

The Effect of Evoked Conflict on Executive Control in a Realistic Task

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Neurocognitive Processing Laboratory

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The integrated model of control

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Goals and assumptions:

- ① Control can occur without *humunculus*
- ② Control emerges from multiple, independent conflict-control loops
- ③ Minimum control principle

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Goals and assumptions:

- 1 Control can occur without *humunculus*
- 2 Control emerges from multiple, independent conflict-control loops
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Conflict

$$C_t = \frac{\sum_{k \in \Lambda \neq i} \exp\left(\frac{U'_k}{n}\right)}{\sum_{j \in \Omega} \exp\left(\frac{U'_j}{n}\right)}$$

C — conflict

U' — utility modified by control

G — current control strength (dynamic)

a — adaptation factor

g — global control strength (constant for agent)

Conflict

$$C_t = \frac{\sum_{k \in \Lambda \neq i} \exp\left(\frac{U'_k}{n}\right)}{\sum_{j \in \Omega} \exp\left(\frac{U'_j}{n}\right)}$$

Control

$$G_t = agC_t + (1 - a)G_{t-1}$$

C — conflict

U' — utility modified by control

G — current control strength (dynamic)

a — adaptation factor

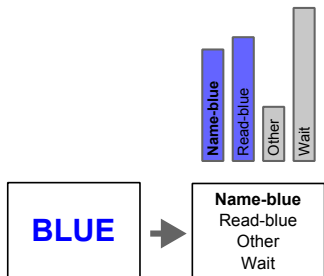
g — global control strength (constant for agent)

Stroop task

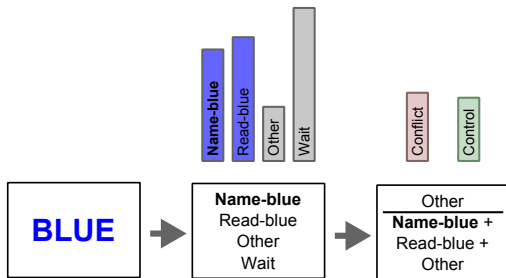
Stroop task

BLUE

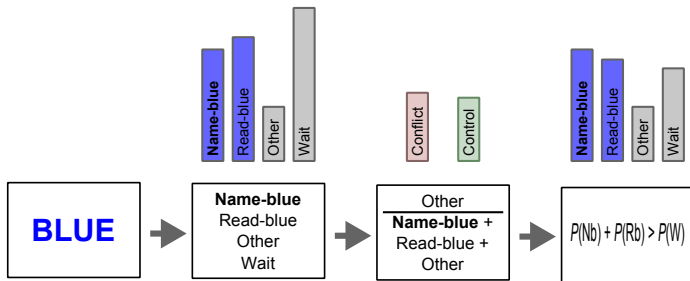
Stroop task



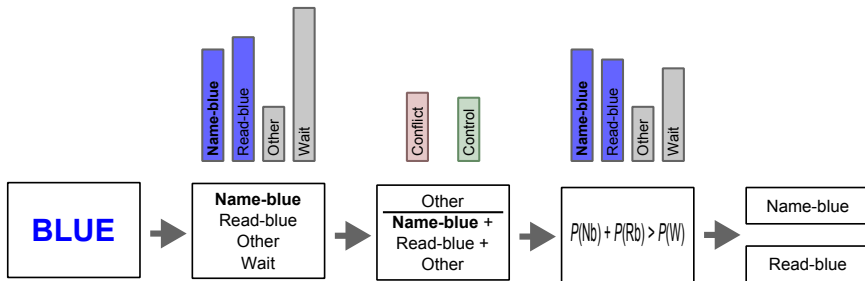
Stroop task



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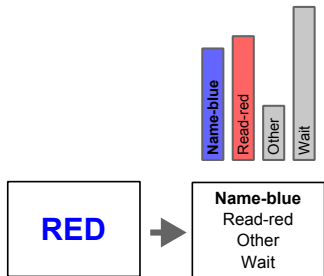
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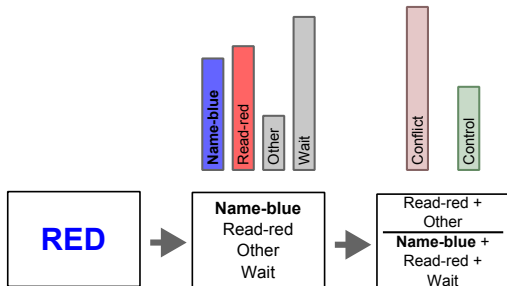
Stroop task

RED

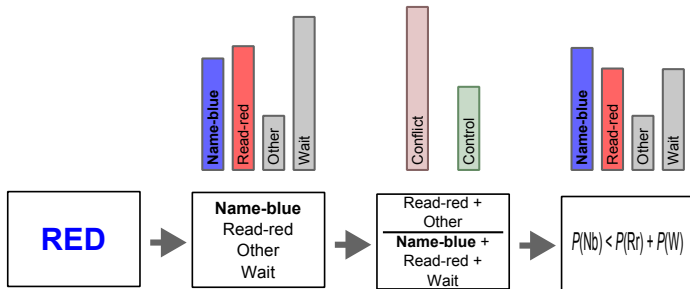
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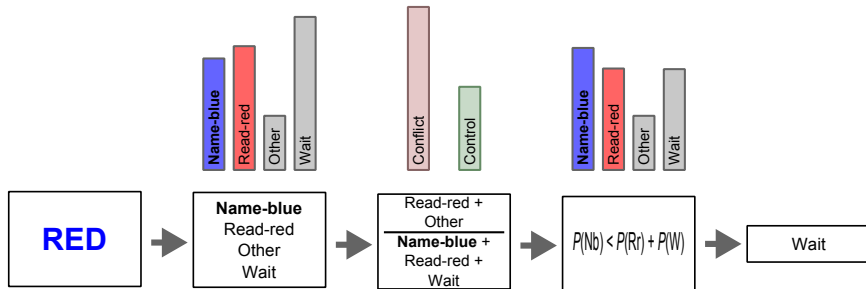
Stroop task



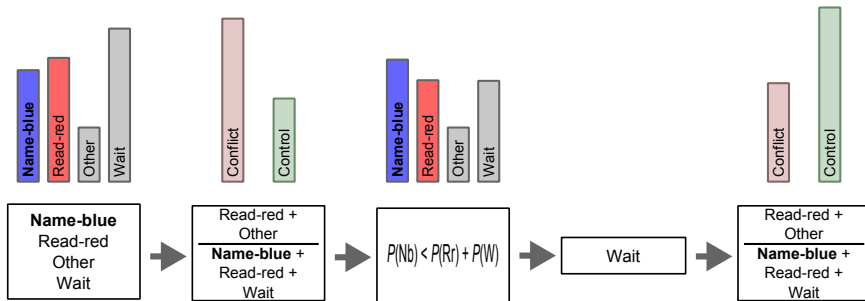
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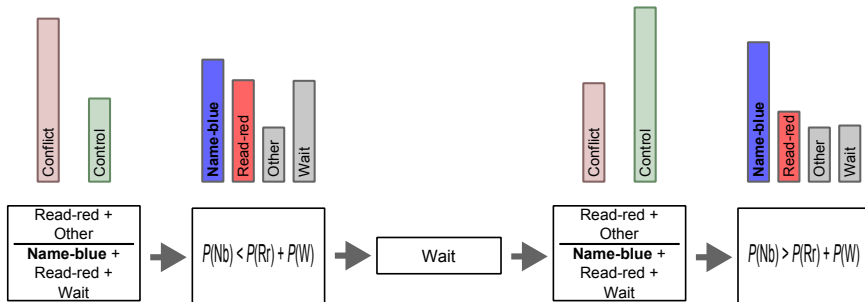
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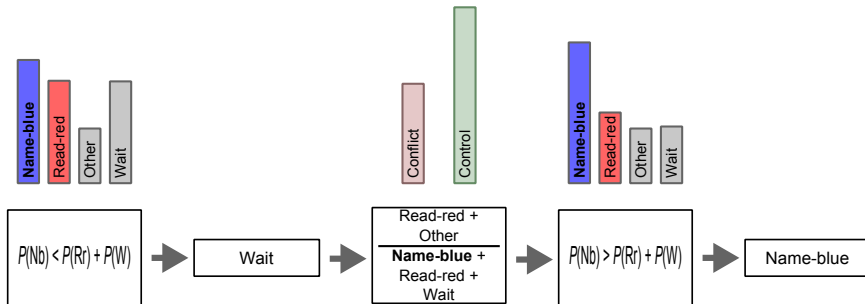
Stroop task



Stroop task



Stroop task







The complex control task

Goals of the study

- Generalisation of the model's prediction
- Verification of semantic control hypothesis

The task





Badanie bodźców wizualnych

	<p>Over the years, a number of different methods have been used for establishing remote connections between industrial systems and sensors, including fixed connections, low power radio links, Bluetooth and Wi-Fi.</p>	<p>Electronic industry is not counted as a crucial sector of the global economy, what does not predict high profits for companies from this sector.</p>
<p>Pipes of varying sorts are among the earliest of musical instruments, and pipers must often have imagined a pipe too large for human lungs.</p>	<p>Electronic industry is counted as a crucial sector of the global economy, what predicts high profits for companies from this sector.</p>	
	<p>Little Sam (on phone): My son is having high fever and he won't be able to come to school today. Teacher: Who is this? Little Sam: This is my father speaking!</p>	

7 messages out of 30 has been marked. 1 min. 43 sec. left.

The task

Badanie bodźców wizualnych





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Target message

The task

Badanie bodźców wizualnych

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Target message

Conflicting target

The task

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Distractor message

Target message

Conflicting target

The task

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Distractor message





Target message

Conflicting target

Distractor message/image

The task

Badanie bodźców wizualnych **Noise message/image**





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Distractor message/image

The task

Badanie bodźców wizualnych **Noise message/image**

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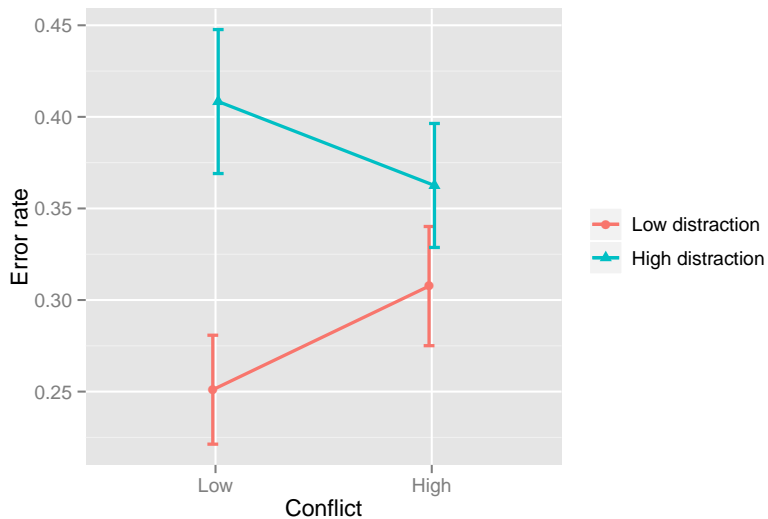
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Distractor message/image

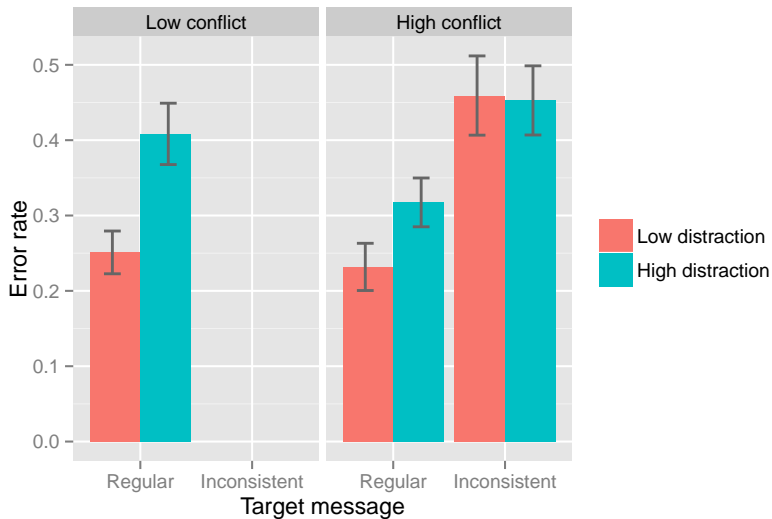
Problems to solve:

- Analyze new investment of IT company Elekroniikka-alan in a mobile phone system, and judge the probability that Elekroniikka-alan will increase its head-count due to this investment.
- Describe how the human cortex works.
- Tell how computer processor works.
- Evaluate what factors have the most important role in supporting the existing political system in Ukraine.

Results



Results



Thank You for Your Attention

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Neurocognitive Processing Laboratory

<http://ecfi-group.eu>