Introducing Interrelations Of Madness & Virtuality

Steffen P. Walz
Institute for Social Anthropology
University of Tuebingen
72070 Tuebingen, Germany
+49 7071 29 72374

spw@playbe.com

Isabel Zundel
playbe
Kornbergstr. 36 links
70176 Stuttgart, Germany
+49 711 28417 35

izun@playbe.com

ABSTRACT
This paper approximates interrelations between representations of madness, and virtuality in Immersive Virtual Environments semiotically. Thereby, social and sensual performances indicating coded acts of practice are mapped, and investigated from several perspectives. The authors give an introduction to these 'altered states', and suggest that it is possible to learn from codes and mappings of madness in order to create virtual environments, and learn from codes of virtual environments in order to understand representations of madness.

General Terms
Design, Experimentation, Human Factors, Theory.

Keywords
Semiotics, Computational Semiotics, Mental Disorder, Virtual Environments, Philosophy of Mind, Human Information Processing.

1. INTRODUCTION
"Categorizing the sensual modes that bodies can experience fulfills several functions. It elicits a discourse system; it represents efforts to frame the body as an ordered set of impressions which could be disrupted and require re-ordering (implying a structure to do the ordering); and it implies a binary view of the ways that bodily experience is mediated -- the opposition of order and chaos within the frame of a single physicality." [1]

This paper investigates possible interrelations between two symbolic coded concepts of meaning-making, 'madness' and 'virtuality'. The authors know of no further research that explicitly articulates such a liaison between these two social and sensual experiences, both of which seem to be increasingly pervasive in advanced capitalistic societies. By 'pervasive', the authors mean experiences, and workings of these symbolic coded concepts.

In the following, we mainly focus on structures, processes and performances of madness and virtuality. Both concepts represent certain semiotic communicative codes, and communication concepts, which we call 'coded acts of practices'.

1.1 Theoretical Propositions
Both madness and virtuality demonstrate scope and elasticity of social and sensual experiences. Thereby, the two coded concepts generate a fluid transgression between form and content, physical and mental. Madness and virtuality pose questions about what is real, and what not, and mostly: what is in-between. To seemingly 'stable' physical and mental societies' structures, both queries can be dangerous. Hence, madness and virtuality themselves appear ordered, and disordered, depending on the perspective: A madman may, e.g., experience the world coherently, whereas an outside therapist may experience the opposite.

Contrary, a visitor to a virtual environment may undergo a social and sensual tour-de-force, whilst the computer system performing the virtual environment considers the locale to be in perfect order: The virtual environment works. If it doesn't work, it must be disordered and incoherent, and would therefore be interrupted, or not established at all, or carried out irregularly.

1.1.1 Symbolic Order & Symbolic Chaos
Let us clarify the terms 'order' and 'chaos' as being applied in this paper: Besides an ontological distinction between form and content, both madness and virtuality seem to contain *symbolic order* - constructed and maintained by e.g. relatively rigid hegemonial definitions, dominant rules and values at-present - and *symbolic chaos*. In this paper, symbolic chaos - or symbolic 'disorder' when directly opposed to symbolic order - unfolds recessive, non-linear structures to the eyes of the observer.

Should it be proven true that madness and virtuality really challenge coded concepts of reality, at least they share this clash between strange and 'normal' attractors.

These recessive structures, then, need not to be less complex than structures of symbolic order. 'Complex', when used as a term in this paper, signals a multiply encoded, accumulated meaning-making system's extrinsic-organization, rather than its self-organization.

1.1.2 Physical and Mental Discourses
Once read, the governing hegemonial symbolic order categorizes these recessive symbolic structures as being incoherent insofar that they might attack, withstand, mirror, or reject dominant

structures of coded acts of practices. Thus, symbolic order and symbolic chaos - found in symbolic coded concepts of meaning-making - constantly negotiate meaning within these meaning-making systems. Such negotiations are carried out by human and computational performances during physical and mental discourses. The result of these performances are describable coded acts of practice.

If a discourse was a war of differering meanings, then symbolic order, and symbolic chaos, would battle bi-frontally over representations of both physical form and mental content, that is, representations of madness and virtuality.

Additionally, madness and virtuality themselves can be understood as prototypical examples of symbolic coded concepts which are not only physical, but at the same time mental. The two categories transgress into each other.

1.1.3 Qualities of Madness & Virtuality
Madness and virtuality possess qualities of structuring, processing, and performing information. From another perspective, madness and virtuality also mediate information about themselves, apart from mediating information about the world shaping the way these two coded concepts are perceived.

1.1.4 Points of View
Our brains seem to have internal theories about what the world is like not only in terms of mere perception. Here, points of view occur individually, because of different gender, age, ethnicity, race, and habitus, to name a few indicators of social identity.

A similar, inverted interpretative code can also be examined in external, physical points of view *onto* the workings of the mind: A computational semiotician will look at them differently than, say, a philosopher of mind (see Figure 1), a neuropsychiatrist, or a computer. This computer that e.g. generates virtuality in form and content of a virtual environment, and a madwoman share a mutual mode of self-reflexion: From the point of view of the authors, to a certain degree both computer and madwoman are not reflective at all when thinking about their representation of madness, or virtuality.

1.1.5 Research Approach
At this point, we need to draw attention to our research approach towards 'madness' and 'virtuality': The authors analyse these terms according to their conceptual quality of being semiotic representations of meaning-making, not in terms of medical diagnosis, for example.

1.2 Definitions
In this section, we present definitions of concurrent terms used in this paper.

1.2.1 Symbolic Signs
Within our context, symbolic signs designate historiocritical coded concepts built of arbitrary signs [2] which negotiate meaning in physical and mental discourses without having been learned, or are just experienced without outer reference, see e.g. [3].

1.2.2 Signifiers & Signified
Symbolic signs themselves are put together of signifiers, and signified. This structure might be compared to the societal agency-agent-paradigm [4], including two major differences signalling a semiotic approach: historioicity of the structure, and diverse and dynamic points of view: Form and content of a structure change over time, depending on who generates, and who receives form and structure.

1.2.3 Upper-Level Signifiers & Signified
Symbolic signs of an upper hierarchical level consist of an upper level signifier and upper level signified artifacts.

1.2.4 Meaning
Meanings - expressed through physical and mental definitions - of these symbolic signs differ over time, too - linguistically, culturally, and perceptively, and insofar socially and sensually. That is, meanings install a social and sensual definitorial hegemony of a certain symbolic reading.

1.2.5 Meaning-Making
Eventually, clusters of complex symbolic signs form a meaning-making *system* with an intrinsic symbolic order - imagine a puzzle made out of pieces, that pictures a part of a brain, e.g. the optic tract. The finished jigsaw is just another piece in a bigger puzzle that would eventually show the whole of the brain. However, this brain is just another piece in an even bigger jigsaw. We assert that computers and their practical performance can be de- and reverse-constructed similarly. Meaning-making is characterized by digital and analogue codes mapping reality; a discourse constructs and maintains forms of reality whilst reflecting symbolic order or symbolic chaos inscribed into meaning-making. This differentiates pragmatic meaning-making systems from semantic or syntactic systems, where e.g. semantic research focuses on the preferred reading rather than the representational performances of systems [5], and thence the resulting codes acts of practices.

1.2.6 Performance
In social sciences, 'performance' indicates one *coded act of practice.* The interpretation of symbolic signs is determined by signs' relevance and agreement throughout other participants in a physical or mental discourse. Participants of a mental discourse can, e.g., be pre-existing symbolic coded concepts.

However, it is not clear whether - in a Hegelian sense - there is an ultimate reality (or an ultimate meaning-making system). Meaning-making systems could reside - according to Nietzsche before he fell for eternal recurrence - in a state of flux, and hardly be explained and analysed: They themselves, then, would present no facts, but only interpretations.

1.2.7 Codes & Mappings
Mappings and codes feature analytical semiotic agendas in order to approximate symbolic coded concepts of meaning-making. In this context, mappings operationalize symbolic concepts, and help to approximate these, whereas codes organize symbolic signs into meaning-making systems. We apply these semiotic agendas to concepts of madness, and concepts of virtuality.

1.3 Computational Semiotics and Madness

As outlined in 1.1.4, not only physical and mental symbolic orders of representations can be semiotically prescribed, but also physical and mental (interior) symbolic chaotic perceptions can be matrixed semiotically. Apart from perception, computational semiotics know of other fields of e.g. interior investigation, for example behavior generation.

Thus, in this paper we suggest to examine aspects of a symbolic coded concept of meaning-making - madness - more closely, so as to apply those perceptions of versions of reality upon comprehending virtual environments, and vice versa. In other words: *We do believe it is possible to learn from codes and mappings of madness in order to create virtual environments, and learn from codes of virtual environments in order to understand madness.*

1.3.1 Extrinsic-Organization of Self-Organization

As shown above, symbolic constituencies do not need to be chaotic inherently. At times, they rather show a certain - though unfortunately pathological - coherence, pattern, which may signal a complex symbolic order, just like a flock of seagulls fluttering into the skies, suddenly changing direction as if following a secret path. This procedural behavior of intra-social systems is neither novel to neuro- and cognitive science, nor to social sciences. The latter have started to study dissipative systems most recently, for example in [6]. Still, those studies bear in mind that they monitor these systems with a certain point of view of their own: The studies extrinsically organize the systems' self-organization.

When browsing research on simulation of reality, and simulation of complexity - the two major streams of intentional and planned virtual *expression* in immersion it seems - researchers face similar problems. Inscribing reality, and especially complexity, into virtual spheres is not a simple task. In the field of volume rendering in immersive Virtual Environments [7] [8], research e.g. mimicks complex processes through literal visual magnification and/or multiple layering of voxels. However, visitors to these worlds are voluntarily interiorised into a system of symbolic negotiation like they were temporary sucked into a black hole.

Other than this, real face-to-face communication channels such as para-verbal or non-verbal ones [9], are only fairly compensated especially in collaborative virtual scenarios. Besides their procedural act, performative practices of these channels follow a system of symbolic order and symbolic chaos. In both cases, seemingly ordered 'real' symbols and seemingly chaotic, or 'virtual' symbols compete with one another, and therefore emerge as seemingly chaotic or seemingly ordered, measurable performances on the surface of reality, or within virtuality.

1.3.2 The Social Dimension of Meaning-Making

The inscription of an extrinsic-organization into the self-organization of both madness and virtuality wards both phenomena sociability, which makes it only possible to analyze the phenomena semiotically. Structures, processes, and performances of these phenomena are socially engineered, whilst these phenomena change dynamically during this act of social engineering.

The two symbolic coded concepts in this paper work as versions of reality, because they challenge, and substitute reality. Beyond this, both coded concepts become more and more pervasive in society. In this paper, we assume that this procedure leads to a transgression of the coded concepts, once they establish themselves in our perception of reality.

1.4 Re-questioning our topic

We are aware that above mentioned assumptions map a much broader ethical and moral area of thought, an area we have not at all covered. For developers, the pain and heartbreak relatives of patients, or patients themselves, have to suffer from, is maybe understandable rationally, but not emotionally. Especially, when those developers have been unaffected by meaning-making systems of madness before.

In this discussion, we will try and concentrate on the possibilities granted by the gift of experiencing the world differently, of being "mad" (and being "virtual", too).

2. REPRESENTATIONS OF MEANING-MAKING

In the following section, we discuss two symbolic coded concepts of meaning-making, madness and virtuality. We call both 'representations', alluding to their overall social & conceptual appearance as discussed above.

In section 3, we will then explain how come we found evidence of a possible comparison, following which we will present this comparative discussion of semiotic aspects of virtuality and madness, concentrating on "mappings", and "codes". We conclude briefly with future research directions, and suggest a framework of how to apply findings of this paper upon building Virtual Environments.

We want to emphasize that our paper represents a discourse by itself, an approximation of the topic.

2.1 Representations of Madness

'Lunacy', 'insanity', 'dementia', 'mania', 'frenzy', 'mental defect', 'mental disability', 'mental disease', 'mental disorder', 'mental deficiency', 'mental disturbance', 'mental derangement', and 'mental illness' format discursive representations trying to describe and therefore categorize phenomena into symbolic order, held against symbolic chaos. We will cluster these terms with the representational term 'madness' henceforth.

Schools within social anthropology, cultural studies and the philosophy of everyday-practice and meaning-making systems [10] – 'meaning-making' as outlined in our introductory equation - identify phenomena not stringently according to quantitative measures. Rather, schools concerned with meaning-making practices detect the symbols, or constructions, humming underneath definitions qualitatively. Styles of this kind of research and interpretation offer empirical diversity, be they socio-historical, structuralist [11], descriptive [12], narrative [13] or iconological. As part of a well-established tradition, most anthropological researchers bear in mind that by deconstructing semiotic codes, the discourse model itself opens up new understanding of the codes, and encodes new meaning. Therefore, their personal impact into the research is reflected. We shall return to our personal interest in section 3, "Mythology". By drawing an analogy from cybernetics, let us clarify aforementioned discursive representations. Those set up a cluster model of the world, which

also represents a system within other systems. A meaning-making system has some knowledge if this system carries a code of some part of reality as it is perceived by the system. In this sense, symbolic order and its counterpart symbolic chaos should be understood and taken for complex symbolic systems of symbolic signs on a spectrum, which can be expressed by either language – 'lunacy', 'mental illness' and so forth – regardless of their exact neuro-psychological or cognitive definitions, overlaps and differences as being taught at universities worldwide. Or, those symbolic systems manifest their presence through e.g. software applications' everyday-practices, or development, and last but not least, art.

2.2 Everyday-Practices of Madness

Specifically madness has brought to life outstanding pieces of art. In Vienna in 1997, an exhibition entitled "Kunst und Wahn" - "Art and Madness" - traced this exceptional relationship between expressive imagination and psychosis [14]. [15] refers to historic cycles bearing power relations shaping these relationships.

So on the one hand, in order to approximate 'madness' from an semiotic standpoint, a thorough investigation would need to ask for the power relations wherein madness is brought into our perception. We will not conduct this kind of research in this paper.

On the other hand, whilst generative mechanisms underneath this representation would be worth a look at, interrelationships and between representations of meaning-making are of interest, specifically their performances. Comparisons may be a useful method to come to closer terms with both clusters.

We seize our following attempt in reflection of a *gedanken-experiment* that has been revolving around common conversations about human-computer interfaces in immersive Virtual Environments - we presume CAVEs and CAVE-like installations are known across our readers. If not, visit web sites such as e.g. [16] or read [17], where those are introduced.

In our paper, madness is understood as a symbolic performance embedded into a meaning-making system which is encapsulated and embraced by exogene, clustered definitions and endogene symbolic-chaotic patterns forming systemic subsets. Both poles live on a symbolic spectrum, though their transition into one another - that is, from observation and definition to proprioception - shifts blurry, seamless and reciprocally. One may say that this kind of spectrum could be called a dynamic transgression of madness, where ordered and chaotic symbols of meaning-making resort into one another.

Accordingly, Michel Foucault has been describing such a transcending bipolar archaeology of madness in-depth [18].

In toto, we can state that representations of madness aggregate a symbolic meaning-making system where representations of symbolic order and symbolic chaos negotiate meaning during their performances.

If madness were an alternate version of reality – which it is for the ones suffering from it - it can be compared to virtuality, which by its name declares it is not real, but virtual.

2.3 Representations of Virtuality

Virtuality „in an everyday-practice administers non-Cartesian,

three-dimensional Internet-based, computer-generated coordinate environments" [19], although the authors have been working in immersive, network-based Virtual Environments lately. An updated definition matched to this paper would state that virtuality, in an everyday-practice, administers immersive non-Cartesian, three-dimensional, network-based, computer-generated and –rendered coordinate environments, autarkic or collaboratively, but yet physically inhabited. 'Being there' - which in usability studies concerned with immersive virtuality placeholds modes of presence and awareness (and, we might add, proprioception) - fosters a dynamic spectrum of order transgressing into chaos, and contrariwise.

Disruptions of this outside order - maintained by a visualization system – lead to a lessened intra-perception of 'being there', which can be claimed symbolically chaotic. Similar to the preceding section, a representation of virtuality exists as a symbolic meaning-making system. A comprehensive and more detailed overview of models partaking into this system gives [20], though contrary to our semiotic approach, this study engages with usability engineering of Virtual Environments.

Virtuality as a symbolic meaning-making system produces expressive forms, e.g. simulations of complexity and reality; therefore, virtuality does not simply equal simulation, see [21], especially when referencing to semiotics.

Quite interestingly, long-lasting architectural definitions, such as outlined in [22], try to lift-off real space from "mathematical space" by attributing the latter with transgressing boundaries, homogeneity, infinity, and a free-floating coordinate axis. For our case, the following subsection shows an eventual attempt of defining a representation of virtuality.

2.4 Everyday-Practices of Virtuality

Virtuality, in an everyday-practice, administers immersive non-Cartesian, three-dimensional, network-based, computer-generated and –rendered coordinate semiotic environments, autarkic or collaboratively, but yet physically inhabited. The inhabitation is depending on a visitor's maximum feeling of presence, awareness and her proprioception in this environment which enforces transgressing boundaries, inherent homogeneity, infinity, and a free-floating coordinate axis.

Symbolic signs within this environment can be simulations, or other pragmatic expressive orders. They trigger the degree of perceived inhabitation, and sustain bodily experience through a multitude of signs. Virtuality as a whole aggregates a semiotic meaning-making system where symbolic order and symbolic chaos negotiate meaning, but only if virtuality is in fact inhabited: A semiotic representation of virtuality comes only into existence when a visitor, and the steering computer, form a temporary symbiotic entity that characterizes virtuality.

3. MYTHOLOGY

In the following section, we describe how we found evidence of a possible comparison between madness and virtuality. We use artistic pieces representative of representations of madness, and virtuality, to exemplify interfacing aspects of the two concepts.

Furtheron, we reference to other representations of madness, and virtuality that triggered our interest in a comparison.

3.1 Art & Madness

Whereas [23] renders an visual iconography of psychosis, [24] emphasizes on a genre within pictorial art, 'L'art brut', or Raw Art in the United States. Other languages of art have likewise brought madness into reality, either through their originators, or their products, or both. In literature, evidence of originators' madness can be traced in Friedrich Hölderlin's oeuvre. Works spieling with the meme of madness are numerous, just think "Die Blendung" by Elias Canetti, Georg Büchner's "Lenz", or Sylvia Plath's "The Bell Jar". Most recently, the movie "Girl, Interrupted" dealt with a representation of madness, and even music group's names refer to the theme – think British band 'Madness'.

Musical and applied art are widely spread therapeutic means by which patients are stimulated and helped to express themselves. We encountered a thick red line that indispensably ties imagination and creativity to madness, and encodes an artistic discourse dealing with boundary experiences, and creativity. Even if not considered a "mad" artistic expression, the cited examples picture artistically how madness as a symbolic concept challenges versions of reality.

3.2 Art & Virtuality

The University Stuttgart based CAVE-like Virtual Environment has been utilized for artistic experiments over and over again. Most artistic endeavors challenge perceptions of external reality by triggering a Look & Feel that does not match with what Jean-Pierre Changeux describes as the "anthropic principle" [25]. Instead of anthropocentrically assigning "specifically human qualities to external reality" [26] - which would force Virtual Environments to anthropomorph - visitors of artistic Virtual Environments tend to machinamorph insofar that they adapt to a computer-controlled world.

This discourse seems remarkable, since it underlines and supports the immersive quality of CAVE-like Virtual Environments when confronting human beings with rules and constraints not known to outside meaning-making systems. Here, similar to 'art-on-the-edge', virtual symbolic chaos is held against an anthropic symbolic order of reality. On the other hand, one could argue that in order to understand exactly what happens to a machinamorphed visitor within an artistic Virtual Environment, that above mentioned anthropic principle would just keep ready the key to unlock the door to first-person science, where a perceptive methodology "based on a relinquishing of memory and imagination in favour of observation" [27] nullifies any *a priori* meaning-making system. Within this context of a meditative, ineffable and almost autotelic being, semiotics would have come to an end.

3.3 An Architect and an Anthropologist on Mars, dreaming

Besides artistic expression - where madness and virtuality can in fact transgress into one another - we remembered Oliver Sack's popular volumes [28] [29], where he describes some of his patients' representations of madness. Reading through the tragic, astonishing and sometimes pleasing episodes, we encountered something like 'guidelines': Wouldn't it be challenging to transfer those losses, amplifications and journeys into Virtual Environments?

We resembled Alan Lightman's "Einstein's Dreams" [30], too, which had almost the same intention as Sacks – to describe somebody else's would-be experience, and perception of space and time. Lightman's novel renders virtuality as a twosome literary simulation of reality and complexity – what would happen to space, time and everyday practices in alternate physical worlds if they were for real?

Sacks, on the other hand, literarily renders madness as if his patients' cognitions were on the boundary of experience, as if they were virtual: He describes alternate versions of everyday practice (but not at all simulations). Contrary to [31], where social collaboration is held responsible for creativity, Sacks' patients' alternate versions of everyday practices are immanently and individually creative - if the pathological disease precipitating creativity is not taken into account as a, if you want, silent collaborator.

We took this thesis on, and started to ask us to what extent representations of virtuality and madness correlate, since the narrations of both Lightman and Sacks seemed to match at least discursively.

3.4 Computers and Madness

Simplistically put, scientific research in the field of computing machinery either concentrates on regulating madness' surrounding organizational structures, for instance fiscally and administratively [32]. Or, which is of more influence for this paper, constructionist approaches in complex adaptive systems seem handy enough to apply them to our representations of madness and virtuality.

The computer is in control of virtuality, as opposed to a "decentralized mindset" as suggested by Mitchel Resnick [33], where he states that "randomness can help create order", and ongoing: "In many self-organizing systems, random fluctuations act as the seeds from which patterns and structures grow" [34]. The implicit question we raise here is whether symbolic randomness – a superficial sign of potential complexity – equals symbolic chaos as we defined it in the preceding sections.

We will not answer this question, since this section intends to show what route we took, but suggest some questions instead: Can random parameters encourage virtual representations of madness? If yes, can computational semiotics adopting behavior generation - see section 1.2 – induce representations of madness into digital codes and therefore evoke creative behavior?

3.5 Computers and Virtuality

Daniel Weiskopf of the University Tübingen has been working on a project called "Virtual relativity" [35], which simulates the complexity of special relavitiy in a CAVE-like immersive Virtual Environment. Weiskopf has, analogically spoken, visualized some chapters of Lightman's novel. He has also set forth a discourse where an anthropocentric view of the real world is undermined by a simulation of complexity.

From a rationalist's view, knowledge of special relativity will explain being within this meaning-making system fully. From a constructivist's angle, a visually chaotic structure is put into symbolic order. From an architectural standpoint, this mathematical space is non-existent in reality. From a anthropological standpoint, Virtual Relativity performs a boundary experience in which we participate for real – the

application sets up a symbolic chaotic meaning-making system, one must almost dare to say: a mad meaning-making system.

From the steering computer's perspective, this all doesn't matter. If the machine which renders special relativity were a brain, it wouldn't be aware of what it is doing to the extent that it doesn't gain positive feedback following its actions. It just *is*, and therefore has relinquished a priori memory and imagination in favour of observation ('a priori' implying the state before Virtual Relativity is launched). Average visitors to this virtual world transgress from symbolic order to symbolic chaos, but form in affiliation with the 'brain' a temporary, symbiotic-like entity: The control-less attendants now possibly face a representation of madness.

We considered this supposition the most thrilling aspect patronizing a comparison between representations of madness, and virtuality.

4. MAPPING CHAOS, CODING ORDER – CODING CHAOS, MAPPING ORDER

This section features two conferring semiotic aspects of representations of virtuality, and madness, mappings and codes.

4.1 Semiotic Mappings

Methodological mapping stems from communication studies, and obviously, from geographical sciences. In semiotics, mapping has grown into a research style which helps to operationalize and approximate a topic. It can be a survey's starting point for an analysis. We had the fortune to find real maps concerned with both madness and virtuality, which seemed promising, resulting in the following mapping of the topics, exemplified by maps.

The art of map-making has entered both representations of madness and non-immersive representations of virtuality a long time ago already. Whereas organic matter is, in the former case, signified by the signifying geographical localization of neurological diseases - e.g. neuroimaging [36] - anorganic relationships present the latter's signified, with signifiers in form of visualizing spatial notions of these relationships, see [37].

4.2 Maps

The symbolic sign, which already pictures a meaning-making system, is in both cases a map. A multitude of maps (signified) showing different renderings and versions of spatial relations and processes (signifier) establish an upper level sign: an atlas. This atlas, then, has some knowledge if this atlas carries a model of some part of reality as it is perceived by the whole atlas. The 'text', as some semioticians even term a map, mediates information about locale, function, communicative acts, geometrical frames, distance, directions, topology, routes etc. of both representations. These atlases facilitate an understanding of madness and virtuality spatially – they establish symbolic order.

Atlases of virtuality also enforce the prophecy of virtual immersion: They engage their users to believe in the cultural, but yet technical spatiality of non-immersive representations of virtuality, whereas maps of madness allude to the naturalness of healthy, ordered brains. Both maps intend to put symbolic chaos into symbolic order, but require special skills to be decoded.

If maps signifying representations of madness, and those of virtuality, are compared, it intrigues how much they relate in terms of cognitive map knowledge. But the most important factor - a converging sign for both kinds of maps - stays navigation. Madness, likewise virtuality, can be navigated, and steers navigation. According to our definition in subsection 2.4, representations of virtuality in our case take place in immersive Virtual Environments - so what does a map of immersive virtuality look like?

We suggest that the Virtual Enviroment *itself* configures a map: If a map delivers complex and abstract information concerning navigation in a certain environment, then it must be true that immersive Virtual Environments represent maps of virtuality to visitors – the latter become part of the map-landscape. On the contrary, maps of madness do allow for a exterior surface navigation of madness merely, but not for a first-person perception of the meaning-making system at work inside the patients' brains. Performances - or coded acts of practice – appear to be navigational practices in both representations, then.

4.3 Semiotic Codes

Codes organize symbolic signs into meaning-making systems. When codes are used in a certain familiar chronological sequence, they can be interpreted by both originators and recipients, with reference to their appropriateness – semiotic codes are the wind in the wind chime.

Virtuality uses digital codes to convey information; representations of madness use neural analogue codes, yet the transmittal processes are bio-chemically maintained. What is important to us here is the mutual inherent *structure of articulation* within both codes.

4.4 Coded Articulation

Virtuality can be broken down into tiniest pieces of articulation easily: Bits and bytes of the programming code, which do not possess meaning by themselves. Being a minimum functional unit, a bit lacks meaning, though one may argue that a bit surely has to decide whether it wants to be zero, or one, and therefore carries meaning, because it equals either true, or false. If these two categories are numeric states, they can only be influenced from the outside, not by the bit itself. Therefore, a bit does not carry meaning without exterior manipulation. Though, if a bit could be both zero and one at a time - which it can - semiotics would probably feel a bit better about this paradigm.

Only in combination with other referencing bits, the sole bit gains meaningfulness. These combined bits become a symbolic sign, which, signified by other byted bits, form a piece of software running inside a Virtual Environment. Here, articulations of the digital code determine a direct symbolic order, whereas the expressive performance of these chunks of code can be of the complete opposite. Ordered software pieced together out of single bits may visualize complexity, or chaos. Imagine a waiter who serves your favorite pasta dish, which looks and smells mouthwatering, and has been cooked exactly to your order. Before you notice, the waiter flips the warmed porcelain plate a 180° - there you go!

Such an anachronism can also be detected in representations of madness. Although most representations of madness are pathologically dynamic, we assume they still contain a basic anthropological element, perceptual constancy. Citing [38], perceptual constancy as an analogue code ensures that "the

variability of the everyday world becomes translated by reference to less variable codes". Most of Sacks patients held such a perceptual constancy, but one that can be described as an *alternate representation* of at least the authors' common perceptual constancy. The anachronous element with representations of madness manifests itself in the complete reverse semiotic transgression from symbolic order to symbolic chaos. Now, your dish consists of a huge rubber tire, but a candle-lit dinner table awaited you, and the waiter dances towards you in rhythm with the gentle melodies of a lounge combo. Everything, apart from the food you eat, seems perfect, and comfortable.

The structure of articulation in representations of madness doesn't ask for appropriate codes; it sets up its own, consisting of phrasings, variations, shifts, or inventions of codes. "Randomness can help create order", Resnick writes, as can slightly "bracketed" chunks of code, whilst building "bracketed perception" piece by piece [39].

In comparison, codes within virtuality need a visitor to generate meaning. Codes within representations of madness make up meaning by themselves. Yet, if Virtual Environment's visitors form temporary entities with the computer, they do experience almost the same as some of Sacks' patients: They are not in control of navigating through a mapped landscape. Since people in CAVE-like environments differ in their interpretation of symbolic signs, and the codes brought along with these, they will experience differing modes of awareness, presence, and proprioception, ditto depending on the kind of Virtual Environment.

As opposed to Sacks patients, regular visitors to Virtual Environments will have a feeling of self-reference because of code practices they brought with them from the outside; in o

ther words: they are able to *compare* different meaning-making systems, like they would compare their wristband watch's time with the present time zone after a long flight.

5. CONCLUSIONS

In the beginning of our paper, we stated that we did believe it would be possible to learn from codes and mappings of madness, and virtuality, and apply findings to each of the pair. Virtual Environments, on the one hand, could help compensating patients' *losses*, or weaken their experienced *amplifications* [40].

On the other hand, let us present a buzzword list of our key findings in order to support our argument:

- Representations of madness, and representations of virtuality seem to show general conformities in the way they are practiced, and practicable

- Performances - or coded acts of practice – appear to be navigational practices in both representations

- Codes within representations of virtuality need a visitor to generate meaning; codes within representations of madness make up autarkic meaning

- Both themes bear transgressional character, stepping from symbolic chaos to symbolic order, and vice versa

- Representations of madness seem to present alternate, "bracketed" versions of common perceptual constancy, likewise representations of virtuality

- Both madness and virtuality work as concepts where physical and mental interconnect: The physical becomes mental, and the mental becomes physical

- Through virtuality, representations of madness find their way into reality; through madness, representations of virtuality as we may build them, are already lived

- Both concepts challenge symbolic orders of reality

6. FUTURE RESEARCH

We have shown that madness and virtuality have a lot in common in the ways they challenge coded concepts of reality. To what extent they can inform each other purposefully (and possibly therapeutically), would need to be tested in future Virtual Environments, really – in co-operation with and between patients, therapists, and researchers.

The social dimension of interrelations between madness and virtuality, and their impacts onto physical and mental societies will need to be explored much more deeply, too.

7. ACKNOWLEDGEMENTS

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