



Attentional Networks during the Menstrual Cycle



Zahira Z. Cohen¹, Offer Erez², Arnon Wiznitzer², Lee Koren³ & Avishai Henik¹

¹Department of Psychology and the Zlotowski Center for Neuroscience, Ben-Gurion University of the Negev, Beer-Sheva, Israel,

²Department of Obstetrics and Gynecology, Soroka Medical Center, Beer-Sheva, Israel and ³The Mina and Everard Goodman Faculty of Life Sciences, Bar-Ilan University, Ramat-Gan, Israel

Introduction

Alerting, orienting and executive control; the three attentional networks [Fig. 1]

- Attentional networks interactions - studied using the ANT-I [1]
- Main neurotransmitters: Norepinephrine (NE), acetylcholine (ACh), serotonin (5-HT), dopamine (DA) [2-4]

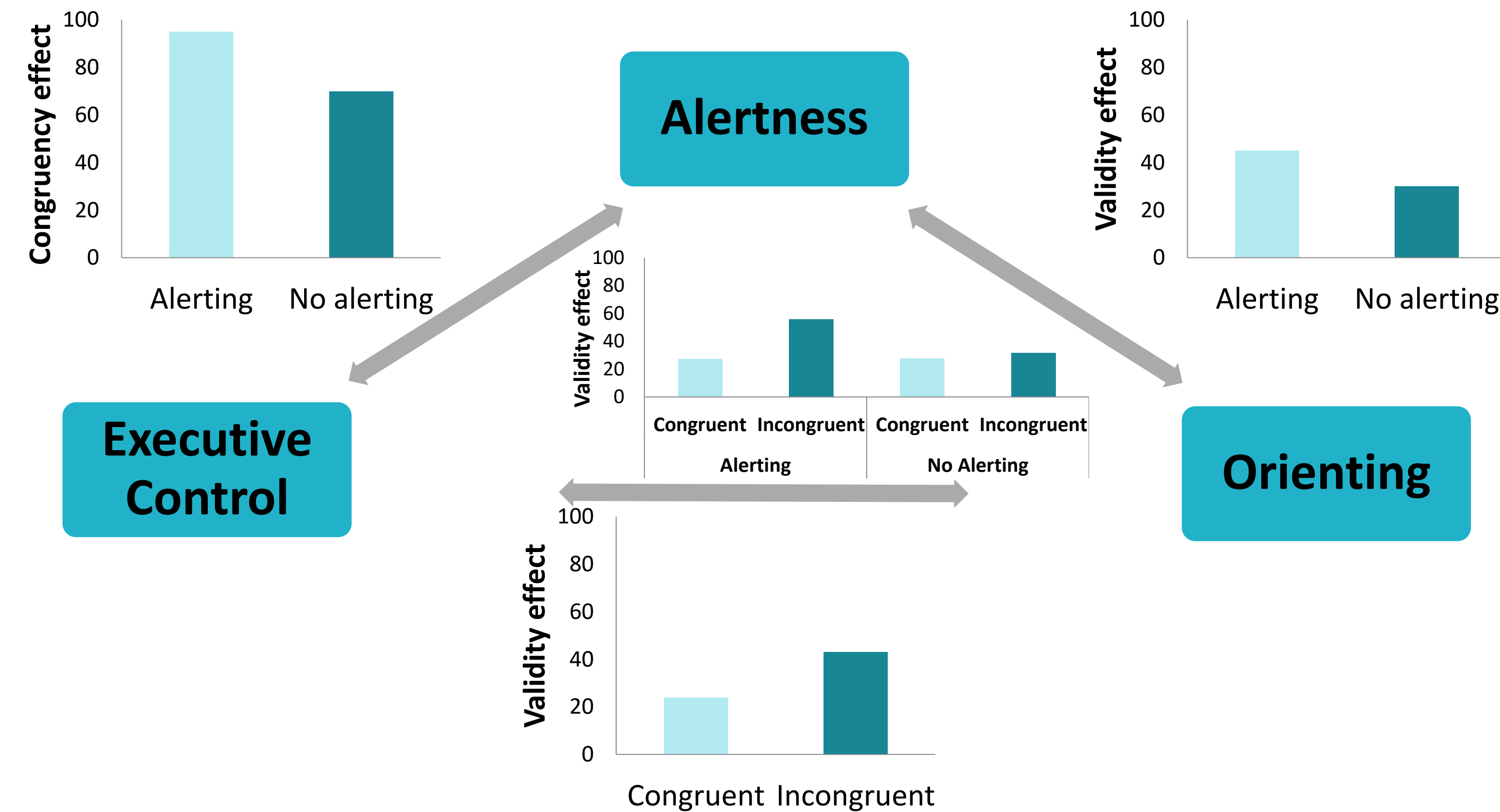


Fig. 1: The three attentional networks and their interactions

Ovarian hormone levels, Estradiol (E2) and Progesterone (P), change during the menstrual cycle [Fig. 2] [5]

- E2 and P influence NE, ACh, 5HT and DA, implicated in the regulation of cognition and affect [e.g., 6-8]

Reflexive attention (alertness and orienting) is changed during the menstrual cycle [9]

Current study

Examining the three attentional networks and their interactions during the menstrual cycle

- Group: under contraceptives (control; C) / regular menstrual cycle (natural; N)
- Time: pre-ovulatory (4th day - early follicular phase - low E2 and P) and post ovulatory (18th day - luteal phase - high E2 and P)
- E2 and P level correlates with ANT-I

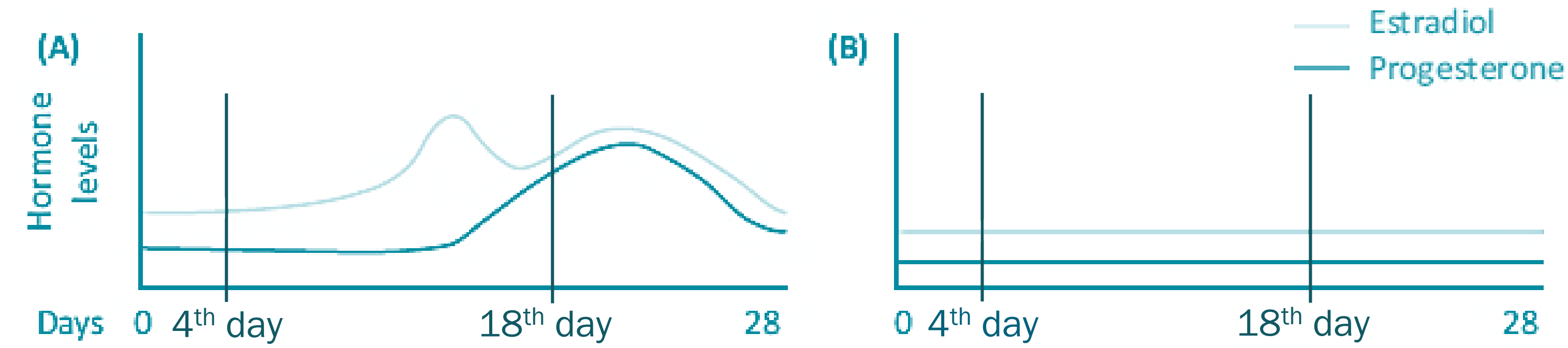


Fig. 2: E2 and P levels under regular natural cycle (A) and under contraceptives (B) [5]

Methods

Order/ Group	Pre-Ovulatory First	Post-Ovulatory First	Total
C	14	10	24
N	12	9	19
Total	26	19	N=43

Table 1: Number of participants

- E2 and P saliva samples
- Age range: 19-27 years
- Mean age

- Control - 23.4 (SD=1.3)
- Natural - 22.9 (SD=2.1)

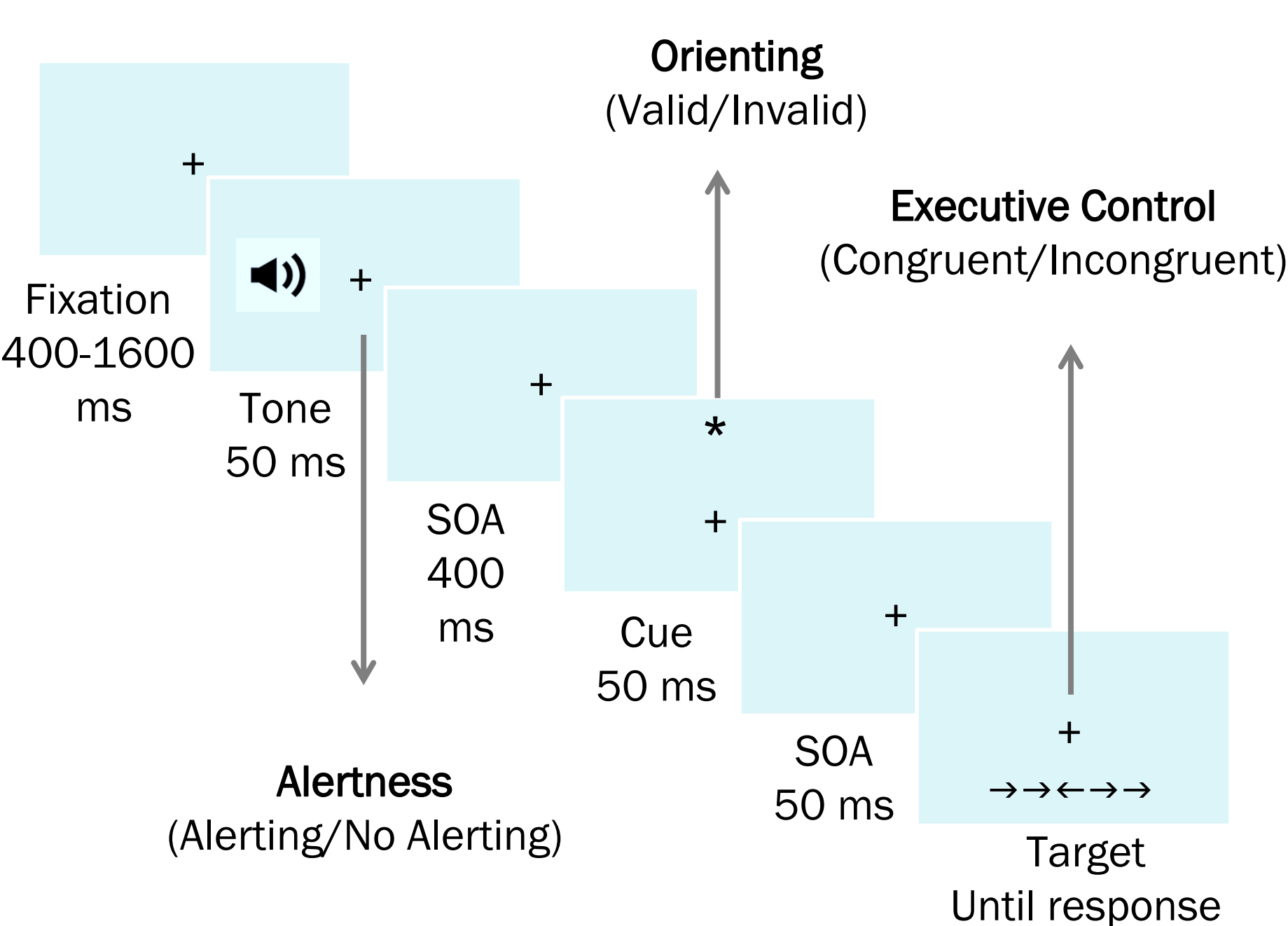


Fig. 3: Trial sequence in the ANT-I task

Results

Analysis scheme

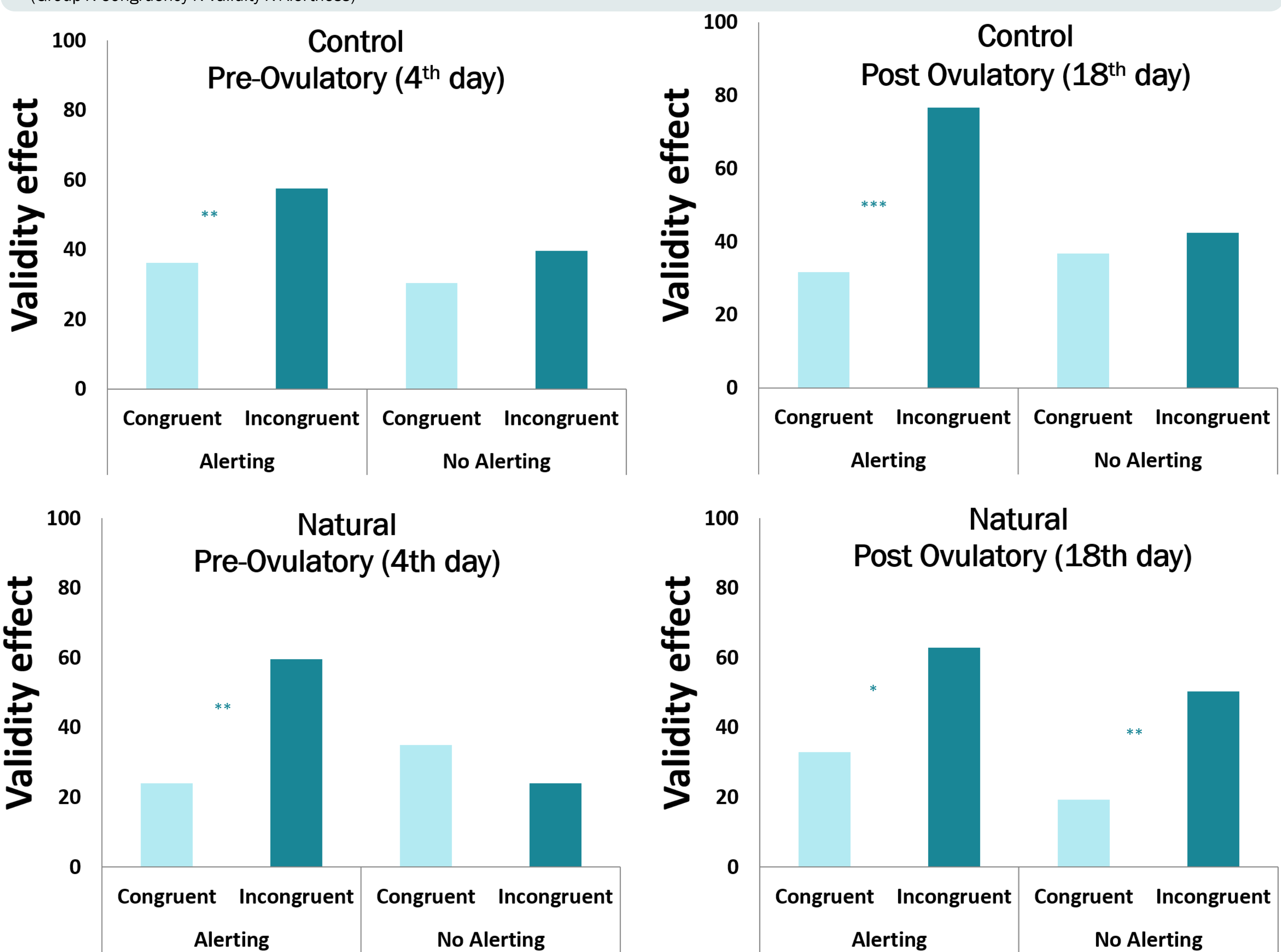
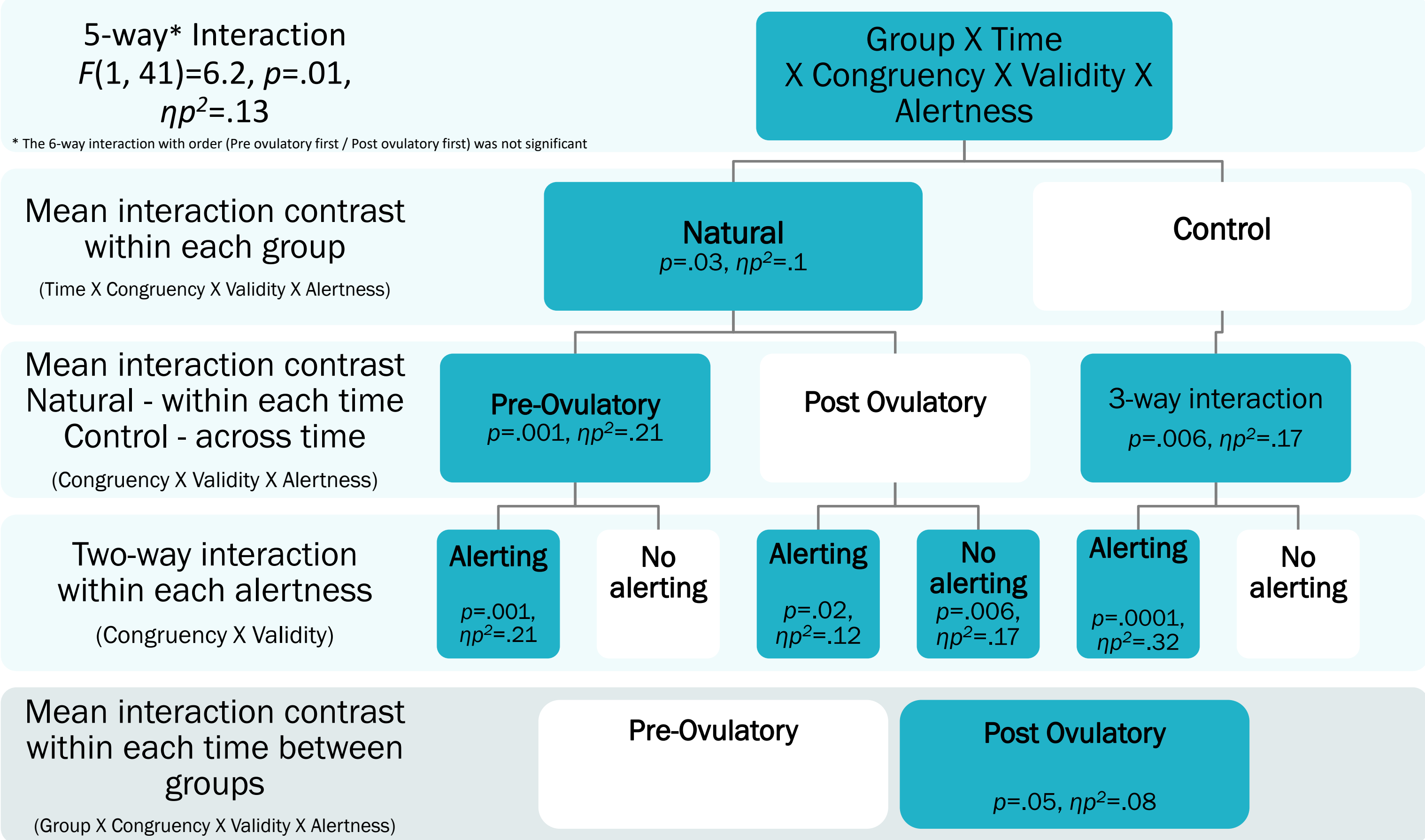


Fig. 4: ANT-I validity effect between groups and time in alertness and congruency

Results-driven regression analysis (preliminary)

- RT interaction = invalid (incongruent - congruent) - valid (incongruent - congruent)
- 0 = main effects only, no interaction

Alertness	r	R ²	adjR ²	F(1,20)	p
Alerting	.174	.03	-.018	0.626	.43
No Alerting	.482	.23	.194	6.05	.02

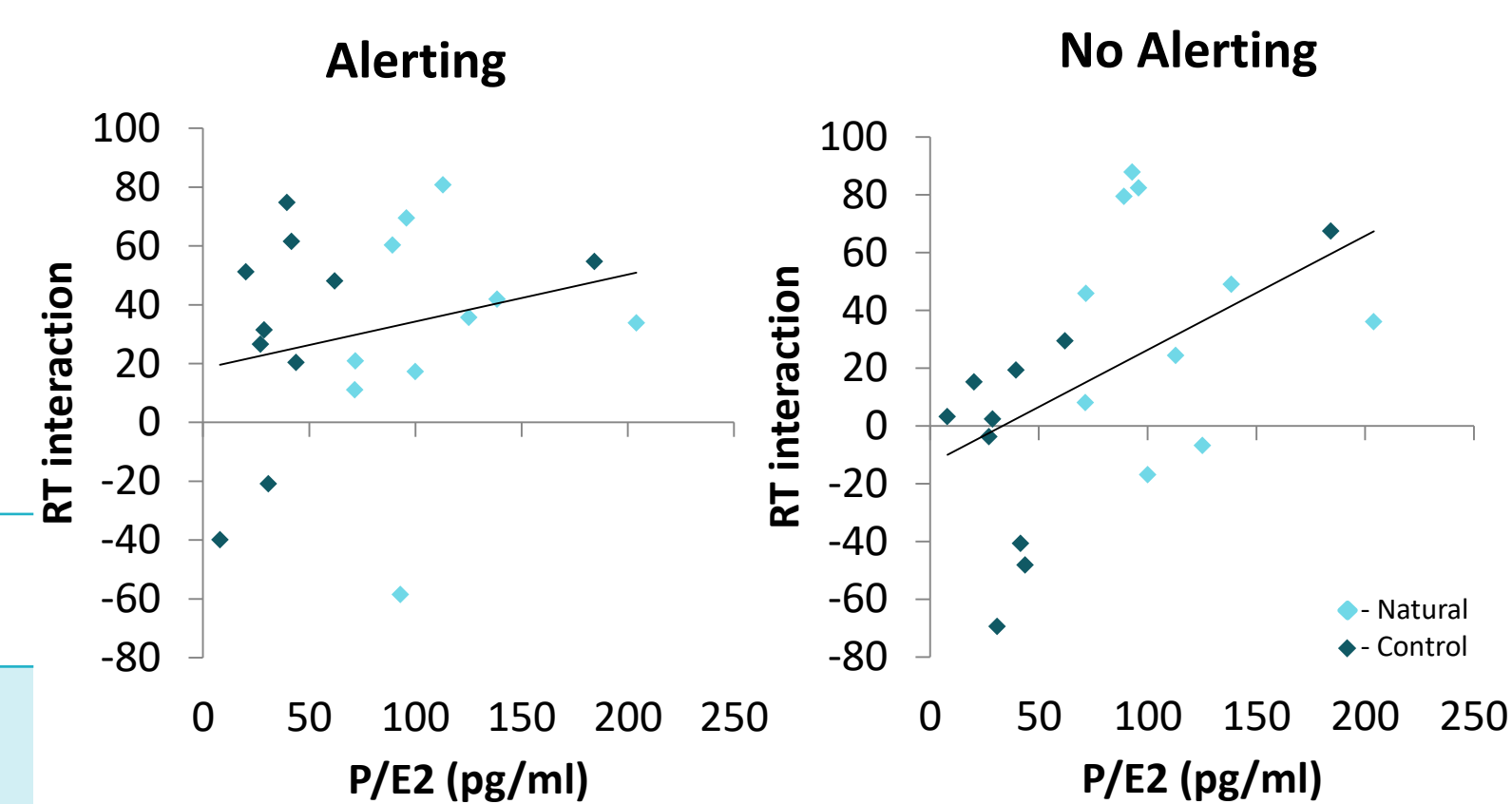


Fig. 5: Simple regression of RT interaction and P/E2 in alerting and no alerting

Discussion

The three attentional networks interact [1]

- Alerting tone increases validity effect for incongruent trials
- Menstrual cycle has an influence on attentional networks:
 - Post ovulatory - alerting system is activated without alerting tone
 - Due to high level of progesterone/estrogen (compared to pre-ovulatory and compared to controls)

References

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Correspondence:
Zahirac@post.bgu.ac.il

