Anticipatory Timing Precision in Synchronization Tapping: A Matter of Attention

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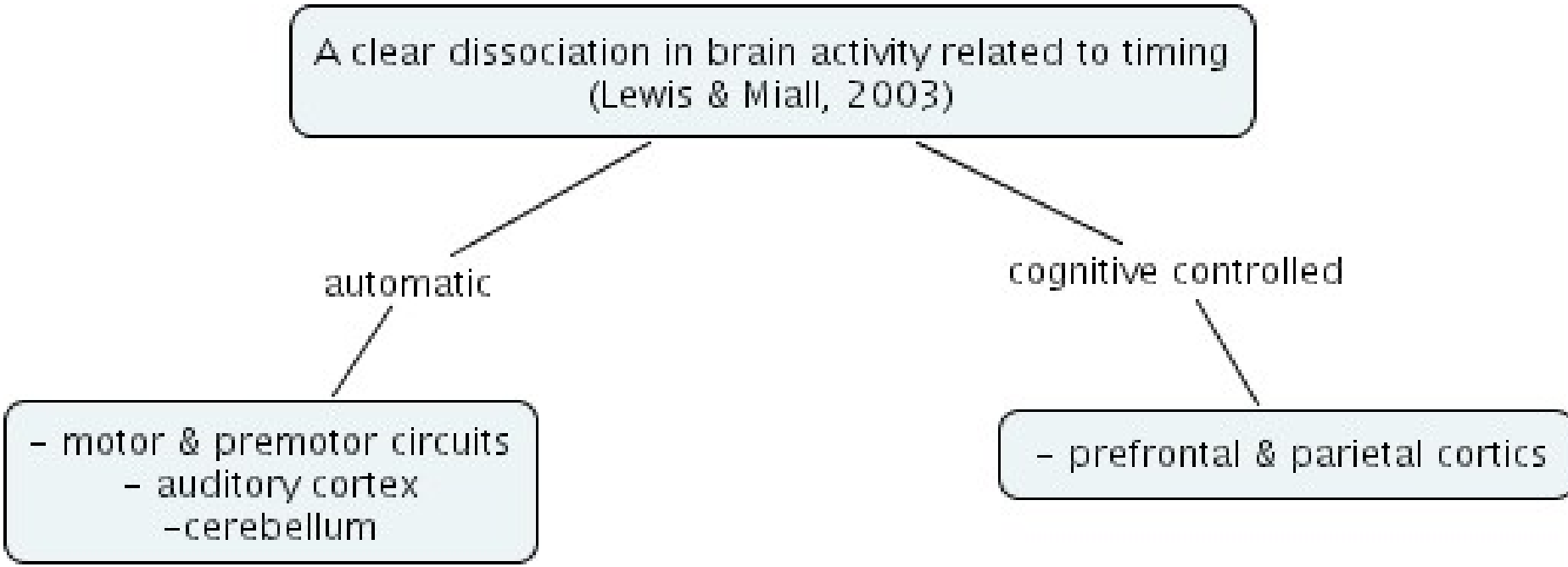
RPPW 2005

Synchronization tapping

Two distinct processes:

- automatic (implicit)
- processing of temporal information (explicit)



Dual-task experiment

- synchronization tapping
- +
- word memory task (phonological loop)

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Miyake et al. (2004)

- ISI < 1500 ms (ISI >450 ms)
  - automatic (low level)
- ISI > 1800 ms (ISI < 4000 ms)
  - depends on working memory capacity (high level)

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- Drummers show a low synchronization error
- **Question:**
- High level processing?
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- Word memory task
  - 5 words at beginning of each trial
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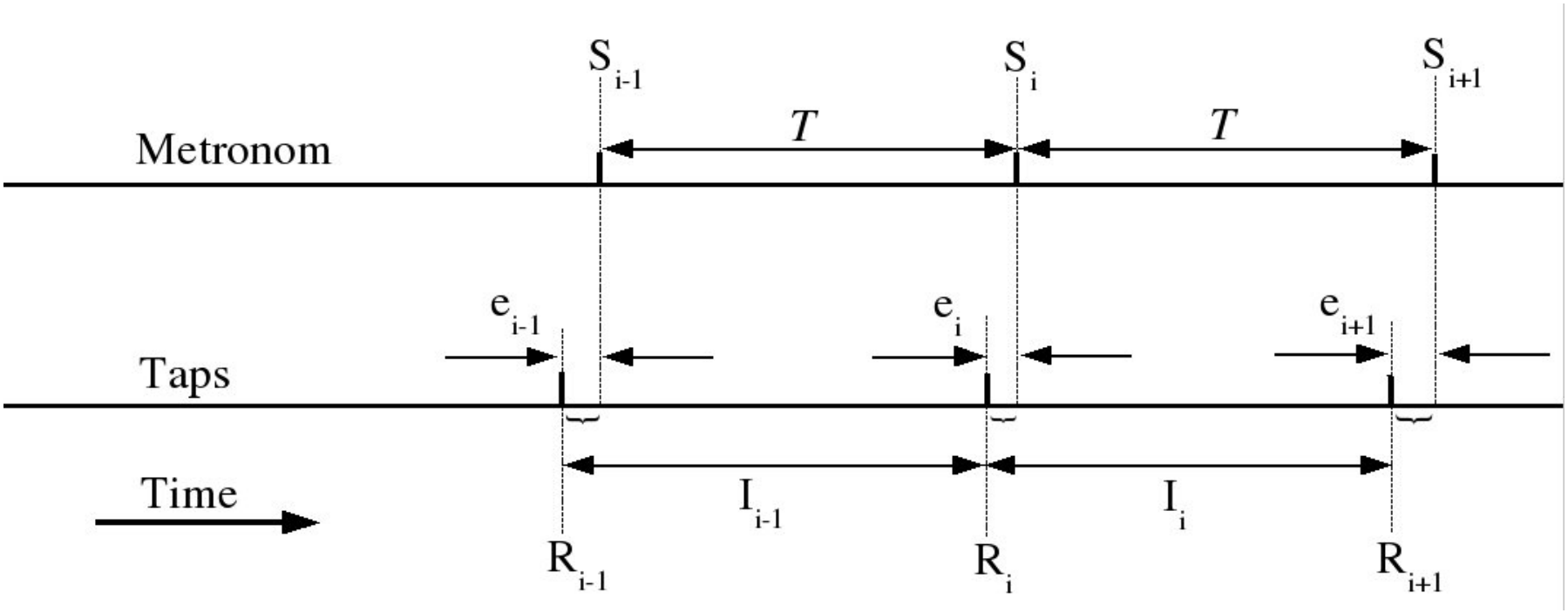
- ISI = 500 ms
- ISI = 600 ms
- ISI = 800 ms
- ISI = 1000 ms

The negative synchronization error



The negative synchronization error

Definitions

Definition

inter-response intervall I_i

- $I_i = T + e_{i+1} - e_i$

Definition

synchronization error e_i

- $e_i = e_0 + \sum_{k=1}^{i} (I_{k-1} - T)$

Results

Statistik bei gepaarten Stichproben

TRIAL			Mittelwert	N	Standardabweichung	Standardfehler des Mittelwertes
5	Paaren 1	ALL_3_14	-5,20	123	11,860	1,069
		ALL_3_24	-11,83	123	12,495	1,127
6	Paaren 1	ALL_3_14	-5,95	164	12,578	,982
		ALL_3_24	-12,81	164	17,492	1,366
8	Paaren 1	ALL_3_14	-12,48	93	18,451	1,913
		ALL_3_24	-11,88	93	20,276	2,103
10	Paaren 1	ALL_3_14	-13,44	62	19,223	2,441
		ALL_3_24	-17,24	62	27,802	3,531

Results

- ISI = 500 ms ($p < 0.000$)
- ISI = 600 ms ($p < 0.000$)
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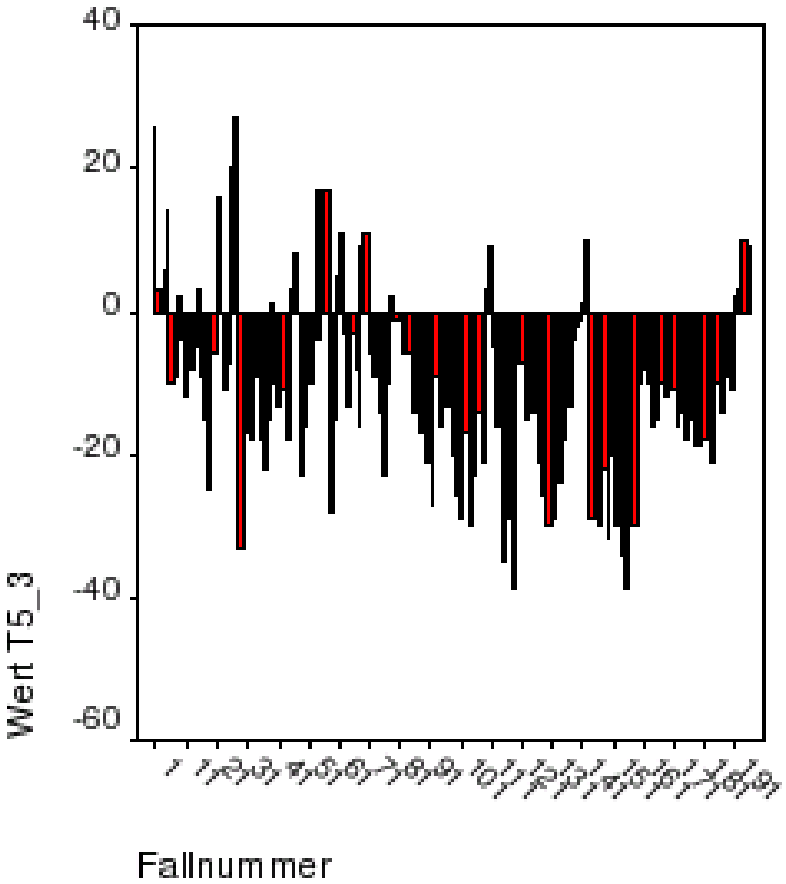
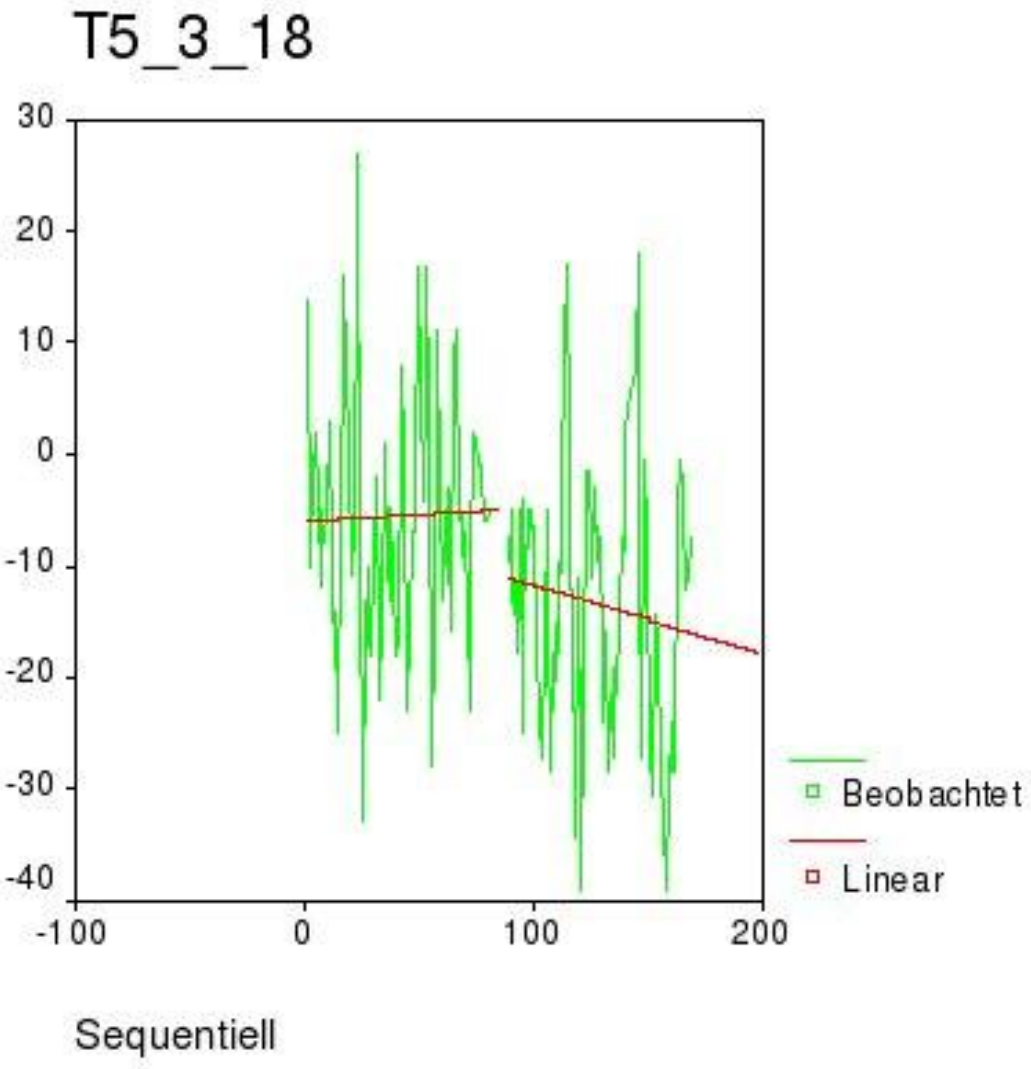


Results


T5_3_18
30
20
10
0
-10
-20
-30
-40
-100
0
100
200
Beobachtet
Linear
Sequentiell

Results

- T5_1 = -5,46 ms
- T5_2 = -17,16 ms
- $p < 0.000$

ACT-R 5.0
An integrated theory of mind

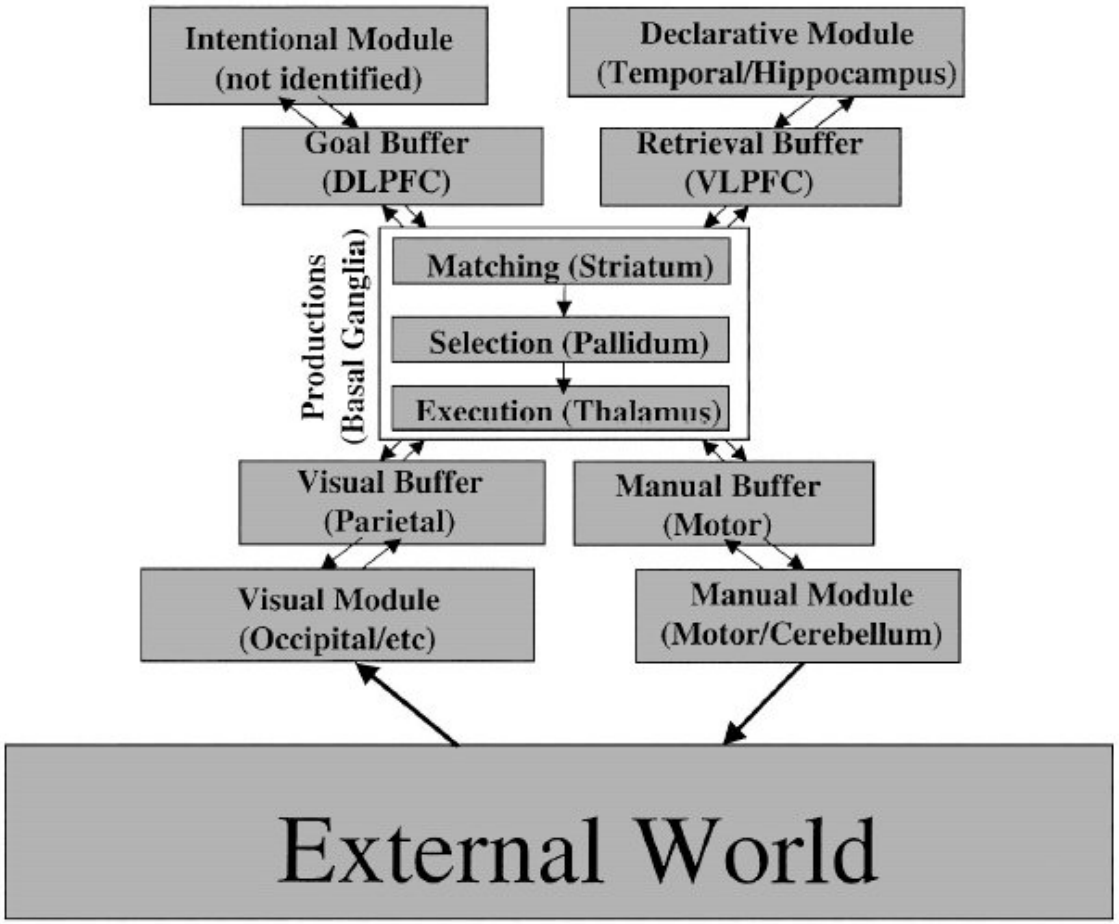
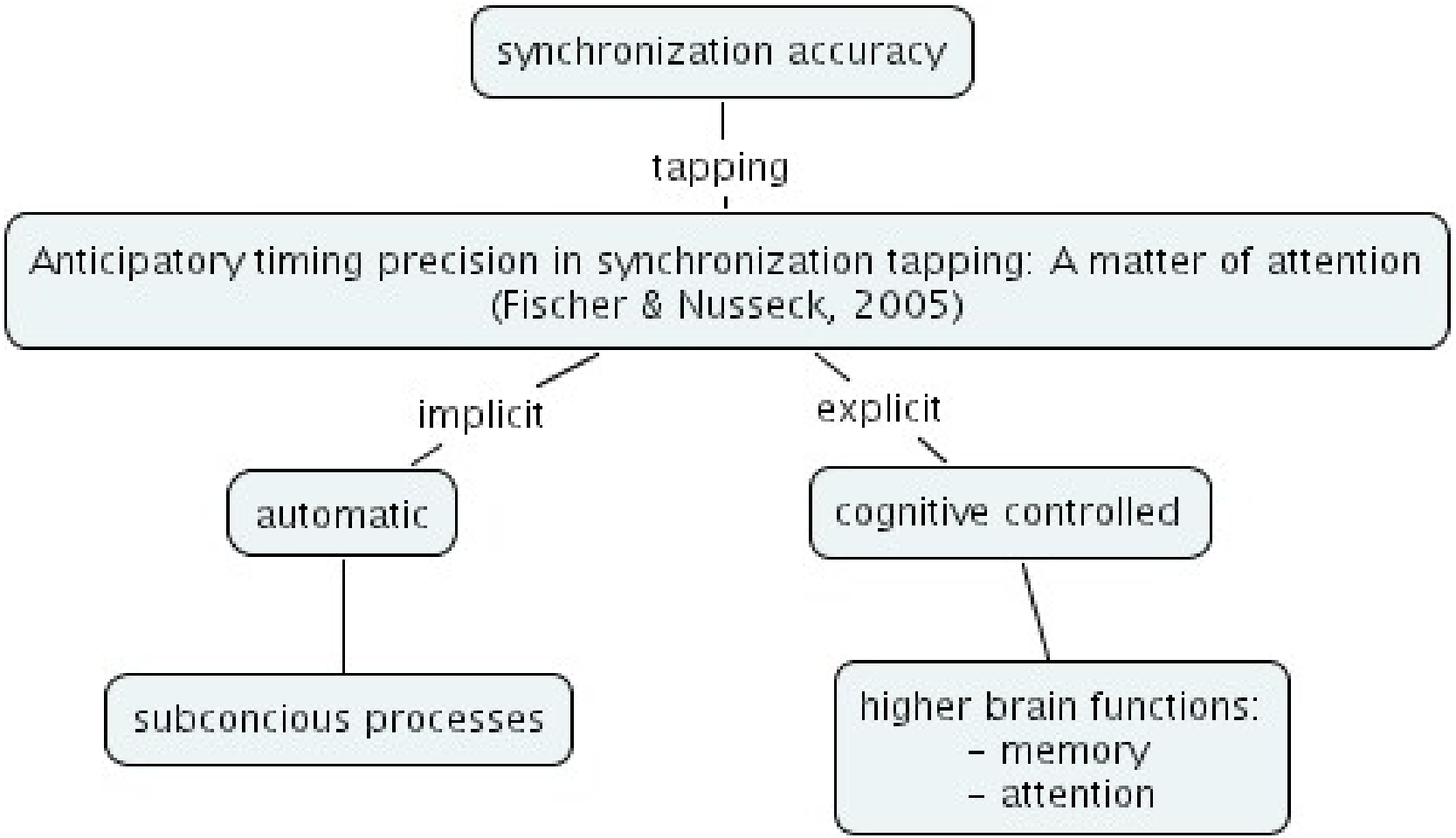


Figure 1. The organization of information in ACT–R 5.0. Information in the buffers associated with modules is responded to and changed by production rules. DLPFC = dorsolateral prefrontal cortex; VLPFC = ventrolateral prefrontal cortex.

Discussion


synchronization accuracy
tapping
Anticipatory timing precision in synchronization tapping: A matter of attention
(Fischer & Nusseck, 2005)
implicit
explicit
automatic
cognitive controlled
subconcious processes
higher brain functions:
- memory
- attention

- Outlook

  - Further research has do be done.

  - Dual-task should be done uner ’more controlled’ conditions.

References I

beamericonbook A. Author.
Handbook of Everything.
Some Press, 1990.

beamericonarticle S. Someone.
On this and that.
Journal on This and That. 2(1):50–100, 2000.