

## **Sleep pressure and circadian process do not modulate pseudoneglect effects**

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**Objectives:** A slight but consistent right visual field pseudoneglect [i.e. a leftward attentional bias (LWB)] is observed within the healthy population. Right hemispheric (RH) dominance in alertness regulation is usually supposed to explain this phenomenon. It has been shown using a greyscales (GS) task that sleep deprivation (SD) induces a rightward shift in attention abolishing this LWB at 05:00 but not at 09:00 (Schmitz et al. 2011 *Neuropsychologia*) suggesting a possible circadian modulation of laterality bias in the GS. Here we aimed at replicating this effect in a controlled setting using a constant routine protocol (CRP).

**Method:** Following a baseline night, thirteen healthy right-handed volunteers (nine males; mean age =  $23.4 \pm 1.5$  years) were kept awake during 40 h under constant routine conditions (CR) to assess

endogenous circadian phase and amplitude while controlling the confounding effects of light-dark and behavioral cycles. During the CR period, the GS was administered 16 times from 9:00 am on Day 1 to 10:30 pm on Day 2. The GS task consisted in six types of rectangles (height 79 pixels; width 320, 400, 480, 560, 640 or 720 pixels). Each rectangle was darker on its left or right side (for a total of 72 stimuli), changed by increments of 80 pixels in density from black on one side to white on the other. Each trial (72/session) consisted in one upper and one lower GS arranged in such a way that they were left-right reversals of one another. Participants had to decide which one of the two stimuli was the darkest. Unbeknownst to them, the two stimuli within each trial were equiluminous. A leftward bias was computed as the proportion of responses for darker GS on their left side according to their position (top or bottom).

**Results:** A two ways repeated measures ANOVA on the leftward bias score with factors Session (Session 1 to Session 16) and Position (Top versus Bottom) failed to reveal a significant effect of Session ( $P > 0.98$ ). The effect of Position was highly significant ( $P < 0.001$ ), with a leftward bias for the top position only ( $71.7 \pm 4.9\%$  versus  $38.1 \pm 7.8\%$ ).

**Conclusion:** Under CR, a total night of SD failed to reduce the LWB indicating that circadian effect does not modulate this attentional effect under well controlled conditions. Since the vestibular system is known to modulate the LWB, the effect of position might be explained by the participants' supine posture during the CR.