

Multiverse analysis

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Abstract

One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline.

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Multiverse analysis

Results

Model diagnostics

The model diagnostics for the main analysis, and for all models presented in this document are in Table 1

Multiverse

In this document we show the relationship between sleep and physical activity by the moderators that were pre-registered in our protocol.

Moderation

In the following section we present models for a range of moderators which were pre-defined in our protocol.

Table 1

Model diagnostics

Model name	Skewness	Kurtosis	Converged (%)
Models moderated by age data imp			
Scale sleep duration by PA volume	0.09	-2.39	100.00%
Scale sleep efficiency by PA volume	-0.93	-3.79	100.00%
Scale sleep onset by PA volume	0.47	-4.84	100.00%
Scale sleep regularity by PA volume	-0.86	-3.20	100.00%
Scale sleep duration by PA intensity	0.09	-2.37	100.00%
Scale sleep efficiency by PA intensity	-0.93	-3.77	100.00%
Scale sleep onset by PA intensity	0.47	-4.75	100.00%
Scale sleep regularity by PA intensity	-0.85	-3.16	100.00%
Scale PA volume by sleep duration(lagged)	1.14	-12.71	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.74	100.00%
Scale PA volume by sleep efficiency(lagged)	1.14	-12.78	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep onset(lagged)	1.14	-12.71	100.00%
Scale PA intensity by sleep onset(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep regularity(lagged)	1.18	-13.08	100.00%
Scale PA intensity by sleep regularity(lagged)	0.18	-2.67	100.00%
Models moderated by bmi data imp			
Scale sleep duration by PA volume	0.09	-2.40	100.00%
Scale sleep efficiency by PA volume	-0.93	-3.79	100.00%
Scale sleep onset by PA volume	0.47	-4.83	100.00%
Scale sleep regularity by PA volume	-0.86	-3.22	100.00%
Scale sleep duration by PA intensity	0.09	-2.37	100.00%
Scale sleep efficiency by PA intensity	-0.93	-3.77	100.00%
Scale sleep onset by PA intensity	0.47	-4.75	100.00%
Scale sleep regularity by PA intensity	-0.86	-3.13	100.00%
Scale PA volume by sleep duration(lagged)	1.14	-12.72	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.75	100.00%
Scale PA volume by sleep efficiency(lagged)	1.14	-12.78	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep onset(lagged)	1.14	-12.73	100.00%
Scale PA intensity by sleep onset(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep regularity(lagged)	1.18	-13.06	100.00%
Scale PA intensity by sleep regularity(lagged)	0.17	-2.67	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Models moderated by ses data imp			
Scale sleep duration by PA volume	0.09	-2.40	100.00%
Scale sleep efficiency by PA volume	-0.93	-3.78	100.00%
Scale sleep onset by PA volume	0.46	-4.84	100.00%
Scale sleep regularity by PA volume	-0.86	-3.19	100.00%
Scale sleep duration by PA intensity	0.09	-2.37	100.00%
Scale sleep efficiency by PA intensity	-0.93	-3.77	100.00%
Scale sleep onset by PA intensity	0.47	-4.76	100.00%
Scale sleep regularity by PA intensity	-0.86	-3.11	100.00%
Scale PA volume by sleep duration(lagged)	1.14	-12.71	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.75	100.00%
Scale PA volume by sleep efficiency(lagged)	1.14	-12.78	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep onset(lagged)	1.14	-12.72	100.00%
Scale PA intensity by sleep onset(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep regularity(lagged)	1.18	-13.06	100.00%
Scale PA intensity by sleep regularity(lagged)	0.17	-2.68	100.00%
Models moderated by sex data imp			
Scale sleep duration by PA volume	0.09	-2.40	100.00%
Scale sleep efficiency by PA volume	-0.93	-3.77	100.00%
Scale sleep onset by PA volume	0.47	-4.82	100.00%
Scale sleep regularity by PA volume	-0.86	-3.19	100.00%
Scale sleep duration by PA intensity	0.09	-2.37	100.00%
Scale sleep efficiency by PA intensity	-0.93	-3.78	100.00%
Scale sleep onset by PA intensity	0.47	-4.75	100.00%
Scale sleep regularity by PA intensity	-0.86	-3.12	100.00%
Scale PA volume by sleep duration(lagged)	1.14	-12.73	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.75	100.00%
Scale PA volume by sleep efficiency(lagged)	1.14	-12.76	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep onset(lagged)	1.14	-12.71	100.00%
Scale PA intensity by sleep onset(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep regularity(lagged)	1.18	-13.08	100.00%
Scale PA intensity by sleep regularity(lagged)	0.17	-2.67	100.00%
Models moderated by weekday x data imp			

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep duration by PA volume	0.07	-2.35	100.00%
Scale sleep efficiency by PA volume	-0.92	-3.79	100.00%
Scale sleep onset by PA volume	0.45	-4.92	100.00%
Scale sleep regularity by PA volume	-0.91	-3.59	100.00%
Scale sleep duration by PA intensity	0.07	-2.35	100.00%
Scale sleep efficiency by PA intensity	-0.91	-3.76	100.00%
Scale sleep onset by PA intensity	0.46	-4.81	100.00%
Scale sleep regularity by PA intensity	-0.92	-3.62	100.00%
Scale PA volume by sleep duration(lagged)	1.20	-13.13	100.00%
Scale PA intensity by sleep duration(lagged)	0.19	-2.84	100.00%
Scale PA volume by sleep efficiency(lagged)	1.19	-13.21	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.19	-2.88	100.00%
Scale PA volume by sleep onset(lagged)	1.20	-13.18	100.00%
Scale PA intensity by sleep onset(lagged)	0.20	-2.88	100.00%
Scale PA volume by sleep regularity(lagged)	1.22	-13.34	100.00%
Scale PA intensity by sleep regularity(lagged)	0.21	-2.76	100.00%
Models moderated by season data imp			
Scale sleep duration by PA volume	0.09	-2.38	100.00%
Scale sleep efficiency by PA volume	-0.92	-3.76	100.00%
Scale sleep onset by PA volume	0.47	-4.83	100.00%
Scale sleep regularity by PA volume	-0.86	-3.23	100.00%
Scale sleep duration by PA intensity	0.09	-2.36	100.00%
Scale sleep efficiency by PA intensity	-0.92	-3.76	100.00%
Scale sleep onset by PA intensity	0.47	-4.76	100.00%
Scale sleep regularity by PA intensity	-0.86	-3.11	100.00%
Scale PA volume by sleep duration(lagged)	1.14	-12.66	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.76	100.00%
Scale PA volume by sleep efficiency(lagged)	1.14	-12.78	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep onset(lagged)	1.14	-12.66	100.00%
Scale PA intensity by sleep onset(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep regularity(lagged)	1.18	-13.08	100.00%
Scale PA intensity by sleep regularity(lagged)	0.17	-2.68	100.00%
Models moderated by region data imp			
Scale sleep duration by PA volume	0.09	-2.41	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep efficiency by PA volume	-0.92	-3.81	100.00%
Scale sleep onset by PA volume	0.46	-4.82	100.00%
Scale sleep regularity by PA volume	-0.86	-3.22	100.00%
Scale sleep duration by PA intensity	0.09	-2.36	100.00%
Scale sleep efficiency by PA intensity	-0.92	-3.77	100.00%
Scale sleep onset by PA intensity	0.46	-4.74	100.00%
Scale sleep regularity by PA intensity	-0.84	-3.07	100.00%
Scale PA volume by sleep duration(lagged)	1.14	-12.72	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.77	100.00%
Scale PA volume by sleep efficiency(lagged)	1.13	-12.72	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.74	100.00%
Scale PA volume by sleep onset(lagged)	1.14	-12.74	100.00%
Scale PA intensity by sleep onset(lagged)	0.13	-2.74	100.00%
Scale PA volume by sleep regularity(lagged)	1.18	-13.08	100.00%
Scale PA intensity by sleep regularity(lagged)	0.17	-2.67	100.00%
Models moderated by daylight hours data imp			
Scale sleep duration by PA volume	0.09	-2.41	100.00%
Scale sleep efficiency by PA volume	-0.93	-3.79	100.00%
Scale sleep onset by PA volume	0.47	-4.83	100.00%
Scale sleep regularity by PA volume	-0.86	-3.21	100.00%
Scale sleep duration by PA intensity	0.09	-2.38	100.00%
Scale sleep efficiency by PA intensity	-0.93	-3.78	100.00%
Scale sleep onset by PA intensity	0.47	-4.75	100.00%
Scale sleep regularity by PA intensity	-0.86	-3.12	100.00%
Scale PA volume by sleep duration(lagged)	1.14	-12.72	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.76	100.00%
Scale PA volume by sleep efficiency(lagged)	1.14	-12.77	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep onset(lagged)	1.14	-12.72	100.00%
Scale PA intensity by sleep onset(lagged)	0.14	-2.74	100.00%
Scale PA volume by sleep regularity(lagged)	1.18	-13.06	100.00%
Scale PA intensity by sleep regularity(lagged)	0.18	-2.66	100.00%
Models moderated by accelerometer wear location data imp			
Scale sleep duration by PA volume	0.09	-2.40	100.00%
Scale sleep efficiency by PA volume	-0.92	-3.81	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep onset by PA volume	0.47	-4.85	100.00%
Scale sleep regularity by PA volume	-0.86	-3.21	100.00%
Scale sleep duration by PA intensity	0.09	-2.37	100.00%
Scale sleep efficiency by PA intensity	-0.92	-3.76	100.00%
Scale sleep onset by PA intensity	0.48	-4.73	100.00%
Scale sleep regularity by PA intensity	-0.85	-3.14	100.00%
Scale PA volume by sleep duration(lagged)	1.14	-12.71	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.75	100.00%
Scale PA volume by sleep efficiency(lagged)	1.14	-12.77	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep onset(lagged)	1.14	-12.74	100.00%
Scale PA intensity by sleep onset(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep regularity(lagged)	1.18	-13.07	100.00%
Scale PA intensity by sleep regularity(lagged)	0.19	-2.67	100.00%
Models moderated by PA mostactivehr data imp			
Scale sleep duration by PA volume	0.09	-2.40	100.00%
Scale sleep efficiency by PA volume	-0.92	-3.79	100.00%
Scale sleep onset by PA volume	0.47	-4.83	100.00%
Scale sleep regularity by PA volume	-0.85	-3.16	100.00%
Scale sleep duration by PA intensity	0.09	-2.37	100.00%
Scale sleep efficiency by PA intensity	-0.93	-3.78	100.00%
Scale sleep onset by PA intensity	0.47	-4.74	100.00%
Scale sleep regularity by PA intensity	-0.85	-3.06	100.00%
Scale PA volume by sleep duration(lagged)	1.13	-12.60	100.00%
Scale PA intensity by sleep duration(lagged)	0.14	-2.75	100.00%
Scale PA volume by sleep efficiency(lagged)	1.13	-12.69	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.14	-2.72	100.00%
Scale PA volume by sleep onset(lagged)	1.13	-12.62	100.00%
Scale PA intensity by sleep onset(lagged)	0.14	-2.73	100.00%
Scale PA volume by sleep regularity(lagged)	1.17	-12.93	100.00%
Scale PA intensity by sleep regularity(lagged)	0.17	-2.66	100.00%