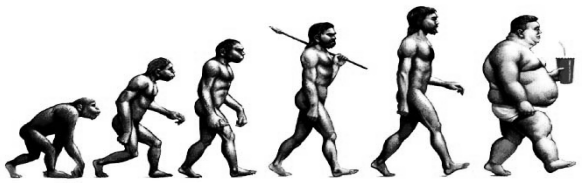


C. Robert Cloninger, MD
Washington University in St. Louis

- **Most medical treatment is "illness care", not health care**
- **Treatment focuses on relief or management of symptoms, not their causes or prevention**
- **Drop-outs, relapses, and recurrences occur in most people who request treatment**
- **There is no diagnosis or correction of underlying causes producing the symptoms**
- **Focus on pathology is stigmatizing and counter-therapeutic**
- **In sum, burden is large and standard symptomatic treatments are weak, incomplete, temporary, and stigmatizing**

What is Health ? – WHO Definition

- A state of physical, mental, social, and spiritual well-being in which the developing person
  - Realizes and uses his or her own abilities
  - Can cope with the normal stresses of life
  - Learns to work productively and fruitfully
  - Learns to contribute to his or her community
- Indivisible from physical health
- More than the absence of disease

WHO 1946; Herrman H et al (2005)

What Really Kills People in the US?

Table 2. Actual Causes of Death in the United States in 1990 and 2000

Actual Cause	No. (%) in 1990*	No. (%) in 2000
Tobacco **	400 000 (19)	435 000 (18.1)
Poor diet and physical inactivity *	300 000 (14)	400 000 (16.6)
Alcohol consumption **	100 000 (5)	85 000 (3.5)
Microbial agents	90 000 (4)	75 000 (3.1)
Toxic agents	60 000 (3)	55 000 (2.3)
Motor vehicle *	25 000 (1)	43 000 (1.8)
Firearms *	35 000 (2)	29 000 (1.2)
Sexual behavior *	30 000 (1)	20 000 (0.8)
Illicit drug use **	20 000 (<1)	17 000 (0.7)
Total	**1 060 000** (50)	**1 159 000** (48.2)

*Data are from McGinnis and Foege.[1] The percentages are for all deaths.

Mokdad et al., JAMA 2004

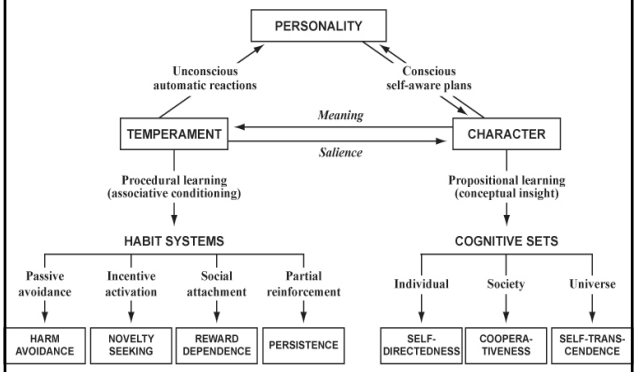
- **Medicine has long sought a way to describe the natural building blocks of human consciousness as a way to understand the causes of both health and illness**
- **The nature of human consciousness is a deep mystery with no satisfactory explanation and not even an adequate description**
- **Recent scientific advances do allow a systematic description of the structure of human consciousness using a bottom-up approach based on the evolutionary record (Cloninger 2009)**
- **The foundation of the description of human thought comes from**
  - **Description of the structure and dynamics of personality**
  - **Description of the structure and dynamics of human thought**
  - **Phylogeny of human brain functions**

Cloninger CR, Austr NZ J Psychiatry 43: 995-2006, 2009

- **<u>Personality is…</u>**
  - **the way people learn and adapt**
  - **the self plus the internal and external forces that pull on the self**
  - **the "dynamic organization within the individual of the psychobiological systems by which the person both shapes and adapts uniquely to an ever-changing internal and external environment" (Cloninger 2004)**

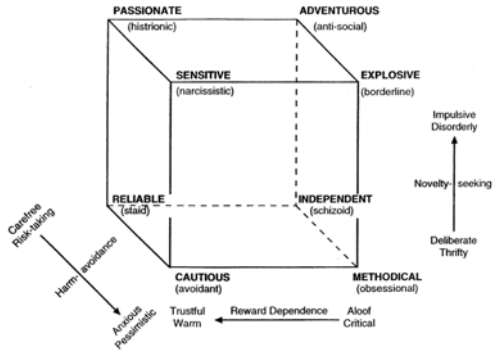
- **Dynamical – non-linear and adaptive, not linear or fixed**
- **Psychobiological – involves body (soma), analytical mind (thought), and intuitive and creative mind (psyche)**
- **Organized – there is a universal structure shared by human beings that allows us to understand one another and to communicate**
- **Personal (Intrapsychic) – adaptive processes occur WITHIN the individual, not between persons**
- **Idiographic – each person is unique in the development of their life narrative**

The Psychobiological Model of Personality (Cloninger 1993)



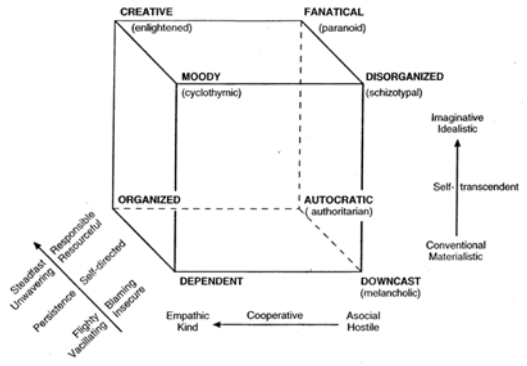
- Harm Avoidance
  - High: anxious, depressive, internalizing disorders (Cluster C)
  - Low: risk-taking, externalizing disorders
- Novelty Seeking
  - High: impulsive, irritable, craving (Cluster B)
  - Low: rigid, internalizing disorders
- Reward Dependence
  - High: sociable or rejection-sensitive
  - Low: aloof, cold (Cluster A)
- Persistence
  - High: ambitious, perseverating (Obsessive disorders)
  - Low: phlegmatic, inactive, easily discouraged

The Temperament Cube (Cloninger 1987)



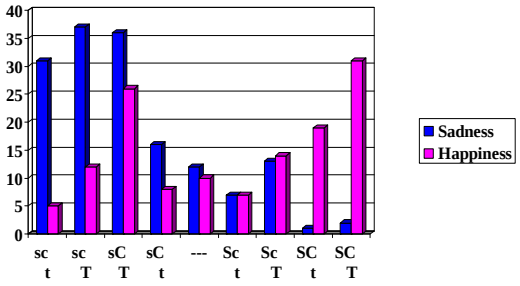
- **Executive Functions (Self-directedness)**
  - **responsible, purposeful, resourceful**
- **Legislative Functions (Cooperativeness)**
  - **flexible, helpful, compassionate**
- **Judicial Functions (Self-transcendence)**
  - **judicious, insightful, intuitive**

The Character Cube (Cloninger 1993)



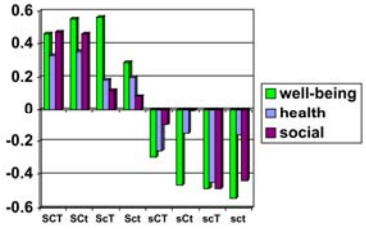
Character and Subjective Well-Being

- **Happiness and Sadness depend on all 3 TCI character dimensions**



Cloninger, Feeling Good: The Science of Well-Being, 2004

Emotional, Physical, and Social Well-being depend on Character Profiles

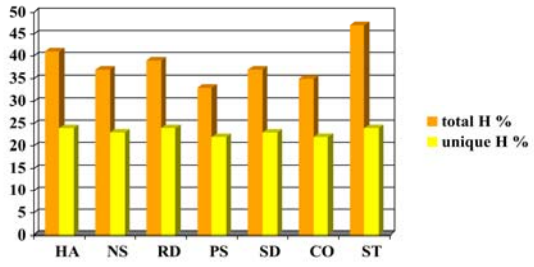


Zohar & Cloninger, JAD 2010

- **Prospective studies of TCI show strong stability in all dimensions (r = .7-.8 over 1 year,10 years, or more)**
- **Stability is comparable to heritability of all TCI dimensions (each about 50% heritable)**
- **Change in configuration occurs as a non-linear dynamical process**
- **Conditions for activating change were initially unclear – could not predict who would change from their current configuration without treatment**

Cloninger et al, 1988; Cloninger et al, 1997; Keltikangas-Jarvinen et al, 2008

- **Australian study of 4562 twins**



Gillespie et al, 2003

Environmental effects

Environmental roots	ADULTHOOD TEMPERAMENT (NS, HA, RD)
Genetic roots	
G X E	

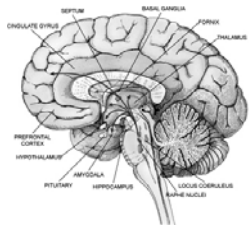
Punitive Control of Child
- **Strict and unsystematic disciplinary style**
- **Low tolerance**
- **Emotional distance**

⇨ **Adulthood NS**

Affectionless Neglect of Child
- **Emotional rejection**
- **Maternal neglect**
- **Maternal life-dissatisfaction**

⇨ **Adulthood HA**

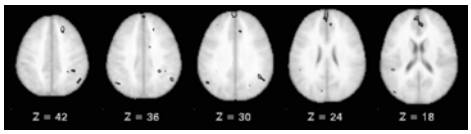
Keltikangas-Jarvinen et al, 2004, 2009

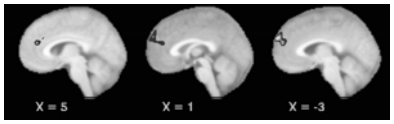


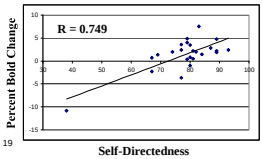
HA explains 30% variance in Amygdala-Cingulate Connectivity (Pezawas et al, 2005)

Munch's "The Scream"

Self-Directedness and the Pre-Frontal Cortex

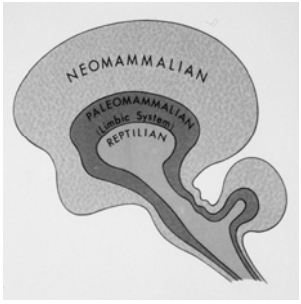






Self-Directedness versus Percent Bold Change in Left Dorsal MPFC (Active –Control)

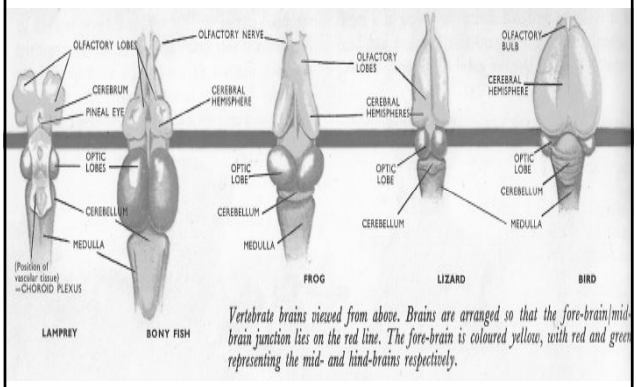
Gusnard et al, 2001



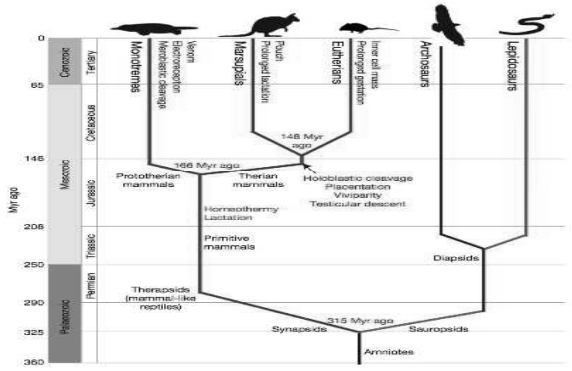
- Triune brain has 3 evolutionary aspects
  - Reptilian: Habits & Skills
  - Mammalian: Emotion & Thought
  - Human: Self-Aware Perception
- The 3 aspects communicate and function as one
- The components are interconnections among modules, not separate parts
- Evolved functions are always adaptive – whether they are healthy depends on goals and values of person and sociocultural and ecological context

Clade	Emergent Functions	Emergent Structures
0 – Craniates	Paired sensory organs in head	Skull and neural crest tissues. Peripheral nervous system, endocrine system, paired sense organs in head.
1-a - Early Vertebrates (fish, amphibians)	Associative conditioning well-developed; reproduce in water	All cranial nerves present. Midbrain is central integrator of input-output
1-b – Amniotes	Tetrapods on land, breathing oxygen, amnion protecting fetus	Reptile brain centrally regulated by hypothalamus without thalamo-cortical feedback to or control of hypothalamus. Dorsal cortex is single layer of pyramidal cells.

Evolution of the Vertebrate brain: Fish to Reptile & Bird



Vertebrate brains viewed from above. Brains are arranged so that the fore-brain/mid-brain junction lies on the red line. The fore-brain is coloured yellow, with red and green representing the mid- and hind-brains respectively.



Warren et al, Nature (2008)


Long-nosed spiny anteater

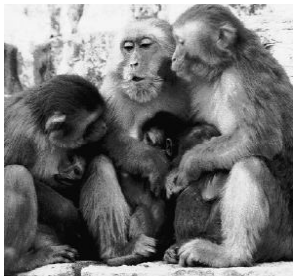

Pentailed treeshrew

Clade	Emergent Functions	Emergent Structures
2a-non-placental mammals	Warm-blooded, skin with hair and glands, including milk; sexually prolific, foraging for food is main activity	6-layered neocortex with cortical control of sexual copulation. All special senses represented neocortically, but most neocortex processes touch with no separate motor areas
2b- placental mammals	Live young that require little maternal care, able to restrain sexual activity according to food supply	Somatosensory, motor and premotor areas differentiated in neocortex

Carpolestes simpsoni

Lemur

Clade	Emergent Functions	Emergent Structures
3a - protoprimates	Enhanced physical agility to grasp food and maternal care of young	(fossils only – functions suggest similar to prosimians except eyes not forward directed)
3b – strepsirhines (e.g. lemurs)	Nocturnal solitary foragers with skill in finding and selecting food	Taste is processed in primary gustatory cortex prior to hypothalamic or amygdalar input. Expanded parietal cortex for eye-hand coordination VMH feeding for reproduction. DPIC supports awareness of affective aspect of sensation.



2 Rhesus reconciling after a fight with alpha mom mediating

Chimps kissing after a fight

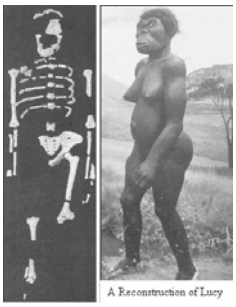
De Waal, 2000

Clade	Emergent Functions	Emergent Structures
4a – haplorhines (e.g. monkeys)	Diurnal and social with increased metabolic rate able to support larger body and brain. Enduring social relationships, much time in social activities of large groups. Cooperative socially and reconcile after fights.	PFC expands and projects directly to hypothalamus, thalamus, septum, basal amygdala, and striatum. Mirror Neuron System appears in monkeys, allowing mirroring of observed behaviors by neurons in speech motor area, ventral premotor area and IPL. Affective information relayed to Middle Insular Cortex for regulation of sensuality.

Young macaque learned to wash sweet potatoes on island of Koshima, Japan. The habit spread to the whole population and descendents still pass on the tradition

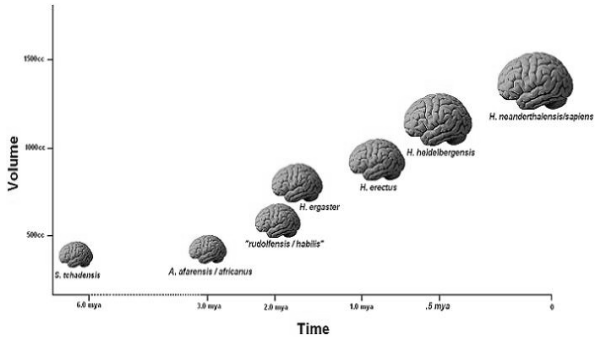
De Waal, 1999

Clade	Emergent Functions	Emergent Structures
4b – apes	Highly social, warm emotional expression and affectivity, flexible dominance hierarchies, imitation learning. Have frequent cultural transmission of traditions. Bipedal walking in Australopiths.	Somatosensory processing more serial for greater depth. IPL differentiated for cross-modal integration. AIC and ACC reciprocally connected by Von Economo neurons Mirror Neurons present in Broca's area and IPL. AIC differentiated for emotional awareness, which supports the communication of social emotions.

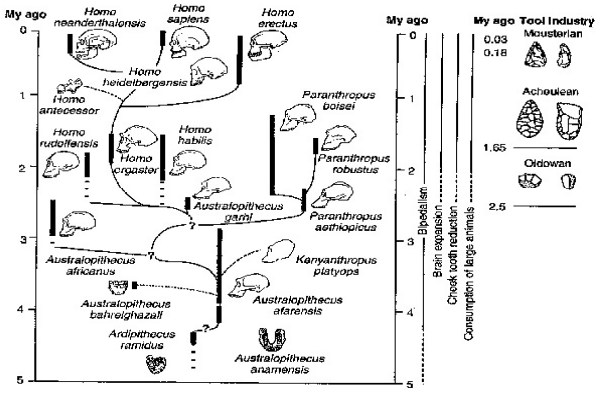


Bipedal ape – 3-4 mya

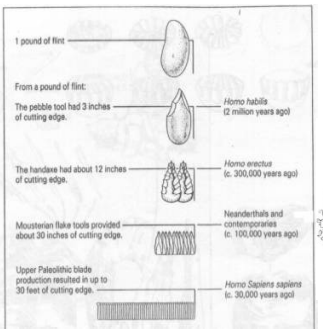
Laetoli footprints



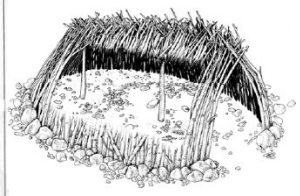
Tattersall, 2008



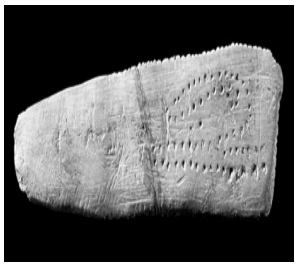
Clade	Emergent Functions	Emergent Structures
5a – early Homo (H. habilis, ergaster, erectus)	Tool-making, refined gesture and vocalization, ability to walk long distances efficiently	Hemispheric asymmetry, particularly around lateral sulcus in regions related to language, enlarging prefrontal cortex but no angular gyrus for language with syntax
5b – mid Pleistocene hominids (H. heidelbergensis, neanderthalensis, pre-modern hominids)	Artistic craftsmanship, long-term planning, shelter building, fire domesticated, division of labor and sharing in hunter-gather culture	Increasing size of prefrontal cortex for problem solving and planning; Default Mode Network for day-dreaming, global attention, and on-the-spot problem solving.



Increasing cutting ability of Mode 1-3 stone tools, 2000 (1), 800 - 300 (2), 100 (3) kya



Shelter with hearth, Terra Amata, France, 400 kya



Lunar cycle on bone,
Blanchard, France 30 kya

Cave paintings,
Lascaux, France 32-16 kya

Clade	Emergent Functions	Emergent Structures
7 – modern Homo sapiens	Self-awareness with syntactical language, art, science, and spirituality	Auto-noetic awareness depends on a distributed fronto-temporo-parietal network with encoding in the hippocampus. The same regions are most recently differentiated in evolution and are late in myelinating. Essentially the whole neocortex becomes a functional whole by linking all association areas through projections of the visual system

Clade	Emergent Brain Network	Major Voluntary Function	Component Functions
Early mammals	Somatosensory neocortex regulating sexuality	Mating	Sex drive Foraging/craving
Early primates	Differentiation of sensori-motor and taste neocortex	Physicality	Rhythmicity Agility Sensory Discrimination
Anthropoid primates	Prefrontal cortex regulating limbic system; Von Economo neurons in AIC/ACC; Mirror neuron system	Mood	Closeness Reconciliation Traditions

Clade	Emergent Brain Networks	Major Voluntary Function	Component Functions
Early Homo	Auditory association cortex regulates cross-modal symbolism; Brain Default Mode network regulates attention and daydreaming; fronto-parietal perceptual-motor praxis system permits refined tool-making	Meaning	Planning Handicraft Gesture
Modern Homo sapiens	Auto-noetic system unifying fronto-temporo-parietal association areas, linked by visual projection system	Unity	Harmony Art Science Spirituality

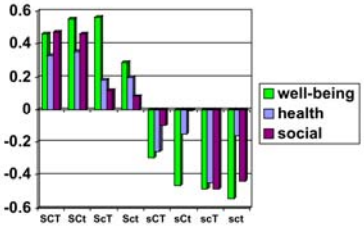
Plane	Sexual Subplane	Material Subplane	Emotional Subplane	Intellectual Subplane	Spiritual Subplane
Spirituality					**Unity**
Intellectual				**Meaning**	
Emotional			**Mood**		
Material		**Physicality**			
Sexual	**Mating**				

Plane	Sexual Subplane	Material Subplane	Emotional Subplane	Intellectual Subplane	Spiritual Subplane
Spirituality	Moderation ST2	Spontaneity	Altruism ST3	Dialogue	**Unity**
Intellectual	Planning ritual PS	Handicraft symmetry SD	Rapport sharing CO	**Meaning privacy**	Diplomacy ST1
Emotional	Intimacy attachment RD123	Motive traditions	**Mood reconcile**	Appeal leaders	Humor
Material	Parenting maternal care HA	**Physicality agile rhythmic**	Sensibility singing NS	Gesture drama	Charity RD4
Sexual	**Mating foraging**	Gratification risk-taking	Sensuality seduction	Community chivalry	Trust

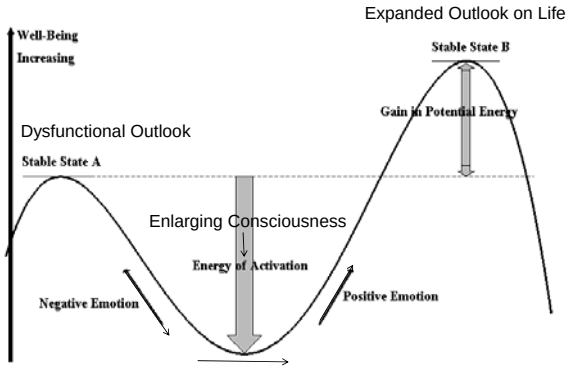
- Sexual behaviors
- Nutrition
- Physical activity and exercise
- Interpersonal relations/support
- Safe use of medications & alcohol
- Self-responsibility for health
- Stress management, rest, & sleep
- Smoking avoidance or cessation
- Accident or injury prevention
- Spiritual growth, fulfillment of potential

Malone AM & Walker SN, Measuring healthy Lifestyle, 2004

Emotional, Physical, and Social Well-being depend on Character Profiles



Zohar & Cloninger, 2009

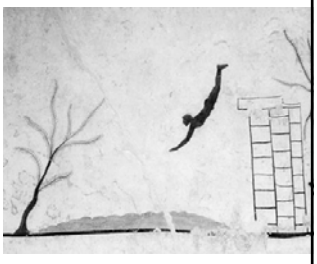


- **Evidence-based treatments that promote physical health and well-being are highly diverse (Bertisch et al, 2009; Chiesa & Serretti, 2009; Servan-Schreiber, 2005)**
  - **Physical exercise, diet, sleep hygiene, deep breathing exercises**
  - **Relaxation, guided imagery, meditation**
- **Effectiveness of conventional and alternative treatments are often indistinguishable, suggesting a common mechanism is being influenced by complementary pathways**
- **The common mechanism is activated by person-centered care, which promotes self-awareness, empathy, and well-being**
- **Person-centered care is characterized by humanistic dialogue that expresses an outlook of connectedness or unity, which promotes hope, empathy, and respect**
- **Self-awareness leads to health as a state of physical, emotional, social, and spiritual well-being (WHO, 1946)**

- **Awareness of the personality and health of the patient**
- **Establish a working alliance with shared goals**
- **Are doctor & patient calm and respectful?**
  - **Reassurance and relaxation to permit acceptance and reasoning with courage, honor, and compassion**
- **Are doctor and patient empathetic and reflective?**
  - **Encourage reflection through empathetic dialogue with fairness, wisdom, and hope**
- **Are doctor and patient genuinely humble and aware of how and why to promote health wholeheartedly?**
  - **Promote well-being through genuine humility and awareness with moderation, patience, and faith**

- **The 3 principles of coherent living in well-being:**

1. **Working in service of others**
   - **Enjoy giving of yourself**
   - **Be respectful & kind**
2. **Letting go**
   - **Don't fight or worry**
   - **Be empathic & reflective**
3. **Growing in awareness**
   - **Be happy to adapt and to learn constantly**
   - **Be genuine & humble**



Diver of Paestum

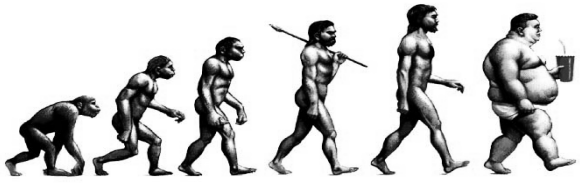
- **To optimize the quality and efficiency of personal interaction, adjunctive tools are available to assist busy doctors and to provide extended access to education and support for the patient**
- **Reliable measurement of personality and emotionality – Temperament and Character Inventory (TCI) and other tests**
- **Educational videos to teach relaxation, meditation, and lifestyle principles in an inspiring and enjoyable way – Know Yourself DVD series**
- **Light and inspiring recreational materials that promote well-being – Sophiarte Music, Movies**
- **In the near future there will also be opportunities for professional development and training in Coherence Therapy.**

http://anthropedia.org

Learn more about the TCI and Coherence Therapy at psychobiology.wustl.edu

TCI

… and more about the *Know Yourself* DVD series and other therapeutic tools at anthropedia.org



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