

## **Reviewer's report**

**Title:** Effect of Sunlight Exposure on Cognitive Function: a Cross-Sectional Study

**Version:** 1 **Date:** 24 January 2009

**Reviewer:** Patricia Turner

### **Reviewer's report:**

#### Discretionary Revisions

This well-written manuscript describes an epidemiological study of sunlight's effect on cognitive function as measured by repeated intraday satellite insolation data linked to geocoded home addresses for study participants. This study is important suggesting that natural light appears to affect both mood and cognition which has many implications. Methods, analysis and conclusions are logical and well-stated. Some specific comments are the following.

Page 11, line 7. The authors' brief mention of "leading theories" mentions melatonin which is but a small measure of circadian rhythmicity and doesn't acknowledge the importance of the underlying control by suprachiasmatic nuclei. An extra sentence and reference or 2 here would be helpful for some readers. Potential references are [1, 2].

Page 12, line 1. The authors' briefly discuss memory and cognition's short wavelength spectral sensitivity without explanation or acknowledgment of the supporting literature elucidating this dependence. The intensity and spectral qualities of natural light make it optimal for enhancing cognitive function and briefly mentioning this will enhance this paper. Reference(s) above could apply here as well

Page 13, line 1. The authors' acknowledge some study limitations but the discussion fails to mention the confounding factor of reduced retinal illuminance which occurs with age due to decreasing crystalline lens transmittance and pupillary area.[2]

Page 14, line 21-23. The authors state "This study also has an important finding regarding those without an elevated level of depressive symptoms. We did not find that sunlight meaningfully affected the cognitive abilities of these individuals". This conclusion is strictly true based on a narrow interpretation of the data but probably understates positive effects on mood and cognition for the general population. The incidence of both seasonal and nonseasonal depression are inversely correlated with environmental illumination[3-5] and depression is also linked to cognitive deficits.[6, 7] Both are responsive to bright light therapy.[8] Depressed individuals benefit the most from sunny environments but are typically those whose mental status, work schedules or lifestyle choices provide relatively less illumination. On the other hand, light enhancement has been shown to increase subjective mood in general populations free of depression [9-11] and

improve work performance (cognition) of employees without depression.[12] To state that sunlight did not meaningfully affect the cognitive abilities of non-depressive individuals ignores evidence that the depressive-free subjects are possibly those who spend sufficient and relatively more time in natural lighting and therefore possibly avoid both depression and reduced cognition. This possible alternative contingency of adverse selection should be acknowledged.

## References

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**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests