

Multiverse analysis

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The authors made the following contributions. First Author: Conceptualization, Writing - Original Draft Preparation, Writing - Review & Editing; Ernst-August Doelle: Writing - Review & Editing, Supervision.

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Abstract

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

Keywords: keywords

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Multiverse analysis

Results

Multiverse

In this document we show the results using another analytic technique. Namely treating study ID as a fixed effect. This is what we wrote in the protocol originally.

The effects of physical activity volume on sleep

We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by age, and the results are presented in Table 1 and Figure 1

The effects of physical activity intensity on sleep

We estimated how physical activity intensity affects sleep across different age groups. We present the results controlling for sex, SES, and BMI, in Table 1 and Figure 2.

The effects of sleep duration on physical activity

We estimated the effect of sleep duration on physical activity by age. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 3.

The effects of sleep efficiency on physical activity

We estimated the effect of sleep efficiency on physical activity by age. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 4.

The effects of sleep onset on physical activity

We estimated the effect of sleep onset on physical activity by age. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 5.

The effects of sleep regularity on physical activity

We estimated the effect of sleep regularity on physical activity by age. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 6.

Moderation

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

BMI

The effects of physical activity volume on sleep by BMI. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by BMI, and the results are presented in Table 3 and Figure 7.

The effects of physical activity intensity on sleep by BMI. We estimated how physical activity intensity affects sleep across BMI. We present the results in Table 3 and Figure 8.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by BMI. Results, controlling for sex, SES, and BMI are presented in Table 4 and Figure 9.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by BMI. Results, controlling for sex, SES, and BMI are presented in Table 4 and Figure 10.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by BMI. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 11.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by BMI. Results are presented in Table 4 and Figure 12.

SES

The effects of physical activity volume on sleep by SES. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by SES, and the results are presented in Table 5 and Figure 13.

The effects of physical activity intensity on sleep by SES. We estimated how physical activity intensity affects sleep across SES. We present the results in Table 5 and Figure 14.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by SES. Results, controlling for sex, SES, and BMI are presented in Table 6 and Figure 15.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by SES. Results, controlling for sex, SES, and BMI are presented in Table 6 and Figure 16.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by SES. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 17.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by SES. Results are presented in Table 6 and Figure 18.

sex

The effects of physical activity volume on sleep by sex. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by sex, and the results are presented in Table 7 and Figure 19.

The effects of physical activity intensity on sleep by sex. We estimated how physical activity intensity affects sleep across sex. We present the results in Table 7 and Figure 20.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by sex. Results, controlling for sex, SES, and BMI are presented in Table 8 and Figure 21.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by sex. Results, controlling for sex, SES, and BMI are presented in Table 8 and Figure 22.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by sex. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 23.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by sex. Results are presented in Table 8 and Figure 24.

weekday

The effects of physical activity volume on sleep by weekday. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by weekday, and the results are presented in Table 9 and Figure 25.

The effects of physical activity intensity on sleep by weekday. We estimated how physical activity intensity affects sleep across weekday. We present the results in Table 9 and Figure 26.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by weekday. Results, controlling for sex, SES, and BMI are presented in Table 10 and Figure 27.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by weekday. Results, controlling for sex, SES, and BMI are presented in Table 10 and Figure 28.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by weekday. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 29.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by weekday. Results are presented in Table 10 and Figure 30.

season

The effects of physical activity volume on sleep by season. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by season, and the results are presented in Table 11 and Figure 31

The effects of physical activity intensity on sleep by season. We estimated how physical activity intensity affects sleep across season. We present the results in Table 11 and Figure 32.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by season. Results, controlling for sex, SES, and BMI are presented in Table 12 and Figure 33.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by season. Results, controlling for sex, SES, and BMI are presented in Table 12 and Figure 34.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by season. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 35.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by season. Results are presented in Table 12 and Figure 36.

region

The effects of physical activity volume on sleep by region. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by region, and the results are presented in Table 13 and Figure 37

The effects of physical activity intensity on sleep by region. We estimated how physical activity intensity affects sleep across region. We present the results in Table 13 and Figure 38.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by region. Results, controlling for sex, SES, and BMI are presented in Table 14 and Figure 39.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by region. Results, controlling for sex, SES, and BMI are presented in Table 14 and Figure 40.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by region. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 41.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by region. Results are presented in Table 14 and Figure 42.

daylight hours

The effects of physical activity volume on sleep by daylight hours. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by daylight hours, and the results are presented in Table 15 and Figure 43.

The effects of physical activity intensity on sleep by daylight hours. We estimated how physical activity intensity affects sleep across daylight hours. We present the results in Table 15 and Figure 44.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by daylight hours. Results, controlling for sex, SES, and BMI are presented in Table 16 and Figure 45.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by daylight hours. Results, controlling for sex, SES, and BMI are presented in Table 16 and Figure 46.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by daylight hours. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 47.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by daylight hours. Results are presented in Table 16 and Figure 48.

wear location

The effects of physical activity volume on sleep by wear location. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by wear location, and the results are presented in Table 17 and Figure 49.

The effects of physical activity intensity on sleep by wear location. We estimated how physical activity intensity affects sleep across wear location. We present the results in Table 17 and Figure 50.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by wear location. Results, controlling for sex, SES, and BMI are presented in Table 18 and Figure 51.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by wear location. Results, controlling for sex, SES, and BMI are presented in Table 18 and Figure 52.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by wear location. Results, controlling for sex, SES, and BMI are presented in Table 2 and Figure 53.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by wear location. Results are presented in Table 18 and Figure 54.

Table 1

Physical activity predicting sleep controlling for SES, sex, BMI, and the fixed effects of study IDs.

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.84 [0.32, 1.36]	0.27	3.16	.050	0.78 [0.37, 1.20]	0.21	3.69	.020
Physical activity	0.12 [-0.25, 0.48]	0.19	0.62	.597	-0.04 [-0.32, 0.24]	0.14	-0.27	.811
Age	0.00 [-0.01, 0.00]	0.00	-0.56	.578	0.00 [-0.01, 0.00]	0.00	-0.36	.722
Physical activity ²	-0.02 [-0.07, 0.03]	0.02	-0.70	.551	0.07 [-0.11, 0.24]	0.09	0.72	.546
Physical activity × age	0.00 [-0.01, 0.00]	0.00	-0.32	.777	0.00 [0.00, 0.01]	0.00	0.31	.786
Age × Physical activity ²	0.00 [0.00, 0.00]	0.00	0.84	.460	0.00 [0.00, 0.00]	0.00	-0.81	.494
Sleep efficiency								
(Intercept)	-0.37 [-0.61, -0.13]	0.12	-3.00	.018	-0.41 [-0.63, -0.19]	0.11	-3.61	.004
Physical activity	0.11 [-0.08, 0.30]	0.10	1.14	.366	0.00 [-0.17, 0.18]	0.09	0.03	.981
Age	0.00 [0.00, 0.00]	0.00	-0.03	.974	0.00 [0.00, 0.00]	0.00	0.22	.829
Physical activity ²	-0.02 [-0.05, 0.00]	0.01	-1.72	.196	0.00 [-0.06, 0.07]	0.04	0.11	.920
Physical activity × age	0.00 [0.00, 0.00]	0.00	-1.86	.172	0.00 [0.00, 0.00]	0.00	-0.13	.911
Age × Physical activity ²	0.00 [0.00, 0.00]	0.00	1.61	.127	0.00 [0.00, 0.00]	0.00	-0.52	.641
Sleep onset								
(Intercept)	-0.97 [-1.89, -0.06]	0.47	-2.09	.152	-1.00 [-1.74, -0.27]	0.37	-2.67	.090
Physical activity	0.14 [-0.63, 0.90]	0.39	0.35	.762	-0.08 [-0.77, 0.61]	0.35	-0.21	.852
Age	0.00 [-0.01, 0.01]	0.00	-0.09	.937	0.00 [-0.01, 0.01]	0.00	-0.06	.956
Physical activity ²	-0.03 [-0.13, 0.08]	0.05	-0.50	.665	0.03 [-0.35, 0.41]	0.19	0.16	.889
Physical activity × age	0.00 [-0.01, 0.01]	0.00	-0.69	.562	0.00 [-0.01, 0.01]	0.01	0.17	.879
Age × Physical activity ²	0.00 [0.00, 0.00]	0.00	1.00	.416	0.00 [-0.01, 0.00]	0.00	-0.13	.911
Sleep regularity								

Table 1 continued

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	0.14 [-0.48, 0.75]	0.32	0.43	.703	0.11 [-0.46, 0.68]	0.29	0.38	.731
Physical activity	0.16 [-0.21, 0.53]	0.19	0.85	.484	0.07 [-0.21, 0.35]	0.14	0.49	.675
Age	0.00 [0.00, 0.00]	0.00	0.58	.562	0.00 [0.00, 0.00]	0.00	-0.30	.769
Physical activity ²	-0.02 [-0.07, 0.04]	0.03	-0.65	.577	0.02 [-0.14, 0.18]	0.08	0.20	.862
Physical activity × age	0.00 [0.00, 0.01]	0.00	0.37	.745	0.00 [-0.01, 0.00]	0.00	-0.37	.744
Age × Physical activity ²	0.00 [0.00, 0.00]	0.00	-1.23	.333	0.00 [0.00, 0.00]	0.00	-0.55	.634

Note. Adjusted for SES, sex, BMI, and the fixed effects of study IDs. Outcomes variables are listed in the column headers.

Table 2

Sleep predicting physical activity controlling for SES, sex, BMI, and the fixed effects of study IDs

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.27 [-0.09, 0.64]	0.19	1.45	.201	0.63 [0.16, 1.09]	0.24	2.63	.057
Sleep duration	-0.04 [-0.10, 0.02]	0.03	-1.22	.318	0.05 [-0.03, 0.13]	0.04	1.18	.345
Age	-0.02 [-0.02, -0.01]	0.00	-6.91	< .001	-0.02 [-0.03, -0.01]	0.00	-3.89	.040
Sleep duration ²	0.03 [0.01, 0.05]	0.01	2.49	.063	-0.06 [-0.10, -0.02]	0.02	-2.90	.085
Sleep duration × age	0.00 [0.00, 0.00]	0.00	0.61	.589	0.00 [0.00, 0.00]	0.00	-0.98	.374
Age × Sleep duration ²	0.00 [0.00, 0.00]	0.00	-2.91	.028	0.00 [0.00, 0.00]	0.00	1.86	.141
Sleep efficiency								
(Intercept)	0.29 [-0.06, 0.63]	0.18	1.64	.148	0.57 [0.09, 1.05]	0.25	2.33	.079
Sleep efficiency	0.01 [-0.02, 0.05]	0.02	0.79	.439	-0.03 [-0.08, 0.01]	0.02	-1.40	.213
Age	-0.02 [-0.02, -0.01]	0.00	-6.67	< .001	-0.02 [-0.03, -0.01]	0.00	-3.81	.041
Sleep efficiency ²	0.01 [0.00, 0.02]	0.01	1.34	.194	-0.01 [-0.02, 0.00]	0.01	-2.12	.055
Sleep efficiency × age	0.00 [0.00, 0.00]	0.00	-0.26	.796	0.00 [0.00, 0.00]	0.00	1.81	.073
Age × Sleep efficiency ²	0.00 [0.00, 0.00]	0.00	-0.98	.357	0.00 [0.00, 0.00]	0.00	0.85	.398
Sleep onset								
(Intercept)	0.29 [-0.06, 0.64]	0.18	1.63	.151	0.59 [0.04, 1.15]	0.28	2.10	.116
Sleep onset	-0.02 [-0.08, 0.03]	0.03	-0.82	.430	0.01 [-0.06, 0.09]	0.04	0.38	.726
Age	-0.02 [-0.02, -0.01]	0.00	-7.83	< .001	-0.02 [-0.03, -0.01]	0.00	-3.69	.045
Sleep onset ²	-0.02 [-0.10, 0.05]	0.04	-0.68	.553	0.00 [-0.04, 0.03]	0.02	-0.23	.823
Sleep onset × age	0.00 [0.00, 0.00]	0.00	-0.32	.751	0.00 [0.00, 0.00]	0.00	-0.17	.865
Age × Sleep onset ²	0.00 [0.00, 0.00]	0.00	0.48	.661	0.00 [0.00, 0.00]	0.00	-0.14	.886
Sleep regularity								

Table 2 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	0.26 [-0.06, 0.59]	0.17	1.58	.156	0.59 [0.10, 1.08]	0.25	2.34	.079
Sleep regularity	0.15 [0.05, 0.24]	0.05	3.03	.078	0.03 [-0.07, 0.12]	0.05	0.55	.631
Age	-0.02 [-0.02, -0.01]	0.00	-7.45	< .001	-0.02 [-0.03, -0.01]	0.01	-3.44	.055
Sleep regularity ²	0.00 [-0.05, 0.05]	0.02	-0.15	.895	-0.02 [-0.06, 0.02]	0.02	-0.93	.423
Sleep regularity × age	0.00 [0.00, 0.00]	0.00	-2.73	.017	0.00 [0.00, 0.00]	0.00	-0.17	.879
Age × Sleep regularity ²	0.00 [0.00, 0.00]	0.00	-0.22	.831	0.00 [0.00, 0.00]	0.00	1.01	.326

Note. Adjusted for SES, sex, BMI, and the fixed effects of study IDs. Outcomes variables are listed in the row headers.

Table 3

Physical activity predicting sleep controlling for SES, age, and sex.

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.46 [0.06, 0.87]	0.21	2.24	.097	0.49 [0.01, 0.97]	0.25	1.99	.143
Physical activity	0.08 [-0.23, 0.40]	0.16	0.52	.647	-0.02 [-0.26, 0.22]	0.12	-0.14	.900
Physical activity ²	-0.03 [-0.13, 0.06]	0.05	-0.67	.562	0.02 [-0.08, 0.12]	0.05	0.47	.674
Age	0.00 [-0.01, 0.00]	0.00	-1.40	.184	0.00 [-0.01, 0.00]	0.00	-2.17	.047
Physical activity × bmi	0.00 [-0.01, 0.01]	0.00	0.01	.996	0.00 [-0.01, 0.01]	0.00	0.24	.828
Sleep efficiency								
(Intercept)	0.07 [-0.19, 0.33]	0.13	0.55	.594	0.11 [-0.21, 0.44]	0.17	0.68	.526
Physical activity	0.09 [-0.17, 0.35]	0.13	0.69	.554	-0.05 [-0.23, 0.14]	0.10	-0.49	.669
Physical activity ²	-0.01 [-0.07, 0.05]	0.03	-0.28	.799	0.00 [-0.13, 0.13]	0.06	-0.02	.983
Age	0.00 [0.00, 0.00]	0.00	1.04	.297	0.00 [0.00, 0.01]	0.00	0.55	.601
Physical activity × bmi	0.00 [-0.01, 0.00]	0.00	-0.59	.593	0.00 [0.00, 0.01]	0.00	0.76	.501
Sleep onset								
(Intercept)	-0.20 [-0.65, 0.25]	0.23	-0.86	.425	-0.22 [-0.72, 0.29]	0.26	-0.84	.444
Physical activity	0.10 [-0.54, 0.74]	0.33	0.31	.787	-0.08 [-0.84, 0.68]	0.39	-0.20	.860
Physical activity ²	-0.03 [-0.14, 0.08]	0.06	-0.48	.677	0.04 [-0.31, 0.39]	0.18	0.23	.842
Age	0.00 [-0.01, 0.01]	0.00	0.17	.877	0.00 [-0.01, 0.01]	0.00	-0.14	.898
Physical activity × bmi	0.00 [-0.01, 0.01]	0.00	-0.67	.563	0.00 [-0.02, 0.02]	0.01	0.19	.870
Sleep regularity								
(Intercept)	0.32 [-0.22, 0.87]	0.28	1.17	.334	0.51 [-0.05, 1.06]	0.28	1.79	.176
Physical activity	0.06 [-0.73, 0.84]	0.40	0.14	.901	0.05 [-0.23, 0.32]	0.14	0.34	.767
Physical activity ²	0.03 [-0.16, 0.21]	0.09	0.30	.795	0.00 [-0.13, 0.13]	0.07	0.01	.990

Table 3 continued

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Age	0.00	[0.00, 0.00]	0.00	0.39	.700	0.00	[0.00, 0.00]	0.00	-0.20	.846
Physical activity \times bmi	0.01	[-0.02, 0.03]	0.01	0.46	.689	0.00	[-0.01, 0.01]	0.00	0.02	.982

Note. Adjusted for SES, age, and sex. Outcomes variables are listed in the column headers.

Table 4

Sleep predicting physical activity controlling for SES, age, and sex

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.34 [0.85, 1.84]	0.25	5.32	.002	0.87 [0.46, 1.27]	0.21	4.15	.019
Sleep duration	-0.02 [-0.08, 0.04]	0.03	-0.74	.484	0.08 [-0.07, 0.23]	0.08	1.00	.413
Sleep duration ²	0.03 [-0.02, 0.08]	0.03	1.14	.337	-0.08 [-0.14, -0.02]	0.03	-2.63	.092
Age	-0.02 [-0.02, -0.01]	0.00	-7.28	< .001	-0.02 [-0.03, -0.01]	0.00	-5.37	.014
Sleep duration × bmi	0.00 [0.00, 0.00]	0.00	-0.06	.951	0.00 [-0.01, 0.00]	0.00	-0.81	.484
Sleep efficiency								
(Intercept)	1.38 [0.94, 1.82]	0.23	6.13	< .001	0.75 [0.30, 1.20]	0.23	3.29	.040
Sleep efficiency	0.02 [-0.06, 0.11]	0.04	0.55	.604	-0.05 [-0.13, 0.03]	0.04	-1.13	.307
Sleep efficiency ²	0.00 [-0.02, 0.02]	0.01	-0.27	.785	-0.02 [-0.04, 0.00]	0.01	-1.80	.093
Age	-0.02 [-0.02, -0.01]	0.00	-7.27	< .001	-0.02 [-0.03, -0.01]	0.00	-5.14	.016
Sleep efficiency × bmi	0.00 [0.00, 0.00]	0.00	-0.32	.766	0.00 [0.00, 0.01]	0.00	1.01	.359
Sleep onset								
(Intercept)	1.41 [0.95, 1.87]	0.23	6.04	< .001	0.76 [0.28, 1.24]	0.24	3.11	.050
Sleep onset	0.01 [-0.05, 0.07]	0.03	0.38	.705	0.02 [-0.03, 0.08]	0.03	0.85	.395
Sleep onset ²	-0.03 [-0.14, 0.08]	0.05	-0.56	.623	-0.02 [-0.07, 0.03]	0.03	-0.83	.437
Age	-0.02 [-0.02, -0.01]	0.00	-7.32	< .001	-0.02 [-0.03, -0.01]	0.00	-5.04	.017
Sleep onset × bmi	0.00 [0.00, 0.00]	0.00	-0.97	.352	0.00 [0.00, 0.00]	0.00	-0.31	.764
Sleep regularity								
(Intercept)	1.31 [0.85, 1.76]	0.23	5.66	.001	0.75 [0.18, 1.33]	0.29	2.57	.092
Sleep regularity	0.15 [0.05, 0.25]	0.05	2.91	.046	-0.01 [-0.21, 0.18]	0.10	-0.14	.897
Sleep regularity ²	-0.02 [-0.12, 0.08]	0.05	-0.45	.687	-0.03 [-0.10, 0.04]	0.04	-0.82	.468

Term	Physical Activity Volume			Physical Activity Intensity						
	β	[95% CI]	SE	t	p	β [95% CI]	SE	t	p	
Age	-0.02	[-0.02, -0.01]	0.00	-7.60	< .001	-0.02	[-0.03, -0.01]	0.00	-5.02	.017
Sleep regularity \times bmi	0.00	[0.00, 0.00]	0.00	-0.88	.405	0.00	[-0.01, 0.01]	0.00	0.49	.664

Note. Adjusted for SES, age, and sex. Outcomes variables are listed in the row headers.

Table 5

Physical activity predicting sleep controlling for BMI, age, and sex.

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.43 [0.07, 0.78]	0.18	2.34	.074	0.49 [-0.07, 1.05]	0.29	1.71	.200
Physical activity	0.10 [-0.07, 0.26]	0.09	1.14	.356	-0.01 [-0.09, 0.08]	0.05	-0.11	.918
Physical activity ²	-0.01 [-0.04, 0.01]	0.01	-1.10	.297	0.03 [-0.03, 0.08]	0.03	0.93	.427
Age	0.00 [-0.01, 0.00]	0.00	-1.36	.198	0.00 [-0.01, 0.00]	0.00	-2.13	.051
Physical activity × sesmedium	-0.03 [-0.10, 0.05]	0.04	-0.63	.543	0.02 [-0.03, 0.06]	0.02	0.68	.494
Physical activity × seshigh	0.01 [-0.10, 0.13]	0.06	0.21	.846	0.00 [-0.07, 0.06]	0.03	-0.13	.904
Sleep efficiency								
(Intercept)	0.10 [-0.19, 0.38]	0.15	0.67	.521	0.14 [-0.14, 0.41]	0.14	0.99	.350
Physical activity	0.04 [-0.10, 0.18]	0.07	0.54	.637	0.00 [-0.10, 0.10]	0.05	-0.03	.977
Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.12	.302	-0.01 [-0.04, 0.02]	0.01	-0.77	.467
Age	0.00 [0.00, 0.00]	0.00	1.06	.290	0.00 [0.00, 0.01]	0.00	0.45	.673
Physical activity × sesmedium	0.00 [-0.08, 0.08]	0.04	-0.07	.947	0.00 [-0.07, 0.08]	0.04	0.12	.912
Physical activity × seshigh	0.02 [-0.03, 0.07]	0.03	0.71	.479	-0.01 [-0.05, 0.03]	0.02	-0.52	.606
Sleep onset								
(Intercept)	-0.22 [-0.63, 0.18]	0.21	-1.07	.315	-0.16 [-1.12, 0.80]	0.49	-0.33	.771
Physical activity	0.01 [-0.41, 0.44]	0.22	0.06	.960	-0.04 [-0.38, 0.30]	0.17	-0.25	.827
Physical activity ²	0.00 [-0.05, 0.06]	0.03	0.12	.913	0.01 [-0.08, 0.10]	0.05	0.21	.852
Age	0.00 [-0.01, 0.01]	0.00	0.18	.870	0.00 [-0.01, 0.01]	0.00	-0.07	.945
Physical activity × sesmedium	0.01 [-0.06, 0.08]	0.04	0.19	.855	-0.01 [-0.05, 0.03]	0.02	-0.43	.673
Physical activity × seshigh	0.04 [-0.04, 0.13]	0.04	1.03	.363	-0.01 [-0.04, 0.03]	0.02	-0.30	.767
Sleep regularity								

Table 5 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	0.42 [-0.04, 0.87]	0.23	1.80	.164	0.51 [-0.18, 1.21]	0.36	1.44	.263
Physical activity	0.20 [-0.02, 0.42]	0.11	1.77	.211	0.06 [-0.08, 0.19]	0.07	0.78	.512
Physical activity ²	-0.04 [-0.07, -0.01]	0.02	-2.58	.078	0.00 [-0.05, 0.05]	0.02	0.02	.988
Age	0.00 [0.00, 0.00]	0.00	0.37	.716	0.00 [-0.01, 0.00]	0.00	-0.25	.814
Physical activity \times sesmedium	-0.01 [-0.06, 0.04]	0.03	-0.51	.612	-0.01 [-0.06, 0.04]	0.03	-0.52	.614
Physical activity \times seshigh	-0.04 [-0.10, 0.02]	0.03	-1.25	.224	0.01 [-0.03, 0.04]	0.02	0.27	.791

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the column headers.

Table 6

Sleep predicting physical activity controlling for BMI, age, and sex

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration										
(Intercept)	1.37	[0.91, 1.84]	0.24	5.83	.001	0.78	[0.35, 1.20]	0.22	3.58	.032
Sleep duration	-0.03	[-0.09, 0.03]	0.03	-0.96	.415	0.04	[-0.02, 0.10]	0.03	1.37	.273
Sleep duration ²	0.00	[-0.02, 0.02]	0.01	0.19	.857	-0.04	[-0.07, -0.02]	0.01	-3.07	.049
Age	-0.02	[-0.02, -0.01]	0.00	-7.33	< .001	-0.02	[-0.03, -0.01]	0.00	-5.37	.014
Sleep duration × sesmedium	0.00	[-0.05, 0.04]	0.02	-0.02	.987	0.00	[-0.05, 0.05]	0.02	-0.03	.974
Sleep duration × seshigh	0.01	[-0.03, 0.05]	0.02	0.48	.639	-0.01	[-0.04, 0.03]	0.02	-0.39	.695
Sleep efficiency										
(Intercept)	1.36	[0.89, 1.83]	0.24	5.72	.001	0.74	[0.29, 1.19]	0.23	3.24	.042
Sleep efficiency	0.01	[-0.06, 0.08]	0.04	0.33	.759	-0.02	[-0.10, 0.05]	0.04	-0.66	.555
Sleep efficiency ²	0.01	[-0.01, 0.03]	0.01	1.21	.278	-0.02	[-0.03, 0.00]	0.01	-1.93	.088
Age	-0.02	[-0.02, -0.01]	0.00	-7.29	< .001	-0.02	[-0.03, -0.01]	0.00	-5.08	.017
Sleep efficiency × sesmedium	0.00	[-0.06, 0.07]	0.03	0.08	.939	0.04	[-0.03, 0.11]	0.04	1.14	.310
Sleep efficiency × seshigh	0.00	[-0.08, 0.07]	0.04	-0.11	.920	0.00	[-0.10, 0.11]	0.05	0.04	.974
Sleep onset										
(Intercept)	1.39	[0.95, 1.83]	0.22	6.21	< .001	0.73	[0.25, 1.21]	0.24	3.01	.055
Sleep onset	-0.02	[-0.10, 0.06]	0.04	-0.52	.639	0.01	[-0.04, 0.05]	0.02	0.23	.822
Sleep onset ²	-0.02	[-0.06, 0.02]	0.02	-1.17	.316	0.00	[-0.03, 0.02]	0.01	-0.37	.720
Age	-0.02	[-0.02, -0.01]	0.00	-7.22	< .001	-0.02	[-0.03, -0.01]	0.00	-5.13	.016
Sleep onset × sesmedium	0.01	[-0.06, 0.08]	0.03	0.24	.818	0.00	[-0.06, 0.06]	0.03	0.01	.991
Sleep onset × seshigh	-0.02	[-0.10, 0.06]	0.04	-0.47	.668	0.01	[-0.06, 0.08]	0.04	0.38	.723
Sleep regularity										

Table 6 continued

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	1.30 [0.91, 1.70]	0.20	6.48	< .001	0.73 [0.23, 1.24]	0.26	2.84	.067
Sleep regularity	0.11 [0.00, 0.22]	0.06	1.88	.183	0.02 [-0.04, 0.08]	0.03	0.72	.512
Sleep regularity ²	-0.01 [-0.07, 0.05]	0.03	-0.27	.808	-0.02 [-0.07, 0.02]	0.02	-0.99	.388
Age	-0.02 [-0.02, -0.01]	0.00	-7.62	< .001	-0.02 [-0.03, -0.01]	0.00	-4.99	.018
Sleep regularity \times sesmedium	0.00 [-0.05, 0.05]	0.03	-0.01	.994	0.00 [-0.05, 0.05]	0.02	0.07	.946
Sleep regularity \times seshigh	0.02 [-0.04, 0.07]	0.03	0.61	.554	0.00 [-0.04, 0.04]	0.02	0.07	.942

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the row headers.

Table 7

Physical activity predicting sleep controlling for SES, age, and BMI.

Term	Physical Activity Volume						Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p		
Sleep duration												
(Intercept)	0.42	[0.06, 0.78]	0.19	2.26	.084	0.48	[-0.05, 1.00]	0.27	1.77	.185		
Physical activity	0.09	[-0.16, 0.34]	0.13	0.68	.565	0.02	[-0.07, 0.10]	0.04	0.40	.724		
Physical activity ²	-0.01	[-0.04, 0.03]	0.02	-0.34	.762	0.04	[-0.05, 0.13]	0.05	0.98	.426		
Age	0.00	[-0.01, 0.00]	0.00	-1.38	.191	0.00	[-0.01, 0.00]	0.00	-2.12	.055		
Physical activity \times sexmale	0.01	[-0.09, 0.11]	0.05	0.20	.851	-0.03	[-0.07, 0.02]	0.02	-1.30	.226		
Sleep efficiency												
(Intercept)	0.10	[-0.19, 0.38]	0.14	0.66	.526	0.14	[-0.15, 0.43]	0.15	0.96	.368		
Physical activity	0.02	[-0.11, 0.15]	0.07	0.29	.795	-0.02	[-0.10, 0.06]	0.04	-0.54	.636		
Physical activity ²	-0.01	[-0.03, 0.01]	0.01	-1.35	.255	-0.02	[-0.04, 0.01]	0.01	-1.38	.231		
Age	0.00	[0.00, 0.01]	0.00	1.14	.253	0.00	[0.00, 0.01]	0.00	0.46	.666		
Physical activity \times sexmale	0.05	[0.01, 0.09]	0.02	2.30	.023	0.04	[-0.03, 0.10]	0.03	1.09	.352		
Sleep onset												
(Intercept)	-0.22	[-0.62, 0.19]	0.21	-1.04	.329	-0.17	[-1.06, 0.72]	0.45	-0.37	.739		
Physical activity	0.05	[-0.46, 0.57]	0.26	0.20	.859	-0.04	[-0.33, 0.25]	0.15	-0.28	.806		
Physical activity ²	-0.01	[-0.07, 0.06]	0.03	-0.25	.827	0.02	[-0.16, 0.20]	0.09	0.19	.865		
Age	0.00	[-0.01, 0.01]	0.00	0.17	.878	0.00	[-0.01, 0.01]	0.00	-0.08	.940		
Physical activity \times sexmale	-0.04	[-0.16, 0.08]	0.06	-0.67	.564	-0.01	[-0.08, 0.06]	0.04	-0.38	.735		
Sleep regularity												
(Intercept)	0.41	[-0.04, 0.86]	0.23	1.79	.165	0.52	[-0.15, 1.20]	0.34	1.52	.243		
Physical activity	0.16	[-0.12, 0.43]	0.14	1.13	.375	0.05	[-0.07, 0.16]	0.06	0.84	.483		
Physical activity ²	-0.03	[-0.07, 0.00]	0.02	-1.82	.191	-0.01	[-0.09, 0.08]	0.04	-0.18	.872		

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Age	0.00	[0.00, 0.00]	0.00	0.43	.674	0.00	[-0.01, 0.00]	0.00	-0.23	.824
Physical activity \times sexmale	0.04	[-0.07, 0.15]	0.06	0.67	.560	0.01	[-0.03, 0.05]	0.02	0.28	.785

Note. Adjusted for SES, age, and BMI. Outcomes variables are listed in the column headers.

Table 8

Sleep predicting physical activity controlling for SES, age, and BMI

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.36 [0.88, 1.84]	0.24	5.57	.001	0.78 [0.33, 1.22]	0.03	3.42	.039
Sleep duration	-0.04 [-0.08, 0.01]	0.02	-1.55	.225	0.04 [-0.02, 0.09]	0.03	1.34	.290
Sleep duration ²	0.01 [0.00, 0.03]	0.01	1.54	.166	-0.04 [-0.07, -0.01]	0.02	-2.44	.114
Age	-0.02 [-0.02, -0.01]	0.00	-7.30	< .001	-0.02 [-0.03, -0.01]	0.00	-5.39	.013
Sleep duration × sexmale	0.02 [-0.01, 0.05]	0.01	1.39	.168	0.00 [-0.04, 0.04]	0.02	0.15	.885
Sleep efficiency								
(Intercept)	1.37 [0.91, 1.83]	0.23	5.86	.001	0.73 [0.26, 1.20]	0.02	3.06	.052
Sleep efficiency	0.02 [-0.01, 0.04]	0.01	1.38	.169	-0.01 [-0.04, 0.03]	0.02	-0.39	.703
Sleep efficiency ²	0.00 [-0.01, 0.02]	0.01	0.85	.426	-0.01 [-0.02, 0.00]	0.01	-1.13	.288
Age	-0.02 [-0.02, -0.01]	0.00	-7.31	< .001	-0.02 [-0.03, -0.01]	0.00	-5.07	.017
Sleep efficiency × sexmale	-0.02 [-0.06, 0.02]	0.02	-0.87	.391	0.00 [-0.04, 0.03]	0.02	-0.15	.880
Sleep onset								
(Intercept)	1.38 [0.93, 1.83]	0.23	5.96	< .001	0.73 [0.23, 1.23]	0.02	2.84	.067
Sleep onset	-0.01 [-0.06, 0.05]	0.03	-0.26	.812	-0.01 [-0.08, 0.07]	0.04	-0.15	.890
Sleep onset ²	-0.01 [-0.03, 0.02]	0.01	-0.63	.542	0.00 [-0.03, 0.03]	0.02	-0.26	.805
Age	-0.02 [-0.02, -0.01]	0.00	-7.36	< .001	-0.02 [-0.03, -0.01]	0.00	-5.08	.017
Sleep onset × sexmale	-0.03 [-0.07, 0.01]	0.02	-1.63	.126	0.03 [-0.04, 0.10]	0.03	0.90	.432
Sleep regularity								
(Intercept)	1.31 [0.91, 1.70]	0.20	6.52	< .001	0.72 [0.23, 1.21]	0.25	2.89	.063
Sleep regularity	0.11 [0.02, 0.21]	0.05	2.36	.128	0.03 [-0.01, 0.07]	0.02	1.41	.232
Sleep regularity ²	-0.01 [-0.06, 0.04]	0.02	-0.47	.679	-0.01 [-0.04, 0.02]	0.01	-0.80	.467

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Age	-0.02	[-0.02, -0.01]	0.00	-7.66	< .001	-0.02	[-0.03, -0.01]	0.00	-5.03	.017
Sleep regularity \times sexmale	0.00	[0.03, 0.03]	0.02	-0.04	.966	-0.02	[-0.05, 0.02]	0.02	-0.96	.338

Note. Adjusted for SES, age, and BMI. Outcomes variables are listed in the row headers.

Table 9

Physical activity predicting sleep controlling for BMI, age, and sex.

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.38 [0.04, 0.71]	0.17	2.20	.081	0.45 [-0.08, 0.98]	0.27	1.67	.204
Physical activity	0.06 [-0.18, 0.31]	0.13	0.51	.656	0.02 [-0.14, 0.17]	0.08	0.22	.847
Weekday xmonday	0.00 [-0.07, 0.08]	0.04	0.05	.957	-0.02 [-0.10, 0.05]	0.04	-0.57	.567
Weekday xsaturday	0.09 [0.03, 0.16]	0.03	2.83	.005	0.11 [0.02, 0.20]	0.04	2.52	.021
Weekday xsunday	0.07 [0.00, 0.14]	0.03	1.95	.054	0.05 [-0.02, 0.13]	0.04	1.43	.155
Weekday xthursday	0.00 [-0.07, 0.06]	0.03	-0.12	.901	-0.01 [-0.10, 0.08]	0.05	-0.27	.792
Weekday xtuesday	-0.01 [-0.09, 0.06]	0.04	-0.34	.735	-0.04 [-0.11, 0.04]	0.04	-0.90	.370
Weekday xwednesday	-0.01 [-0.08, 0.05]	0.03	-0.40	.691	-0.04 [-0.12, 0.04]	0.04	-0.99	.322
Physical activity ²	0.00 [-0.04, 0.03]	0.02	-0.30	.783	0.03 [-0.04, 0.10]	0.04	0.75	.515
Age	0.00 [-0.01, 0.00]	0.00	-1.29	.221	0.00 [-0.01, 0.00]	0.00	-2.07	.057
Physical activity × weekday xmonday	0.03 [-0.06, 0.13]	0.05	0.70	.494	-0.01 [-0.10, 0.08]	0.05	-0.21	.840
Physical activity × weekday xsaturday	0.04 [-0.05, 0.13]	0.05	0.93	.362	-0.04 [-0.13, 0.06]	0.05	-0.79	.471
Physical activity × weekday xsunday	0.06 [-0.03, 0.16]	0.05	1.26	.227	-0.04 [-0.15, 0.08]	0.06	-0.61	.583
Physical activity × weekday xtuesday	0.02 [-0.06, 0.10]	0.04	0.46	.643	-0.02 [-0.09, 0.06]	0.04	-0.40	.702
Physical activity × weekday xtuesday	0.03 [-0.06, 0.13]	0.05	0.71	.491	-0.01 [-0.09, 0.08]	0.04	-0.16	.876
Physical activity × weekday xwednesday	0.00 [-0.08, 0.08]	0.04	0.08	.939	-0.01 [-0.10, 0.08]	0.04	-0.22	.838
Weekday xmonday × Physical activity ²	0.00 [-0.03, 0.02]	0.01	-0.34	.736	0.01 [-0.03, 0.05]	0.02	0.44	.663
Weekday xsaturday × Physical activity ²	-0.02 [-0.05, 0.01]	0.02	-1.08	.291	-0.04 [-0.10, 0.02]	0.03	-1.18	.286
Weekday xsunday × Physical activity ²	-0.02 [-0.05, 0.01]	0.02	-1.03	.305	-0.01 [-0.05, 0.03]	0.02	-0.60	.546
Weekday xthursday × Physical activity ²	0.00 [-0.03, 0.03]	0.01	-0.09	.930	0.00 [-0.03, 0.04]	0.02	0.20	.839
Weekday xtuesday × Physical activity ²	0.00 [-0.03, 0.02]	0.01	-0.38	.707	0.02 [-0.03, 0.06]	0.02	0.70	.489

Table 9 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Physical activity ²	0.01 [-0.02, 0.04]	0.02	0.48	.638	0.03 [-0.02, 0.07]	0.02	1.24	.228
Sleep efficency (Intercept)	0.09 [-0.21, 0.39]	0.15	0.60	.568	0.16 [-0.11, 0.43]	0.14	1.16	.275
Physical activity	0.02 [-0.08, 0.12]	0.05	0.38	.728	-0.01 [-0.10, 0.08]	0.05	-0.20	.854
Weekday xmunday	0.03 [-0.04, 0.09]	0.03	0.78	.448	-0.01 [-0.08, 0.05]	0.03	-0.36	.722
Weekday xsaturday	-0.02 [-0.07, 0.03]	0.03	-0.87	.387	-0.07 [-0.13, -0.01]	0.03	-2.26	.024
Weekday xsunday	-0.03 [-0.10, 0.03]	0.03	-0.94	.360	-0.08 [-0.14, -0.02]	0.03	-2.58	.010
Weekday xthursday	-0.02 [-0.09, 0.05]	0.04	-0.53	.610	-0.04 [-0.10, 0.03]	0.03	-1.11	.271
Weekday xtuesday	0.00 [-0.06, 0.05]	0.03	-0.09	.925	-0.04 [-0.10, 0.03]	0.03	-1.12	.266
Weekday xwednesday	0.03 [-0.03, 0.09]	0.03	0.98	.334	0.01 [-0.06, 0.07]	0.03	0.23	.815
Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.27	.791	-0.02 [-0.05, 0.01]	0.02	-1.27	.232
Age	0.00 [0.00, 0.00]	0.00	1.12	.263	0.00 [0.00, 0.01]	0.00	0.46	.660
Physical activity \times weekday xmonday	0.02 [-0.05, 0.09]	0.04	0.61	.543	0.01 [-0.03, 0.06]	0.02	0.58	.560
Physical activity \times weekday xsaturday	0.09 [0.03, 0.16]	0.03	2.94	.003	-0.03 [-0.08, 0.03]	0.03	-0.91	.384
Physical activity \times weekday xsunday	0.06 [0.00, 0.13]	0.03	1.82	.071	0.00 [-0.05, 0.05]	0.02	-0.03	.976
Physical activity \times weekday xthursday	0.02 [-0.09, 0.12]	0.05	0.34	.750	0.04 [-0.02, 0.09]	0.03	1.28	.225
Physical activity \times weekday xtuesday	0.00 [-0.07, 0.07]	0.04	-0.11	.915	-0.01 [-0.06, 0.05]	0.03	-0.20	.845
Physical activity \times weekday xwednesday	-0.02 [-0.12, 0.08]	0.05	-0.39	.713	0.01 [-0.04, 0.05]	0.02	0.35	.725
Weekday xmunday \times Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.09	.277	0.02 [-0.02, 0.05]	0.02	1.07	.290
Weekday xsaturday \times Physical activity ²	-0.02 [-0.04, 0.00]	0.01	-1.71	.092	0.02 [-0.01, 0.06]	0.02	1.31	.195
Weekday xsunday \times Physical activity ²	-0.03 [-0.05, -0.01]	0.01	-2.51	.012	0.01 [-0.03, 0.06]	0.02	0.50	.634
Weekday xthursday \times Physical activity ²	-0.01 [-0.04, 0.02]	0.02	-0.67	.520	0.01 [-0.03, 0.05]	0.02	0.54	.597
Weekday xtuesday \times Physical activity ²	0.00 [-0.02, 0.02]	0.01	0.01	.992	0.02 [-0.01, 0.06]	0.02	1.26	.222

Table 9 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Physical activity ²	0.00 [-0.03, 0.02]	0.01	-0.26	.799	0.01 [-0.03, 0.04]	0.02	0.39	.698
Sleep onset								
(Intercept)	-0.19 [-0.59, 0.22]	0.21	-0.90	.395	-0.13 [-1.08, 0.82]	0.49	-0.27	.805
Physical activity	0.04 [-0.40, 0.48]	0.22	0.17	.883	-0.04 [-0.43, 0.34]	0.20	-0.21	.853
Weekday xmunday	-0.05 [-0.15, 0.04]	0.05	-1.08	.345	-0.04 [-0.11, 0.02]	0.03	-1.40	.165
Weekday xsaturday	0.08 [0.03, 0.13]	0.03	3.05	.003	0.08 [0.01, 0.14]	0.03	2.39	.025
Weekday xsunday	0.08 [0.00, 0.17]	0.04	1.90	.120	0.04 [-0.02, 0.11]	0.03	1.37	.178
Weekday xthursday	-0.05 [-0.12, 0.02]	0.04	-1.47	.183	-0.08 [-0.15, -0.01]	0.04	-2.11	.054
Weekday xtuesday	-0.05 [-0.10, 0.00]	0.03	-1.92	.057	-0.07 [-0.17, 0.03]	0.05	-1.32	.249
Weekday xwednesday	-0.04 [-0.11, 0.03]	0.04	-1.10	.306	-0.05 [-0.15, 0.06]	0.05	-0.87	.428
Physical activity ²	0.00 [-0.06, 0.05]	0.03	-0.17	.877	0.01 [-0.10, 0.12]	0.06	0.19	.868
Age	0.00 [-0.01, 0.01]	0.00	0.16	.887	0.00 [-0.01, 0.01]	0.00	-0.10	.925
Physical activity \times weekday xmonday	-0.06 [-0.12, 0.00]	0.03	-2.03	.042	-0.01 [-0.12, 0.11]	0.06	-0.13	.908
Physical activity \times weekday xsaturday	0.03 [-0.04, 0.10]	0.03	0.85	.404	0.03 [-0.09, 0.14]	0.06	0.49	.663
Physical activity \times weekday xsunday	0.01 [-0.06, 0.09]	0.04	0.30	.770	0.00 [-0.15, 0.16]	0.08	0.02	.984
Physical activity \times weekday xtuesday	0.00 [-0.09, 0.09]	0.05	0.02	.987	-0.03 [-0.09, 0.03]	0.03	-0.85	.429
Physical activity \times weekday xtuesday	-0.01 [-0.13, 0.11]	0.06	-0.22	.842	-0.01 [-0.06, 0.05]	0.03	-0.21	.838
Physical activity \times weekday xwednesday	0.01 [-0.11, 0.14]	0.06	0.20	.856	-0.01 [-0.07, 0.05]	0.03	-0.32	.762
Weekday xmunday \times Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.70	.483	-0.01 [-0.06, 0.04]	0.02	-0.45	.670
Weekday xsaturday \times Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-0.67	.507	0.00 [-0.05, 0.05]	0.03	-0.02	.984
Weekday xsunday \times Physical activity ²	-0.02 [-0.04, 0.01]	0.01	-1.33	.199	0.01 [-0.04, 0.05]	0.02	0.42	.693
Weekday xthursday \times Physical activity ²	0.00 [-0.04, 0.03]	0.02	-0.06	.956	0.01 [-0.02, 0.05]	0.02	0.84	.415
Weekday xtuesday \times Physical activity ²	0.00 [-0.03, 0.02]	0.01	-0.05	.958	0.01 [-0.04, 0.06]	0.02	0.37	.727

Table 9 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Physical activity ²	-0.01 [-0.04, 0.03]	0.02	-0.31	.773	0.00 [-0.05, 0.05]	0.03	0.09	.930
Sleep regularity								
(Intercept)	0.40 [-0.03, 0.82]	0.22	1.83	.154	0.53 [-0.19, 1.24]	0.36	1.45	.263
Physical activity	0.16 [-0.05, 0.37]	0.11	1.47	.268	0.01 [-0.12, 0.15]	0.07	0.18	.873
Weekday xmunday	0.03 [-0.07, 0.13]	0.05	0.56	.608	0.00 [-0.06, 0.07]	0.03	0.04	.965
Weekday xsaturday	-0.10 [-0.16, -0.04]	0.03	-3.30	.005	-0.13 [-0.20, -0.05]	0.04	-3.30	.006
Weekday xsunday	-0.12 [-0.21, -0.04]	0.04	-2.79	.040	-0.18 [-0.26, -0.11]	0.04	-4.91	< .001
Weekday xthursday	0.15 [0.09, 0.21]	0.03	4.75	< .001	0.15 [0.06, 0.25]	0.05	3.33	.015
Weekday xtuesday	0.16 [0.08, 0.24]	0.04	4.06	.006	0.15 [0.08, 0.23]	0.04	3.91	.001
Weekday xwednesday	0.17 [0.08, 0.26]	0.05	3.57	.023	0.17 [0.10, 0.25]	0.04	4.60	< .001
Physical activity ²	-0.02 [-0.05, 0.00]	0.01	-1.72	.170	-0.01 [-0.06, 0.05]	0.03	-0.25	.822
Age	0.00 [0.00, 0.00]	0.00	0.26	.802	0.00 [-0.01, 0.00]	0.00	-0.40	.705
Physical activity \times weekday xmonday	0.05 [-0.03, 0.13]	0.04	1.32	.208	0.07 [0.00, 0.13]	0.03	1.98	.088
Physical activity \times weekday xsaturday	0.04 [-0.03, 0.12]	0.04	1.13	.274	-0.04 [-0.10, 0.02]	0.03	-1.31	.225
Physical activity \times weekday xsunday	0.08 [0.01, 0.15]	0.03	2.39	.018	-0.03 [-0.12, 0.05]	0.04	-0.74	.500
Physical activity \times weekday xtuesday	0.00 [-0.06, 0.07]	0.03	0.08	.934	0.07 [0.02, 0.12]	0.02	3.00	.005
Physical activity \times weekday xtuesday	-0.01 [-0.08, 0.06]	0.03	-0.30	.765	0.06 [0.02, 0.11]	0.02	2.62	.010
Physical activity \times weekday xwednesday	-0.06 [-0.16, 0.04]	0.05	-1.18	.284	0.05 [-0.01, 0.11]	0.03	1.71	.123
Weekday xmunday \times Physical activity ²	-0.01 [-0.04, 0.01]	0.01	-0.82	.424	0.01 [-0.04, 0.06]	0.03	0.28	.790
Weekday xsaturday \times Physical activity ²	-0.02 [-0.05, 0.01]	0.02	-1.07	.314	0.00 [-0.06, 0.05]	0.03	-0.14	.892
Weekday xsunday \times Physical activity ²	-0.03 [-0.06, 0.00]	0.02	-1.93	.083	0.01 [-0.04, 0.05]	0.02	0.27	.796
Weekday xthursday \times Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-0.84	.398	-0.01 [-0.06, 0.04]	0.03	-0.35	.742
Weekday xtuesday \times Physical activity ²	0.00 [-0.02, 0.02]	0.01	0.37	.709	0.01 [-0.04, 0.05]	0.02	0.39	.706

Table 9 continued

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday x wednesday x Physical activity ²	0.00 [-0.03, 0.04]	0.02	0.14	.896	-0.01 [-0.05, 0.03]	0.02	-0.51	.614

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the column headers.

Table 10

Sleep predicting physical activity controlling for BMI, age, and sex

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.46 [1.04, 1.89]	0.22	6.78	< .001	0.84 [0.43, 1.24]	0.21	4.05	.021
Sleep duration	0.00 [-0.05, 0.05]	0.02	-0.05	.959	0.06 [-0.06, 0.18]	0.06	1.03	.398
Weekday xmonday	-0.21 [-0.27, -0.14]	0.03	-6.36	< .001	-0.05 [-0.11, 0.01]	0.03	-1.67	.097
Weekday xsaturday	-0.14 [-0.20, -0.08]	0.03	-4.61	< .001	-0.05 [-0.11, 0.01]	0.03	-1.57	.127
Weekday xsunday	-0.22 [-0.31, -0.14]	0.04	-5.09	.002	-0.12 [-0.18, -0.06]	0.03	-3.64	.002
Weekday xthursday	-0.06 [-0.12, 0.00]	0.03	-1.93	.055	0.03 [-0.02, 0.09]	0.03	1.16	.245
Weekday xtuesday	-0.10 [-0.16, -0.04]	0.03	-3.15	.002	0.02 [-0.05, 0.10]	0.04	0.65	.528
Weekday xwednesday	-0.10 [-0.17, -0.02]	0.04	-2.61	.019	0.01 [-0.06, 0.09]	0.04	0.31	.766
Sleep duration ²	-0.02 [-0.06, 0.02]	0.02	-0.90	.412	-0.04 [-0.07, 0.00]	0.02	-2.01	.101
Age	-0.02 [-0.02, -0.01]	0.00	-7.29	< .001	-0.02 [-0.03, -0.01]	0.00	-5.41	.014
Sleep duration × weekday xmonday	-0.03 [-0.08, 0.02]	0.03	-1.25	.213	-0.05 [-0.13, 0.04]	0.05	-1.01	.376
Sleep duration × weekday xsaturday	-0.05 [-0.11, 0.02]	0.03	-1.50	.179	-0.06 [-0.20, 0.08]	0.07	-0.80	.493
Sleep duration × weekday xsunday	-0.06 [-0.11, -0.01]	0.02	-2.44	.016	-0.04 [-0.15, 0.07]	0.06	-0.65	.564
Sleep duration × weekday xtuesday	-0.01 [-0.06, 0.04]	0.02	-0.48	.632	0.00 [-0.08, 0.07]	0.04	-0.04	.967
Sleep duration × weekday xtuesday	-0.01 [-0.06, 0.04]	0.03	-0.26	.795	-0.02 [-0.10, 0.07]	0.04	-0.39	.716
Sleep duration × weekday xwednesday	0.00 [-0.08, 0.07]	0.04	-0.04	.967	0.01 [-0.05, 0.07]	0.03	0.26	.798
Weekday xmonday × Sleep duration ²	0.03 [-0.01, 0.07]	0.02	1.54	.156	-0.03 [-0.06, 0.00]	0.02	-1.82	.083
Weekday xsaturday × Sleep duration ²	0.03 [0.00, 0.06]	0.02	1.71	.095	-0.02 [-0.05, 0.01]	0.01	-1.19	.238
Weekday xsunday × Sleep duration ²	0.03 [-0.02, 0.09]	0.03	1.17	.323	-0.01 [-0.04, 0.01]	0.01	-1.08	.284
Weekday xtuesday × Sleep duration ²	0.01 [-0.02, 0.05]	0.02	0.76	.450	0.00 [-0.03, 0.03]	0.02	-0.20	.843
Weekday xtuesday × Sleep duration ²	0.02 [-0.03, 0.06]	0.02	0.69	.523	0.01 [-0.04, 0.06]	0.02	0.32	.762

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Sleep duration ²	0.04 [-0.03, 0.11]	0.04	1.04	.379	0.00 [-0.03, 0.04]	0.02	0.23	.825
Sleep efficiency (Intercept)	1.46 [1.02, 1.89]	0.22	6.58	< .001	0.79 [0.36, 1.21]	0.22	3.64	.028
Sleep efficiency	-0.01 [-0.06, 0.03]	0.02	-0.52	.606	-0.03 [-0.09, 0.03]	0.03	-0.99	.359
Weekday xmunday	-0.19 [-0.25, -0.14]	0.03	-6.84	< .001	-0.08 [-0.13, -0.03]	0.03	-3.07	.002
Weekday xsaturday	-0.12 [-0.18, -0.06]	0.03	-4.09	< .001	-0.08 [-0.13, -0.02]	0.03	-2.76	.009
Weekday xsunday	-0.23 [-0.29, -0.17]	0.03	-7.71	< .001	-0.13 [-0.18, -0.07]	0.03	-4.72	< .001
Weekday xthursday	-0.06 [-0.11, -0.01]	0.03	-2.20	.028	0.03 [-0.03, 0.08]	0.03	0.92	.365
Weekday xtuesday	-0.10 [-0.17, -0.03]	0.03	-2.76	.020	0.03 [-0.03, 0.08]	0.03	0.89	.383
Weekday xwednesday	-0.07 [-0.12, -0.01]	0.03	-2.52	.012	0.02 [-0.06, 0.09]	0.04	0.45	.667
Sleep efficiency ²	-0.02 [-0.03, 0.00]	0.01	-2.02	.046	0.00 [-0.03, 0.03]	0.02	-0.25	.820
Age	-0.02 [-0.02, -0.01]	0.00	-7.19	< .001	-0.02 [-0.03, -0.01]	0.00	-5.02	.018
Sleep efficiency \times weekday xmonday	0.03 [-0.04, 0.11]	0.04	0.86	.408	0.04 [-0.03, 0.10]	0.03	1.03	.315
Sleep efficiency \times weekday xsaturday	0.02 [-0.04, 0.09]	0.03	0.72	.474	0.05 [-0.02, 0.12]	0.04	1.33	.210
Sleep efficiency \times weekday xsunday	0.05 [-0.02, 0.12]	0.03	1.50	.147	0.03 [-0.03, 0.09]	0.03	1.01	.313
Sleep efficiency \times weekday xtuesday	0.00 [-0.09, 0.09]	0.05	0.00	.997	0.02 [-0.08, 0.11]	0.05	0.31	.766
Sleep efficiency \times weekday xtuesday	0.05 [0.00, 0.11]	0.03	1.84	.065	0.01 [-0.05, 0.08]	0.03	0.47	.643
Sleep efficiency \times weekday xwednesday	0.00 [-0.09, 0.09]	0.05	-0.01	.992	0.01 [-0.07, 0.09]	0.04	0.23	.827
Weekday xmunday \times Sleep efficiency ²	0.02 [0.00, 0.04]	0.01	2.01	.048	0.00 [-0.04, 0.03]	0.02	-0.25	.817
Weekday xsaturday \times Sleep efficiency ²	0.02 [0.00, 0.05]	0.01	2.01	.049	0.00 [-0.05, 0.05]	0.03	0.06	.959
Weekday xsunday \times Sleep efficiency ²	0.05 [0.03, 0.08]	0.01	3.87	.002	-0.02 [-0.08, 0.05]	0.03	-0.49	.663
Weekday xthursday \times Sleep efficiency ²	0.01 [-0.01, 0.03]	0.01	0.93	.354	0.00 [-0.03, 0.03]	0.01	-0.03	.976
Weekday xtuesday \times Sleep efficiency ²	0.02 [0.00, 0.04]	0.01	1.53	.128	0.01 [-0.02, 0.04]	0.02	0.41	.700

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Sleep efficiency ²	0.01 [-0.02, 0.04]	0.01	0.86	.418	-0.01 [-0.04, 0.03]	0.02	-0.44	.681
Sleep onset								
(Intercept)	1.45 [1.02, 1.88]	0.22	6.63	< .001	0.78 [0.31, 1.25]	0.24	3.23	.046
Sleep onset	-0.02 [-0.07, 0.04]	0.03	-0.59	.564	-0.03 [-0.09, 0.04]	0.03	-0.78	.470
Weekday xmunday	-0.17 [-0.24, -0.10]	0.04	-4.82	< .001	-0.05 [-0.13, 0.02]	0.04	-1.35	.194
Weekday xsaturday	-0.12 [-0.19, -0.06]	0.03	-3.62	.001	-0.06 [-0.13, 0.01]	0.03	-1.71	.097
Weekday xsunday	-0.18 [-0.25, -0.12]	0.03	-5.90	< .001	-0.11 [-0.19, -0.04]	0.04	-3.02	.008
Weekday xthursday	-0.07 [-0.14, 0.00]	0.03	-2.07	.041	0.02 [-0.04, 0.08]	0.03	0.58	.562
Weekday xtuesday	-0.08 [-0.15, 0.00]	0.04	-1.92	.070	0.03 [-0.03, 0.10]	0.03	0.94	.348
Weekday xwednesday	-0.08 [-0.15, -0.01]	0.04	-2.25	.026	0.01 [-0.06, 0.07]	0.03	0.20	.840
Sleep onset ²	-0.02 [-0.06, 0.01]	0.02	-1.23	.246	-0.01 [-0.04, 0.03]	0.02	-0.30	.771
Age	-0.02 [-0.02, -0.01]	0.00	-7.32	< .001	-0.02 [-0.03, -0.01]	0.00	-5.00	.018
Sleep onset \times weekday xmonday	-0.01 [-0.07, 0.04]	0.03	-0.46	.648	0.09 [0.04, 0.14]	0.03	3.58	< .001
Sleep onset \times weekday xsaturday	-0.01 [-0.06, 0.05]	0.03	-0.21	.835	0.05 [-0.01, 0.11]	0.03	1.54	.150
Sleep onset \times weekday xsunday	0.01 [-0.05, 0.07]	0.03	0.27	.788	0.09 [0.04, 0.14]	0.03	3.41	.001
Sleep onset \times weekday xthursday	-0.02 [-0.08, 0.04]	0.03	-0.66	.513	0.01 [-0.06, 0.07]	0.03	0.22	.832
Sleep onset \times weekday xtuesday	0.02 [-0.04, 0.07]	0.03	0.68	.499	0.00 [-0.05, 0.05]	0.03	-0.13	.898
Sleep onset \times weekday xwednesday	0.00 [-0.06, 0.05]	0.03	-0.12	.906	0.02 [-0.07, 0.11]	0.05	0.46	.666
Weekday xmunday \times Sleep onset ²	0.00 [-0.04, 0.04]	0.02	0.10	.920	-0.02 [-0.08, 0.04]	0.03	-0.71	.510
Weekday xsaturday \times Sleep onset ²	0.03 [-0.01, 0.07]	0.02	1.31	.192	0.00 [-0.06, 0.06]	0.03	-0.01	.991
Weekday xsunday \times Sleep onset ²	0.01 [-0.04, 0.06]	0.03	0.51	.622	-0.02 [-0.07, 0.03]	0.03	-0.67	.520
Weekday xthursday \times Sleep onset ²	0.02 [-0.02, 0.06]	0.02	0.92	.357	0.01 [-0.03, 0.06]	0.02	0.59	.564
Weekday xtuesday \times Sleep onset ²	0.00 [-0.05, 0.04]	0.02	-0.09	.931	0.01 [-0.04, 0.06]	0.02	0.35	.730

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Sleep onset ²	0.03 [-0.02, 0.07]	0.02	1.19	.238	0.01 [-0.05, 0.08]	0.03	0.35	.739
Sleep regularity								
(Intercept)	1.37 [1.00, 1.75]	0.19	7.17	< .001	0.78 [0.29, 1.28]	0.25	3.09	.054
Sleep regularity	0.10 [0.01, 0.19]	0.05	2.12	.126	0.00 [-0.05, 0.06]	0.03	0.15	.888
Weekday xmunday	-0.18 [-0.25, -0.11]	0.03	-5.09	< .001	-0.09 [-0.17, -0.01]	0.04	-2.17	.058
Weekday xsaturday	-0.06 [-0.13, 0.00]	0.03	-1.96	.052	-0.06 [-0.18, 0.06]	0.06	-1.04	.365
Weekday xsunday	-0.17 [-0.24, -0.10]	0.04	-4.68	< .001	-0.13 [-0.21, -0.05]	0.04	-3.21	.011
Weekday xthursday	-0.04 [-0.11, 0.03]	0.03	-1.15	.253	0.04 [-0.04, 0.11]	0.04	0.99	.334
Weekday xtuesday	-0.10 [-0.18, -0.02]	0.04	-2.41	.035	0.03 [-0.04, 0.10]	0.04	0.79	.433
Weekday xwednesday	-0.05 [-0.12, 0.02]	0.04	-1.48	.143	0.01 [-0.07, 0.09]	0.04	0.29	.775
Sleep regularity ²	-0.02 [-0.06, 0.03]	0.02	-0.80	.456	-0.01 [-0.06, 0.03]	0.02	-0.47	.656
Age	-0.02 [-0.02, -0.01]	0.00	-7.50	< .001	-0.02 [-0.03, -0.01]	0.00	-4.97	.019
Sleep regularity \times weekday xmonday	0.00 [-0.07, 0.07]	0.04	-0.02	.987	0.00 [-0.06, 0.06]	0.03	-0.01	.994
Sleep regularity \times weekday xsaturday	0.02 [-0.04, 0.07]	0.03	0.60	.547	0.04 [-0.01, 0.10]	0.03	1.52	.136
Sleep regularity \times weekday xsunday	0.04 [-0.02, 0.09]	0.03	1.28	.201	0.02 [-0.06, 0.09]	0.04	0.39	.709
Sleep regularity \times weekday xthursday	0.02 [-0.04, 0.08]	0.03	0.63	.534	0.03 [-0.03, 0.08]	0.03	1.00	.320
Sleep regularity \times weekday xtuesday	0.02 [-0.04, 0.07]	0.03	0.60	.551	0.01 [-0.06, 0.07]	0.03	0.17	.865
Sleep regularity \times weekday xwednesday	-0.04 [-0.10, 0.02]	0.03	-1.19	.240	-0.02 [-0.08, 0.04]	0.03	-0.72	.469
Weekday xmunday \times Sleep regularity ²	0.03 [-0.01, 0.07]	0.02	1.64	.102	0.01 [-0.03, 0.05]	0.02	0.51	.609
Weekday xsaturday \times Sleep regularity ²	-0.03 [-0.09, 0.03]	0.03	-1.00	.344	-0.02 [-0.07, 0.03]	0.03	-0.76	.459
Weekday xsunday \times Sleep regularity ²	0.02 [-0.03, 0.06]	0.02	0.74	.465	-0.01 [-0.05, 0.03]	0.02	-0.42	.678
Weekday xthursday \times Sleep regularity ²	-0.01 [-0.08, 0.05]	0.03	-0.43	.682	-0.02 [-0.06, 0.02]	0.02	-0.87	.388
Weekday xtuesday \times Sleep regularity ²	0.03 [-0.02, 0.08]	0.03	1.08	.300	0.01 [-0.03, 0.05]	0.02	0.44	.659

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday x wednesday \times Sleep regularity ²	0.02 [-0.04, 0.08]	0.03	0.60	.562	0.02 [-0.03, 0.06]	0.02	0.66	.515

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the row headers.

Table 11

Physical activity predicting sleep controlling for BMI, age, and sex.

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.40 [0.08, 0.72]	0.16	2.45	.053	0.48 [-0.01, 0.98]	0.25	1.92	.159
Physical activity	0.13 [-0.03, 0.29]	0.08	1.55	.245	-0.01 [-0.11, 0.09]	0.05	-0.15	.889
Seasonspring	-0.02 [-0.11, 0.08]	0.05	-0.33	.750	-0.04 [-0.13, 0.04]	0.04	-0.94	.355
Seasonsummer	-0.11 [-0.24, 0.01]	0.06	-1.73	.148	-0.15 [-0.24, -0.06]	0.05	-3.16	.003
Seasonwinter	0.04 [-0.06, 0.15]	0.05	0.82	.447	0.02 [-0.09, 0.13]	0.05	0.33	.755
Physical activity ²	-0.02 [-0.04, 0.00]	0.01	-1.69	.145	0.01 [-0.07, 0.09]	0.04	0.20	.860
Age	0.00 [-0.01, 0.00]	0.00	-1.21	.245	0.00 [-0.01, 0.00]	0.00	-1.86	.091
Physical activity × season	-0.05 [-0.15, 0.06]	0.06	-0.83	.451	0.00 [-0.04, 0.05]	0.02	0.11	.910
Physical activity × seasonsummer	-0.02 [-0.13, 0.09]	0.05	-0.36	.727	0.01 [-0.05, 0.07]	0.03	0.27	.785
Physical activity × seasonwinter	-0.08 [-0.21, 0.05]	0.07	-1.22	.304	0.02 [-0.08, 0.12]	0.05	0.38	.729
Seasonspring × Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.78	.444	0.02 [-0.01, 0.06]	0.02	1.26	.221
Seasonsummer × Physical activity ²	0.01 [-0.04, 0.06]	0.03	0.30	.777	0.03 [-0.03, 0.09]	0.03	1.05	.341
Seasonwinter × Physical activity ²	0.01 [-0.02, 0.05]	0.02	0.89	.421	0.03 [-0.01, 0.07]	0.02	1.28	.229
Sleep efficiency								
(Intercept)	0.05 [-0.22, 0.33]	0.14	0.36	.726	0.09 [-0.16, 0.35]	0.13	0.72	.485
Physical activity	0.06 [-0.08, 0.21]	0.07	0.87	.466	0.02 [-0.08, 0.12]	0.05	0.40	.724
Seasonspring	0.06 [-0.02, 0.14]	0.04	1.49	.163	0.06 [-0.01, 0.14]	0.04	1.61	.118
Seasonsummer	0.00 [-0.07, 0.08]	0.04	0.13	.900	-0.03 [-0.12, 0.06]	0.05	-0.67	.509
Seasonwinter	0.07 [0.00, 0.13]	0.03	2.09	.038	0.08 [0.01, 0.15]	0.04	2.17	.031
Physical activity ²	-0.01 [-0.03, 0.00]	0.01	-1.59	.180	0.00 [-0.04, 0.03]	0.02	-0.26	.808
Age	0.00 [0.00, 0.01]	0.00	1.09	.277	0.00 [0.00, 0.01]	0.00	0.48	.649

Table 11 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity × season ^{spring}	-0.05 [-0.13, 0.03]	0.04	-1.19	.282	-0.04 [-0.10, 0.02]	0.03	-1.33	.234
Physical activity × season ^{summer}	0.02 [-0.05, 0.09]	0.04	0.60	.553	-0.04 [-0.10, 0.03]	0.03	-1.14	.279
Physical activity × season ^{winter}	-0.04 [-0.09, 0.02]	0.03	-1.37	.172	-0.02 [-0.06, 0.02]	0.02	-0.98	.328
Seasonspring × Physical activity ²	0.01 [-0.01, 0.03]	0.01	1.06	.292	-0.01 [-0.04, 0.03]	0.02	-0.34	.739
Seasonsummer × Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-0.83	.409	0.02 [-0.02, 0.06]	0.02	0.83	.432
Seasonwinter × Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.74	.469	-0.01 [-0.04, 0.03]	0.02	-0.46	.655
Sleep onset (Intercept)	-0.22 [-0.60, 0.17]	0.20	-1.11	.293	-0.16 [-1.03, 0.71]	0.44	-0.36	.745
Physical activity	0.01 [-0.44, 0.46]	0.23	0.04	.969	-0.04 [-0.41, 0.33]	0.19	-0.21	.852
Seasonspring	0.04 [-0.06, 0.15]	0.05	0.76	.496	0.02 [-0.09, 0.13]	0.06	0.33	.755
Seasonsummer	0.07 [0.00, 0.14]	0.04	1.95	.062	0.08 [-0.03, 0.19]	0.06	1.47	.204
Seasonwinter	0.03 [-0.09, 0.14]	0.06	0.44	.687	0.01 [-0.08, 0.10]	0.05	0.19	.856
Physical activity ²	0.00 [-0.05, 0.05]	0.03	-0.04	.975	0.01 [-0.14, 0.17]	0.08	0.16	.891
Age	0.00 [-0.01, 0.01]	0.00	0.13	.907	0.00 [-0.01, 0.01]	0.00	-0.17	.876
Physical activity × season ^{spring}	0.01 [-0.06, 0.07]	0.03	0.25	.808	0.00 [-0.10, 0.10]	0.05	-0.06	.957
Physical activity × season ^{summer}	0.04 [-0.04, 0.12]	0.04	0.98	.357	-0.01 [-0.08, 0.06]	0.03	-0.33	.758
Physical activity × season ^{winter}	0.06 [-0.01, 0.13]	0.04	1.55	.169	-0.02 [-0.10, 0.05]	0.04	-0.63	.572
Seasonspring × Physical activity ²	0.00 [-0.03, 0.02]	0.01	-0.39	.709	0.01 [-0.03, 0.05]	0.02	0.58	.590
Seasonsummer × Physical activity ²	-0.02 [-0.04, 0.01]	0.01	-1.29	.202	-0.02 [-0.09, 0.05]	0.04	-0.53	.636
Seasonwinter × Physical activity ²	-0.01 [-0.04, 0.01]	0.01	-1.02	.357	0.00 [-0.03, 0.04]	0.02	0.09	.933
Sleep regularity (Intercept)	0.45 [0.02, 0.88]	0.22	2.06	.121	0.57 [-0.08, 1.22]	0.33	1.72	.201
Physical activity	0.13 [-0.11, 0.37]	0.12	1.06	.397	0.04 [-0.10, 0.17]	0.07	0.57	.622

Table 11 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Seasonspring	-0.08 [-0.17, 0.01]	0.05	-1.72	.128	-0.10 [-0.18, -0.01]	0.04	-2.17	.049
Seasonsummer	-0.03 [-0.10, 0.04]	0.04	-0.76	.449	-0.06 [-0.15, 0.03]	0.04	-1.35	.187
Seasonwinter	-0.01 [-0.10, 0.08]	0.05	-0.30	.773	-0.04 [-0.12, 0.05]	0.04	-0.84	.413
Physical activity ²	-0.02 [-0.05, 0.00]	0.01	-1.63	.215	-0.01 [-0.08, 0.05]	0.03	-0.41	.714
Age	0.00 [0.00, 0.00]	0.00	0.47	.643	0.00 [-0.01, 0.00]	0.00	-0.17	.872
Physical activity \times seasonspring	0.06 [-0.01, 0.14]	0.04	1.63	.147	0.01 [-0.03, 0.06]	0.02	0.54	.598
Physical activity \times seasonsummer	0.10 [0.03, 0.17]	0.03	2.94	.005	0.04 [-0.01, 0.08]	0.02	1.56	.119
Physical activity \times seasonwinter	0.06 [-0.01, 0.12]	0.03	1.73	.107	0.01 [-0.04, 0.07]	0.03	0.49	.635
Seasonspring \times Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.07	.296	0.01 [-0.01, 0.04]	0.01	0.97	.339
Seasonsummer \times Physical activity ²	-0.03 [-0.06, 0.00]	0.02	-1.97	.071	0.02 [-0.04, 0.08]	0.03	0.66	.546
Seasonwinter \times Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.26	.207	0.02 [-0.02, 0.05]	0.02	0.95	.359

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the column headers.

Table 12

Sleep predicting physical activity controlling for *BMI, age, and sex*

Term	Physical Activity Volume						Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p		
Sleep duration										
(Intercept)	1.36 [0.92, 1.79]	0.22	6.11	< .001	0.84 [0.43, 1.25]	0.21	4.01	.022		
Sleep duration	-0.01 [-0.07, 0.05]	0.03	-0.39	.720	0.04 [-0.02, 0.10]	0.03	1.39	.258		
Seasonspring	-0.02 [-0.09, 0.06]	0.04	-0.42	.677	-0.05 [-0.11, 0.01]	0.03	-1.52	.131		
Seasonsummer	-0.01 [-0.08, 0.06]	0.04	-0.35	.723	-0.04 [-0.11, 0.03]	0.03	-1.23	.220		
Seasonwinter	-0.05 [-0.12, 0.03]	0.04	-1.23	.231	-0.03 [-0.10, 0.04]	0.04	-0.83	.419		
Sleep duration ²	0.00 [-0.02, 0.02]	0.01	0.34	.738	-0.04 [-0.07, -0.01]	0.02	-2.33	.102		
Age	-0.02 [-0.02, -0.01]	0.00	-7.31	< .001	-0.02 [-0.03, -0.01]	0.00	-5.31	.014		
Sleep duration × seasonspring	-0.02 [-0.07, 0.04]	0.03	-0.50	.637	0.00 [-0.04, 0.03]	0.02	-0.17	.867		
Sleep duration × seasonsummer	-0.04 [-0.15, 0.07]	0.06	-0.76	.511	0.00 [-0.04, 0.03]	0.02	-0.23	.816		
Sleep duration × seasonwinter	-0.01 [-0.07, 0.04]	0.03	-0.52	.623	0.00 [-0.05, 0.05]	0.03	0.13	.905		
Seasonspring × Sleep duration ²	0.01 [-0.02, 0.03]	0.01	0.51	.621	-0.01 [-0.03, 0.01]	0.01	-0.65	.521		
Seasonsummer × Sleep duration ²	-0.02 [-0.07, 0.04]	0.03	-0.52	.645	0.00 [-0.03, 0.03]	0.01	-0.14	.888		
Seasonwinter × Sleep duration ²	0.02 [-0.01, 0.04]	0.01	1.39	.177	-0.02 [-0.04, 0.00]	0.01	-1.71	.099		
Sleep efficiency										
(Intercept)	1.36 [0.94, 1.78]	0.21	6.34	< .001	0.80 [0.38, 1.22]	0.21	3.73	.025		
Sleep efficiency	0.02 [-0.03, 0.06]	0.02	0.68	.512	-0.01 [-0.07, 0.05]	0.03	-0.34	.746		
Seasonspring	-0.01 [-0.07, 0.05]	0.03	-0.24	.810	-0.07 [-0.13, -0.01]	0.03	-2.13	.038		
Seasonsummer	-0.01 [-0.08, 0.06]	0.04	-0.23	.820	-0.05 [-0.12, 0.02]	0.04	-1.46	.151		
Seasonwinter	-0.04 [-0.11, 0.03]	0.04	-1.08	.291	-0.06 [-0.12, 0.00]	0.03	-1.90	.061		
Sleep efficiency ²	0.00 [-0.02, 0.02]	0.01	0.16	.876	-0.01 [-0.02, 0.01]	0.01	-0.85	.403		
Age	-0.02 [-0.02, -0.01]	0.00	-7.35	< .001	-0.02 [-0.03, -0.01]	0.00	-5.00	.018		

Table 12 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep efficiency \times seasonspring	-0.02 [-0.07, 0.04]	0.03	-0.69	.495	-0.01 [-0.06, 0.04]	0.03	-0.44	.666
Sleep efficiency \times seasonsummer	0.01 [-0.07, 0.09]	0.04	0.27	.796	0.01 [-0.07, 0.09]	0.04	0.25	.813
Sleep efficiency \times seasonwinter	-0.01 [-0.06, 0.05]	0.03	-0.22	.824	0.01 [-0.04, 0.07]	0.03	0.49	.630
Seasonspring \times Sleep efficiency ²	0.00 [-0.02, 0.02]	0.01	0.00	.999	0.00 [-0.02, 0.01]	0.01	-0.19	.847
Seasonsummer \times Sleep efficiency ²	-0.01 [-0.03, 0.01]	0.01	-0.82	.430	0.00 [-0.02, 0.02]	0.01	0.00	.998
Seasonwinter \times Sleep efficiency ²	0.01 [-0.01, 0.03]	0.01	1.06	.318	0.00 [-0.03, 0.02]	0.01	-0.31	.767
Sleep onset								
(Intercept)	1.38 [0.97, 1.79]	0.21	6.60	< .001	0.80 [0.35, 1.24]	0.23	3.52	.033
Sleep onset	-0.01 [-0.06, 0.05]	0.03	-0.26	.803	0.01 [-0.06, 0.08]	0.04	0.18	.868
Seasonspring	-0.03 [-0.10, 0.04]	0.04	-0.95	.343	-0.06 [-0.13, 0.01]	0.04	-1.58	.119
Seasonsummer	-0.04 [-0.12, 0.04]	0.04	-0.94	.349	-0.05 [-0.13, 0.02]	0.04	-1.36	.179
Seasonwinter	-0.07 [-0.15, 0.02]	0.04	-1.57	.128	-0.07 [-0.14, 0.00]	0.04	-1.94	.058
Sleep onset ²	-0.03 [-0.07, 0.01]	0.02	-1.43	.225	-0.01 [-0.03, 0.01]	0.01	-0.61	.541
Age	-0.02 [-0.02, -0.01]	0.00	-7.38	< .001	-0.02 [-0.03, -0.01]	0.00	-4.99	.018
Sleep onset \times seasonspring	-0.03 [-0.08, 0.02]	0.03	-1.18	.247	0.02 [-0.05, 0.08]	0.03	0.46	.662
Sleep onset \times seasonsummer	0.00 [-0.05, 0.05]	0.03	0.11	.909	0.02 [-0.04, 0.07]	0.03	0.53	.605
Sleep onset \times seasonwinter	-0.04 [-0.09, 0.02]	0.03	-1.38	.192	-0.01 [-0.09, 0.07]	0.04	-0.26	.810
Seasonspring \times Sleep onset ²	0.02 [-0.01, 0.06]	0.02	1.19	.250	-0.01 [-0.04, 0.02]	0.02	-0.63	.533
Seasonsummer \times Sleep onset ²	0.02 [-0.03, 0.06]	0.02	0.62	.555	0.00 [-0.04, 0.04]	0.02	0.07	.942
Seasonwinter \times Sleep onset ²	0.03 [-0.01, 0.06]	0.02	1.51	.142	0.00 [-0.04, 0.05]	0.02	0.19	.858
Sleep regularity								
(Intercept)	1.29 [0.92, 1.66]	0.19	6.86	< .001	0.79 [0.33, 1.25]	0.24	3.35	.040
Sleep regularity	0.09 [-0.02, 0.20]	0.06	1.65	.220	0.01 [-0.04, 0.05]	0.02	0.28	.785

Table 12 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Seasonspring	-0.01 [-0.08, 0.06]	0.04	-0.28	.783	-0.08 [-0.14, -0.01]	0.03	-2.30	.022
Seasonsummer	-0.02 [-0.09, 0.06]	0.04	-0.40	.691	-0.05 [-0.12, 0.02]	0.04	-1.36	.175
Seasonwinter	-0.03 [-0.11, 0.04]	0.04	-0.94	.349	-0.07 [-0.15, 0.00]	0.04	-1.85	.079
Sleep regularity ²	-0.01 [-0.07, 0.05]	0.03	-0.36	.747	-0.01 [-0.05, 0.03]	0.02	-0.62	.563
Age	-0.02 [-0.02, -0.01]	0.00	-7.73	< .001	-0.02 [-0.03, -0.01]	0.00	-4.94	.019
Sleep regularity \times seasonspring	0.02 [-0.04, 0.07]	0.03	0.62	.552	0.01 [-0.03, 0.06]	0.02	0.57	.570
Sleep regularity \times seasonsummer	0.01 [-0.06, 0.08]	0.03	0.31	.761	0.01 [-0.04, 0.06]	0.03	0.47	.642
Sleep regularity \times seasonwinter	0.06 [0.01, 0.10]	0.02	2.32	.024	0.03 [-0.04, 0.11]	0.04	0.90	.417
Seasonspring \times Sleep regularity ²	0.01 [-0.03, 0.04]	0.02	0.42	.676	0.00 [-0.03, 0.04]	0.02	0.28	.780
Seasonsummer \times Sleep regularity ²	0.00 [-0.04, 0.04]	0.02	0.09	.933	0.00 [-0.04, 0.03]	0.02	-0.20	.842
Seasonwinter \times Sleep regularity ²	0.00 [-0.06, 0.06]	0.03	-0.02	.989	0.00 [-0.03, 0.03]	0.02	0.07	.944

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the row headers.

Table 13

Physical activity predicting sleep controlling for SES, age, and sex.

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.52 [0.08, 0.96]	0.22	2.30	.092	0.49 [-0.05, 1.02]	0.27	1.77	.178
Physical activity	0.06 [-0.14, 0.25]	0.10	0.58	.610	-0.10 [-0.34, 0.14]	0.12	-0.84	.483
Regioneurope	-0.19 [-0.39, 0.01]	0.10	-1.91	.069	-0.14 [-0.35, 0.07]	0.11	-1.31	.206
Regionafrica	-0.20 [-0.47, 0.07]	0.14	-1.47	.175	-0.16 [-0.47, 0.14]	0.16	-1.05	.335
Regionasia	-0.33 [-0.72, 0.07]	0.20	-1.61	.183	-0.45 [-0.87, -0.02]	0.22	-2.06	.120
Regionnorth america	-0.06 [-0.30, 0.18]	0.12	-0.48	.639	-0.09 [-0.47, 0.29]	0.19	-0.45	.674
Regionsouth america	-0.36 [-0.58, -0.14]	0.11	-3.24	.005	-0.42 [-0.79, -0.05]	0.19	-2.25	.097
Physical activity ²	-0.01 [-0.04, 0.02]	0.02	-0.39	.722	0.07 [0.00, 0.15]	0.04	1.99	.143
Age	0.00 [-0.01, 0.00]	0.00	-1.74	.097	0.00 [-0.01, 0.00]	0.00	-2.20	.032
Physical activity × regioneurope	0.00 [-0.11, 0.11]	0.06	0.01	.995	0.13 [-0.10, 0.35]	0.12	1.09	.379
Physical activity × regionafrica	0.02 [0.26, 0.29]	0.14	0.12	.914	0.13 [-0.12, 0.39]	0.13	1.04	.386
Physical activity × regionasia	0.24 [-0.08, 0.55]	0.16	1.48	.232	0.02 [-0.17, 0.21]	0.10	0.22	.835
Physical activity × regionnorth america	0.02 [-0.40, 0.44]	0.22	0.09	.931	0.06 [-0.28, 0.40]	0.17	0.36	.749
Physical activity × regionsouth america	0.11 [-0.05, 0.27]	0.08	1.40	.214	0.05 [-0.15, 0.24]	0.10	0.47	.674
Regioneurope × Physical activity ²	0.01 [-0.02, 0.03]	0.01	0.64	.533	-0.06 [-0.11, -0.02]	0.02	-3.02	.009
Regionafrica × Physical activity ²	0.00 [-0.11, 0.10]	0.05	-0.07	.947	-0.06 [-0.20, 0.09]	0.08	-0.77	.501
Regionasia × Physical activity ²	-0.08 [-0.21, 0.05]	0.07	-1.17	.298	-0.02 [-0.29, 0.25]	0.14	-0.14	.899
Regionnorth america × Physical activity ²	-0.02 [-0.07, 0.03]	0.03	-0.76	.451	0.03 [-0.21, 0.27]	0.12	0.25	.825
Regionsouth america × Physical activity ²	-0.01 [-0.06, 0.04]	0.02	-0.47	.646	0.04 [-0.11, 0.18]	0.07	0.48	.665
Sleep efficiency								
(Intercept)	0.22 [-0.03, 0.46]	0.13	1.71	.102	0.23 [-0.05, 0.50]	0.14	1.59	.142

Table 13 continued

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity	-0.06 [-0.17, 0.05]	0.05	-1.09	.337	0.08 [-0.03, 0.20]	0.06	1.38	.275
Regioneurope	-0.18 [-0.35, -0.01]	0.09	-2.08	.039	-0.17 [-0.35, 0.00]	0.09	-1.93	.058
Regionafrica	-0.07 [-0.26, 0.12]	0.10	-0.76	.451	-0.13 [-0.32, 0.07]	0.10	-1.27	.207
Regionasia	-0.21 [-0.44, 0.03]	0.12	-1.74	.094	-0.42 [-0.61, -0.22]	0.10	-4.17	< .001
Regionnorth america	-0.06 [-0.25, 0.13]	0.10	-0.60	.546	-0.10 [-0.30, 0.10]	0.10	-1.01	.314
Regionsouth america	-0.28 [-0.47, -0.10]	0.09	-3.04	.003	-0.40 [-0.57, -0.22]	0.09	-4.48	< .001
Physical activity ²	0.01 [-0.01, 0.02]	0.01	0.75	.476	-0.03 [-0.08, 0.02]	0.03	-1.34	.260
Age	0.00 [0.00, 0.00]	0.00	0.51	.610	0.00 [0.00, 0.01]	0.00	0.54	.597
Physical activity × regioneurope	0.06 [-0.02, 0.15]	0.04	1.42	.182	-0.09 [-0.18, 0.00]	0.05	-1.86	.146
Physical activity × regionafrica	0.11 [-0.07, 0.28]	0.09	1.16	.293	-0.08 [-0.18, 0.02]	0.05	-1.59	.144
Physical activity × regionasia	0.35 [0.08, 0.63]	0.14	2.51	.089	-0.12 [-0.30, 0.06]	0.09	-1.29	.266
Physical activity × regionnorth america	0.12 [-0.05, 0.29]	0.09	1.38	.209	-0.06 [-0.18, 0.06]	0.06	-0.95	.364
Physical activity × regionsouth america	0.28 [0.13, 0.42]	0.07	3.70	.016	-0.15 [-0.24, -0.07]	0.04	-3.45	.006
Regioneurope × Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.11	.269	0.02 [-0.03, 0.07]	0.02	0.84	.441
Regionafrica × Physical activity ²	-0.02 [-0.09, 0.05]	0.04	-0.54	.598	0.06 [0.00, 0.12]	0.03	2.01	.051
Regionasia × Physical activity ²	-0.10 [-0.21, 0.01]	0.06	-1.79	.144	0.08 [0.01, 0.15]	0.04	2.19	.032
Regionnorth america × Physical activity ²	-0.01 [-0.06, 0.03]	0.02	-0.67	.508	0.03 [-0.06, 0.12]	0.05	0.74	.484
Regionsouth america × Physical activity ²	-0.06 [-0.10, -0.03]	0.02	-3.56	.001	0.06 [-0.01, 0.13]	0.04	1.58	.170
Sleep onset								
(Intercept)	-0.16 [-0.94, 0.61]	0.40	-0.41	.712	-0.15 [-1.16, 0.87]	0.52	-0.28	.802
Physical activity	0.00 [-0.32, 0.31]	0.16	-0.02	.986	-0.05 [-0.68, 0.58]	0.32	-0.16	.890
Regioneurope	0.13 [-0.01, 0.28]	0.07	1.78	.074	0.13 [-0.02, 0.28]	0.08	1.69	.092
Regionafrica	0.04 [-0.19, 0.28]	0.12	0.36	.729	-0.01 [-0.33, 0.31]	0.16	-0.05	.964

Table 13 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Regionasia	0.24 [0.04, 0.43]	0.10	2.40	.018	0.13 [-0.42, 0.68]	0.28	0.46	.683
Regionnorth america	0.11 [-0.20, 0.41]	0.15	0.70	.522	-0.07 [-0.69, 0.56]	0.32	-0.21	.851
Regionsouth america	0.06 [-0.40, 0.51]	0.23	0.24	.827	-0.02 [-0.77, 0.73]	0.38	-0.05	.968
Physical activity ²	0.00 [-0.05, 0.04]	0.02	-0.20	.862	-0.01 [-0.19, 0.17]	0.09	-0.10	.930
Age	0.00 [-0.01, 0.01]	0.00	0.07	.947	0.00 [-0.01, 0.01]	0.00	0.03	.974
Physical activity × regioneurope	-0.02 [-0.10, 0.06]	0.04	-0.54	.596	0.01 [-0.44, 0.45]	0.23	0.03	.979
Physical activity × regionafrica	0.14 [-0.45, 0.74]	0.30	0.47	.683	-0.11 [-0.33, 0.11]	0.11	-0.95	.429
Physical activity × regionasia	0.10 [-0.50, 0.71]	0.31	0.34	.766	0.02 [-0.15, 0.20]	0.09	0.26	.811
Physical activity × regionnorth america	0.23 [-0.35, 0.81]	0.30	0.78	.512	0.11 [-0.16, 0.37]	0.14	0.79	.500
Physical activity × regionsouth america	0.10 [-0.20, 0.40]	0.15	0.68	.561	0.01 [-0.25, 0.28]	0.13	0.10	.927
Regioneurope × Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.55	.594	0.01 [-0.12, 0.14]	0.07	0.16	.884
Regionafrica × Physical activity ²	0.03 [-0.07, 0.13]	0.05	0.55	.613	0.08 [-0.07, 0.23]	0.08	1.06	.384
Regionasia × Physical activity ²	-0.04 [-0.10, 0.03]	0.03	-1.11	.270	0.04 [-0.26, 0.33]	0.15	0.26	.815
Regionnorth america × Physical activity ²	-0.02 [-0.10, 0.07]	0.04	-0.39	.719	0.10 [-0.26, 0.47]	0.19	0.56	.632
Regionsouth america × Physical activity ²	0.01 [-0.07, 0.09]	0.04	0.23	.835	0.07 [-0.22, 0.36]	0.15	0.45	.698
Sleep regularity								
(Intercept)	-0.01 [-0.70, 0.68]	0.35	-0.03	.980	0.16 [-0.60, 0.92]	0.39	0.40	.720
Physical activity	0.14 [-0.03, 0.30]	0.08	1.60	.223	0.05 [-0.21, 0.32]	0.14	0.40	.725
Regioneurope	0.27 [0.11, 0.43]	0.08	3.34	.001	0.19 [0.02, 0.37]	0.09	2.14	.034
Regionafrica	0.42 [0.17, 0.67]	0.13	3.28	.010	0.29 [0.09, 0.50]	0.10	2.80	.006
Regionasia	0.34 [0.14, 0.55]	0.10	3.32	.001	0.13 [-0.18, 0.44]	0.16	0.83	.440
Regionnorth america	0.10 [-0.14, 0.34]	0.12	0.83	.427	0.03 [-0.17, 0.22]	0.10	0.28	.779
Regionsouth america	0.02 [-0.21, 0.25]	0.12	0.16	.875	-0.17 [-0.52, 0.19]	0.18	-0.91	.420

Table 13 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity ²	-0.01 [-0.04, 0.01]	0.01	-1.24	.295	-0.02 [-0.12, 0.07]	0.05	-0.45	.691
Age	0.00 [0.00, 0.00]	0.00	-0.35	.727	0.00 [-0.01, 0.00]	0.00	-0.89	.400
Physical activity × regioneurope	0.07 [-0.02, 0.15]	0.04	1.59	.132	0.00 [-0.21, 0.21]	0.11	0.01	.991
Physical activity × regionafrica	0.04 [-0.34, 0.41]	0.19	0.19	.867	0.01 [-0.13, 0.14]	0.07	0.11	.919
Physical activity × regionasia	0.07 [-0.26, 0.39]	0.17	0.40	.716	0.07 [-0.03, 0.18]	0.05	1.36	.176
Physical activity × regionnorth america	0.02 [-0.23, 0.27]	0.13	0.17	.874	-0.04 [-0.21, 0.13]	0.09	-0.49	.647
Physical activity × regionsouth america	0.12 [-0.14, 0.38]	0.13	0.88	.456	0.01 [-0.18, 0.20]	0.09	0.10	.930
Regioneurope × Physical activity ²	-0.03 [-0.05, -0.01]	0.01	-2.92	.018	0.02 [-0.07, 0.10]	0.04	0.44	.697
Regionafrica × Physical activity ²	-0.07 [-0.22, 0.07]	0.07	-1.02	.389	0.04 [-0.06, 0.14]	0.05	0.75	.498
Regionasia × Physical activity ²	-0.09 [-0.18, 0.00]	0.05	-1.88	.093	0.07 [-0.09, 0.23]	0.08	0.89	.443
Regionnorth america × Physical activity ²	-0.02 [-0.07, 0.03]	0.03	-0.65	.525	0.01 [-0.11, 0.14]	0.06	0.19	.860
Regionsouth america × Physical activity ²	-0.04 [-0.07, 0.00]	0.02	-2.08	.045	0.04 [-0.13, 0.20]	0.08	0.46	.684

Note. Adjusted for SES, age, and sex. Outcomes variables are listed in the column headers.

Table 14

Sleep predicting physical activity controlling for SES, age, and sex

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.39 [1.04, 1.74]	0.18	7.81	< .001	0.68 [0.30, 1.07]	0.20	3.46	.025
Sleep duration	0.00 [-0.04, 0.05]	0.02	0.12	.902	0.07 [-0.09, 0.24]	0.09	0.88	.466
Regioneurope	-0.28 [-0.49, -0.06]	0.11	-2.56	.021	-0.12 [-0.28, 0.05]	0.08	-1.42	.160
Regionafrica	-0.28 [-0.68, 0.12]	0.20	-1.39	.249	-0.10 [-0.44, 0.24]	0.17	-0.59	.588
Regionasia	-0.55 [-0.87, -0.22]	0.17	-3.26	.023	-0.33 [-0.62, -0.04]	0.15	-2.22	.078
Regionnorth america	-0.46 [-0.77, -0.15]	0.16	-2.88	.030	0.03 [-0.40, 0.47]	0.22	0.14	.897
Regionsouth america	-0.65 [-0.84, -0.45]	0.10	-6.52	< .001	-0.04 [-0.32, 0.25]	0.15	-0.26	.806
Sleep duration ²	-0.03 [-0.10, 0.05]	0.04	-0.74	.527	-0.06 [-0.12, -0.01]	0.03	-2.23	.129
Age	-0.02 [-0.02, -0.01]	0.00	-7.33	< .001	-0.02 [-0.03, -0.01]	0.00	-4.56	.027
Sleep duration × regioneurope	-0.04 [-0.13, 0.06]	0.05	-0.71	.526	-0.04 [-0.16, 0.08]	0.06	-0.62	.587
Sleep duration × regionafrica	-0.10 [-0.29, 0.10]	0.10	-0.98	.410	0.02 [-0.07, 0.10]	0.04	0.38	.711
Sleep duration × regionasia	-0.07 [-0.38, 0.24]	0.16	-0.44	.695	-0.01 [-0.17, 0.15]	0.08	-0.11	.921
Sleep duration × regionnorth america	0.04 [-0.23, 0.30]	0.14	0.28	.803	-0.06 [-0.34, 0.23]	0.14	-0.39	.731
Sleep duration × regionsouth america	-0.03 [-0.15, 0.10]	0.06	-0.39	.724	-0.07 [-0.36, 0.21]	0.15	-0.51	.661
Regioneurope × Sleep duration ²	0.03 [-0.04, 0.10]	0.04	0.75	.518	0.02 [-0.01, 0.06]	0.02	1.16	.304
Regionafrica × Sleep duration ²	0.10 [-0.07, 0.28]	0.09	1.13	.367	-0.03 [-0.16, 0.11]	0.07	-0.39	.726
Regionasia × Sleep duration ²	0.09 [-0.08, 0.26]	0.09	1.00	.409	0.02 [-0.12, 0.17]	0.07	0.28	.802
Regionnorth america × Sleep duration ²	0.05 [-0.08, 0.18]	0.07	0.74	.528	0.02 [-0.12, 0.16]	0.07	0.25	.825
Regionsouth america × Sleep duration ²	0.05 [0.00, 0.10]	0.03	1.86	.148	0.02 [-0.07, 0.11]	0.05	0.42	.710
Sleep efficiency								
(Intercept)	1.35 [1.06, 1.65]	0.15	8.97	< .001	0.58 [0.18, 0.98]	0.20	2.86	.042

Table 14 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep efficiency	-0.05 [-0.12, 0.03]	0.04	-1.20	.260	-0.03 [-0.20, 0.13]	0.08	-0.39	.727
Regioneurope	-0.26 [-0.43, -0.09]	0.09	-2.95	.003	-0.07 [-0.24, 0.10]	0.09	-0.83	.414
Regionafrica	-0.13 [-0.34, 0.07]	0.10	-1.27	.208	-0.14 [-0.31, 0.04]	0.09	-1.50	.137
Regionasia	-0.41 [-0.62, -0.20]	0.11	-3.82	< .001	-0.30 [-0.48, -0.11]	0.10	-3.14	.002
Regionnorth america	-0.40 [-0.59, -0.21]	0.10	-4.16	< .001	0.09 [-0.28, 0.46]	0.19	0.49	.658
Regionsouth america	-0.59 [-0.76, -0.42]	0.09	-6.64	< .001	0.01 [-0.33, 0.35]	0.17	0.06	.956
Sleep efficiency ²	-0.02 [-0.04, 0.00]	0.01	-1.79	.088	-0.01 [-0.05, 0.03]	0.02	-0.63	.575
Age	-0.02 [-0.02, -0.01]	0.00	-7.33	< .001	-0.02 [-0.03, -0.01]	0.00	-4.40	.030
Sleep efficiency × regioneurope	0.07 [-0.03, 0.16]	0.05	1.41	.208	0.03 [-0.16, 0.22]	0.10	0.29	.793
Sleep efficiency × regionafrica	0.09 [-0.13, 0.32]	0.12	0.81	.481	-0.05 [-0.19, 0.09]	0.07	-0.73	.494
Sleep efficiency × regionasia	0.21 [0.07, 0.35]	0.07	2.90	.015	-0.02 [-0.14, 0.11]	0.06	-0.25	.804
Sleep efficiency × regionnorth america	0.04 [-0.10, 0.19]	0.08	0.57	.583	0.07 [-0.18, 0.32]	0.13	0.53	.636
Sleep efficiency × regionsouth america	0.03 [-0.06, 0.12]	0.05	0.64	.531	0.04 [-0.17, 0.25]	0.11	0.35	.754
Regioneurope × Sleep efficiency ²	0.03 [-0.01, 0.08]	0.02	1.36	.269	0.00 [-0.04, 0.03]	0.02	-0.26	.805
Regionafrica × Sleep efficiency ²	0.03 [-0.01, 0.07]	0.02	1.43	.194	-0.01 [-0.04, 0.03]	0.02	-0.41	.694
Regionasia × Sleep efficiency ²	0.07 [0.01, 0.12]	0.03	2.21	.073	0.00 [-0.05, 0.04]	0.02	-0.18	.860
Regionnorth america × Sleep efficiency ²	0.03 [-0.01, 0.06]	0.02	1.63	.110	0.01 [-0.03, 0.05]	0.02	0.31	.763
Regionsouth america × Sleep efficiency ²	0.01 [-0.01, 0.04]	0.01	1.15	.260	0.01 [-0.03, 0.06]	0.02	0.62	.577
Sleep onset								
(Intercept)	1.28 [0.97, 1.60]	0.16	8.03	< .001	0.58 [0.24, 0.92]	0.17	3.38	.010
Sleep onset	-0.08 [-0.16, 0.01]	0.04	-1.76	.103	0.01 [-0.16, 0.18]	0.09	0.09	.937
Regioneurope	-0.15 [-0.37, 0.06]	0.11	-1.40	.171	-0.10 [-0.29, 0.09]	0.10	-1.02	.311
Regionafrica	0.08 [-0.28, 0.45]	0.19	0.46	.662	-0.28 [-0.52, -0.04]	0.12	-2.33	.020

Table 14 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Regionasia	-0.39 [-0.77, 0.00]	0.20	-1.98	.094	-0.22 [-0.63, 0.19]	0.21	-1.05	.347
Regionnorth america	-0.37 [-0.64, -0.10]	0.14	-2.68	.009	0.26 [-0.20, 0.73]	0.24	1.11	.340
Regionsouth america	-0.50 [-0.71, -0.29]	0.11	-4.61	< .001	0.05 [-0.21, 0.30]	0.13	0.38	.715
Sleep onset ²	0.01 [-0.05, 0.07]	0.03	0.32	.760	-0.02 [-0.10, 0.06]	0.04	-0.45	.679
Age	-0.02 [-0.02, -0.01]	0.00	-7.31	< .001	-0.02 [-0.03, -0.01]	0.00	-4.32	.031
Sleep onset × regioneurope	0.05 [-0.04, 0.14]	0.04	1.13	.273	0.00 [-0.13, 0.13]	0.07	0.01	.996
Sleep onset × regionafrica	0.07 [-0.44, 0.58]	0.26	0.25	.812	0.05 [-0.64, 0.74]	0.35	0.15	.894
Sleep onset × regionasia	-0.40 [-1.61, 0.82]	0.62	-0.64	.578	0.24 [-0.61, 1.08]	0.43	0.55	.620
Sleep onset × regionnorth america	0.06 [-0.23, 0.36]	0.15	0.43	.691	0.16 [-0.01, 0.34]	0.09	1.82	.073
Sleep onset × regionsouth america	0.05 [-0.06, 0.16]	0.06	0.88	.387	0.03 [-0.11, 0.17]	0.07	0.41	.695
Regioneurope × Sleep onset ²	-0.02 [-0.07, 0.03]	0.03	-0.90	.384	0.01 [-0.05, 0.08]	0.03	0.37	.728
Regionafrica × Sleep onset ²	-0.15 [-0.52, 0.21]	0.19	-0.82	.468	0.21 [-0.23, 0.65]	0.23	0.95	.422
Regionasia × Sleep onset ²	-0.40 [-1.19, 0.39]	0.40	-0.99	.410	0.16 [-0.27, 0.58]	0.22	0.72	.507
Regionnorth america × Sleep onset ²	0.05 [-0.13, 0.22]	0.09	0.52	.627	-0.02 [-0.16, 0.11]	0.07	-0.34	.743
Regionsouth america × Sleep onset ²	-0.03 [-0.09, 0.04]	0.03	-0.78	.449	0.00 [-0.10, 0.09]	0.05	-0.04	.971
Sleep regularity								
(Intercept)	1.30 [1.02, 1.59]	0.15	8.91	< .001	0.57 [0.15, 0.98]	0.21	2.67	.053
Sleep regularity	0.14 [0.09, 0.20]	0.03	5.04	< .001	0.00 [-0.06, 0.06]	0.03	-0.01	.995
Regioneurope	-0.24 [-0.41, -0.06]	0.09	-2.62	.009	-0.08 [-0.26, 0.10]	0.09	-0.87	.389
Regionafrica	-0.14 [-0.37, 0.08]	0.11	-1.28	.212	-0.10 [-0.36, 0.17]	0.14	-0.70	.509
Regionasia	-0.44 [-0.64, -0.24]	0.10	-4.32	< .001	-0.27 [-0.54, 0.00]	0.14	-1.98	.090
Regionnorth america	-0.37 [-0.57, -0.18]	0.10	-3.76	< .001	0.11 [-0.23, 0.45]	0.17	0.62	.571
Regionsouth america	-0.59 [-0.77, -0.41]	0.09	-6.37	< .001	0.03 [-0.32, 0.38]	0.18	0.18	.870

Table 14 continued

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep regularity ²	-0.01 [-0.06, 0.03]	0.02	-0.67	.531	0.00 [-0.05, 0.04]	0.02	-0.10	.922
Age	-0.02 [-0.02, -0.01]	0.00	-7.60	< .001	-0.02 [-0.03, -0.01]	0.00	-4.28	.032
Sleep regularity × regioneurope	-0.03 [-0.10, 0.04]	0.04	-0.81	.443	0.03 [-0.04, 0.09]	0.03	0.81	.428
Sleep regularity × regionafrica	0.05 [-0.09, 0.20]	0.07	0.71	.512	-0.10 [-0.33, 0.14]	0.12	-0.83	.479
Sleep regularity × regionasia	0.07 [-0.07, 0.22]	0.07	0.96	.382	-0.03 [-0.18, 0.12]	0.08	-0.34	.749
Sleep regularity × regionnorth america	-0.05 [-0.21, 0.11]	0.08	-0.64	.556	0.11 [-0.22, 0.45]	0.17	0.65	.574
Sleep regularity × regionsouth america	-0.08 [-0.15, -0.01]	0.04	-2.31	.025	0.10 [0.00, 0.20]	0.05	1.95	.109
Regioneurope × Sleep regularity ²	0.00 [-0.04, 0.03]	0.02	-0.28	.783	-0.01 [-0.05, 0.03]	0.02	-0.51	.628
Regionafrica × Sleep regularity ²	-0.02 [-0.11, 0.06]	0.04	-0.51	.622	-0.01 [-0.11, 0.08]	0.05	-0.29	.781
Regionasia × Sleep regularity ²	0.02 [-0.04, 0.08]	0.03	0.75	.458	-0.02 [-0.11, 0.07]	0.05	-0.39	.711
Regionnorth america × Sleep regularity ²	0.00 [-0.08, 0.08]	0.04	0.00	.997	-0.01 [-0.15, 0.12]	0.07	-0.20	.854
Regionsouth america × Sleep regularity ²	0.03 [-0.01, 0.07]	0.02	1.43	.154	0.01 [-0.03, 0.05]	0.02	0.65	.516

Note. Adjusted for SES, age, and sex. Outcomes variables are listed in the row headers.

Table 15

Physical activity predicting sleep controlling for BMI, age, and sex.

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.68 [0.30, 1.06]	0.19	3.54	.015	0.79 [0.24, 1.33]	0.28	2.84	.065
Physical activity	0.09 [-0.15, 0.34]	0.12	0.74	.501	0.05 [-0.15, 0.24]	0.10	0.45	.682
Daylight hours	-0.02 [-0.04, -0.01]	0.01	-3.62	.002	-0.03 [-0.04, -0.02]	0.01	-4.50	< .001
Physical activity ²	-0.01 [-0.09, 0.07]	0.04	-0.18	.865	0.01 [-0.08, 0.10]	0.05	0.27	.794
Age	0.00 [-0.01, 0.00]	0.00	-1.08	.298	0.00 [-0.01, 0.00]	0.00	-1.85	.089
Physical activity × daylight hours	0.00 [-0.01, 0.01]	0.01	0.02	.983	0.00 [-0.02, 0.01]	0.01	-0.47	.670
Daylight hours × Physical activity ²	0.00 [-0.01, 0.01]	0.00	-0.07	.947	0.00 [-0.01, 0.01]	0.00	0.32	.764
Sleep efficiency								
(Intercept)	0.09 [-0.19, 0.36]	0.14	0.62	.542	0.16 [-0.11, 0.43]	0.14	1.16	.256
Physical activity	0.03 [-0.21, 0.28]	0.13	0.26	.809	0.04 [-0.14, 0.23]	0.09	0.47	.669
Daylight hours	0.00 [-0.01, 0.01]	0.01	-0.01	.992	0.00 [-0.02, 0.01]	0.01	-0.45	.652
Physical activity ²	0.00 [-0.05, 0.04]	0.02	-0.16	.875	-0.02 [-0.09, 0.06]	0.04	-0.42	.690
Age	0.00 [0.00, 0.01]	0.00	1.11	.269	0.00 [0.00, 0.01]	0.00	0.48	.650
Physical activity × daylight hours	0.00 [-0.01, 0.01]	0.01	0.15	.883	0.00 [-0.01, 0.01]	0.00	-0.82	.442
Daylight hours × Physical activity ²	0.00 [0.00, 0.00]	0.00	-0.37	.716	0.00 [0.00, 0.01]	0.00	0.32	.754
Sleep onset								
(Intercept)	-0.31 [-0.75, 0.13]	0.23	-1.37	.215	-0.27 [-1.11, 0.57]	0.43	-0.63	.581
Physical activity	0.02 [-0.61, 0.66]	0.32	0.08	.945	-0.07 [-0.46, 0.32]	0.20	-0.34	.763
Daylight hours	0.01 [0.00, 0.02]	0.00	2.08	.041	0.01 [0.00, 0.03]	0.01	1.46	.195
Physical activity ²	0.00 [-0.07, 0.07]	0.04	-0.08	.942	0.02 [-0.20, 0.23]	0.11	0.15	.895
Age	0.00 [-0.01, 0.01]	0.00	0.09	.936	0.00 [-0.01, 0.01]	0.00	-0.19	.864

Table 15 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity \times daylight hours	0.00 [-0.02, 0.02]	0.01	0.08	.943	0.00 [-0.01, 0.01]	0.01	0.26	.814
Daylight hours \times Physical activity ²	0.00 [0.00, 0.00]	0.00	-0.22	.826	0.00 [-0.01, 0.01]	0.00	-0.05	.961
Sleep regularity								
(Intercept)	0.41 [-0.05, 0.86]	0.23	1.76	.159	0.53 [-0.08, 1.13]	0.31	1.70	.190
Physical activity	0.10 [-0.16, 0.36]	0.13	0.74	.516	0.02 [-0.11, 0.15]	0.07	0.32	.758
Daylight hours	0.00 [-0.01, 0.01]	0.01	0.31	.758	0.00 [-0.01, 0.01]	0.01	0.06	.954
Physical activity ²	0.00 [-0.04, 0.05]	0.02	0.08	.937	-0.02 [-0.14, 0.10]	0.06	-0.32	.767
Age	0.00 [0.00, 0.00]	0.00	0.33	.743	0.00 [-0.01, 0.00]	0.00	-0.29	.784
Physical activity \times daylight hours	0.01 [0.00, 0.02]	0.01	1.33	.193	0.00 [0.00, 0.01]	0.00	0.73	.464
Daylight hours \times Physical activity ²	0.00 [-0.01, 0.00]	0.00	-1.79	.074	0.00 [-0.01, 0.01]	0.00	0.41	.699

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the column headers.

Table 16

Sleep predicting physical activity controlling for BMI, age, and sex

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.19 [0.72, 1.66]	0.24	5.00	.001	0.89 [0.50, 1.29]	0.20	4.47	.009
Sleep duration	0.01 [-0.18, 0.20]	0.10	0.12	.916	0.06 [-0.07, 0.20]	0.07	0.94	.410
Daylight hours	0.01 [0.00, 0.03]	0.01	1.84	.091	-0.01 [-0.02, 0.00]	0.01	-1.35	.179
Sleep duration ²	0.06 [-0.05, 0.17]	0.06	1.10	.358	-0.05 [-0.10, 0.00]	0.02	-2.10	.046
Age	-0.02 [-0.02, -0.01]	0.00	-7.27	< .001	-0.02 [-0.03, -0.01]	0.00	-5.37	.014
Sleep duration × daylight hours	0.00 [-0.02, 0.01]	0.01	-0.39	.728	0.00 [-0.01, 0.01]	0.01	-0.38	.723
Daylight hours × Sleep duration ²	0.00 [-0.01, 0.01]	0.00	-0.94	.427	0.00 [0.00, 0.00]	0.00	0.22	.827
Sleep efficiency								
(Intercept)	1.21 [0.72, 1.69]	0.25	4.88	.002	0.85 [0.44, 1.26]	0.21	4.08	.012
Sleep efficiency	-0.01 [-0.23, 0.22]	0.11	-0.05	.966	0.00 [-0.10, 0.10]	0.05	0.05	.957
Daylight hours	0.01 [0.00, 0.02]	0.01	1.95	.061	-0.01 [-0.02, 0.00]	0.01	-1.59	.113
Sleep efficiency ²	0.04 [-0.02, 0.11]	0.03	1.23	.280	-0.01 [-0.05, 0.04]	0.02	-0.34	.734
Age	-0.02 [-0.02, -0.01]	0.00	-7.34	< .001	-0.02 [-0.03, -0.01]	0.00	-5.04	.017
Sleep efficiency × daylight hours	0.00 [-0.02, 0.02]	0.01	0.15	.893	0.00 [-0.01, 0.01]	0.00	-0.22	.824
Daylight hours × Sleep efficiency ²	0.00 [-0.01, 0.00]	0.00	-1.25	.267	0.00 [0.00, 0.00]	0.00	0.06	.950
Sleep onset								
(Intercept)	1.25 [0.81, 1.68]	0.22	5.65	< .001	0.83 [0.38, 1.28]	0.23	3.60	.025
Sleep onset	-0.04 [-0.18, 0.11]	0.07	-0.48	.657	-0.05 [-0.21, 0.10]	0.08	-0.66	.548
Daylight hours	0.01 [0.00, 0.02]	0.01	1.50	.140	-0.01 [-0.02, 0.00]	0.01	-1.17	.242
Sleep onset ²	-0.02 [-0.10, 0.07]	0.04	-0.41	.694	0.02 [-0.05, 0.09]	0.03	0.53	.604
Age	-0.02 [-0.02, -0.01]	0.00	-7.40	< .001	-0.02 [-0.03, -0.01]	0.00	-5.03	.017

Table 16 continued

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep onset × daylight hours	0.00	[0.01, 0.01]	0.00	0.19	.854	0.01	[0.00, 0.01]	0.00	1.14	.290
Daylight hours × Sleep onset ²	0.00	[-0.01, 0.01]	0.00	0.14	.887	0.00	[-0.01, 0.00]	0.00	-0.90	.371
Sleep regularity										
(Intercept)	1.16	[0.82, 1.51]	0.18	6.60	< .001	0.84	[0.41, 1.28]	0.22	3.83	.018
Sleep regularity	0.16	[0.00, 0.32]	0.08	1.93	.130	0.11	[-0.09, 0.31]	0.10	1.10	.353
Daylight hours	0.01	[0.00, 0.02]	0.01	1.42	.175	-0.01	[-0.02, 0.00]	0.01	-1.53	.127
Sleep regularity ²	-0.01	[-0.11, 0.08]	0.05	-0.29	.779	-0.05	[-0.12, 0.02]	0.04	-1.38	.176
Age	-0.02	[-0.02, -0.01]	0.00	-7.73	< .001	-0.02	[-0.03, -0.01]	0.00	-5.02	.017
Sleep regularity × daylight hours	0.00	[-0.01, 0.01]	0.01	-0.70	.512	-0.01	[-0.02, 0.01]	0.01	-1.07	.355
Daylight hours × Sleep regularity ²	0.00	[-0.01, 0.01]	0.00	0.12	.908	0.00	[0.00, 0.01]	0.00	1.19	.234

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the row headers.

Table 17

Physical activity predicting sleep controlling for BMI, age, and sex.

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.84 [0.38, 1.30]	0.23	3.58	.032	0.79 [0.40, 1.18]	0.20	3.97	.013
Physical activity	0.14 [-0.20, 0.48]	0.17	0.80	.508	-0.01 [-0.25, 0.23]	0.12	-0.07	.952
Wrist	-0.54 [-0.78, -0.30]	0.12	-4.47	< .001	-0.43 [-0.74, -0.11]	0.16	-2.66	.020
Physical activity ²	-0.03 [-0.08, 0.02]	0.03	-1.09	.352	0.05 [-0.15, 0.25]	0.10	0.51	.658
Age	0.00 [-0.01, 0.00]	0.00	-1.87	.063	0.00 [-0.01, 0.00]	0.00	-2.57	.010
Physical activity × wrist	-0.07 [-0.36, 0.22]	0.15	-0.46	.686	0.02 [-0.24, 0.27]	0.13	0.12	.913
Wrist × Physical activity ²	0.02 [-0.04, 0.08]	0.03	0.79	.489	-0.03 [-0.21, 0.15]	0.09	-0.36	.750
Sleep efficiency								
(Intercept)	-0.39 [-0.58, -0.21]	0.09	-4.17	.004	-0.48 [-0.62, -0.33]	0.07	-6.49	< .001
Physical activity	0.16 [-0.03, 0.36]	0.10	1.62	.238	-0.03 [-0.22, 0.16]	0.10	-0.30	.789
Wrist	0.68 [0.52, 0.83]	0.08	8.75	< .001	0.71 [0.58, 0.84]	0.07	10.49	< .001
Physical activity ²	-0.05 [-0.08, -0.02]	0.01	-3.27	.015	0.02 [-0.04, 0.08]	0.03	0.60	.597
Age	0.00 [0.00, 0.00]	0.00	0.54	.595	0.00 [0.00, 0.00]	0.00	1.36	.188
Physical activity × wrist	-0.20 [-0.38, -0.03]	0.09	-2.30	.130	0.05 [-0.15, 0.24]	0.10	0.45	.692
Wrist × Physical activity ²	0.05 [0.02, 0.09]	0.02	2.96	.033	-0.03 [-0.09, 0.02]	0.03	-1.13	.348
Sleep onset								
(Intercept)	-0.93 [-1.87, 0.01]	0.48	-1.95	.144	-1.00 [-1.83, -0.17]	0.42	-2.36	.087
Physical activity	0.14 [-0.62, 0.90]	0.39	0.35	.760	-0.07 [-0.66, 0.52]	0.30	-0.23	.841
Wrist	1.03 [0.54, 1.52]	0.25	4.13	< .001	1.05 [0.56, 1.53]	0.25	4.22	< .001
Physical activity ²	0.00 [-0.07, 0.08]	0.04	0.08	.944	0.07 [-0.36, 0.50]	0.22	0.32	.779
Age	0.00 [0.00, 0.00]	0.00	-0.42	.686	0.00 [0.00, 0.00]	0.00	-0.03	.976

Table 17 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity \times wrist	-0.20 [-0.85, 0.44]	0.33	-0.61	.603	0.04 [-0.42, 0.50]	0.23	0.18	.875
Wrist \times Physical activity ²	0.00 [-0.09, 0.09]	0.05	0.07	.948	-0.08 [-0.48, 0.32]	0.20	-0.40	.732
Sleep regularity								
(Intercept)	0.21 [-0.43, 0.85]	0.33	0.64	.558	0.14 [-0.46, 0.75]	0.31	0.47	.662
Physical activity	0.22 [-0.16, 0.60]	0.19	1.13	.375	0.05 [-0.19, 0.29]	0.12	0.41	.720
Wrist	0.28 [-0.10, 0.66]	0.19	1.46	.145	0.49 [0.07, 0.91]	0.21	2.31	.023
Physical activity ²	-0.09 [-0.14, -0.03]	0.03	-3.17	.059	0.02 [-0.16, 0.19]	0.09	0.19	.867
Age	0.00 [0.00, 0.00]	0.00	0.14	.891	0.00 [0.00, 0.00]	0.00	-0.56	.580
Physical activity \times wrist	-0.04 [-0.37, 0.29]	0.17	-0.26	.815	0.00 [-0.19, 0.19]	0.10	-0.02	.984
Wrist \times Physical activity ²	0.06 [0.00, 0.12]	0.03	2.06	.141	-0.03 [-0.20, 0.14]	0.09	-0.32	.779

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the column headers.

Table 18

Sleep predicting physical activity controlling for BMI, age, and sex

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.38 [-0.13, 0.88]	0.26	1.46	.151	0.63 [0.22, 1.05]	0.21	3.01	.006
Sleep duration	-0.04 [-0.11, 0.03]	0.04	-1.10	.366	0.05 [-0.02, 0.12]	0.04	1.37	.281
Wrist	1.25 [0.73, 1.77]	0.27	4.71	< .001	0.23 [-0.28, 0.73]	0.26	0.88	.395
Sleep duration ²	0.05 [0.03, 0.06]	0.01	5.85	< .001	-0.05 [-0.09, -0.01]	0.02	-2.28	.134
Age	-0.02 [-0.02, -0.01]	0.00	-8.12	< .001	-0.02 [-0.03, -0.01]	0.00	-5.14	.017
Sleep duration × wrist	0.03 [-0.03, 0.10]	0.03	1.03	.374	-0.01 [-0.06, 0.03]	0.03	-0.59	.581
Wrist × Sleep duration ²	-0.07 [-0.12, -0.03]	0.02	-3.37	.053	0.01 [-0.03, 0.04]	0.02	0.36	.746
Sleep efficiency								
(Intercept)	0.46 [-0.03, 0.95]	0.25	1.83	.071	0.56 [0.11, 1.00]	0.23	2.44	.023
Sleep efficiency	0.04 [0.01, 0.08]	0.02	2.67	.009	-0.01 [-0.05, 0.02]	0.02	-0.62	.547
Wrist	1.12 [0.61, 1.64]	0.26	4.29	< .001	0.26 [-0.31, 0.83]	0.29	0.90	.391
Sleep efficiency ²	0.01 [0.00, 0.02]	0.00	2.35	.038	-0.01 [-0.02, 0.00]	0.00	-1.40	.187
Age	-0.02 [-0.02, -0.01]	0.00	-7.89	< .001	-0.02 [-0.03, -0.01]	0.00	-4.91	.020
Sleep efficiency × wrist	-0.05 [-0.09, -0.02]	0.02	-2.80	.005	0.00 [-0.04, 0.04]	0.02	0.17	.866
Wrist × Sleep efficiency ²	-0.02 [-0.04, -0.01]	0.01	-3.41	.001	0.00 [-0.02, 0.01]	0.01	-0.38	.711
Sleep onset								
(Intercept)	0.45 [-0.03, 0.93]	0.25	1.83	.069	0.53 [0.06, 1.01]	0.24	2.21	.042
Sleep onset	-0.07 [-0.27, 0.14]	0.10	-0.65	.555	-0.06 [-0.22, 0.11]	0.08	-0.67	.530
Wrist	1.12 [0.61, 1.64]	0.26	4.26	< .001	0.29 [-0.25, 0.82]	0.27	1.05	.311
Sleep onset ²	-0.05 [-0.20, 0.09]	0.07	-0.73	.513	-0.04 [-0.12, 0.05]	0.04	-0.83	.422
Age	-0.02 [-0.02, -0.01]	0.00	-7.96	< .001	-0.02 [-0.03, -0.01]	0.00	-4.89	.020

Table 18 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep onset × wrist	0.03 [-0.15, 0.21]	0.09	0.37	.726	0.07 [-0.05, 0.20]	0.06	1.20	.242
Wrist × Sleep onset ²	0.04 [-0.09, 0.18]	0.07	0.67	.542	0.03 [-0.08, 0.13]	0.05	0.48	.654
Sleep regularity								
(Intercept)	0.42 [-0.06, 0.89]	0.24	1.70	.091	0.57 [0.12, 1.02]	0.23	2.50	.020
Sleep regularity	0.14 [0.02, 0.26]	0.06	2.36	.129	0.01 [-0.14, 0.16]	0.08	0.19	.868
Wrist	1.09 [0.59, 1.59]	0.26	4.24	< .001	0.22 [-0.28, 0.71]	0.25	0.86	.400
Sleep regularity ²	0.00 [-0.06, 0.06]	0.03	0.08	.945	-0.03 [-0.11, 0.05]	0.04	-0.79	.507
Age	-0.02 [-0.02, -0.01]	0.00	-8.16	< .001	-0.02 [-0.03, -0.01]	0.00	-4.91	.020
Sleep regularity × wrist	-0.05 [-0.12, 0.02]	0.04	-1.31	.271	0.01 [-0.17, 0.18]	0.09	0.06	.955
Wrist × Sleep regularity ²	-0.01 [-0.06, 0.03]	0.02	-0.64	.560	0.04 [-0.05, 0.12]	0.04	0.87	.466

Note. Adjusted for BMI, age, and sex. Outcomes variables are listed in the row headers.

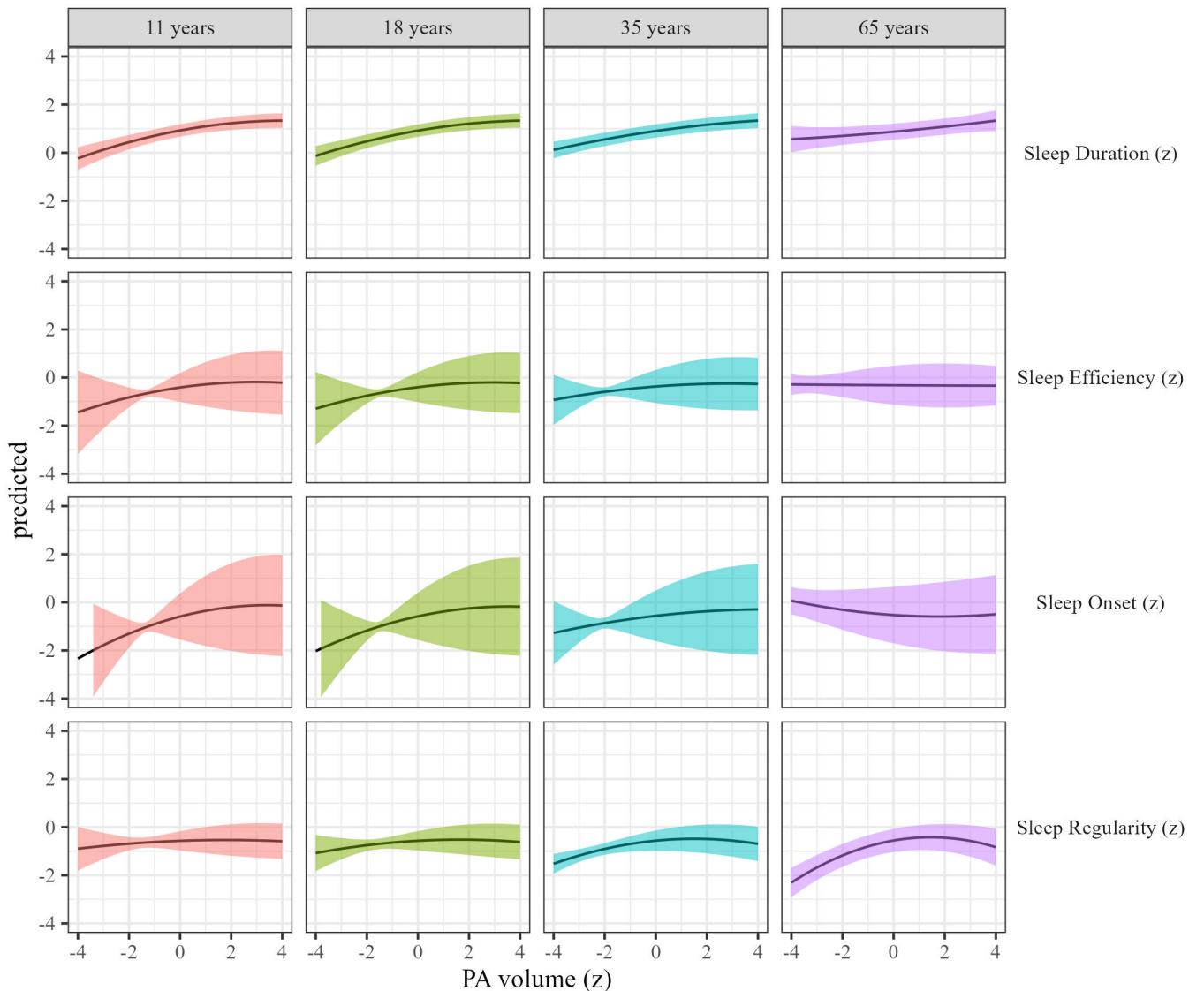


Figure 1. Sleep metrics on Physical activity volume

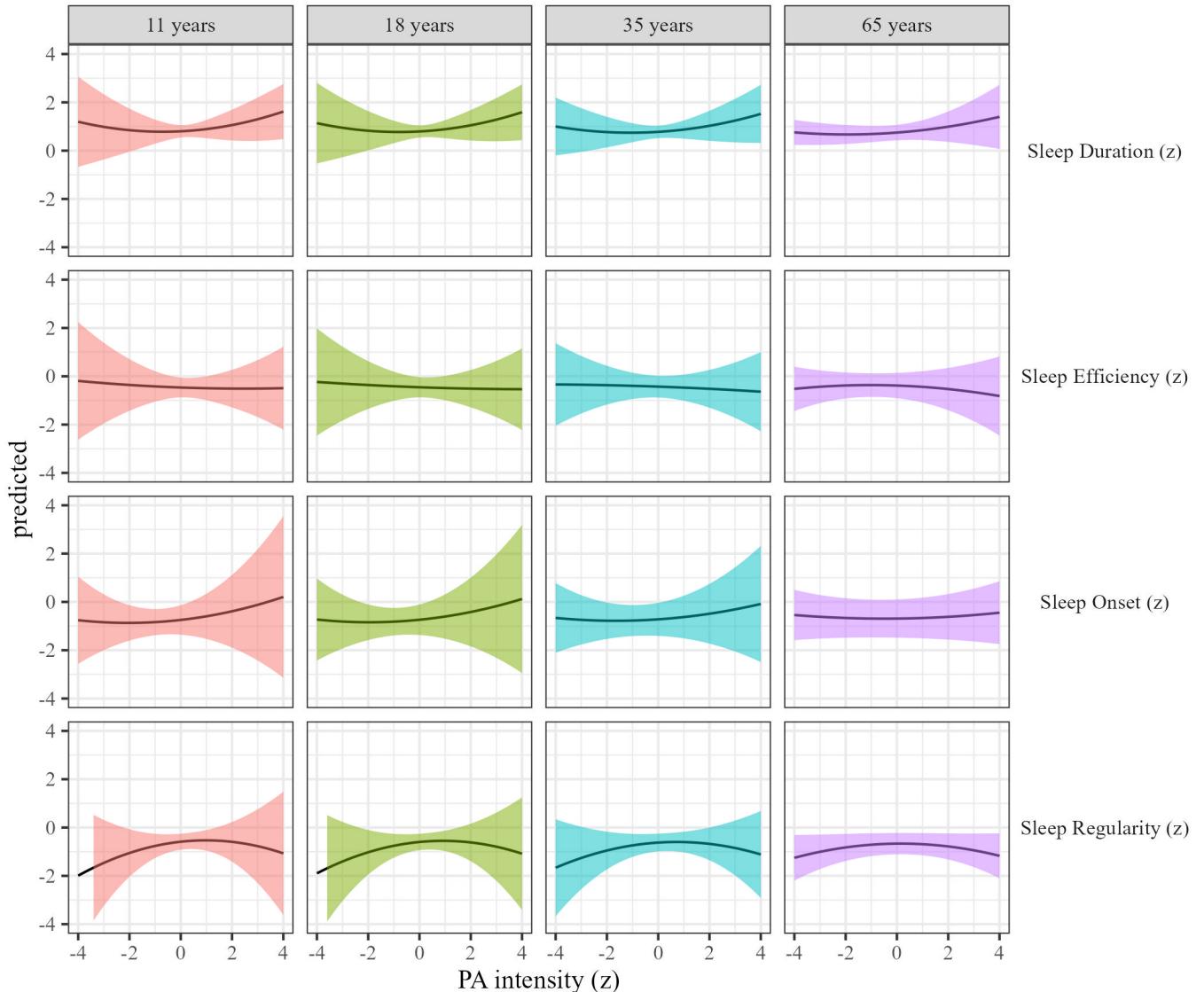


Figure 2. Sleep metrics on Physical activity intensity

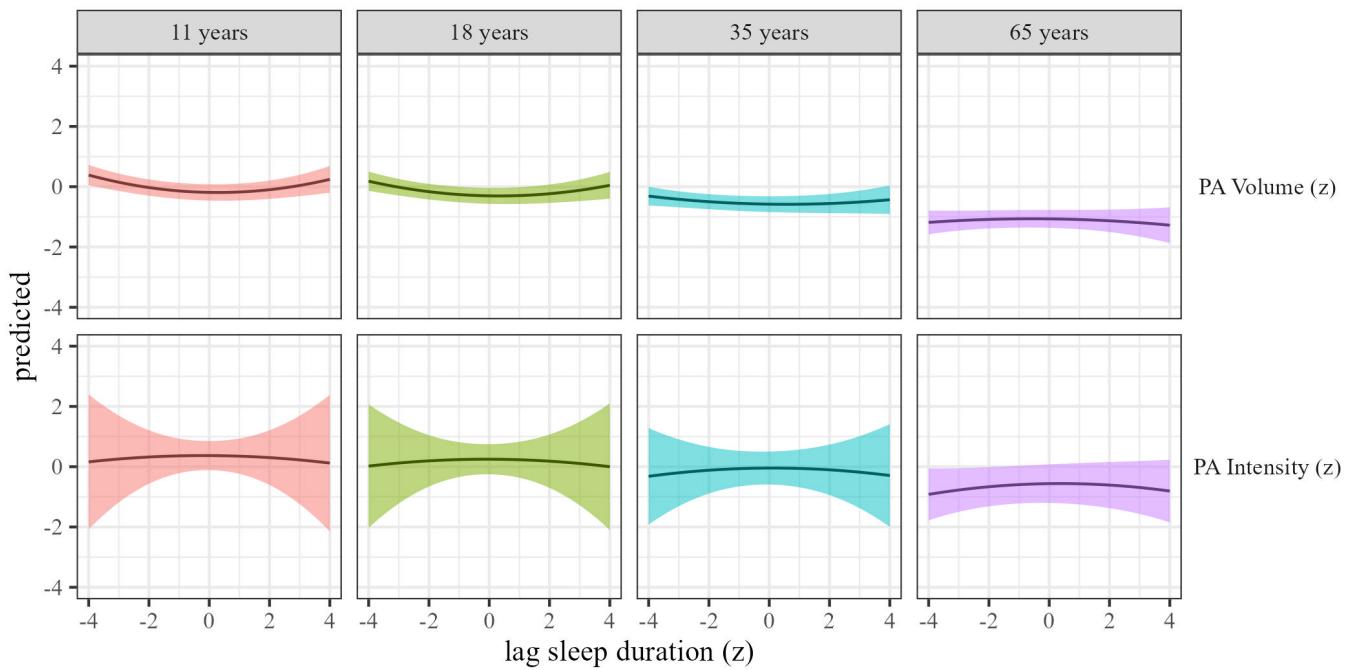


Figure 3. Physical activity by sleep duration

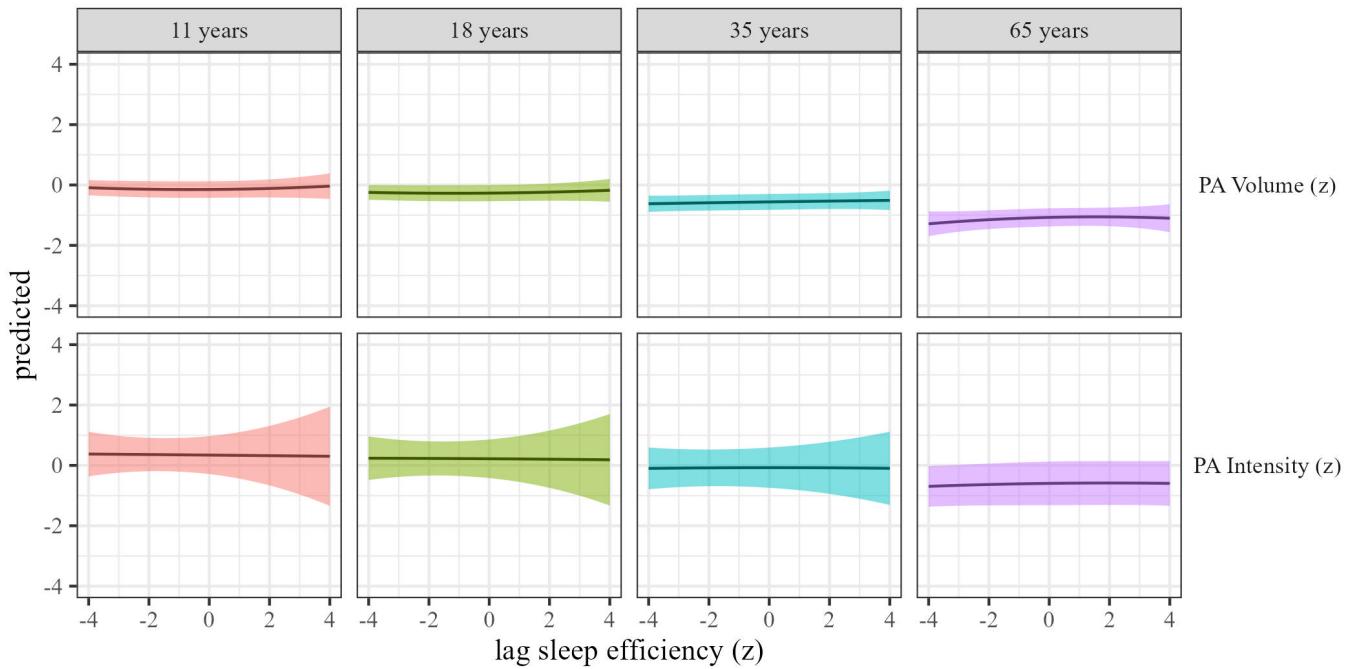


Figure 4. Physical activity by sleep efficiency

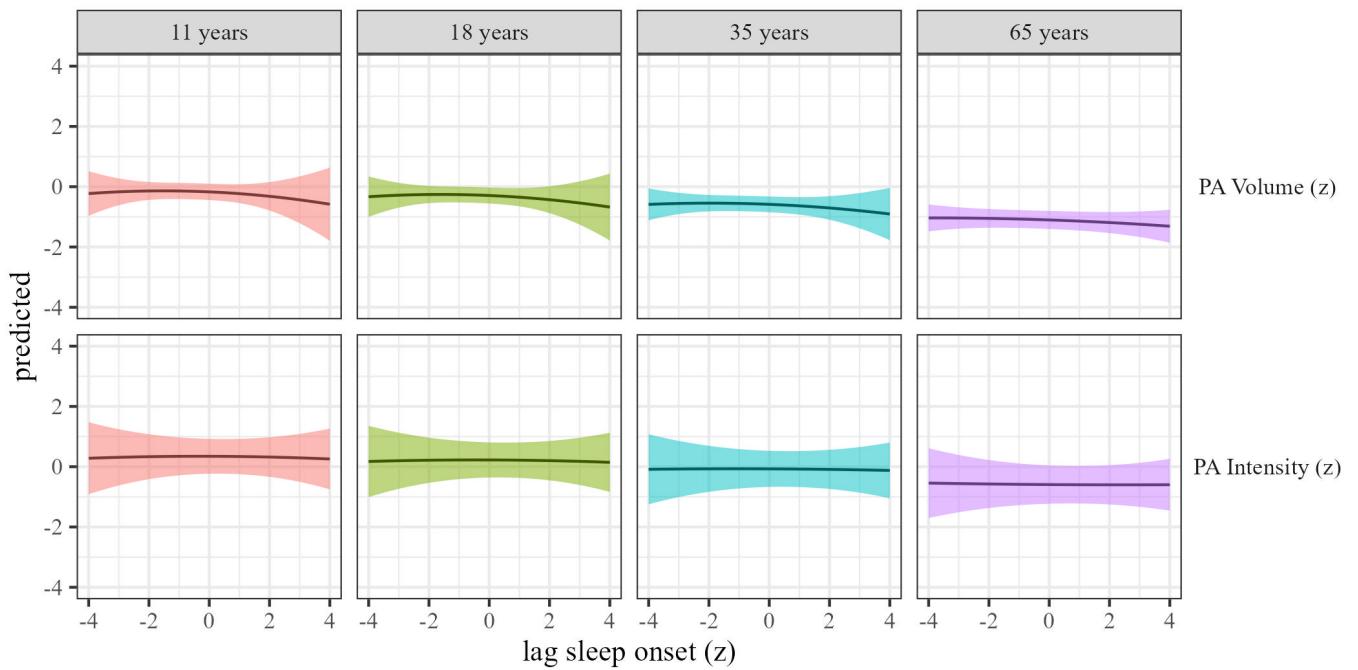


Figure 5. Physical activity by sleep onset

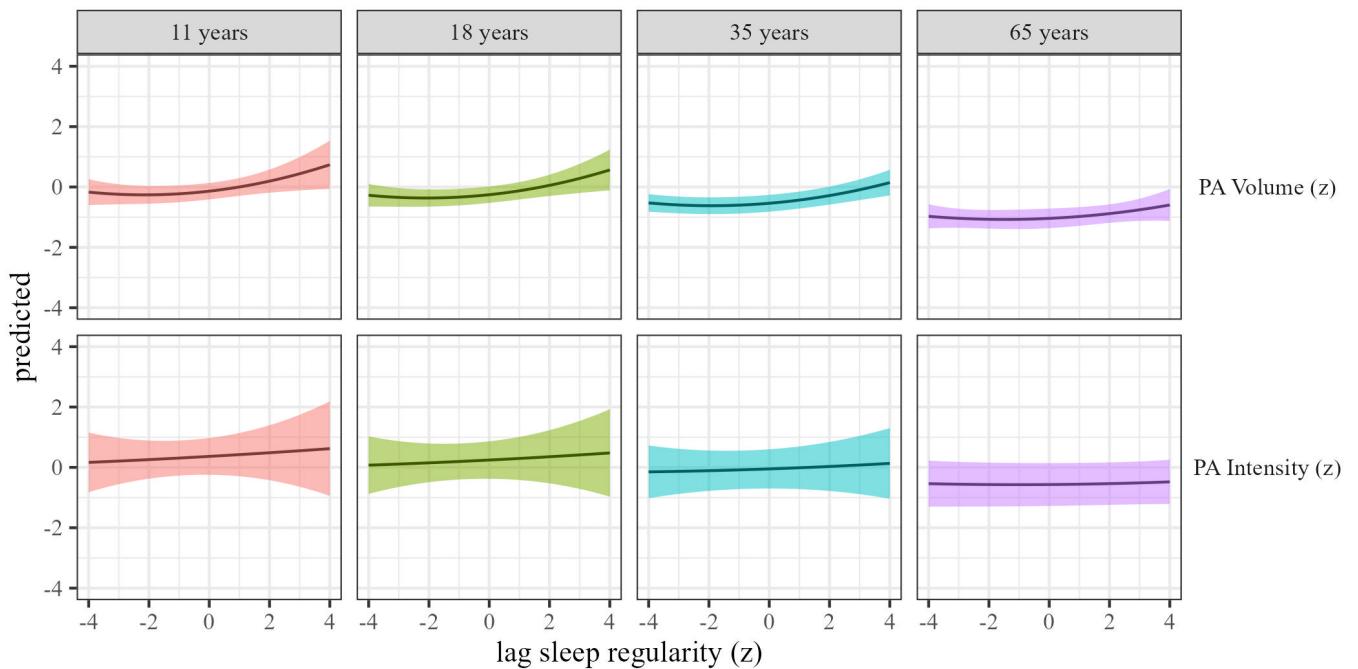


Figure 6. Physical activity by sleep regularity

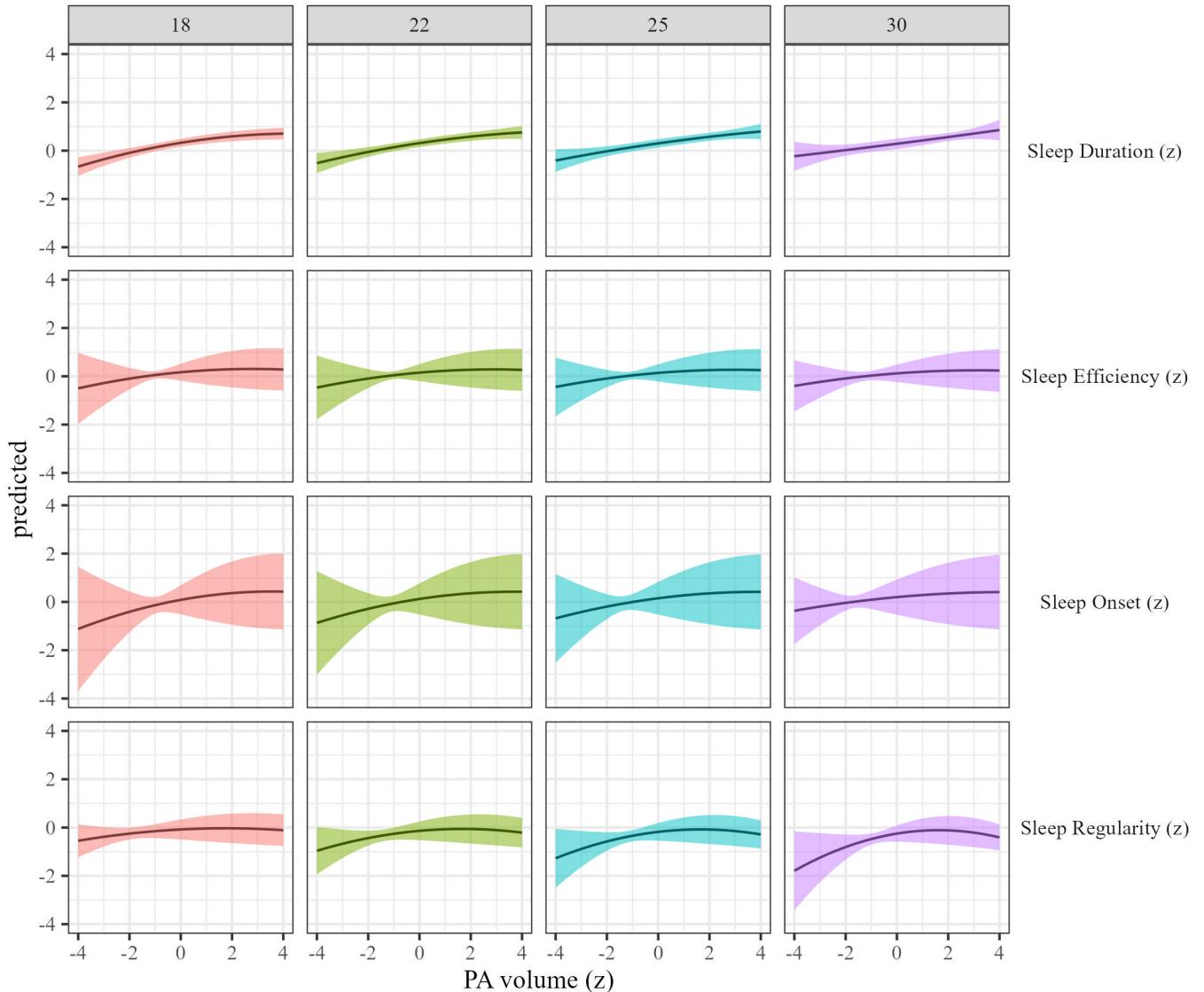


Figure 7. Sleep metrics on Physical activity volume by BMI

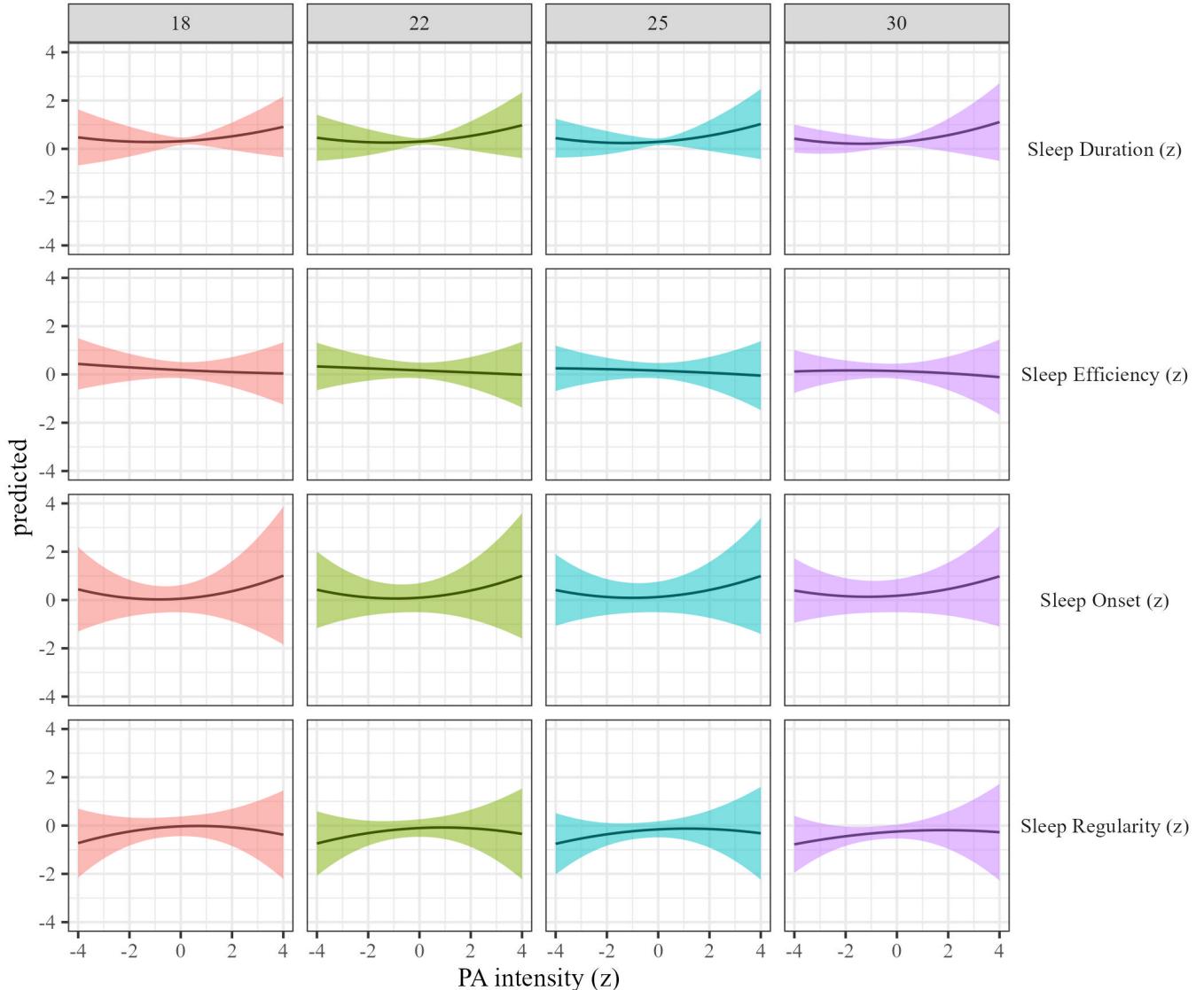


Figure 8. Sleep metrics on Physical activity intensity moderated by BMI

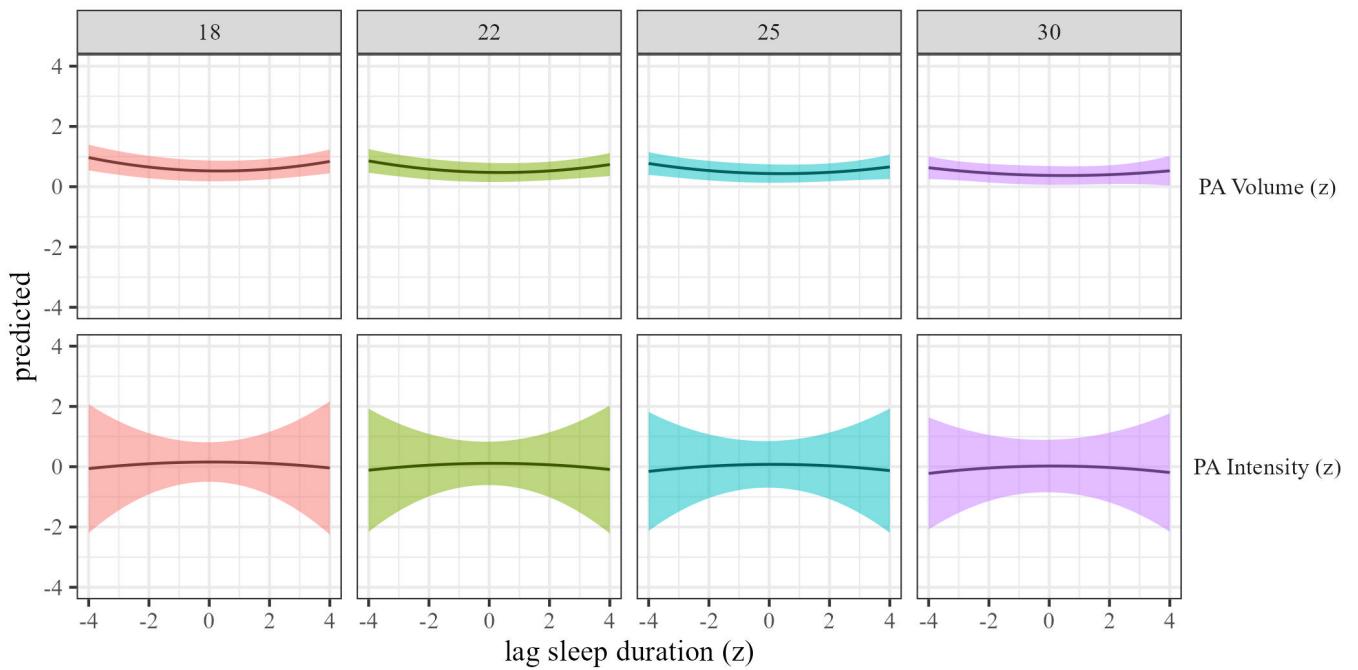


Figure 9. Physical activity by sleep duration moderated by BMI

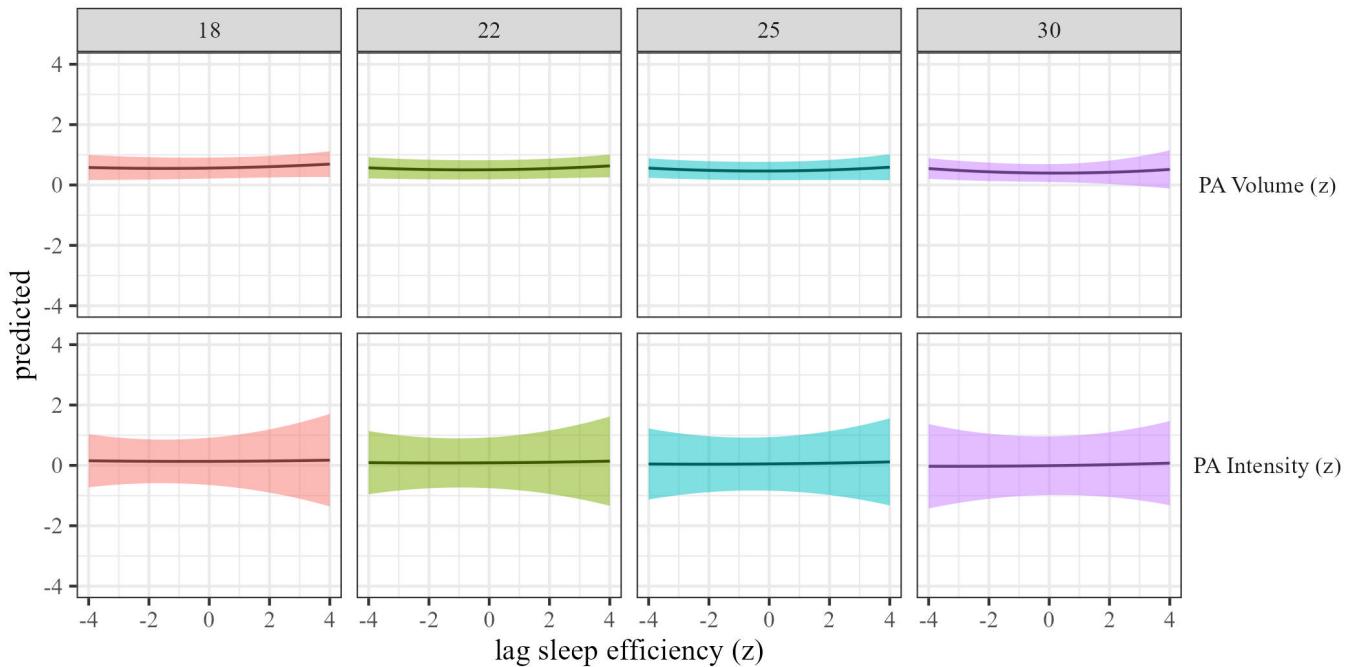


Figure 10. Physical activity by sleep efficiency moderated by BMI

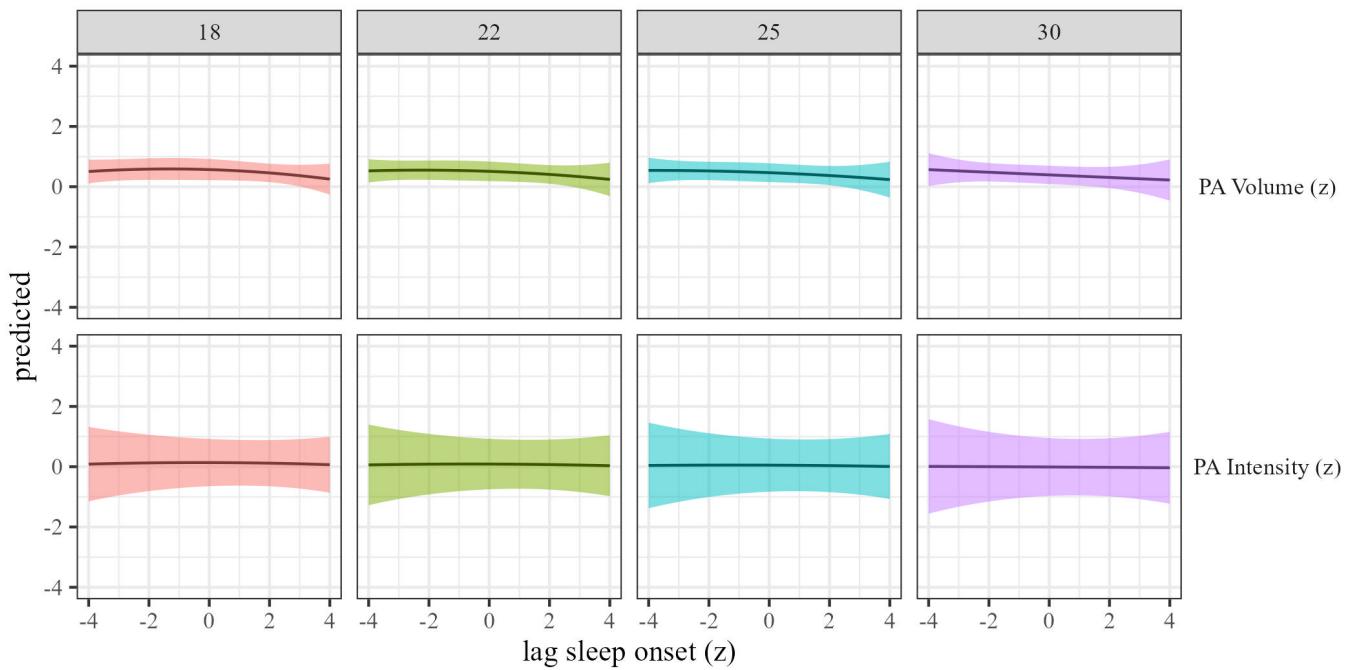


Figure 11. Physical activity by sleep onset moderated by BMI

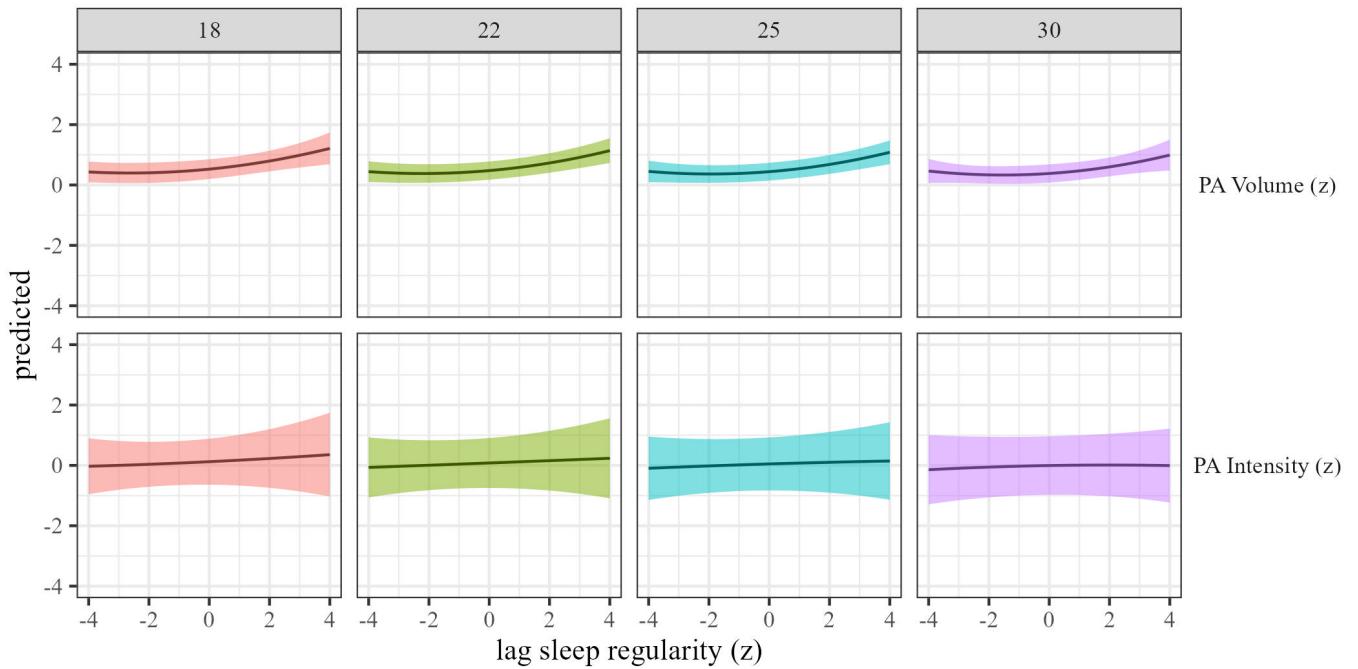


Figure 12. Physical activity by sleep regularity moderated by BMI

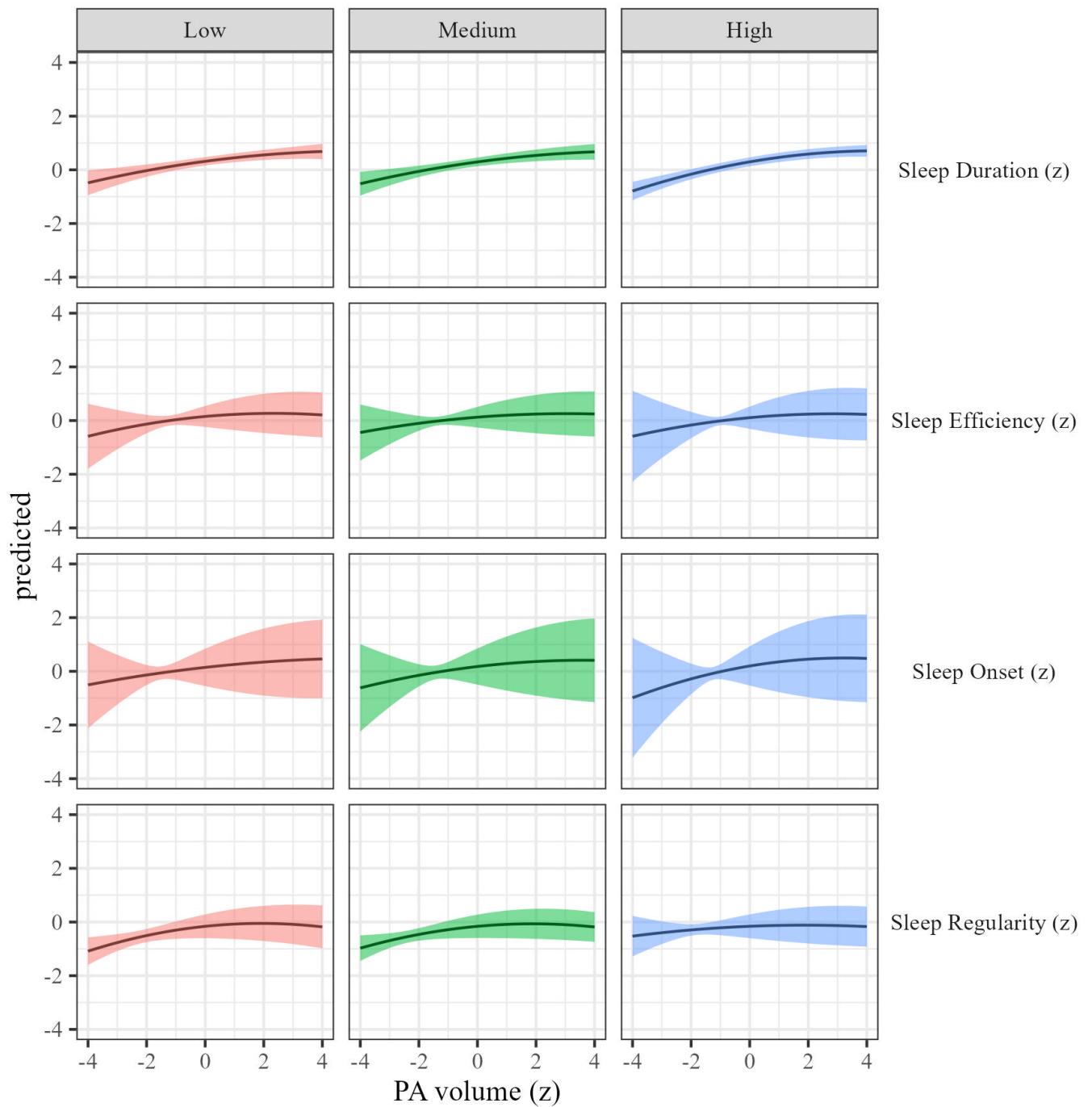


Figure 13. Sleep metrics on Physical activity volume by SES

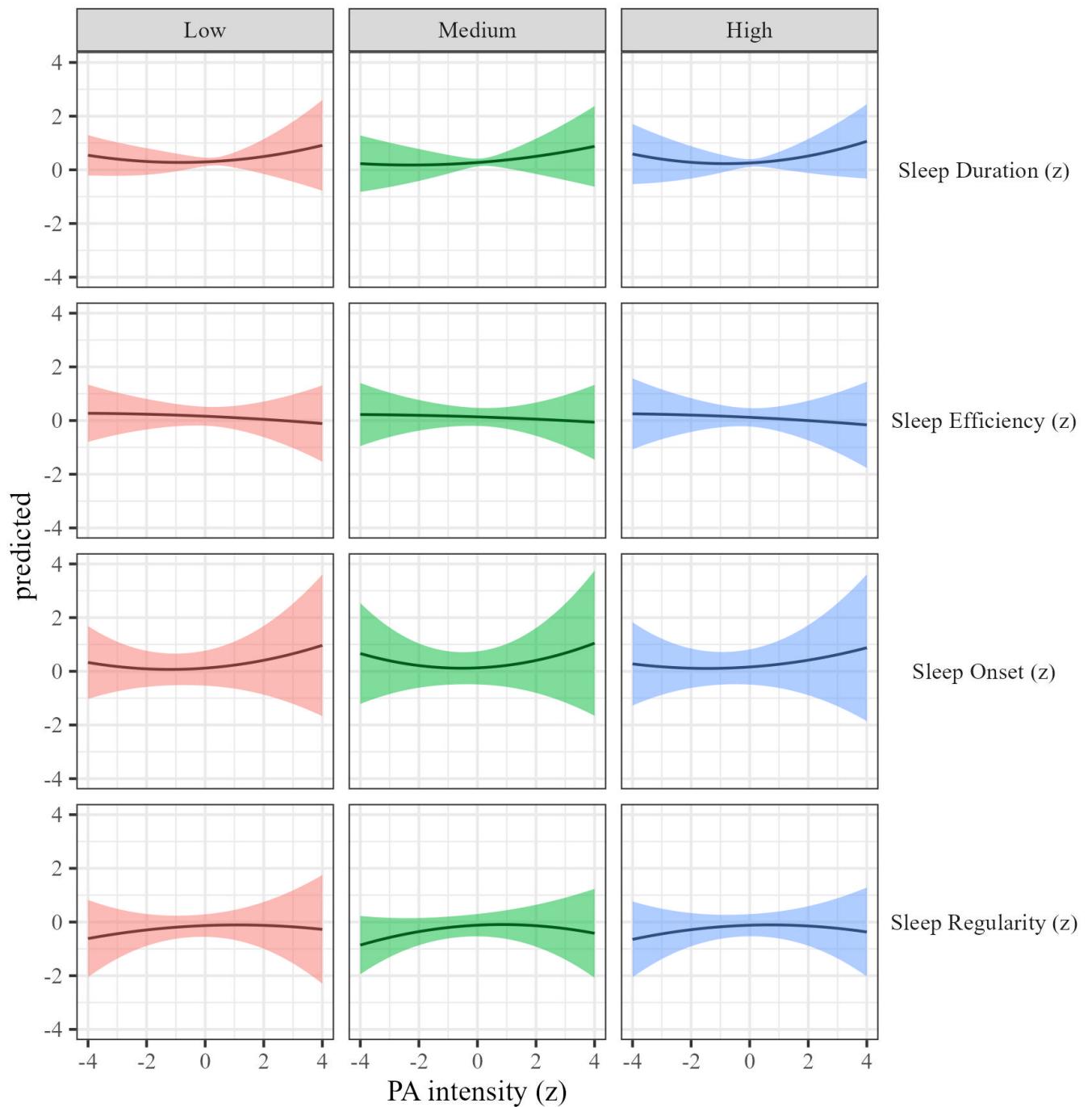


Figure 14. Sleep metrics on Physical activity intensity moderated by SES

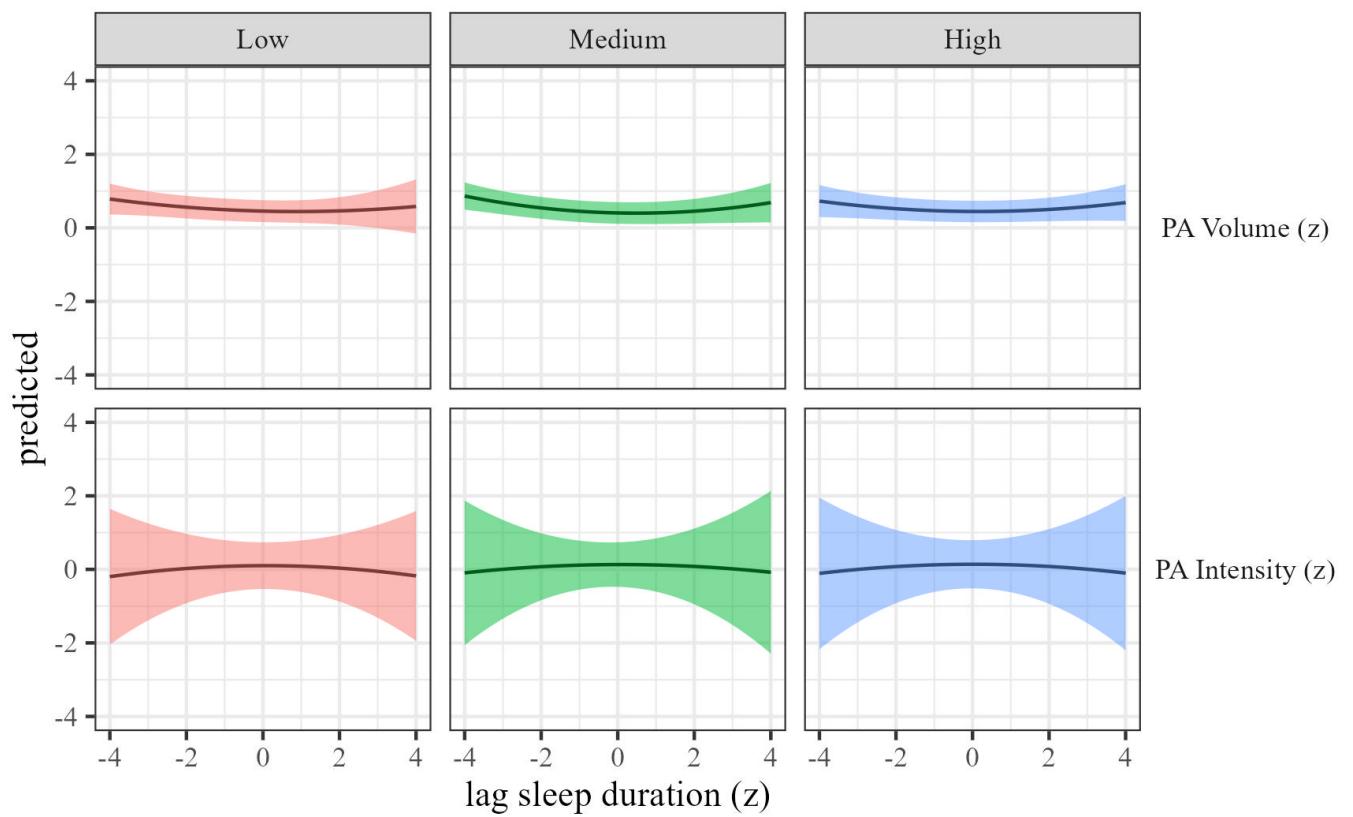


Figure 15. Physical activity by sleep duration moderated by SES

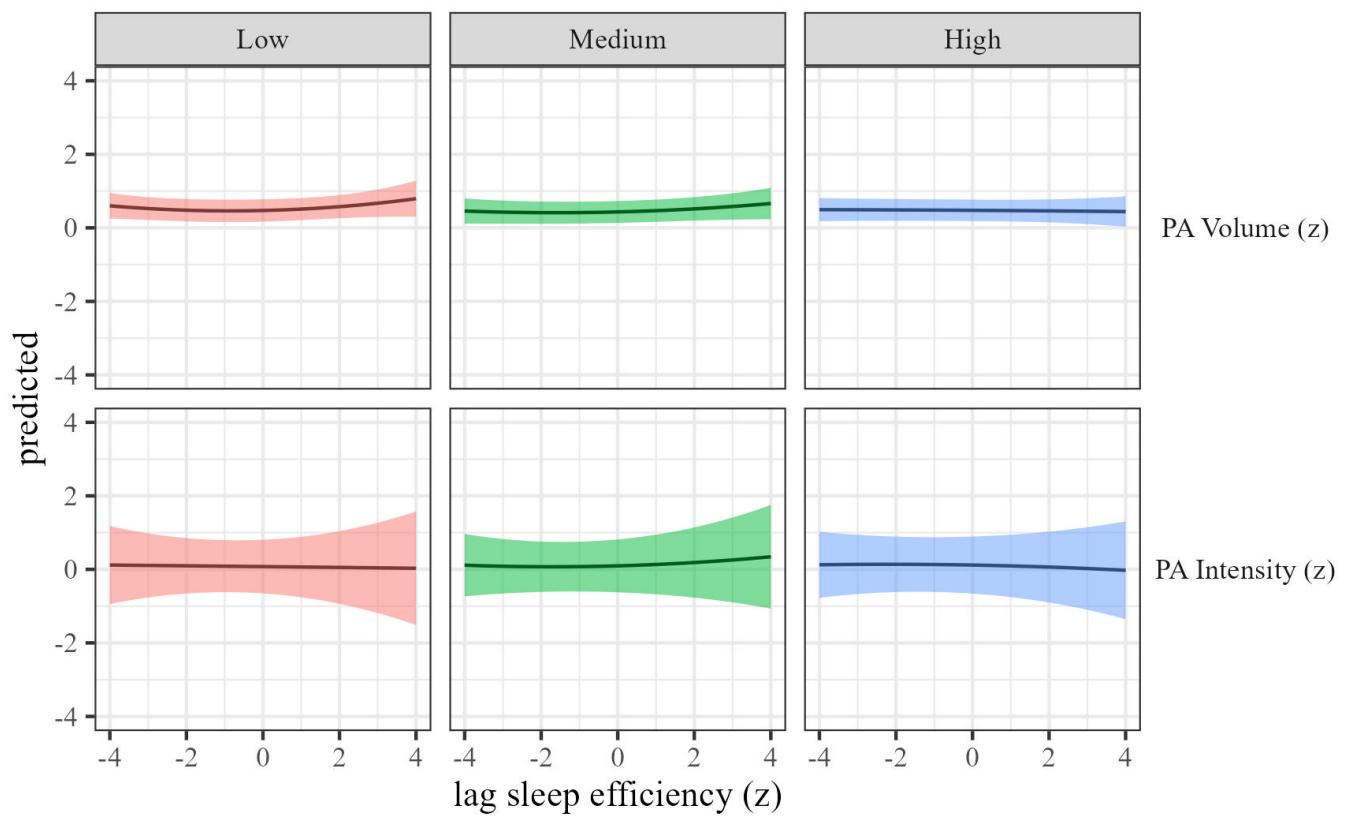


Figure 16. Physical activity by sleep efficiency moderated by SES

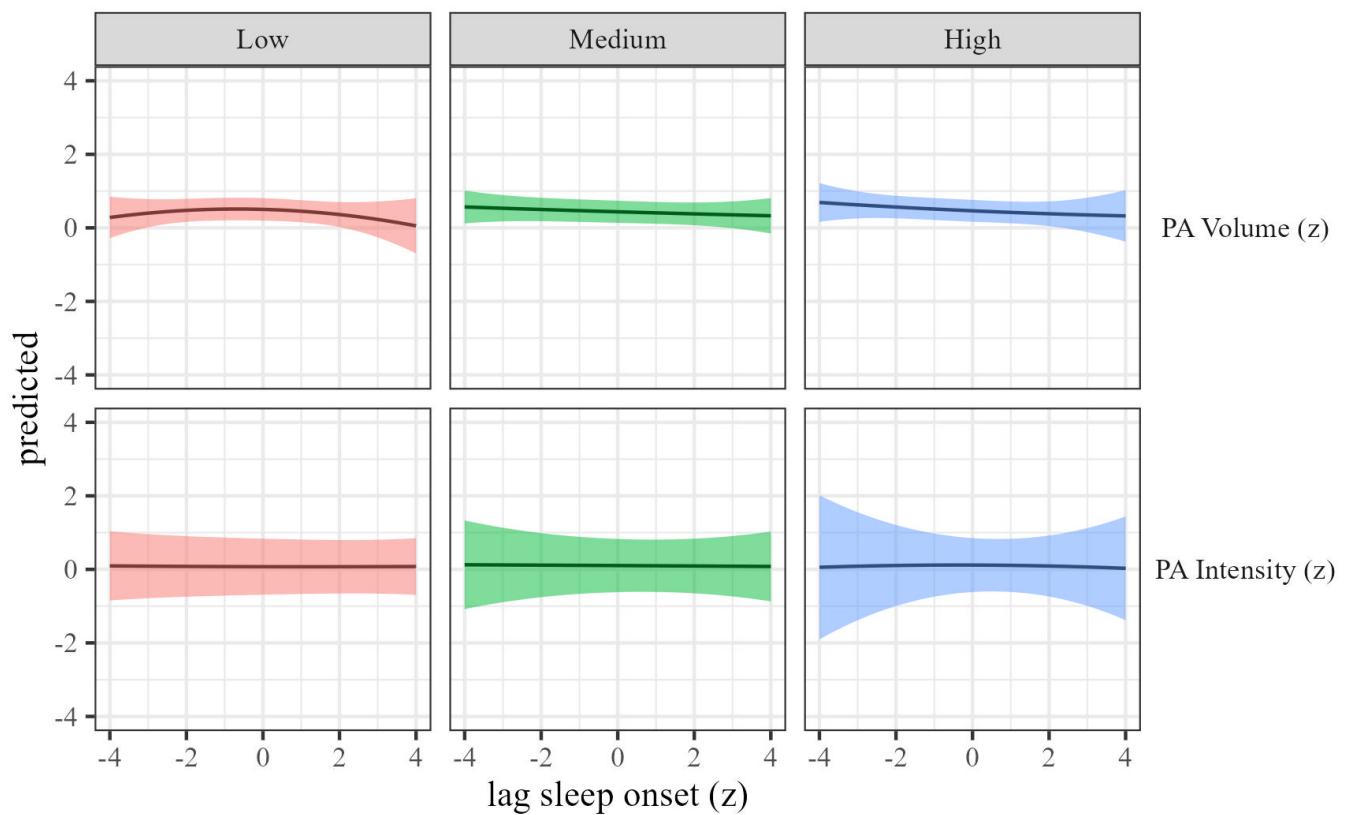


Figure 17. Physical activity by sleep onset moderated by SES

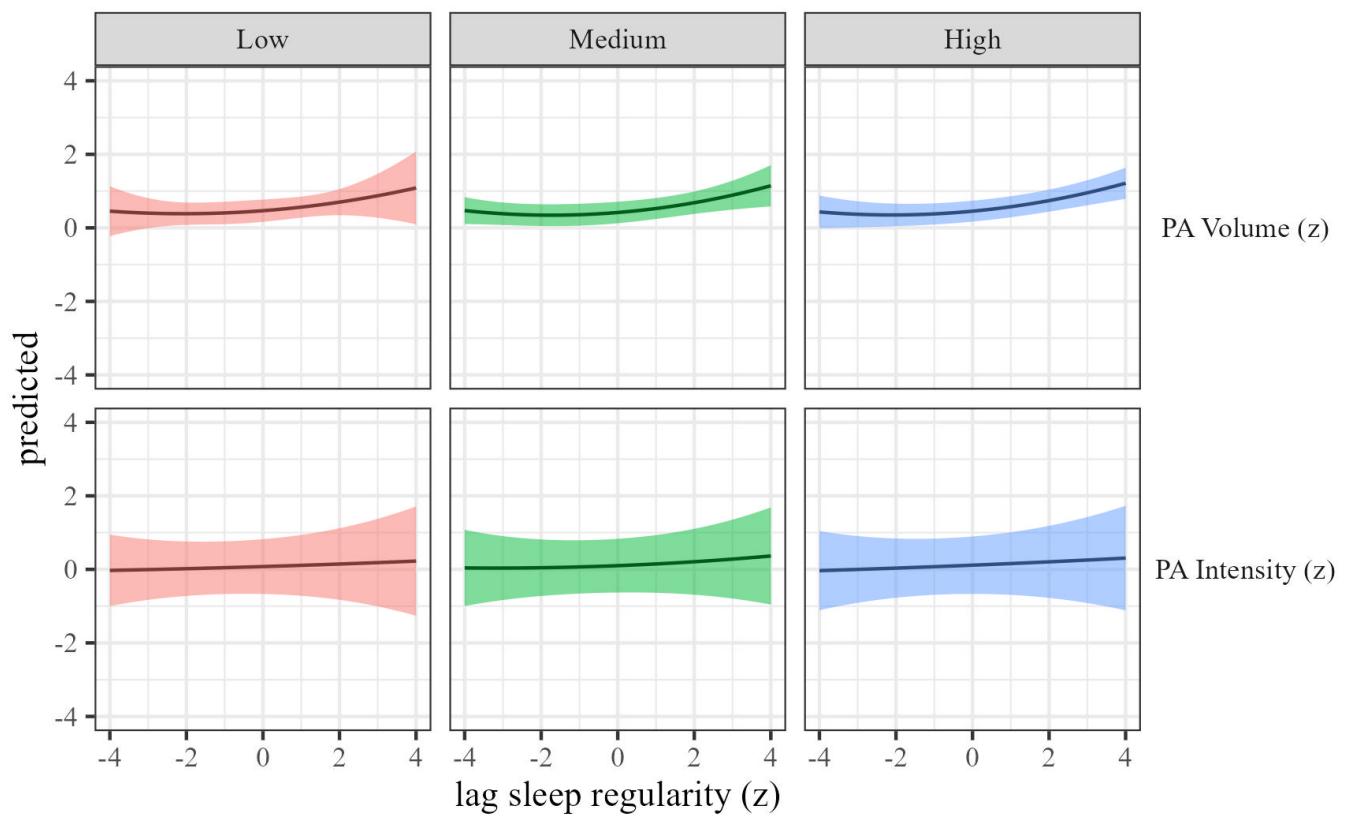


Figure 18. Physical activity by sleep regularity moderated by SES

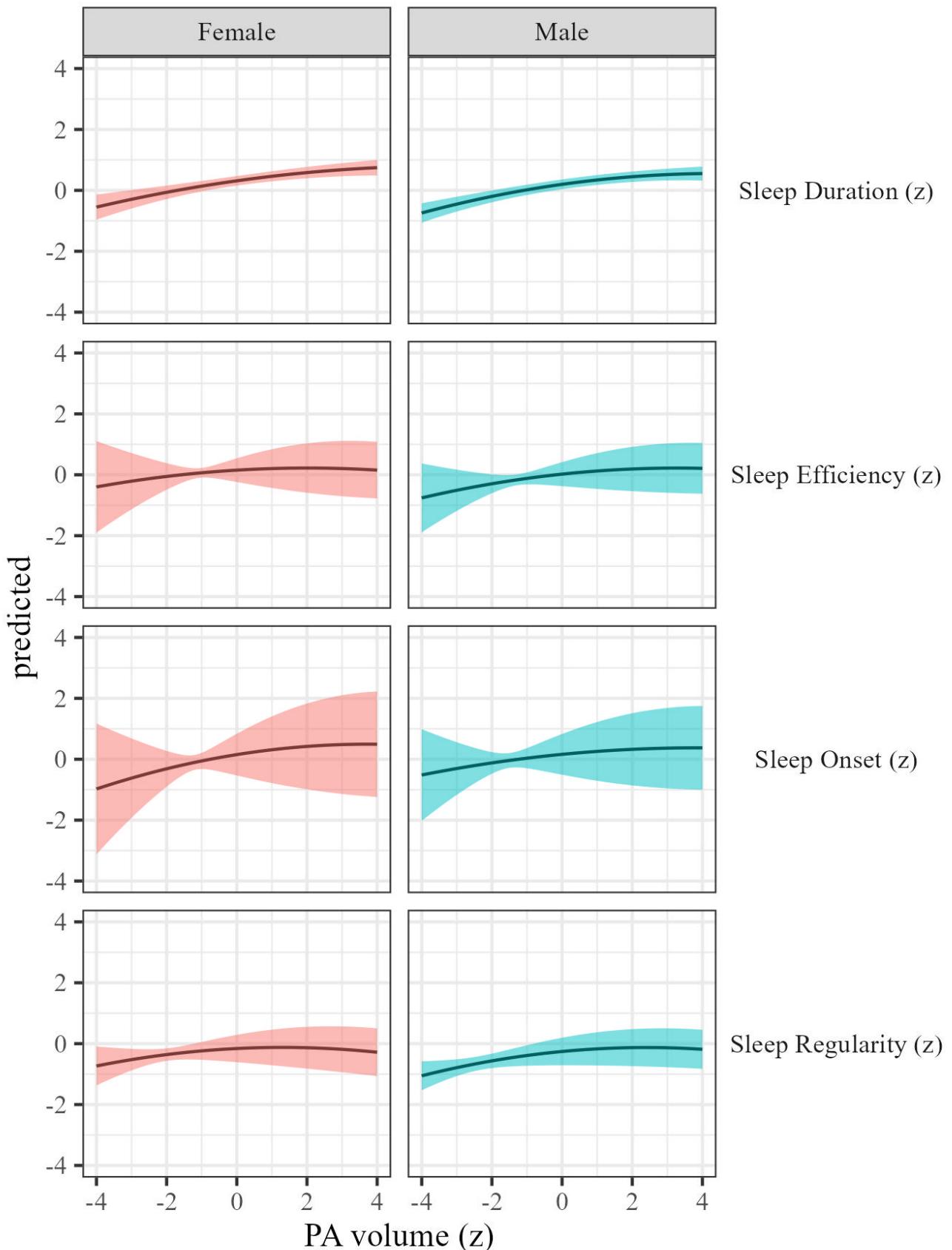


Figure 19. Sleep metrics on Physical activity volume by sex

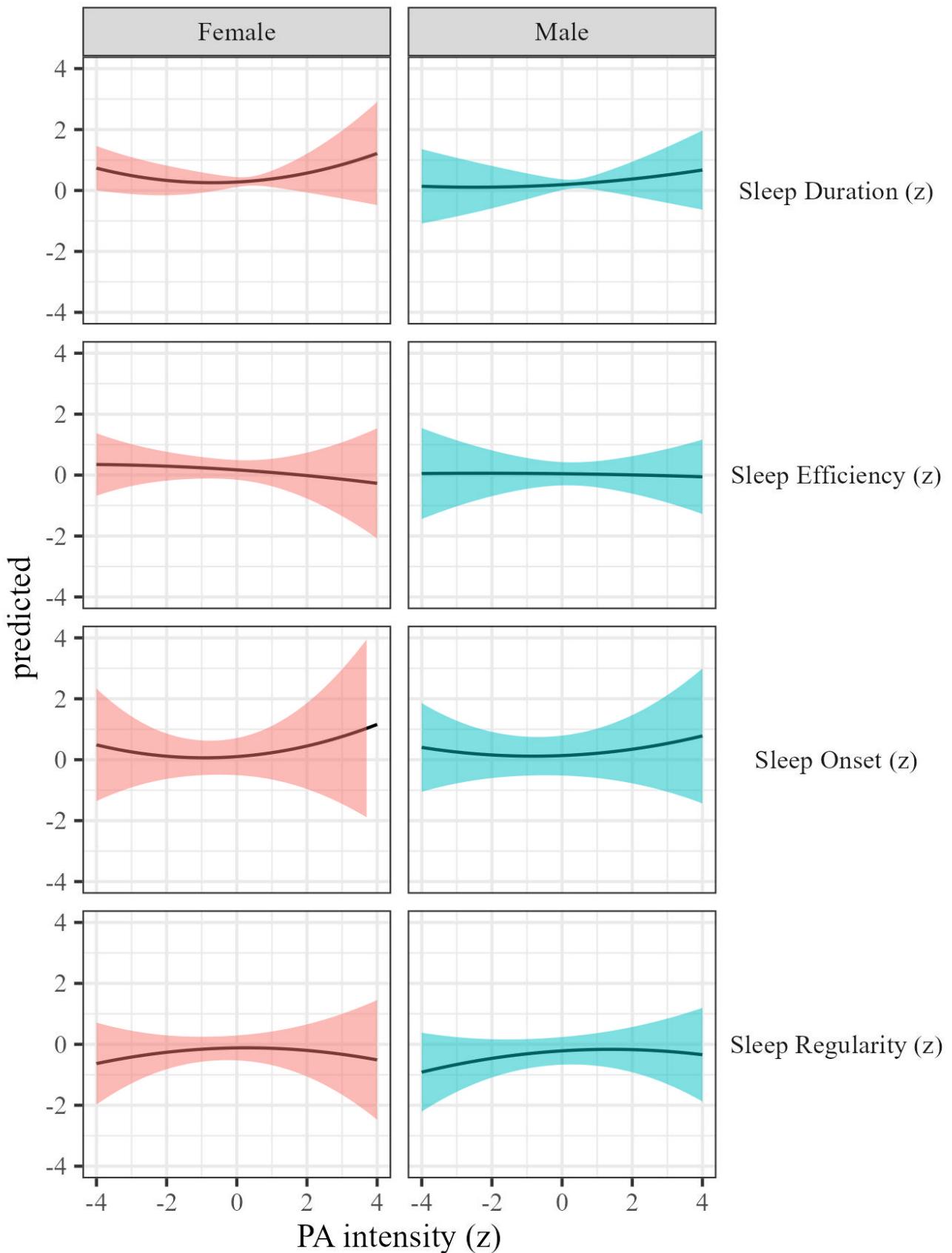


Figure 20. Sleep metrics on Physical activity intensity moderated by sex

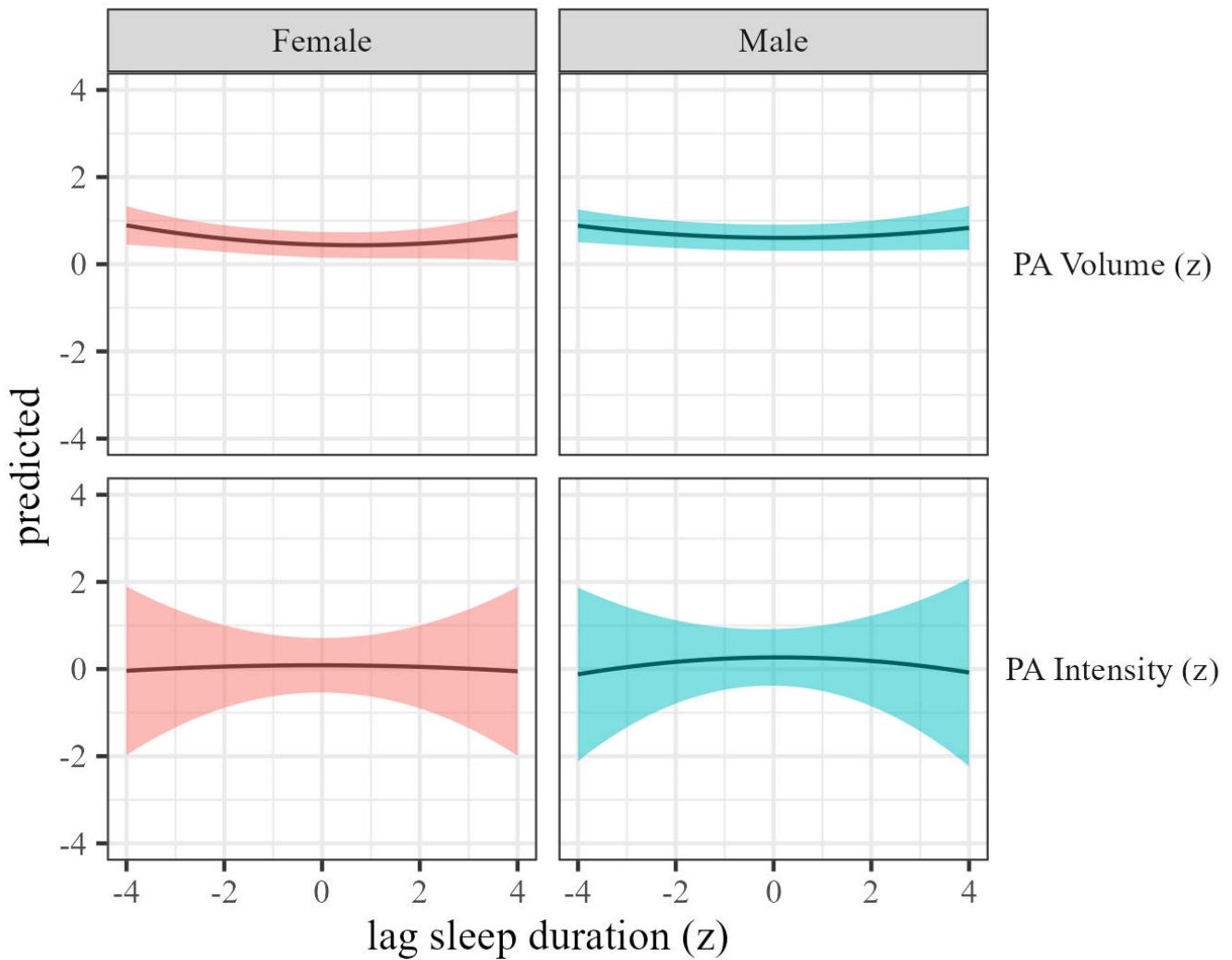


Figure 21. Physical activity by sleep duration moderated by sex

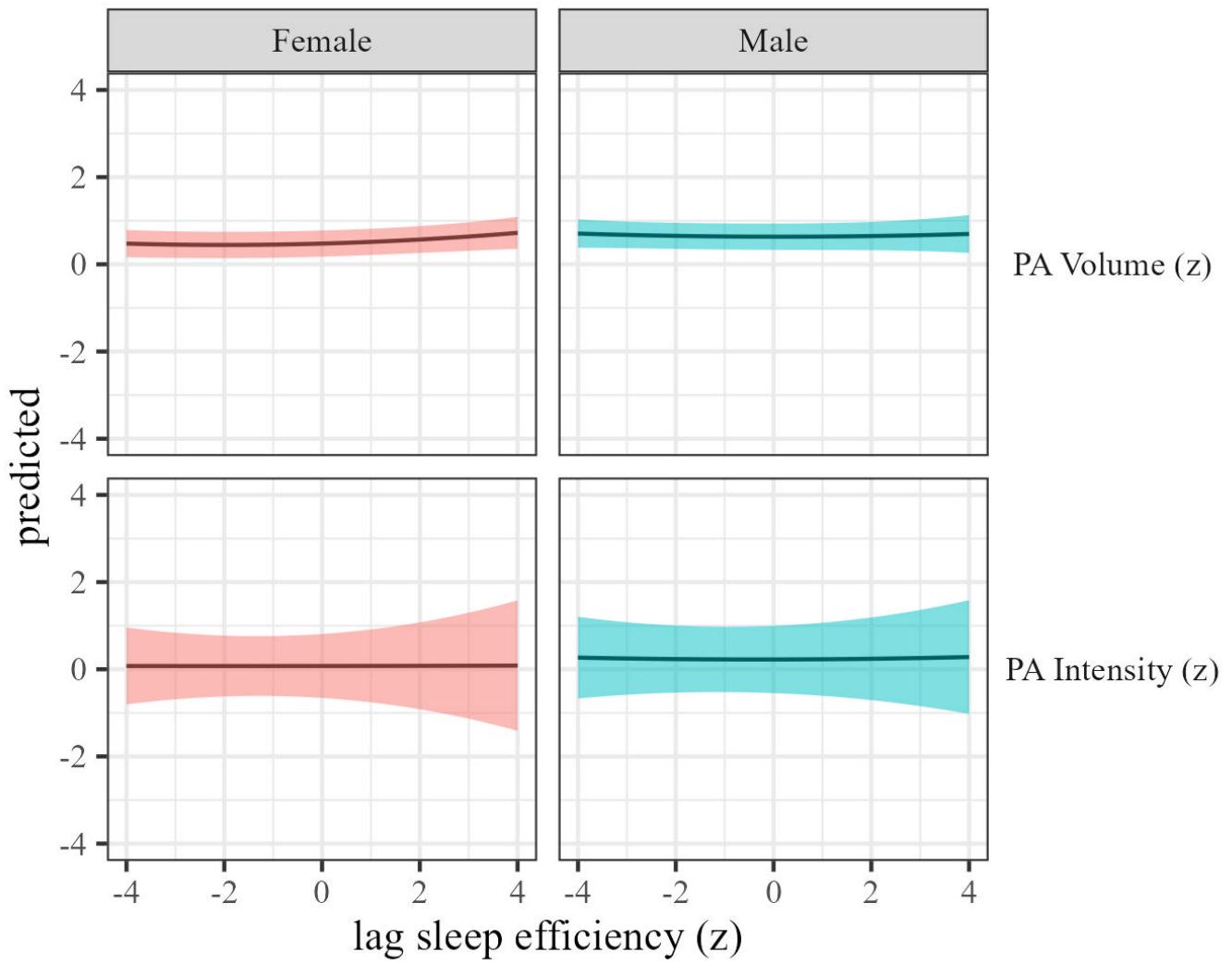


Figure 22. Physical activity by sleep efficiency moderated by sex

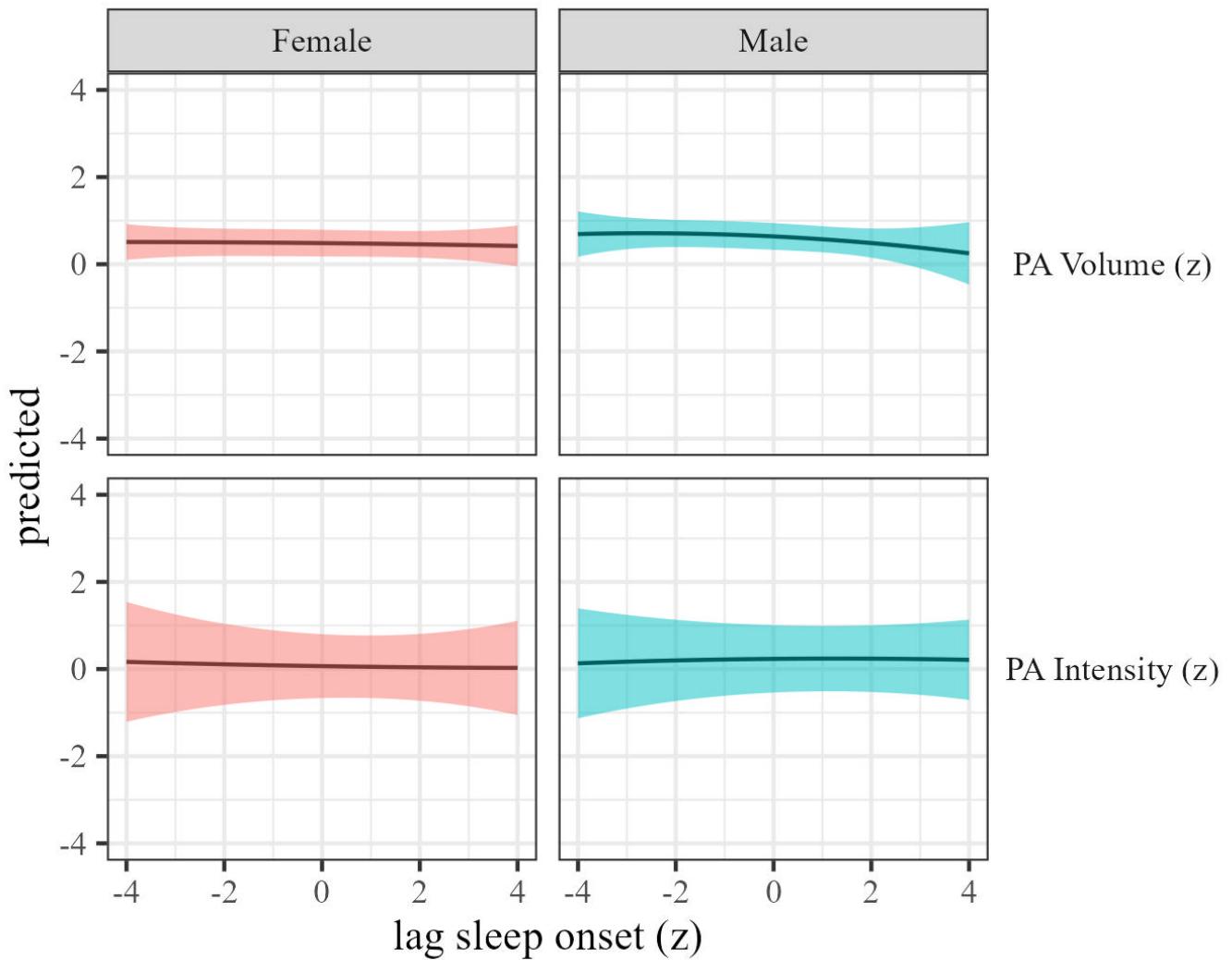


Figure 23. Physical activity by sleep onset moderated by sex

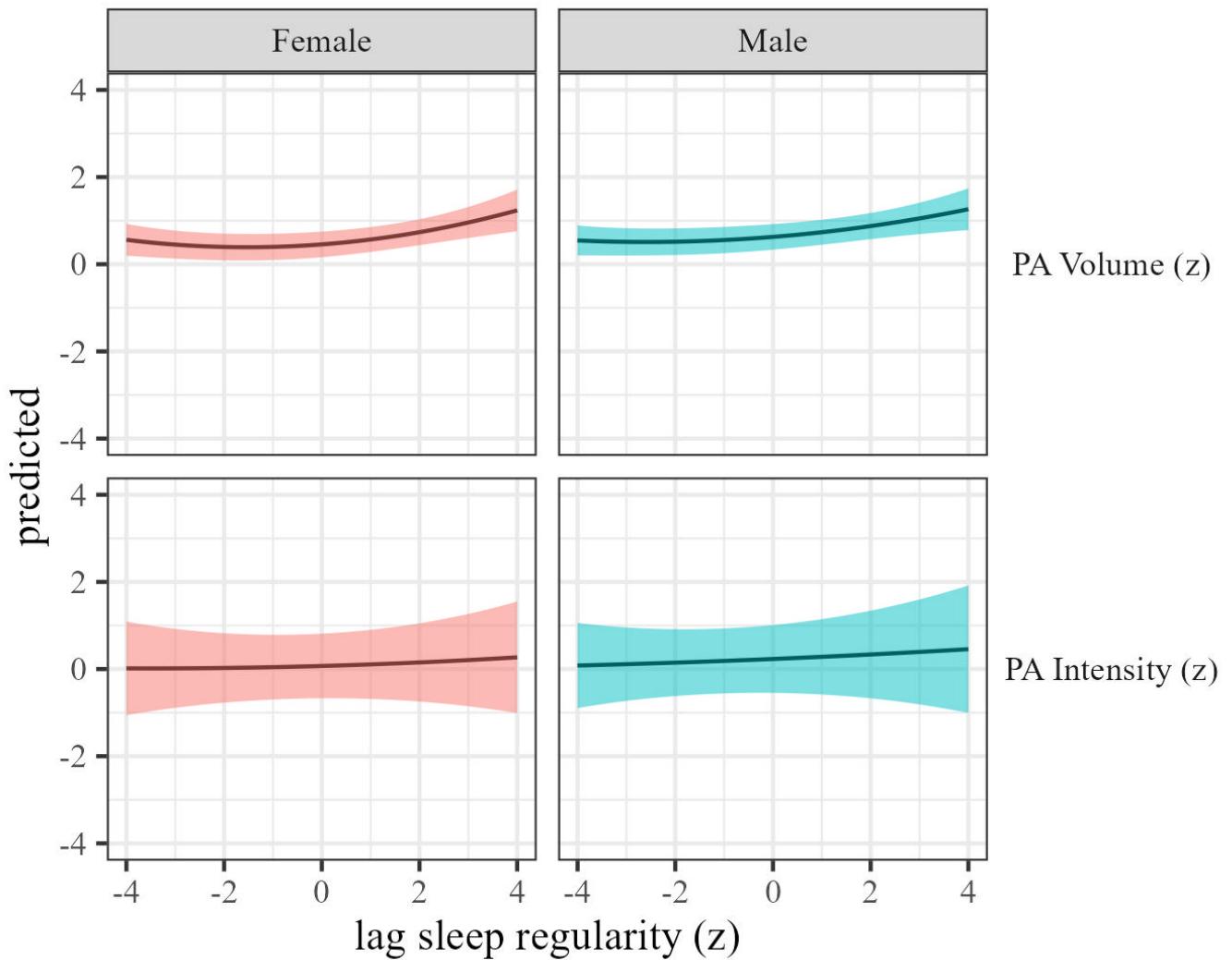


Figure 24. Physical activity by sleep regularity moderated by sex

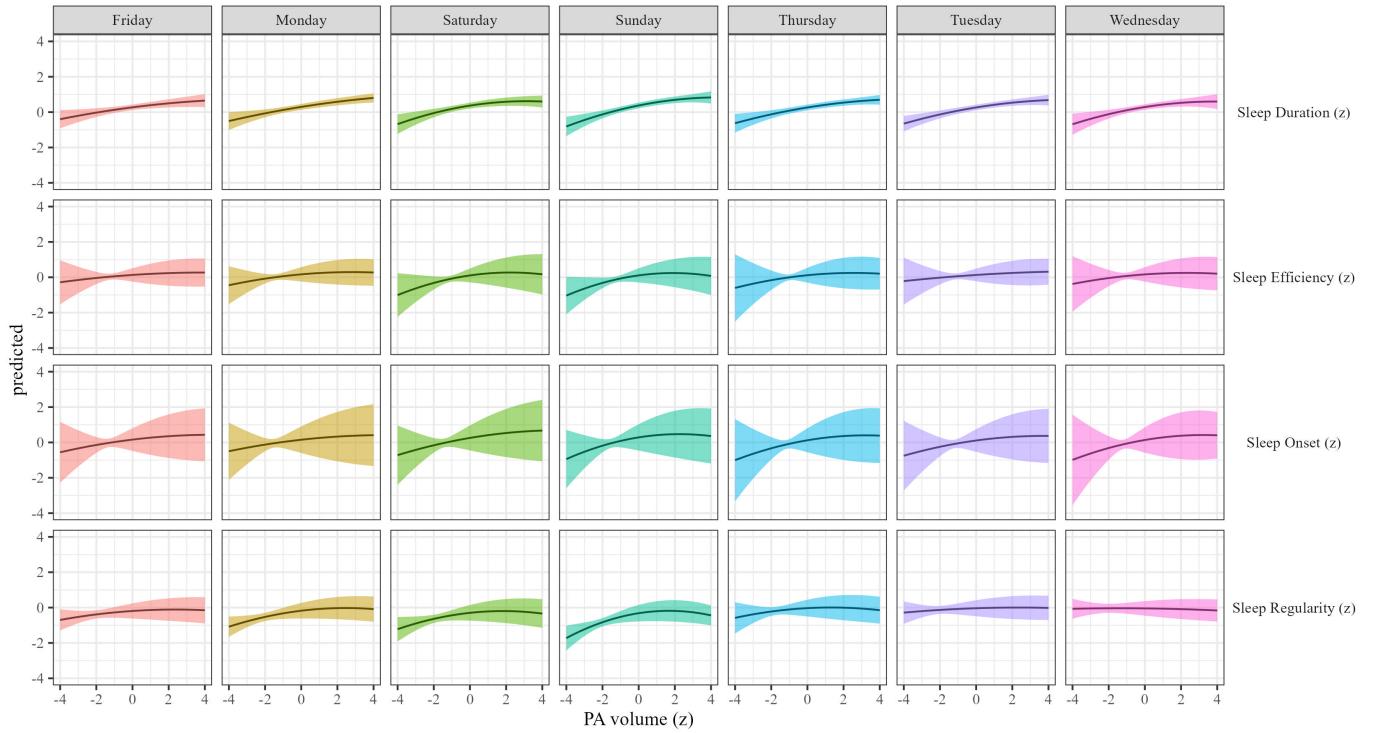


Figure 25. Sleep metrics on Physical activity volume by weekday

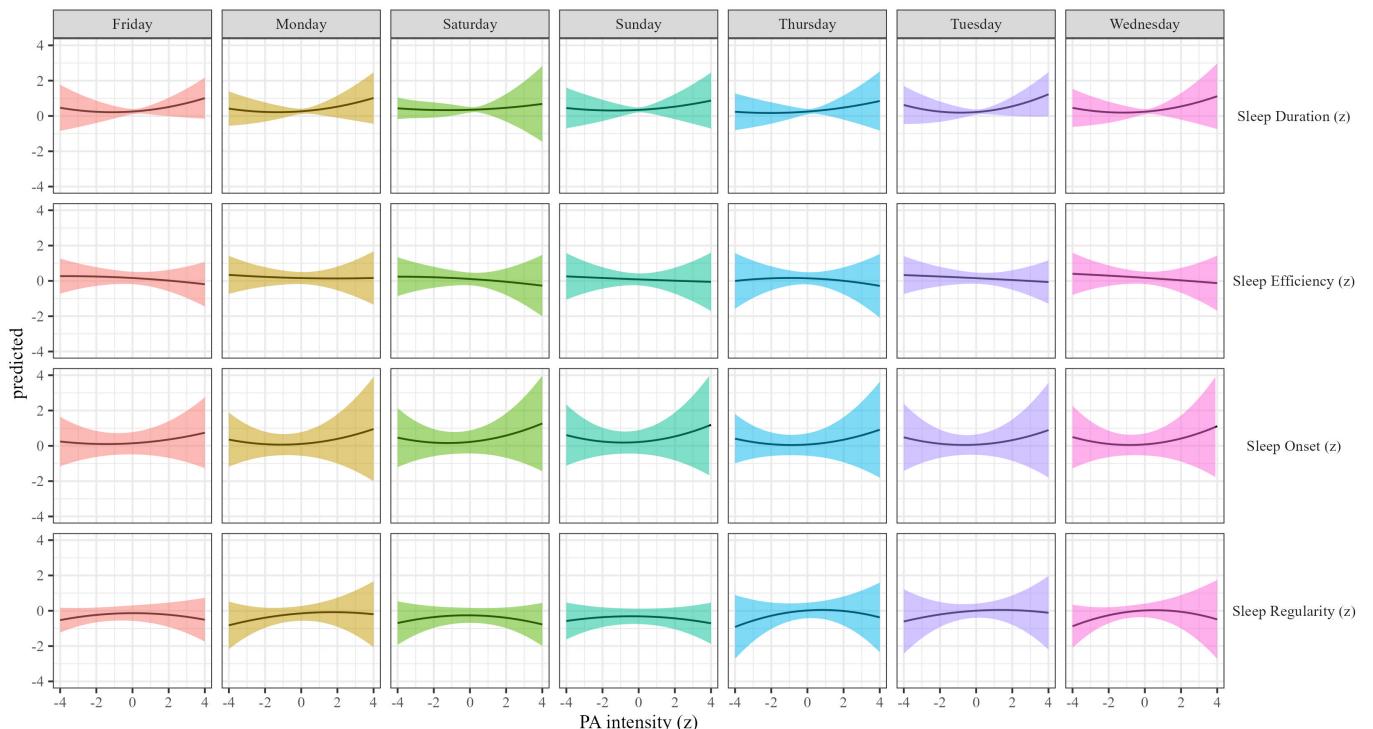


Figure 26. Sleep metrics on Physical activity intensity moderated by weekday

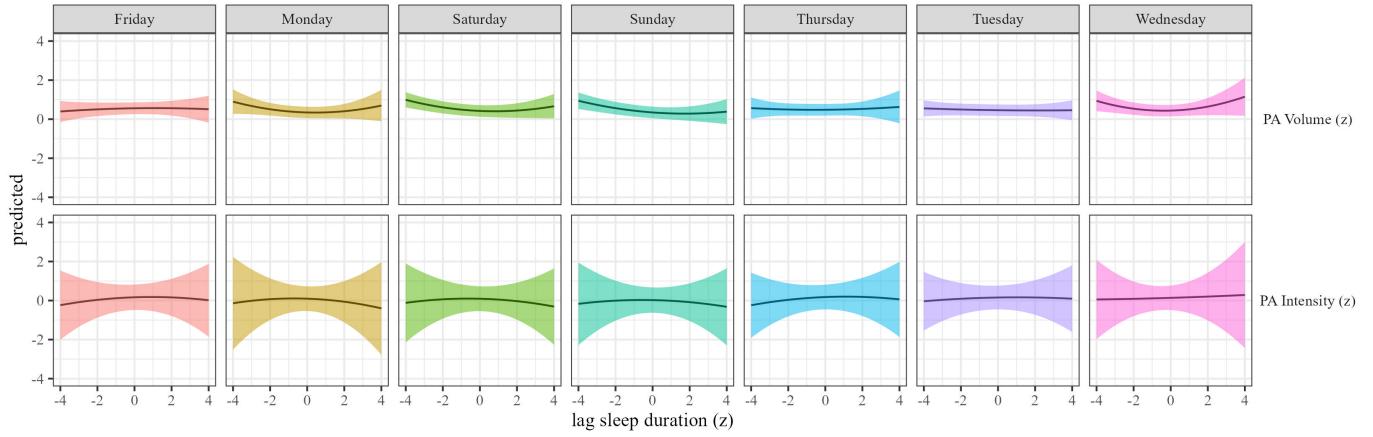


Figure 27. Physical activity by sleep duration moderated by weekday

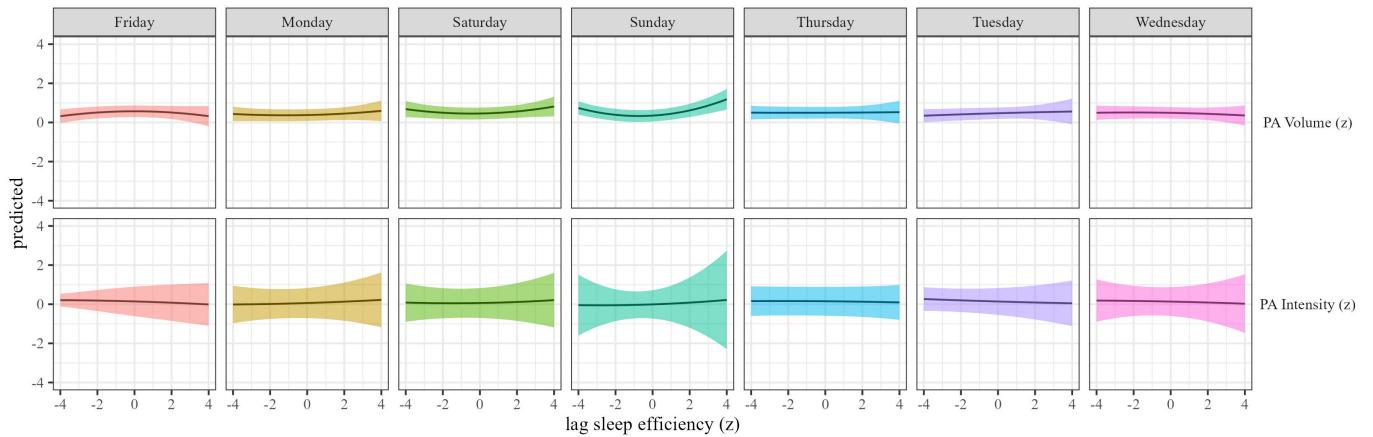


Figure 28. Physical activity by sleep efficiency moderated by weekday

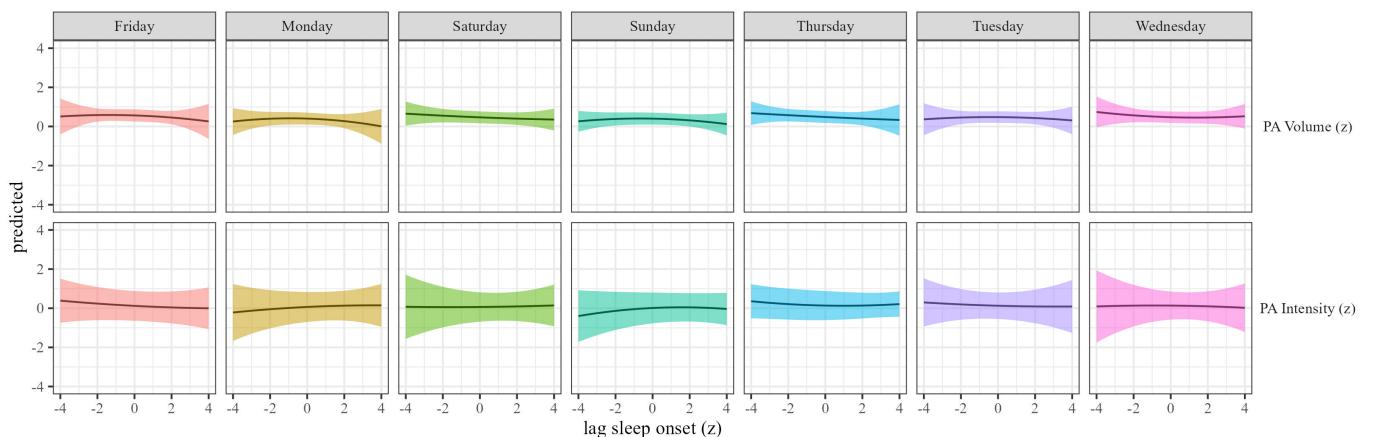


Figure 29. Physical activity by sleep onset moderated by weekday

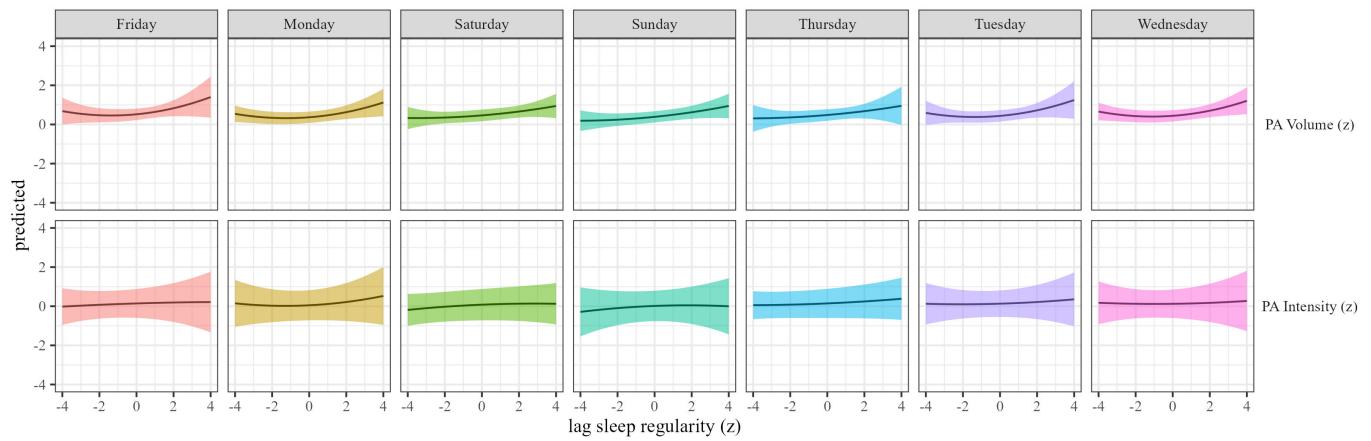


Figure 30. Physical activity by sleep regularity moderated by weekday

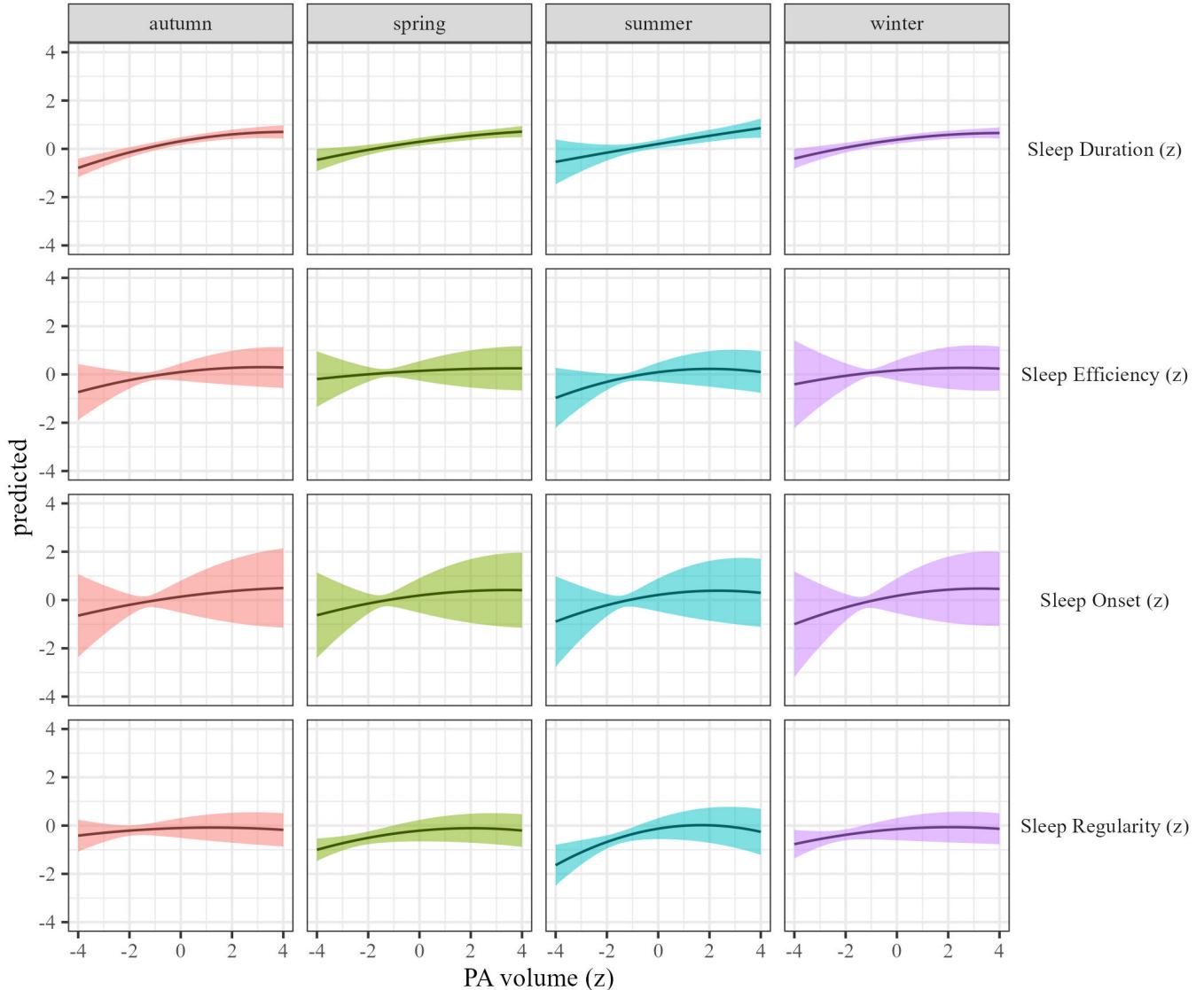


Figure 31. Sleep metrics on Physical activity volume by season

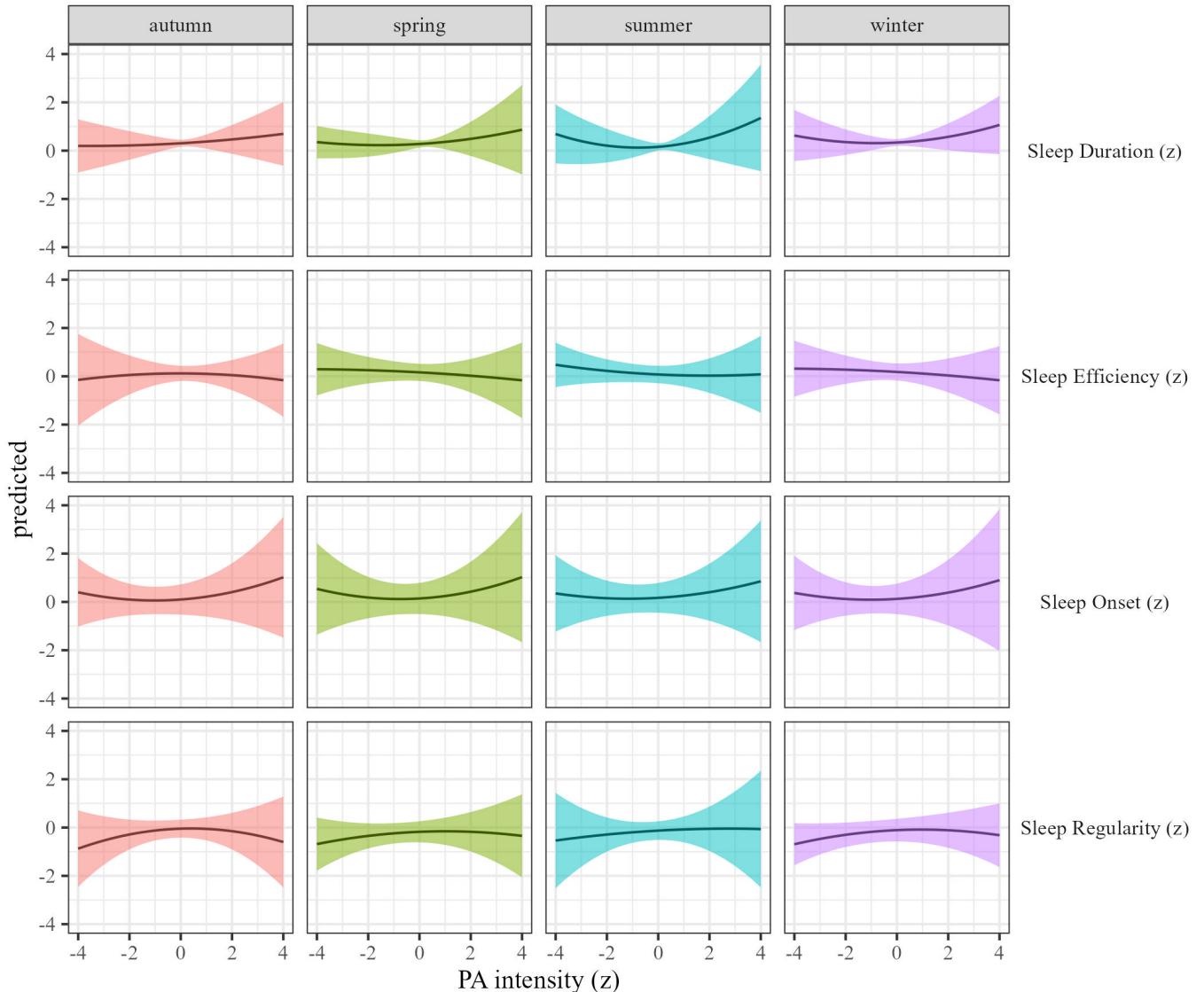


Figure 32. Sleep metrics on Physical activity intensity moderated by season

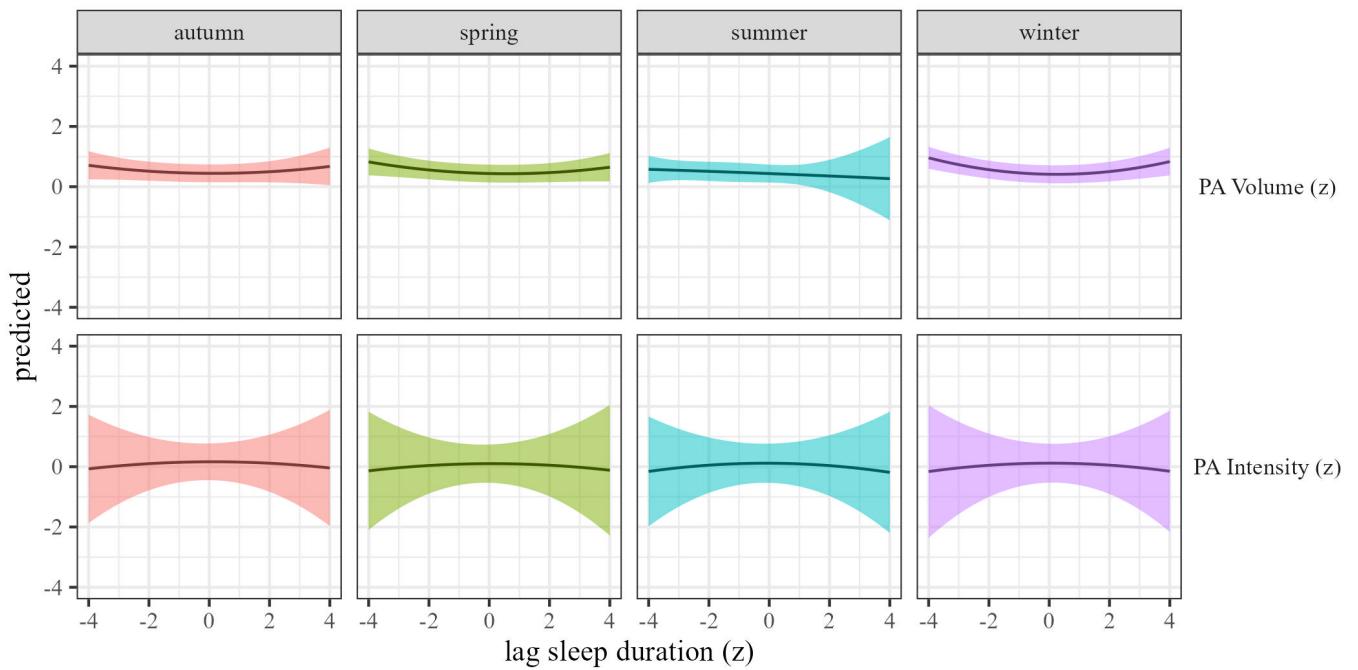


Figure 33. Physical activity by sleep duration moderated by season

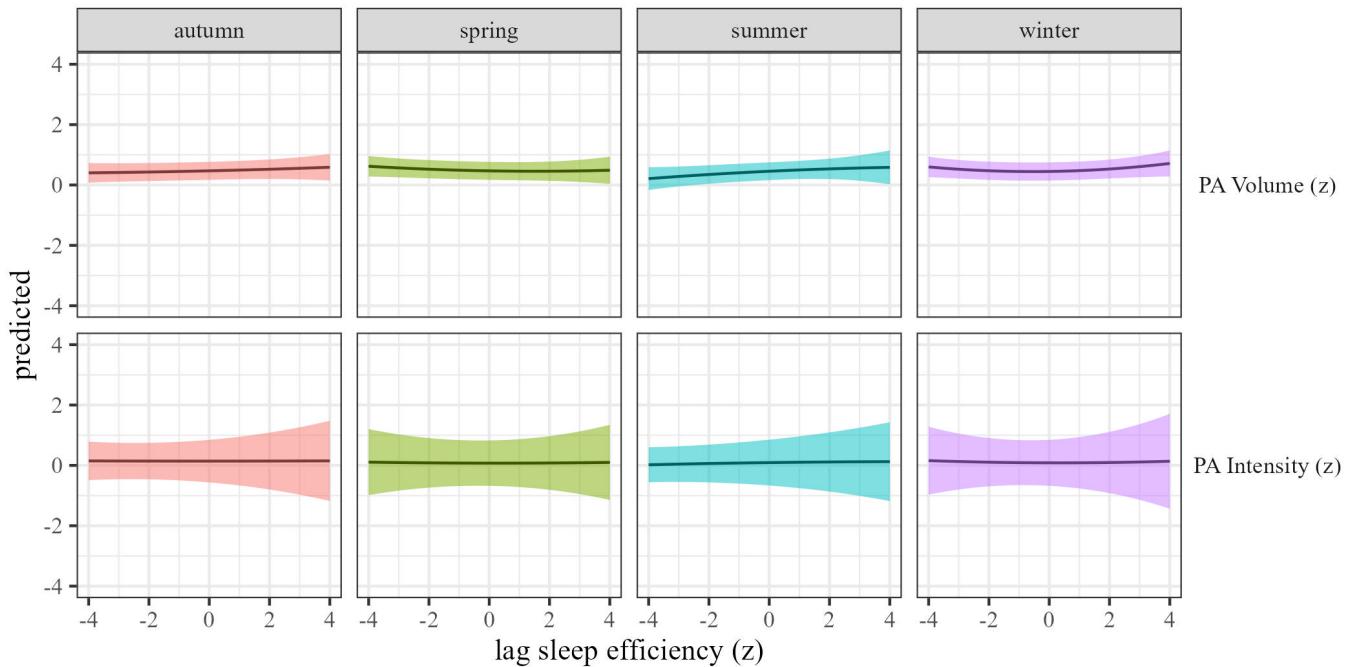


Figure 34. Physical activity by sleep efficiency moderated by season

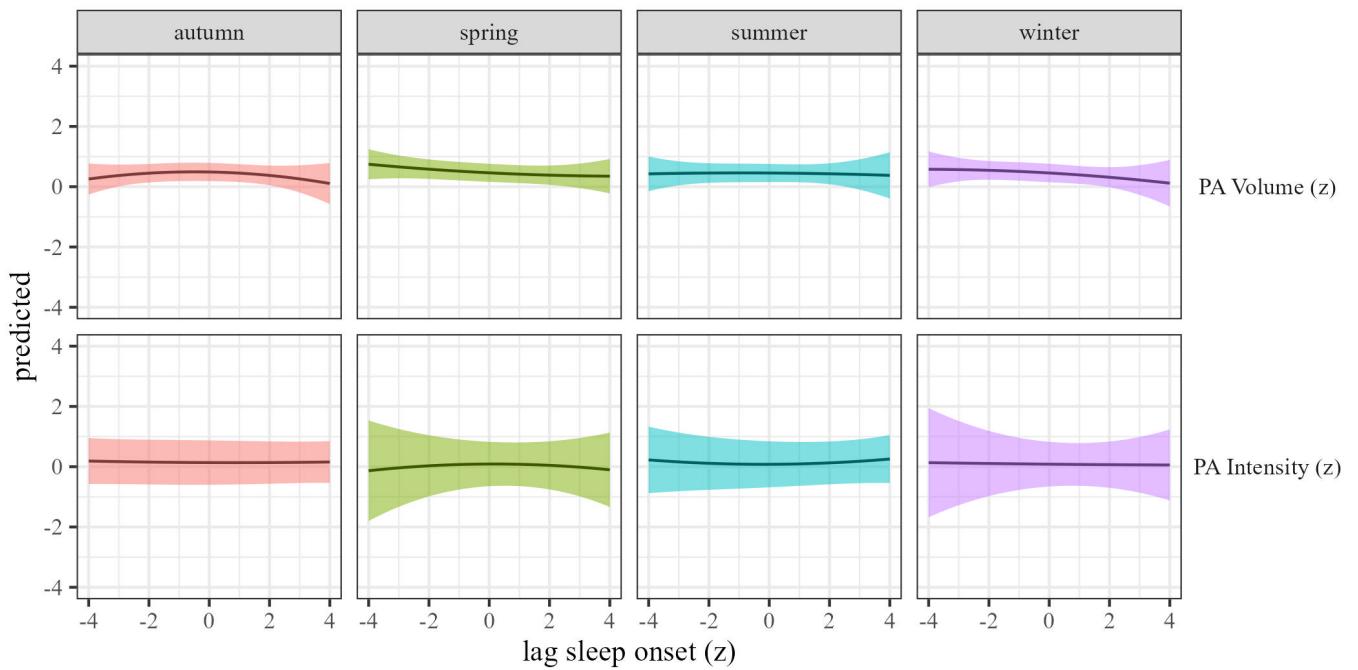


Figure 35. Physical activity by sleep onset moderated by season

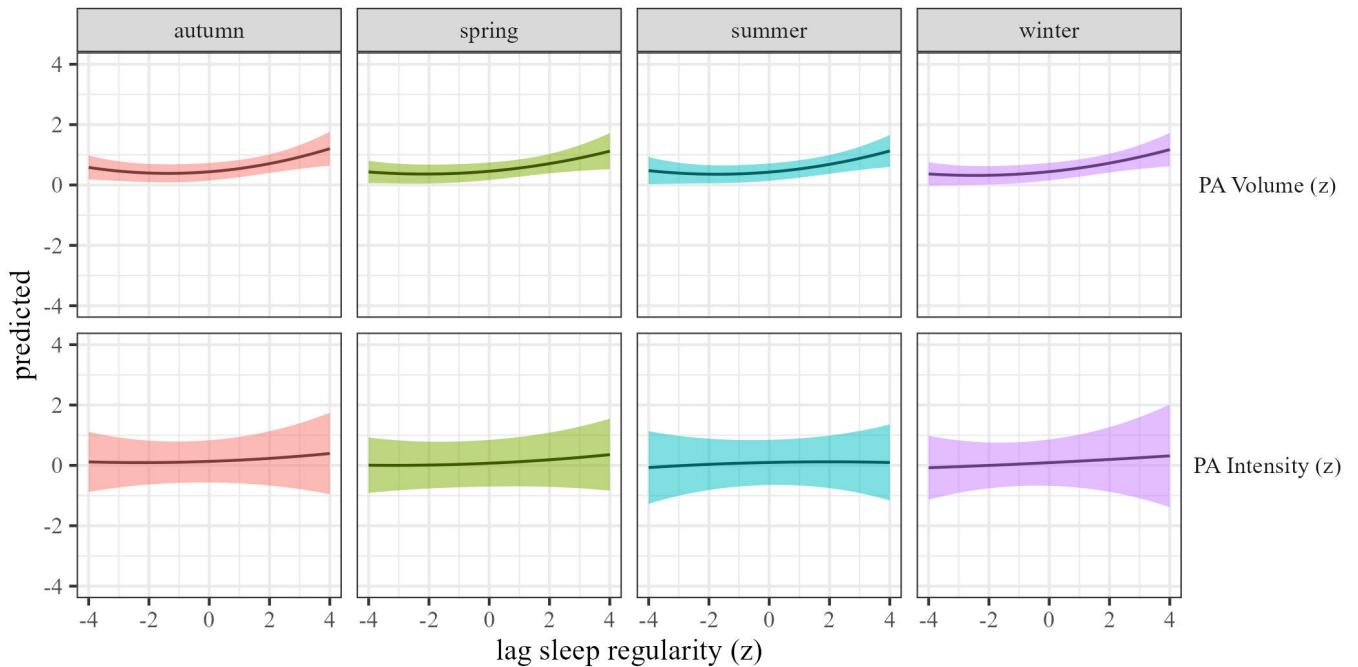


Figure 36. Physical activity by sleep regularity moderated by season

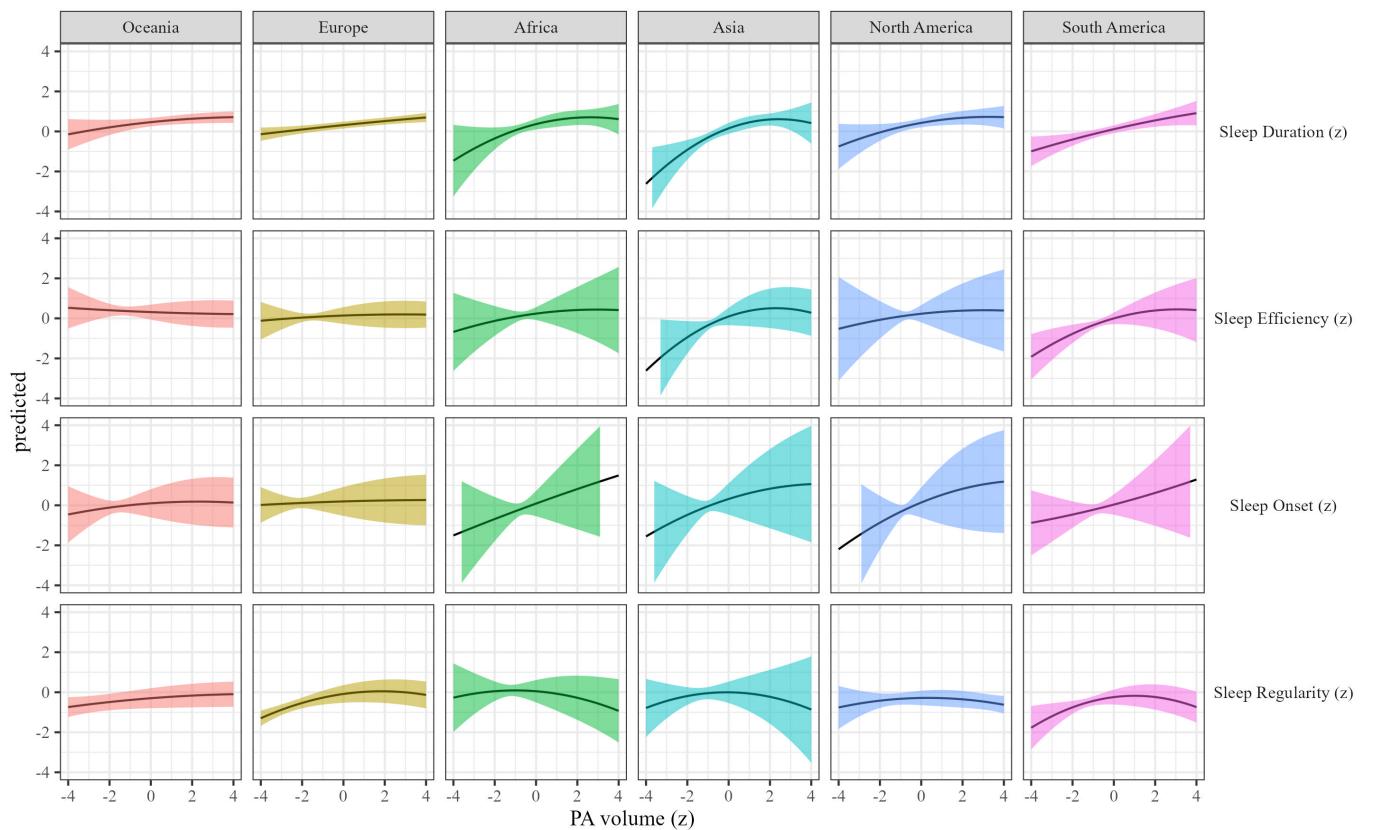


Figure 37. Sleep metrics on Physical activity volume by region

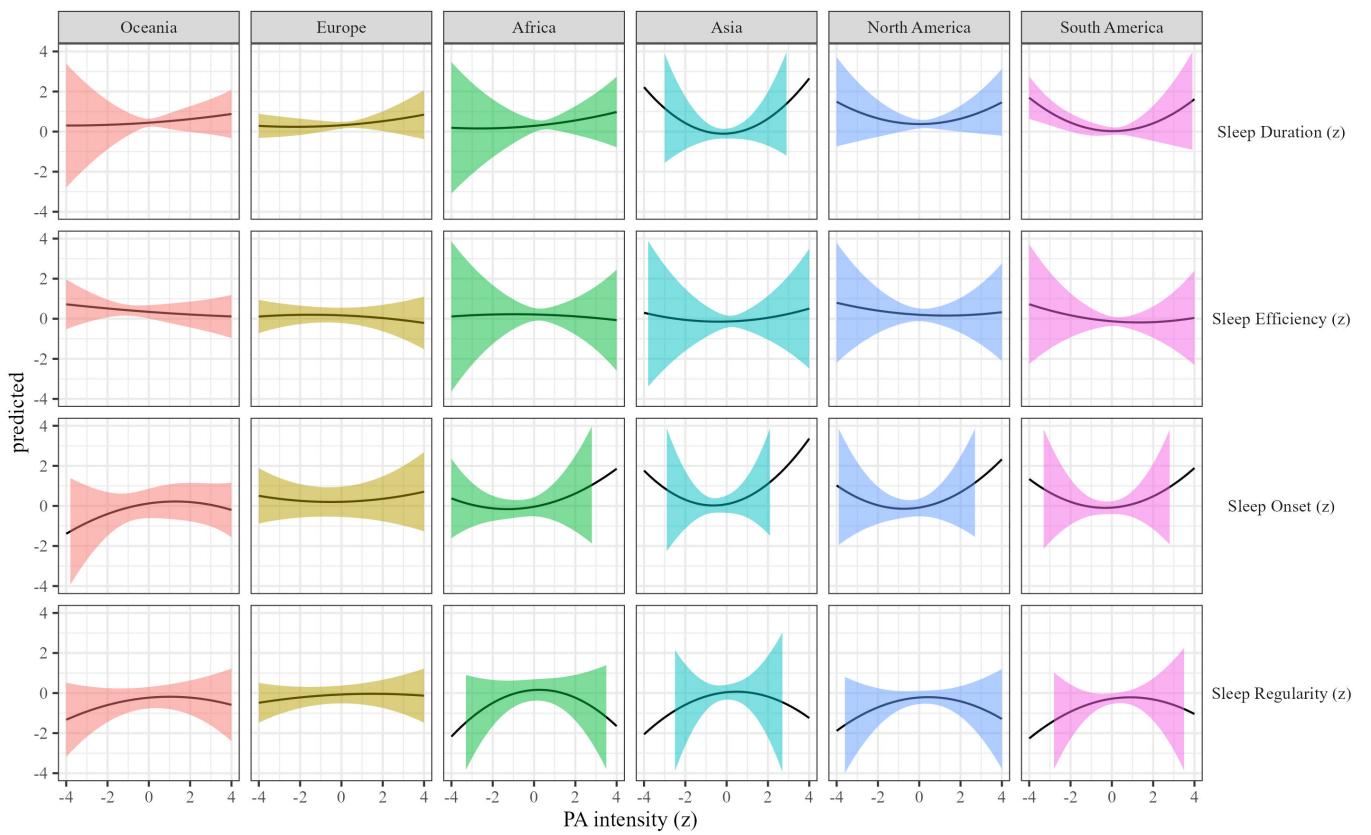


Figure 38. Sleep metrics on Physical activity intensity moderated by region

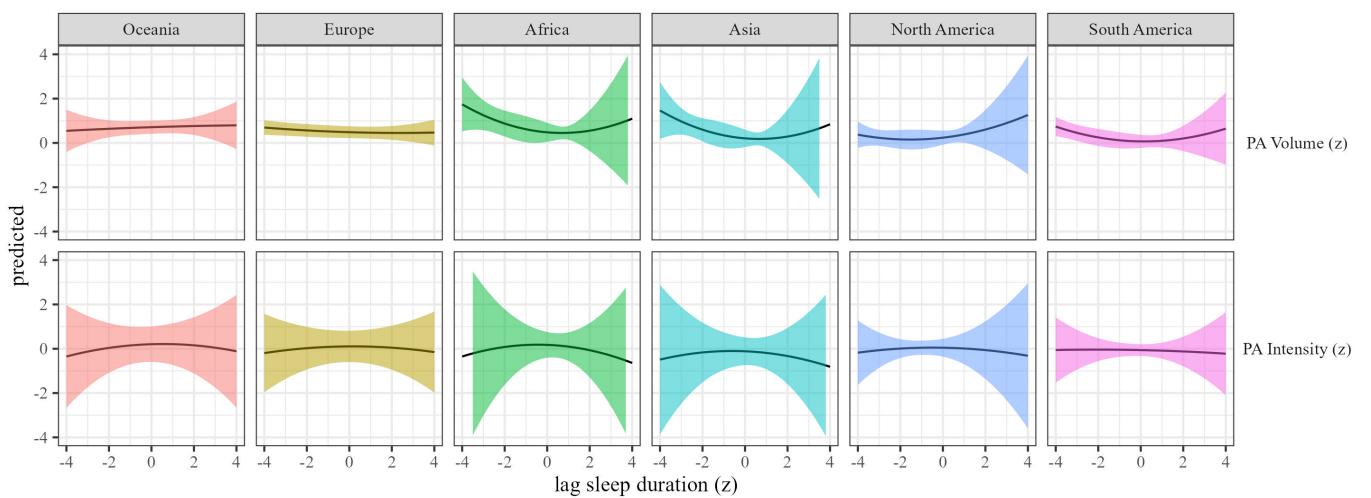


Figure 39. Physical activity by sleep duration moderated by region

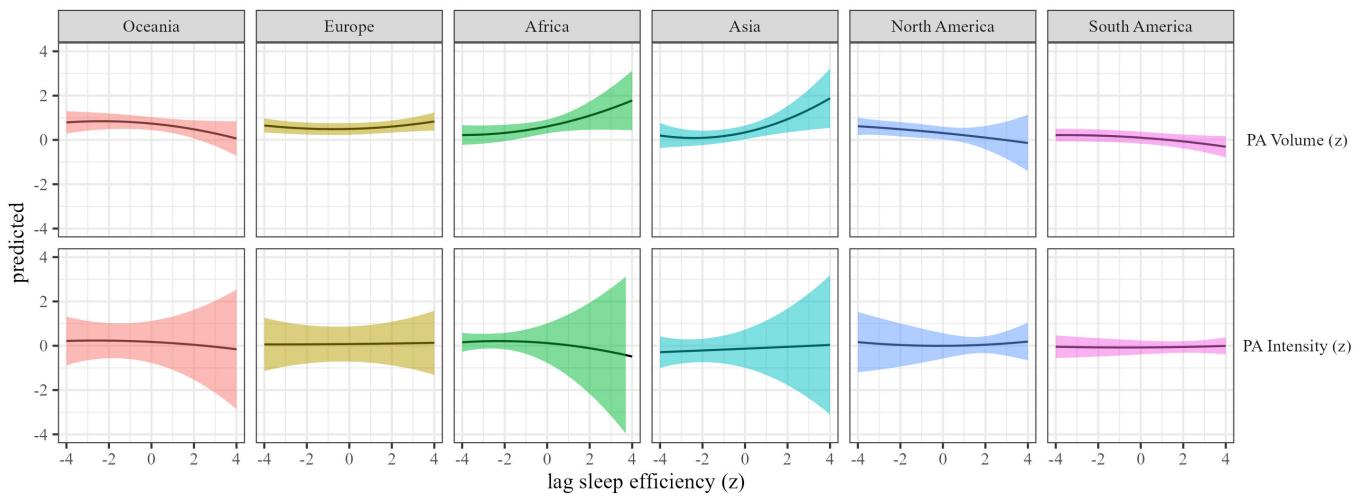


Figure 40. Physical activity by sleep efficiency moderated by region

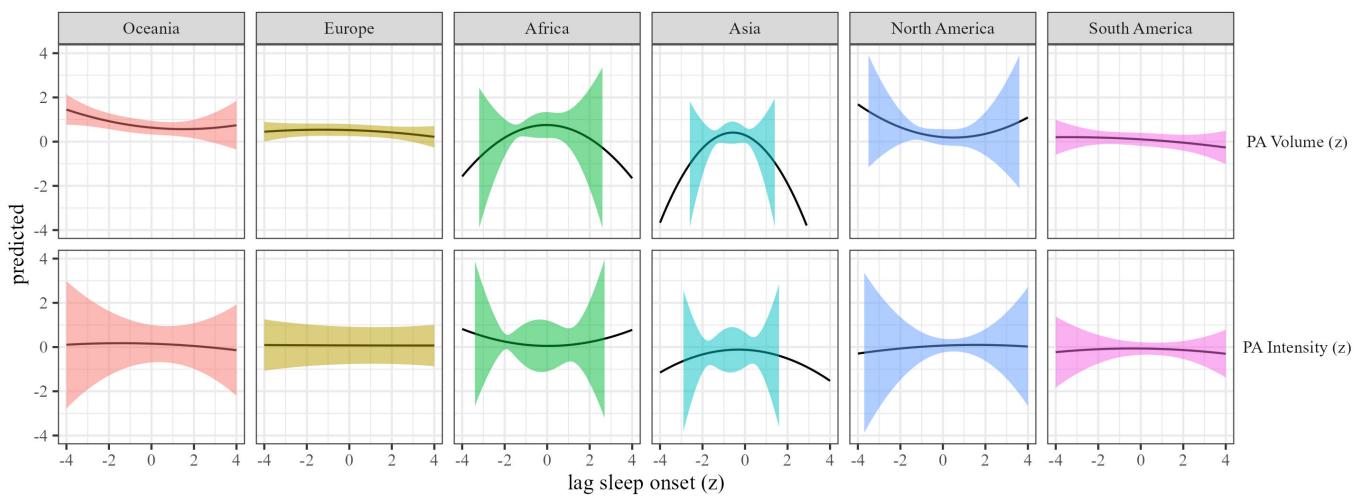


Figure 41. Physical activity by sleep onset moderated by region

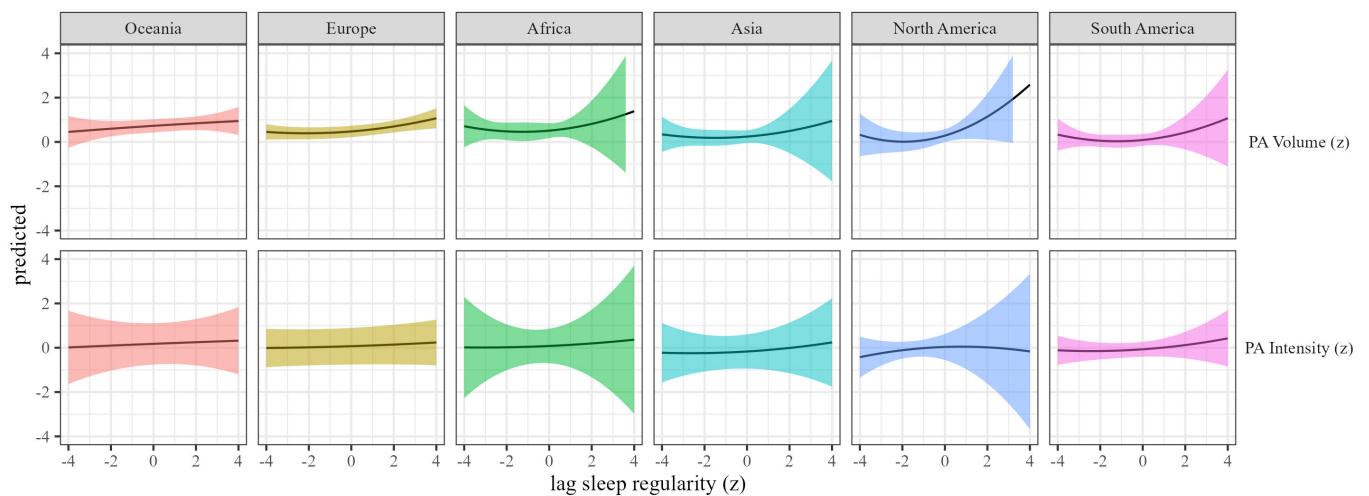


Figure 42. Physical activity by sleep regularity moderated by region

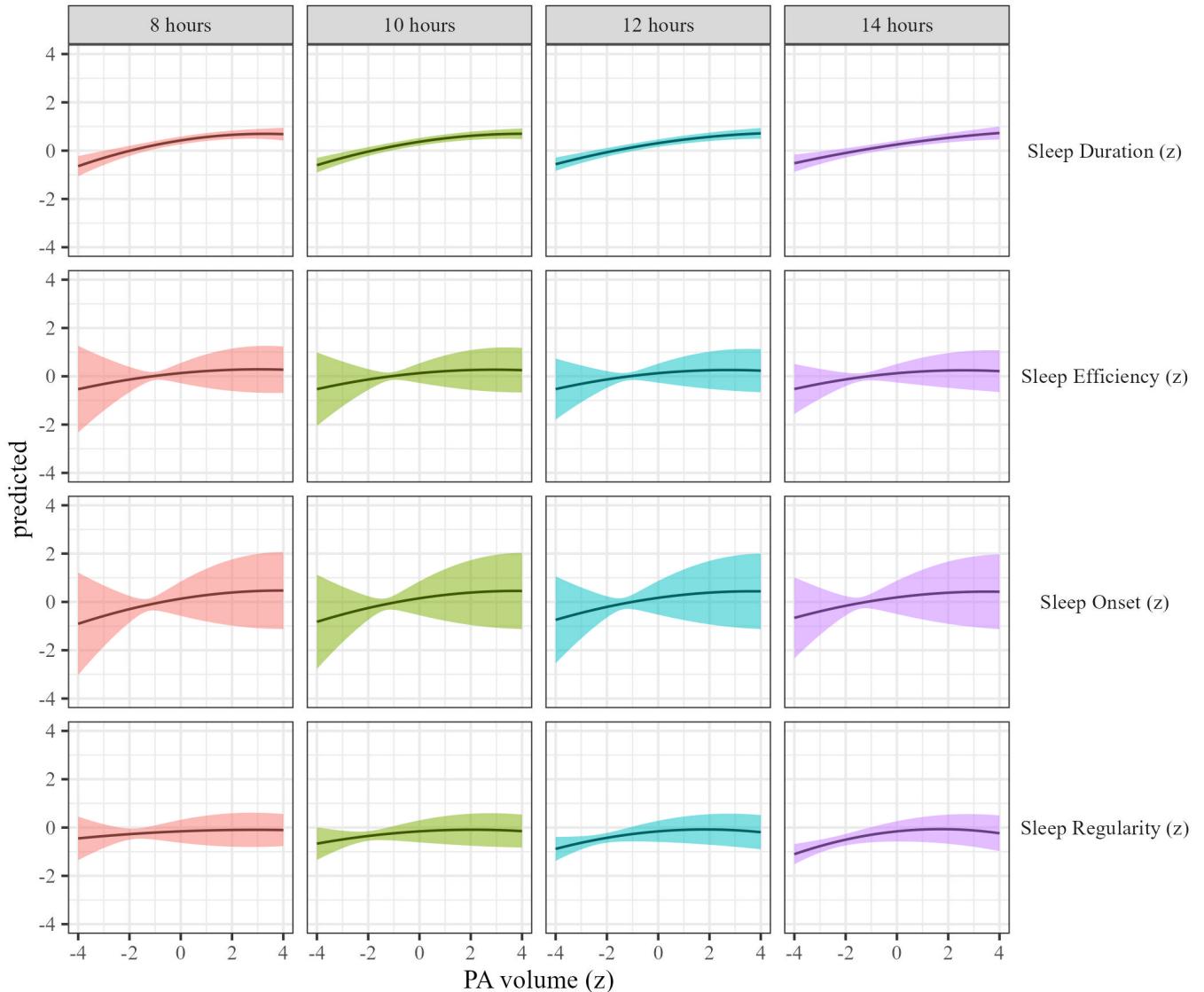


Figure 43. Sleep metrics on Physical activity volume by daylight hours

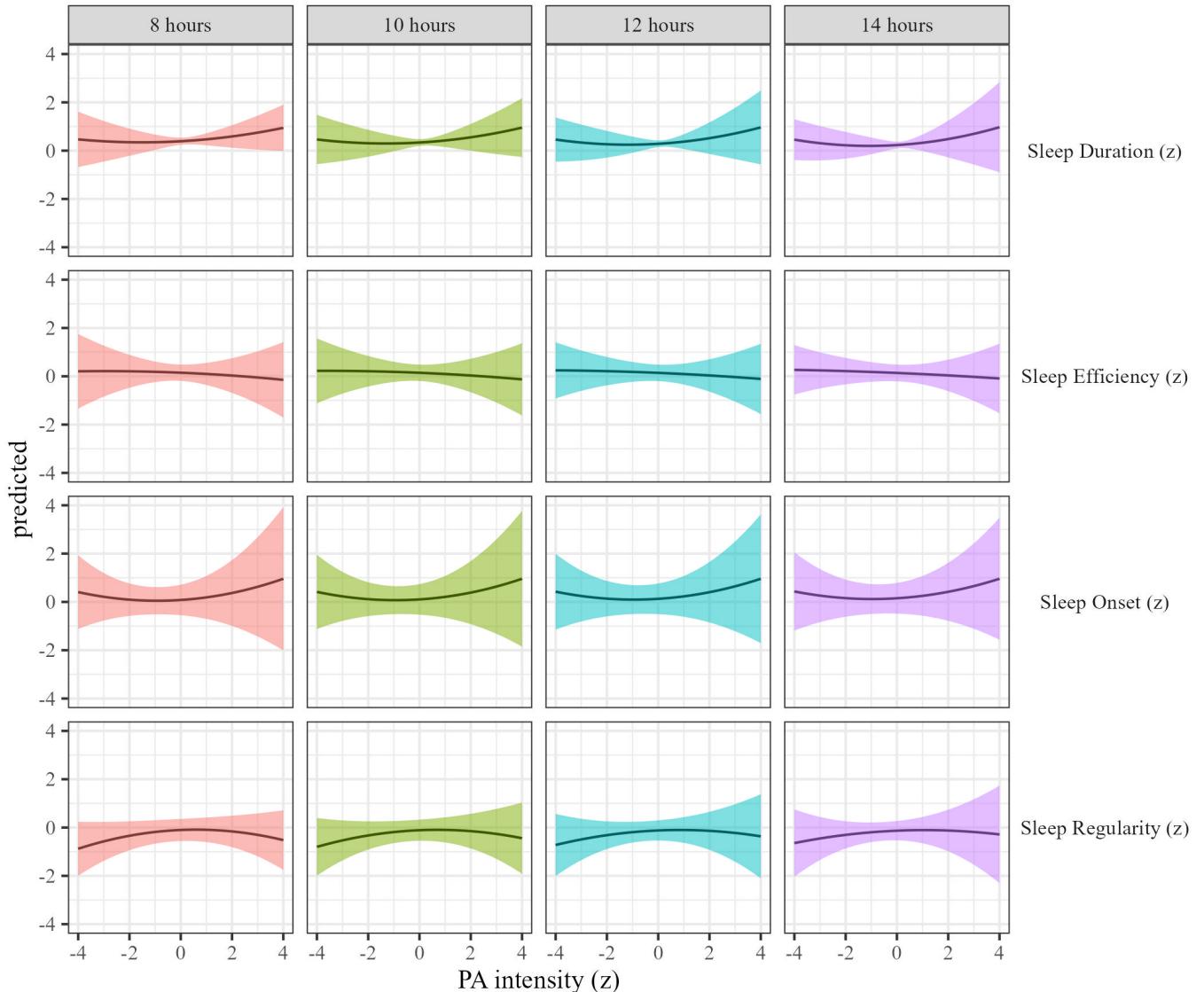


Figure 44. Sleep metrics on Physical activity intensity moderated by daylight hours

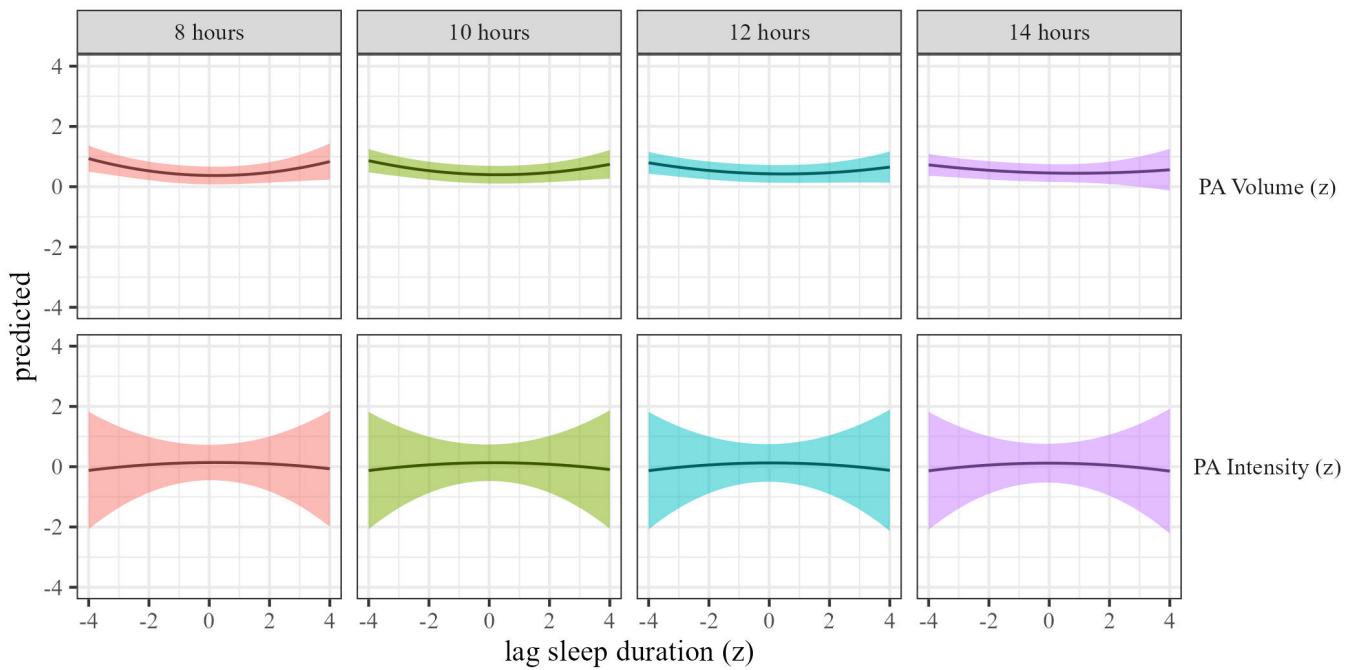


Figure 45. Physical activity by sleep duration moderated by daylight hours

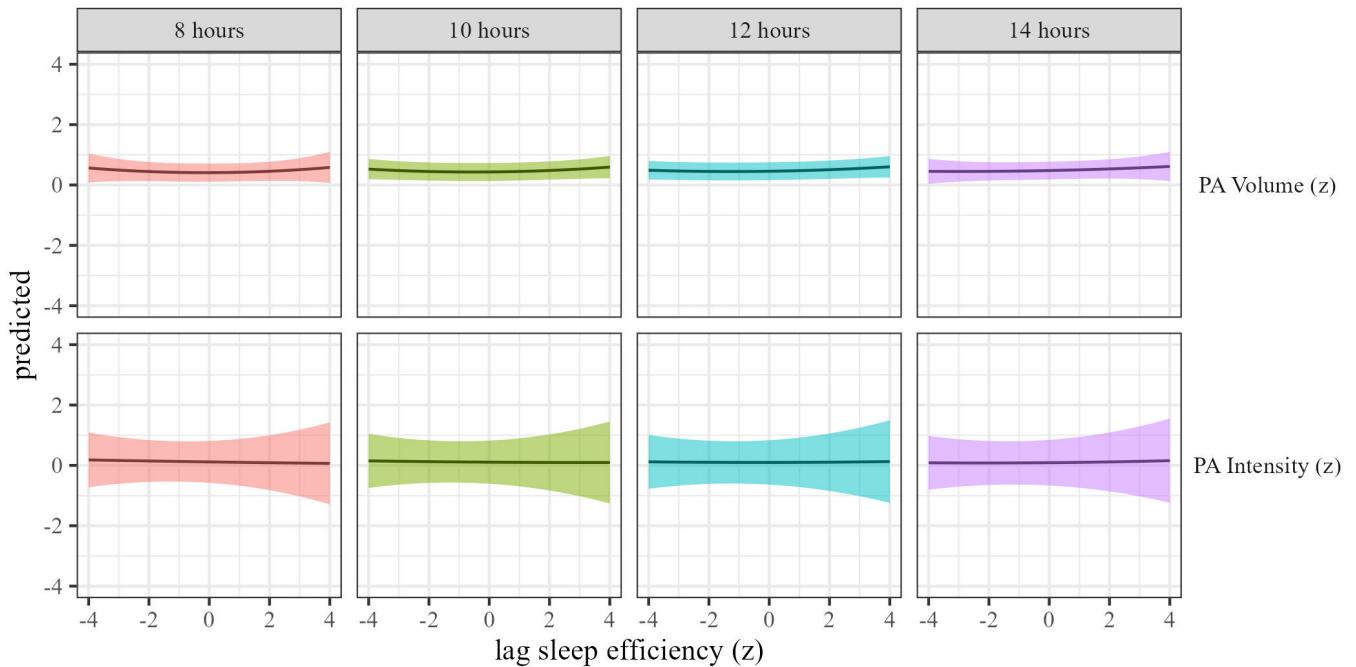


Figure 46. Physical activity by sleep efficiency moderated by daylight hours

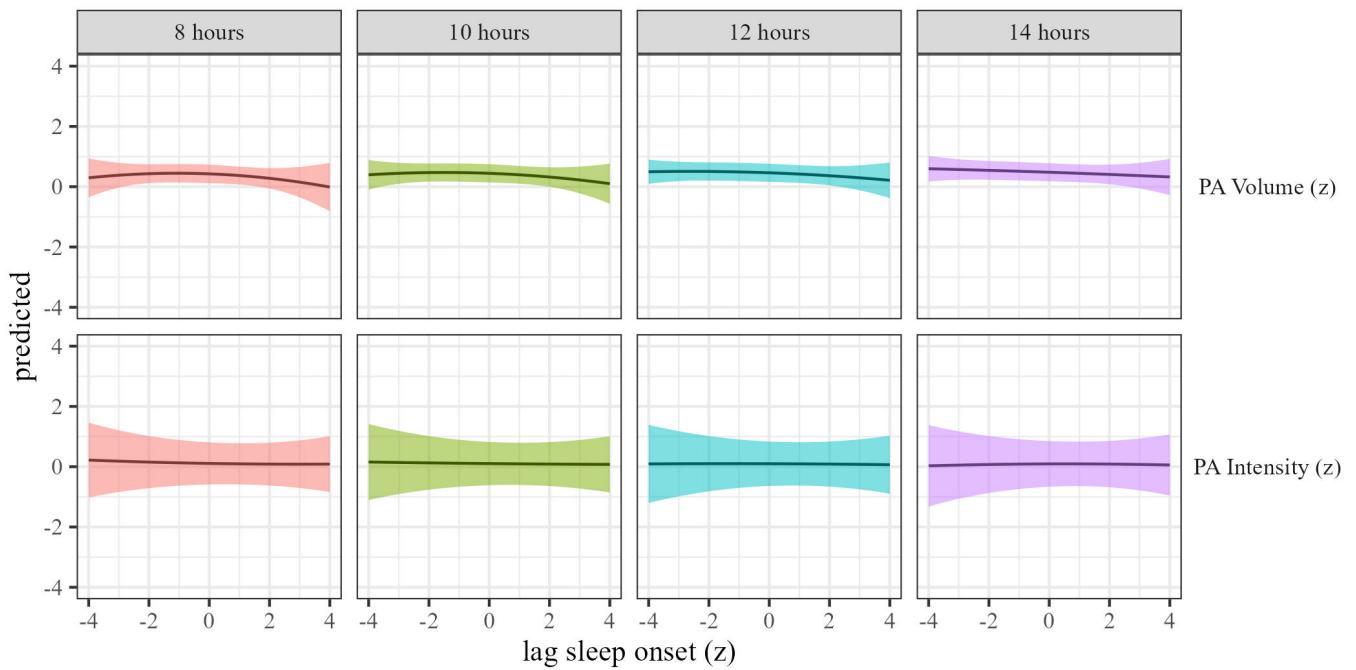


Figure 47. Physical activity by sleep onset moderated by daylight hours

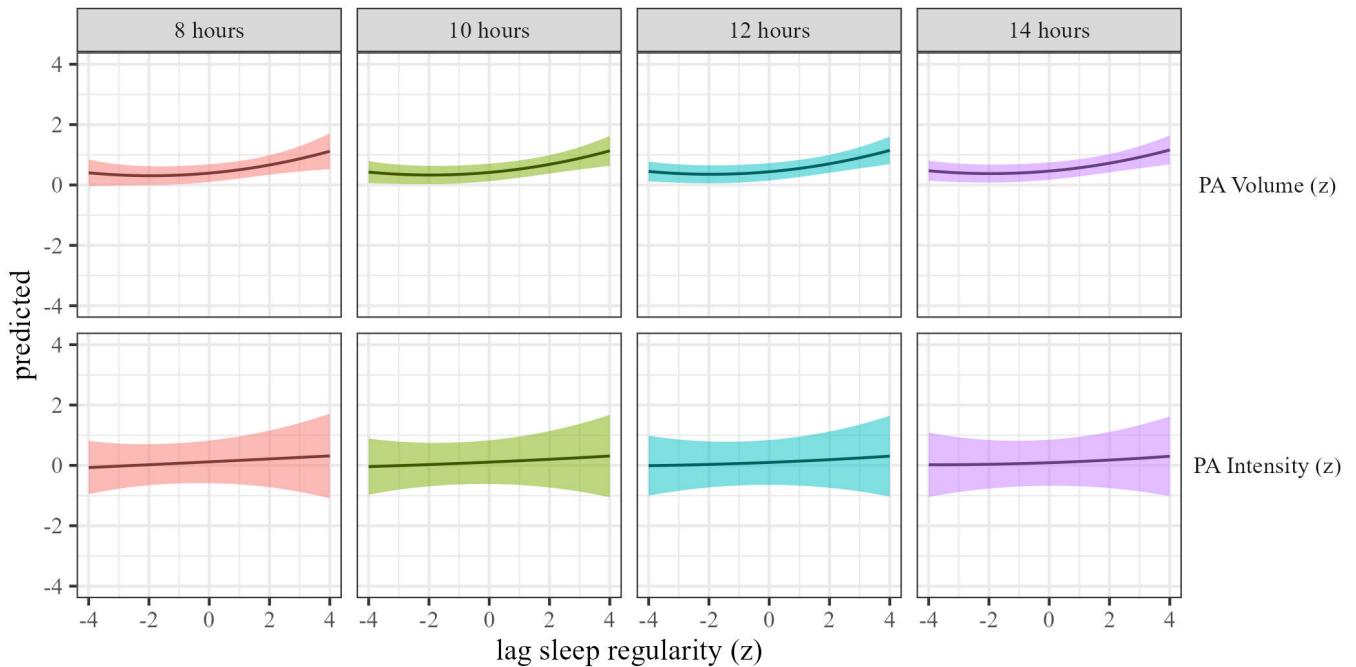


Figure 48. Physical activity by sleep regularity moderated by daylight hours

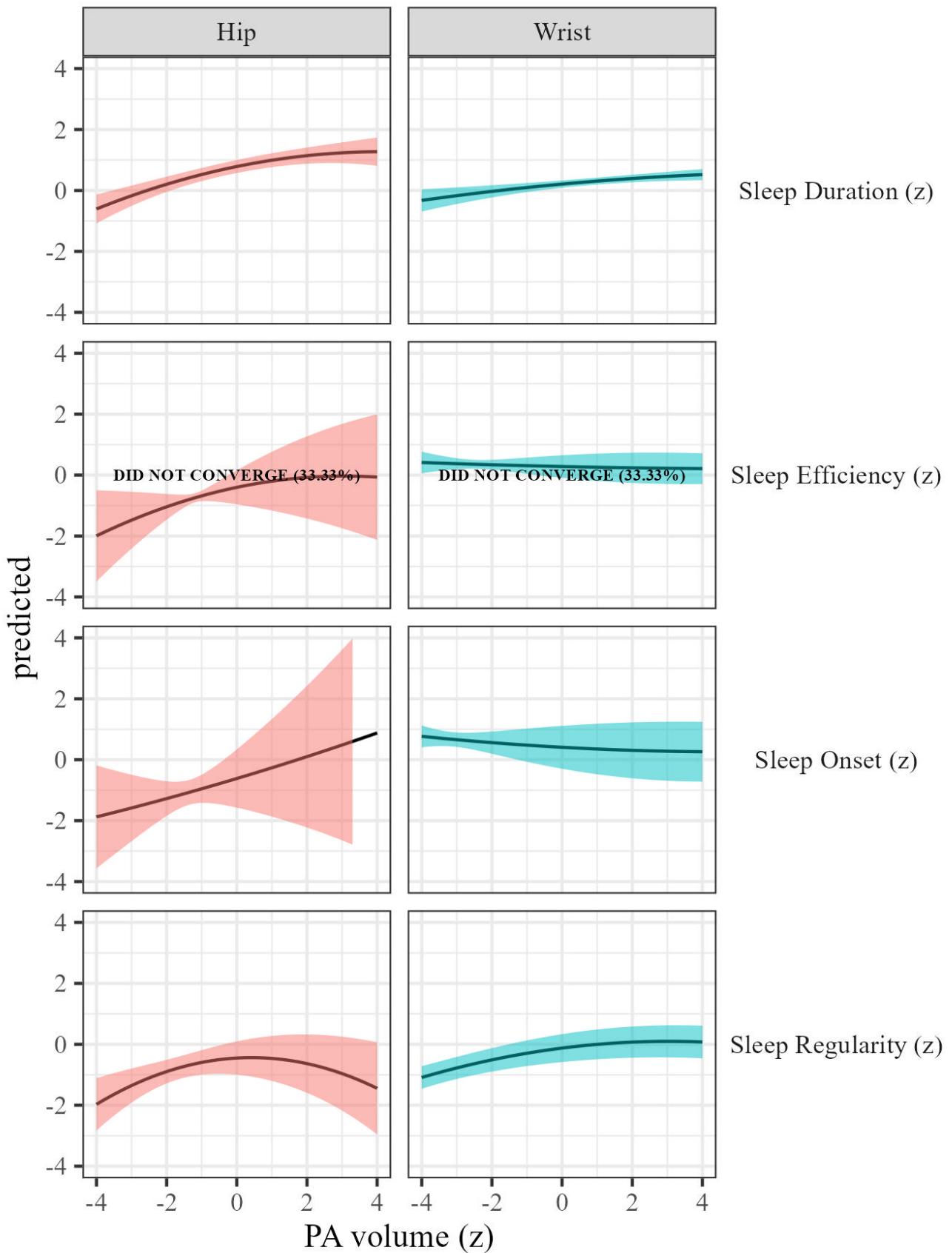


Figure 49. Sleep metrics on Physical activity volume by wear location

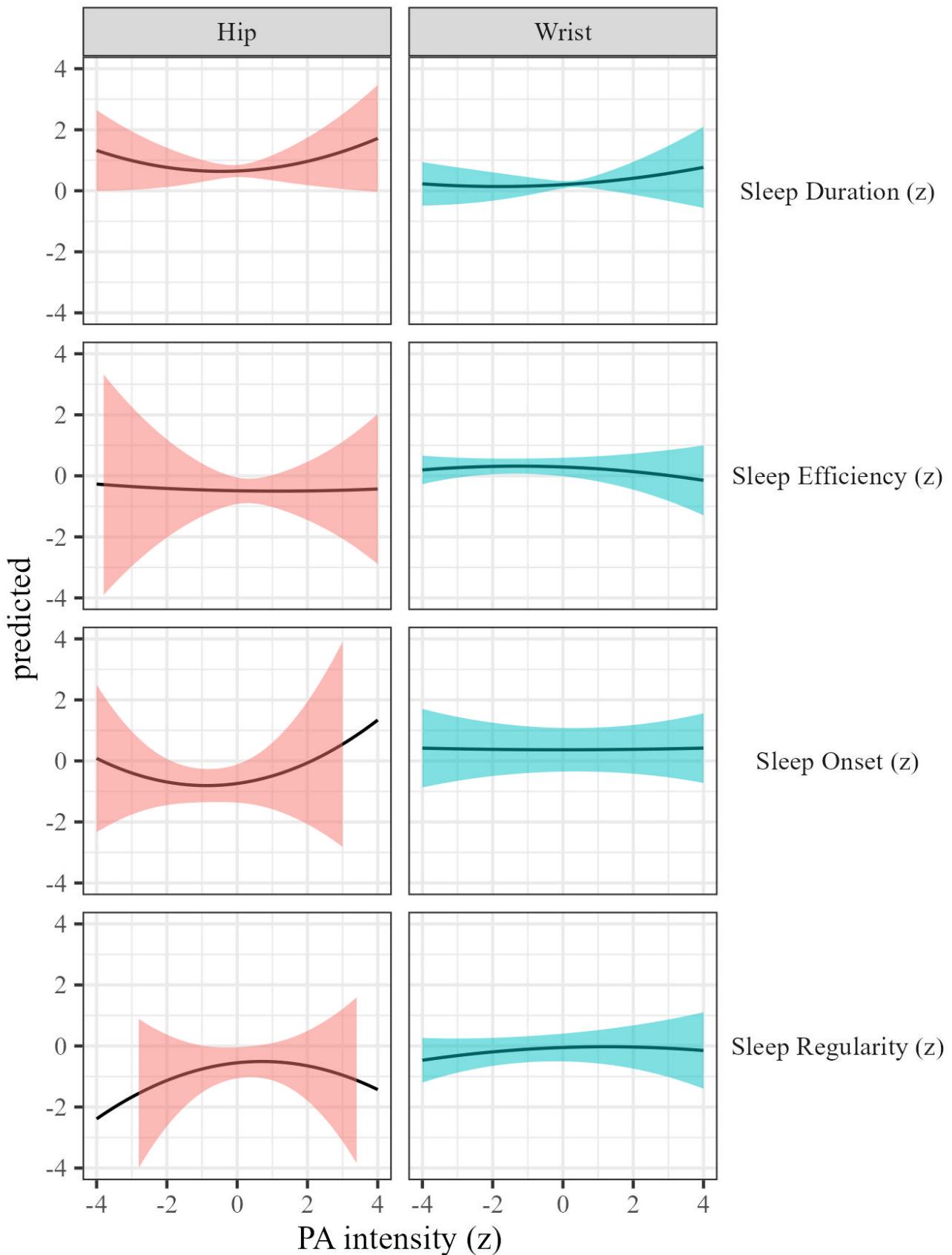


Figure 50. Sleep metrics on Physical activity intensity moderated by wear location

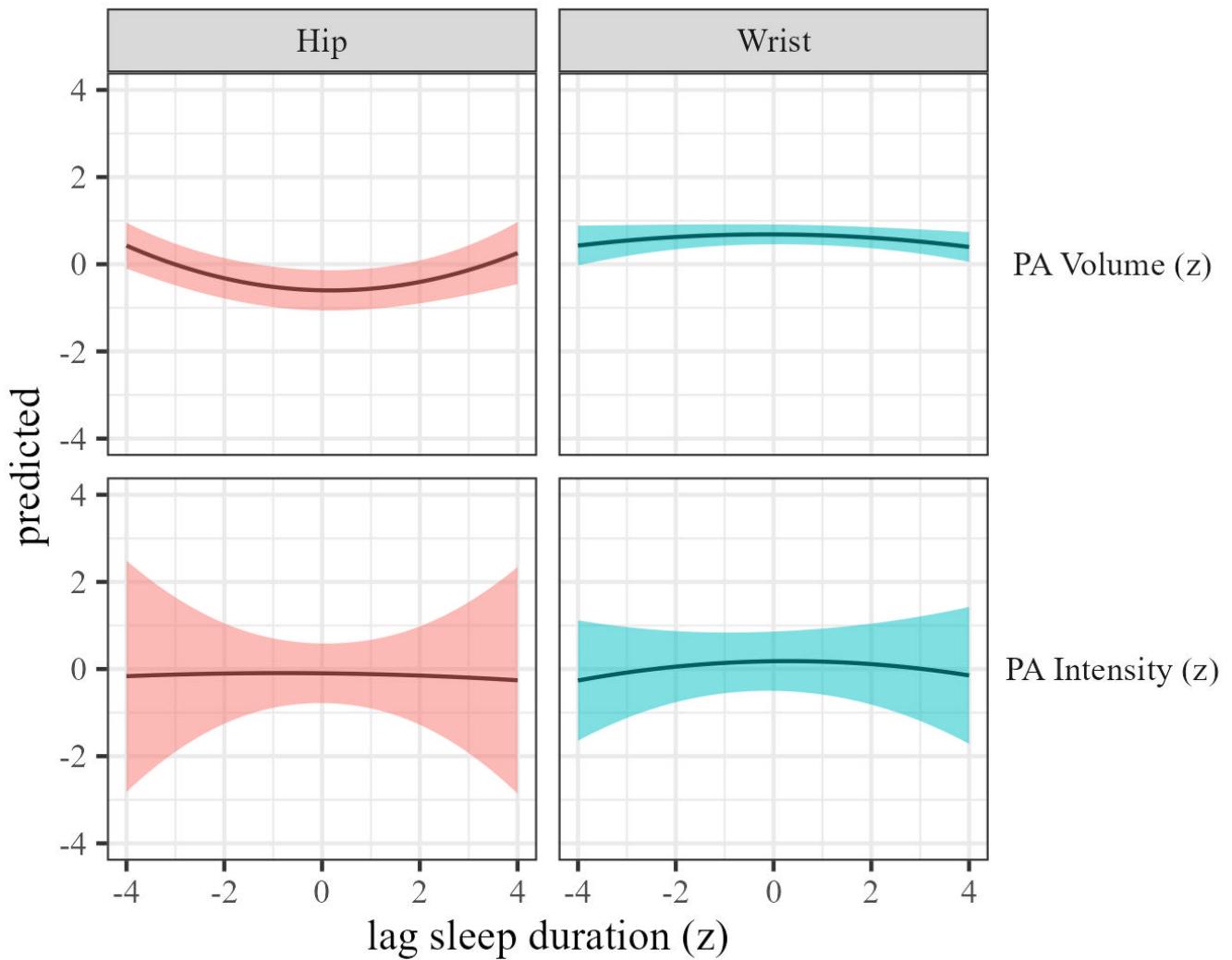


Figure 51. Physical activity by sleep duration moderated by wear location

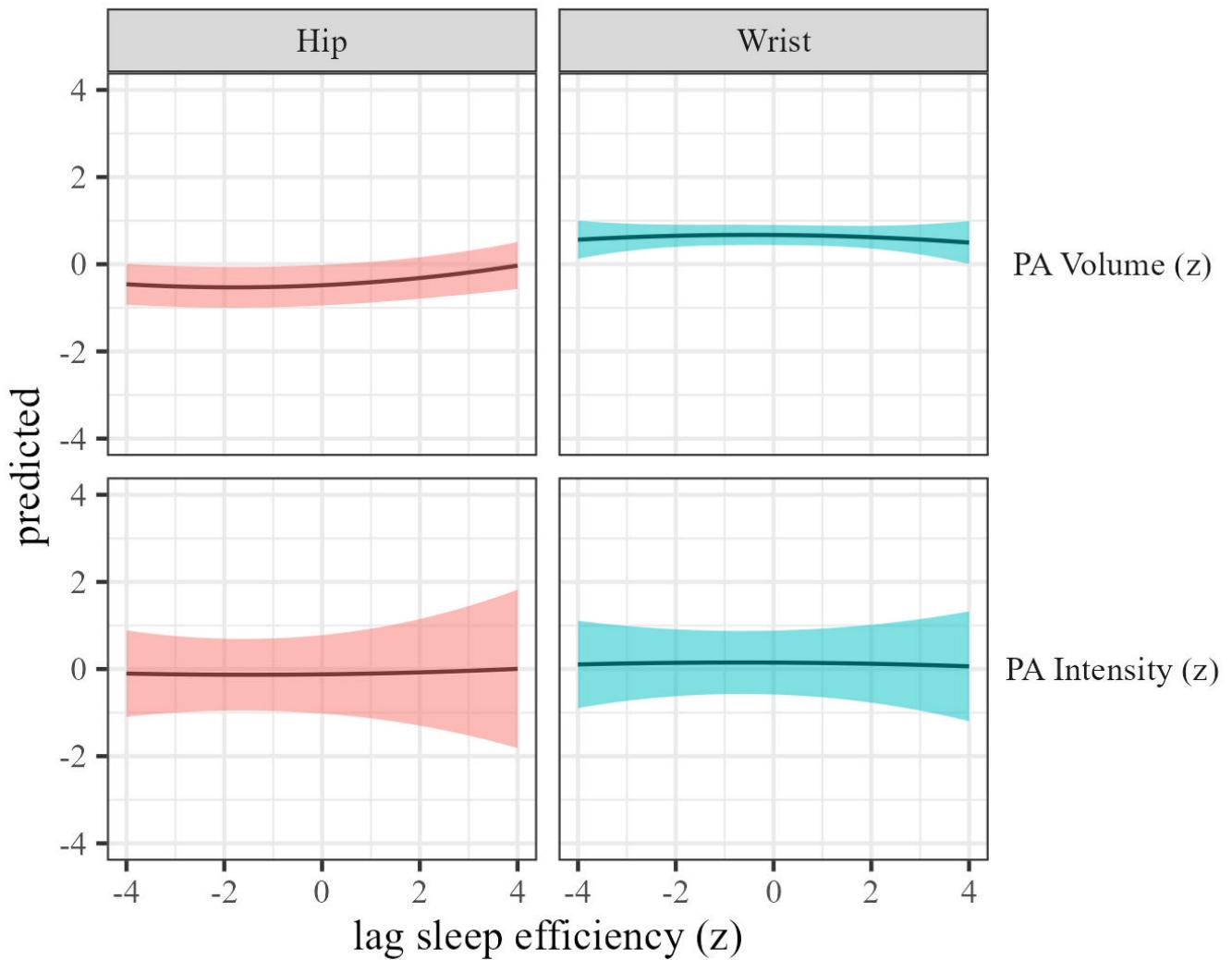


Figure 52. Physical activity by sleep efficiency moderated by wear location

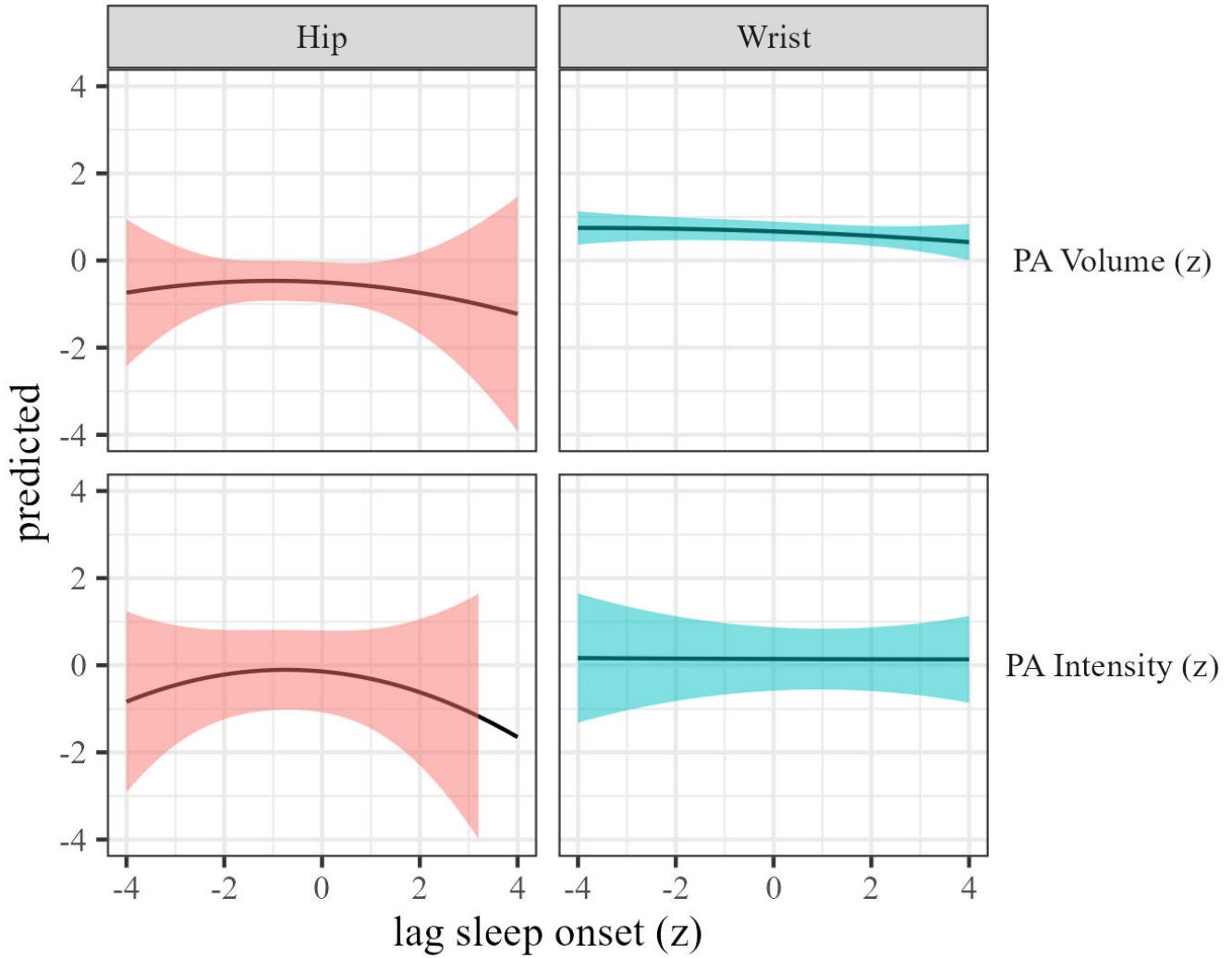


Figure 53. Physical activity by sleep onset moderated by wear location

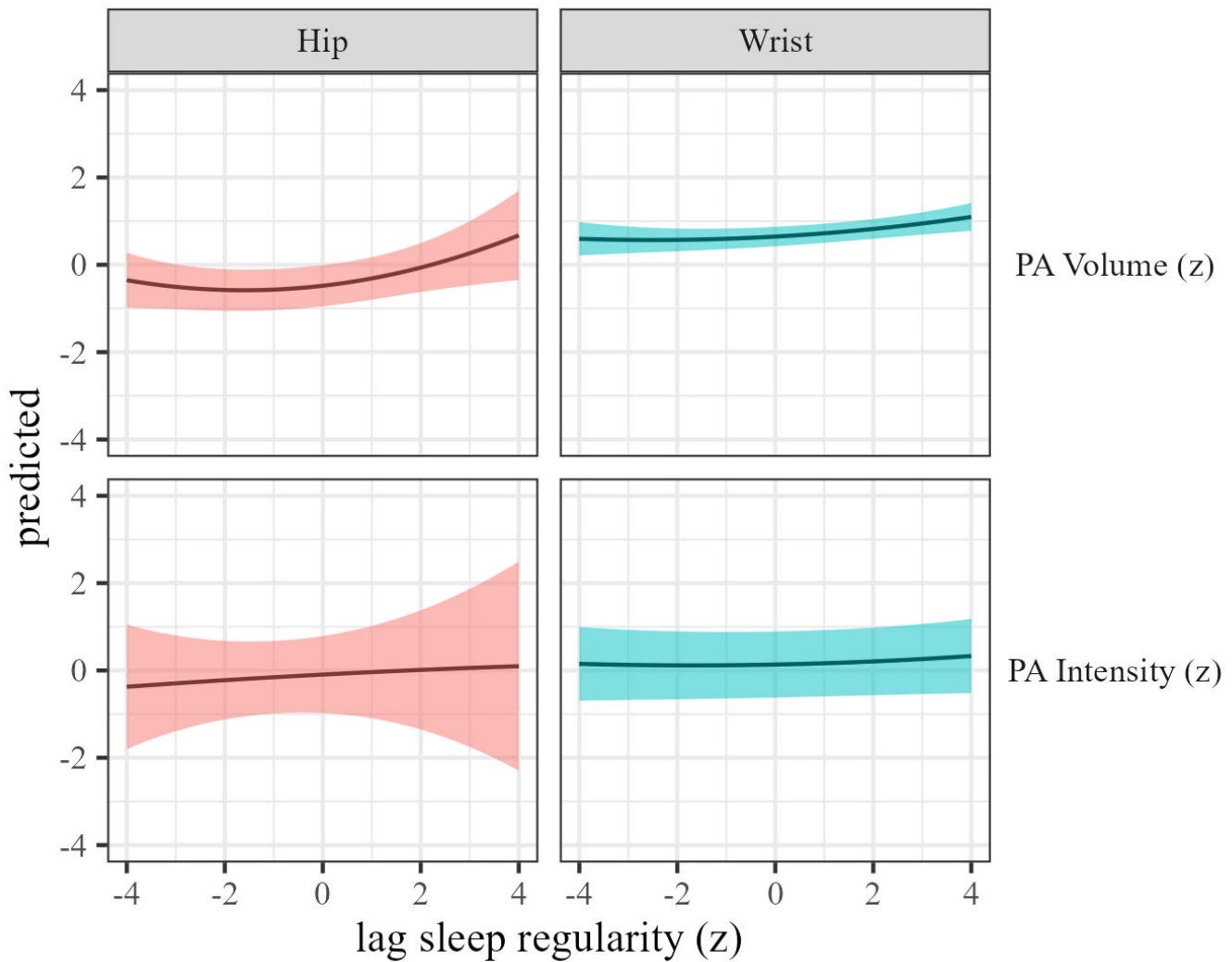


Figure 54. Physical activity by sleep regularity moderated by wear location