Stochastic modeling of behavioral data_

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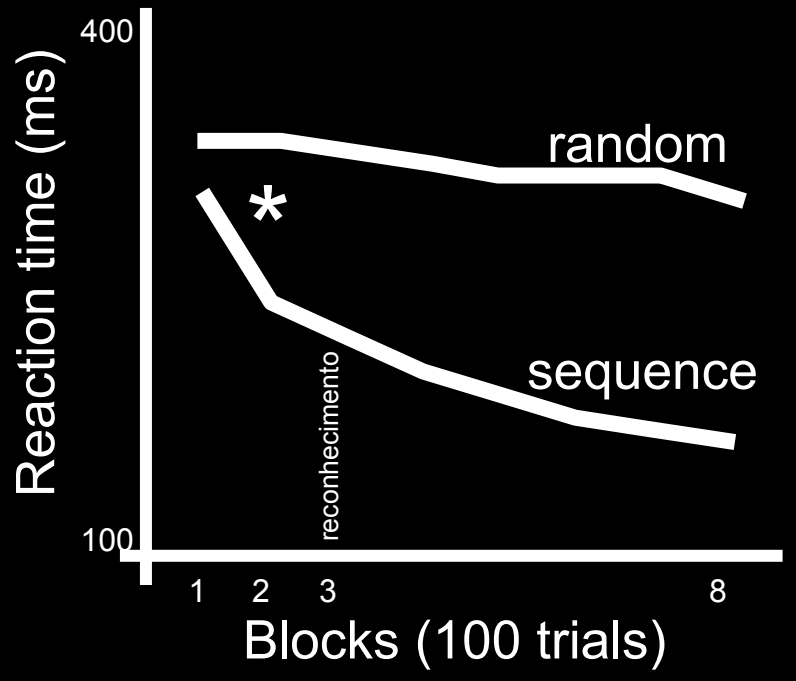
Main idea

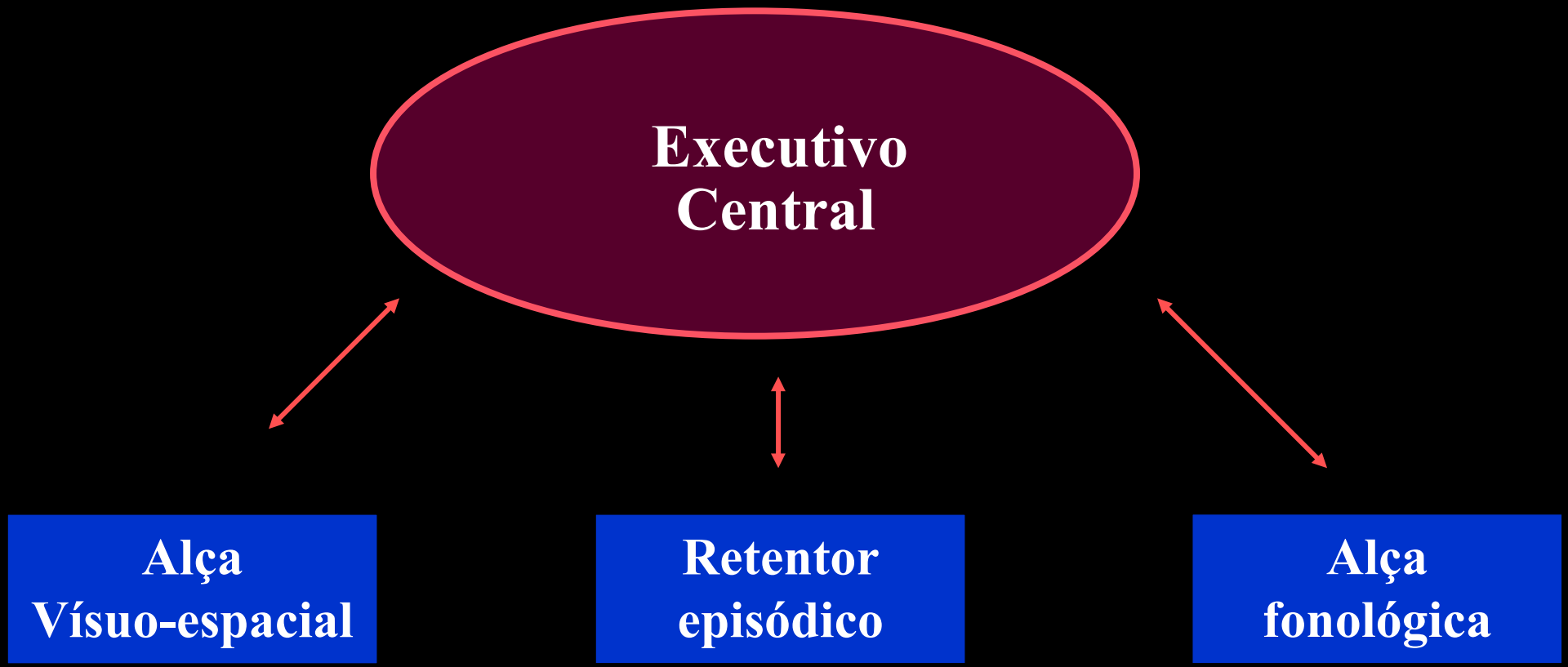
- Behavior can be explained in a simple way?

Serial reaction time task



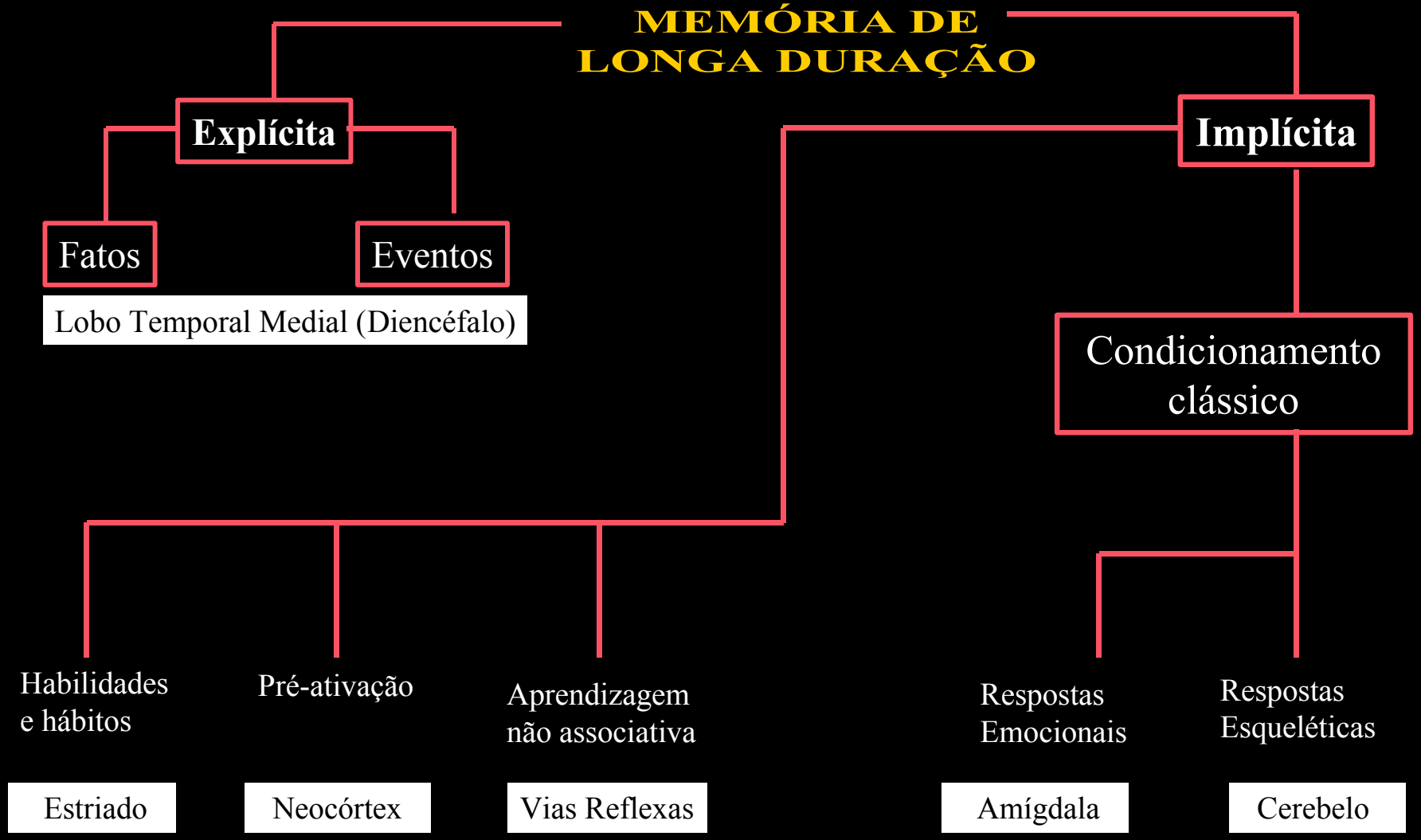
What is memory?

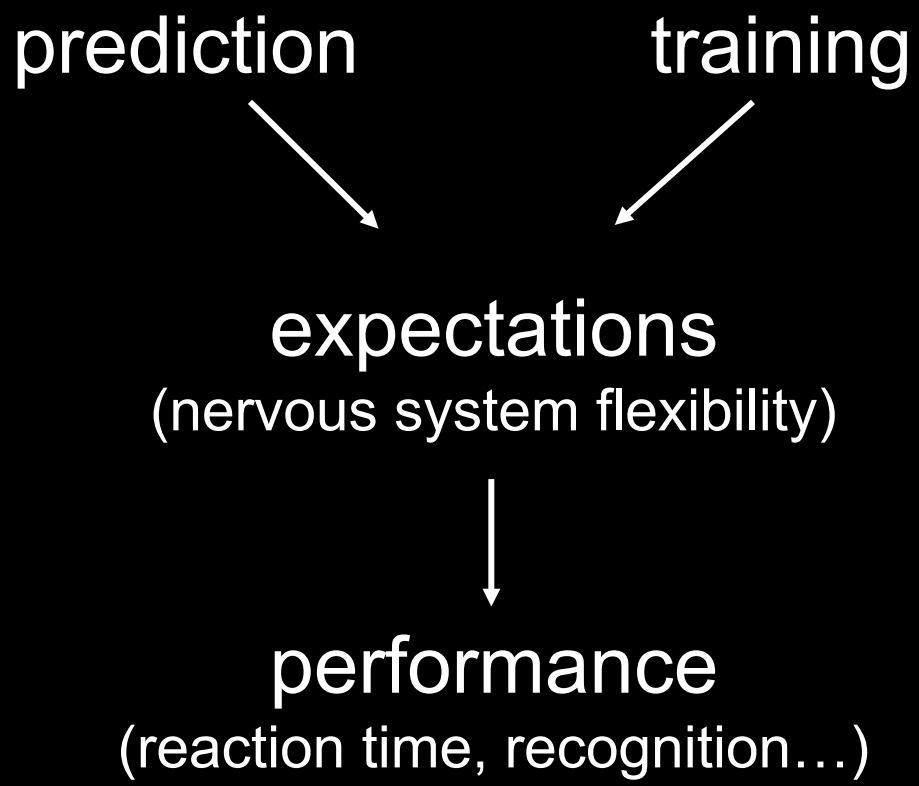
Working Memory



Baddeley, 2000

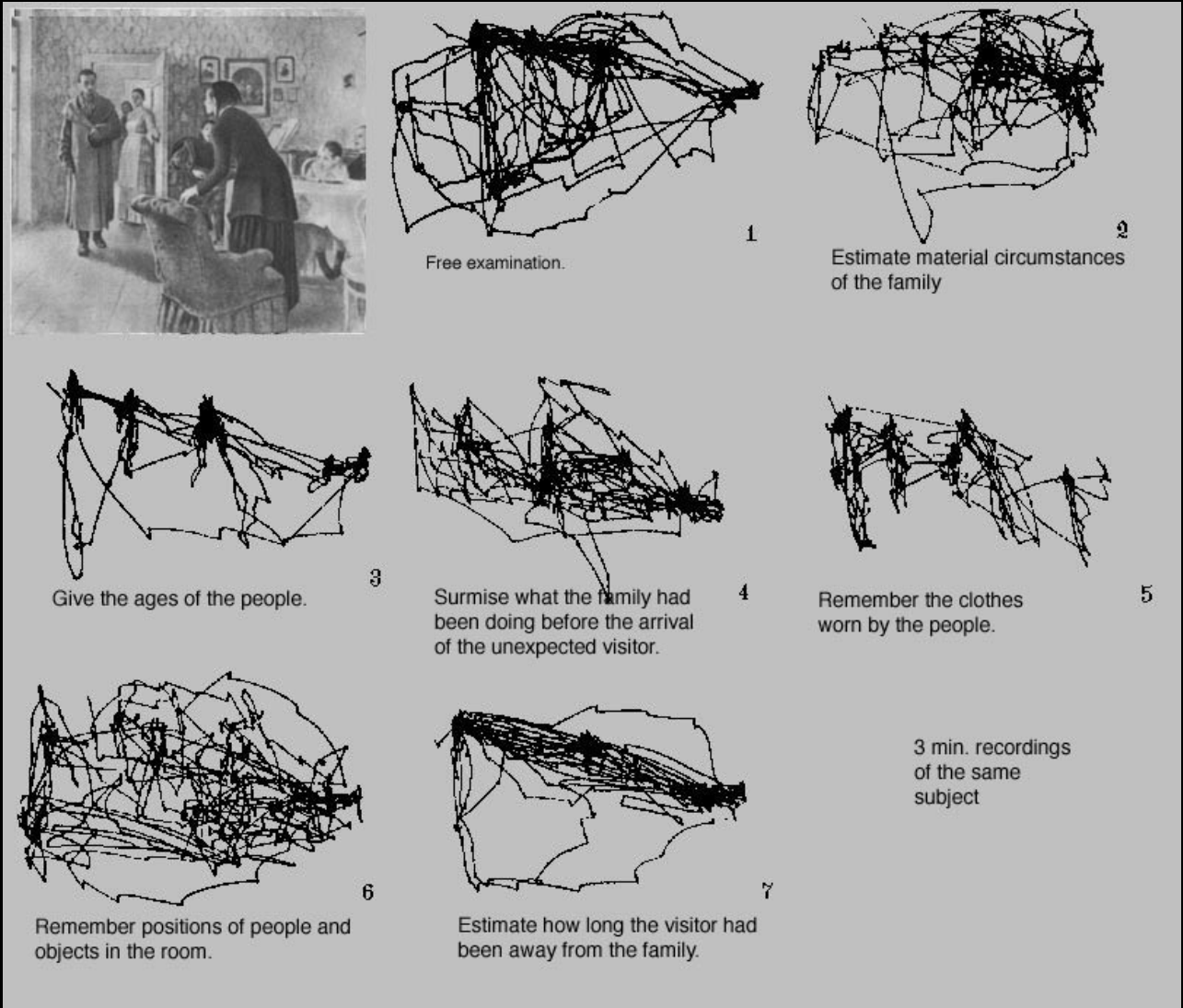
Long Term Memory




prediction
training
expectations
(nervous system flexibility)
performance
(reaction time, recognition…)

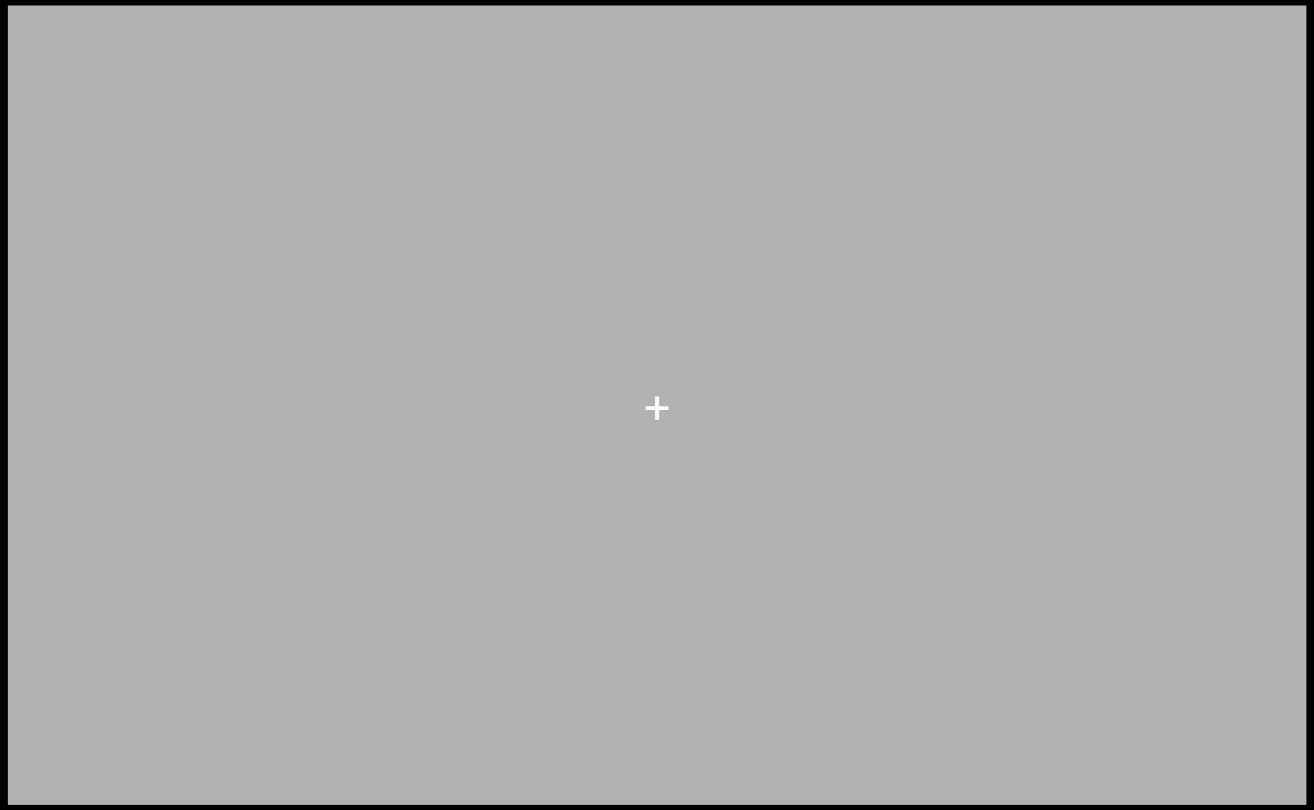
Memory and information

Different challenges, different information in a same context




Novice driver
Experienced driver
9
10
9
10
11
12
11
12
13
14
14
13

Orienting attention



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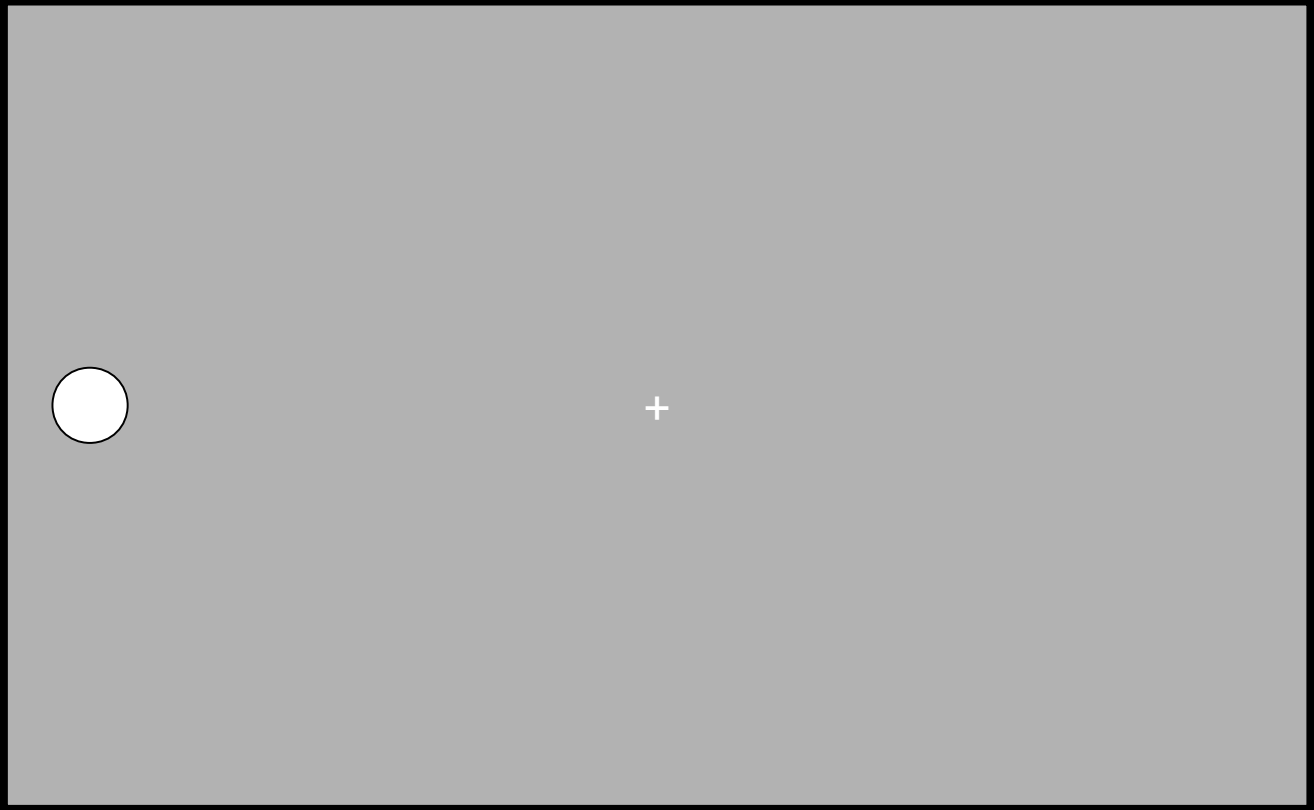
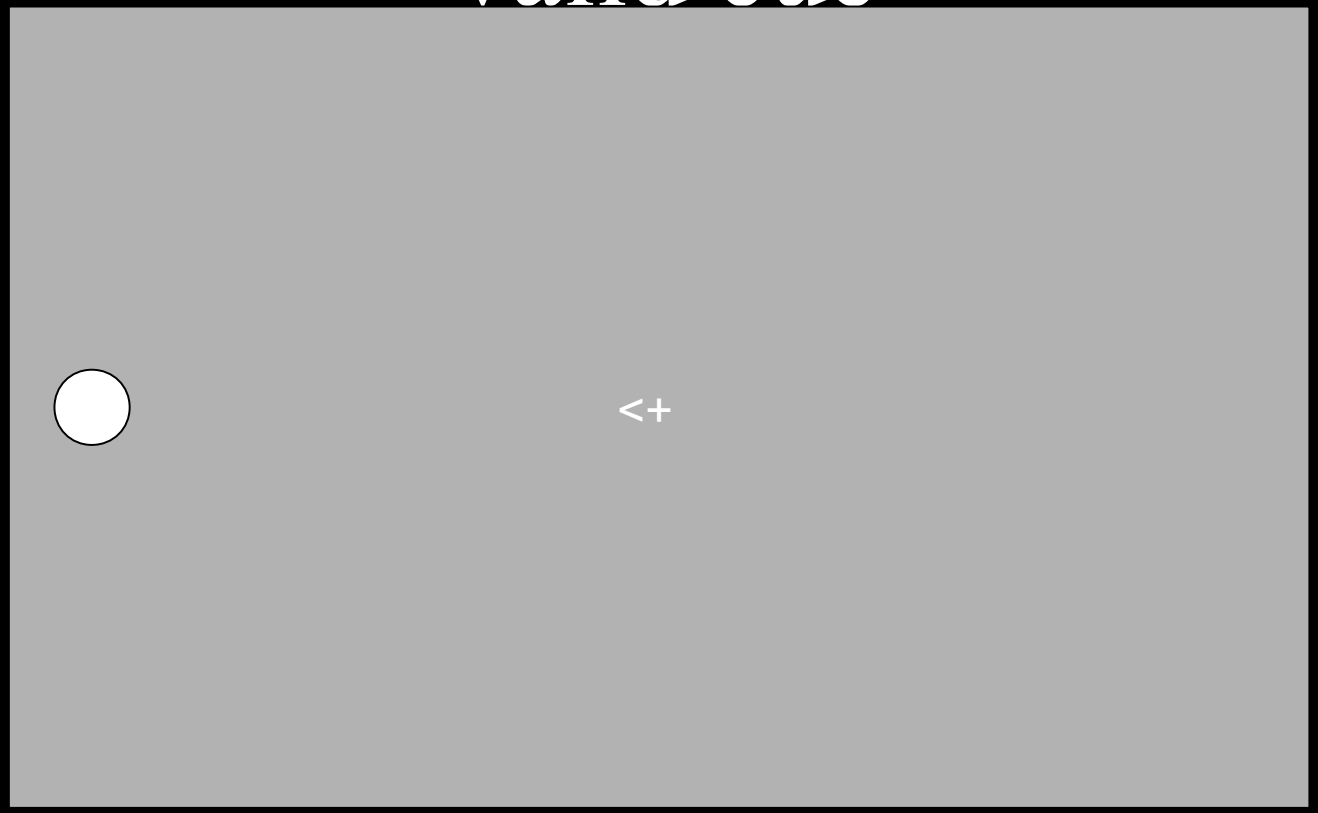
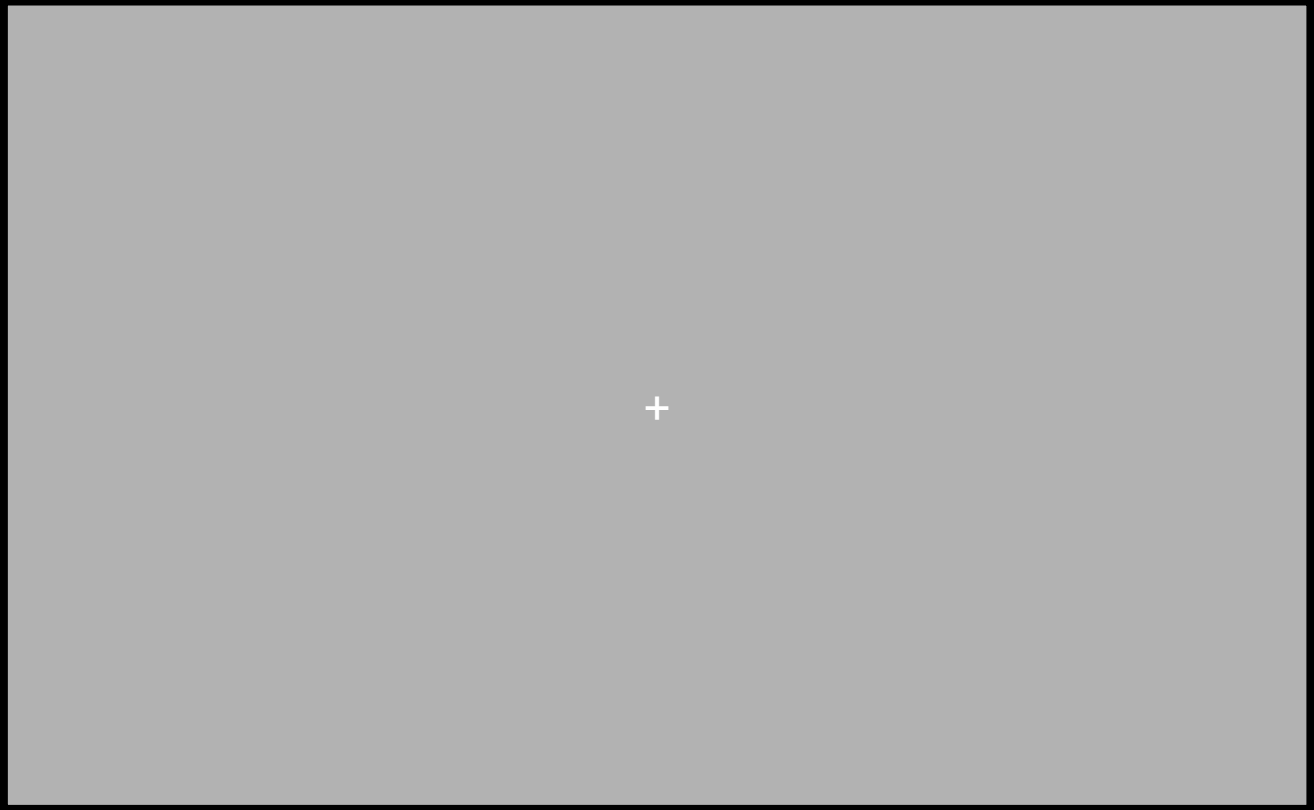
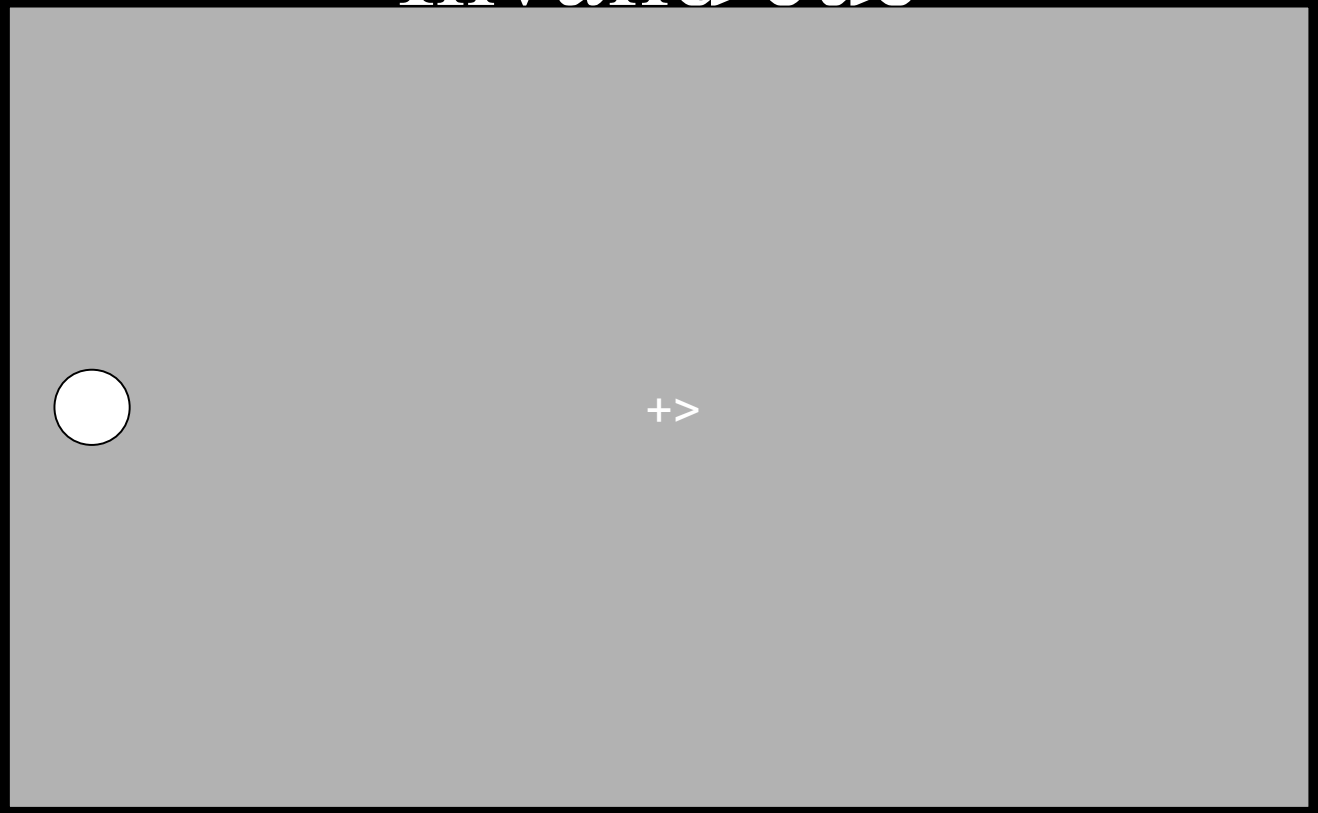


Valid cue

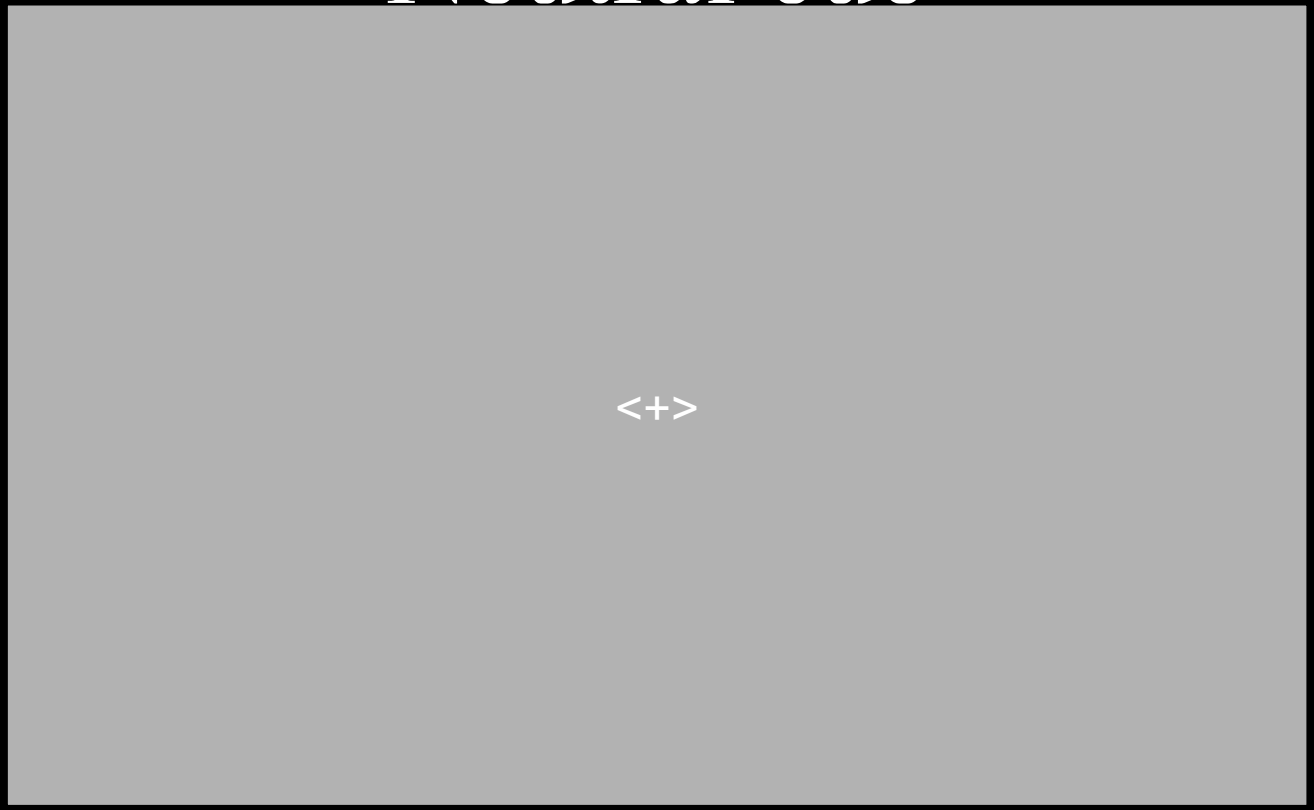




Invalid cue



Neutral cue

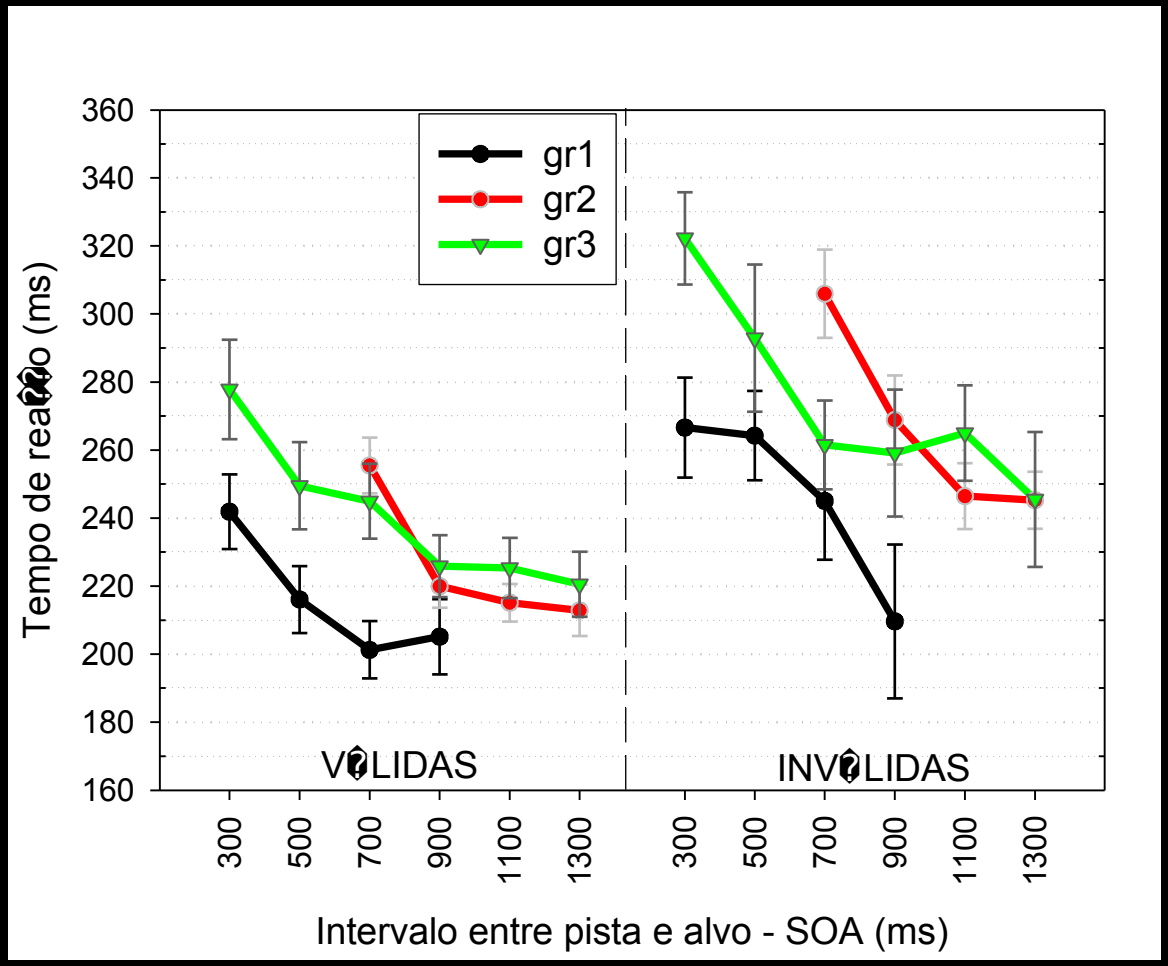


Experiment

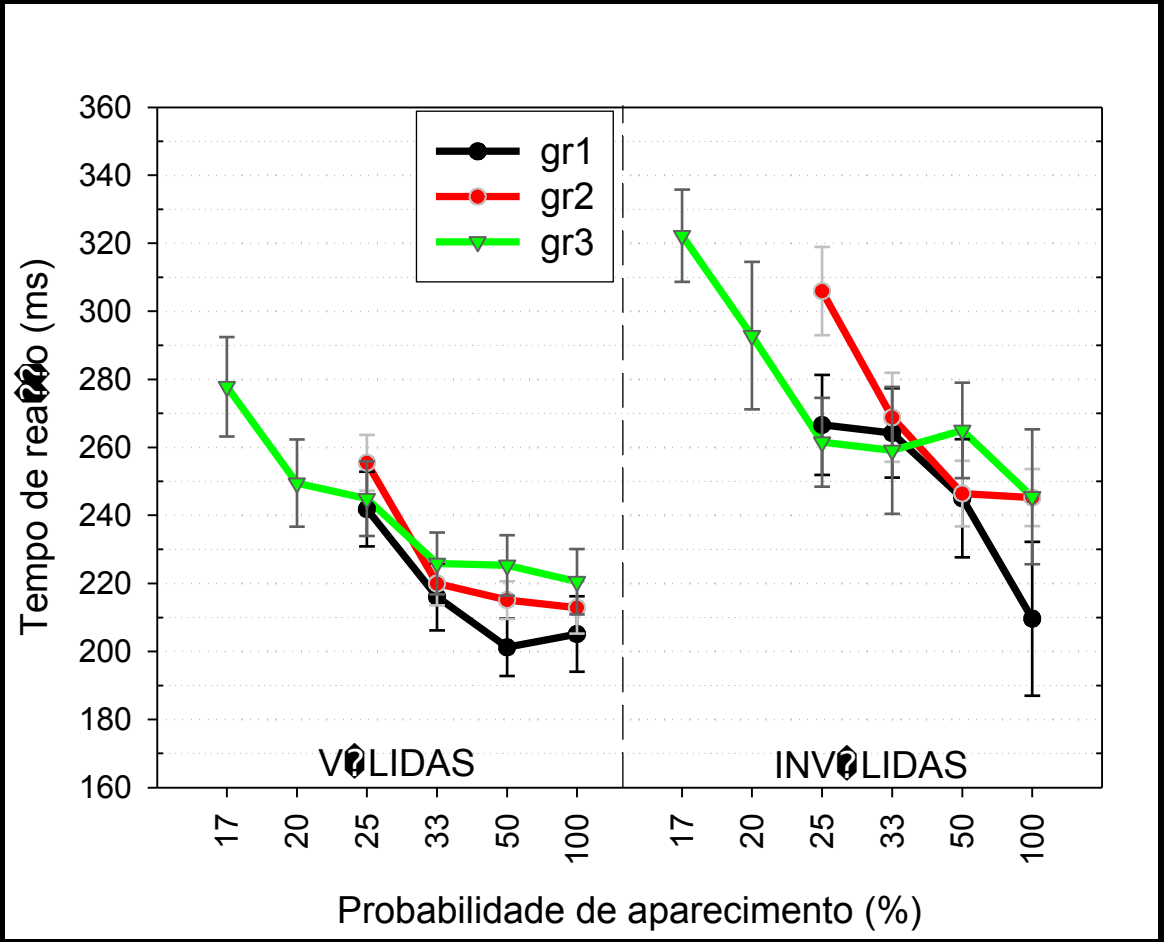
EXPERIMENT

- 3 grups: 3 different SOAs
  - Short SOAs (300, 500, 700, 900)
  - Long SOAs (700, 900, 1100, 1300)
  - All SOAs (300, 500, 700, 900, 1100, 1300)

RESULTS

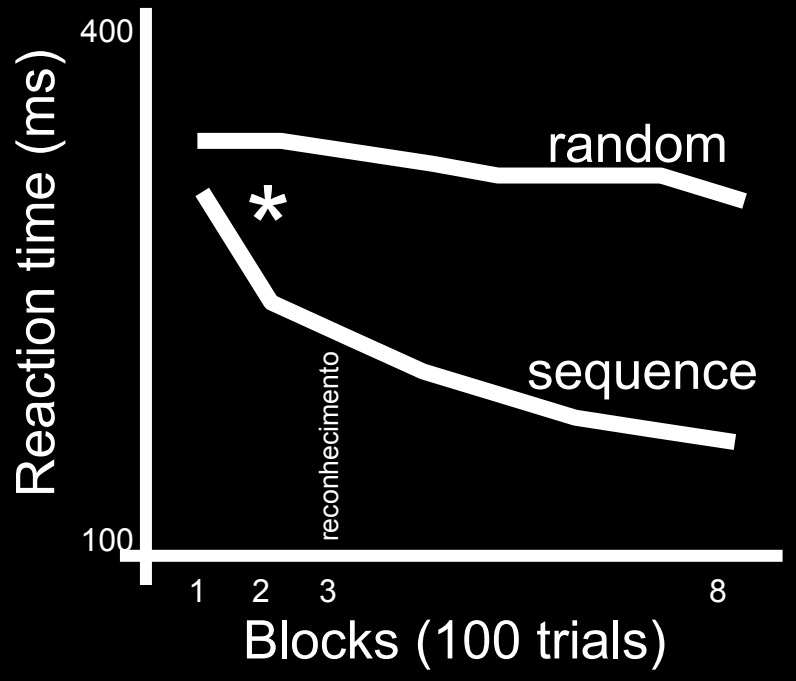

gr1
gr2
gr3
360
340
320
300
280
260
240
220
200
180
160
Tempo de rea
o (ms)
V
LIDAS
INV
LIDAS
300
500
700
900
1100
1300
300
500
700
900
1100
1300
Intervalo entre pista e alvo - SOA (ms)

Considering prediction



Returning to sequence learning

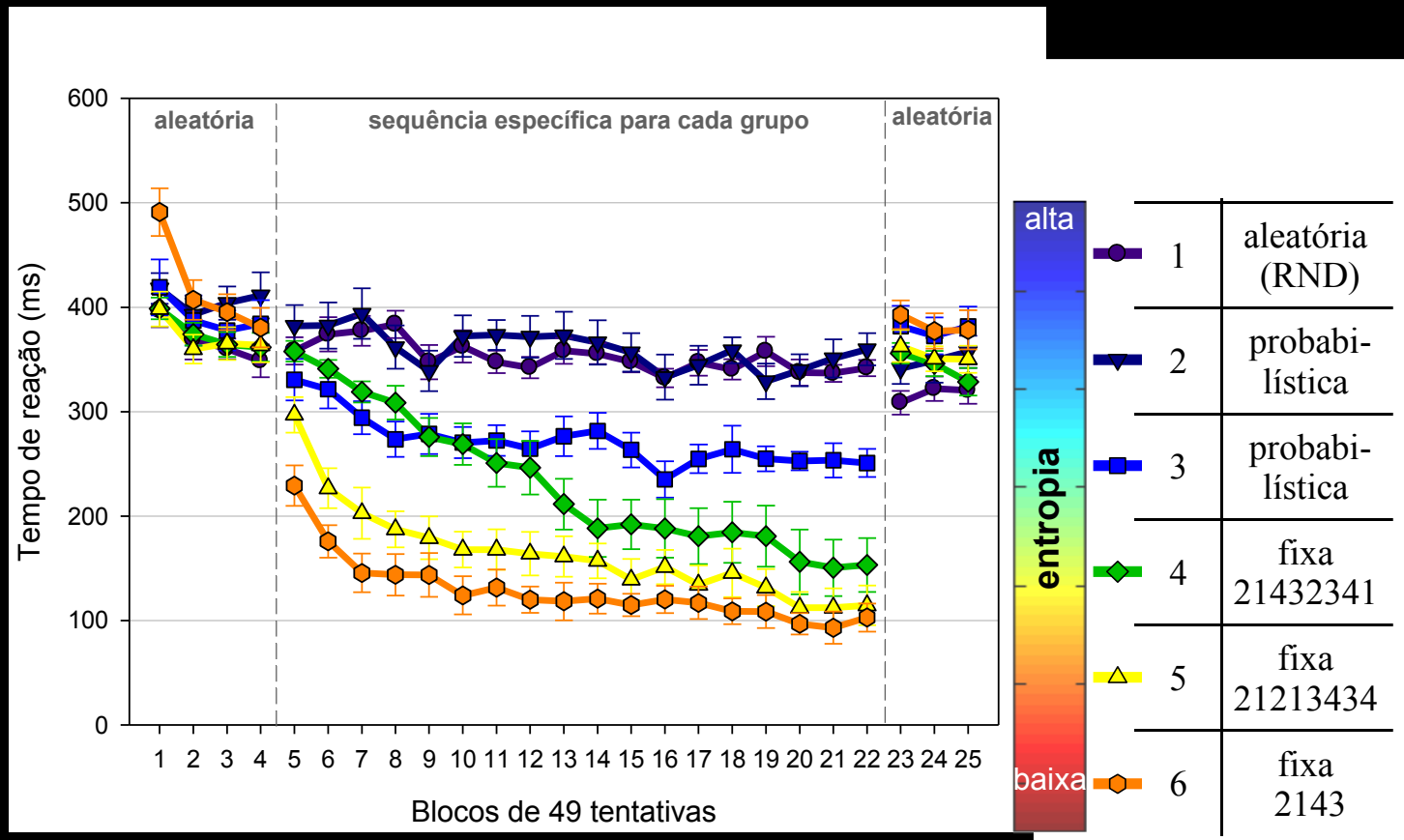
Serial reaction time task



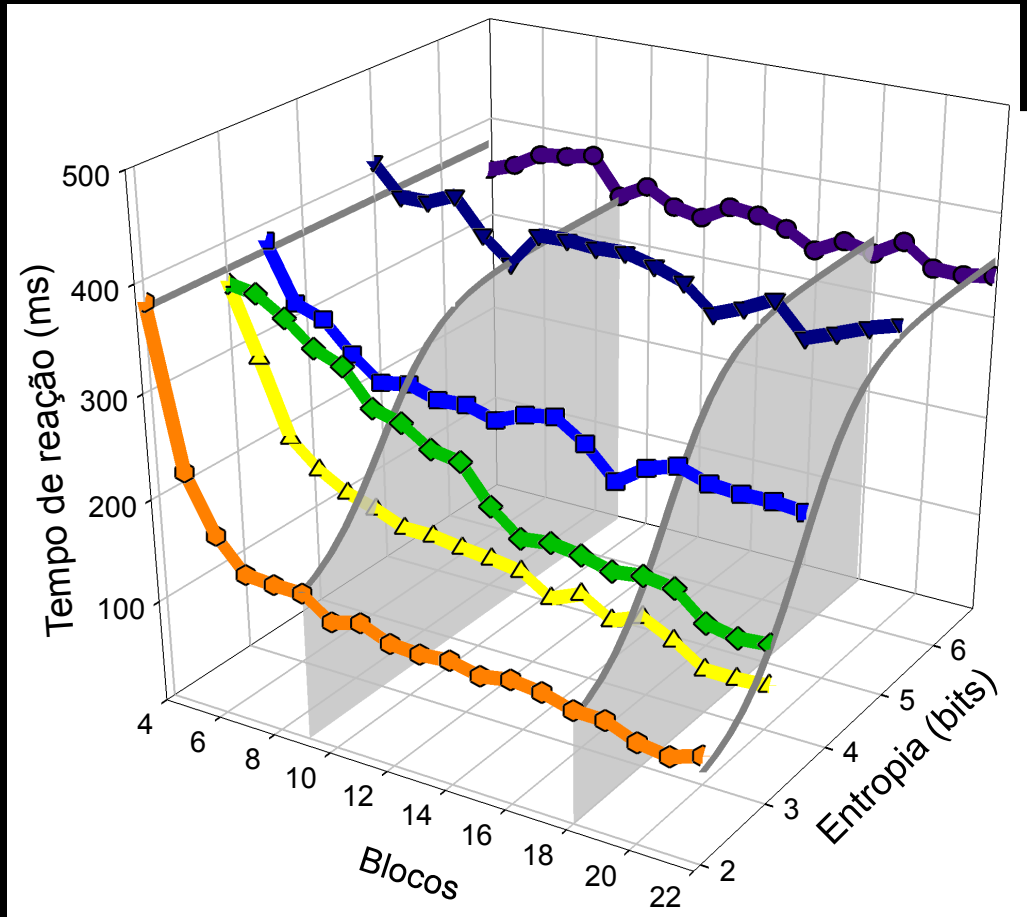
Complexity

$$H = \sum p_i * log_2(1/p_i)$$

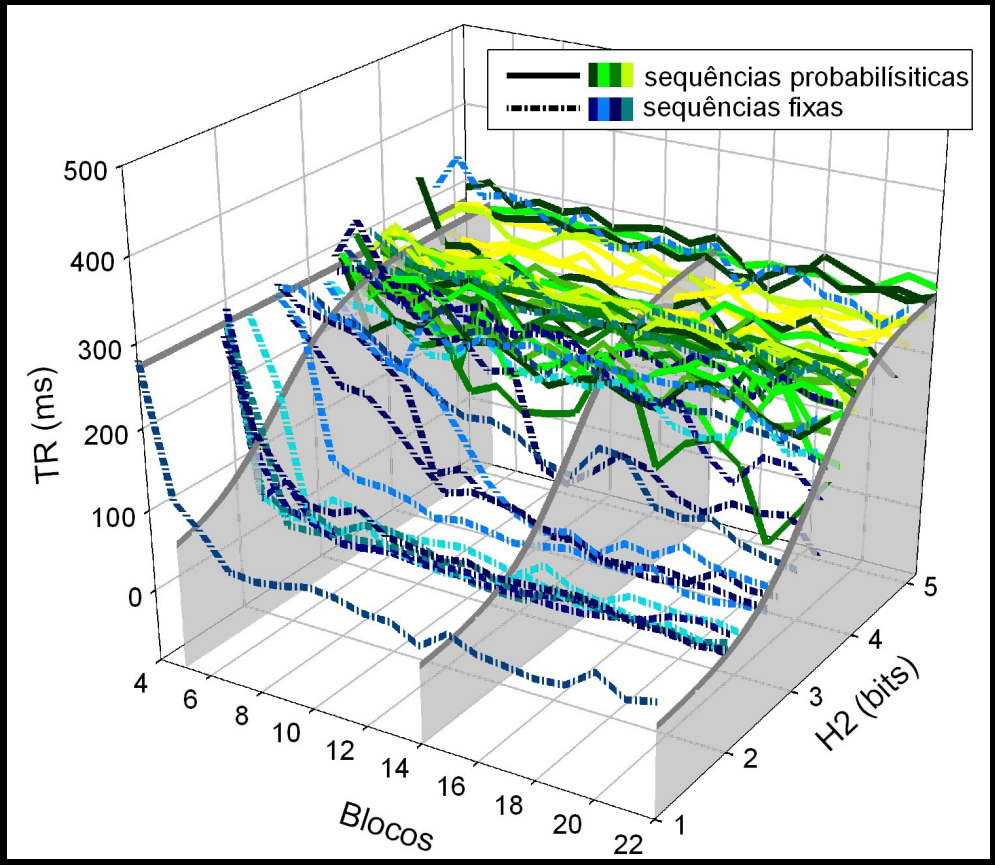
Reaction time and entropy



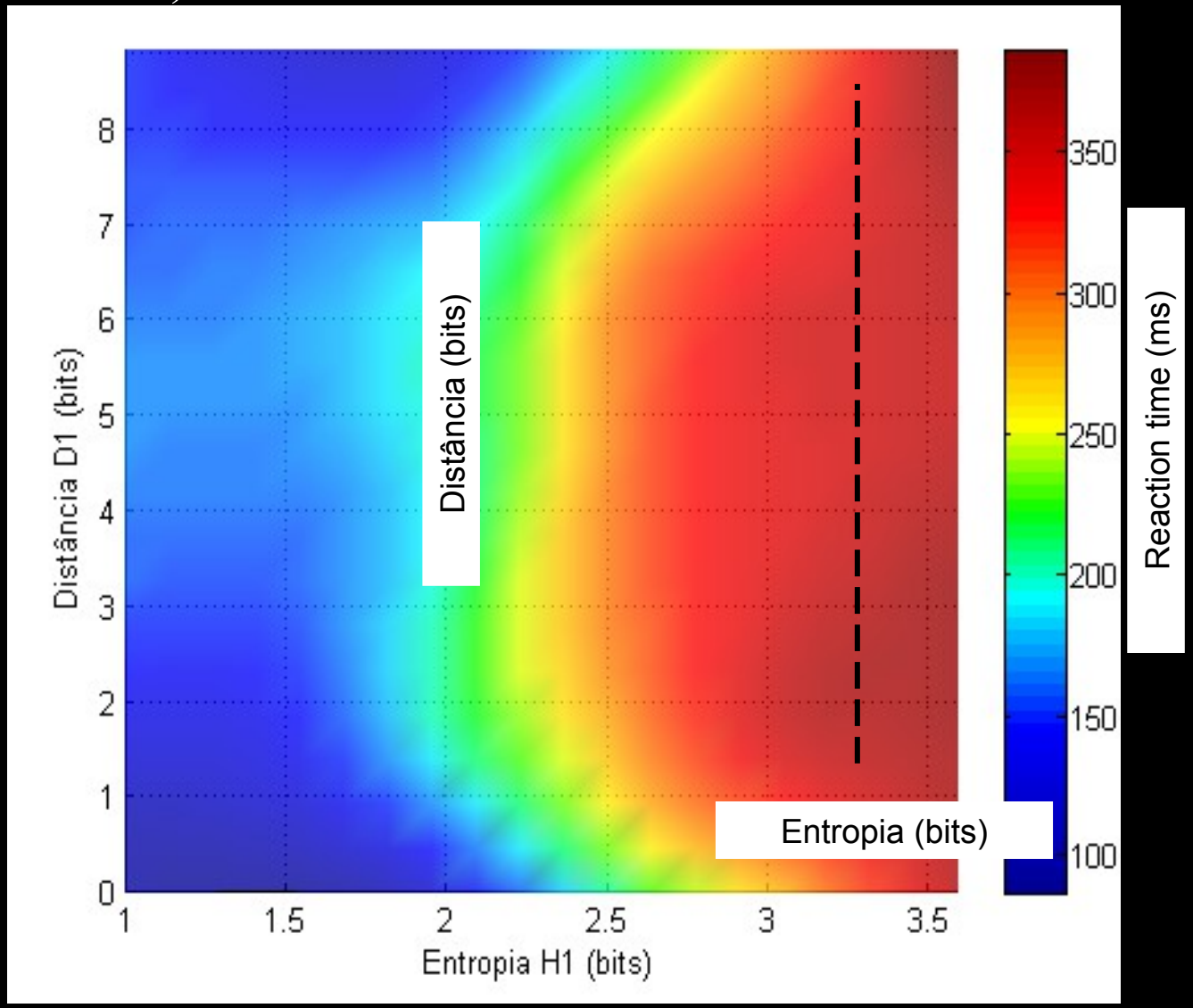
Reaction time

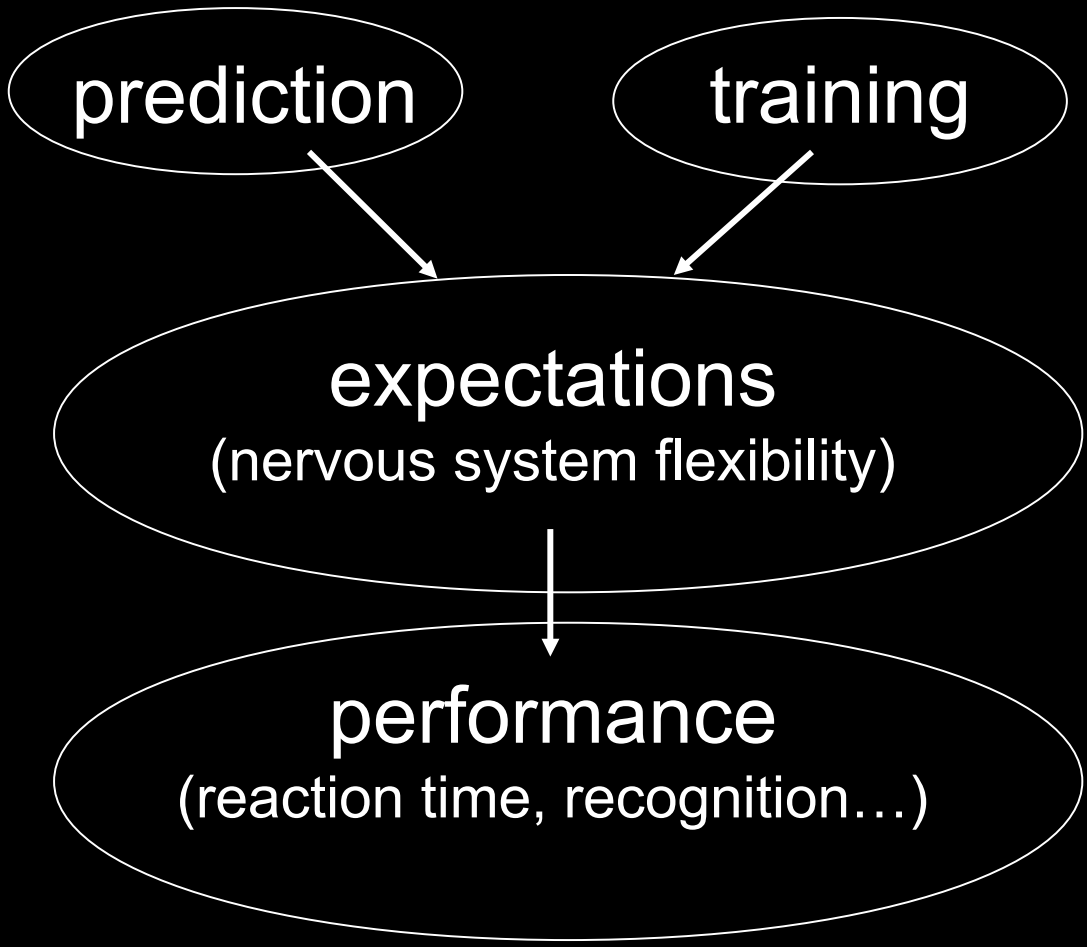


1	aleatória (RND)
2	probabi-lística
3	probabi-lística
4	fixa 21432341
5	fixa 21213434
6	fixa 2143


sequências probabilísiticas
sequências fixas
500
400
300
200
100
0
TR (ms)
4
6
8
10
12
14
16
18
20
22
Blocos
1
2
3
4
5
H2 (bits)

Different entropy on first and second sequence (Kullback–Leibler distance)

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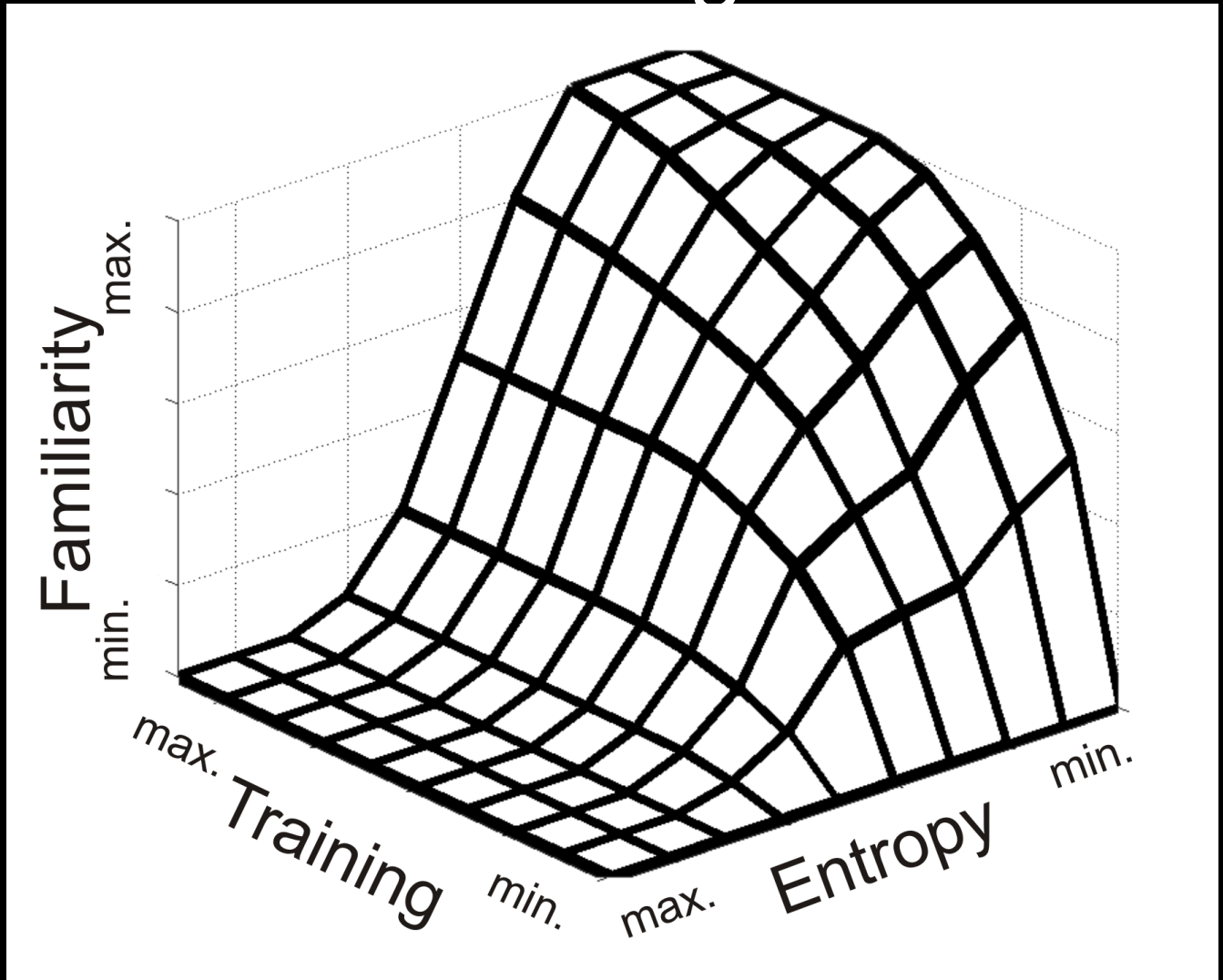
General model for sequence learning



- Rodrigo Pavão
- Gilberto Xavier

Thanks