

# Outdoor daylight exposure is associated with better sleep and mood during social distancing

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## INTRODUCTION

Light/dark is the main external cue to synchronize the biological clock<sup>1</sup>. Even though the physical differences between daylight and electric light are well-known<sup>2,3</sup>, a better understanding of how daylight exposure affects human biology and behavior in real-life conditions is still needed<sup>4</sup>. In this study, we characterized outdoor daylight exposure during the COVID-19 pandemic in Brazil and evaluated its association with depressive symptoms and well-being.

We hypothesized that higher frequency and duration of daylight exposure, especially in the morning, are associated with lower prevalence of sleep problems and of depressive symptoms, and with higher well-being.

## METHODS

A cross-sectional study was conducted between July and November 2020, including Portuguese-speaking participants over 18 years old who answered an online survey. We used regression models to evaluate the association between outdoor daylight exposure (frequency, duration, and shift) and sleep problems, chronotype estimated by mid-sleep time on free days (MSF), and scores of Patient Health Questionnaire (PHQ-9) and of Well-Being Index (WHO-5), controlling for age and sex (figure 1a). We considered statistically significant results with  $p < 0.05$ .

## RESULTS

We included 1,095 participants (895 women; 82%), of which most were in the 18-49 yo age group (figure 1b). The sample's mean MSF was 5.17 (sd 1.71), and individuals with earlier chronotypes had a higher frequency of daylight exposure, particularly in the morning (figure 2a). Daylight exposure everyday (OR 0.43; 95% CI: 0.27-0.69), for more than 1h (OR 0.57; 95% CI: 0.35-0.92) and in the morning (OR 0.37; 95% CI: 0.23-0.61) were protective factors for sleep problems in reference to lack of daylight exposure (figure 2b). Figure 2c shows that higher WHO-5 and lower PHQ-9 scores were observed when daylight exposure occurred in more than half of the days (mean  $\pm$ sd: 10.2  $\pm$ 4.9; 11.3  $\pm$ 6.3) and for more than half an hour (10.1  $\pm$ 5.0; 11.8  $\pm$ 6.4) compared with those without exposure (7.7  $\pm$ 4.0; 14.4  $\pm$ 5.9).

## CONCLUSION

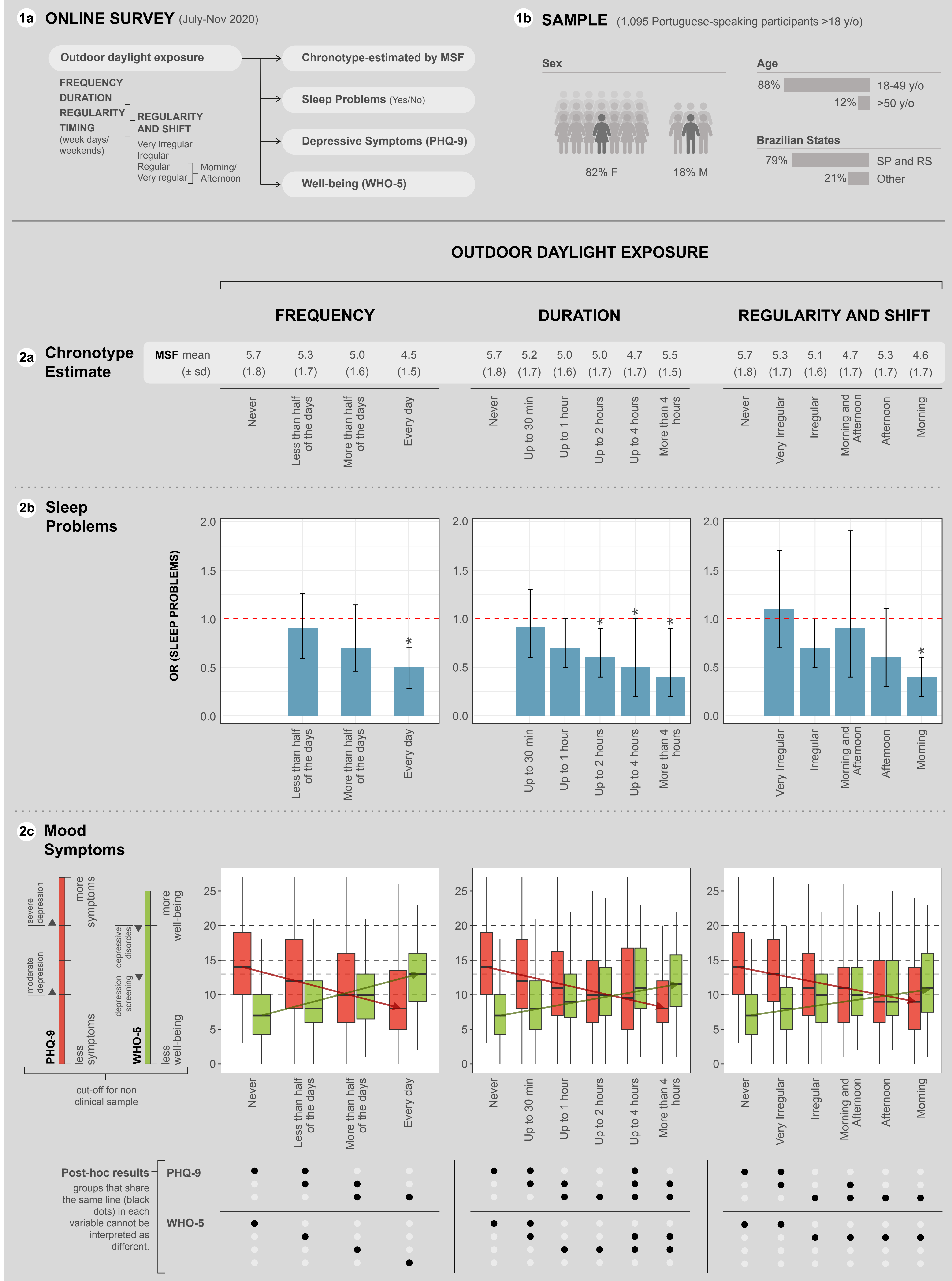
Associations of higher frequency, longer duration, and timing (morning) of outdoor daylight exposure with less depressive symptoms (PHQ-9) and more well-being (WHO-5) were found. Results were consistent with the literature<sup>5-8</sup>.

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