



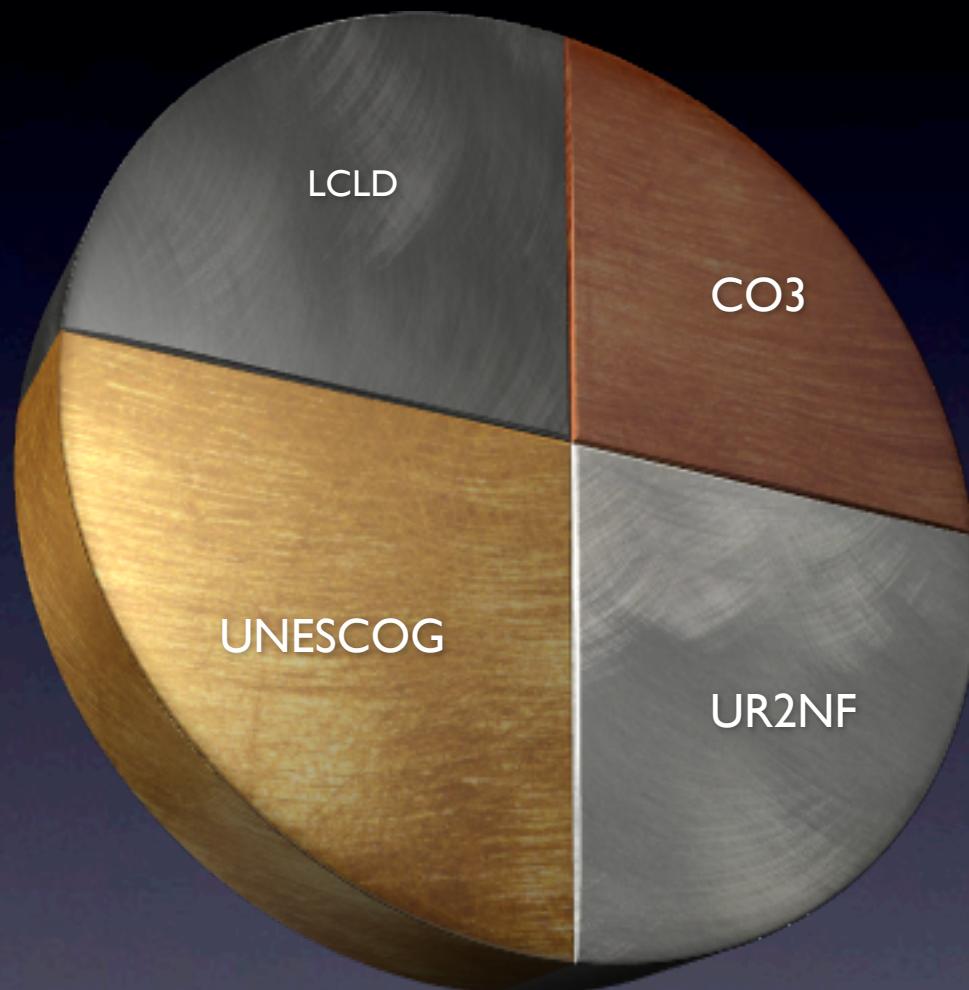
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axel cleeremans

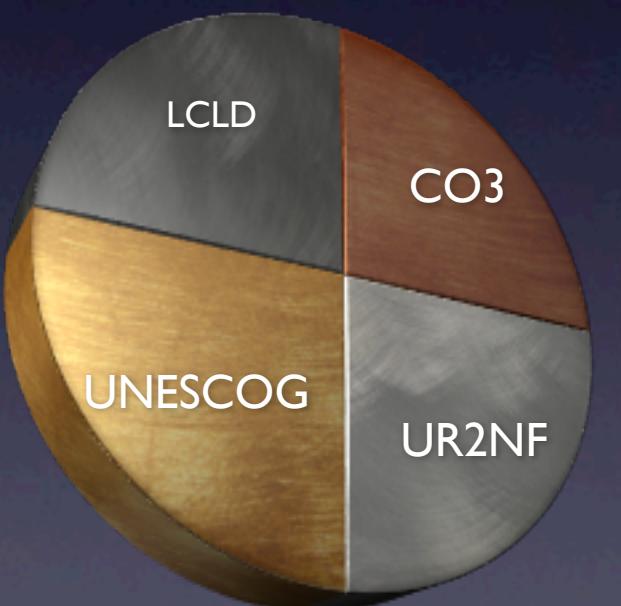


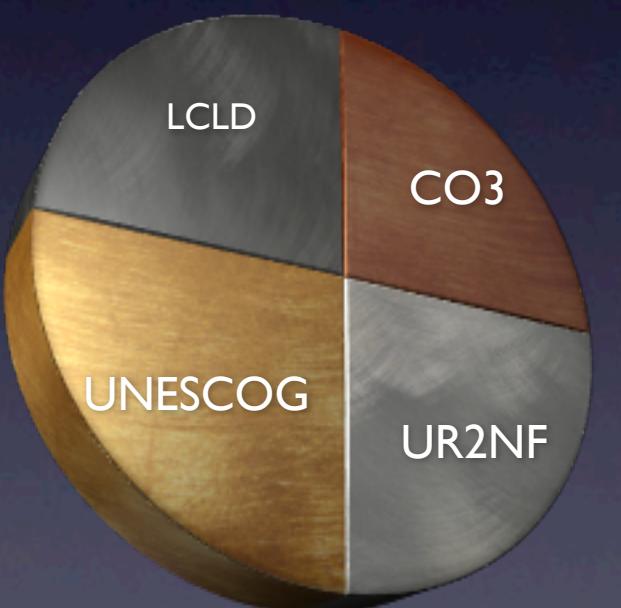
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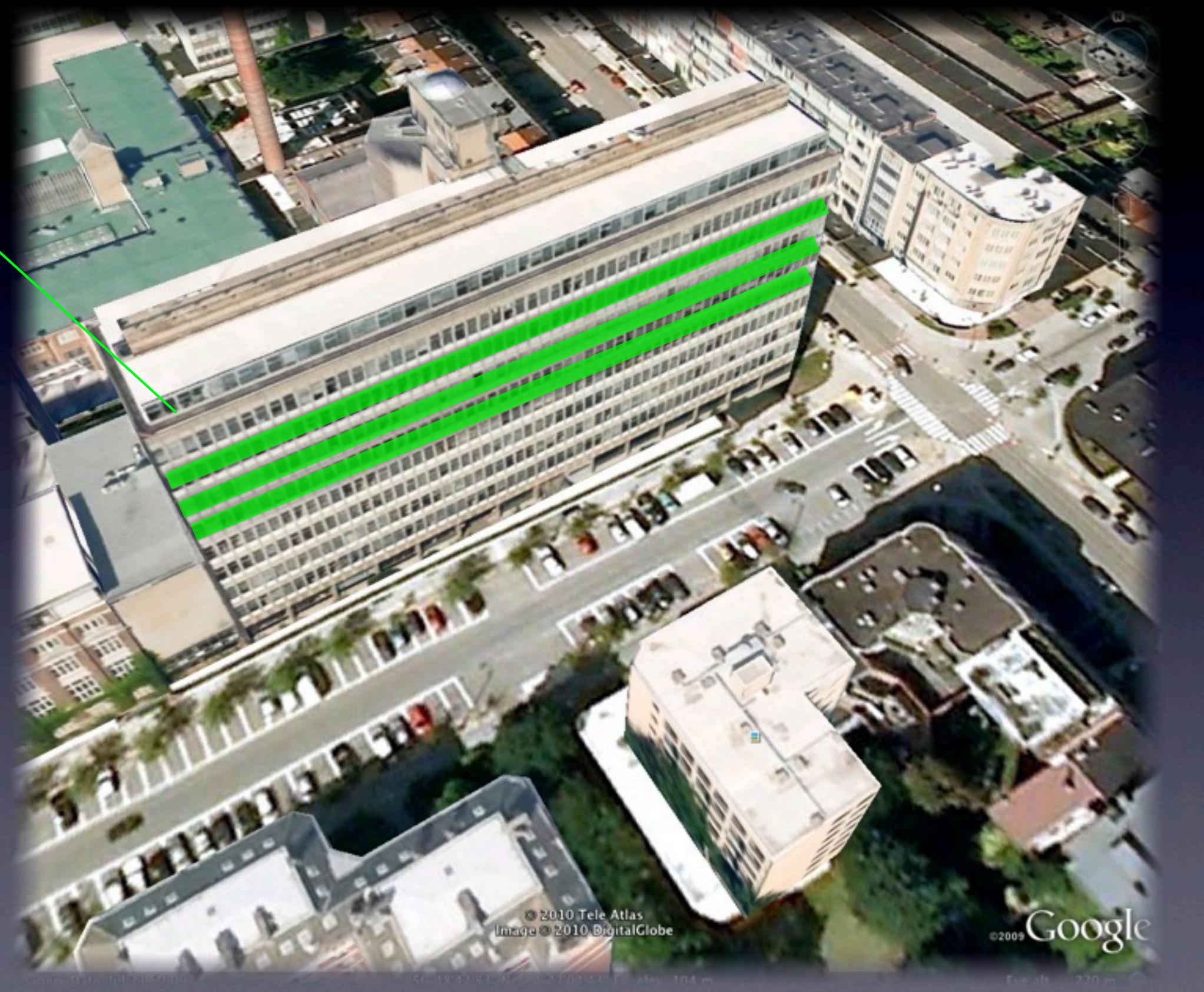


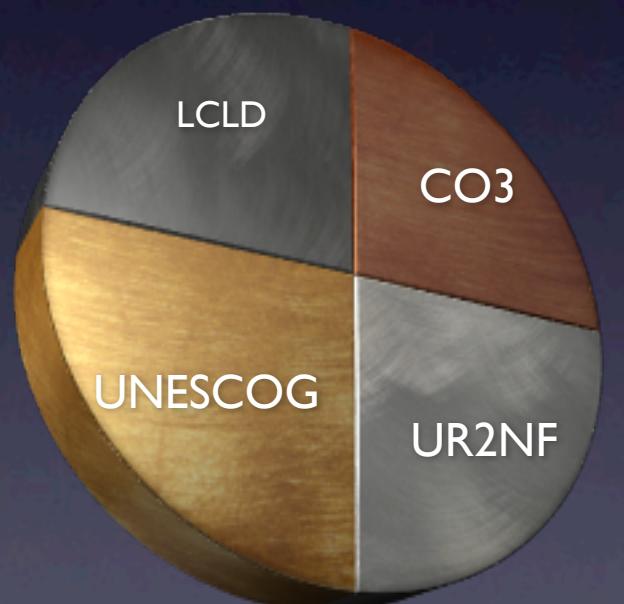
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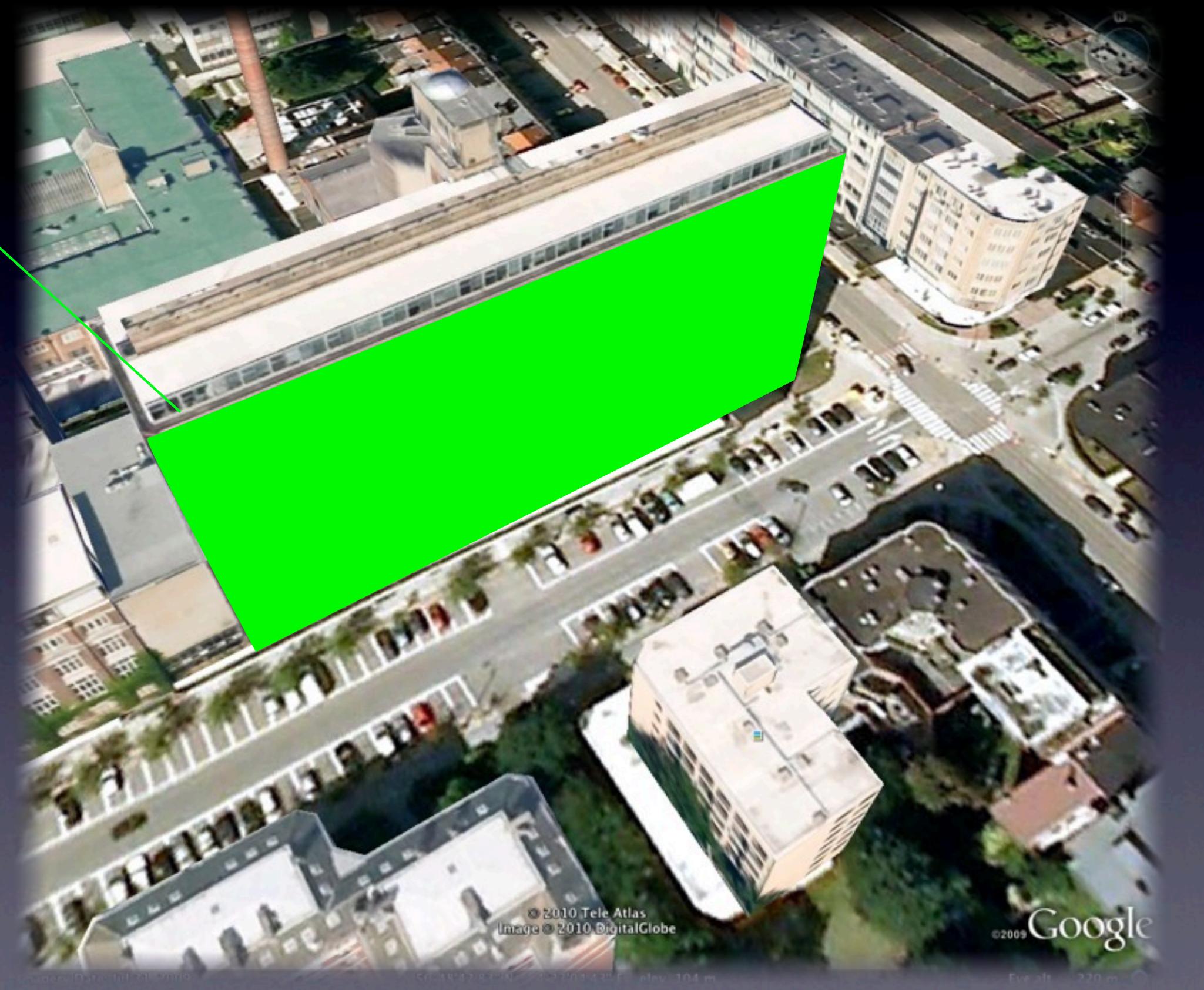


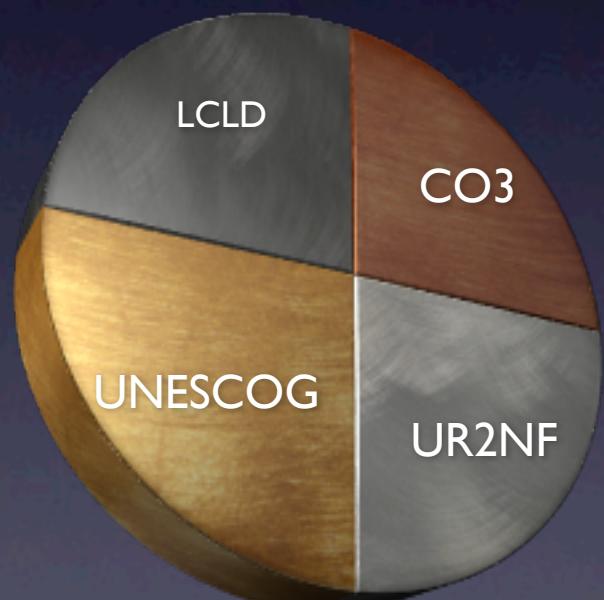
Université Libre de Bruxelles
Faculté des Sciences Psychologiques et de
l'Education





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Psychopathologie & Psychosomatique*

PsyTC

*Centre de Recherche en
Psychologie du Travail et
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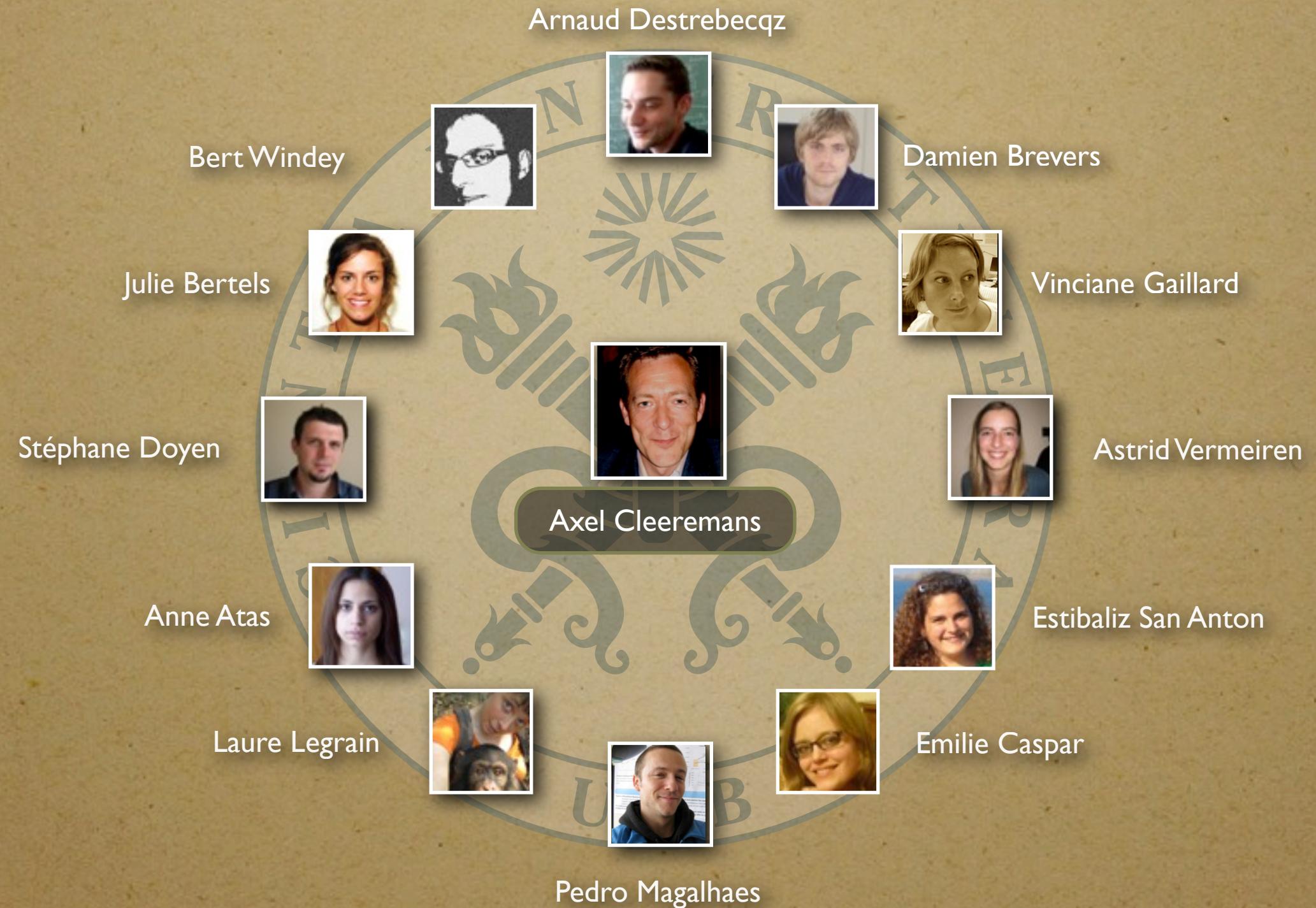
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Bienvenue sur le site de l'**ULBABYLAB**

L'**ULBABYLAB** est un nouveau laboratoire créé en 2010 à l'ULB grâce au financement du FRS/FNRS et dont l'objectif est l'étude des capacités cognitives du jeune et du très jeune enfant. L'ULBabylab fait partie de l'unité Conscience, Cognition & Computation (dir. Axel Cleeremans)

Pour nous contacter

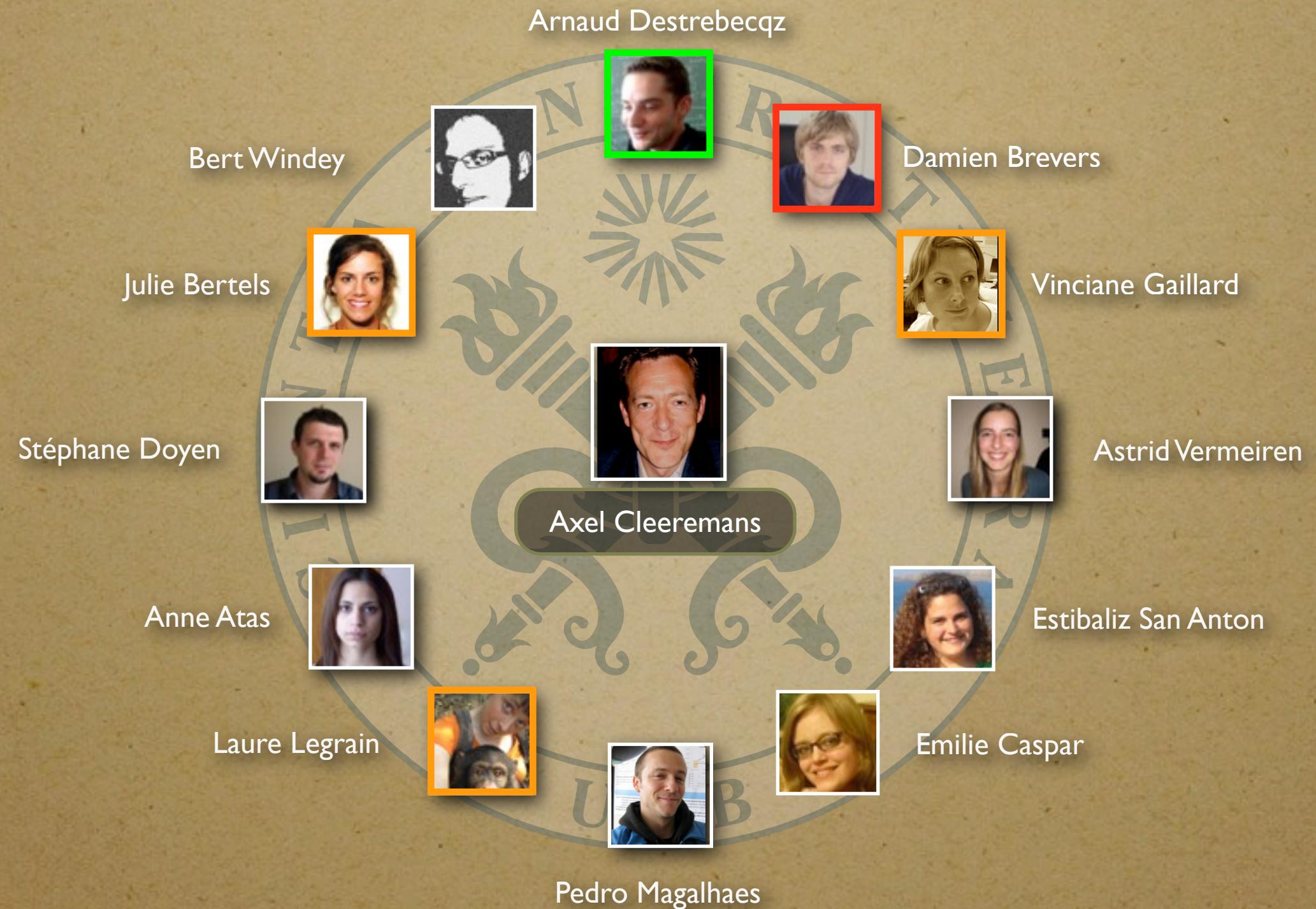
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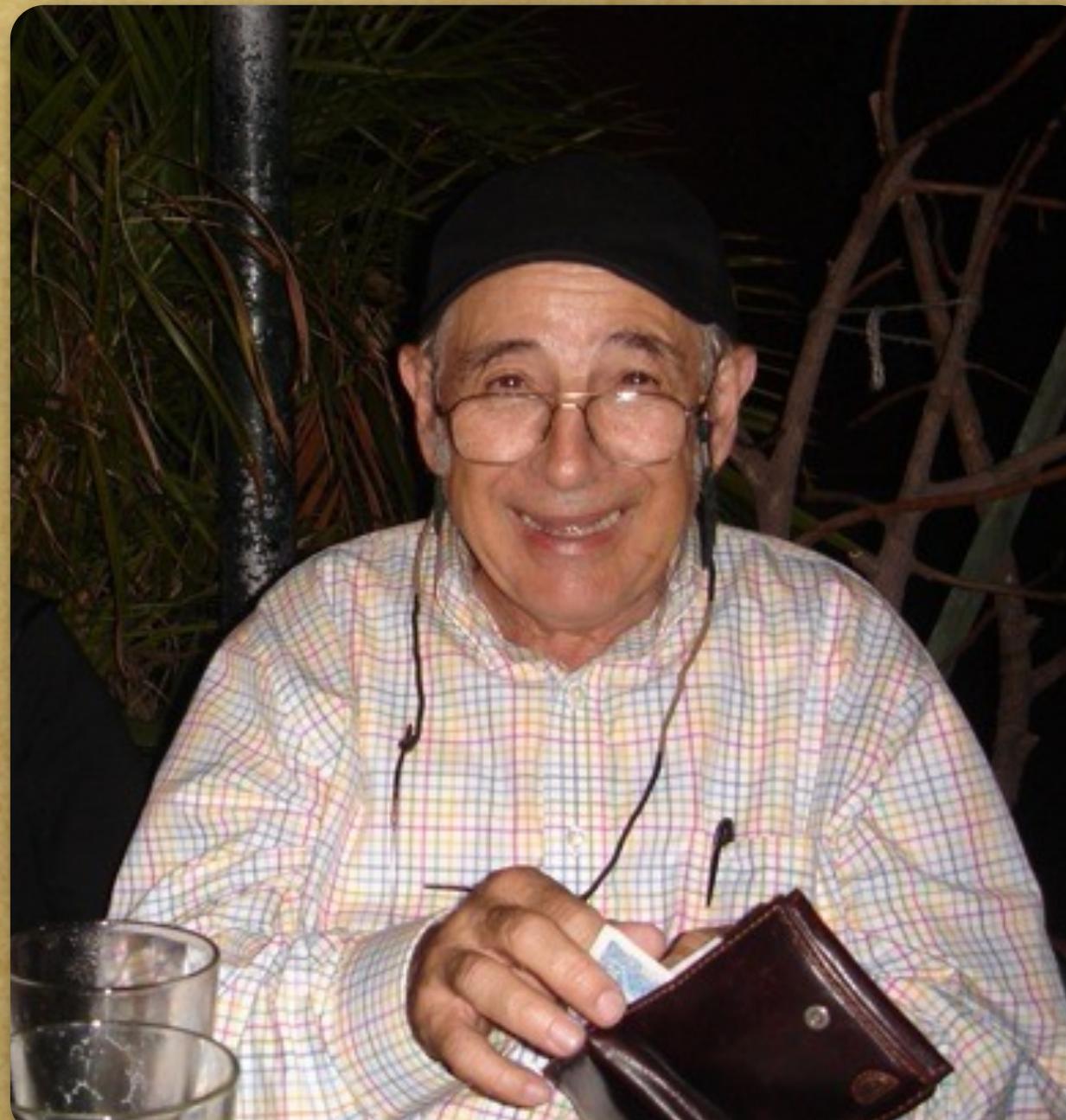
SYSTÈME COGNITIF



SYSTÈME COGNITIF

PROCESSUS CONSCIENTS VS. INCONSCIENTS

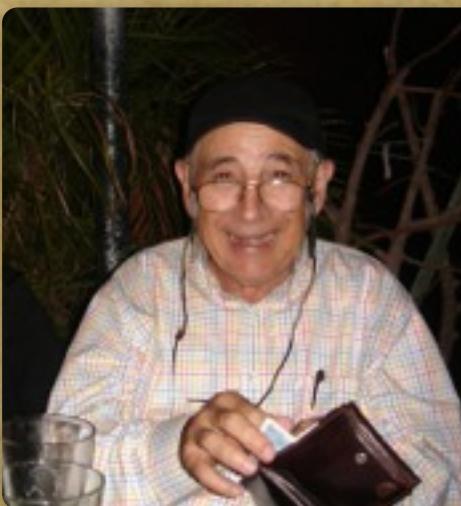
WHAT IS CONSCIOUSNESS?



JOHN SEARLE

WHAT IS CONSCIOUSNESS?

“Consciousness consists of those states of sensation, or feeling, or awareness, which begin in the morning when we awake from a dreamless sleep and continue throughout the day until we fall into a coma, or die, or fall asleep again, or otherwise become unconscious”.



JOHN SEARLE

WHAT IS CONSCIOUSNESS?

Nobody knows!

WHAT IS IT LIKE TO BE A BAT?



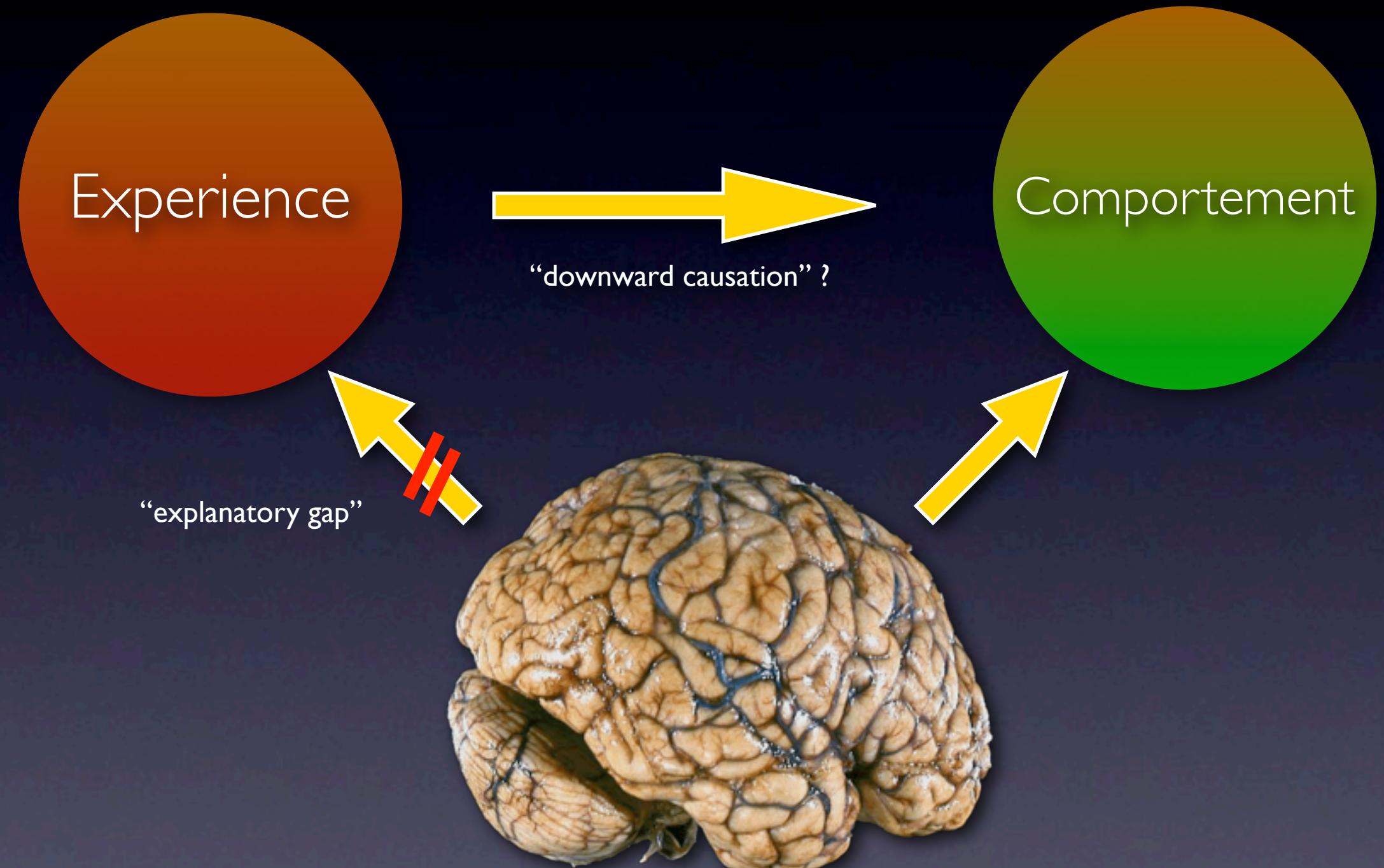
Nagel (1974): No matter how much we know about the brain of a bat, we'll never know what it feels like to chase insects at dusk...

WHAT IS IT LIKE TO BE A BAT?



Nagel (1974): No matter how much we know about the brain of a bat, we'll never know what it feels like to chase insects at dusk...

LE CERVEAU ET L'ESPRIT



L'étude de la conscience exige que l'on combine données objectives et subjectives

Learning the Structure of Event Sequences

Axel Cleeremans and James L. McClelland
Carnegie Mellon University

How is complex sequential material acquired, processed, and represented when there is no intention to learn? Two experiments exploring a choice reaction time task are reported. Unknown to Ss, successive stimuli followed a sequence derived from a "noisy" finite-state grammar. After considerable practice (60,000 exposures) with Experiment 1, Ss acquired a complex body of procedural knowledge about the sequential structure of the material. Experiment 2 was an attempt to identify limits on Ss ability to encode the temporal context by using more distant contingencies that spanned irrelevant material. Taken together, the results indicate that Ss become increasingly sensitive to the temporal context set by previous elements of the sequence, up to 3 elements. Responses are also affected by priming effects from recent trials. A connectionist model that incorporates sensitivity to the sequential structure and to priming effects is shown to capture key aspects of both acquisition and processing and to account for the interaction between attention and sequence structure reported by Cohen, Ivry, and Keele (1990).

SEQUENCE LEARNING



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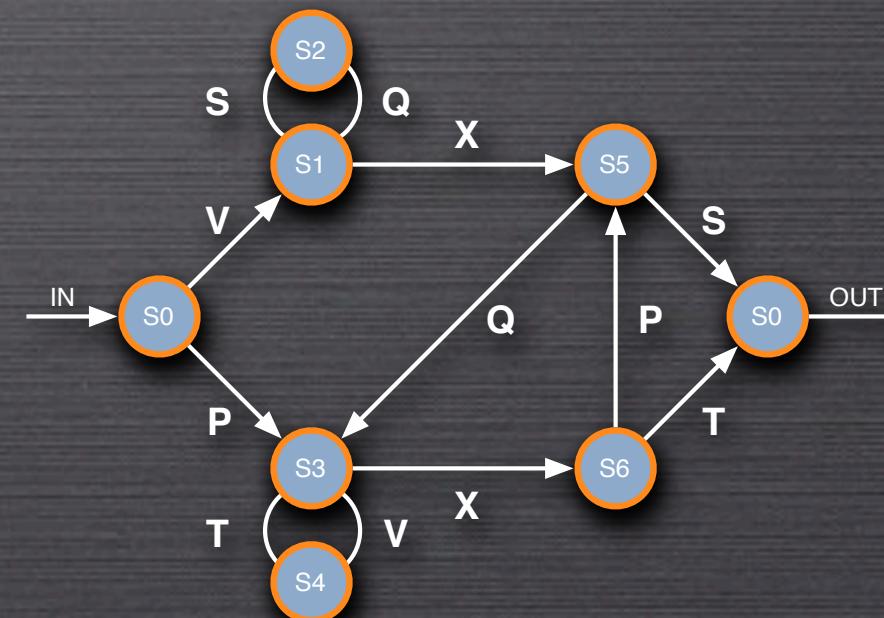
342312143241 342312143241 ... (training)

341243142132 341243142132 ... (transfer)

Task is choice reaction

Unknown to subjects, stimuli follow a repeating sequence

People exhibit sensitivity to the sequential structure in the absence of verbalizable knowledge about the sequence



SEQUENCE LEARNING



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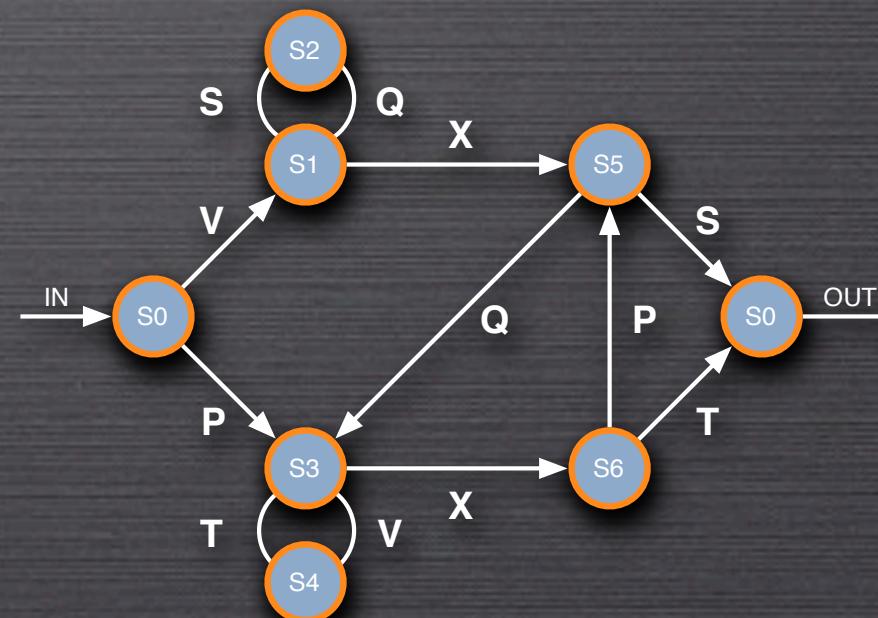
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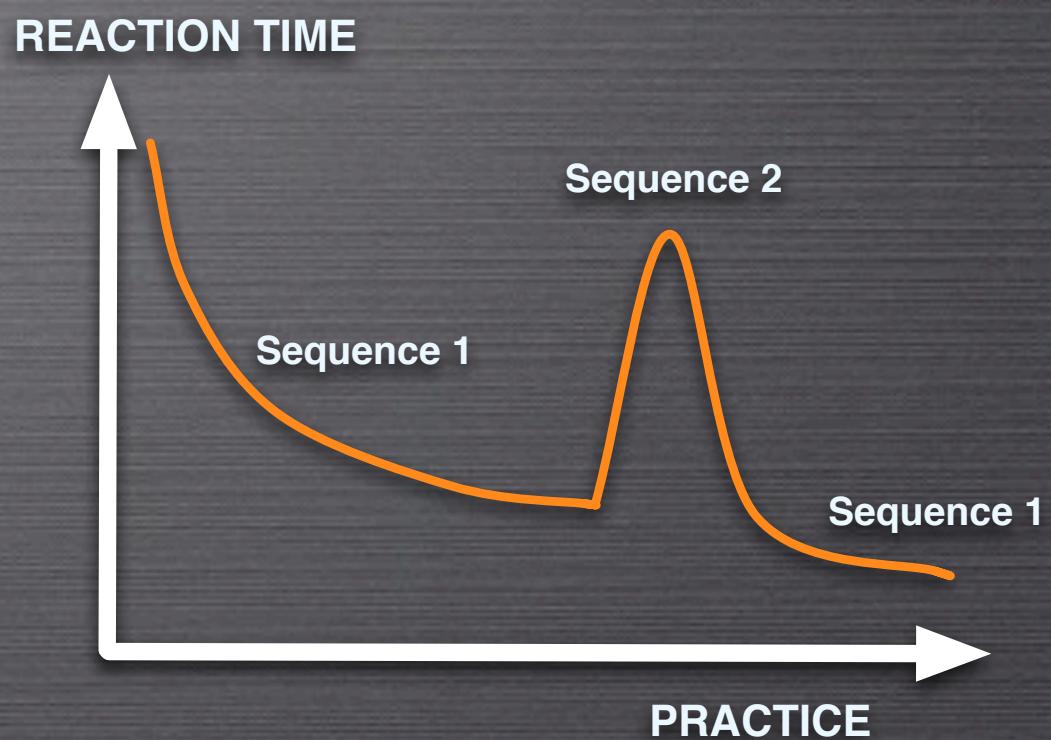
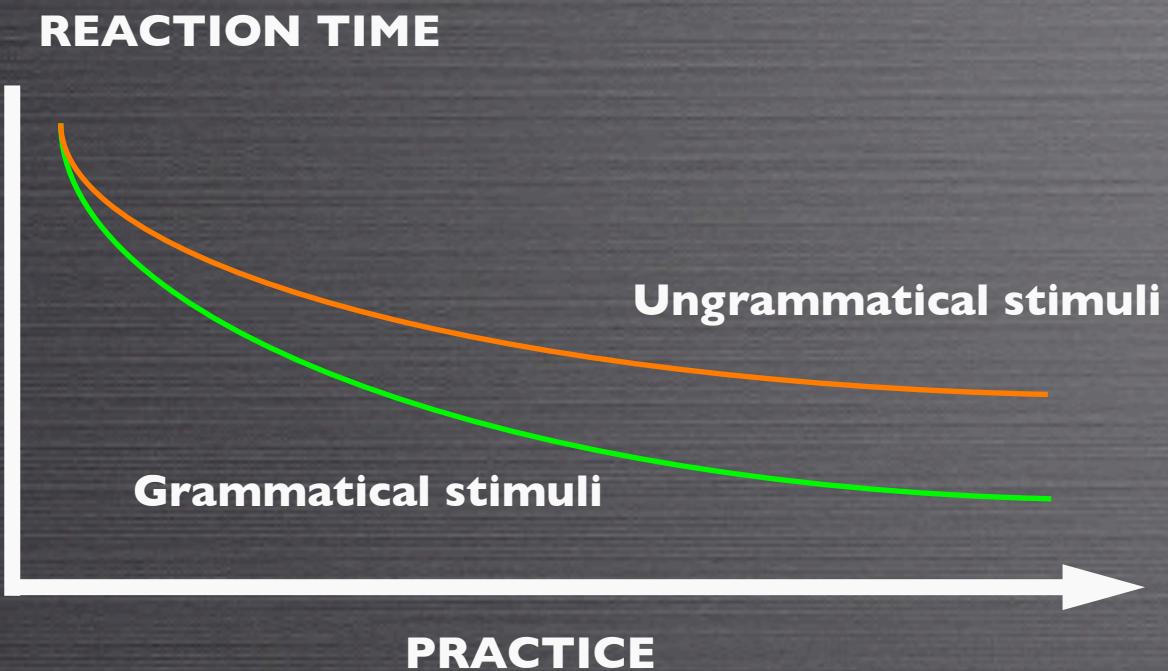
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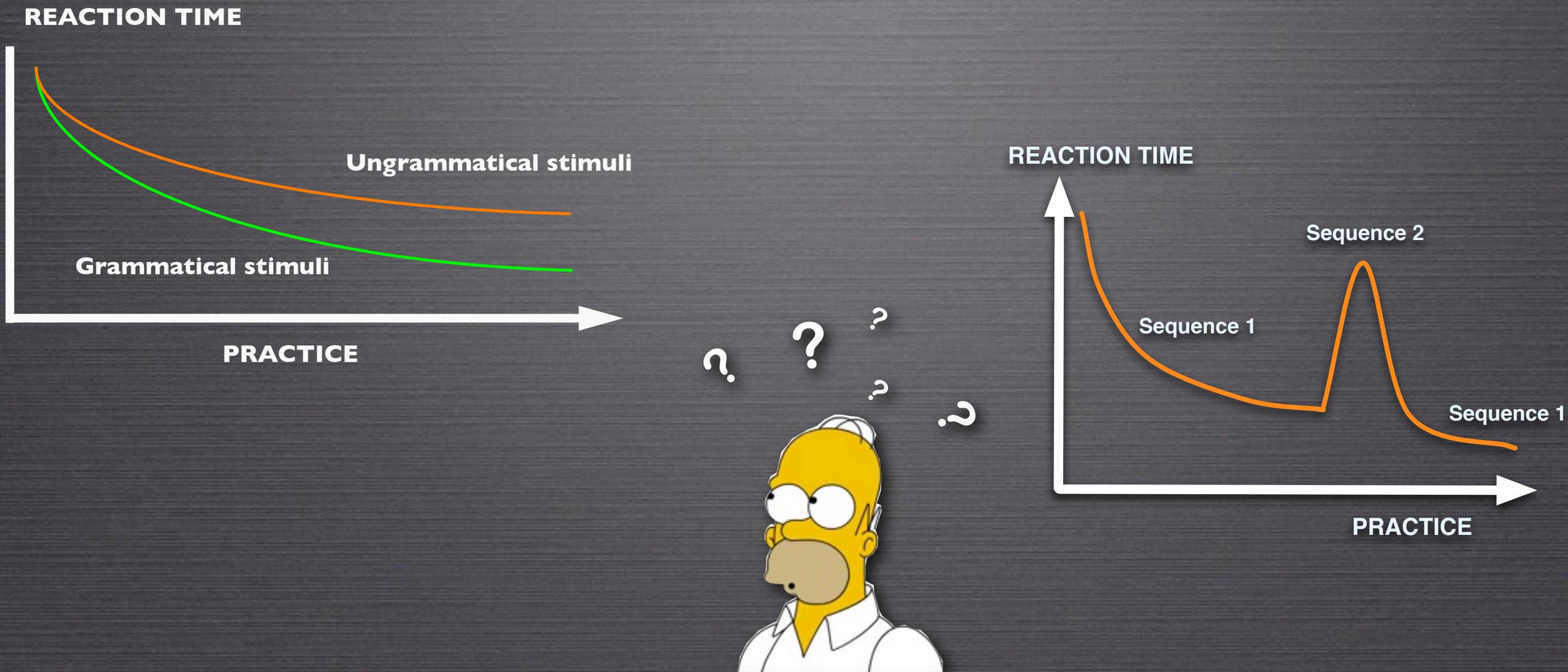
People exhibit sensitivity to the sequential structure in the absence of verbalizable knowledge about the sequence



TYPICAL RESULTS



TYPICAL RESULTS



IMPLICIT LEARNING:

A change in performance that is not accompanied by a corresponding change in the ability to describe the acquired knowledge

Finite State Automata and Simple Recurrent Networks

Axel Cleeremans

Department of Psychology, Carnegie-Mellon University,
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David Servan-Schreiber

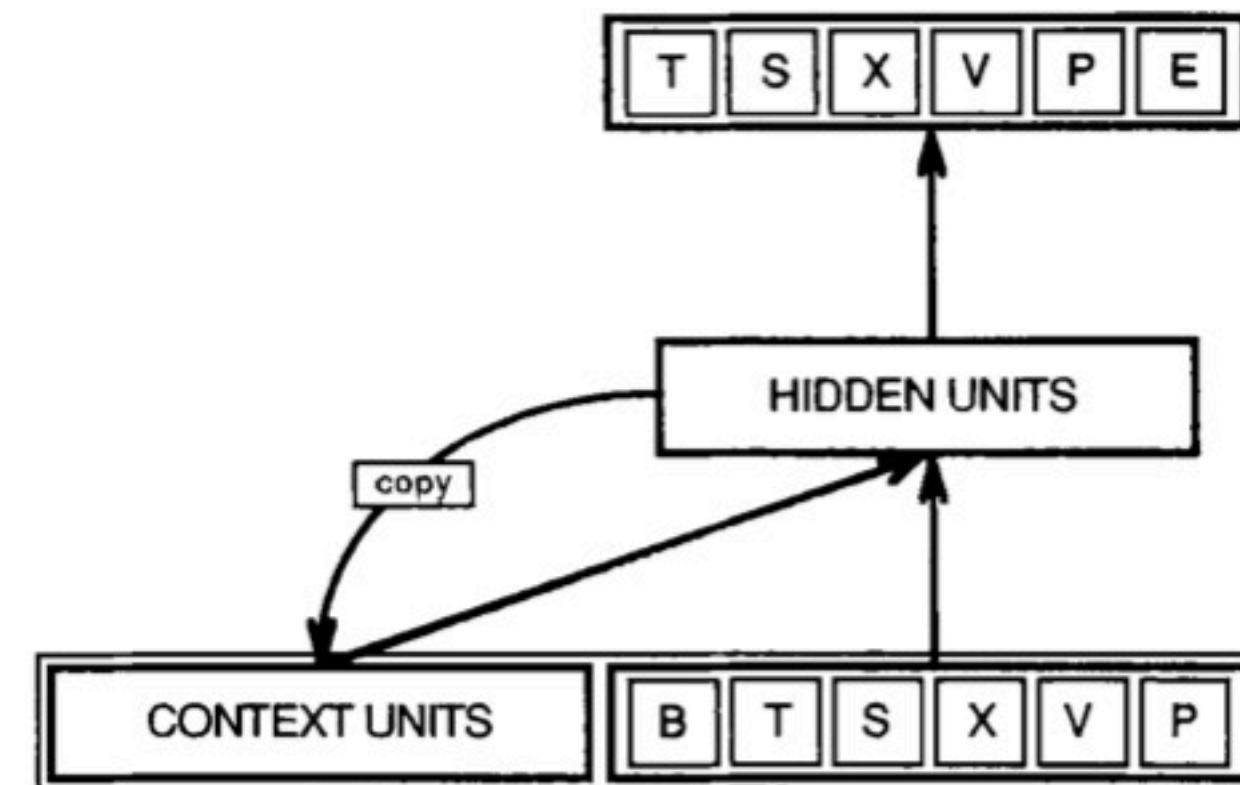
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Finite State Automata and Simple Recurrent Networks

373



2010

2000

1990

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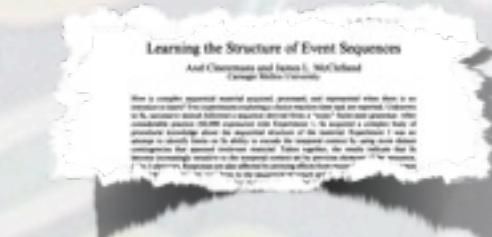
articles

Experience-dependent changes in cerebral activation during human REM sleep

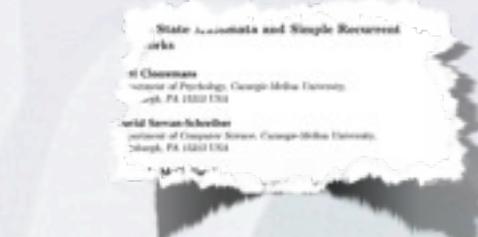
Pierre Maquet^{1,2,6}, Steven Laureys^{1,2}, Philippe Peigneux^{1,2,3}, Sonia Fuchs¹, Christophe Petiau¹, Christophe Phillips^{1,6}, Joel Aerts¹, Guy Del Fiore¹, Christian Degueldre¹, Thierry Meulemans³, André Luxen¹, Georges Franck^{1,2}, Martial Van Der Linden³, Carlyle Smith⁴ and Axel Cleeremans⁵

2000

1990



cleeremans & McClelland *JEP:G*



cleeremans et al. *Neural Computation*

2010

2000

1990

Experience-dependent changes in
cerebral activation during human
REM sleep

Maquet et al. *Nat Neu*

Maquet et al. *Nat Neu*

Learning the Structure of Event Sequences

Aud Cleeremans and James C. McClelland

Cognitive Neuroscience

How is complex memory encoded precisely, and represented when there is no explicit retrieval cue? The hippocampus contains many neurons that are selectively activated by sequences of stimuli. These neurons encode sequences of events in a "spike-timing-dependent plasticity" manner. This allows the hippocampus to store sequences of events in a compressed form. The hippocampus also encodes the sequential structure of the learned sequences. It can do this by using a recurrent network that is able to predict the next event in the sequence. By using such a network, the hippocampus can encode the sequential structure of the learned sequences in a precise manner. The hippocampus can also encode the sequential structure of the learned sequences in a precise manner. The hippocampus can also encode the sequential structure of the learned sequences in a precise manner.

State Asymmetries and Single Recurrent
Arches

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Serial Neural Networks
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cleeremans et al. *Neural Computation*

2010

Psychonomic Bulletin & Review
2001, 8 (2), 343-350

Can sequence learning be implicit? New evidence with the process dissociation procedure

ARNAUD DESTREBECQZ and AXEL CLEEREMANS
Université Libre de Bruxelles, Brussels, Belgium

2000

Experience-dependent changes in cerebral activation during human REM sleep

Maquet et al. Na

1990

Learning the Structure of Event Sequences

Axel Cleeremans and James E. McClelland

Cognitive Science Laboratory

How is complex memory stored without explicit, self-referential awareness? Here it is argued that the hippocampus stores the relations between events in a "latent" fashion and activates them later when the context is appropriate. This view is contrasted with the "declarative" view according to which hippocampus stores explicit knowledge about the sequential structure of the learned stimulus. Two sets of experiments are presented to address this issue. First, subjects learn a sequence of events and are asked to indicate whether or not they can remember the sequence. The results show that subjects can remember the sequence even if they do not remember the individual events. Second, subjects learn a sequence of events and are asked to indicate whether or not they can remember the sequence. The results show that subjects can remember the sequence even if they do not remember the individual events.

State Asymmetries and Single Recurrent Networks

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Learning the Structure of Event Sequences

André Cleeremans and James C. McClelland

Journal of Memory and Language

How is complex memory encoded precisely, and represented when there is no explicit access to it? The representation must be precise enough to support the ability to detect differences between sequences (a "serial position effect"), but also flexible enough to support the ability to learn new sequences. In this article, we propose a model of sequence learning based on the assumption that sequences are learned by forming associations between states. These associations are formed by using knowledge about the sequential structure of the learned sequences. This is achieved by using a recurrent architecture that is able to store and reuse previous representations. The model is able to learn new sequences by using knowledge about the sequential structure of the previous sequences. The results of the model are compared with the results of experiments on sequence learning.

State Asymmetries and Single Recurrent Networks

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How is complex memory encoded precisely, and represented when there is no explicit access to it? The representation must be precise enough to support the ability to detect differences between sequences (a "serial position effect"), but also flexible enough to support generalizations across sequences. In this article, we propose a model of sequence learning that addresses both requirements. The model is based on a neural architecture that encodes sequences as state trajectories. It uses a recurrent network to encode the sequence structure, and a feedforward network to encode the sequence context. The model is able to learn the structure of sequences, and to generalize across sequences. The model is also able to learn the context of sequences, and to generalize across contexts. The model is able to learn the structure and context of sequences simultaneously, and to generalize across both structure and context.

State Trajectories and Single Recurrent Networks

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Neural Networks 1 (1111) 111–111

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Consciousness and metarepresentation: A computational sketch

Axel Cleeremans*, Bert Timmermans, Antoine Pasquali

Cognitive Science Research Unit, Université Libre de Bruxelles CP 191, 50 ave. F.-D. Roosevelt, B1050 Bruxelles, Belgium

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Journal of Memory and Language

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Serial Neural Networks

Journal of Computer Networks, Georgia-Mellon University,

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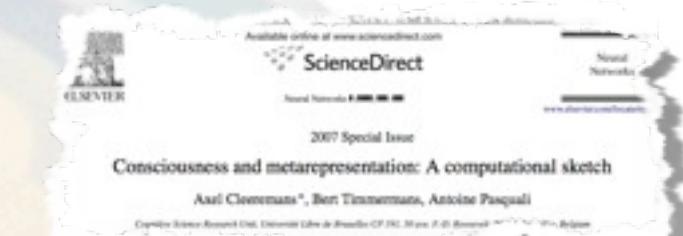
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HYPOTHESIS AND THEORY ARTICLE
published: 09 May 2011
doi: 10.3389/fpsyg.2011.00086

The radical plasticity thesis: how the brain learns to be conscious

Axel Cleeremans*

Consciousness, Cognition and Computation Group, Université Libre de Bruxelles, Bruxelles, Belgium

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Axel Cleeremans and James C. McClelland

Cognitive Science Department

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Department of Psychology, Carnegie-Mellon University,

Pittsburgh, PA 15213 USA

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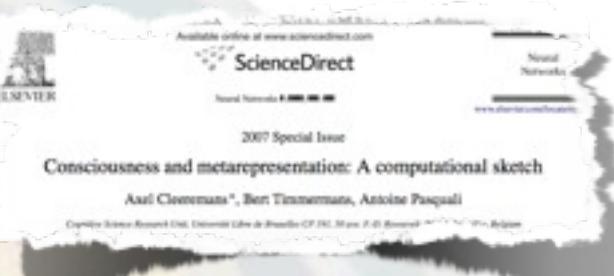
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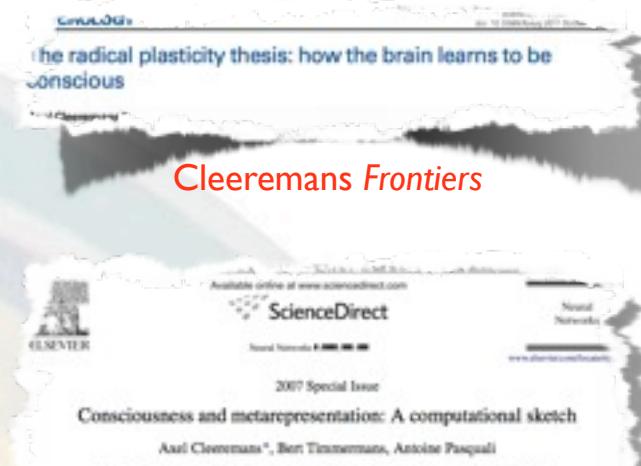
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2007 Special Issue

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*Cognitive Science Research Unit, Université Libre de Bruxelles (CP 174), 50 av. F.D. Roosevelt, 1050 Brussels, Belgium

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Higher order thoughts in action: consciousness as an unconscious re-description process

Bert Timmermans, Leonhard Schilbach, Antoine Pasquali and Axel Cleeremans

Phil. Trans. R. Soc. B 2012 **367**, 1412-1423
doi: 10.1098/rstb.2011.0421

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Journal of Memory and Language

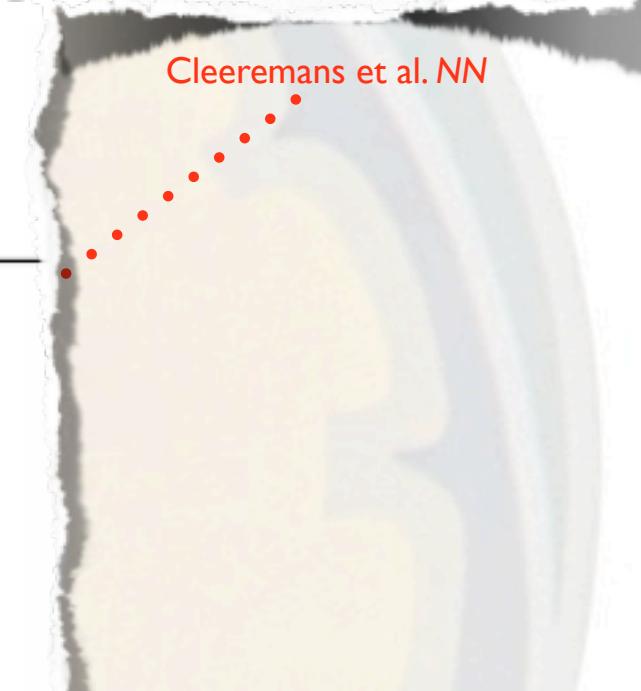
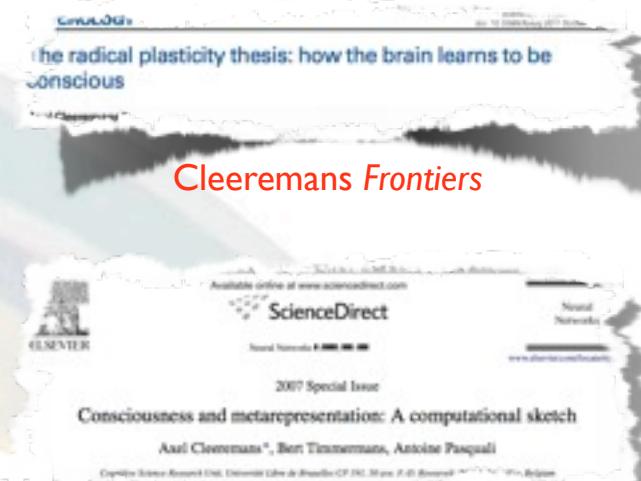
State Asymmetries and Simple Recurrent Networks

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Learning the Structure of Event Sequences

Ari Cleeremans and Jessica E. McClelland

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State Automata and Simple Recurrent Networks

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Higher order thoughts in action: consciousness as an unconscious re-description process
Jeroen Timmermans, Leonard Schiltbach, Antoine Pasquale and Arié Cleeremans
Proc. R. Soc. B 2009 284: 1412-1423
DOI: 10.1098/rspb.2009.0180
Published online 10 March 2009
Received 12 January 2009
Accepted 12 February 2009

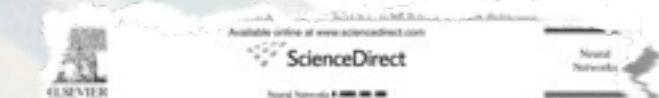
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Consciousness and metarepresentation: A computational sketch

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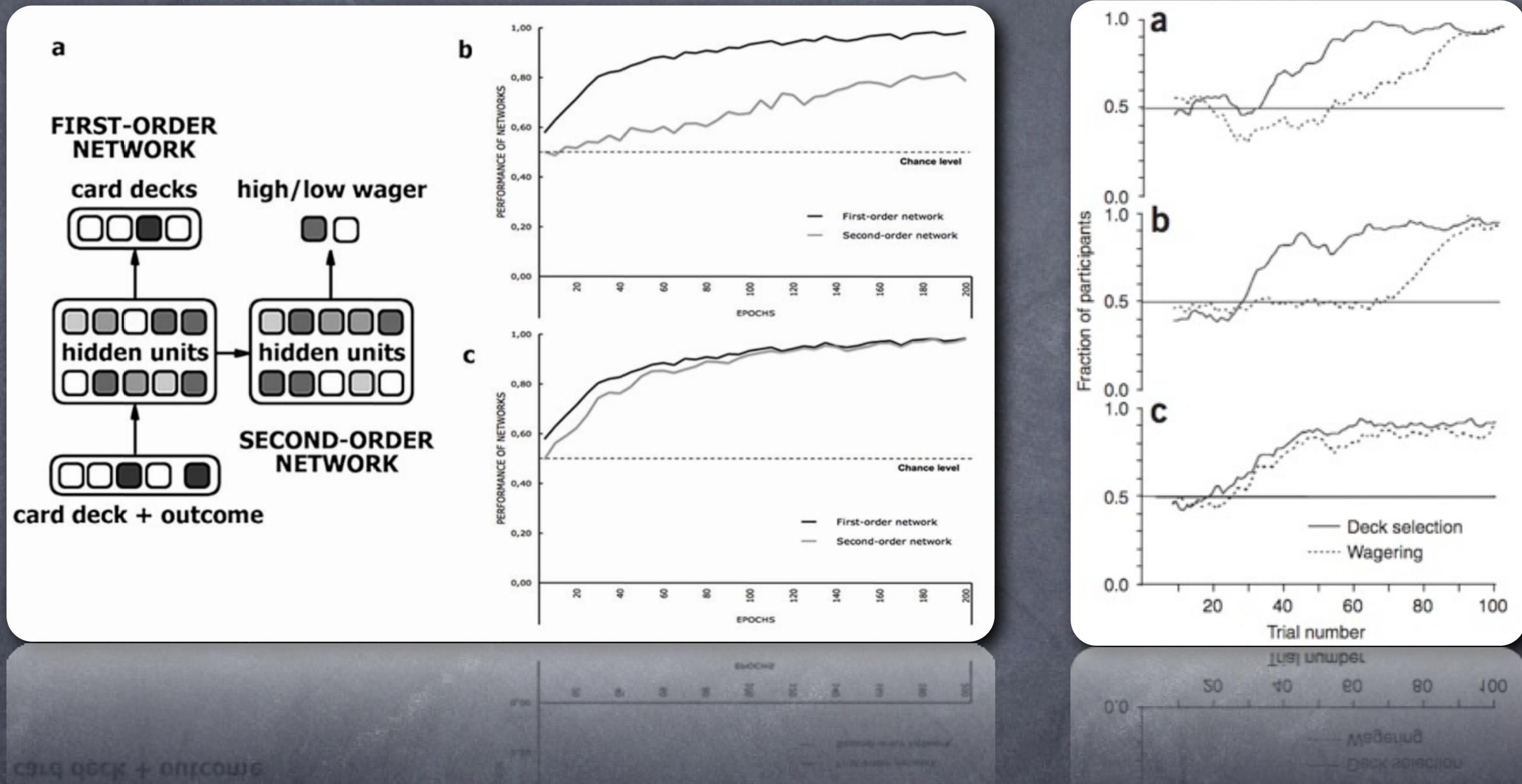
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The Iowa Gambling Task



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1: Stimuli

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skill acquisition



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Experience-dependent changes in cerebral activation during human REM sleep

Peter Maquet*, Jérôme Louysen*, Philippe Peigneux**, Sébastien Fuchs, Christophe Petitjean, Christophe Phillips*, Isidore Aerts*, Guy De Paepe*, Charles Depaepe*, Thierry Mouloua*, Axel Cleeremans*, Georges Prendergast*, Marlene Van der Linden, Géraldine Vanier and Axel Timmermans*

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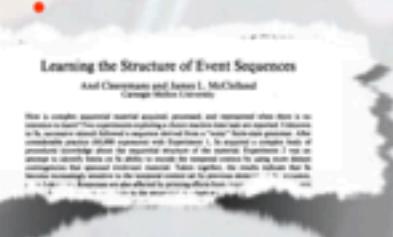
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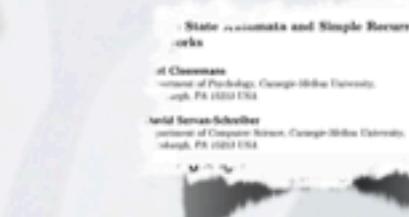
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Consciousness and metarepresentation: A computational sketch
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Higher order thoughts in action: consciousness as an unconscious re-description process
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Phil. Trans. R. Soc. A 2012 **367**: 1410-1423
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Learning the Structure of Event Sequences

Axel Cleeremans and James L. McClelland

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State Estimation and Simple Recurrent Networks

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The radical plasticity thesis: how the brain learns to be conscious
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Bart Terenius, Leonhard Schönbach, Antonio Pascual, and Axel Cleeremans
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The radical plasticity thesis: how the brain learns to be conscious

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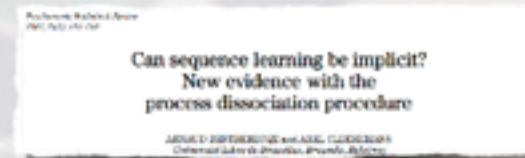
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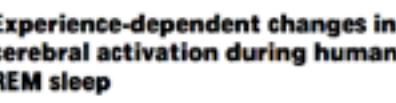
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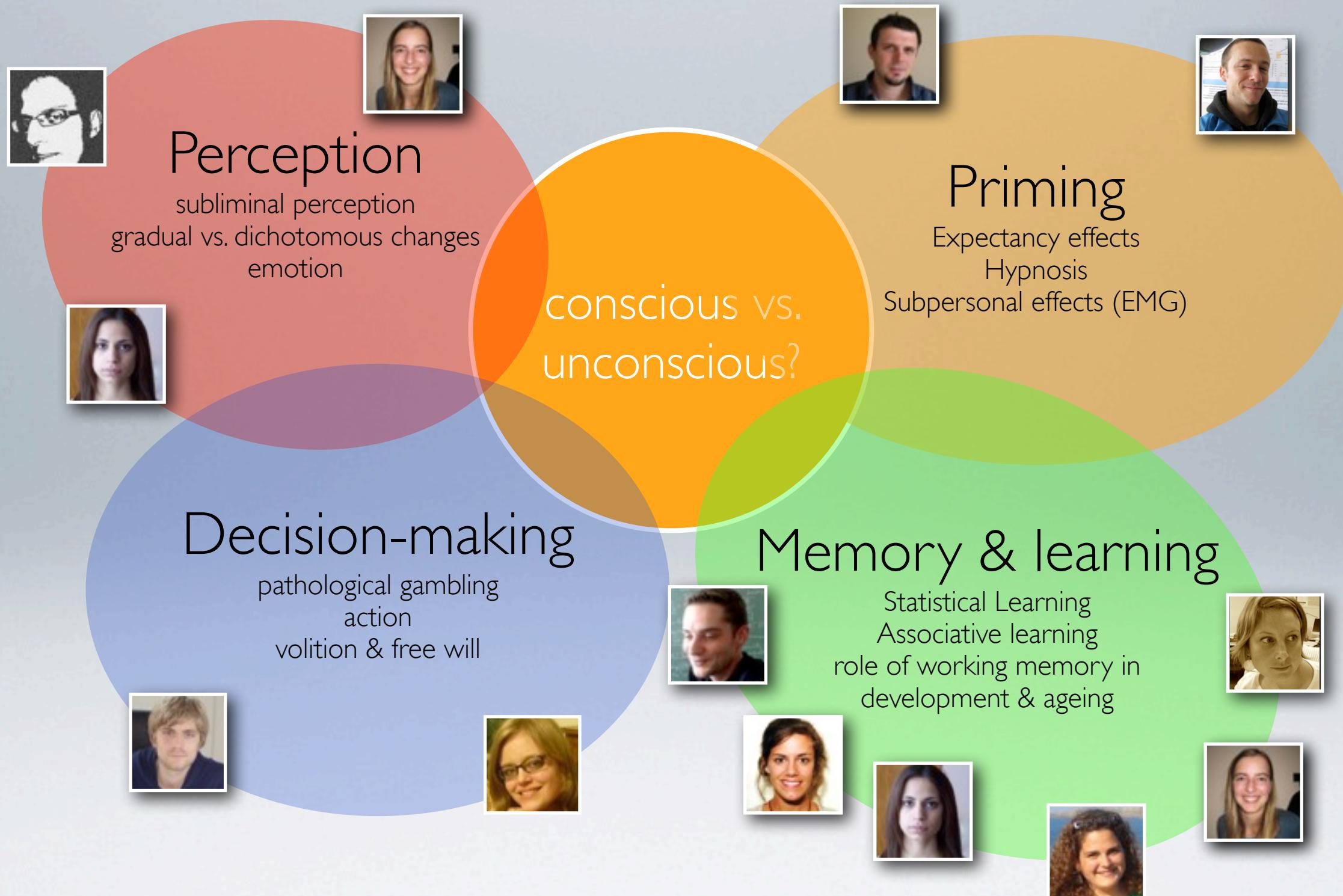
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