**Supplementary material**

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**Table S1.** STROBE Statement. Checklist of items that should be included in reports of longitudinal studies.

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| --- | --- | --- | --- |
|  | Item No | Recommendation | Page No |
| **Title and abstract** | 1 | (*a*) Indicate the study’s design with a commonly used term in the title or the abstract | 1 |
| (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | 2 |
| Introduction | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | 3 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | 3 |
| Methods | | | |
| Study design | 4 | Present key elements of study design early in the paper | 4 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 4 |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants | 4 |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 5 |
| Data sources/ measurement | 8 | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 5, 6 |
| Bias | 9 | Describe any efforts to address potential sources of bias | 6 |
| Study size | 10 | Explain how the study size was arrived at | 4, Figure S1 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | 5 |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | 5, 6 |
| (*b*) Describe any methods used to examine subgroups and interactions | 5 |
| (*c*) Explain how missing data were addressed | 6 |
| (*d*) If applicable, describe analytical methods taking account of sampling strategy | NA |
| (*e*) Describe any sensitivity analyses | NA |
| Results | | | |
| Participants | 13 | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | 4, Figure S1 |
| (b) Give reasons for non-participation at each stage | 4, Figure S1 |
| (c) Consider use of a flow diagram | Figure S1 |
| Descriptive data | 14 | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | 1, Table 1, Figure S2, Table S2-S3 |
| (b) Indicate number of participants with missing data for each variable of interest | 4, Figure S1 |
| Outcome data | 15 | Report numbers of outcome events or summary measures | Table S3 |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 6, 7, Figures 1-2, Tables 2-3, Table S4 |
| (*b*) Report category boundaries when continuous variables were categorized | 7, Tables 2-3 |
| (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | NA |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | 8, 9, Tables 2-3, Table S4, Figures S3-S6 |
| Discussion | | | |
| Key results | 18 | Summarise key results with reference to study objectives | 8 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 9, 10 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 8, 9 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | 10 |
| Other information | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 10, 11 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Site** | **n** | **Coordinates** | **Altitude (m a.s.l.)** | **Average temperature (ºC)\*** | **Sunlight hours\*** | **Daily steps\*** | **Study period** |
| **Iniesta** | 89 | 39°26′40″N 1°44′55″O | 769 | 10.09 ± 0.00 | 10.72 ± 0.00 | 12,109 ± 2,934 | Week 41 2022 - Week 16 2023 |
| **Motilla del Palancar** | 117 | 39°33′47″N 1°54′43″O | 836 | 10.15 ± 0.03 | 10.82 ± 0.07 | 11,106 ± 3,156 | Week 41 2022 - Week 16 2023 (n = 27)  Week 42 2022 - Week 17 2023 (n = 57)  Week 43 2022 - Week 18 2023 (n = 33) |
| **San Clemente** | 106 | 39°24′14″N 2°25′46″O | 722 | 10.16 ± 0.03 | 10.95 ± 0.06 | 10,996 ± 3,312 | Week 43 2022 - Week 18 2023 (n = 78)  Week 44 2022 - Week 19 2023 (n = 28) |
| **Quintanar del Rey** | 160 | 39°20′44″N 1°55′41″O | 728 | 10.11 ± 0.01 | 11.12 ± 0.07 | 11,385 ± 3,026 | Week 44 2022 - Week 19 2023 (n = 80)  Week 45 2022 - Week 20 2023 (n = 80) |
| **Mota del Cuervo** | 84 | 39°30′01″N 2°52′05″O | 714 | 10.26 ± 0.00 | 11.34 ± 0.00 | 11,249 ± 2,832 | Week 46 2022 - Week 21 2023 |
| **Las Pedroñeras** | 99 | 39°26′52″N 2°40′18″O | 704 | 10.58 ± 0.15 | 11.55 ± 0.08 | 10,945 ± 2,724 | Week 47 2022 - Week 22 2023(n = 76)  Week 48 2022 - Week 23 2023 (n = 23) |
| \*Values are mean ± standard deviation. Abbreviation: m a.s.l. = metres above sea level | | | | | | | |

**Table S2.** Characteristics of the study areas.

**Table S3.** Daily steps, daily sunlight hours, and average daily temperature (ºC), by week of the year and sex.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Total sample** | | | | **Girls** | | | | **Boys** | | | |
| **Annual week** | ***n*** | ***Daily steps*** | ***Daily sunlight hours*** | ***Average daily temperature (ºC)*** | n | ***Daily steps*** | ***Daily sunlight hours*** | ***Average daily temperature (ºC)*** | n | ***Daily steps*** | ***Daily sunlight hours*** | ***Average daily temperature (ºC)*** |
| **Week 41 2022** | 116 | 11163 ± 3565 | 11.24 ± 0.00 | 17.29 ± 0.00 | 62 | 9493 ± 3180 | 11.24 ± 0.00 | 17.29 ± 0.00 | 54 | 13080 ± 2988 | 11.24 ± 0.00 | 17.29 ± 0.00 |
| **Week 42 2022** | 173 | 11171 ± 3294 | 10.95 ± 0.00 | 18.34 ± 0.00 | 92 | 9910 ± 3075 | 10.95 ± 0.00 | 18.34 ± 0.00 | 81 | 12603 ± 2445 | 10.95 ± 0.00 | 18.34 ± 0.00 |
| **Week 43 2022** | 285 | 11284 ± 3423 | 10.67 ± 0.00 | 18.50 ± 0.00 | 142 | 9747 ± 2527 | 10.67 ± 0.00 | 18.50 ± 0.00 | 143 | 12799 ± 3520 | 10.67 ± 0.00 | 18.50 ± 0.00 |
| **Week 44 2022** | 392 | 10890 ± 3640 | 10.40 ± 0.01 | 13.41 ± 0.00 | 197 | 9344 ± 2915 | 10.40 ± 0.01 | 13.41 ± 0.00 | 195 | 12451 ± 3638 | 10.40 ± 0.01 | 13.41 ± 0.00 |
| **Week 45 2022** | 472 | 10825 ± 3710 | 10.16 ± 0.01 | 12.07 ± 0.10 | 241 | 9508 ± 3156 | 10.16 ± 0.01 | 12.08 ± 0.00 | 231 | 12198 ± 3753 | 10.16 ± 0.01 | 12.07 ± 0.14 |
| **Week 46 2022** | 556 | 10597 ± 3741 | 9.93 ± 0.01 | 9.98 ± 0.05 | 280 | 9478 ± 3262 | 9.93 ± 0.01 | 9.99 ± 0.00 | 276 | 11732 ± 3857 | 9.93 ± 0.01 | 9.98 ± 0.07 |
| **Week 47 2022** | 632 | 10679 ± 3830 | 9.73 ± 0.01 | 9.13 ± 0.17 | 319 | 9383 ± 3076 | 9.73 ± 0.01 | 9.14 ± 0.13 | 313 | 12001 ± 4068 | 9.73 ± 0.01 | 9.13 ± 0.19 |
| **Week 48 2022** | 655 | 10516 ± 3834 | 9.57 ± 0.01 | 6.74 ± 0.09 | 333 | 9352 ± 3294 | 9.57 ± 0.01 | 6.74 ± 0.07 | 322 | 11719 ± 3984 | 9.57 ± 0.01 | 6.74 ± 0.10 |
| **Week 49 2022** | 655 | 9724 ± 3972 | 9.45 ± 0.01 | 8.06 ± 0.14 | 333 | 8741 ± 3293 | 9.45 ± 0.01 | 8.05 ± 0.12 | 322 | 10741 ± 4345 | 9.45 ± 0.01 | 8.06 ± 0.17 |
| **Week 50 2022** | 655 | 10458 ± 3843 | 9.38 ± 0.01 | 10.18 ± 0.04 | 333 | 9393 ± 3355 | 9.38 ± 0.01 | 10.18 ± 0.03 | 322 | 11560 ± 4007 | 9.38 ± 0.01 | 10.18 ± 0.04 |
| **Week 51 2022** | 655 | 11294 ± 4189 | 9.35 ± 0.01 | 9.62 ± 0.06 | 333 | 9846 ± 3403 | 9.35 ± 0.01 | 9.63 ± 0.05 | 322 | 12791 ± 4399 | 9.35 ± 0.01 | 9.62 ± 0.07 |
| **Week 52 2022** | 655 | 10372 ± 4484 | 9.38 ± 0.01 | 8.79 ± 0.10 | 333 | 9187 ± 3729 | 9.39 ± 0.01 | 8.79 ± 0.08 | 322 | 11598 ± 4859 | 9.38 ± 0.01 | 8.78 ± 0.11 |
| **Week 1 2023** | 655 | 10099 ± 4235 | 9.46 ± 0.01 | 7.38 ± 0.07 | 333 | 9029 ± 3486 | 9.46 ± 0.01 | 7.38 ± 0.06 | 322 | 11206 ± 4643 | 9.46 ± 0.01 | 7.38 ± 0.08 |
| **Week 2 2023** | 655 | 10543 ± 3861 | 9.59 ± 0.01 | 6.30 ± 0.13 | 333 | 9400 ± 3379 | 9.59 ± 0.01 | 6.30 ± 0.10 | 322 | 11725 ± 3975 | 9.59 ± 0.01 | 6.30 ± 0.15 |
| **Week 3 2023** | 655 | 10712 ± 4032 | 9.76 ± 0.01 | 4.40 ± 0.12 | 333 | 9413 ± 3363 | 9.76 ± 0.01 | 4.40 ± 0.10 | 322 | 12057 ± 4225 | 9.76 ± 0.01 | 4.40 ± 0.14 |
| **Week 4 2023** | 655 | 10864 ± 4073 | 9.97 ± 0.01 | 2.64 ± 0.26 | 333 | 9667 ± 3535 | 9.97 ± 0.01 | 2.63 ± 0.21 | 322 | 12101 ± 4224 | 9.97 ± 0.01 | 2.64 ± 0.30 |
| **Week 5 2023** | 655 | 11236 ± 4331 | 10.20 ± 0.00 | 6.40 ± 0.15 | 333 | 10081 ± 3935 | 10.20 ± 0.00 | 6.40 ± 0.12 | 322 | 12430 ± 4403 | 10.20 ± 0.00 | 6.39 ± 0.17 |
| **Week 6 2023** | 655 | 11058 ± 4630 | 10.46 ± 0.00 | 4.25 ± 0.20 | 333 | 9838 ± 3940 | 10.46 ± 0.00 | 4.24 ± 0.16 | 322 | 12320 ± 4947 | 10.46 ± 0.00 | 4.25 ± 0.23 |
| **Week 7 2023** | 655 | 11731 ± 4752 | 10.73 ± 0.00 | 7.17 ± 0.02 | 333 | 10434 ± 4254 | 10.73 ± 0.00 | 7.17 ± 0.01 | 322 | 13073 ± 4871 | 10.73 ± 0.00 | 7.17 ± 0.02 |
| **Week 8 2023** | 655 | 11483 ± 4592 | 11.02 ± 0.00 | 6.88 ± 0.33 | 333 | 10296 ± 4339 | 11.02 ± 0.00 | 6.89 ± 0.26 | 322 | 12710 ± 4530 | 11.02 ± 0.00 | 6.87 ± 0.38 |
| **Week 9 2023** | 655 | 11382 ± 4379 | 11.31 ± 0.00 | 2.13 ± 0.66 | 333 | 10287 ± 4242 | 11.31 ± 0.00 | 2.12 ± 0.54 | 322 | 12515 ± 4234 | 11.31 ± 0.00 | 2.15 ± 0.77 |
| **Week 10 2023** | 655 | 11599 ± 4450 | 11.61 ± 0.00 | 11.90 ± 0.01 | 333 | 10574 ± 4363 | 11.61 ± 0.00 | 11.90 ± 0.01 | 322 | 12659 ± 4295 | 11.61 ± 0.00 | 11.90 ± 0.02 |
| **Week 11 2023** | 655 | 11844 ± 4539 | 11.91 ± 0.00 | 12.11 ± 0.07 | 333 | 10925 ± 4652 | 11.91 ± 0.00 | 12.11 ± 0.06 | 322 | 12796 ± 4219 | 11.91 ± 0.00 | 12.11 ± 0.09 |
| **Week 12 2023** | 655 | 11940 ± 4723 | 12.21 ± 0.00 | 13.20 ± 0.02 | 333 | 10948 ± 4785 | 12.21 ± 0.00 | 13.20 ± 0.02 | 322 | 12965 ± 4437 | 12.21 ± 0.00 | 13.20 ± 0.02 |
| **Week 13 2023** | 655 | 12447 ± 4901 | 12.51 ± 0.00 | 13.48 ± 0.03 | 333 | 11570 ± 4941 | 12.51 ± 0.00 | 13.48 ± 0.03 | 322 | 13353 ± 4697 | 12.51 ± 0.00 | 13.48 ± 0.04 |
| **Week 14 2023** | 655 | 12301 ± 5097 | 12.81 ± 0.00 | 13.03 ± 0.10 | 333 | 11603 ± 5145 | 12.81 ± 0.00 | 13.03 ± 0.08 | 322 | 13022 ± 4951 | 12.81 ± 0.00 | 13.03 ± 0.11 |
| **Week 15 2023** | 655 | 12416 ± 4820 | 13.11 ± 0.00 | 14.47 ± 0.02 | 333 | 11647 ± 4872 | 13.11 ± 0.00 | 14.47 ± 0.02 | 322 | 13210 ± 4640 | 13.11 ± 0.00 | 14.47 ± 0.02 |
| **Week 16 2023** | 655 | 12400 ± 4809 | 13.39 ± 0.00 | 14.76 ± 0.32 | 333 | 11605 ± 4889 | 13.39 ± 0.00 | 14.76 ± 0.26 | 322 | 13222 ± 4590 | 13.39 ± 0.00 | 14.77 ± 0.37 |
| **Week 17 2023** | 539 | 12072 ± 4146 | 13.66 ± 0.00 | 19.48 ± 0.07 | 271 | 1113 5 ± 3913 | 13.66 ± 0.00 | 19.48 ± 0.06 | 268 | 13019 ± 4166 | 13.66 ± 0.00 | 19.48 ± 0.08 |
| **Week 18 2023** | 482 | 11896 ± 4053 | 13.92 ± 0.01 | 18.56 ± 0.16 | 241 | 10839 ± 3657 | 13.92 ± 0.01 | 18.56 ± 0.13 | 241 | 12953 ± 4160 | 13.92 ± 0.01 | 18.55 ± 0.18 |
| **Week 19 2023** | 371 | 12077 ± 4017 | 14.16 ± 0.01 | 16.53 ± 0.25 | 192 | 11115 ± 3791 | 14.16 ± 0.01 | 16.54 ± 0.20 | 179 | 13109 ± 4006 | 14.16 ± 0.01 | 16.52 ± 0.30 |
| **Week 20 2023** | 263 | 12412 ± 4245 | 14.38 ± 0.01 | 13.74 ± 0.26 | 136 | 11921 ± 4218 | 14.38 ± 0.01 | 13.73 ± 0.21 | 127 | 12939 ± 4227 | 14.38 ± 0.01 | 13.75 ± 0.31 |
| **Week 21 2023** | 183 | 11782 ± 3663 | 14.57 ± 0.00 | 16.17 ± 0.02 | 92 | 11131 ± 3874 | 14.57 ± 0.00 | 16.17 ± 0.02 | 91 | 12439 ± 3330 | 14.57 ± 0.00 | 16.17 ± 0.02 |
| **Week 22 2023** | 99 | 11521 ± 3348 | 14.71 ± 0.00 | 16.40 ± 0.26 | 53 | 11112 ± 3526 | 14.71 ± 0.00 | 16.43 ± 0.36 | 46 | 11992 ± 3102 | 14.71 ± 0.00 | 16.38 ± 0.00 |
| **Week 23 2023** | 23 | 11566 ± 2910 | 14.82 ± 0.00 | 18.99 ± 0.00 | 14 | 10427 ± 2561 | 14.82 ± 0.00 | 18.99 ± 0.00 | 9 | 13338 ± 2613 | 14.82 ± 0.00 | 18.99 ± 0.00 |
| Values are mean ± standard deviation. | | | | | | | | | | | | |

**Table S4.** Multivariable linear regression modelof daily steps (total sample, girls, and boys) and daily sunlight hours and average weekly temperature (ºC) for 35 weeks.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Daily sunlight hours | | Average daily temperature | |
|  |  | β ± SD | p-value | β ± SD | p-value |
| Total sample | M0 | 315 ± 237 | **< 0.001** | 74 ± 130 | **0.002** |
| M1 | 335 ± 331 | **< 0.001** | -10 ± 124 | 0.617 |
| Girls | M0 | 416 ± 260 | **< 0.001** | 86 ± 166 | **0.004** |
| M1 | 484 ± 343 | **< 0.001** | -37 ± 124 | 0.097 |
| Boys | M0 | 235 ± 278 | **< 0.001** | 69 ± 112 | **< 0.001** |
| M1 | 192 ± 379 | **0.005** | 21 ± 142 | 0.389 |
| Data are presented as beta coefficient (β) ± standard deviation (SD). The values in bold indicate statistical significance at p < 0.05. Model 0 (M0): raw data analysis. Model 1 (M1): controlling for average weekly temperature (ºC) or daily sunlight hours. | | | | | | |

Respondents:

745

Invited for participation:

1,049

Non-respondents:

304 actively refused or did not return the written approval.

Excluded: 85 had missing data on daily step counts for all weeks.

Population for analyses:

655

# **Figure. S1.** Diagram flow of the study participants in the current study, from the original e-MOVI project.

Mapa

Descripción generada automáticamente

**Figure S2.** Map of the study area.

**Diagrama

Descripción generada automáticamente**

**Figure S3.** Scatterplots illustrating LOESS regression analysis between weeks of the year (from week 41 2022 to week 23 2023) and daily steps, average daily temperature (ºC), and daily sunlight hours, by sex. Complete n (n girls = 333, n boys = 322): Week 49 to Week 17.

Gráfico, Diagrama

Descripción generada automáticamente

**Figure S4.** Scatterplots illustrating LOESS regression analysis between daily steps and average daily temperature (ºC) and daily sunlight hours, by sex.

Gráfico

Descripción generada automáticamente

**Figure S5.** Scatterplots illustrating LOESS regression analysis between average daily temperature (ºC) and daily sunlight hours.

Gráfico, Gráfico de cajas y bigotes

Descripción generada automáticamente

**Figure S6.** Interaction between average daily temperature and daily sunlight hours for the mean difference in daily steps. \* Indicates p < 0.05.

Gráfico, Gráfico de cajas y bigotes

Descripción generada automáticamente

**Figure S7.** Interaction between average daily temperature and daily sunlight hours for the mean difference in daily steps by sex.