle in a plane. If you draw a circle on a blank sheet of paper, by the act of drawing you have created a distinction that let's you indicate the inside and the outside of the circle. In Spencer-Brown's terminology, whichever side you indicate becomes the marked side and the other side becomes the unmarked side. If you now regard the sheet of paper as a whole, this is the 'context' within which this distinction was drawn, and the boundaries of the sheet can be seen as another unwritten distinction or 'unwritten cross.' Now imagine you had not drawn a circle: neither the distinction nor an inside or outside of the circle could be indicated. Thus, the act of distinguishing itself constitutes the inside, the outside as well as the distinction. This principle of dynamic constitution may often be recognized in the concepts of Saussure and Bateson. Figure 1 shows a formal depiction of any specific thought following Spencer-Brown's signs of the 'mark' or 'cross.'

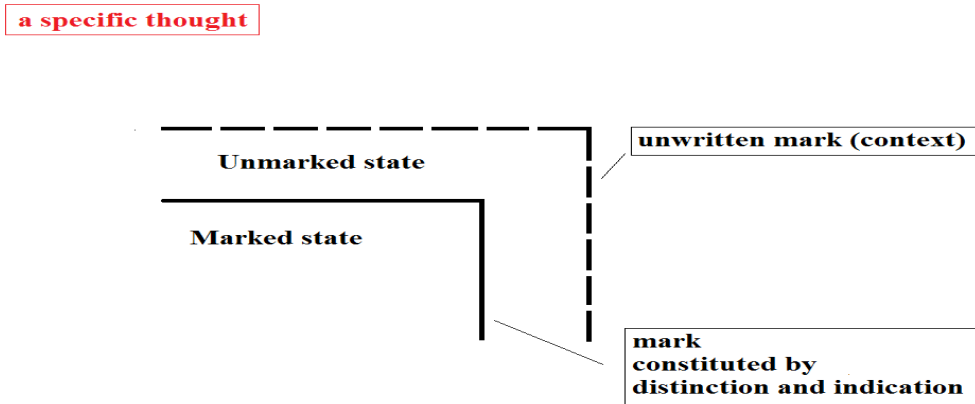


Figure 1.

Please note that this is a very limited description of the 'laws of form,' however, what we have learned from it will help us in the following to understand Luhmann's use² of Spencer-Brown's work for his concept of observation.

How to Find Yourself in the General Theory of Autopoietic Systems

Luhmann defines the operations of autopoietic systems as observations in the sense of distinctions as explained in the previous paragraph. He (1999, 346-376) demonstrates that every thought is observed to be constituted by such an operation: a psychic system operates by observing its own mental representations or thoughts. It produces its elements, their relations and itself as a whole by using observations, and in this sense it is an observer. Following Spencer-Brown, Luhmann defines an observation as necessarily constituted by the two components of distinction and indication. The authors are concerned not with *what* is observed but rather with *how* an observer observes. If we

² Other authors might be irritated differently by Spencer-Brown's communications. This is to be expected since their respective psychic systems are operationally closed, they had different thoughts before and thus also have other foci.

continue with the example of the last paragraph, then a mental representation of the inside of a circle can be created by referring a thought to it, but it is impossible to use the same thought to refer to the outside of the circle or to the distinction itself, for if a thought refers to the outside then a new thought has already been created. Thus, a specific distinction (circle) is bound to reveal only observation of its specific indication (inner circle). Every observation is bound to the one indication that it constituted through its distinction. We can recognize this as 'the blind spot' of observation. Luhmann points out that there is a way to correct and thus observe a specific blind spot, namely by observing the observer. Observing *how* an observer observes is commonly referred to second-order observation. Of course, a second-order observation also constitutes another blind spot – it is its apriori. However, the second-order observation has an important advantage: "It can see the blind spot, the apriori, the 'latent structures' of the first observation" (ibid. author's translation). Thus, a *second-order observation* can observe *how* another observation (a *first-order observation*) was constituted. For example, with such a second-order observation, you can observe how, by drawing a distinction, you have created the preconditions for the possibility of indicating the inside of the circle. Then you realize that with your first indication you could 'see' (i.e. indicate) neither the distinction nor the outside. You also realize that you could have drawn a different distinction, such as a rectangle, a line or anything else. Always remember that this is only a metaphor. Your psychic system does not reproduce itself by drawing circles on a sheet of paper. You can relate a thought to the electromagnetic waves that are reflected by particles on a sheet of paper. You can relate a thought to your retina and your brain that are processing those waves. You can relate a thought to the inside of a circle. However, in actual fact, neither the waves, nor your brain or the inside of a circle *are* thoughts. They are simply mental representations of such waves, brains or circles. These representations are constructed by complex structures in your psychic system through *how* your thoughts relate to each other. Hence, consciousness is able connect its own mental representations (such as the thought of "a circle") only to other mental representations it has previously produced (such as the thought of an inside). Returning to our example, you realize that the current thoughts are possible only because of the fact that there have been other thoughts before, and that mental representations of 'circle,' 'inside,' 'outside' as well as every of any other concept used in this paper – even the concept of 'concept' – is already required. The thoughts of the past are the precondition for the possibility of present thoughts. In terms of Whitehead, it could be said that the occurrence of events engender possibilities for future events.

"The actual is given within a horizon of further possibilities. [...]" The internal dynamics of communication (in the case of social systems) and lived experience ('*Erleben*' in the case of psychic systems) is only possible because – strangely enough – actual operations are also possible operations. The distinction of actual and possible is a form that re-enters itself (see Spencer Brown and Kauffmann). On one side of the distinction, the actual, the distinction actual/possible reappears; it is copied into itself so that the system may have the sense of being able to continue actual operations in spite of an increasing change of themes, impressions and intentions. If we observe such a re-entry, we see a paradox. The reentering distinction is the same, and it is not the same. However, the paradox does not prevent the operation of the system. On the contrary, it is the condition of their possibility, because their autopoiesis requires *continuing* actuality with *different* operations, *actualizing different possibilities.*" (Luhmann, 1995, 42 cursive in the original)

As you can see, Luhmann was inspired by another central aspect of Spencer-Brown's work – the concept of re-entry. Psychic systems can only relate their thoughts to their own thoughts, and they are forced to observe the continuous constitution of new thoughts.

Thus, they are based on re-entry. Luhmann (ibid.) concludes that they "face their future as a succession of marked and unmarked states or self-referential and hetero-referential indications." Luhmann (ibid., 43) refers to Heinz von Foerster's term "non-trivial machine" to emphasize that such systems are "[...] structurally determined by its own output and therefore unreliable." In the next paragraph, I will explain Luhmann's conceptualization of self-reference and hetero-reference.

The Latin word *referre* means "to relate," "pertain," "attribute," "affiliate," or "ascribe to." Luhmann's (1999, 596) use of the word indicates the sense given in the previous paragraph. Figure 1 depicts a thought as a distinction and as an indication with marked and unmarked space. Now imagine a second thought which refers to this thought: the first thought indicates its marked space by drawing a distinction, and, if the second thought is to indicate the first thought, then it too needs to draw a distinction. The distinction it constitutes is the difference between referring to itself (the second thought) and something else (the first thought), i.e. it refers to this (e.g. first) thought and not to that (e.g. second) thought. It has to combine the difference between indicating itself and something else to indicate anything at all. Thus it can be said that the second thought constituted itself by combining self-identity with self-diversity. In other words, its operation of observation utilized the distinction between self-reference and hetero-reference. Luhmann (ibid. 393; author's translation) defines self-reference as "the ability to internally determine oneself through a combination of self-identity and self-diversity while at the same time leaving latitude for external codetermination." As has already been emphasized in the previous paragraph, the 'inside of the circle' is a mental representation too – it is a thought. Thus, it was constituted in the same way as the second thought. In this example, a mental event (thought) is the 'self' that refers to itself. This form of reference is constituted by a distinction between the second thought and its relation, i.e. what it relates to (the other thought). It needs to distinguish between element and relation. In such cases, Luhmann speaks of *basic self-reference*. Because elements are events that vanish as soon as they appear, he (1999, 600) identifies basic self-reference as the minimum requirement for autopoietic reproduction. The reference to self-construction of a psychic system is concurrent in all relations between its elements. Hence, Luhmann (1999, 604 ff) also speaks of "*concurrent or rotating self-reference*" (the author's translation of "mitlaufende Selbstreferenz"). For another example for forms of self-reference, you are now invited to reflect upon your current thought process and observe the arising and passing away of thoughts. Whatever specific content thoughts may arise, the thought process is referring to the thought process, and thus your consciousness operates in a processual or reflexive mode. This 'self' that refers to itself is a process that constitutes the distinction 'before' / 'after.' Besides thinking about thinking, there are further examples for what Luhmann refers to as *processual self-reference*, such as the enjoying of enjoyment (Luhmann, 1999, 610), the learning of learning and communicating about communication (ibid. 11).

To ground another form of self-reference in your experience, you can imagine filling out a self-report questionnaire. These usually require you to rate the extent to which you agree with certain statements (such as "I am optimistic"). In order to reply to such questions, your psychic system needs to accomplish two tasks: first, it has to condense itself to a single unit, drawing a distinction between 'all my thoughts' and its environment. The 'self' that refers to itself constitutes the distinction between system and environment, a form of self-reference which Luhmann (ibid, 601) refers to as *Reflexion*. Secondly, your psychic system has to observe *how* it drew the distinction - the difference - between itself and the environment. Only in this case your psychic system is able to determine whether it

observes itself as more or less optimistic (e.g. compared to a supposed norm or to a specific person). Luhmann speaks of *rationality* (1999, 599) whenever a system observes the ways in which it constitutes the difference between itself and its environment. However, neither an element nor a process or a system are in a position to fully indicate their own totality. It is unable to see the distinction created through its own operation (despite the fact that the distinction is a constitutive part of the self). Thus, he (ibid, 624) emphasizes that concurrent self-reference requires an operation he calls *self-simplification*. Forms of self-reference are characterized neither as tautology nor as a complete duplication of the self that refers to itself (ibid, 623). By means of such operations, systems would not be able to generate information in the sense of Bateson. In the following paragraphs, I will explain how autopoietic systems simplify themselves through a continuous reduction and production of complexity through the generation of meaning, structures, expectations and identities.

Remember the breathing exercise. Psychic systems are black boxes for each other. They are unable to know the thoughts of another psychic system and they understand that every other psychic system is in this same situation. If such systems meet, the quantity of possible events or actions – the *complexity* of the situation – is enormous. All those involved understand that they are able to act in one way or another. This is what Luhmann (1999, 152) refers to as "*double contingency*" (Latin: *contingere*, to happen; possibility). If we meet each other, it is likely that we will think and talk about issues of systems theory or other scientific topics, and it is unlikely that our thoughts and speech will relate to the recipe of the famous Lasagna my grandmother used to cook. Your psychic system (as well as mine) is 'irritated' by the social system of science. Within any given system, some thoughts and communications are much more likely than others. We can conclude that the social system of science reduces complexity of the world. Without the social system of science, the possibility of relating communication and thoughts to this article (among many other topics) would not exist. Thus, we can also conclude that autopoietic systems increase the complexity of the world.

The simultaneous decrease and increase of complexity is also true for your biological system. While reading this text, electromagnetic waves hit your retina. Because of the structure of the retina, they are transformed into nerve impulses and transferred to your brain, which has developed specific networks for processing language. Thus, through this indifference to certain other electromagnetic waves, your biological system has reduced the complexity of the world. If your psychic system observes this processing, it can create mental representations or thoughts related to the read words. However, neither the communication constituted by reading this paper nor your experience are physical phenomena, and psychic and social systems lack physical structures which determine the events by which these systems are irritated. As demonstrated in the example of the lasagna above, they nevertheless succeed at reducing complexity and making certain events more likely than others. In contrast to the physical qualities of living systems, psychic and social systems use *meaning*³ for this purpose. This meaning is neither inherent to the electromagnetic waves that currently hit your retina, nor is it inherent to the electrochemical processes in your brain. It is rather constituted by social and psychic systems to reduce the complexity of their environment as well as themselves. Independent of the structures of your psychic system or the communication system of science, the specific meanings constituted by them would not exist. These systems use

³ In the general theory of autopoietic systems, 'meaning' does not refer to a basic human need as would be the case, for example, in existential analysis.

meaning to structure their autopoietic events by making certain events more likely⁴ than others, for example by thinking and communicating about systems theory instead of lasagna. Specific thoughts and communications become possible because of meaning and simultaneously meaning is produced by them. Thus, psychic systems, social systems and meaning emerge together in a co-evolutive process (Luhmann, 1999, 92 ff), which allows them to be referred to as "*meaning systems*" ("Sinnsysteme", author's translation). Referring explicitly to Husserl and implicitly also to Whitehead, Luhmann defines meaning "as the simultaneous presentation (in Husserl's terms, intention) of actuality and possibility" (Luhmann, 1995, 42; 1999, 92 ff). As we know, the elements of psychic and social systems need to be reproduced in every moment, and "they can maintain their self-reproduction only by continuously actualizing new meaning. This requires selection from many possibilities and, therefore, will appear as information." (Luhmann, 1995, 42) In the next paragraph, I will explain how meaning is related to the structure and expectations of psychic and social systems.

From the last paragraph we can conclude that autopoietic systems are endowed with or rather construct certain structures and that complexity is reduced and novel complexity is constructed by selecting specific communications and thoughts. For example, previous to using my grandmother's lasagna as an example, it would have been extremely unlikely to communicate or think about this topic. The structure of the social system of science excludes this topic, and neither science nor your psychic system had expected lasagna to become one of the topics. However, new structures arise by the choice of this example as one amongst many other possibilities, and with this new structure also emerge new expectations. While writing these lines, I am now aware of the possibility that I could be asked for the said recipe someday (as opposed to the many other topics I could have used as examples), and such thoughts would have been unlikely or even impossible without the structure of this specific communication. This demonstrates again that the realized structures of autopoietic systems are highly dynamic, interdependent and subject to constant change.

While referring to this article, your psychic system as well as science expects their future events to relate to certain aspects of systems theory. These expectations facilitate the current emergence of actual thoughts and communications. However, many other aspects of Luhmann's theory as well as most other events are excluded from this communication. Thus, we can conclude that social and psychic systems construct their *structures* from *expectations*. They utilize them to increase the likelihood that future thoughts and communications will be connected, which Luhmann refers to with his concept of *connectivity* or *integrability the ability to connect* ("Anschlussfähigkeit" author's translation). For example, science expects coherent, consistent and explicit frameworks for its communicative events. If those expectations are belied, the likelihood of connect future communications to a topic is reduced. This argument also demonstrates the importance of refraining from using terms that are, for example, inconsistent, spiritual or esoteric. If we wish to increase the likelihood of further communications on 'altered states,' a scientific model is required that incorporates them as something to be expected. The general theory of autopoietic systems can serve as such a framework: it is in a position to facilitate communication on all forms of consciousness without marginalizing any particular form or aspect.

⁴ If mathematical metaphors are helpful to you, think of meaning as a something like a 'dynamic likelihood function' or an 'AI-algorithm.' Every autopoietic event simultaneously constructs and alters this function. At the same time, this function also increases the likelihood of specific present and future events while decreasing the likelihood of other specific present and future events.

To clarify another important aspect of the construction of autopoietic system, I wish to offer as an example my personal identity. I can observe myself through identifying as a psychologist, however I am unable to use the same observation to see what I distinguished myself from (even though the distinction is a constitutive part of my indication of psychologist). This *identity* may be regarded as a *basic reference point*. It enables my psychic system as well as the social systems to specify the ways which they are sensitive or irritable (e.g. systems theory) and where they can afford to be indifferent (e.g. cooking lasagna). My consciousness should abstain from seeking out other possibilities and alternatives (e.g. observing itself as cook, an Italian or a grandson). Thus, reference to my identity is not restricted to being a psychologist, and this identity obviously is but a contingent form of self-simplification. This identity has to be accepted in order to interrupt interdependencies and enable the connection of operations as a scientist (at least temporary – for the affected operations)⁵. Any self that refers to itself needs to continually simplify itself because it is unable to capture the total complexity of itself or its environment. As demonstrated above through the concepts of distinction and indication, observations always constitute blind spots and once specific expectations arise towards an identity it can be difficult to see them as contingent forms of self-simplification. If you observe your own identities in this way, you will probably come to the same conclusion. Luhmann (1999, 150 f) emphasizes that the identity of autopoietic systems is given by neither god nor the big bang. Their structure is simply "the restriction of the quality and the connectivity of its elements" (Luhmann, 1999, 384 f)⁶. The many possibilities constituted by double contingency are reduced by actual communication and thoughts, and a certain way of communicating or thinking appears normal only after the respective autopoietic process has produced its own structure.

Esposito (2013, 58) points out that the task of sociology is to (re)discover the improbability of what is referred to as "normal" in a given society. The given solution to the problem of complexity could also be a different one and it is not to be taken for granted. I have a similar ambition with this paper but regarding forms of psychic systems. In this case, the general theory of autopoietic systems helps to realize that a specific structure of consciousness, such as rationality, is not the only option since it is no primal given. This realization is the condition of the possibility to reflect upon our observations of 'normal' and 'altered' forms of consciousness. According to Guttman (1992, 300 ff), rationality and the experience of a personal Identity – in the form of 'I am' or an ego – is the outcome of a process of differentiation. He suggests that this process can be rewound in a way that resembles a methodological regression, and for this operation a consistent and explicit framework is required, such as for example the general theory of autopoietic systems. First it may be helpful to remember the forms of self-reference listed below in tabular Form (Table 1, Luhmann, 1999, 604-620).

⁵ This is an example for *asymmetrisation* (Asymmetrisierung) in the social dimension. For further dimensions and implications, see Luhmann, 1999, 631 ff.

⁶ This is a concept derived from general systems theory which states that order emerges out of noise.

Table 1: Forms of self-reference

Form of self-reference	Self, that refers to itself	Guiding difference: examples of possible operations
Basic self-reference	Element	Element/Relation: Relation of elements (thoughts), autopoietic reproduction
Processual self-reference	Process	Before/after: thinking about thought processes, communicating about communication
Reflexion	System	System/environment: reflexion, self-observation, self-description, reflexion of reflection → rationality, constitution of an ego, self-simplification

Table 1 demonstrates that self-simplification and the constitution of an ego are no primal givens. Luhmann (1995, 49) states: "Reflection (including the reflection of reflection) is nothing but a particular way to be, a special capacity among others of the human psyche." An awareness of its own structures and identities is not required for consciousness to continue its autopoiesis, since the reproduction of its elements is based only on basic self-reference. Nevertheless, self-simplifications and identities of psychic systems, i.e. the ego, are first and foremost observed as primal given. Luhmann (1985, 424) emphasizes that there is a particular reason for this observation, and he argues that the operational basis for the identity of consciousness is the differentiation of consciousness and embodied life.⁷ This distinction clamps both together very closely. Indications may switch rapidly so that the founding distinction remains continually blurred. For this reason, the identity of consciousness is observed as a given without usually ever being questioned or challenged. It is unlikely that one comes up with the idea of observing consciousness in abstraction of the autopoiesis of one's life, and it is equally unlikely to observe one's life in disregard of the thought process. Consciousness must draw a distinction if it is to have an identity. Remember the circle example: if the circle (the distinction) is not drawn, it is impossible to observe its inside or any other of its parts. Hence, if the distinction between consciousness and embodied life is not drawn, consciousness is unable to indicate itself. Its identity is lost because it is unable to observe itself as a unity. If a psychic system rejects this foundational distinction, it also rejects the possibility of thinking of the entirety of thoughts as a unity: "It is a thought that dissolves the ego and replaces it with a moment of emptiness and allness – until this becomes too exhausting for consciousness (ibid.; author's translation). Luhmann (2008, 102) lists a few suggestions as to how such rejection / repudiation may be achieved, for example by intuitively imagining forms of consciousness that short-circuit concentration through a focus on the occurrence of thoughts. This would artificially eliminate all distinctness and dissolve the reference points and identities of the psychic system. While Luhmann does not specify the processes leading to such short-circuiting, he does suggest that there are certain circumstances that facilitate its occurrence when he states that "the 'self' of the system can appear and disappear as suggested by circumstances." (Luhmann, 1995, 45) We may infer the

⁷ This seems to be a reasonable founding difference, although it might also be different (e.g. 'ego' and 'true self'). In any case, the importance of the argument is that the observation of a unified identity requires a distinction.

circumstances he is referring to if we take seriously the general theory of autopoietic systems and focus on a few important aspects. Thus, those aspects will first be summarized on a formal level, followed by some examples on how to lose yourself.

How to lose yourself in a nutshell

Psychic systems are based on instantaneous events which are constituted by distinction and indication, and only one side of this distinction may be indicated in a sequence that unfolds in time. This also implies that the observational capacity as well as the working or short-time memory of psychic systems is limited,⁸ and thus you can only retain – that is remember – a certain number of indications within your working memory. This also means the *working memory may be 'filled'* with indications which leads to the forgetting of any further indications. If the indications which fill up memory are themselves too similar to be distinguished, the psychic system is no longer able to observe any distinctness – at least momentarily for as long as its working memory is filled with this specific distinction. Distinctions are only constituted by the observations of a system, and thus such focus of concentration produces a short-circuit which artificially eliminates all distinctness.⁹ Remember that psychic systems utilize the founding distinction between self-reference (e.g. consciousness) and hetero-reference (e.g. embodied life; Luhmann, 1985, 424; 2008, 62 f). Expressed formally consciousness can either indicate self-reference, hetero-reference or the difference between them. In the following, we will now demonstrate how some practices or environments promote the short-circuit mentioned above. Following the relevant academic literature (Dittrich, 1996; Dittrich, Hofmann, & Leuner, 1993a, 1993b, 1994; Fischer, 1971; Guttman & Langer, 1992; Scharfetter & Rättsch, 1998; Slunecko, Vitouch, Korunka, Bauer, & Flatschacher, 1999; Verres & Leuner, 1998) as well as the framework of the theory, I distinguish practices that facilitate a focus on self-reference from those that facilitate a focus on hetero-reference. However, both of them – as well as a focus on the difference between the two – essentially lead to the disappearance of identities.

Utilizing self-reference

You have certainly already experienced daydreams or the drifting off of thoughts. However you prefer to refer to such experiences, they are all based on a strong focus on the interior. Here, you are less concerned with external stimuli until someone might pinch you and ask where you have been. The decisive characteristic of such an experience is that indications are focused on one's own mind (Scharfetter & Rättsch, 1998, 126). Thus, they are focused on self-reference. Such a focus is utilized in and intensified through some traditional meditative practices. They can lead to the experience to "rest in oneself and be driven by the restless back and forth of the desires and will of the ego" (Dittrich, Hofmann, & Leuner, 1993b, 94 author's translation). It can be very demanding to achieve a sufficiently strong focus to fill the working memory of consciousness with a single self-referential indication. Usually the impressions of the environment are constantly imposed onto the psychic system, and it requires a strong focus and motivation to repeatedly indicate one specific self-referential aspect of a thought (e.g. the thought of a nutshell) and remain indifferent to other stimuli, such as a fly landing on your nose. This situation may be alleviated by excluding as many external stimuli as possible, and in

⁸ Exact values are an interesting research topic. I forgo further discussion here, because the limitation is already deducted directly from understanding the general theory of autopoietic systems.

⁹ Of course, this is only true for the respective system that uses this mode of operation. Other systems in its environment may still refer to it as a unity. For example, if my psychic system operates with such a short-circuit, your psychic system may still refer to it as Manfred De Pari's consciousness.

psychological terms we may refer to such practices as 'stimulus deprivation.' Isolation tanks,¹⁰ amongst others, may be used for such purposes. These are pools or basins filled with highly concentrated saltwater so the body may float freely and with a constant temperature of 35 degree Celsius, the ambient temperature of human skin. They can be shut so that the inside is isolated from any light and sound. In such an environment, the chances for hetero-reference are reduced dramatically and thus a focus on self-reference is facilitated.

Utilizing hetero-reference

You are certainly also familiar with experiences of being fascinated, stunned or enchanted by external stimuli and impressions. Maybe you have found (or rather lost) yourself enchanted by a seductive melody, drifting away to the sound of the sea or being stunned by an impressive scenery. Dittrich et. al. (1993b, 94) mention experiences of "being embedded in a landscape," for instance when in harmony with the alpine world or when feeling like a wash of waves while swimming in a lake. You might even intuit that such feelings can be intensified "up to the ecstatic experience of unity with nature" (ibid.). The decisive feature of such an experience is that indications are focused on the environment, in other words on hetero-reference. As already mentioned in the previous paragraph, many impressions are constantly imposed onto your psychic system, such as a fly sitting on our nose, thoughts about your work or anything else. Hence it also requires a strong focus and motivation to continuously indicate the specific hetero-referential aspect of a thought, such as the impression of a nutshell, for example. It is also demanding to achieve a sufficiently strong focus to fill the working memory of consciousness with hetero-reference, something often facilitated by flooding your psychic system with impressions. In psychological terms we may refer to such practices as 'sensory overload' or 'overstimulation.' There are many traditional examples of ritualized settings in which repetitive drumming, rattling or chanting is utilized for auditive overstimulation, and since the 1980s commercially produced 'mind machines' with glasses and earplugs are used for visual and/or auditive overstimulation. In such an environment, the chances for hetero-reference are increased dramatically. In field studies, I have also learned that some forms of loop-based music such as techno and psytrance facilitate losing yourself in music.

There are certainly other examples of environments which are conducive to the loss of identity of a psychic system. The ones presented above should suffice to understand *how* psychic systems may lose their identities. The next section will explain what this loss of identity means in the general theory of autopoietic systems. For this purpose, you are invited to a regression through forms of self-reference. However, please don't fear losing your rationality or identity. Even if a system observes its identity as contingent, "the 'self' of the self-reference *has to treat itself as unexchangeable*" (1999, 622, my translation, cursive in original).

Regress through forms of self-reference

Specific environments are neither required nor sufficient for the production or dissolution of self-referential identities. However, which specific ways or practices are utilized to facilitate this is not relevant for the argument of this paper. What is relevant, however, is that the working memory may be gradually filled with processing a single indication (be it a nutshell, a cat or anything else), and that with more thoughts focusing on a single indication, a differentiation of self-referential structures becomes more unlikely.

¹⁰ The American neurophysiologist John C. Lilly developed them in the 1950s at the National Institute for Mental Health and called them 'Samadhi tanks.'

Consciousness operates in a *rational* mode if it indicates the distinction between system and environment – that is *how* it observes itself (e.g. an optimistic scientist). It observes this identity as a primal given and expects to continue processing with the self-simplifications it has constructed. This form of self-reference is constituted by indicating the distinction of system and environment. Thus, it presupposes another form of self-reference, namely reflexion.

Consciousness operates in the mode of *reflexion* if it indicates its own unity (in the form of "I am all my thoughts"). This also presupposes a distinction from, for example, embodied life, the true self or anything else. In any case, this distinction of 'all my thoughts' and something else needs to be concurrent in its self-referential working memory. The likelihood of condensing itself to a unity decreases the more a psychic system is occupied with processing one of its three possibilities of reference (self-reference, hetero-reference, difference). At some point, it is only able to differentiate before and after or element and relation. While a psychic system at this point will still manage to connect its own thoughts to its own thoughts, it will no longer be in a position to observe this process in a mode of reflexion or rationality.

Consciousness operates with *processual self-reference* if it indicates its own thought process (e.g. thinking about systems theory). This presupposes a distinction between before and after. When a psychic system is no longer able to distinguish which thought occurred previously and which occurred subsequently, it loses its ability to process time. Hence, experiences of timelessness are to be expected with an increasing rate of occupancy of the working memory. Thoughts are still only connected internally and they arise and pass away one after the other, but the psychic system is no longer able to observe this process and anticipate which thought may come next. Thus, it is prone to becoming surprised by its own thoughts.

At this stage, consciousness operates with *basic self-reference*. It can only indicate thoughts by drawing a distinction between its elements and their relations. As demonstrated above, the connection thoughts to each other does not automatically lead to the observation of consciousness as a unified identity. In autopoietic systems theory, the observation of 'I am' is no primal given, and a rational mode of self-reference certainly has to presuppose the distinction between system and environment. However, to doubt one's existence is already a rational observation that presupposes reflexion, and thus the famous rational observation attributed to Kant – *dubito, ergo cogito, ergo sum*, "I doubt, therefore I think, therefore I am" – is to be expected and yet contingent. Within the framework of the general theory of autopoietic systems, we would rather conclude *distinguitur ergo fio*, "I distinguish, therefore I become."

The fact that basic self-reference is the minimum requirement for autopoietic reproduction has already been emphasized by Luhmann. He (1985; 1999, 346–376) has also demonstrated that his theory is sufficiently abstract and complex to be used also for the observation of psychic systems, however, as a sociologist and legal scholar, he was primarily interested in social systems and the observation of society. He did not publish extensively on the topic of consciousness or the more specific focus of this present article. While psychic and social systems have emerged together in co-evolution, there are also elementary differences in so far as the elements of the former are thoughts and those of the latter are communications. Thus, psychic and social systems can be observed as distinct forms of existence, and we should not assume that the same rules and possibilities apply to each of the types of system. As a psychologist, I am primarily

interested in psychic systems and forms of consciousness, and Luhmann (1985, 424; 2008, 102; 1995, 45) has already stated that there may also be forms of consciousness which lack an observation of difference. Therefore, I propose to conceptualize a new minimum requirement for the autopoiesis of consciousness. This final section will outline some of its most important aspects and also feature an explanation why I suggest to refer to this minimum requirement as liminal self-reference or *liminal consciousness*.

A form without form – liminal consciousness

I suggest considering the possibility that psychic systems may operate without observing a distinction between element and relation, facilitated by the filling of working memory with indications that consciousness cannot retrospectively distinguish. While one thought after the other still arises, connects and passes away, and the difference between these thoughts may still be theoretically observed, however, the psychic system can neither observe nor remember the differences of the distinctions drawn in the past which had constituted its elements. Such observation of differences and expectations needs to be actively constituted by the system, and thus, more precisely, this "dissolution /cessation" is rather an omission of the reproduction of self-referential structures. Since consciousness needs to presuppose that its structures will last over time, such observations of indifference often come as a surprise to a psychic system, and it may observe that its own continued autopoiesis is at risk. This is where the formulation of an 'autopoietic immune system' could begin. It stands to reason that in this mode of liminal self-reference, consciousness only experiences intense existential and basal feelings, such as mortal fear, total rapture and ecstasy. In this mode, it is unable to either indicate them or to expect anything, and, in fact, it cannot even expect 'nothing,' because it lacks even the distinction between 'something' and 'nothing.' Such forms of consciousness only process a timeless and ineffable 'feeling' because they are unable to either observe or recollect any difference. It only has thoughts that refer to these feelings or impressions. This is the absolute limit of the autopoiesis of psychic systems, where consciousness has no name for these feelings or itself because it is unable to indicate either itself or its feelings. However, this does not imply that consciousness ceases to exist or that it loses its capacity for other forms of self-reference: "A meaning systems cannot permanently lose itself in itself or in its environment." (Luhmann, 1999, 96, author's translation). As soon as consciousness returns to more structured forms of self-reference, it is under the impression that no indication whatsoever could do justice to what it has just experienced. While all indications presuppose a distinction, this particular mode of self-reference arises only by dropping the observation of difference altogether. Hence every indication, which must always be constituted by a distinction, appears as unfit or inappropriate to the observation of a psychic system operating with liminal self-reference. This is a form of consciousness which cannot indicate its own form – a form without form.

All the information gathered so far is helpful also for finding a more fitting term for these forms other than 'altered state' or 'trance.' For this purpose, we will now highlight a few key aspects of the concept. Within the framework of autopoietic systems theory, there are forms of consciousness that are less focused on reference points or identities. Some environments facilitate the convergence of psychic systems to their limit of (temporary) omission of its autopoiesis. This concept does not refer to a dichotomous category envisioned as the liminal vs. the rational, instead it refers to a specific form of self-reference on a continuum of self-referential system construction. Thus, liminal self-reference or liminal consciousness is defined as the continuously increasing omission of the reproduction of self-referential structures. It is important to emphasize that 'limit'

should not be confused with a limitation in the sense of a restriction, containment, inhibition or similar negatively connoted terms. It simply refers to those borders of the autopoiesis of consciousness that cannot be exceeded. Thus, the psychic system may converge to the limit of its dissolution without ever reaching it, and this omission of the reproduction of self-referential structures does not lead to the complete loss of consciousness – you do not become unconscious.

In German, the term *limes* is used in mathematics to refer to an extreme value to which a progression can converge to, while in English it is primarily used to refer to the boundaries of the Roman Empire. In psychology as well as physiology and psychophysics, a *limen* or a *liminal point* is the threshold of a response and the boundary of perception. While a stimulus is perceptible on the one side of a liminal point, it is not so. The adjective *liminal* may also be used to refer to the absolute threshold of perception, the lowest amount of detectable sensation. Thus, the word *liminal* transports exactly those meanings of the concept presented in this paper by signifying the convergence of a psychic system to the threshold – the *limes* – of its autopoiesis. Hence, I suggest to referring to the proposed concept as *liminal self-reference* or *liminal consciousness* and to employ the term to refer to forms of consciousness which are less structured by reference points and converge to the threshold of the omission of its autopoiesis.

DISCUSSION

The concept of liminal consciousness can be used as a framework, a pattern that connects (Gregory Bateson). It can be used in scientific systems to reasonably communicate experiences of indifference, and it assists the translation of related topics into specific areas of research. In fact, the term liminality is already used in many other disciplines, and these discourses will be helpful in refining the concept of liminal consciousness and facilitating further transdisciplinary connections. In anthropology (Turner, 2005; Van Gennep, 2005), for example, the term liminality is used to describe processes of dissolution of social structures, such as in rites of passage, which are associated with an increasing degree of freedom of possible events. Liminal consciousness can be helpful in thinking beyond the boundaries of "given" structures and identities and in experiencing these as contingent possibilities among others. Currently, Paul Stenner is developing the concept of liminality in psychosocial theory (Stenner, 2013; Stenner & Moreno-Gabriel, 2013), where he describes rites of passage as enacted forms of liminality. Like in a theater or in a performance, such events are carefully planned and structured to enable evolutive or adaptive processes by allowing for the dissolution of obsolete or unsupportive structures and enabling the rise of novel structures more appropriate to the system/environment desiderata. By contrast, forms of spontaneously occurring liminality are not enacted and staged, such as those constituted by natural or manmade disasters. These processes tend to be more destructive, and maladaptive. Turner (2013) argues that enacted liminality may also occur as a reaction and response to more chaotic forms of liminality. Building on his work, the examples above of practices on how to lose yourself, for example in meditation or through isolation tanks and mind-machines, are observed as carefully staged and enacted. Following Stenner's argument, experiences of liminal consciousness in such environments could help adapt to more chaotic forms of self-dissolution, and the essence of this reasoning is even prevalent in textbooks of mainstream clinical and health psychology: "Systems can move in the direction of new order or chaos. While chaotic developments are often also pathological appearances, chaos may also be a fertile intermediate state that leads to new structures and organizations of a system or subsystems." (Oerter, Altgassen, & Kliegel,

2011, 310, author's translation) The concept of liminal self-reference offers a stable, explicit and coherent framework which enables us to speak about, interpret and thus better process enacted as well as more chaotic experiences of liminal consciousness. At ISSS2017, Len Troncale initiated a special integration group on systems pathology, and a more general formulation of the framework proposed in this article could be useful in reflecting upon pathological dynamics within autopoietic systems and their environments. The distinct advantage of the presented framework is that it observes its own observations as well as the observations of other frameworks as contingent possibilities within specific contexts. Each of these observations is only possible within and because of the respective framework, thus simultaneously producing their own respective blind spots. Even the observation of 'pathology' is contingent and constitutes its own blind spot, and this approach prevents the reification of processes as pathological in and of themselves. It would be more suitable to approximate the requirements for conceptualizing the complex dynamics of autopoietic systems and their environments as more vs. less adaptive, disvolutive vs. evolutive, increasing vs. decreasing or as self-referential and hetero-referential connectivity.

Psychotherapy research and education in Austria may serve as concrete fields of application for the concept of liminal consciousness. The Austrian Prime Minister of Health (2014, 2) states that: "In psychotherapeutic education, advanced education and postgraduate training, the presentation of any type of esoteric content, spiritual rituals and religious doctrine of salvation has to be omitted." From a systemic perspective, 'Samadhi' (as referred to in Samadhi tank) is observed as a specific cultural interpretation within the framework of Hinduism. Of course, there will still be research on the topic of, for example, experiences of Samadhi as facilitated through isolation tanks, but it is also a technical term in a religious doctrine of salvation, which necessarily excludes it from Austrian psychotherapeutic education and other possible applications. Thus, what is proposed here is a more general systemic framework in which the concept of liminal consciousness may enable further communication within these fields of research. It should be emphasized that this neither devalues nor excludes spiritual or religious terms and traditions. On the contrary, it enables a process of translation and future research in areas where references to terms stemming from such traditions would generally be excluded. Hence, the proposed model is critically open to spiritual experiences and practices while also remaining agnostic to their specific interpretations, which is also suggested by recent advancements in systems philosophy (Rousseau, 2014, 498 ff).

In cognitive neuroscience (Carhart-Harris et. al., 2014), "self-organized criticality" (Chialvo, Balenzuela, & Fraiman, 2008) is a currently discussed topic. Essentially, it suggests that worthwhile properties may be observed in systems which reaches a critical point in the transition stage between order and chaos (ibid.). Recent findings in neuropharmacology also support this hypothesis (Carhart-Harris et. al., 2016; Schartner, Carhart-Harris, Barrett, Seth, & Muthukumaraswamy, 2017). It seems promising to find ways to combine the concept presented here with such approaches, and currently I am investigating the application of this concept in visual (Pelowski, Markey, Forster, Gerger, & Leder, 2017) and auditive stimulation connected to transformative experiences in religious or spiritual (Pelowski & Akiba, 2011, 92) as well as therapeutic contexts (Hunger & Rittner, 2015). Thus, this article aims to contribute to contemporary transdisciplinary communication regarding the possibilities of how to investigate all forms of consciousness, and hopefully it will help to facilitate future research and formulate hypothesis regarding its possible applications.

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