# BEYOND PLATO? TOWARD A SCIENCE OF ALTERATIONS OF CONSCIOUSNESS

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> The safest general characterization of the European philosophical tradition is that it consists of a series of footnotes to Plato (Whitehead, 1939, p. 39).

It is no longer a death-knell to a person's academic career to confess to an interest in consciousness. In the context of the enormous number of recent books on consciousness (especially neuropsychological and philosophical treatises), specialized journals (e.g., *Journal of Consciousness Studies*, *Consciousness and Cognition)*, and associations (e.g., Association for the Scientific Study of Consciousness) with periodic meetings, it seems almost uncouth to wonder whether we have a science of *states of consciousness.* Yet, however welcome the 'new' science of consciousness may be, there have been some striking gaps in its development and it can be argued that at least in some respects we have not improved on the contributions made by Socrates and Plato more than two thousand years ago.

Among the most important hurdles in the study of consciousness are conceptual vagueness and obfuscation and the facile assumption that a materialist account of brain/mind relations is unassailable (e.g., Crick, 1994) when in fact there are good reasons to at least question such a model (Kelly, Kelly, Crabtree, Gauld, Grosso & Greyson, 2007). In a related vein, the parapsychology community is well aware of the bizarre situation in which discussions about the ontology of consciousness occur amidst a complete ignorance of or disregard for the considerable amount of data produced by parapsychological research. Although less fatal, the failure to even consider relevant evidence is reminiscent of the 19th century disregard of Semmelweis's theory that asepsis might have something to do with puerperal fever and the enormous number of childbirth deaths because his ideas ran counter to the established medicine of his time (Nulland, 2004). Much

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more could be said on this issue, but that is not the goal of this paper.

Another limitation in the discussion about consciousness has been the false assumption that serious, important work on consciousness started with recent cognitive and neuroscientific research, when in fact there have been fundamental and still neglected theoretical and empirical contributions to a science of consciousness by William James, F. W. H., Myers and others at the inception of psychological science (e.g., Kelly *et al.*, 2007). After them, even during the hegemony of behaviorism, other authors (e.g., Martindale, Natsoulas, and Tart) made notable contributions to this topic even before it could be mentioned in polite company among psychologists.

Also, neglected in most of the discussions on consciousness has been the fact that we transit among different states of consciousness even while awake, that such states organize experience, cognition, physiology, and behavior, and that what is postulated about one state may not apply to another. Some decades ago, Ludwig (1966) reintroduced a serious discussion of the topic and Tart (1975) provided the bases to conceptualize states of consciousness, including the transitions between them. Yet, this work has had a modest impact in current discussions of consciousness—with a few exceptions (e.g., Baruss, 2003)—and there have been few theoretical developments recently. Putnam (2005) cogently argued that knowledge about states of consciousness ("discontinuous ensembles of self-organizing variables", cf. Wolff, 1987) is necessary to understand childhood development and variations in psychopathology. I will argue that a development of a science of states of consciousness is also foundational to further the progress of research in parapsychology, but that much work needs to be done before such a science amounts to more than a collection of interesting facts. Because some of the developers of a science of consciousness have also worked in parapsychology, this discipline is well positioned to make important contributions as long as it avoids some common mistakes.

With that goal in mind, I will point out various common conceptual misunderstandings or limitations in the discussion of states of consciousness and will use my and others' research to illustrate how they may be resolved. At the end, I will propose necessary steps to build a discipline of states of consciousness. A recent review by Roe (in press) on the link between different states of consciousness and psi phenomena is very much in harmony with some of the points made in this paper. In this paper, I will follow Tart's (1975, p. 5) definition of a

distinct (or discrete) altered state of consciousness (ASC) as "unique, dynamic pattern or configuration of psychological structures, an active system of psychological systems," that is qualitatively different from the individual's ordinary state of consciousness. Because consciousness is an ever changing process, small, non-qualitative changes (e.g., being a bit more or less attentive) should be considered as just variations within a state, not as distinct states (Tart, 1975).

*1. States of consciousness are not the same as induction procedures*

Even sophisticated discussions of states of consciousness typically make the mistake of conflating qualitatively distinguishable states of consciousness with procedures or techniques that might or might not bring about such experiences. For instance, Vaitl and collaborators (2005) failed to distinguish between alterations of consciousness (e.g., near-death experiences) and psychological procedures that may or may not have an effect on the consciousness of those exposed to them (e.g., meditation, biofeedback). In contrast, an authoritative definition of hypnosis describes it as a *procedure* that may or may not produce ASCs; this definition is moot as to what those alterations may be (Kirsch, 1994; my emphasis). Furthermore, many of the alterations in consciousness sometimes elicited by a hypnotic procedure may also be triggered by very different contexts, such as a traumatic event (Cardeña, Maldonado, van der Hart & Spiegel, 2009). Nonetheless, it is more fruitful to subsume these alterations under one of the descriptive senses of 'dissociation' (Cardeña, 1994) than to talk about the 'trauma state of consciousness'. Similar alterations of consciousness should be discussed under the same rubric (say, state of consciousness or anomalous experience X), regardless of their antecedent procedures or events.

Stanford (1993) earlier on drew the attention of parapsychologists to the fallacy of equating a procedure with a state. His conclusion is supported by the results of a recent study in which a simple hypnotic induction with the only suggestion to go into a 'deep' state of hypnosis produced noticeable effects in the phenomenology and neurophysiology of individuals previously identified as high hypnotizables, but had little or the opposite effect on low hypnotizables (Cardeña, Lehmann, Jönsson, Terhune & Faber, 2007; see also Pekala & Kumar, 2007). Furthermore, it is not justified to even assume that there is only one distinct altered state for those individuals who are responsive to a particular procedure, a point that I will address further.

*2. The terms used need to be defined and described*

If, as Socrates maintained, the beginning of wisdom depends on defining one's terms, consciousness remains a fairly unwise area of study. Natsoulas (1981, 1983) is the *rara avis* that struggled with the complexities of defining what the various concepts and problems of consciousness are, while most other authors just bandy commonly-used terms that are never defined or explained. The assumption is that the reader will know what the writer is talking about, but very often it becomes apparent that the writer is not even sure him/herself or conflates different senses of the same term. Let me discuss two examples commonly found in the literature.

The first one is *trance*. Not uncommonly authors in psychology and anthropology describe an individual as being in a trance or a trance-like state. What they mean is rarely made explicit. Some years ago (see Cardeña & Krippner, in press), being utterly confused as to what authors meant by this term I decided to consult the venerable Oxford English Dictionary (OED). And yes, my incomprehension was understandable. The OED included six different senses of *trance*, which differ in important ways, yet most authors using the term tiptoed around this issue. Furthermore, much more information about conscious experience is provided when the components of a complex variable are analyzed. For instance, a correlational analysis of 2,000 responses to a questionnaire on absorption (the ability to become more or less fully focused in an activity or attentional object) suggests that this process can be further deconstructed as to whether it refers to a narrow or expanded consciousness, and whether the focus is 'internal' or 'external' (Tellegen, 1992).

Another example, found in both the psychological and parapsychological literatures, concerns the word 'unconscious'. There are so many far from interchangeable senses of the term, including the Freudian, the Jungian, the cognitive, and even the political unconscious that unless authors explicitly describe how they are using the term, it is nearly impossible to have an idea of what they mean. Naturally, the same criticism applies to discussions of 'making the unconscious conscious', 'accessing the unconscious', and so on. This search for terminological lucidity does not in any way deny the fact that most of the terms we use are 'fuzzy' (Lakoff, 1973), but even fuzzy terms need to be clearly articulated. Any complexity should lie in the nature of the phenomenon rather than in the lack of conceptual clarity.

*3. States are not fixed, unchangeable entities*

For good or for bad, it seems that at least for the time being we are stuck with the term *altered states of consciousness*, although a slight variation, substituting *alternate* for *altered* gained a bit of traction some years ago (Zinberg, 1977). A related term, anomalous experience, has been proposed, but it is not interchangeable because anomalous (i. e., unusual or 'out of the ordinary') experiences may be an ordinary rather than an altered state of consciousness among some people (Cardeña, Lynn & Krippner, 2000). Synesthetes, for instance, regularly experience that stimuli elicit an additional perceptual experience to the expected one, such as a particular letter also inducing the experience of a color, a phenomenon that most of us will experience, if at all, during an altered state (Marks, 2000).

The problem with the term altered (or alternate) state of consciousness is that it denotes a homogeneous and unchanging state of affairs. For instance when talking about the ordinary or waking state, the variety of changes occurring from one moment to the next are somewhat ignored, despite the fact that a defining characteristic of consciousness is its constant change (James, 1890). Although rarely used, to speak of different *modalities of experiencing* is a more accurate term in the sense that the gerund denotes an active process rather than an unchanging event.

Let me illustrate how considering a state of consciousness as basically immutable veils important changes. While doing research on individuals scoring in the highest 2-3% of hypnotic responsiveness (i.e., hypnotic virtuosos; Cardeña, 2005), I found that although there was reason to conclude that a hypnotic procedure induced qualitatively distinct alterations of consciousness in them, there were at least three discernible and distinct patterns that emerged spontaneously, without any specific suggestions: during self-evaluated *light* hypnosis, respondents mostly mentioned subtle alterations in their physical body, in *medium* hypnosis they described being in a different phenomenal place than their physical body, and during *deep* hypnosis they reported being in a dreamlike reality and/or transcendental experiences such as merging with a light or complete emptiness (see Table 1). Thus, within the alterations in consciousness produced by hypnosis among high hypnotizables there are discernibly different forms of experiencing, and their characteristics depend on when the experience is collected. More recently some colleagues and I have replicated and extended these

results with a between-subjects design by studying the whole spectrum of hypnotic ability, evaluating not only highly hypnotizable individuals, but also those scoring in the medium and low ranges of a hypnotizability test (Cardeña *et al.*, 2007).

TABLE 1.
*Reports of characteristic phenomena according to hypnotic depth*

| | No | Light /Medium | Deep/very deep |
|---|---|---|---|
| Body sensation | Same | Relaxation, spinning | Disembodiedness |
| Emotion | Same | Mildly positive | None or more intense (e.g., 'awe, wonder') |
| Attention | Same | Focused on body changes | Free-floating |
| Memory | Same | Same | Infrequent retrieval of forgotten material |
| Thought | Same | Decrease of 'mental chatter' | Totally absorbed in event, or absent |
| Imagery | Poor | Simple (e.g. geometric forms) | Complex imagery, light, blackness |
| Time sense | Normal | Slow | Timelessness |
| State of Consciousness | Same | 'Trance' | Akin to lucid dream; or transcendent SOC |
| Transpersonal experiences | None | Well-being | Merging, becoming one with all; 'void' |

The dynamic properties of consciousness can also be evaluated according to both small and pervasive changes within a state (i.e., neurophysiological microstates; Vaitl *et al.*, 2005) and longer and more impactful transitions between states (e.g., from being awake to going under anesthesia, or going to sleep). The latter seem to involve cognitive disorganization and may have properties that differ from more stable states (Tart, 1975). Other than the study of hynagogic and hypnopompic transitions (e.g., Foulkes & Vogel, 1965), these phenomena have not received much scrutiny in other states of

consciousness, with few exceptions (e.g., Putnam, 1988). The proposed relationship between PK abilities and release of cognitive effort during testing (Stanford, 1977) may involve a transition between states that creates greater neural lability, a distinction that may have implications for performance in PK tasks (Holt & Roe, 2006).

*4. Even within the 'same' state there are vast individual differences*

Already in the fourth century B.C., Plato had noted in the *Phaedo* that not all initiates into mysteric ritual experienced consciousness alterations (Plato, 1961). However, it is not only the case that only some people will respond to an induction, but also that within the same general type of state there can be important differences. I have already mentioned the example of the ordinary state of synesthetes, but even unremarkable individuals can have important differences in their ordinary state. For instance, Hurlburt (in Hurlburt & Schwitzgebel, 2007) has reported how imagery may be a typical content in some people's experience, but a very rare event in others.

Furthermore, even the same phenomenal event may be apprehended and interpreted in different ways. In the study with hypnotic virtuosos (Cardeña, 2005), every participant reported spontaneously that they had suddenly seen a very bright light (the experiment was conducted in a dark, isolated room, so these reports did not have an external, physical referent). For some, this light was experienced as a source of transcendent bliss ('all the good things'), whereas for others it was just a sudden brightening of their imaginal experience and nothing else. As Bakan (1973) remarked, a common source of confusion in psychology (and parapsychology) is to assume that research findings indicate a *general* function, which asserts something presumably true of each and every member of the class, instead of an *aggregate* function, which asserts something presumably true only of the class as an aggregate. Thus, it is necessary to carry out research at the group and individual levels. An excellent recent example of the need to analyze not only group data but also data from exceptional individuals is provided by Morgan and Stegner (2008). They point out that although hypnosis in general provides a boost to sports performance that is no greater than other strategies to enhance motivation, there have been individuals in their and others' research that have attained what they call 'superhuman' abilities after a hypnotic procedure, after additional research controlling for alternative hypotheses. Exclusive consideration

of mean (aggregate) results, or discarding data outliers would hide this important finding. Whether a similar pattern occurs in controlled psi experiments will depend on researchers integrating idiographic and nomothetic research approaches.

*5. Traits and states are interactive processes*

In an influential chapter, Honorton (1977) reviewed the literature on a probable connection between some ASCs and putative psi phenomena. The important set of studies using homogenous sensory stimulation, or *ganzfeld,* was to a large degree based on the conclusions of this chapter about the importance of lack of variability of sensory stimulation. However, a review of a possible connection between psi and personality traits (i.e., predispositions to think, behave and experience in a particular way) published in the same tome as Honorton's chapter, arrived at the rather unpromising conclusion that the only clear result about traits is that psychologically balanced individuals might do better in psi research than those with psychological problems (Palmer, 1977).

Since that time, two findings have altered the study of personality considerably. The first has been the discussion that the traditional 'big five' personality traits taxonomy that had been dominant for many years has serious limitations. The second is that we gain in understanding, and are able to explain greater variance, when both personality traits and a particular context are considered simultaneously. Besides other problems with the big five model adumbrated by McAdams (1992), an alternative taxonomy to that system includes a (temperamental) trait not considered by the earlier classification, namely *self-transcendence*, or the propensity to experience oneself as part of a larger unity (Cloninger, Przybeck & Svrakic, 1993). This trait has high unique genotypic variance (Gillespie, Cloninger, Heath & Martin, 2003), and moderate positive correlations with hypnotizability, absorption, and related constructs (Cardeña & Terhune, 2008) that have been often associated with various anomalous experiences (Cardeña *et al.*, 2000). It is of interest that a content analysis showed that self-transcendent experiences during a ganzfeld psi task were positively correlated with successful selection of targets (Carpenter, 2004).

As for the second issue, personality psychology has shown that the best predictor of behavior and experience involves consideration of

both personality traits and situations (e.g., Bowers, 1973). It is thus difficult to explain how parapsychology has mostly focused on situations that might alter an individual's experience such as hypnosis or the ganzfeld without researching the effect of that procedure on different individuals. Depending on the individual's trait, an induction may bring about an ASC or nothing at all. The interaction (or joint effect of two or more variables) between a trait and a context may help explain, for instance, the very successful outcome in a psi task with a group of music students (Schlitz & Honorton, 1992) many of whom presumably share one or more similar traits. Most other ganzfeld studies using the same procedure but with different, more heterogeneous groups have not produced such a successful outcome. A good example of how analyzing interactions may reveal psi effects is a PK study by Holt and Roe (2006). Whereas there was no significant main effect for high or low machine or human lability, the hypothesized significant interaction between individuals with high trait lability and low lability systems, and conversely, was supported by the data.

*6. We must develop a good taxonomic system*

It is not much of an exaggeration to assert that without Linnaeus's classificatory system, biology would have taken much longer to become a full-fledged science. Regrettably no such development has occurred with respect to alterations of consciousness. That science is a vast simplification of the richness of life must be kept in mind (Feyerabend, 2001), but it is very difficult to discern meaningful patterns when there is not even an agreed upon set of definitions, descriptions, and a basic taxonomic system (O'Connor *et al.*, 1997). The study of states of consciousness has suffered more than others not only because of the complexity of the subject matter, but also because of the lack of a classificatory system. It could be argued that we have not gone much further than Plato's classification of the *manias* in the *Phaedrus* dialogue. In it, Socrates states that when individuals are not in their usual senses (which we could interpret as being in an ASC), they may have important and useful insights into reality. These manias or inspirations occur in four different realms, the prophetic (as in the case of sibyls), poetic (artistic creation), telestic (self-development and overcoming of disease and sin), and erotic (all-encompassing love) (Plato, 1961). This is not at all a bad classification of self-transcendent

experiences, and we can wonder whether we have gone beyond this Western model, not to mention the more specific classifications of meditative experiences developed in the East (Davidson & Goleman, 1977).

Modern classificatory attempts of states of consciousness have had various limitations and are at times overly simplistic. For instance, the theoretician Fischer (1986) proposed that states of consciousness could be arranged in a circular continuum of arousal; a "cartography of non-ordinary states." His model, though, has various problems, including the equivocation of techniques with states (e.g., zazen), arguable descriptions (e.g., equating creativity with the REM state), and so on. As useful as his attempt to bring attention to this problem was at one point, it is clear now that the proposal of a linear hypo- vs. hyper-arousal continuum does violence to the intricacies of the various relationships between the sympathetic and parasympathetic nervous systems (Berntson, Cacioppo & Quigley, 1993).

A far more elaborate map was proposed by Clark (1983) as a general tool to plot mental states. However, his model is anchored on a number of competing theoretical models rather than on descriptive categories, and perhaps because of its complexity seems not to have had an impact on the field. A more recent model (Kokoszka, 2007) suffers from some of the same problems. Nonetheless, the general idea of some type of multidimensional scaling to classify alterations of consciousness has already been fruitful in the study of different states of mind during childhood (Putnam, 2005) and deserves further development.

The lack of any general taxonomy of states of consciousness is illustrated by a comparison of two recent classifications. Berenbaum, Kerns and Raghavan (2000) suggested that anomalous experiences can be classified according to their onset/course and various phenomenological dimensions such as how pleasant the experience was. In contrast, Vaitl and co-authors (2005) proposed a taxonomy based on level of activation, awareness span, self-awareness, and sensory dynamics. Perhaps the most striking aspect when comparing these two systems is that other than a commonality in proposing level of awareness as essential, they differ in virtually everything else. Some of us took a step in that direction by asking the contributors to an anthology to discuss the same categories so that features of various anomalous experiences could be identified (Cardeña *et al.*, 2000), but this area needs further development.

*7. Where do we go from here?*

The parapsychological community has had to face a number of hurdles throughout its history, many of them unfair, but some of its own making. As an example of the latter category, mention should be made of the practice of publishing papers only in conference proceedings instead of peer-reviewed journals, whether in parapsychology or in more general disciplines (Alvarado, 2003). This would be scandalous in other disciplines. More relevant to this paper, a number of publications in parapsychology (and other fields) have not demanded that the authors provide clear definitions or descriptions of what they mean when they refer to specific ASCs. There are valid and reliable introspective methods (e.g., Pekala & Cardeña, 2000), so there is no justification for not evaluating the effect of a reputed consciousness alteration technique. Editors should demand from authors what Socrates asked of his interlocutors so many centuries ago, to define their terms and to evaluate the effect of their manipulations on the participant's state of consciousness.

There is also a need for greater knowledge and sophistication by remaining engaged with larger disciplines such as psychology, biology, physics and others. For instance, I mentioned earlier how the discussion of a trait/situation interaction was accepted a long time ago in psychology, yet has been mostly absent in the parapsychological terrain. We need considerably more and better research specifying what traits produce what ASCs under what situations, and we need many more studies evaluating specific experiences and performance in psi tasks, such as that of Carpenter (2004). At a more impressionistic level, there has been discussion in the remote viewing literature of attitudes that may be conducive to psi abilities (e.g., Targ, 2004), but these proposals need to be researched more systematically.

We know little about what specific experiences and states are associated with performing successfully in parapsychological tasks, and this will not change unless we have a much clearer conceptualization of states of consciousness in general, and of the specific experiences of individuals both within and across sessions. Parapsychology should integrate idiographic and nomothetic perspectives, and systematically research both general patterns and idiosyncratic responses. It is generally agreed that some individuals perform noticeably better in parapsychology tasks than the rest of us, yet careful and controlled case studies have been mostly absent in contemporary research, despite some thorough examples of this method in the older literature.

Parapsychology may learn a lot by studying further the individual characteristics, processes, and strategies of researchers and of those who are most successful during a psi test (cf. Schlitz, 1992).

Finally, we need a taxonomic system based on the actual experience and behavior of the individual, disregarding theoretical or even religious proposals as to the ultimate nature of these experiences. Specific descriptors of the main aspects of the experience, as well as their changes across time should be used both within and across individuals. To reiterate an earlier point, any term used should be clearly defined and described. However, simple operational definitions such as 'x is what such questionnaire measures' should also be avoided, considering that different processes and strategies ensue even among high hypnotizables responding to the same suggestion (e.g., McConkey, Glisky, & Kihlstrom, 1989). Also, using vague terms (e.g., 'nirvana states') or confusing inductions and procedures with states of consciousness will only perpetuate our current level of confusion. When relevant, significant differences within procedures (e.g., types of meditation) and states (e.g., types of mystical experiences; Wulff, 2000) should be thoroughly studied and spelled out. After the initial phenomenological work is done, there is a good chance of building a neurophenomenological taxonomy in which biological processes are related to identifiable experiences (cf. Lutz & Thompson, 2003). Baars (1997) asserted that subjective experience and brain functioning have a 'close mapping', and specific events such as transcendent experiences have different brain dynamics than other processes (Cardeña *et al.*, 2007; Newberg & d'Aquili, 2000). Yet, a systematic comparison between specific alterations of consciousness and physiological functioning is in its infancy. This, and other developments in the study of consciousness, requires engagement with broader and multidisciplinary research because specialized knowledge in many areas such as brain mapping cannot be obtained by cursory reading.

Researchers in anomalous psychology and parapsychology can contribute to the development of a sophisticated science of states of consciousness and go beyond the extraordinarily promising contributions of Plato, James, Myers, Tart, and others, but only if they avoid the mistakes that have plagued the field for too long. We still have to fully accept the invitation by William James to develop a dynamic, cross-cultural phenomenology of consciousness, related to the psychophysiology of the organism but with relevance to the humanities and the sciences (Taylor, 1998).

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## *DISCUSSION*

HÖVELMANN: Etzel, about 20 years ago during the very first Euro PA conference I expressed very similar concerns about the term 'psi conducive states', for many of the reasons that you mentioned. Unfortunately it didn't have any major effect on the field. Do you have any recommendations for journal editors of any preferred or standardised terminology that could be used?

CARDEÑA: I am not surprised you would have raised this earlier, and I'm sure you expressed it better than I just did. I do not have recommendations right now except for the general recommendation I just gave that we demand more precise descriptions. Perhaps this would make a good future project. In our book *Varieties of Anomalous Experiences* we asked all of the contributors to address the same issues from their different perspectives; this was so that people could more directly compare out of body experiences with near death experiences with mystical experiences, and so on. I am planning an article in which I and others will try to synthesize some of that and try to start developing more of a taxonomy built from what people are actually reporting. At this point I will not be getting into physiology—I think neurophysiology will be extremely important, but will come afterwards. Developing a neuro-phenomenology can be extremely important and can then tie in with changes in brain activity, hormonal activity, and so on, but the basis is what people are reporting.

VON LUCADOU: Whenever you have something to do with qualia then we run into a problem; we can have no clear taxonomy because we have no definite states. The problem is first you have a different step, you have to find the dynamic of the system and then you can describe the dynamics with a certain taxonomy. This is a step further so I do not think you will be successful in describing qualia states at the first level because it is so different—everyone has a different frame of reference. So if you look for certain things to describe and you are outside of the Cartesian Cut, then it is simple; but if you go to qualia inside, then it becomes very individual, and the only thing that you can describe are the dynamics of the system, which show certain behaviors that can be used to describe the taxonomy of the system, using the theory of dynamic systems. But this description cannot be at the level of states. That is a very general remark.

CARDEÑA: I will respectfully disagree. I suppose I am much more phenomenologically oriented than you are because I think that even though in theory one may object and ask how can you compare qualia, where people are telling you about very different things, I would be confident that you can find some consistency or points of agreement. Let me take the example of mysticism, which is one of the typical experiences about which people say is so subjective an experience that we cannot even talk about it. Yet, when they look at what people are describing they are strikingly similar, they are comparable. Of course, I am sure there is going to be error variance, but when you look at the 'surface manifestation' I find there are enough common links for me to see similarities. And this can be improved if we use participants who have been trained to observe and describe their subjective experiences. Now, this is not at all to go against your notion about dynamic systems and multi-dimensional scaling for example when talking about variables. For me that would be the second step, for you the first, but perhaps they could be done simultaneously to come up with something better than we have.