The Core of Learning –
The Mirror Neuron System

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MC / EHF
Mirror Neurons

LEARNING

Conditioning

Conditioning

Cognitive Learning

IMITATION

Direct Matching

Cognition based imitation

Classical Operant

Learning by Problem Solving

Observation Activity

„Behaviour“ „Action“
Mirror Neurons

• The origin: W. B. Carpenter

• The application: Bandura

• The sensation: G. Rizzolatti / V. Gallese
Mirror Neurons

- Next step: M. Umilta
- Extending the concept: Asterix and Obelix
- The breakthrough: Rizzolatti/Gallese/Iacoboni
Mirror Neurons

• Additional Findings: Keysers and Fogassi
• Importance of Motor Vocabulary and Language Competence
• Demonstration vs. Verbal Description
Mirror Neurons

• Cognition vs. Direct Matching
  – pros and cons

Level of Coaches and the Team
Level of Teachers Education and the Practical Work
Education of Referees and Delegates
Mirror Neurons

- Learning from a model
- Limbic System Controlling Function
  - Hippocampus vs. Amygdala
    - Motivation vs. Fear
    - Credibility vs. „Pseudo-Reflexes“
    - Neuromodulators
      - Noradrenalin, ACTH
      - Dopamin, Serotonin