examining the mapping problem in multi mode models

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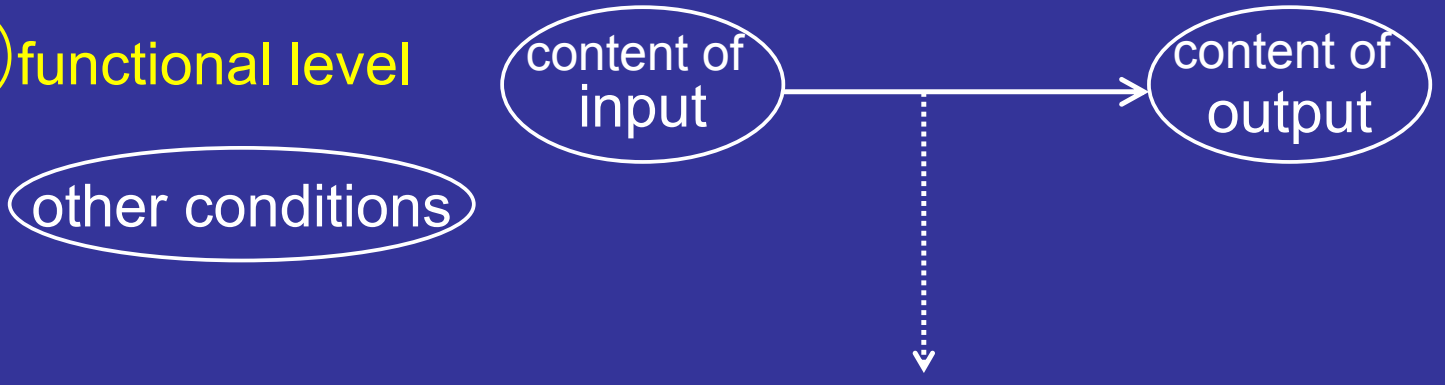
Ghent University

levels of analysis approach (Marr, 1982)

1 functional level

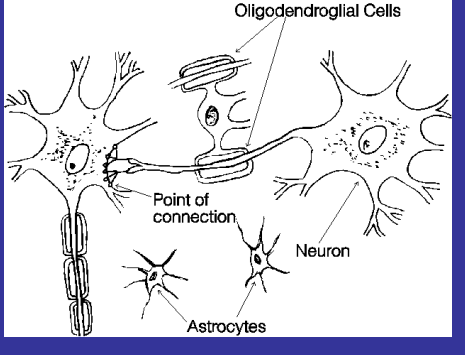


2 formal level

formal process properties/mechanisms

format of representations

3 implementational level



1 2

if actual state = desired state then +

if actual state ≠ desired state then –

cake = cake → +

+

+

1 functional level

content of input → content of output

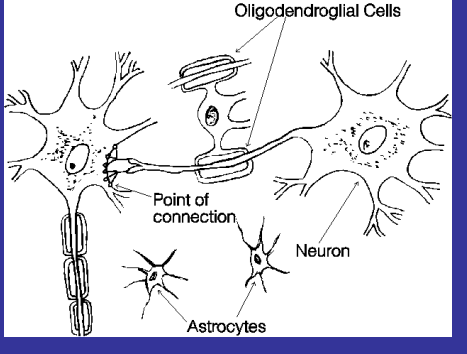
other conditions

2 formal level

formal process properties/mechanisms

format of representations

3 implementational level



heuristic / systematic

1 functional level

content of input → content of output

other conditions

2 formal level

formal process properties/mechanisms

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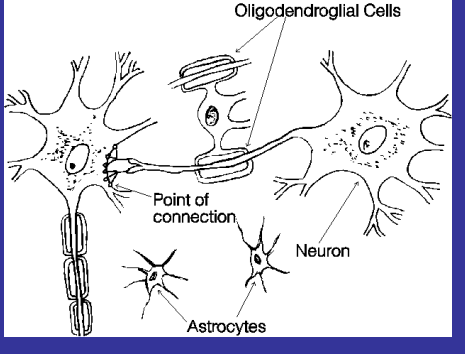
3 implementational level



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other conditions

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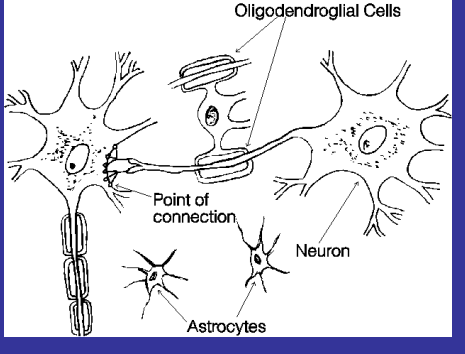

1 functional level

content of input → content of output

other conditions

automatic / nonautomatic

2 formal level

formal process properties/mechanisms

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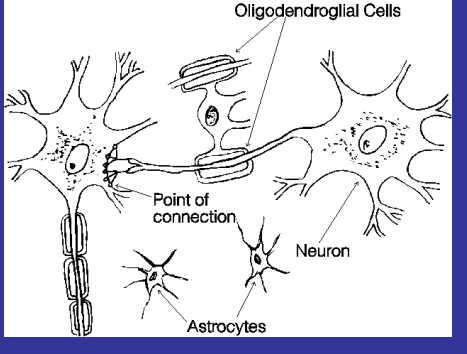

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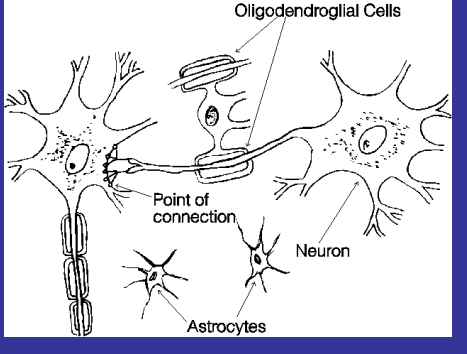

1 functional level

content of input → content of output

other conditions

associative / rule-based

2 formal level

formal process properties/mechanisms

format of representations

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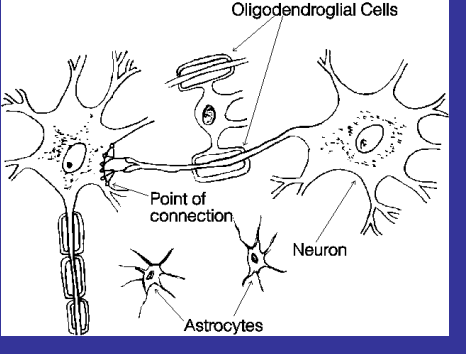

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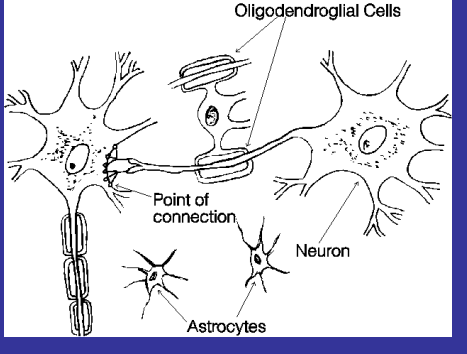

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content of input → content of output

other conditions

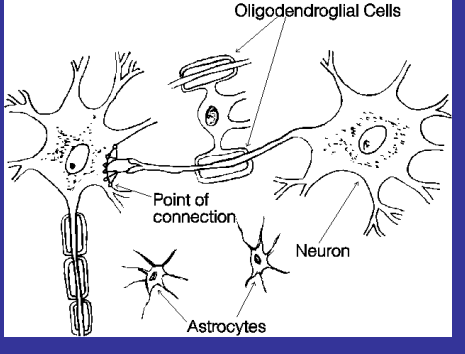
2 formal level

formal process properties/mechanisms

format of representations

nonconceptual / conceptual / propostional

3 implementational level



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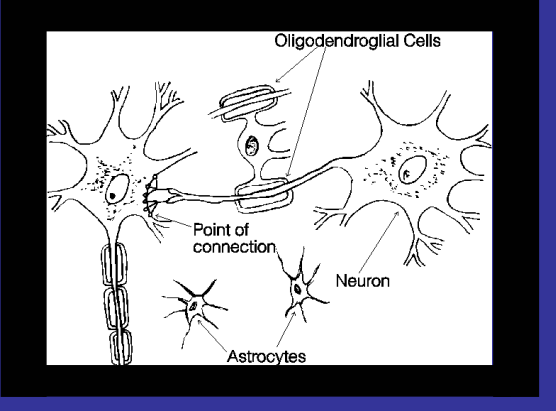

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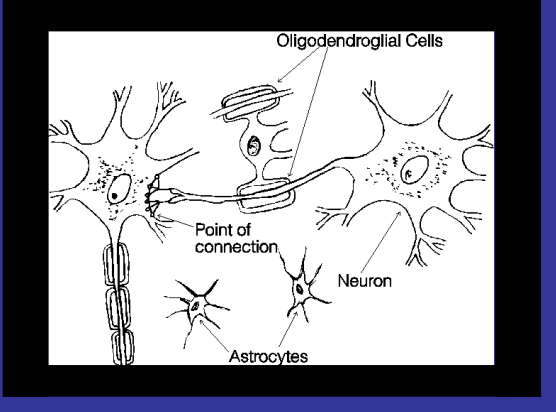

cortical / subcortical

heuristic / systematic

1 functional level

content of input → content of output

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automatic / nonautomatic

associative / rule-based

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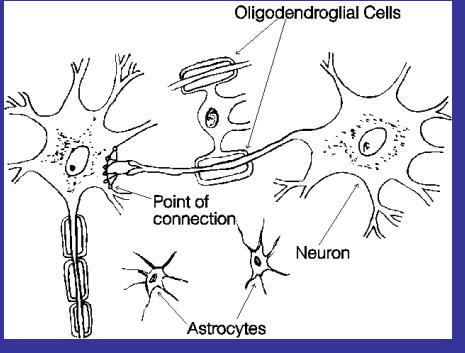

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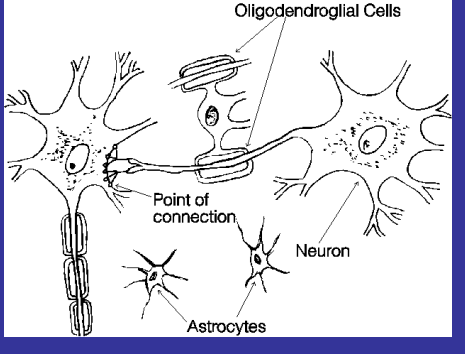

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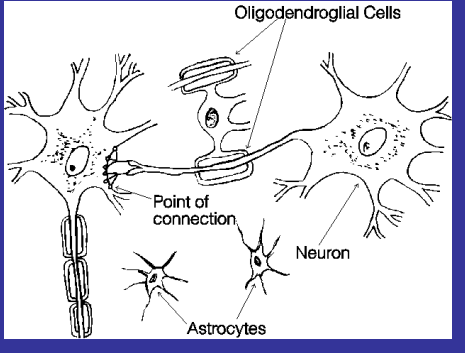

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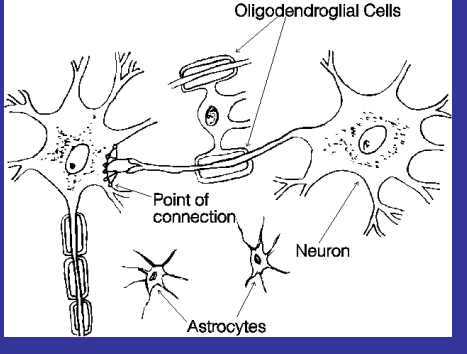


step 1: is conceptual separation possible
or should we assume principled overlap?

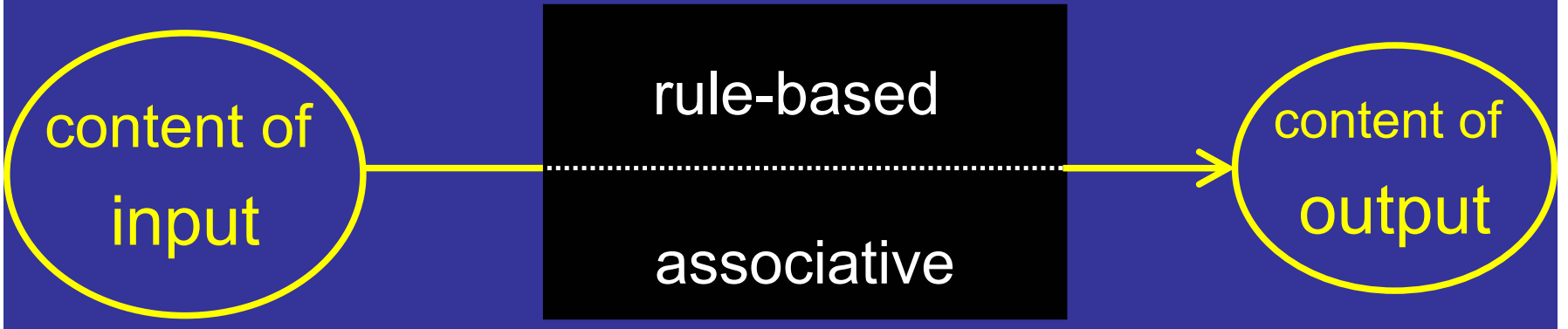
if no principled overlap / if principled overlap

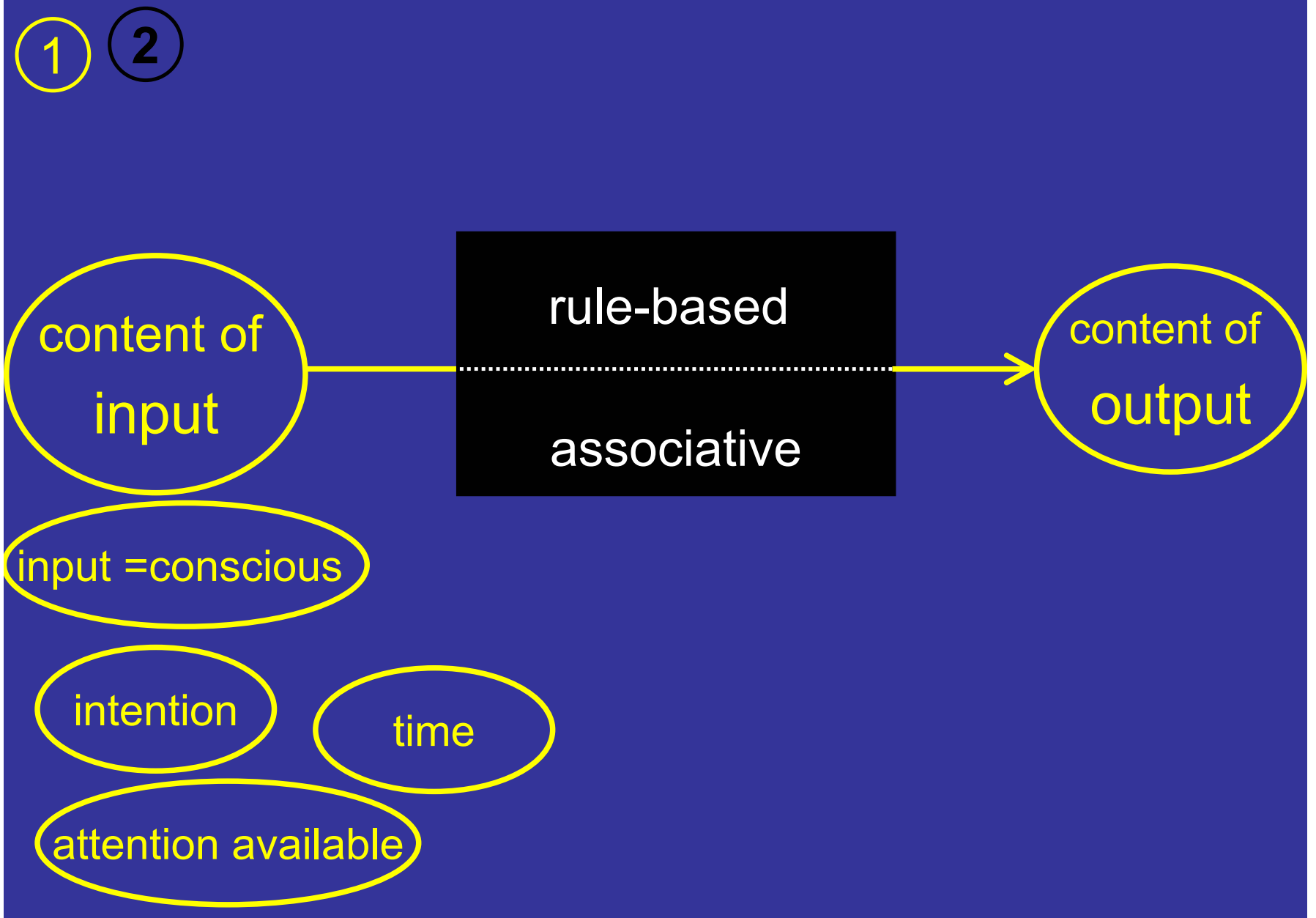
step 2:
investigate empirically
whether there is
de facto overlap

nothing left to investigate

step 1

1 2




1
2
content of input
rule-based
associative
content of output
input =conscious
intention
time
attention available

rule-based

?

associative

4€

n beers x price for 1

2 x 2€ = 4€

4€

4€

if n x p = x then pay x€

2 x 2 = 4 → pay 4€

4€

4€

if n x p = x then pay x€

2 x 2 = 4 → pay 4€

if 2 beers then pay 4€

4€

if n x p = x then pay x€

4€

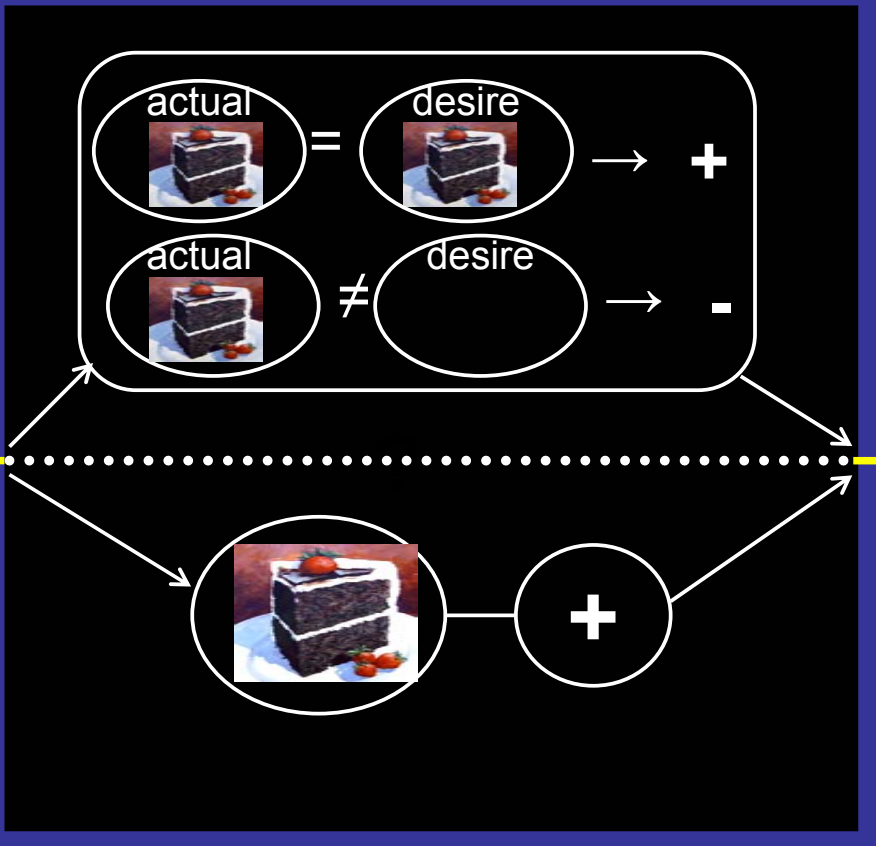
4€

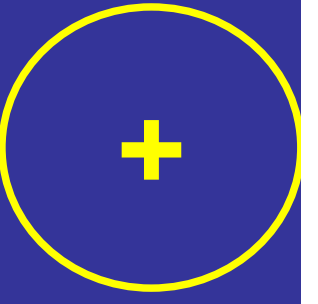
if n x p = x then pay x€

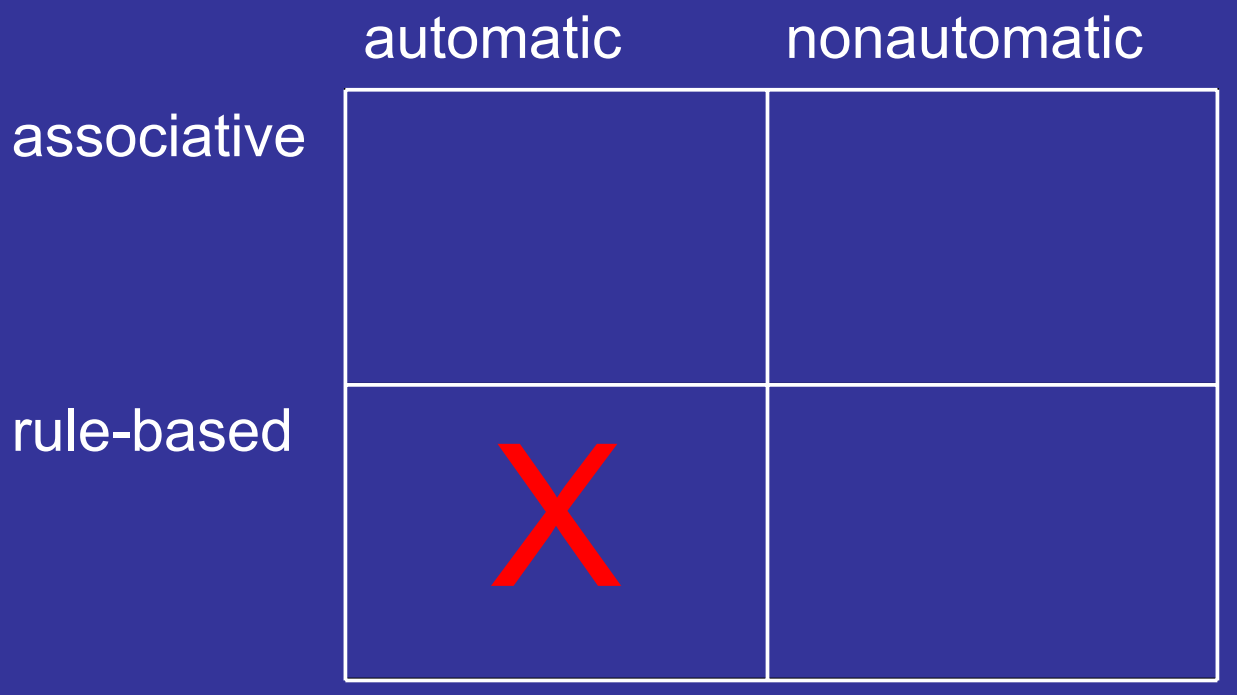
4€

if n x p = x then pay x€

1 2






automatic
nonautomatic
associative
rule-based
X

step 2

automaticity is gradual (cf. Moors & De Houwer,2006, Psych Bull)

abstraction is gradual (cf; Hahn & Chater, 1998; Pothos, 2005)

+ associative processes can compensate for lack of variables in virtue of similarity

what about compositional structure? → debate

options

- make relative conclusions
- continue to look for formal distinction between associative and rule-based that does lead to all-or-none criteria for diagnosis
- give up trying to open black box and stick to the functional level

  note: this level can be divided in sublevels

1 concrete functional level

content of input → content of output

1.5 abstract functional level

input → output

2 formal level

formal process properties/mechanisms

format of representations

3 implementational level