

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
☐	☒ The exact sample size (<i>n</i>) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ The statistical test(s) used AND whether they are one- or two-sided <i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>
☐	☒ A description of all covariates tested
☐	☒ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒ For null hypothesis testing, the test statistic (e.g. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted <i>Give P values as exact values whenever suitable.</i>
☒	☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☐	☒ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☐	☒ Estimates of effect sizes (e.g. Cohen's <i>d</i> , Pearson's <i>r</i>), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection	Data was accessed via the UK Biobank Access Management System for which the authors are approved under project number 6818.
Data analysis	Data organization and analysis was completed in R-4.1.0. The 'GGIR' package was used to analyze activity data from the AX3 devices according to the pseudo-code described in the "Supplementary Methods: Accelerometry and sleep analysis". Light data was extracted from .cwa files and analyzed using in-built R functions according to the pseudo-code described in the "Supplementary Methods: Light Analysis" section and the code is available at https://github.com/dpwindred/Axivity_AX3_Light . The association of day and night light exposure with psychiatric outcomes and symptom severity scales was completed with in-built R functions ('lm'; 'glm'). Plotting of coefficients from resultant models was completed with the 'plot_summs' function from the 'jtools' package.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

The primary data set used in this study is available in the UK Biobank resource and access is subject to project approval by the UK Biobank Access Management Team.

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender	Sex was not considered an inferential variable in this study. We report descriptive statistics for sex in Table 1 and adjust for sex in statistical models.
Reporting on race, ethnicity, or other socially relevant groupings	Ethnicity was not considered an inferential variable in this study. We report descriptive statistics for ethnicity in Table 1 and adjust for ethnicity in statistical models.
Population characteristics	A total of 86,772 participants from the UK Biobank cohort study that completed a week of optional accelerometry (57% female; aged 62.4 ± 7.4 years).
Recruitment	Participants were recruited via the UK National Health Service (NHS) patient registers from 2006 to 2010. Questionnaire items may be subject to recall and response bias.
Ethics oversight	Participants provided written, informed consent and the UK Biobank has ethical approval from the North West Multi-Center Research Ethics Committee (ref 11/NW/03820).

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☒ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

Behavioural & social sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	The present study is a quantitative cross-sectional study.
Research sample	A total of 86,772 UK adults (57% female; aged 62.4 ± 7.4 years) from the UK Biobank cohort who completed a 7-day accelerometry study. The UK Biobank is a non-representative sample.
Sampling strategy	Convenience sampling was used for both the accelerometry and light monitoring sub-study and the Mental Health Questionnaire (MHQ) sub-study. This sample is the largest to-date of objectively measured light, sleep, physical activity and mental health. Samples for analysis were determined by the maximum available n available for a given outcome and model covariates.
Data collection	Accelerometry and light monitoring sub-study: participants were invited via email to wear an accelerometer for seven days. Upon receiving the device, they were instructed to wear the device on their dominant wrist continuously and go about their normal activities. Mental Health Questionnaire (MHQ) sub-study: Participants were invited via email to complete the MHQ on the UK Biobank web-questionnaire online platform. Participants completed both the accelerometry and light monitoring sub-study and the MHQ sub-study under free-living conditions and without any experimenters present.
Timing	Accelerometry and light monitoring sub-study: 2013-2015; Mental Health Questionnaire (MHQ) sub-study: 2016-2017.
Data exclusions	Of the 103,720 participants with accelerometry and light data, 16,948 were excluded due to data file corruption, device non-wear and insufficient data for analysis.
Non-participation	Accelerometry and light study: 236,519 invited and 103,720 accepted. MHQ: 339,092 invited and 157,366 accepted.

Randomization

Participants were sorted into quartiles of day and night light exposure. Covariates were age, sex, ethnicity, photoperiod, physical activity, sleep, cardiometabolic health and shift work.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☐	☒ Clinical data
☒	☐ Dual use research of concern
☒	☐ Plants

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Clinical data

Policy information about [clinical studies](#)

All manuscripts should comply with the ICMJE [guidelines for publication of clinical research](#) and a completed [CONSORT checklist](#) must be included with all submissions.

Clinical trial registration

Study protocol

Data collection

Outcomes