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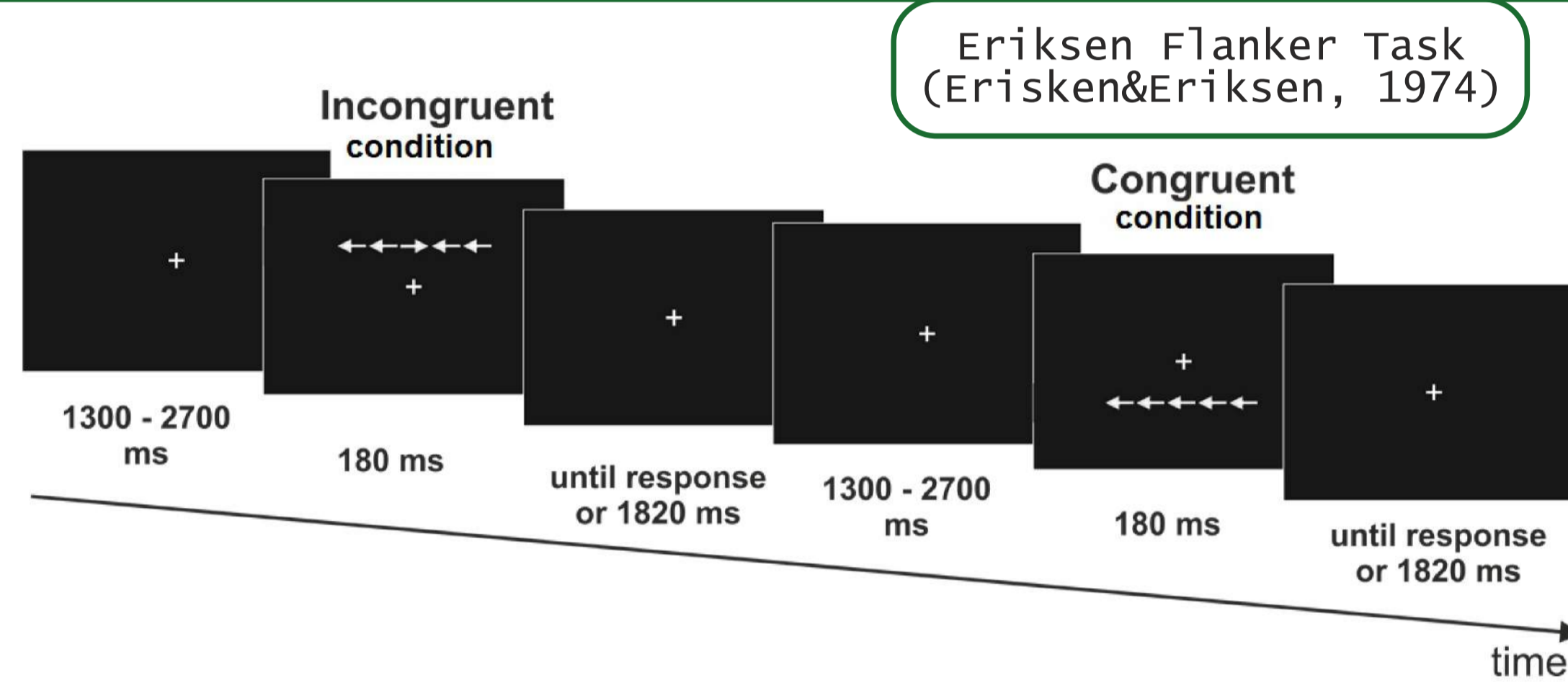
## Background

1. The fronto-central N2 (200-300ms post-stimulus at FCz) observed in the Go-NoGo paradigm typically interpreted as an index of response inhibition [1].
2. By analogy, a negativity reported for incongruent trials in the flanker task also interpreted as an index of response inhibition [1,6].
3. Striking diversity in characteristics of the reported „N2” component across different ERP studies using the flanker paradigm (different from the Go-NoGo N2):
  - varying topography (e.g. posterior)[8],
  - diverse time windows [8,9],
  - nonstandard measures (non-mastoid reference [3], using peak amplitudes [2]),
  - the effect often confused with the P300 for congruent trials [1,4,6].

## Task structure

Respond to the direction of the central arrow  
Ignore the distractors (flanking arrows)

2 blocks, 72 trials in each, 50% incongruent trials 50% trials under fixation point



## Research goal

Replication of the N2 effect in the canonical version of the Eriksen Flanker Task on a large sample with repeated measures.

## Methods

Large sample with repeated measures

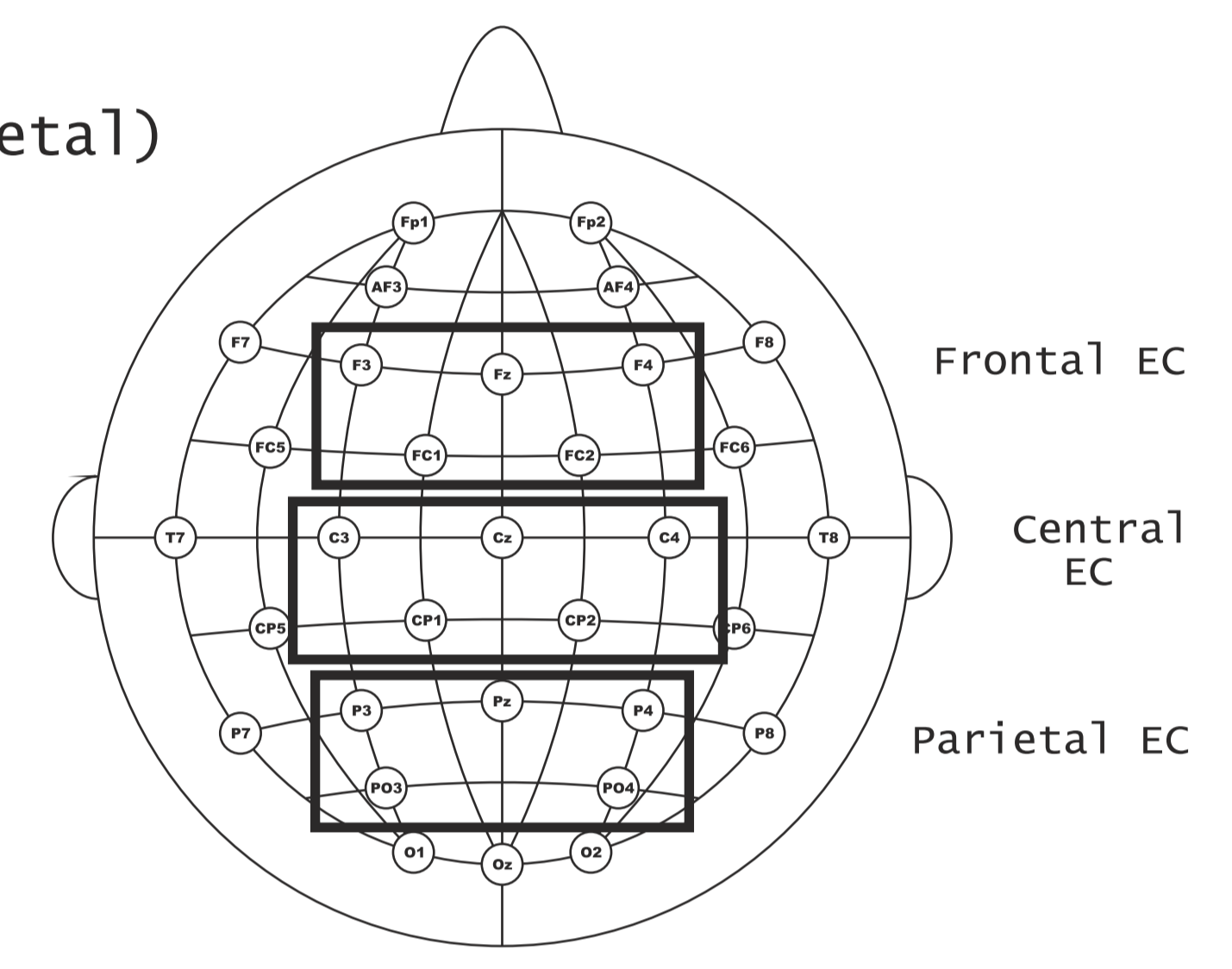
52 Polish high school students (41 women, 16-17 y.o.)  
7-month breaks between the three testing sessions

Independent variables:

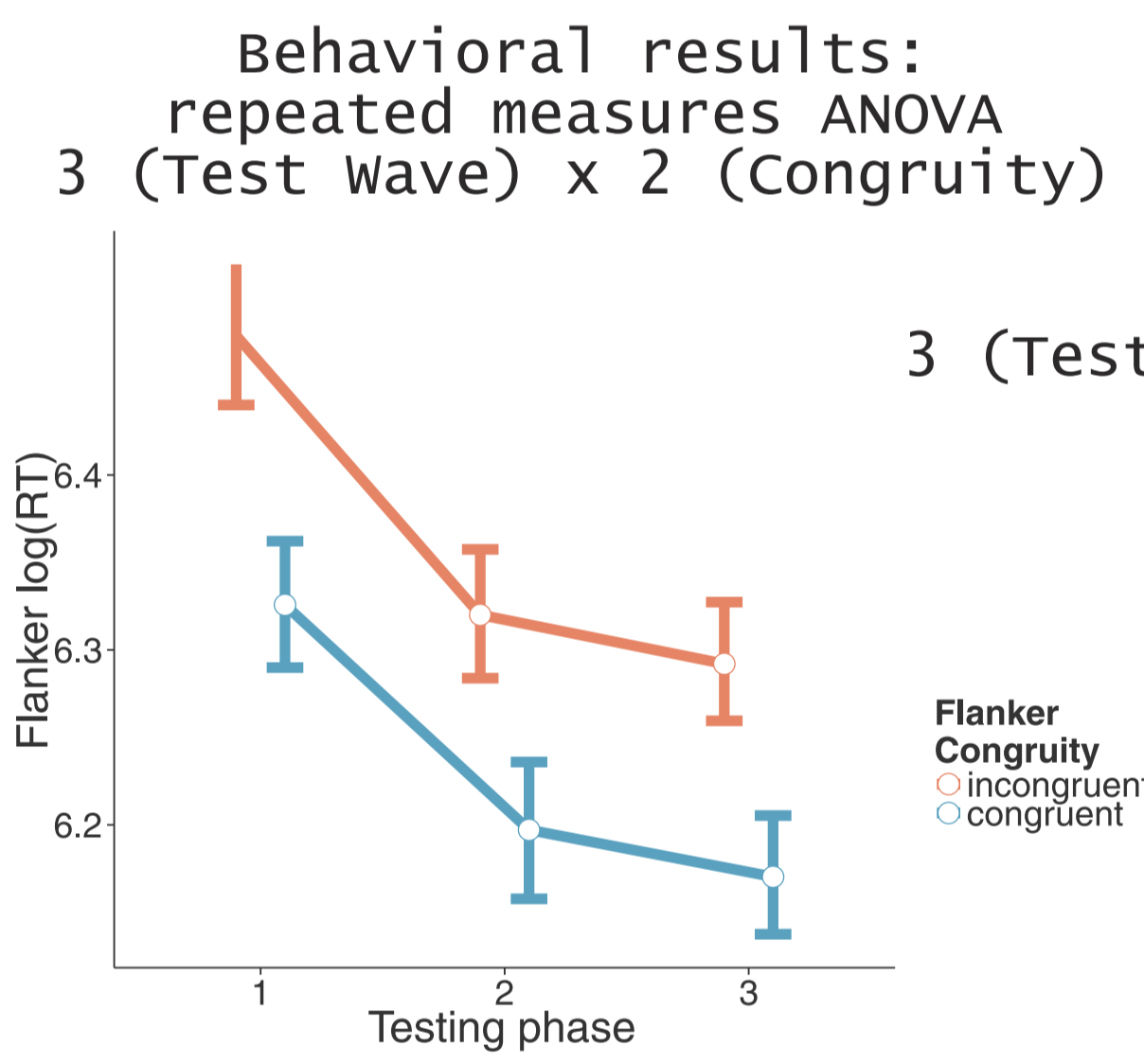
- C - congruency (incongruent vs. congruent)
- EC - electrode cluster (frontal, central, parietal)
- T - testing session (T1, T2, T3)

Dependent variable:

- Mean amplitude (µV) in time windows (ms):
- N2 (200-320)
  - P3.c (370-450)
  - P3.ic (490-630)



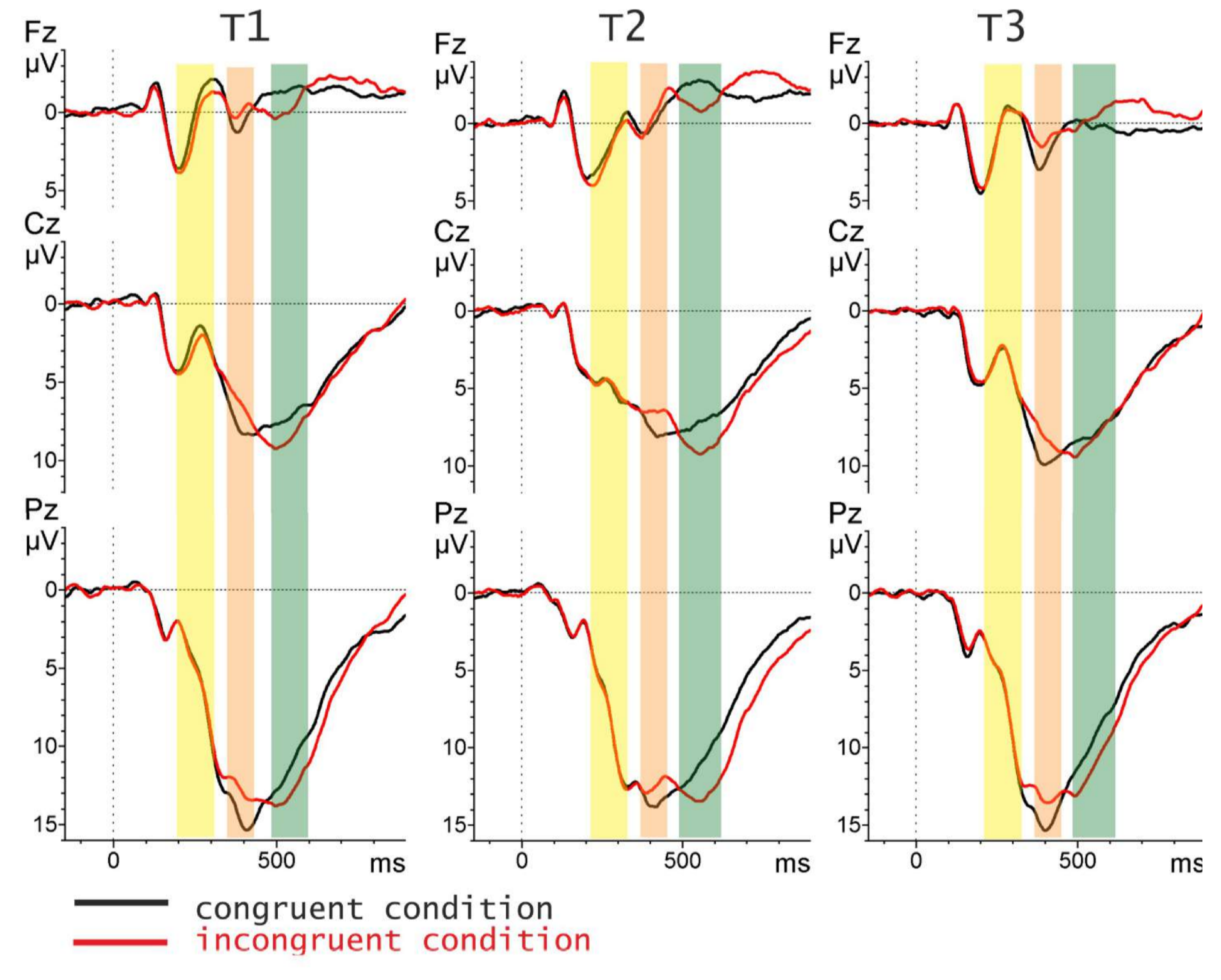
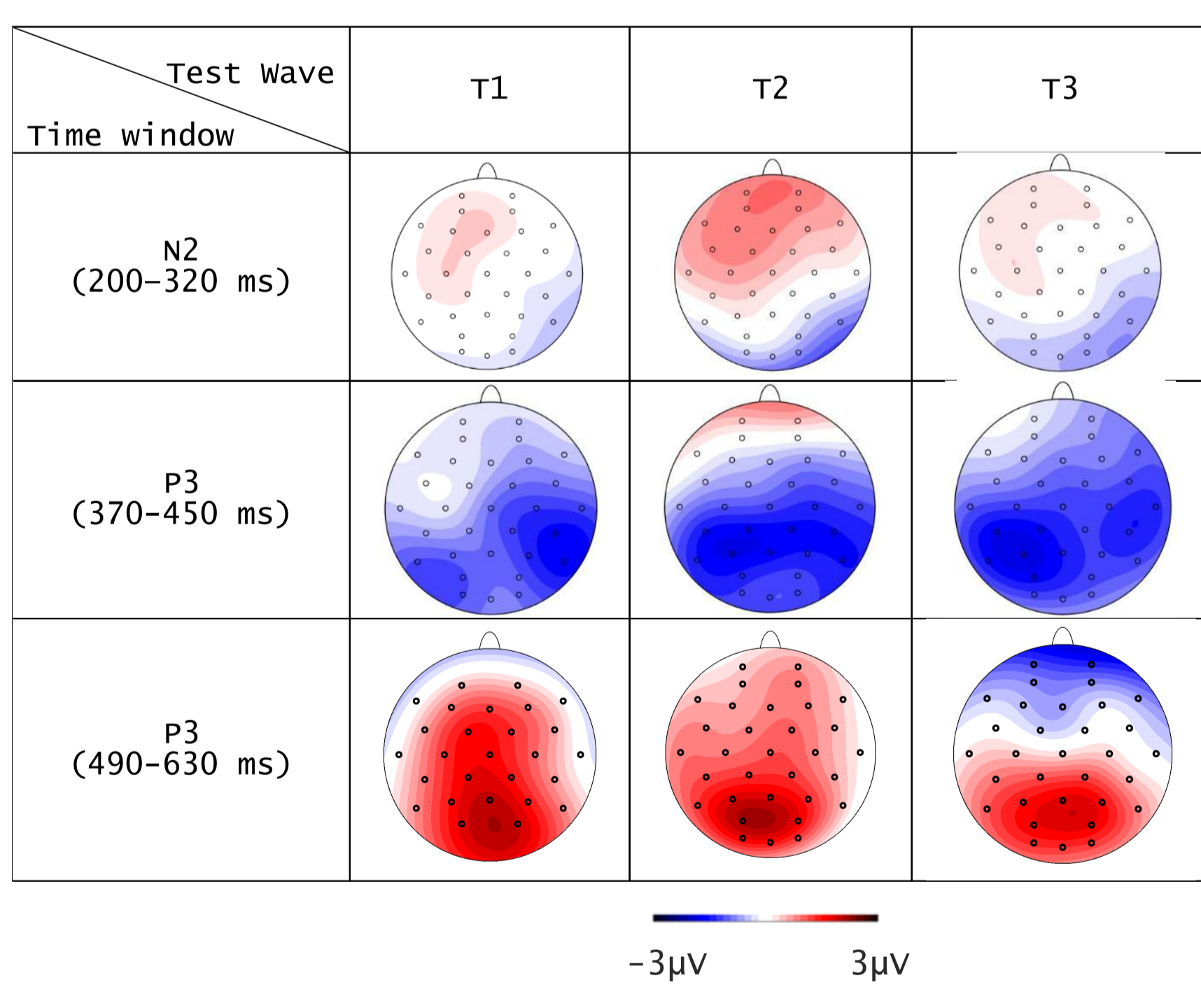
## Results



ERP results: repeated measures ANOVA  
3 (Test Wave) x 3 (Electrode Cluster) x 2 (Congruity)

Factors	Mean amplitudes (µV)		
	N2 (200-320 ms)	P3.con (370-450 ms)	P3.inc (490-630 ms)
C		**	**
C x EC	*	*	**
C x T			
C x EC x T			**

\* <.05 \*\* <.001



## Results summary

### Behavioral results

1. Clear flanker congruity effect: shorter RTs in congruent condition (p<.001)
2. Better performance at T2&T3 than at T1: shorter RTs (p<.001)

### ERP results

1. A frontal positivity for the incongruent condition in the 200-320 ms time window.
2. Differences in P3 latency dependent on Congruity:
  - a) P300 for congruent trials in the 370-450 ms time window (congruent > incongruent)
  - b) P300 for incongruent trials in the 490-630 ms time window (incongruent > congruent)
  - c) The P300 latencies for congruent and incongruent trials correlate with RTs

## Conclusions

1. Despite the general consensus on the N2 in the Eriksen Flanker Task, we did not obtain the N2 effect, instead we report P2 + P300 components.
2. Based on literature review, the fronto-central N2 occurs only in modified versions of the Eriksen Flanker Task, e.g. when the proportion of trials is manipulated (the higher the proportion of congruent trials, the larger N2 for incongruent vs. congruent trials) [4].
3. Basing on the P2 finding, possible strategy of resolving conflict in the canonical Flanker task: focusing on central arrow helps avoid interference in incongruent trials.
4. The N2 is elicited in the Flanker task, when the dominant reaction related to congruent stimuli need to be inhibited (the N2 as an index of response inhibition). Whereas, in the canonical Flanker task, there is no need to inhibit a response, but there is need to resolve the interference between the target and flankers (the P2 as an index of selective attention).

## References

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