

**Netsi, E.<sup>1</sup>, Murphy S.E.<sup>1</sup>, Wulff, K. <sup>2</sup>, Ramchandani, P.G. <sup>1</sup>**  
<sup>1</sup> Department of Psychiatry, Oxford University, <sup>2</sup>Nuffield Laboratory of Ophthalmology, Oxford University

## Introduction

### Infant Sleep

- Marker of bio-behavioural organization
- Associated with **mental** and **psychomotor development**<sup>1</sup>

**Antenatal Depression predicts infant sleep** (also established using this cohort<sup>2</sup>).

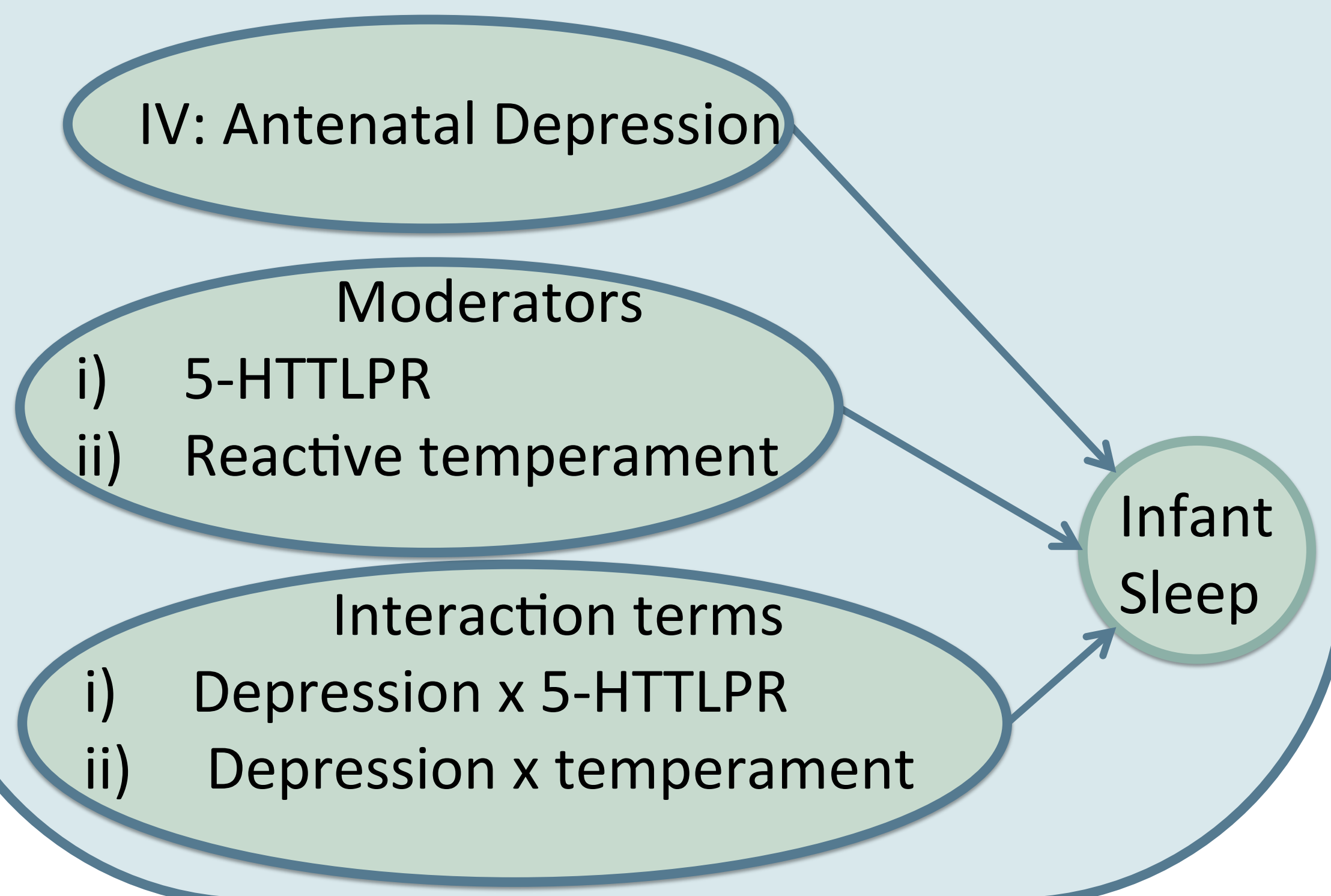
### Differential Susceptibility Hypothesis <sup>3</sup>

Individuals more susceptible to negative environmental influences are the ones which would benefit the most in a supportive environment.

### 2 plasticity factors are examined here

- plasticity gene - 5-HTTLPR
- plasticity factor – reactive temperament (this construct describes infants who are more irritable and fussy, cry more and do not respond well to novel stimuli)

This is the first study to look at the moderating effect of 5-HTTLPR and reactive temperament in antenatal depression and infant sleep.



### Aims:

To examine whether the relationship of antenatal depression & infant sleep is moderated by

- 5-HTTLPR
- Reactive temperament

### Sample

Avon Longitudinal Study of Parents and Children (ALSPAC) cohort (n=14,663)

5-HTTLPR data  
n = 4,385

Reactive  
temperament  
data n=8,310

- Maternal age 29 years (SD 4.7)
- Background : White Caucasian(97.4%) (non-White exc. for 5-HTTLPR analysis)
- Education: 16.4% University degree

**Analysis:** Hierarchical Linear Model

**Step 1:** depression, moderators, covariates,

**Step 2:** three 2-way interactions

**Step 3:** 3-way interaction

## Measures

**Infant sleep:** number of night-time awakenings and sleep problems at 18 & 30 months

**5-HTTLPR:** Subjects were grouped into those homozygous for the short allele (Low expression), heterozygous (Medium expression) and those homozygous for the long allele (High expression). L<sub>G</sub> allele carriers were treated as S allele carriers for the purposes of grouping. Data in H-W equilibrium Low: SS, SL<sub>G</sub>, L<sub>G</sub>L<sub>G</sub> (23.3%), Medium: SL<sub>A</sub>, L<sub>G</sub>L<sub>A</sub> (51.2%), High: L<sub>A</sub>L<sub>A</sub> (25.4%).

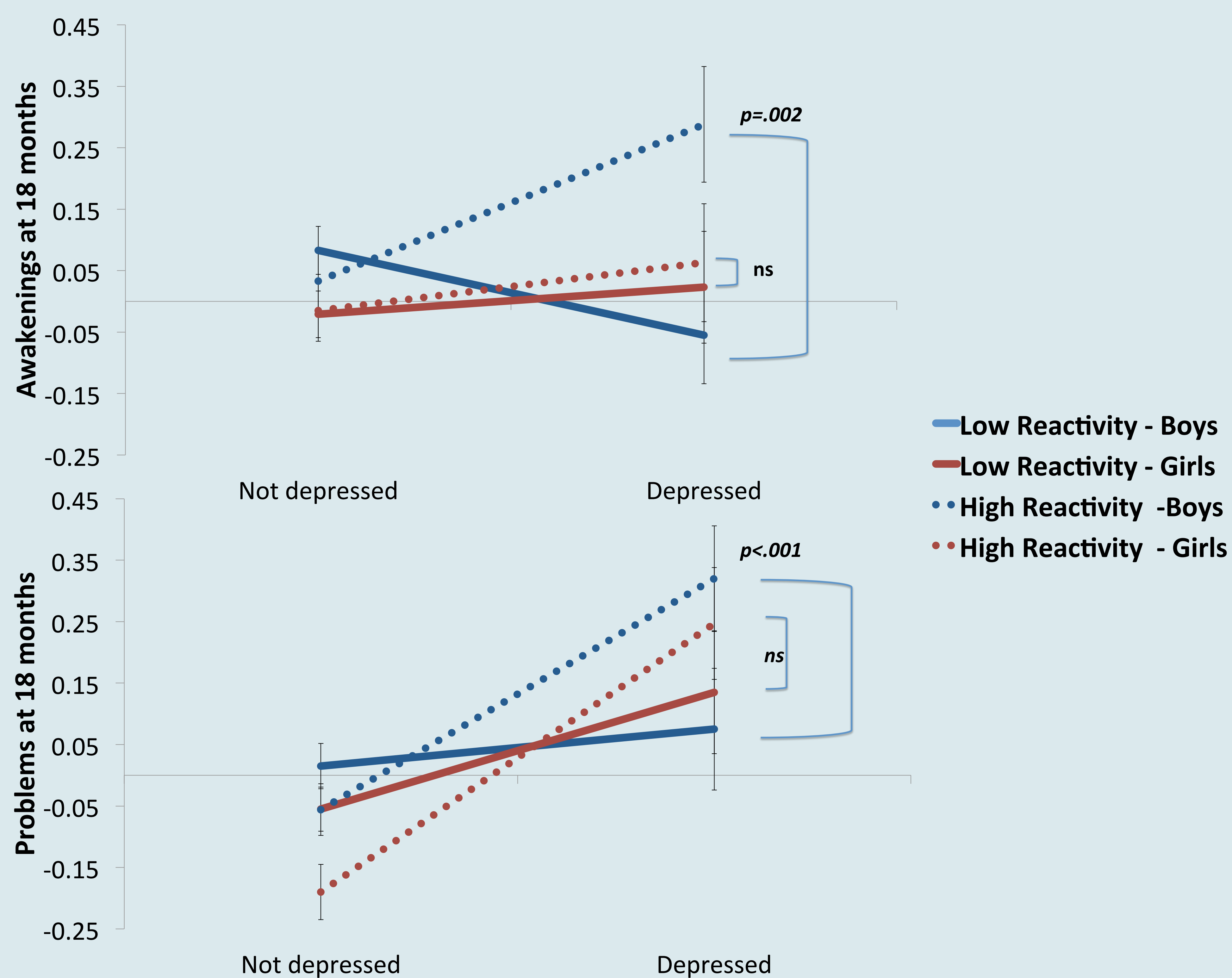
**Reactive temperament:** intensity, threshold, approach, adaptability (α=.76).

**Antenatal and postnatal depression:** EPDS at 32 weeks gestation and 8 weeks postnatal.

**Socio-demographic characteristics:** smoking, alcohol consumption, maternal education, marital status, crowding and maternal age (not shown)

## Results

| Variables                                 | 5-HTTLPR (n=4,385) |             |              |             | Temperament (n=8,310) |             |              |             |
|---|--------------------|-------------|--------------|-------------|-----------------------|-------------|--------------|-------------|
|   | Sleep problems     |             | Awakenings   |             | Sleep problems        |             | Awakenings   |             |
|   | β                  | p           | β            | p           | β                     | p           | β            | p           |
| Antenatal Depression                      | .046               | .330        | -.020        | .672        | .022                  | .523        | -.023        | .522        |
| Postnatal Depression                      | .064               | .000        | .039         | .036        | .072                  | .000        | .066         | .000        |
| 5-HTTLPR/Reactivity                       | .063               | .172        | .044         | .345        | <b>.006</b>           | <b>.859</b> | <b>-.031</b> | <b>.372</b> |
| Gender                                    | -.017              | .249        | -.008        | .585        | .014                  | .674        | .008         | .822        |
| Dep. x 5-HTTLPR/Dep. x Reactivity         | .012               | .791        | .062         | .192        | <b>.116</b>           | <b>.001</b> | <b>.101</b>  | <b>.003</b> |
| Depression x Gender x 5-HTTLPR/Reactivity | <b>-.014</b>       | <b>.767</b> | <b>-.063</b> | <b>.183</b> | <b>-.088</b>          | <b>.008</b> | <b>-.085</b> | <b>.013</b> |



- No evidence that 5-HTTLPR moderates antenatal depression and infant sleep.
- Reactive temperament is a moderator of the association of antenatal depression and infant sleep.

## Conclusion

There was no evidence that 5-HTTLPR is a moderator of infant sleep at 18 or 30 months, however reactive temperament did moderate the relationship of antenatal depression and infant sleep. The data support the differential susceptibility hypothesis, with highly reactive infants exhibiting more night-time awakenings and sleep problems when exposed to a known stressor, antenatal depression. There was also a significant gender effect with boys showing statistically significant trajectories based on their reactivity scores. There was no evidence that 5-HTTLPR was associated with reactive temperament.

### Strengths

- Large community sample
- Tri-allelic classification of 5-HTTLPR
- Widely used questionnaires

- Controlling for important confounders

### Limitations

- Sleep data subject to reporter bias

## References

<sup>1</sup>Ednick, M., et al., A review of the effects of sleep during the first year of life on cognitive, psychomotor, and temperament development. *Sleep*, 2009. **32**(11): p. 1449.

<sup>2</sup> O'Connor, T., Caprariello, P., Blackmore, E., et al. *Prenatal mood disturbance predicts sleep problems in infancy and toddlerhood*. *Early Human Development*, 2007. **83**(7): p. 451-58

<sup>3</sup> Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: differential susceptibility to environmental influences. *Psychological bulletin*, 135(6), 885-908.

### Disclosure

This research is financially supported by EN's educational grant from the Medical Research Council.