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Altered States of Consciousness as Structural Variations of the Cognitive System

ABSTRACT

The chapter presents a new approach to defining consciousness in terms of an innovative theory of meaning (Kreitler & Kreitler). Most of the existing approaches to consciousness are based on the assumption that differences in consciousness consist primarily in degrees of awareness, so that it may seem superfluous to dwell on the characterization of various so-called alternate states of consciousness (SOCs). However, an analysis of different SOC's reveals several major dimensions in which they differ, e.g., status of the "I" or sense of control. The new approach is cognitive and is based on the theory of meaning which deals with the contents and processes underlying cognitive functioning. The major thesis is that SOC's are a function of encompassing changes in the cognitive system brought about by specific organizational transformations in the meaning system. Structural changes of this kind may affect cognitive functioning, personality manifestations, mood and affect, as well as physiological processes. The new approach may enable matching of cognitive tasks to adequate SOC's, the production of SOC's by self-controlled cognitive means, and even the definition of new SOC's.

DEMYSTIFYING CONSCIOUSNESS

According to Dennett (1991: 21) "human consciousness is just about the last surviving mystery", whereby mystery he defines as a phenomenon that people do not know how to think about and where to look for answers about it. This paper is designed to make a contribution to demystifying consciousness by embedding it in a relevant context, which may inspire thoughts about consciousness, and possibly the basic components for a new theory of consciousness (Kreitler 1999; 2001; 2002).

CONSCIOUSNESS AND AWARENESS

Any survey of the common definitions of consciousness readily reveals that most of them tend to equate consciousness with the mental state of awareness (Sutherland 1995; Dennett 1996). This conception has its origins in the approaches to consciousness prior to Freud (Whyte 1962: 17ff) and has been adopted and developed by Freud and the psychodynamically oriented psychologists (Freud 1981).

According to this approach consciousness is considered as a property that varies along one continuum, best described in terms of the triarchic set 'conscious,' 'preconscious' and 'unconscious.' The continuum is mostly positioned perpendicularly, with consciousness characterizing its upper end, unconsciousness its lower end, and preconsciousness holding a middle position, in between the extremes. The upper end of the continuum represents ordinary consciousness, with its highly valued qualities of awareness and clarity, to which other similarly valued characteristics became attached, mainly logical reasonable thinking, control of drives and emotions, the power of volition, reality-orientation and self-regulation of behavior. The lower end of the continuum stands for the various altered states of consciousness (SOCs). Since awareness was considered as the major property of consciousness, it did not make much sense to dwell on the characteristics of the various altered states of consciousness, all of which seemed to be characterized by low or fuzzy awareness. Differences among SOC's were dealt with, if at all, in terms of the external stimuli or triggers, such as drugs, alcohol or hypnotic induction.

Psychodynamically oriented theoreticians may differ in the descriptions they provide of the contents of the unconscious. Thus, according to the Freudians (Freud 1981) the contents are mainly sexual and aggressive drives and personally repressed issues, whereas according to the Jungians (Jung 1982) they also include collectively shared archetypes of structures and meanings of general importance for human beings. But differences in contents of this kind did not lead these theoreticians to attribute psychological importance to differences among SOC's that have been experienced and documented by many people and peoples.

MULTIPLE PHENOMENA

The assumption that consciousness is characterized mainly by awareness leads to a unidimensional conception of consciousness. This approach seems to be too narrow and may result in an erroneous conceptualization of the problems of consciousness.

Our first step towards a different approach would be considering the phenomena that are relevant for consciousness. The literature and documentation of consciousness contain a long list of concepts, labels, descriptions, or terms denoting SOCs (e.g., Barber, Spanos & Chaves 1974; Blackmore 2004; Eliade 1964; Fischer 1978; Foulkes 1990; Habel, O'Donoghue & Maddox 1993; Harrison 1989; Kakar 1992; Ornstein 1977; Riboli 2000; Singer & Antrobus 1972; Wulff 2000; Zuckerman 1969). Let us mention at least some of the major ones.

A regular textbook or encyclopedia mentions SOCs that can come about through physical disorders, such as indigestion, fever, nitrogen narcosis (deep diving), a traumatic accident or deprivation of food or water or sleep or oxygen; states induced by meditation, prayer, or techniques bound with specific disciplines (such as Mantra Meditation, Sufism, Yoga, Surat Shabbda Yoga); intoxication states induced by psychoactive substances or opioids (e.g., LSD, mescaline, heroin, marijuana, MDMA or ecstasy, psychedelic mushrooms, datura or jimson weed, peyote, ketamin, ayahuasca, DXM or dextromethorphan, amphetamines, cocaine, including perhaps also the lower-grade ones, such as nicotine, caffeine and Ritalin or methylphenidate); states induced by sensory deprivation (also called floating tank, sensory attenuation tank or Restricted Environmental Stimulation Therapy or Floatation REST); states induced by physical means, such as postures, dancing or breathing exercises; mental disorder states, such as mania or psychosis; states bound with hypnosis, self-hypnosis or guided imagery; sleep, dreaming, lucid dreaming, and transitional states between sleep and wakefulness (hypnagogic and hypnopompic, false awakening, and sleep paralysis); drunkenness (e.g., induced by the consumption of alcohol); states induced by shamanistic practices, including music and drugs; mystical experiences; oceanic experience; psychological states like flow, as well as intense emotional states (e.g., fear or panic, love, anger, sadness or depression); peak experiences; trance states including rapture or religious ecstasy, Samadhi, "possession" and "channeling"; and the state often produced by immersion in a crowd.

The list that uses the terms commonly applied in this context presents a mixture of several points of view. The main ones are (a) contents that characteristically appear in the described states (e.g., mystical experiences), (b) conditions under which the states characteristically occur (e.g., sleep, mental disorders, physical state of deprivation, sensory deprivation), (c) techniques used for inducing particular states (e.g., meditation, hypnosis, shamanistic practices, music, dancing), and (d) chemical or other substances applied as triggers (e.g., psychoactive drugs, alcohol, stimulants). Sometimes the category of chemical substances is further subdivided into classes of drugs in line with their general effects, such as stimulants, opioids, psychedelics, dissociatives and delirants.

It is possible that one or more of the states categorized under one of the four major headings is similar to or identical with a state categorized under a completely different heading, for example, a state induced by hypnosis and a state triggered by a certain drug.

This unclarity calls for a new attempt to construct a taxonomy of the different SOCs which would enable productive research considering the whole range of observed variations.

MULTIPLE DIMENSIONS

Several approaches are possible to the issue of setting up a taxonomy of SOCs. Those of potentially greatest interest are the psychological and the physiological ones. The psychological approach to be applied here has the advantages of being closer to the phenomenological-experiential level of SOCs and of being based at present on a larger store of information than the physiological one is. It may be hoped that in the future the two sets of characterization will be combined.

The psychological approach proposed here consists in defining a set of dimensions, each of which may get different values. It is expected that this approach will result in the characterization of each state of consciousness by a profile of values along each of the dimensions. The first part of the task is to define the relevant dimensions.

There are several proposals of dimensions for mapping the consciousness phenomena. One often applied dimension refers to the continuum from the outer being to the inner being and is rooted apparently in different mystical traditions including the Indian, Jewish (Kabala, Hassidism) and European (Gooch 1972; Lilly 1972). It is often de-

scribed in metaphorical terms as representing a variety of axes, the main ones being from the subjective to the objective, the personal to the impersonal, the illusory to the absolutely true, the material to the spiritual, and the temporary to the constant. Two other proposals are often quoted. Tart (1975) suggested two orthogonal dimensions of irrationality and of the ability to hallucinate, which define the locations of three clusters labeled REM dreaming, lucid dreaming and ordinary consciousness. Fischer (1978) proposed two dimensions fanning to the sides from one origin: one along the perception-hallucination continuum of increasing ergotropic arousal (of the sympathetic nervous system), which describes a gradual turning inward toward a mental dimension while turning away from the physical arousal, and includes creative, psychotic, and ecstatic experiences; and another dimension along the perception-meditation continuum of increasing trophotropic arousal, which includes the hypoaeroused states of Zazen and Yoga Samadhi.

To our mind these proposals are inadequate. The axis from the outer to inward reality is overly general and vulnerable to metaphorical expansion and fuzziness; irrationality and ability to hallucinate are both cognitive characteristics and do not seem sufficient to cover the whole variety of experiential phenomena, beyond the three clusters discussed by Tart; the two dimensions of ergotropic and trophotropic arousal define in fact one dimension of arousal and is also too limited in scope.

The following dimensions are based on preliminary investigations and present an attempt to do justice to the field in psychological terms. They emphasize aspects of the phenomena that, on the one hand, are sufficiently close to the observed characteristics to have at least face validity, but, on the other hand, have the potential to account for characteristics that may not be directly observable, so that they have construct validity. It will be noted that the dimensions refer to specific psychological variables.

The listed dimensions do not stem from any specific psychological theory and may match different theoretical approaches. Further, none of the dimensions was defined in view of one specific state of consciousness, so that they all apply to all the different SOC's. At present there are 9 dimensions, but the number may change somewhat in the future. Brief definitions and examples will follow the presentation of each dimension.

1. Salience and status of the “I”. This dimension describes the role, salience and status of the I in the different SOC. In ordinary consciousness the I is experienced as the major agent of all actions, clearly delineated and differentiated from external reality, in charge of all its components, which include also the body. It functions actually as “the measure of all things”. In dream states the I is not always prominent, and often occupies a secondary role in the fringes; in hypnosis the I may relinquish its ruling status and transfer it to another agent, such as the hypnotizer; in an oceanic experience the I may experience a sense of connectedness to everything in the vicinity or even a feeling of “oneness” with all beings; in shamanistic states the I may even give up its existence and get transformed into the shapes or functions of other beings, human or animal; and even in a state of immersion in a crowd situation the individual may lose the sense of one’s self.

2. Sense of control and ability to control. The strength of the sense of control and the domains in regard to which control is exercised or felt to be viable differ in the various SOC. Thus, in ordinary consciousness the individual may feel having control of oneself and one’s behavior as well as over the closer environment, but neither over physiological processes within one’s body nor over reality at large. In some dream states a person may feel having control over external reality (e.g., changing some parts of reality); and in hypnosis - over physiological processes, if the instructions are adequately given. In other SOC one may experience loss of control over one’s muscles and ability to move (e.g., ‘false awakening’) or in contrast experience the ability to fly (e.g., shamanistic flights).

3. Clarity of thought. Clarity of thought, sharpness of attention, and ability to concentrate and to focus when performing any cognitive act vary from one SOC to another, regardless of the contents of the thoughts. Clarity is increased in the states of inspiration as for example in “Flow” and after ingesting stimulants, but it is decreased in states of fatigue, disorders of metabolism, liver, kidneys, lungs, or heart as well as following toxic exposure, carbon dioxide or opioid toxicity.

4. Precision of perception in regard to external reality and environment. Precision of reality perception is fairly good in ordinary consciousness, but it is impaired for example in states of sleep or intoxication due to alcohol ingestion or certain drugs, when even the perception of constancies is transformed and time and place disorientation may follow. The hallucinogenic drugs produce hallucinations that impair

external reality perception. In other states it may be enhanced, as for example in depression or increased fear, especially in regard to the threatening stimuli. In some SOC's due to the ingestion of certain drugs there is an enhanced perception of colors and sounds of music, but following other drugs (e.g., LSD) there may be dramatic changes in perception.

5. Precision of perception in regard to internal reality and environment. In some SOC's there may be an enhanced perception of inner states, physiological or others (sometimes called intuitions), as in hypnosis or specific types of meditation, whereas in other SOC's there may be complete dissociation from the inner and bodily processes.

6. Emotional involvement. The different SOC's differ greatly in the amount and direction of emotional involvement. Some SOC's are characterized by low degree of emotionality, sometimes to the point of dissociation. In other SOC's there is a tendency toward intensified emotions, as in a crowd situation with a "charismatic" leader, or after ingestion of certain drugs. The evoked emotions may be positive (following the ecstasy drug) or negative (e.g., fear, anxiety, disorientation).

7. Arousal. Basically this dimension describes the differences in arousal that characterize SOC's, which may range from peaks of hyperarousal (e.g., following a leader in a crowd situation, ecstatic experiences, or psychosis) to low level of hypoarousal (e.g., dream states, following the ingestion of sedatives).

8. Kind of cognitive processes activated. A large body of data indicates that SOC's differ greatly in the cognitive processes that are prominent or weak while they last. Thus, some SOC's are characterized by logical and systematic thinking, primarily verbal (e.g., ordinary consciousness); some – by creativity (perhaps LSD; and other SOC's – by **imagial (imaginative?)** integrative thinking that produces connections and relations between different themes or domains (e.g., night dreams).

9. Accessibility and inhibition of certain kinds of information (kinds of and amount). This dimension focuses on accessibility of information. In no SOC is all available information also accessible. In ordinary consciousness the accessible information refers primarily to the external interpersonally shared reality that is socially and culturally confirmed and approved. The inaccessible information refers mostly to personal information of a threatening nature, emotions, often the negative ones, as well as drives and wishes that are classified as taboo in one's culture, or traumatic experiences and memories that are bound to

significant figures in one's life. Basically, all the inaccessible information is of the kind viewed as "unconscious" by the psychodynamic approaches. In dream states the accessible information refers to personal emotions and experiences of the kind labeled as unconscious in ordinary consciousness, while the inaccessible information refers to external and interpersonally shared reality. In drug induced states, such as following the ingestion of ayahuasca information referring to spiritual and religious themes is apparently accessible while the information referring to external and interpersonally-shared reality is inaccessible. In a state of being in love the accessible information includes all the good qualities of the beloved one and those that express optimism in general, but all the weaker features pointed to mostly by others are inaccessible.

The presented dimensions were selected for their relative generality and ability to account for other psychological phenomena that differ among the SOCs but could be derived from one of the dimensions or a combination of several dimensions, whereby both higher and lower values on the relevant dimensions need to be considered. Thus, for example, suggestibility could be derived from low values in Dimension 3, "Out-of-the-Body" experiences are likely to be facilitated by low values on Dimension 1, when the strongly delineated boundaries of personal identity are weakened. High values on Dimension 1 are involved in I-Thou relations and empathy for others (but not identification) that require clarity and stability of the personal identity. Telepathy and parapsychological effects also require the activation of values on specific dimensions, most likely high values on Dimensions 9 and 5. All the effects that are presented as dependent on one or more dimensions may be considered as derivatives or secondary manifestations of the dimensions.

Some of the derivatives are more complex because they seem to depend on a combination of several values of several dimensions. One example is healing power, actual or virtual. There is evidence that in some SOCs the individuals report experiencing being endowed with a healing power, which may be illusory or actual (e.g., shamanistic states, mystical experiences). One may surmise that in specific SOCs the sense of this particular power is more likely to be evoked or elicited than in others. Dimensions that are probably involved include low values on Dimension 1, high on Dimensions 5, 6 and 9. The second example is specific scientific disciplines. It seems that specific sciences thrive more or better under specific SOCs than under others. For example, psychol-

ogy as a science requires among others a high value on Dimension 1 given that its basic unit of inquiry is the human individual; the life sciences require high values on Dimensions 3 and 4; while mathematics requires also high values on Dimension 5.

Table 1: Schematic presentation of dimensional profiles of four SOC's

Dimensions	Ordinary Con- sciousness	Hypnosis	Dreams	Ecstatic state
Status of the I	High	Medium	Low	High
Control	High	Low	Low	Low
Clarity	High	Low	Low	Low
External reality	High	Low	Low	Low
Internal reality	Low	High	High	Medium
Emotion	Medium	Medium	High	High
Arousal	Medium	Medium	Low	High
Thinking	Logical	Imagial	Paralogical	Unsystematic
Information	External High Internal Low	External Low Internal High	External Low Internal High	Low

The dimensions could be used for setting up profiles characterizing different SOC's. (See Table 1 for examples). At present some of the profiles may be incomplete due to missing information. The dimensions may also be helpful in organizing the different SOC's into clusters on the basis of similarities among them in several of the dimensions. A taxonomy of this kind could promote the efforts of matching the psychological characteristics present and future physiological information about processes mediating the psychological phenomena. A further use of the profiles could be that they would help in devising additional elicitation procedures for the different SOC's (in line with the specific values on the dimensions). Another advantage is that the profiles could promote diagnosing specific benefits and risks of the different SOC's. For example, some SOC's are characterized by highly accurate perception of external reality, whereas other SOC's may be characterized by enhanced fantasy functioning. The former SOC would seem to be adequate for tasks such as monitoring screens for detecting the earliest signs of dan-

gerous weather changes, whereas the latter SOC would be more adequate for tasks such as producing creative advertisement. Most importantly, the profiles could help in selecting the appropriate SOC for performing a particular task, if the means and procedures for eliciting the diverse SOCs are under our control (see Kreitler 2002).

CONSCIOUSNESS AND COGNITION

An examination of the different dimensions and the range of effects that they represent reveal a large number of phenomena that are affected by changes in SOCs. Some investigators treat the changed aspects as one package and lump them together under a general term, such as “mental functioning” (Tart 1972: 1203). Others (Farthing 1992) provide a detailed list of the domains in which changes take place: attention, perception, imagery and fantasy, inner speech, memory, higher-level thought processes, meaning and significance, time perception, emotional feeling and expression, arousal, self-control, suggestibility, body image, sense of personal identity. Despite its length it is unlikely that the list is complete. Notably missing are effects in the domain of behavior, including motor actions, and physiological processes.

However it may be, scanning the list, even though it is partial, raises the question of what kind of system in the living organism could be responsible for such a diversity of effects? There is only one system that could be considered as a candidate for this role. At least at present, on the psychological level cognition is the only system that has been shown capable to promote, originate, enable and affect phenomena in all the named domains, ranging from perception to behavior, including all the cognitive processes, emotions, and personality traits.

There are a great many indications in the writings about consciousness that suggest the intimate relations that have long been noted between consciousness and cognition. Many investigators have noted that consciousness and changes in consciousness affect cognition. For example, ordinary consciousness promotes learning new and complex material (Baars & McGovern 1996: 74-75; Hardcastle 1995); a hypnotic state intensifies the individual’s imaginative processes (Barber, Spanos & Chaves 1974). Others considered cognition as the object of consciousness, so that consciousness has been described as referring to contents contained in ‘primary memory’ (a kind of short-term working store) defining the ‘psychological present’ (James 1890/1950). Another

conceptualization emphasizes cognition as the antecedent, condition or cause for consciousness (Mandler 1984). Most prevalent is the conception of cognition as the function of consciousness, evident in regard to a specific cognitive subsystem, e.g., episodic memory (Tulving 1983), or the majority of cognitive processes (Baars 1988: chap. 10).

The close interrelatedness of consciousness with cognitive processes and contents encourages attempts to construct cognitive theories of consciousness. Some of the better known ones have been proposed by investigators of different theoretical orientations (e.g., Baars 1988; Johnson-Laird 1988; Kihlstrom 1993; Nastoulas 1994; Velmans 1996). However, these attempts have been limited in the scope of their contributions to the understanding of consciousness, mainly because of several assumptions they share concerning consciousness and cognition.

One major assumption concerns the unidimensional character of consciousness, conceived solely in terms of a continuum denoting differences in clarity and awareness. As noted, this assumption leads to disregarding differences between the SOCs, lumping all those that are characterized by apparently lower awareness under the heading of “unconscious states”. Another important assumption concerns the consideration of cognition as a set of subsystems, each reflecting one of the standard functions, such as memory, attention or problem solving. Other functions, including dreaming or daydreaming are mostly overlooked as well as the underlying substratum that may maintain the functioning of all of the separate subsystems. According to this approach, consciousness is distinct from cognition, which it may however affect. More importantly, changes in consciousness are viewed as mediated by agents external to consciousness, or for that matter, to cognition (e.g., physiological phenomena, drugs) and are not themselves cognitive.

These assumptions, one or more of which may be implicit, have resulted in too narrow conceptualizations of both cognition and consciousness, which do not suffice for a comprehensive theory.

Despite these critical remarks, cognition is the context we suggest as relevant for the comprehension and study of consciousness. We will outline a blueprint for a new cognitive approach to consciousness that is based on other assumptions. According to this new approach consciousness and cognition are considered as inextricably bound together. Though distinct, one cannot be described satisfactorily without the other. Further, consciousness is viewed as a characterization of the cognitive system as a whole, not just of this or another part of it. It

expresses or manifests something that inheres in or depends on the totality of the cognitive system. The cognitive system itself is conceptualized as including not only processes (e.g., abstracting, categorizing), as is commonly assumed, but also contents (e.g., memories, informations) which are involved in the performance of all cognitive functions, both the standard ones (e.g., memory, problem solving) as well as the not yet standard ones (e.g., dreaming). All these assumptions derive from the basic conceptualization that cognition is a psycho-semantic system, namely, it is a meaning-processing and meaning-processed system, or in more specific terms, it is a system that produces, assigns, stores, retrieves, transforms, applies and elaborates meaning. This assumption will become clearer after the next section that deals with defining meaning and illustrating its role in cognition.

MEANING AND COGNITION

The theory of meaning is based on a large body of data and empirical studies (Kreitler & Kreitler 1988; 1990a; 1993b). Meaning is defined as a referent-centered pattern of cognitive contents. Referent is the input, the carrier of meaning, which can be anything, including a word, an object, a situation, an event, or even a whole period, whereas meaning values are cognitive contents assigned to the referent for the purpose of expressing or communicating its meaning. For example, if the referent is 'Town,' responses such as 'includes buildings' or 'it is bigger than a village' represent two different meaning values. The referent and the meaning value together form a meaning unit (e.g., Town – includes buildings).

Five sets of variables are used for characterizing the meaning unit (see Table 2): (a) *Meaning Dimensions*, which characterize the contents of the meaning values from the viewpoint of the specific information communicated about the referent, such as the referent's *Sensory Qualities* (e.g., Grass - green), *Feelings and Emotions* it evokes (e.g., Storm - scary) or *experiences* (e.g., I - love my sister), *Range of Inclusion* (e.g., Body - the head, arms, torso and legs); (b) *Types of Relation*, which characterize the immediacy of the relation between the referent and the cognitive contents, for example, *attributive* (e.g., Summer - warm), *comparative* (e.g., Summer - warmer than spring), *exemplifying instance* (e.g., Country - the U.S.); (c) *Forms of Relation*, which characterize how the relation between the referent and the

cognitive contents is regulated, in terms of its validity (positive or negative; e.g., Yoga - is not a religion), quantification (absolute, partial; Apple - sometimes red), and form (factual, desired or desirable; Law - should be obeyed, Money - I wish I had more); (d) *Referent Shifts*, which characterize the relation between the referent and the presented input, or - in a chain of responses to some input - the relation between the referent and the previous one, for example, the referent may be identical to the input or the previous referent, it may be its opposite, or a part of it, or even apparently unrelated to it (e.g., when the stimulus is "U.S." and the response is "I love New York," the response refers to a part of the stimulus) ; (e) *Forms of Expression*, which characterize the forms of expression of the meaning units (e.g., verbal, denotational, graphic) and its directness (e.g., actual gesture or verbal description of gesture) (Kreitler & Kreitler 1990a).

Table 2: Major Variables of the Meaning System: The Meaning Variables

MEANING DIMENSIONS		FORMS OF RELATION	
Dim. 1	Contextual Allocation	FR 1	Propositional (1a: Positive; 1b: Negative)
Dim. 2	Range of Inclusion (2a: Sub-classes; 2b: Parts)	FR 2	Partial (2a: Positive; 2b: Negative)
Dim. 3	Function, Purpose & Role	FR 3	Universal (3a: Positive; 3b: Negative)
Dim. 4	Actions & Potentialities for Actions (4a: by referent; 4b: to referent)	FR 4	Conjunctive (4a: Positive; 4b: Negative)
Dim. 5	Manner of Occurrence & Operation	FR 5	Disjunctive (5a: Positive; 5b: Negative)
Dim. 6	Antecedents & Causes	FR 6	Normative (6a: Positive; 6b: Negative)
Dim. 7	Consequences & Results	FR 7	Questioning (7a: Positive; 7b: Negative)
Dim. 8	Domain of Application (8a: as subject; 8b: as object)	FR 8	Desired, wished (8a: Positive; 8b: Negative)

Dim.	Material	SHIFT IN REFERENT ^B	
9			
Dim. 10	Structure	SR 1	Identical
Dim. 11	State & Possible change in it	SR 2	Opposite
Dim. 12	Weight & Mass	SR 3	Partial
Dim. 13	Size & Dimensionality	SR 4	Modified by addition
Dim. 14	Quantity & Mass	SR 5	Previous meaning value
Dim. 15	Locational Qualities	SR 6	Association
Dim. 16	Temporal Qualities	SR 7	Unrelated
Dim. 17	Possessions (17a) & Belongingness (17b)	SR 8	Verbal label
Dim. 18	Development	SR 9	Grammatical variation
Dim. 19	Sensory Qualities (19a: of referent; 19b: by referent)	SR 10	Previous meaning values combined
Dim. 20	Feelings & Emotions (20a: evoked by referent; 20b: felt by referent)	SR 11	Superordinate
Dim. 21	Judgments & Evaluations (21a: about referent; 21b: by referent)	SR 12	Synonym (12a: in original language; 12b: translated in another language; 12c: label in another medium; 12d a different formulation for the same referent on the same level)
Dim. 22	Cognitive Qualities (22a: evoked by referent; 22b: of referent)	SR 13	Replacement by implicit meaning value

TYPES OF RELATION ^a		FORMS OF EXPRESSION	
TR 1	Attributive (1a: Qualities to substance; 1b: Actions to agent)	FE 1	Verbal (1a: Actual enactment; 1b: Verbally described; 1c: Using available materials)
TR 2	Comparative (2a: Similarity; 2b: Difference; 2c: Complementariness; 2d: Relationality)	FE 2	Graphic (2a: Actual enactment; 2b: Verbally described; 2c: Using available materials)
TR 3	Exemplifying-Illustrative (3a: Exemplifying instance; 3b: Exemplifying situation; 3c: Exemplifying scene)	FE 3	Motoric (3a: Actual enactment; 3b: Verbally described; 3c: Using available materials)
TR 4	Metaphoric-Symbolic (4a: Interpretation; 4b: Metaphor; 4c: Symbol)	FE4	Sounds & Tones (4a: Actual enactment; 4b: Verbally described; 4c: Using available materials)
		FE5	Denotative (5a: Actual enactment; 5b: Verbally described; 5c: Using available materials)

^a Modes of meaning: Lexical mode: TR1+TR2; Personal mode: TR3+TR4

^b Close SR: 1+3+9+12; Medium SR: 2+4+5+6+10+11; Distant SR: 7+8+13

Each individual tends to use only a part of the different meaning variables in assigning meaning to inputs. The individual's tendencies for meaning assignment can be assessed through the Meaning Test, which yields information about the individual's meaning profile, namely, the frequency with which the individual uses each of the meaning variables.

Each meaning variable has characteristic manifestations in the different spheres of cognitive functioning. For example, the meaning dimension Locational Qualities is involved in performance of tasks that rely on spatial and locational aspects, such as finding one's way or storing things. A body of data has shown in regard to a great many cognitive tasks that a set of different meaning variables is involved in the performance of each task, and that individuals who use most or all

of these meaning variables frequently (according to their meaning profile) succeed better in the performance of the specific task than those who do not use them often. Specific patterns of meaning variables - which could be called 'meaning profiles of tasks' - were found to correspond to good performance on cognitive tasks which assess spatial navigation, curiosity, creativity, constancy, problem solving, planning, learning of reading and reading comprehension (Arnon & Kreitler 1984; Kreitler & Kreitler 1985b; 1986a; 1986b; 1987a; 1987b; 1990b; 1990c; 1994; Weissler 1993). Such patterns reveal, as it were, the infrastructure of the cognitive processes involved in performing the cognitive act of, say, planning or solving a problem, thereby providing insight into the cognitive dynamics characteristic of the act.

When meaning variables are used for exploring the cognitive processes involved in specific cognitive tasks, they are grasped in a *dynamic sense*, whereby each meaning variable corresponds to some process (e.g., the meaning dimension 'range of inclusion' - to analyzing into components; the comparative type of relation - to detecting similarity or difference). The meaning system can however be conceptualized also in a *static sense*, whereby each meaning variable corresponds to some specific domain of contents (e.g., the meaning dimension 'sensory qualities' - to contents such as sensations of different kinds; the metaphoric type of relation - to metaphors). The dynamic and static manifestations of each meaning variable complement each other.

The central role that meaning fulfills in regard to cognition has led to the conceptualization of cognition as a meaning-processing and meaning-processed system. This conceptualization expresses one of the basic functions of meaning, which is to provide the infrastructure and the raw materials for cognitive functioning. However, our studies revealed other basic functions of meaning, a major one being in the domain of personality. A body of research has shown that each of almost 300 personality traits and tendencies was correlated with a specific set of meaning variables (Kreitler & Kreitler 1990a; 1993a; 1997). These findings support the conceptualization that each personality trait corresponds in fact to a unique pattern of meaning variables that is characterized by specific qualities. Again, an individual whose meaning profile contains the meaning variables that define a particular personality tendency would show evidence of behaving in line with this

personality tendency. Thus, a second function of the meaning system is to provide the cognitive foundations for personality traits.

Further, studies showed that the meaning system provides the cognitive raw materials for the self-concept (Kreitler & Kreitler 1987c), and is also similarly involved in the elicitation, selection and implementation of emotions (Kreitler 2003; Kreitler & Kreitler 1985a; 1987a). In conclusion, it seems justified to assume that cognition, as it is modulated and activated by the infrastructure of meaning, is potentially adequate and capable to account for SOCs. How does this take place?

COGNITION AND SOCS

Cognition is a system that is constantly activated since it is involved in all cognitive acts and other activities of the organism which depend on cognitive support, regardless of whether the acts are conscious or not. In each activity only those cognitive processes and contents that are relevant for the task as well as accessible to the individual are involved. One major factor that defines and modifies the accessibility of the adequate cognitive processes in the individual is the state of the cognitive system in the course of performing the task. The state of the cognitive system is defined in terms of the kind and number of meaning variables that are in a focal position and salient at the time, namely, they have an organizational primacy and a functional advantage for elicitation and involvement in the act, whereas the other meaning variables are in the background in different states of inactivation.

A great many changes occur in the cognitive system due to ongoing cognitive operations. These include actions elicited by some externally presented task, such as solving a problem; handling some task arising from the needs of the cognitive system itself, e.g., organizing material; or performing a cognitive act in response to the needs of other systems in the organism, e.g., emotional or social. Some of the changes are relatively small, for example, in contents defined as changes within one meaning variable, others may be larger in the sense that more processes are involved, or more complex, in the sense that the changes are interdependent and more enduring. However, regardless of how encompassing or how long they last, these changes do not affect the cognitive system as a whole.

Changes that affect the whole cognitive system may be brought about by means of organizational transformations in the meaning system. These kinds of transformations take place because of the needs and dynamics of the meaning system itself *sui generi* or in response to the needs of the organism, for example, reorganizing when a mass of new contents has become available, developing structural complexity, complementing a rudimentary or fragmentary view of reality, etc. Changes motivated by the dynamics of the meaning system typically consist of placing in the focal position one or more specific meaning variables or even merely one or more meaning values and changing accordingly the whole structure of the meaning system (organizational transformation). Changes motivated by the meaning system include, for example, placing in a focal position (a) the meaning dimensions 'Contextual Allocation,' 'Results and Consequences,' and 'Causes and Antecedents' which manifest the so-called 'abstract approach'; (b) the meaning dimensions 'Sensory Qualities,' 'Size and Dimensions,' 'Weight and Mass,' and perhaps also 'Locational Qualities' - all of which manifest the so-called 'concrete approach' or 'concrete thinking'; or (c) the meaning dimension 'Feelings and Emotions,' which would manifest the 'emotional approach.' Likewise, we could refer to the 'evaluative-judgmental approach,' when the meaning dimension 'Judgments and Evaluations' is in the focal position, the 'actional approach' when the meaning dimension 'Actions and Potentialities for Actions' is in the focal position, the 'comparative approach' when one or more of the comparative types of relation is in the focal position, the 'disjunctive (or either/or) approach' when the disjunctive form of relation is in the focal position, or the 'nonverbal approach' when one of the nonverbal forms of expression (e.g., gestural, graphic) is in the focal approach. As a matter of fact, almost any of the meaning variables and quite a number of sets of meaning variables could serve as foci for the meaning system and be the carriers of an organizational transformation.

In order to exemplify the process of organizational transformation and its effects one set of studies will be described briefly. The studies dealt with two complementary organizational structures of the meaning system: one focused on the interpersonally-shared (or lexical) mode of meaning and the other on the personal (or subjective) mode of meaning (see Table 2). The definitions and experimental procedures were based on prior findings about the salience of these modes of meaning in interpersonal and personal communication. The interperson-

ally-shared mode of meaning is defined by the two following types of relation: 1. the attributive, which relates the meaning value to the referent directly in a substantive (e.g., Flower - in the garden) or actional way (e.g., Dog - can bark); 2. the comparative, which relates the meaning value to the referent through the mediation of another referent, by way of similarity (e.g., Sea - has the same color as the sky), difference (e.g., House - unlike a tent is built of wood or bricks), complementarity (e.g., Wife - has a husband and husband has a wife), and relationality (e.g., Highway - broader than a path). In contrast, the personal mode of meaning is defined by the two following types of relation: 1. the exemplifying-illustrative, which relates the meaning value to the referent by way of an example, in the form of an instance (e.g., Wisdom - Moses), an image portraying a situation (e.g., Motherhood - a woman holding a baby in her arms) or a scene with dynamic elements (e.g., Aggression - an unemployed person comes to the government agency for employment, the clerk tells him that there is no work for him, the person feels warm anger rising in him, his fists clench, his vision becomes blurred etc.); 2. the metaphoric-symbolic, which relates the meaning value to the referent in a mediated way using non-conventional contents, in the form of an interpretation (e.g., Life - the unknown known), metaphor (an image related interpretatively to a more abstract referent, e.g., Wisdom - cool water in the desert at noon), or symbol (a metaphoric image that resolves contrasting elements, e.g., Love - a fire that produces and consumes) (Kreitler 1965). A method was developed for inducing experimentally each of the meaning modes so that the participants acted when their cognitive system was structured in line with one or the other mode (Kreitler, Kreitler & Wanounou 1987-88). In different groups of participants the findings showed that under the impact of induction of personal meaning - as compared with their performance under the impact of interpersonally-shared meaning induction - participants scored higher on visual memory tasks, identifying embedded figures, recalling faces; performed better on creativity measures of fluency, flexibility and originality; reported many more unusual and bizarre experiences; produced a greater number of associations; grasped texts more often in metaphoric terms; made more mistakes on judging the validity of logical syllogisms; had lower scores on reality testing and emotional control in the Rorschach test; and had higher scores on scales assessing emotions (negative as well as positive). Findings of this kind demonstrate first, that it is possible to

produce cognitive changes by manipulating modes of meaning, second, that the produced cognitive changes are of various kinds and in various domains, and third, that the level of performance of specific cognitive tasks depends on the organizational state of the cognitive system.

The changes brought about by the placement of different meaning constituents in a focal position include changes in the nature, salience, and interconnectedness of contents and cognitive processes that affect cognitive functioning. But the changes are not limited to the cognitive sphere. Since, as noted, the meaning system is also involved in personality traits, the self-concept and emotions, it is likely that the organizational transformations of the meaning system affect these spheres too, directly or indirectly. Hence, one may expect the organizational transformations of the meaning system to be manifested in the form of changes in cognitive functioning (e.g., changes in attention, memory, creativity, the difficulty of solving different types of problems, styles of decision making, fluency and flexibility of associations, etc.), in the self concept (e.g., thoughts about oneself, self-esteem, one's biographical narrative, the experiential atmosphere of the self, etc.), in personality traits (e.g. changes in the strength and salience of different traits and other personality dispositions), and in emotions (e.g., changes in the strength and salience of different emotions and moods). These changes in turn may bring about further changes in the affected domains as well as in other domains, including overt behavior and physiological reactions.

BLUEPRINT FOR A MEANING-BASED COGNITIVE THEORY OF CONSCIOUSNESS

In view of the theoretical considerations and empirical findings presented above, it seems justified to suggest that SOCs are products of changes that concern cognition as a whole, reflecting organizational transformations in the meaning system (Kreitler, 1999; 2001; 2002). Since cognition is involved in the functioning of many systems in the organism, the suggested definition may be expanded by emphasizing that SOCs refer to a total state of the individual that in principle encompasses, in addition to the cognitive system, also other systems in the individual (emotions, personality, self) affected directly by changes in the meaning system or the cognitive system or both. The above definition refers to SOCs rather than to consciousness for two reasons.

First, as noted earlier, consciousness is identified by many investigators as awareness, which is only one of the dimensions in terms of which SOC's may differ. Secondly, according to the approach presented in this chapter consciousness is the overall quality that refers to the state of the cognitive system, and since the cognitive system is always in some state, it would be more precise and correct to refer to the State of Consciousness (SOC) rather than to consciousness.

It may not be superfluous to reiterate at this point that according to the here suggested definition, conscious-unconscious adjectives describe the state of different contents and processes in each SOC. Hence, unconsciousness is not a SOC or an altered SOC but denotes a specific degree of availability or readiness for evocation and can be applied in regard to each SOC. In each SOC there are contents or processes that are not available and may hence be considered as "unconscious". The difference between the SOC's consists then merely in the kind of contents or processes that are unconscious. Thus, every SOC has an unconscious but the SOC's differ in the duration of the unconsciousness, the ease with which the unconsciousness can be overcome or suspended and mainly in the rules defining which material (contents or processes) is rendered unconscious.

Defining SOC as reflecting the state of the cognitive system (and other systems) under the sway of a meaning-based organizational transformation has several theoretical implications and practical applications. First, in contrast to the definitions that assume the existence of 'the' consciousness (presumably denoting ordinary consciousness) and so-called altered SOC's, the suggested meaning-based definition implies that there are an infinite number of potential SOC's and all are evaluated as of equal potential importance and status. Indeed, any one of them can become dominant for any duration and can come to characterize a given culture. It is possible that some of the possible SOC's are not yet known or described. Moreover, it is likely that it is even possible to invent new SOC's.

In principle, any organizational transformation in the meaning system may be considered as generating a SOC. Thus, there is an infinite number of possible SOC's. In practice, however, not all organizational transformations affect the cognitive system and other systems (personality, emotions, etc.) to the same extent. Sometimes the changes may be minimal, or hardly noticeable, so that they may pass unnoticed or may be experienced as fluctuations in the prevailing SOC.

In other cases the changes may be very salient, so much that they are clearly experienced or considered as alterations in consciousness (viz. altered SOC's).

The extent of the changes could be associated with their duration, but does not depend on them. There may be dramatic changes in the SOC that may last milliseconds and yet be noticed, sometimes even treasured for a lifetime. Another factor that can affect the extent of the changes is probably the number and nature of the meaning variables that are placed in the focal position in the meaning system bringing about the organizational transformation in the system. It may be assumed that there exist core variables in the meaning system whose placement in a focal position yields a far-reaching organizational transformation (e.g., the modes). Further factors affecting the extent of the changes are probably the salience of emotional reactions among the changes, and the difference between the resulting SOC and the one habitual for the individual.

It is likely that some changes in SOC's become noticeable because they are sanctioned by the culture to which the individual belongs, or are bound to a specific technique that is salient in a particular culture (Faber 1981). Thus, the training of Yoga may focus on differentiation of SOC's that a regular untrained person from Western culture can hardly make sense of. A case in point is the differentiation between the following two consciousness states that form part of Buddhist meditation: *Dhāraṇā* and *Dhyāna*. *Dhāraṇā* (=“fixation of attention”) is described as the first step of deep concentrative meditation, when the target object is held in the mind without wavering of consciousness, but the meditating person, the act of meditation and the object of meditation remain separate. Though consciousness is focused on one object, awareness of the object is still interrupted. *Dhyāna* (=“concentration,” “meditative stability”) is described as a more advanced stage of meditation, when consciousness of the act of meditation dwindles away, and only the consciousness of being and the object of concentration continue to exist in the mind. As a result, awareness of the object is complete and without any interruption (Fischer 1978: 42; Maehle 2006: 234). Admittedly, an untrained person can hardly be expected to comprehend and apply SOC's of this kind.

Another important implication of the suggested definition of SOC is that SOC depends upon and is characterized by changes occurring in the cognitive system (through an organizational transform-

ation in the meaning system), regardless of the nature of the agent or conditions that brought about the changes. Even when the changes are induced by conditions external to meaning and cognition, for example, behavioral, emotional, physiological, technological (e.g., virtual reality), the changes that form the basis for SOC occur in cognition.

This conclusion as well as the findings of the studies on inducing interpersonally-shared and personal-subjective meaning modes indicate that it is possible to generate SOCs by psychological means tailored to produce the targeted SOCs. The use of psychological induction methods may broaden infinitely the range of individuals that will expose themselves to SOCs and the range of SOCs that they will experience. Notably, the psychological induction methods of SOCs will eventually make it possible for individuals to produce desired SOCs by self-controlled cognitive means.

Moreover, by using psychological induction methods it may be possible to produce not only already known SOCs but also new not yet documented or experienced SOCs. Generating and inventing SOCs depend on values of SOCs in terms of the defining dimensions (e.g., Table 1) and the relations between these values and the meaning variables of the meaning system.

There are three major reasons for improving the potentialities of experiencing SOCs and expanding the range of available SOCs. One reason is that some SOCs are apparently accompanied by enjoyable experiences, which many people seek out and crave for, as manifested in the popularity of various drugs and stimulants. Another reason is that SOCs seem to lead to unraveling new and hitherto unknown aspects of oneself, others and the world, which make possible the attainment of a deepened knowledge of the self and reality. It is possible to speculate that the exposure of new aspects of the personal and impersonal reality may in principle culminate in the formation of new scientific disciplines. The third reason is of a more practical nature. Since there is evidence that some cognitive tasks are performed better under specific SOCs than under others (see above the set of studies on the induction of modes of meaning), it is of importance to be able to elicit for each cognitive task the SOC that promotes its performance in the best possible way.

In sum, the means for inducing, defining and creating SOCs provided by the new approach presented in this paper may serve to expand our view of consciousness, our methodology for studying

consciousness and our ability to manipulate, shape and experience consciousness.

ABBREVIATIONS

SOC	State of consciousness
REM	Rapid Eye Movement

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