How Neuroscience Can Illuminate the Nature of the Human Emotional Feelings:

To understand key psychiatric Issues we need a cross-species neuroscientific understanding of neglected topics such as Sadness and Joy

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College of Veterinary Medicine
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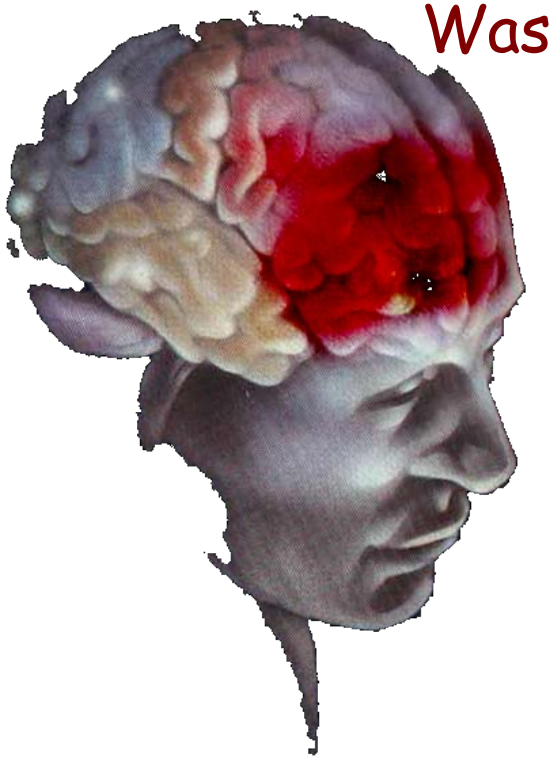

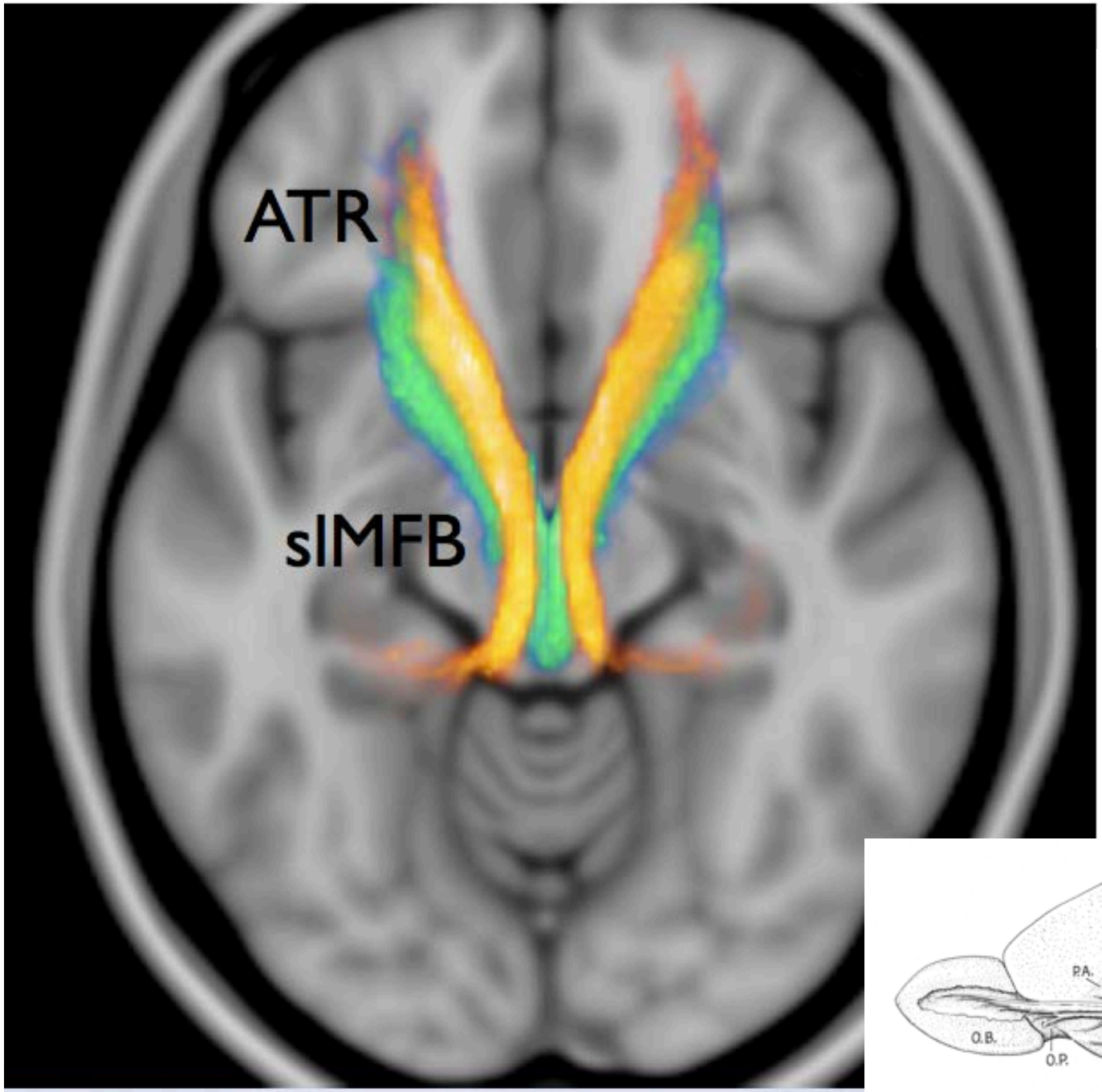
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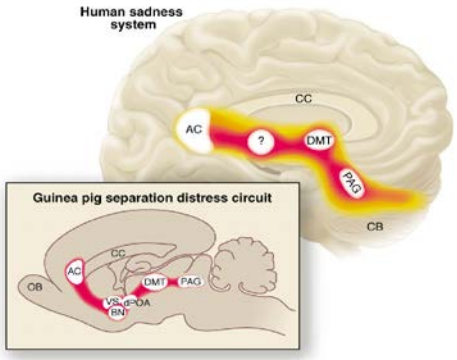
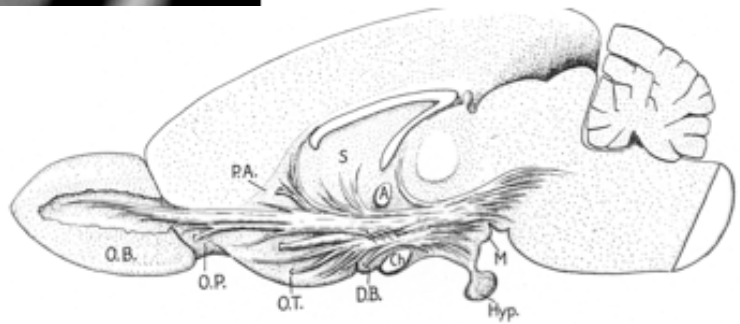

Human sadness system
CC
AC
?
DMT
PAG
CB
Guinea pig separation distress circuit
CC
AC
OB
DMT
PAG
VS
POA
BN


P.A.
S
O.B.
O.P.
O.T.
D.B.
M
Hyp.

Why study Emotional Feelings?

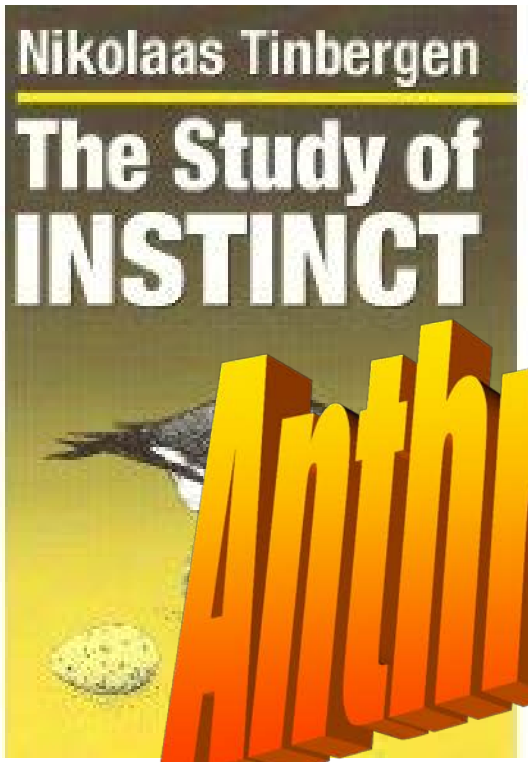
1. We are all curious about our own powerful feelings.
2. Most animal lovers are convinced animals have feelings
3. Most scientists are skeptical that animal feelings can be studied: (LeDoux, 2012: "We will never know what an animal feels.'
4. But Feelings (Affects) Evolved. They are a natural part of all our minds, and we are animals.
5. Affective feelings always feel "good" or "bad" to humans
6. And animals can tell us whether certain brain systems are "rewarding" or "punishing"—namely "good" or "bad"
7. If we understand their basic feelings we will finally begin to understand our own.

So What are we Waiting for?

Early Ethological Perspective

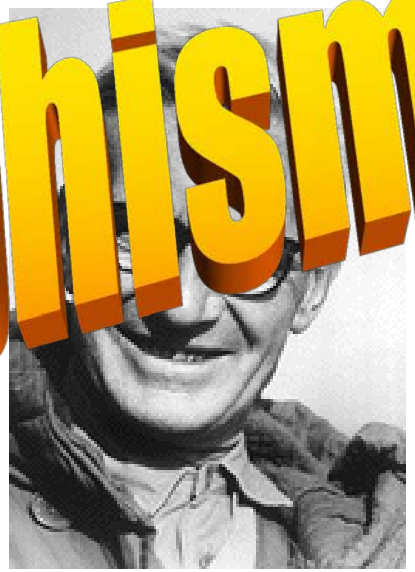
"Because subjective phenomena cannot be observed objectively in animals, it is idle to claim or deny their existence" *Tinbergen, 1951, p. 4*

Marian Dawkins (June 2012).
"there is nothing to say that the emotion of fear has to be consciously experienced."

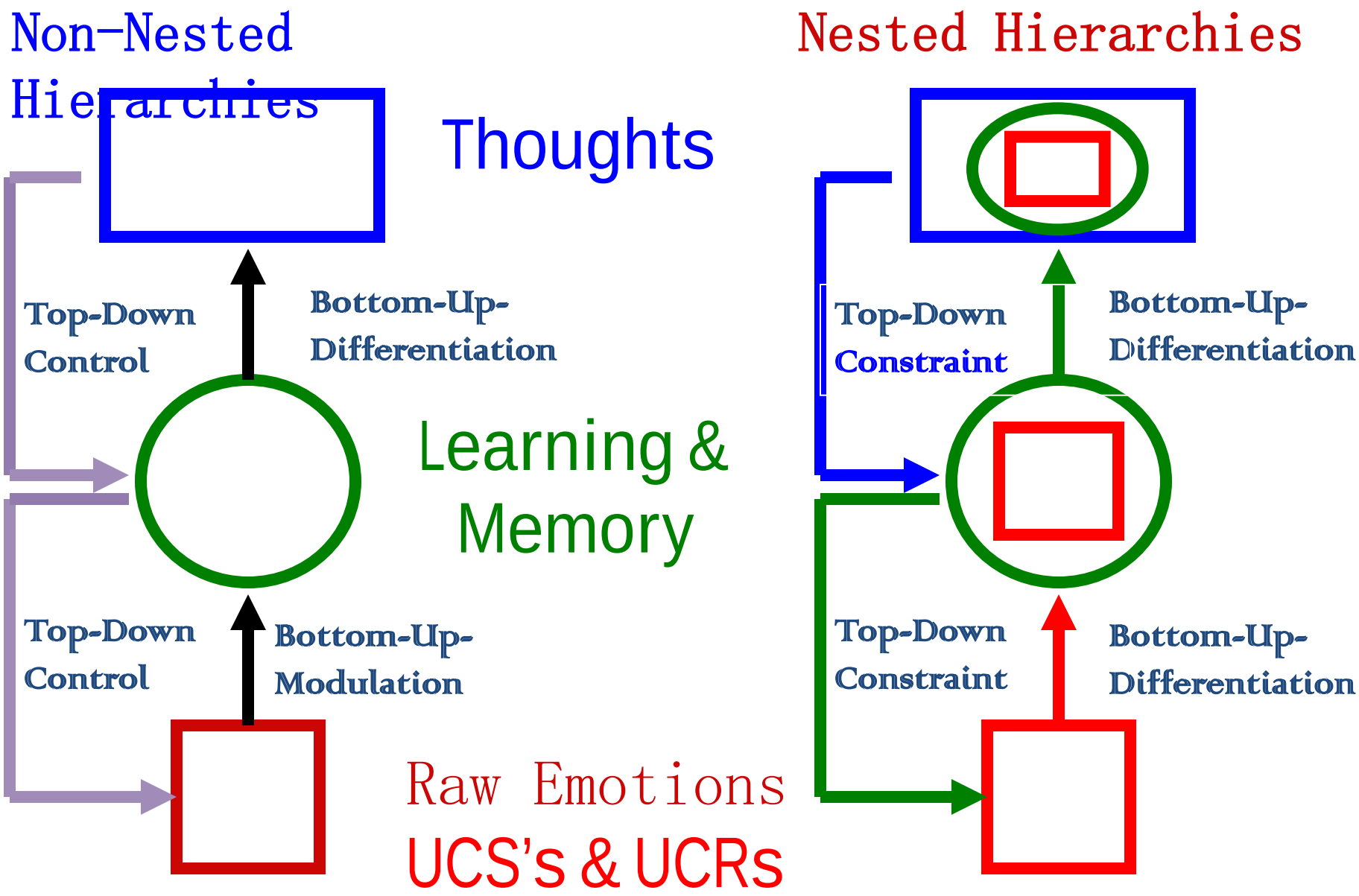


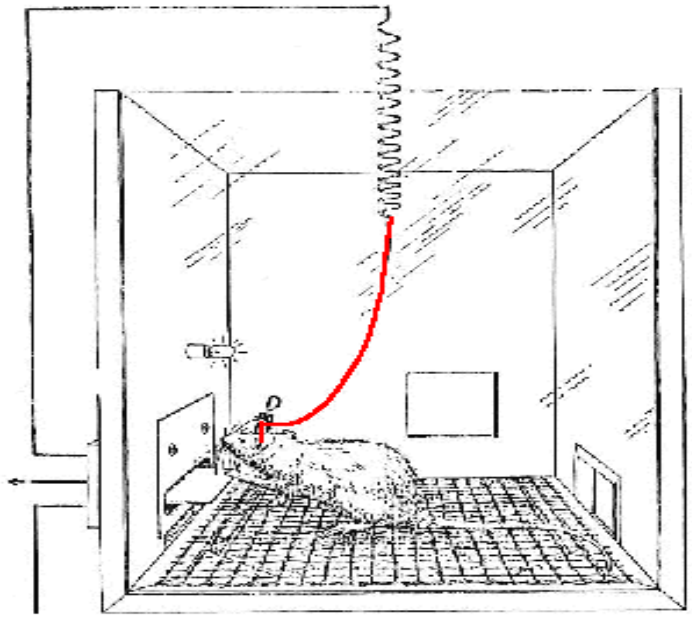
Anthrop

phism



Different Forms of BrainMind Hierarchies





Reward Prediction Error

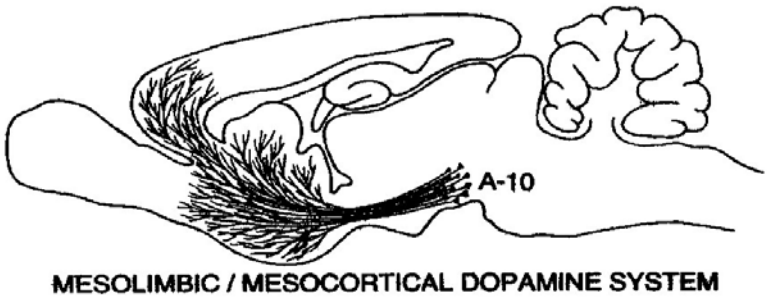
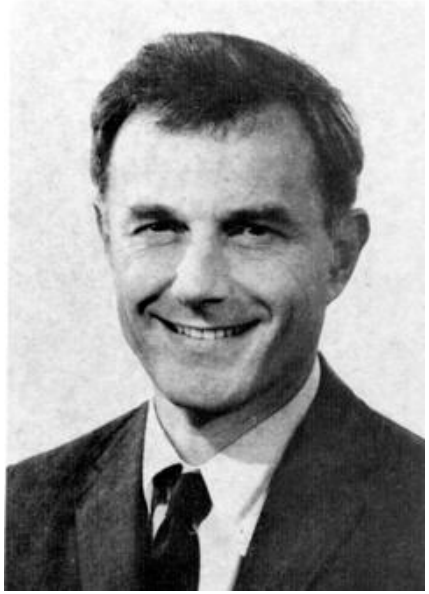


Fig. 3.6. AN

‘wanting’

SEEKING System

Jim Olds & Milner (1954)



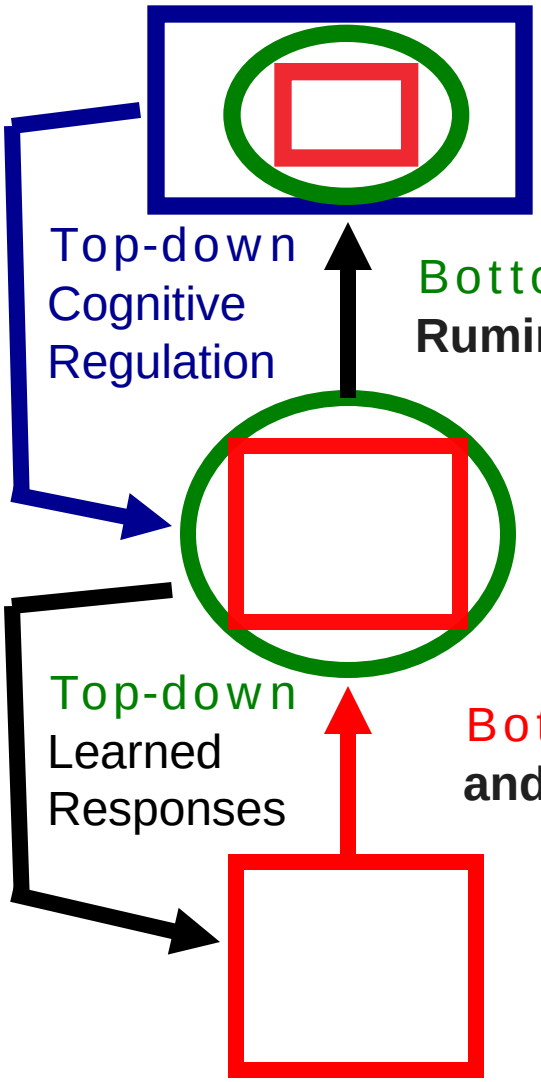
Reward,
Pleasure,

Reinforcement
System

Sniffing
Exploration
Foraging
Predation

Fig. 8.6. AN

Two-Way or "Circular" Causation



Reward Prediction Error

Tertiary-Process Cognitions

Largely Neocortical

Top-down Cognitive Regulation

Bottom-Up **Influences on Ruminations and Thoughts**

'Wanting'

Secondary-Process Learning

Largely Upper Limbic

Top-down Learned Responses

Bottom-Up **Learning and Development**

SEEKING

Primary-Process Emotions

Affects Deeply Subcortical

Nested BrainMind Hierarchies **(Ancestral Origins of Mind)**

Contents lists available at ScienceDirect

Neuroscience and Biobehavioral Reviews

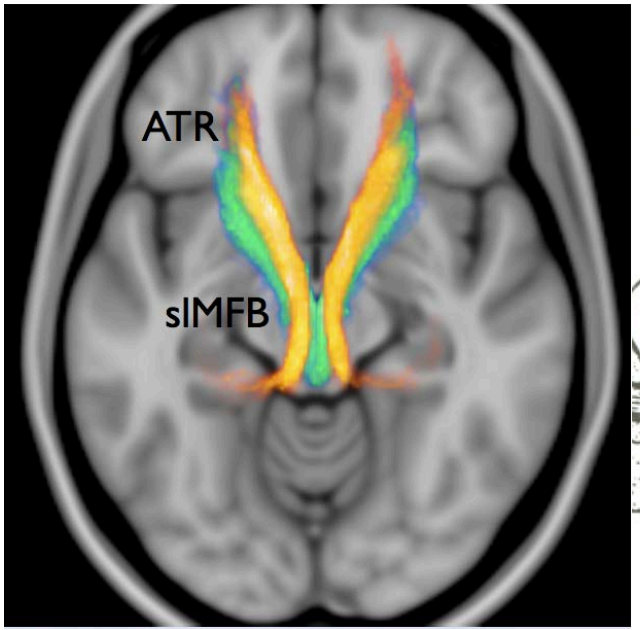
journal homepage: www.elsevier.com/locate/neubiorev

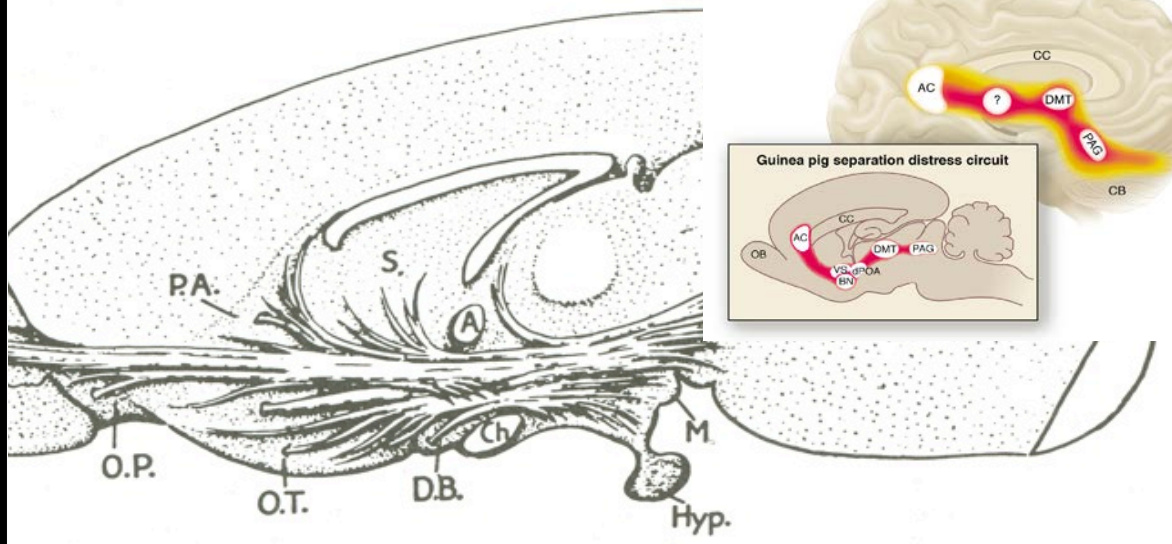
Review

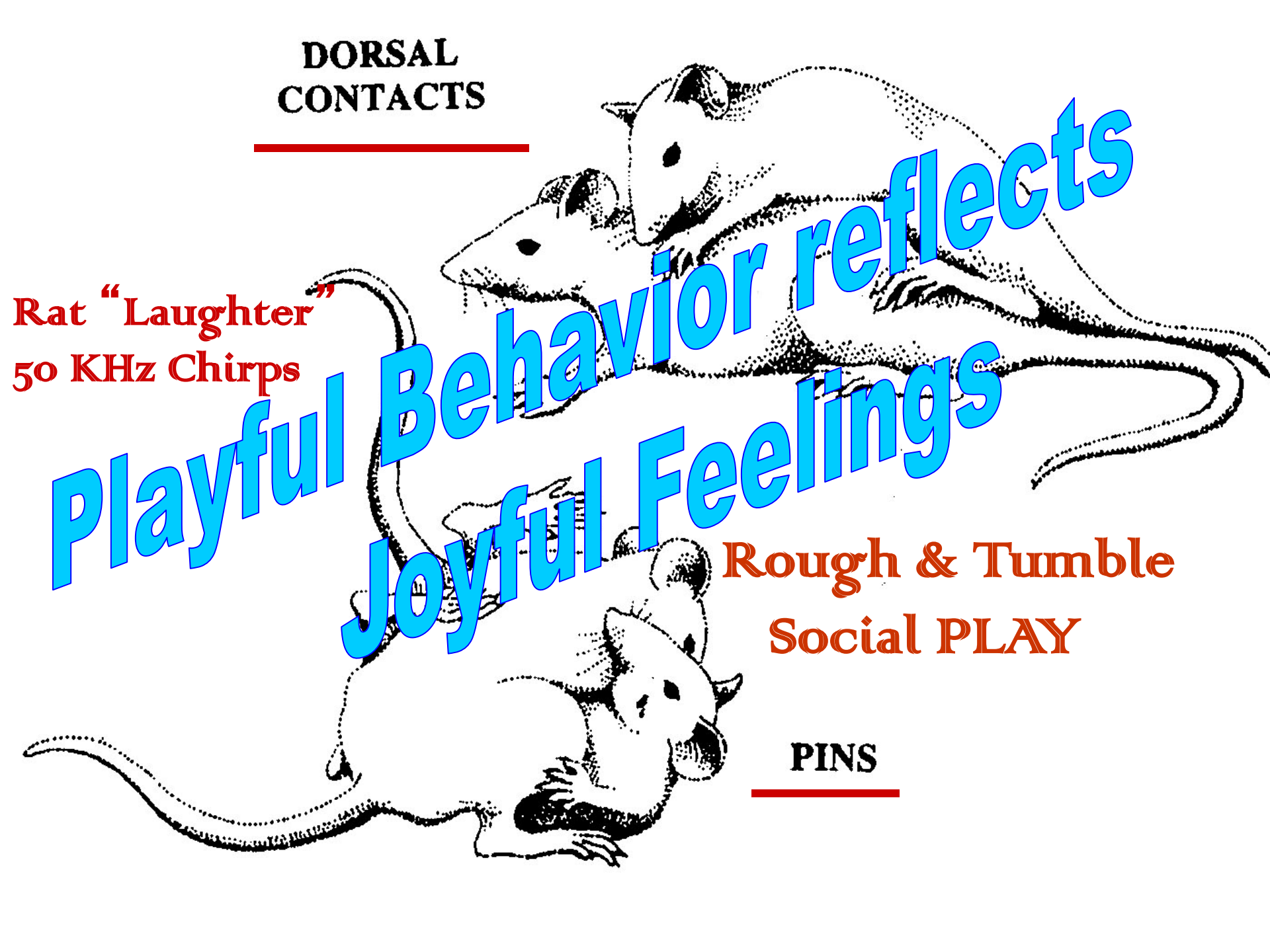
Cross-species affective functions of the medial forebrain bundle—Implications for the treatment of affective pain and depression in humans☆

Volker A. Coenen[a], Thomas E. Schlaepfer[b,c,*], Burkhard Maedler[a], Jaak Panksepp[d] (2011)

[a] Stereotaxy and MR-based OR-techniques/Department of Neurosurgery, Germany
[b] Department of Psychiatry and Psychotherapy, University Hospital Bonn, Germany
[c] Departments of Psychiatry and Mental Health; The Johns Hopkins University, Baltimore, MD, USA
[d] Department of Comparative Anatomy, Physiology and Pharmacology, College of Veterinary Medicine, Washington State University, Pullmann, WA 99163, USA






DORSAL
CONTACTS
Rat "Laughter"
50 KHz Chirps
Playful Behavior reflects
Joyful Feelings
Rough & Tumble
Social PLAY
PINS

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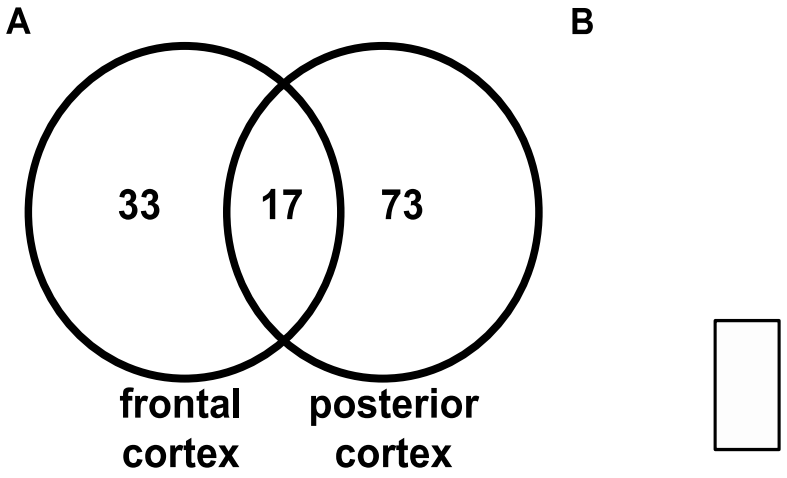
journal homepage: www.elsevier.com/locate/neubiorev

Review

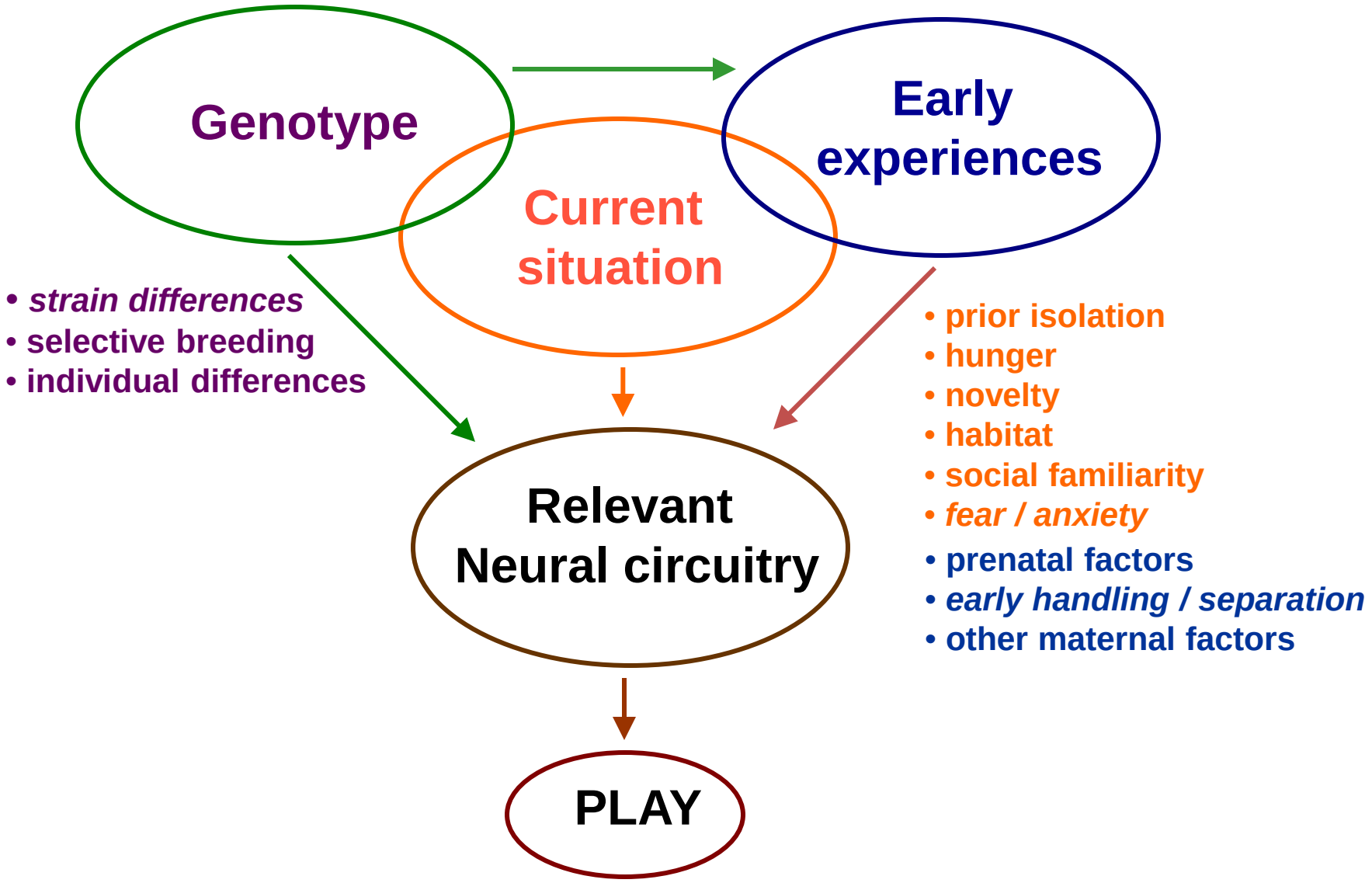
Frequency-modulated 50 kHz ultrasonic vocalizations a tool for uncovering the molecular substrates of positive affect

Jeffrey Burgdorf[a,*], Jaak Panksepp[a,b], Joseph R. Moskal[a] (2011)

[a] The Falk Center for Molecular Therapeutics, Department of Biomedical Engineering, The McCormick School of Engineering and Applied Sciences, Northwestern University, Evanston, IL 60201, USA
[b] Department of Veterinary Comparative Anatomy, Physiology, and Pharmacology, College of Veterinary Medicine, Washington State University, Pullman, WA 99163, USA



A conceptual framework for studying play in the rat and summary of last 30 years of work.

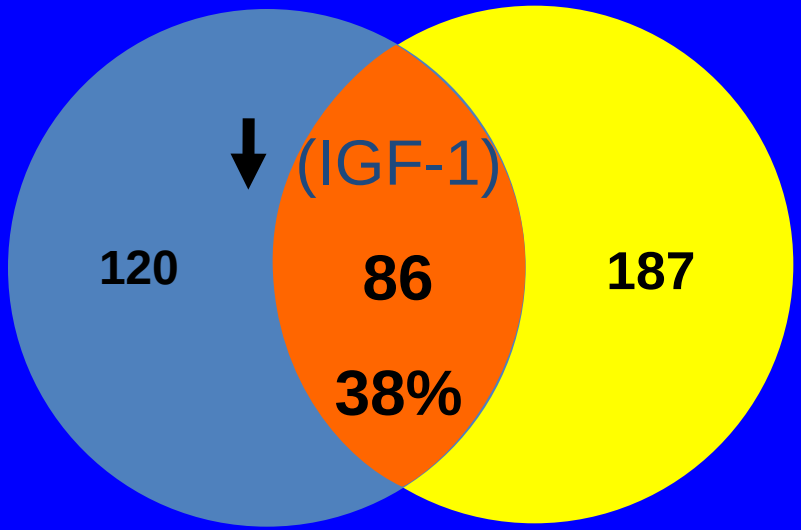
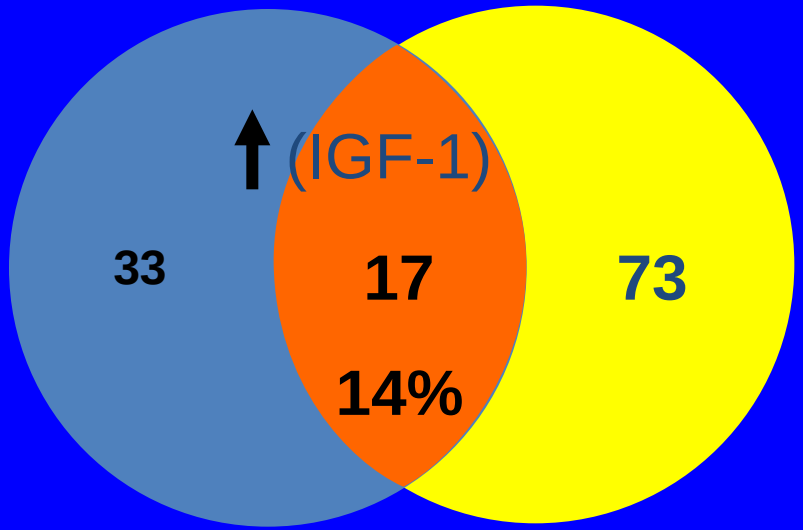


Brain Gene Expression Micro-arrays

Following PLAY

(1,200 genes)

1 Hour Time Point



6 Hour Time Point