

What happens when we switch tasks?

Pupil dilation in multitasking

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Introduction

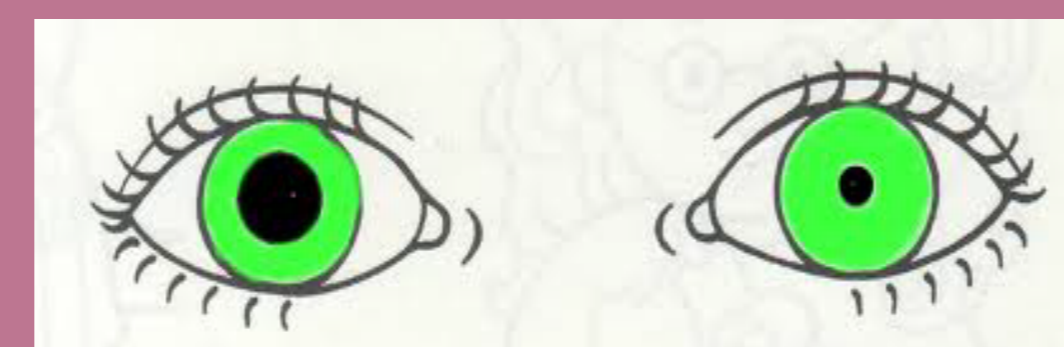


In our daily life we constantly switch between tasks

We switch from working to checking our emails or facebook and then back to work again, from cooking to washing some dishes and then continue with cooking etc.

What happens when people switch between tasks? What can happen at a switch?

1. our decision to switch
2. the old task finishes (e.g. rehearsal)
3. preparing for the new task



In order to investigate switch processes, we studied changes in pupil dilation.

Pupil dilation increase: reflects many cognitive processes (e.g. Laeng et al. 2012)

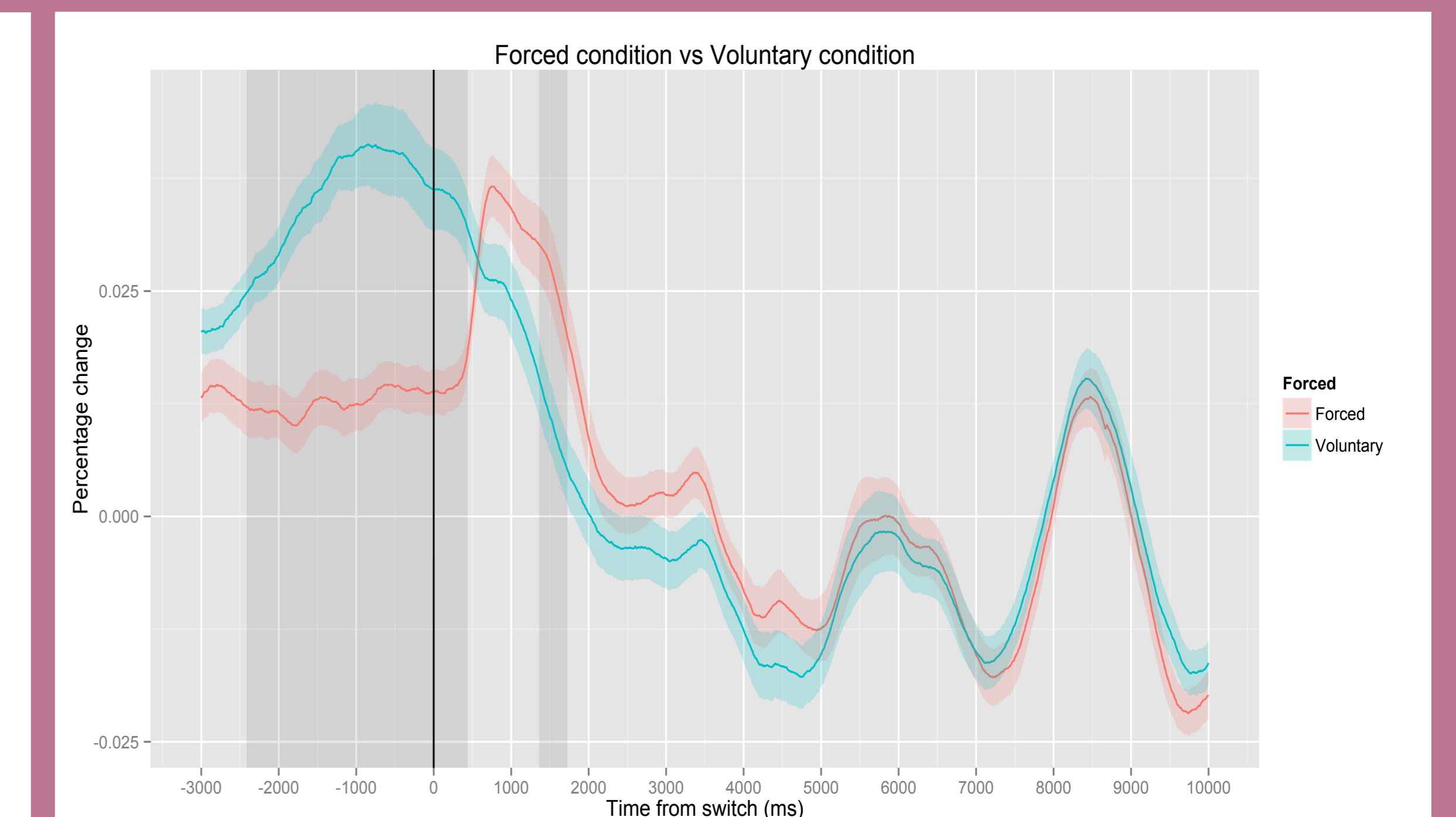
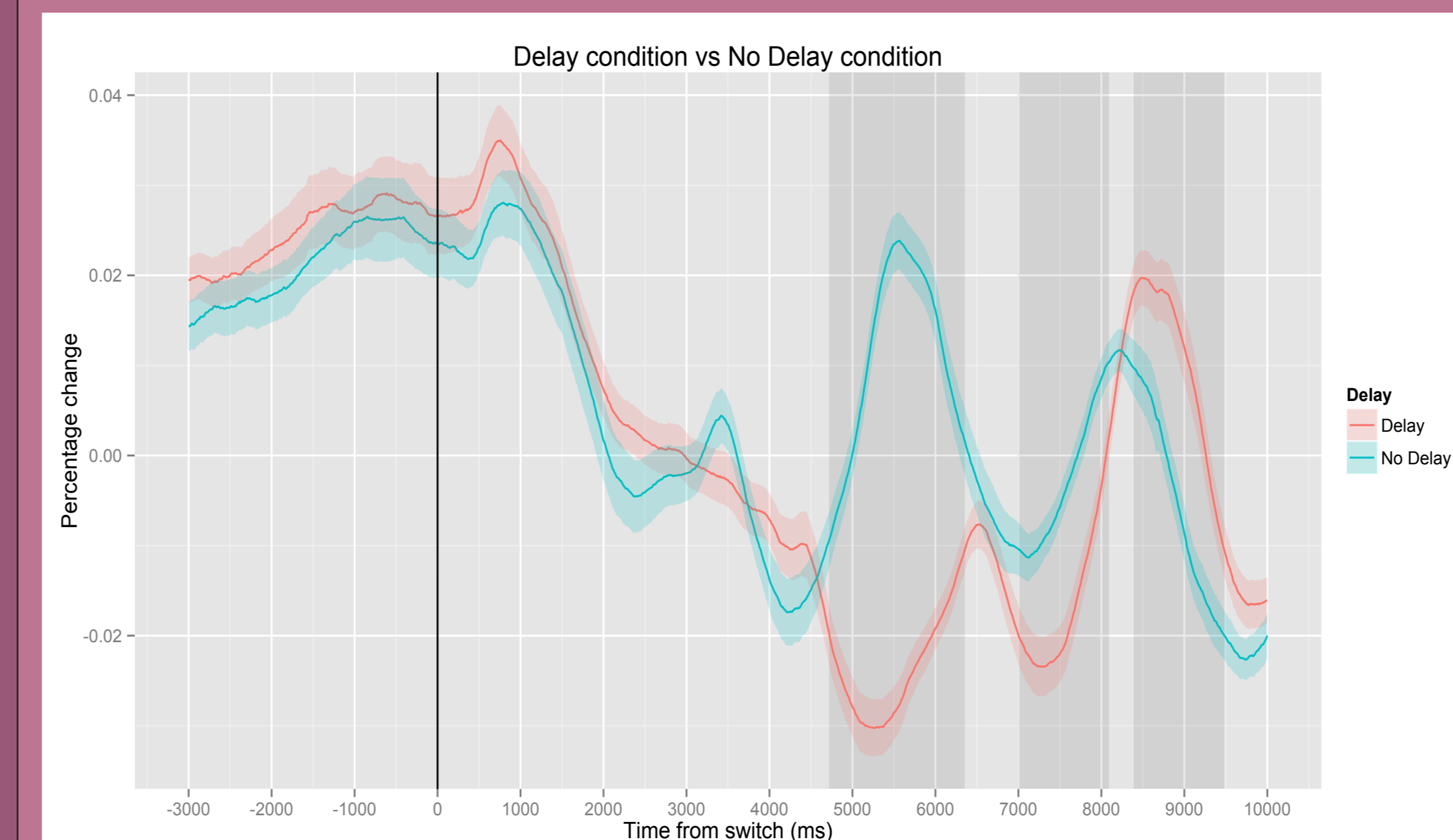
The timeframe it will create in combination with our conditions will show that the **decision to switch** is the most influential factor.



Results

Pupil dilation results

Increase in pupil dilation around the switching point from primary to secondary task



No significant difference between Delay/No Delay

Pupil dilation does not increase because of:

- the preparation to interrupt the primary task
- the beginning of the secondary task

Significant difference between Forced/Voluntary

Pupil dilation increases because of:

- the decision to switch tasks

Behavioral results

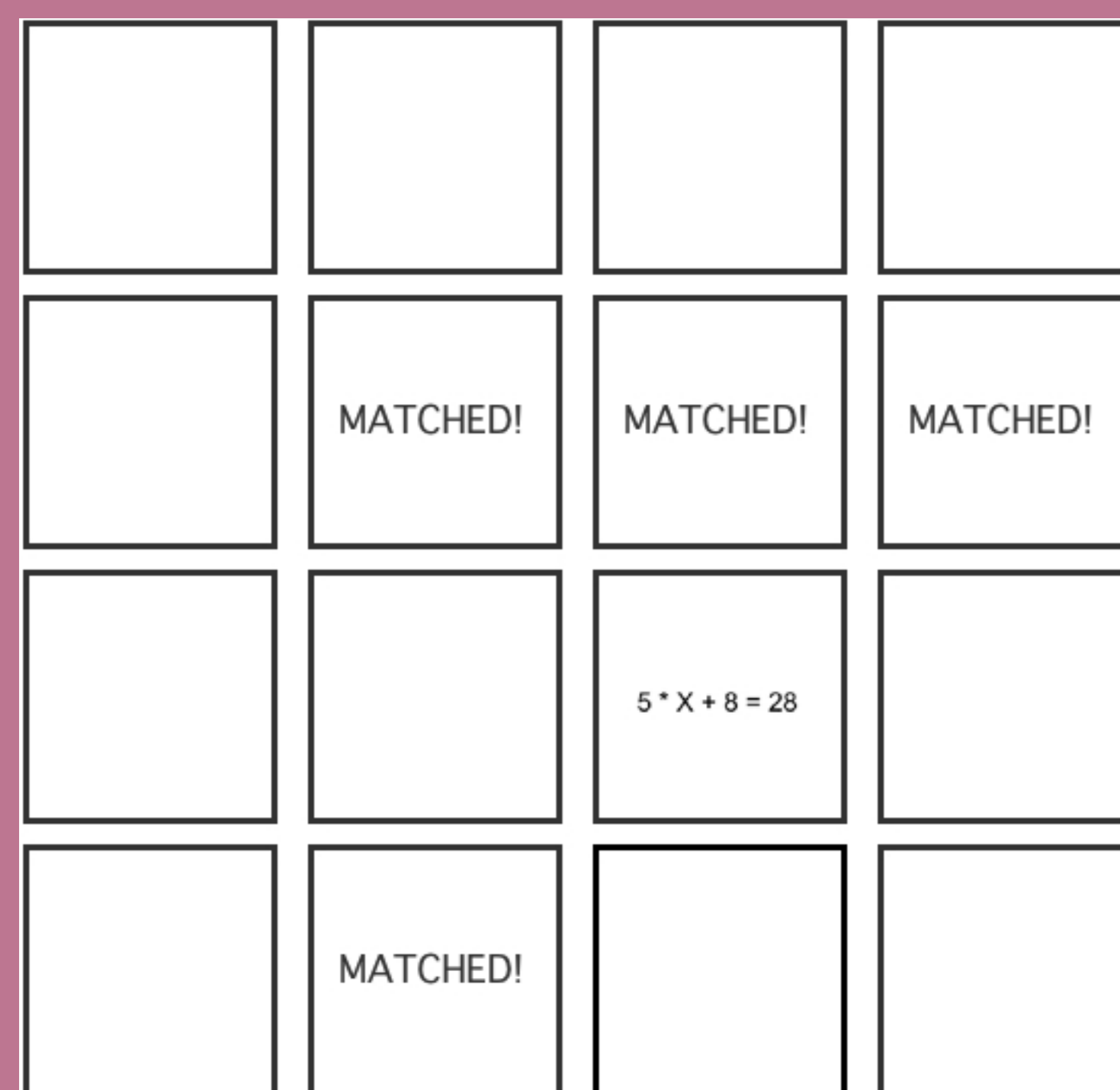
74.73% of the voluntary switches happened after a match!

	Forced	Voluntary
Avg time spent on memory game	187.16	198.28
Avg nr of revisits per block	13.37	11.9

No significant difference between Forced/Voluntary conditions for behavioral data:

being forced to switch did not make their performance worse compared to when they chose when to switch

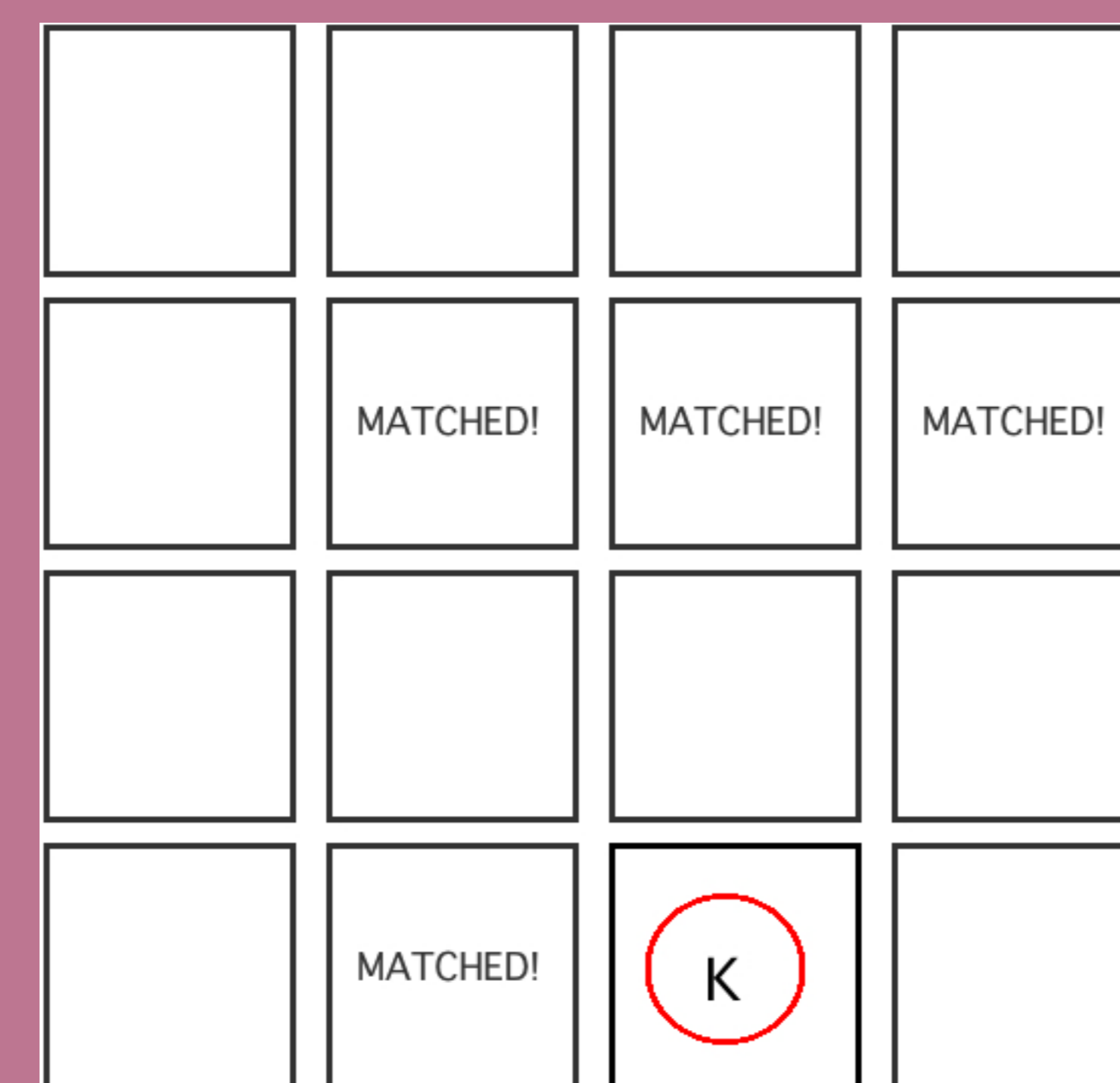
Experiment



Primary task: Memory game

- solve the equation
- find the equation with the same solution
- match all the cards

Possible moves: open a new card, revisit a card that has already been opened or make a match.



Secondary task: 2-back

- decide if the letter is the same as 2 letters before
- automatically return to memory game after 15sec

Switch 3 times within a memory game

Conditions

First variation

No Delay:

2-back starts immediately after switch

Delay:

2-back starts 3 seconds after the switch

Participants were aware of each block's condition

Second variation

Voluntary:

participants choose when to switch

Forced:

switch happens on unexpected moment

Discussion

The decision to switch tasks takes time.

Pupil dilation increases around the switching point.

Reason of this increase: not the beginning of the secondary task or the interruption of the primary, otherwise the increase would increase 3 seconds later in the Delay condition. That increase starts 3 seconds before the switch only when they decide to switch (Voluntary condition). It happens because of the **decision to switch tasks**.

Choosing when to switch tasks is not less disruptive than being forced to switch tasks.

Behavioral results After matching two cards, the n of cards (solution and position) you have to remember decreases by 2. Participants preferred to switch after a match, when the items in their working memory decreased.

References

Laeng B., Sirois, S. & Gredebäck, G. (2012). Pupillometry: A window to preconscious?. Perspectives on Psychological Science, 7, 18-27
Salvucci, D. D., & Taatgen, N. A. (2011a). The multitasking mind. New York: Oxford University Press

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