

NEURODYNAMICS OF CONSCIOUSNESS AND CULTURES

from a single mind to cultures and coalitions

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STRUCTURE OF THE MIND



- **Concepts**
 - Models of objects, their relations, and situations
 - Evolved to satisfy instincts
- **Instincts**
 - Internal sensors (e.g. sugar level in blood)
- **Emotions**
 - Neural signals connecting instincts and concepts
 - e.g. a hungry person sees food all around
- **Behavior**
 - Models of goals (desires) and muscle-movement...
- **Hierarchy**
 - Concept-models and behavior-models are organized in a “loose” hierarchy



THE KNOWLEDGE INSTINCT



- **Model-concepts always have to be adapted**
 - lighting, surrounding, new objects and situations
 - even when there is no concrete “bodily” needs

- **Instinct for knowledge and understanding**
 - **Increase similarity** between models and the world

- **Emotions related to the knowledge instinct**
 - Satisfaction or dissatisfaction
 - **change in similarity** between models and world
 - Related not to bodily instincts
 - harmony or disharmony (knowledge-world): aesthetic emotion



CONSCIOUSNESS AND UNCONSCIOUS



- **Dynamic logic: maximizes similarity and satisfies the KI**
 - Vague-fuzzy concept-models evolve into crisp models
- **Consciousness, unconscious, and emotions**
 - Vague-fuzzy models are unconscious and emotional
 - Crisp models are adapted, conscious, unemotional
- **Jung: conscious concepts and unconscious archetypes**
- **Grossberg: models attaining a resonant state (winning the competition for signals) reach consciousness**



EVOLUTION OF CULTURES



- The knowledge instinct
 - Two mechanisms: **differentiation and synthesis**
- Differentiation
 - More **detailed, conscious** concepts
 - Measure by ~ number of words
- Synthesis
 - Knowledge has to have meaning, otherwise it is useless
 - **Connect concepts and emotions**
 - Measure by ~ strength of emotions per word



CULTURAL EVOLUTION MATH MODEL



■ Differentiation, synthesis, hierarchy

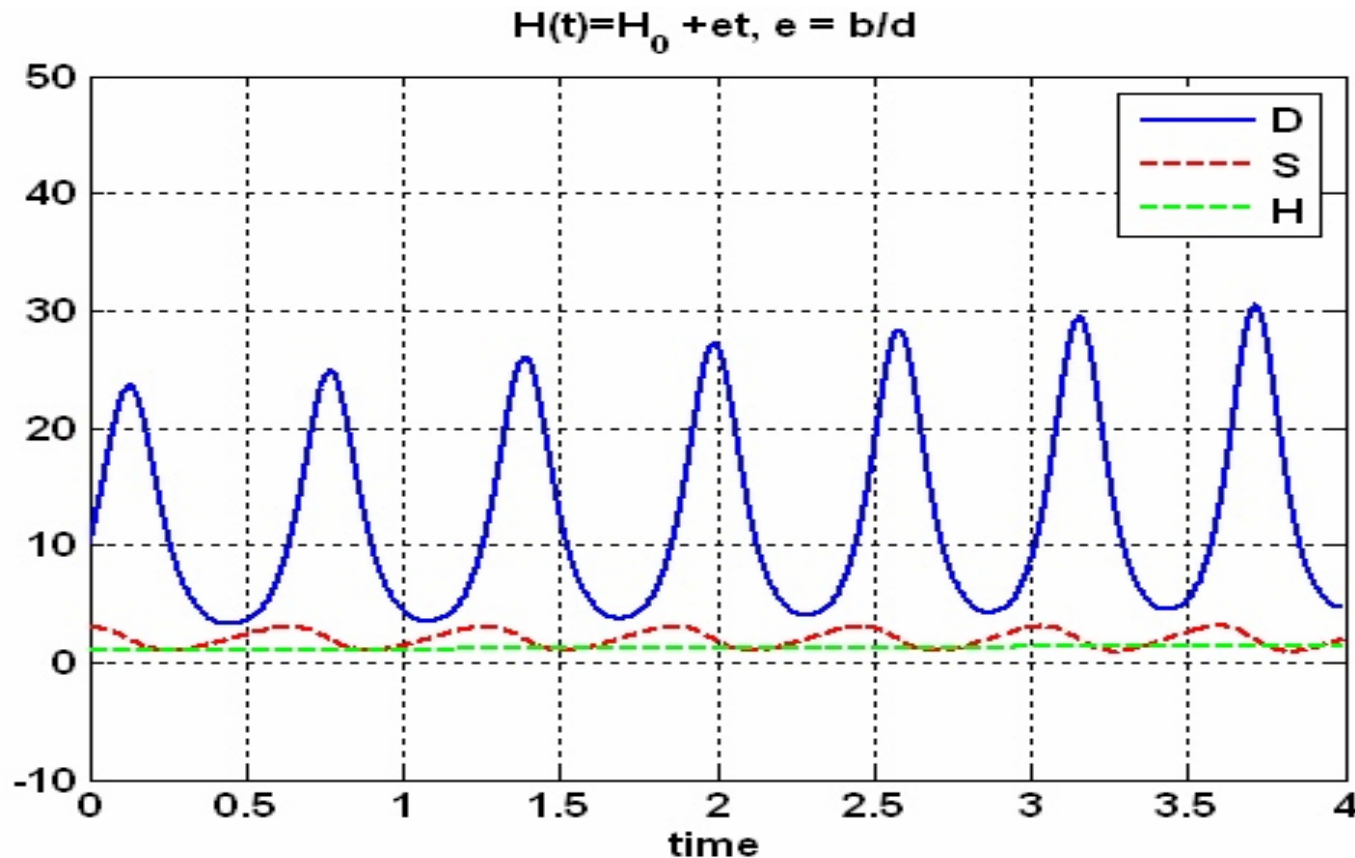
$$dD/dt = a D G(S); \quad G(S) = (S - S_0) \exp(-(S - S_0) / S_1)$$

$$dS/dt = -bD + dH$$

$$H = H_0 + e^*t$$



DYNAMIC CULTURE

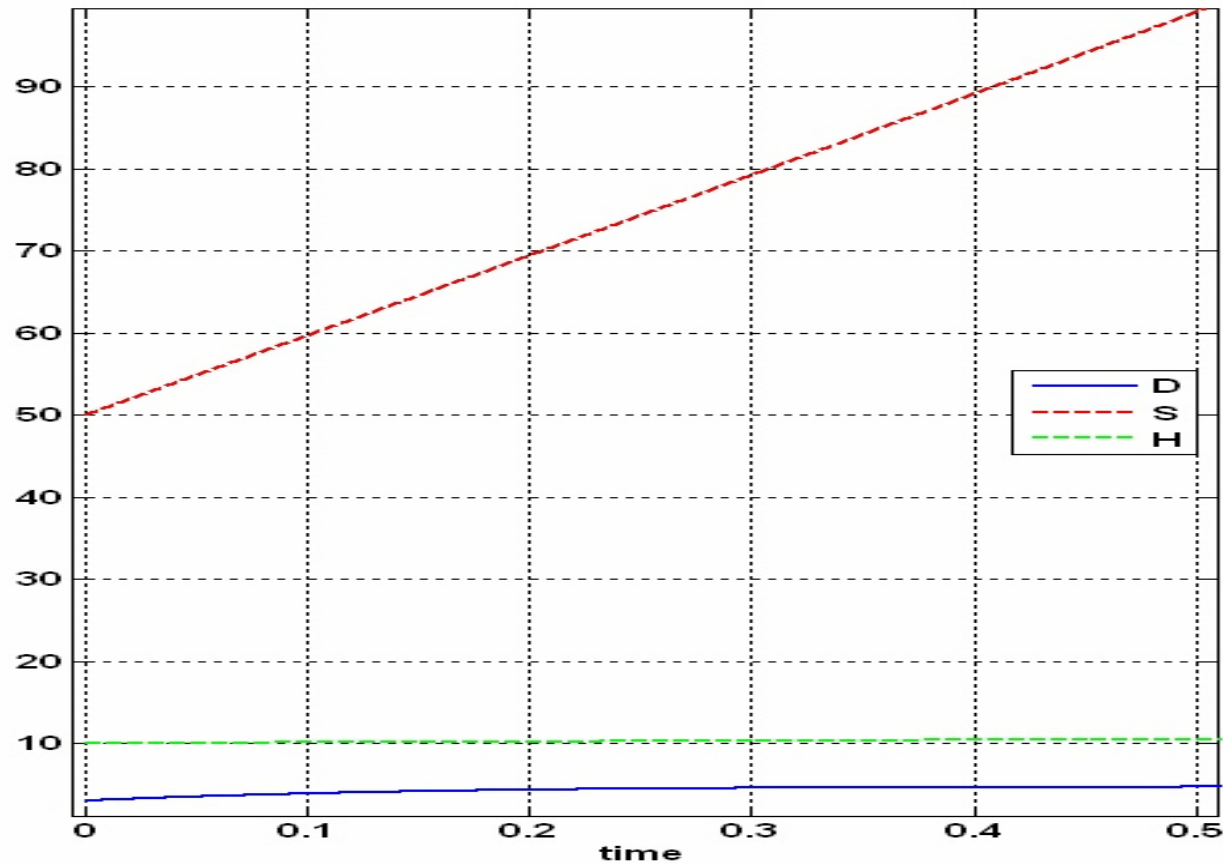


Average synthesis, high differentiation; oscillating solution

Knowledge accumulates; no stability



TRADITIONAL CULTURE



High synthesis, low differentiation; stable solution

Stagnation, stability increases



CULTURE AND LANGUAGE



- Animal consciousness
 - Undifferentiated, few vague concepts
 - No mental “space” between thought, emotion, and action
- Evolution of human consciousness and culture
 - More differentiated concepts
 - **More mental “space” between thoughts, emotions, and actions**
 - Created by evolution of language
- Language, concepts, emotions
 - Language creates concepts, separates them from emotions
 - Still, colored by emotions, in language sound



LANGUAGE: EMOTIONS AND CONCEPTS



- Conceptual content of culture: words, phrases
 - Easily borrowed among cultures
- Emotional content of culture
 - In voice sound (melody of speech)
 - Determined by grammar
 - Cannot be borrowed among cultures
- English language (Diff. > Synthesis)
 - Weak connection between conceptual and emotional (since 15 c)
 - Pragmatic, high culture, but may lead to identity crisis
- Arabic language (Synthesis > Diff.)
 - Strong connection between conceptual and emotional
 - Cultural immobility, but strong feel of identity (synthesis)



TERRORIST'S CONSCIOUSNESS



- Ancient consciousness was “fused”
 - Concepts, emotions, and actions were one
 - Undifferentiated, fuzzy psychic structures
 - Psychic conflicts were unconscious and projected outside
 - Gods, other tribes, other people

- Complexity of today’s world is “too much” for many
 - Evolution of culture and differentiation
 - Internalization of conflicts: too difficult
 - Reaction: relapse into fused consciousness
 - Undifferentiated, fuzzy, but simple and synthetic

- The recent terrorist’s consciousness is “fused”
 - European terrorists in the 19th century
 - Fascists and communists in the 20th century
 - Current Moslem terrorists



INTERACTING CULTURES



■ Two cultures

- dynamic and traditional
- slow exchange by D and S

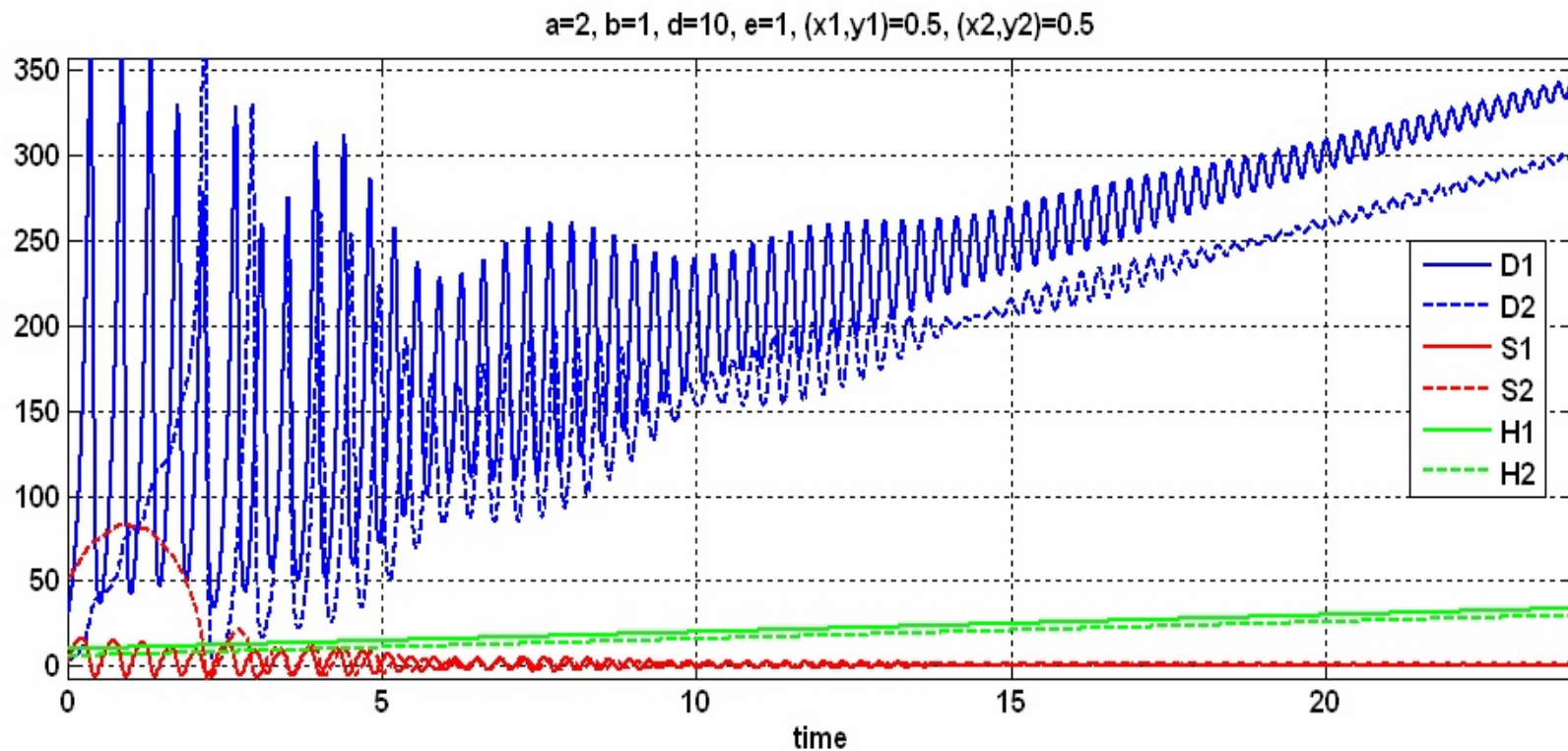
$$dD_k/dt = a_k D_k G(S_k) + x_k D_{\underline{k}}$$

$$dS_k/dt = -b_k D_k + d_k H_k + y_k S_{\underline{k}}$$

$$H_k = H0_k + e_k * t$$



INTERACTING CULTURES



- 1) Early: Dynamic culture affects traditional culture, no reciprocity
- 2) Later: 2 dynamic cultures stabilize each other

Knowledge accumulation + stability



MUSIC IN EVOLUTION OF CONSCIOUSNESS AND CULTURES



- **Melody of human voice** contains vital information
 - About people's world views and mutual compatibility
 - Exploits mechanical properties of human inner ear
 - Consonances and dissonances
- **Tonal system** evolved (14th to 19th c.) for
 - Differentiation of emotions
 - Synthesis of conceptual and emotional
 - Bach integrates personal concerns with “the highest”
- **Pop-song** is a mechanism of synthesis
 - Integrates conceptual (lyric) and emotional (melody)
 - Also, differentiates emotions
 - Bach concerns are too complex for many everyday needs
 - Human consciousness requires synthesis immediately
- **Rap** is a simplified, but powerful mechanism of synthesis
 - Exactly like ancient Greek dithyramps of Dionysian cult



PUBLICATIONS



250 publications

**OXFORD UNIVERSITY PRESS
(2001; 3rd printing)**

Future, 2007:

**The Knowledge Instinct
Basic Books**

**Neurodynamics of High
Cognitive Functions
with Prof. Kozma, Springer**

**Sapient Systems
with Prof. Mayorga, Springer**

