

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.

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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.

**most active hour**

**The effects of physical activity volume on sleep by most active hour.** 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 most active hour, and the results are presented in Table 19 and Figure 55.

**The effects of physical activity intensity on sleep by most active hour.** We estimated how physical activity intensity affects sleep across most active hour. We present the results in Table 19 and Figure 56.

**The effects of sleep duration on physical activity.** We estimated the effect of sleep duration on physical activity by most active hour. Results, controlling for sex, SES, and BMI are presented in Table 20 and Figure 57.

**The effects of sleep efficiency on physical activity.** We estimated the effect of sleep efficiency on physical activity by most active hour. Results, controlling for sex, SES, and BMI are presented in Table 20 and Figure 58.

**The effects of sleep onset on physical activity.** We estimated the effect of sleep onset on physical activity by most active hour. Results, controlling for sex, SES, and BMI are presented in Table 20 and Figure 59.

**The effects of sleep regularity on physical activity.** We estimated the effect of sleep regularity on physical activity by most active hour. Results are presented in Table 20 and Figure 60.

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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration</b>								
(Intercept)	0.89 [0.74, 1.04]	0.08	11.87	< .001	0.84 [0.69, 0.99]	0.08	11.10	< .001
Physical activity	0.03 [-0.03, 0.08]	0.03	0.88	.445	0.05 [0.01, 0.09]	0.02	2.35	.020
Age	0.00 [-0.01, 0.00]	0.00	-1.52	.131	0.00 [-0.01, 0.00]	0.00	-1.26	.210
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.19	.856	0.02 [-0.01, 0.04]	0.01	1.20	.236
Physical activity × age	0.00 [0.00, 0.00]	0.00	0.20	.849	0.00 [0.00, 0.00]	0.00	-1.29	.199
Age × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.13	.897	0.00 [0.00, 0.00]	0.00	-1.82	.072
<b>Sleep efficiency</b>								
(Intercept)	-0.35 [-0.55, -0.14]	0.10	-3.35	.008	-0.37 [-0.56, -0.19]	0.10	-3.91	.001
Physical activity	0.04 [-0.01, 0.09]	0.03	1.40	.248	0.02 [-0.04, 0.08]	0.03	0.72	.494
Age	0.00 [-0.01, 0.00]	0.00	-0.39	.701	0.00 [-0.01, 0.00]	0.00	-0.26	.794
Physical activity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.55	.617	0.00 [-0.03, 0.02]	0.01	-0.29	.775
Physical activity × age	0.00 [0.00, 0.00]	0.00	-1.45	.219	0.00 [0.00, 0.00]	0.00	-1.28	.225
Age × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.29	.784	0.00 [0.00, 0.00]	0.00	-0.51	.618
<b>Sleep onset</b>								
(Intercept)	-1.12 [-1.24, -1.00]	0.06	-18.50	< .001	-1.08 [-1.21, -0.96]	0.06	-17.01	< .001
Physical activity	0.01 [-0.01, 0.04]	0.01	1.17	.266	-0.04 [-0.07, 0.00]	0.02	-1.94	.075
Age	0.00 [0.00, 0.00]	0.00	0.05	.961	0.00 [0.00, 0.00]	0.00	-0.26	.797
Physical activity <sup>2</sup>	0.00 [-0.01, 0.00]	0.00	-1.05	.356	-0.03 [-0.05, -0.01]	0.01	-2.60	.027
Physical activity × age	0.00 [0.00, 0.00]	0.00	-4.80	< .001	0.00 [0.00, 0.00]	0.00	-0.21	.834
Age × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	1.11	.292	0.00 [0.00, 0.00]	0.00	2.62	.032
<b>Sleep regularity</b>								

Table 1 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
(Intercept)	0.19 [0.00, 0.38]	0.10	1.91	.061	0.13 [-0.05, 0.31]	0.09	1.44	.151
Physical activity	0.06 [-0.01, 0.14]	0.04	1.58	.229	0.19 [0.15, 0.24]	0.02	8.09	< .001
Age	0.00 [-0.01, 0.00]	0.00	-0.51	.614	0.00 [-0.01, 0.00]	0.00	-1.08	.293
Physical activity <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.90	.420	-0.05 [-0.08, -0.01]	0.02	-2.69	.024
Physical activity × age	0.00 [0.00, 0.00]	0.00	1.50	.167	0.00 [0.00, 0.00]	0.00	-5.80	< .001
Age × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-1.05	.381	0.00 [0.00, 0.00]	0.00	0.86	.389

*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			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration</b>								
(Intercept)	0.24 [0.07, 0.41]	0.09	2.76	.006	1.04 [0.90, 1.18]	0.07	14.23	< .001
Sleep duration	0.01 [-0.05, 0.06]	0.03	0.27	.809	0.00 [-0.03, 0.03]	0.02	0.04	.972
Age	-0.02 [-0.03, -0.02]	0.00	-8.70	< .001	-0.03 [-0.03, -0.02]	0.00	-6.88	.003
Sleep duration <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.43	.703	0.00 [-0.01, 0.00]	0.00	-0.81	.444
Sleep duration × age	0.00 [0.00, 0.00]	0.00	-0.59	.589	0.00 [0.00, 0.00]	0.00	0.61	.574
Age × Sleep duration <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.23	.830	0.00 [0.00, 0.00]	0.00	-0.55	.598
<b>Sleep efficiency</b>								
(Intercept)	0.23 [0.06, 0.41]	0.09	2.63	.009	1.04 [0.90, 1.17]	0.07	15.16	< .001
Sleep efficiency	-0.01 [-0.05, 0.02]	0.02	-0.68	.539	-0.01 [-0.03, 0.02]	0.01	-0.51	.626
Age	-0.02 [-0.03, -0.02]	0.00	-9.02	< .001	-0.03 [-0.03, -0.02]	0.00	-6.99	.003
Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.01]	0.00	0.65	.540	0.00 [-0.01, 0.01]	0.00	0.43	.699
Sleep efficiency × age	0.00 [0.00, 0.00]	0.00	0.94	.373	0.00 [0.00, 0.00]	0.00	0.61	.560
Age × Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.88	.399	0.00 [0.00, 0.00]	0.00	-0.50	.652
<b>Sleep onset</b>								
(Intercept)	0.22 [0.05, 0.40]	0.09	2.48	.013	1.02 [0.88, 1.17]	0.07	13.97	< .001
Sleep onset	-0.07 [-0.12, -0.02]	0.03	-2.82	.014	-0.04 [-0.08, 0.00]	0.02	-2.20	.042
Age	-0.02 [-0.03, -0.02]	0.00	-8.76	< .001	-0.03 [-0.03, -0.02]	0.00	-7.10	.002
Sleep onset <sup>2</sup>	-0.04 [-0.08, 0.00]	0.02	-1.77	.169	-0.01 [-0.03, 0.01]	0.01	-1.00	.347
Sleep onset × age	0.00 [0.00, 0.00]	0.00	2.48	.019	0.00 [0.00, 0.00]	0.00	2.25	.030
Age × Sleep onset <sup>2</sup>	0.00 [0.00, 0.00]	0.00	1.11	.323	0.00 [0.00, 0.00]	0.00	0.81	.429
Sleep regularity								

Table 2 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
(Intercept)	0.24 [0.07, 0.41]	0.09	2.77	.006	1.05 [0.91, 1.19]	0.07	14.52	< .001
Sleep regularity	0.11 [0.04, 0.18]	0.04	3.05	.068	0.06 [0.04, 0.08]	0.01	6.20	< .001
Age	-0.02 [-0.03, -0.02]	0.00	-8.78	< .001	-0.03 [-0.03, -0.02]	0.00	-6.95	.003
Sleep regularity <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-1.05	.320	-0.01 [-0.02, 0.00]	0.01	-1.22	.252
Sleep regularity × age	0.00 [0.00, 0.00]	0.00	-1.99	.122	0.00 [0.00, 0.00]	0.00	-3.67	.001
Age × Sleep regularity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.83	.432	0.00 [0.00, 0.00]	0.00	0.30	.776

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

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

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.45 [0.24, 0.66]	0.11	4.15	< .001	0.41 [0.20, 0.62]	0.11	3.80	< .001
Physical activity	0.03 [-0.07, 0.12]	0.05	0.54	.623	0.03 [-0.03, 0.09]	0.03	0.97	.333
Physical activity <sup>2</sup>	0.00 [-0.03, 0.03]	0.01	0.03	.974	0.02 [-0.02, 0.06]	0.02	1.15	.251
Age	-0.01 [-0.01, 0.00]	0.00	-3.20	.001	-0.01 [-0.01, 0.00]	0.00	-2.97	.003
Physical activity × bmi	0.00 [0.00, 0.00]	0.00	0.04	.970	0.00 [0.00, 0.00]	0.00	0.26	.797
Sleep efficiency								
(Intercept)	0.23 [-0.01, 0.48]	0.12	1.88	.062	0.26 [0.01, 0.50]	0.12	2.06	.039
Physical activity	0.02 [-0.07, 0.11]	0.05	0.47	.663	-0.03 [-0.09, 0.03]	0.03	-0.90	.371
Physical activity <sup>2</sup>	0.00 [-0.03, 0.02]	0.01	-0.39	.713	-0.01 [-0.05, 0.03]	0.02	-0.30	.765
Age	0.00 [0.00, 0.01]	0.00	0.96	.335	0.00 [0.00, 0.01]	0.00	0.85	.394
Physical activity × bmi	0.00 [0.00, 0.00]	0.00	-0.17	.870	0.00 [0.00, 0.00]	0.00	0.83	.416
Sleep onset								
(Intercept)	-0.13 [-0.45, 0.18]	0.16	-0.83	.408	-0.08 [-0.41, 0.25]	0.17	-0.46	.648
Physical activity	0.04 [-0.01, 0.09]	0.02	1.59	.151	-0.03 [-0.09, 0.02]	0.03	-1.22	.245
Physical activity <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-1.00	.384	-0.03 [-0.06, 0.00]	0.01	-2.25	.029
Age	0.00 [0.00, 0.01]	0.00	0.96	.336	0.00 [0.00, 0.00]	0.00	0.62	.536
Physical activity × bmi	0.00 [-0.01, 0.00]	0.00	-2.18	.086	0.00 [0.00, 0.00]	0.00	-0.59	.572
Sleep regularity								
(Intercept)	0.58 [0.31, 0.85]	0.14	4.18	< .001	0.62 [0.38, 0.87]	0.13	4.97	< .001
Physical activity	0.07 [-0.01, 0.15]	0.04	1.72	.137	0.18 [0.11, 0.24]	0.03	5.41	< .001
Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	0.85	.421	-0.04 [-0.08, 0.00]	0.02	-1.84	.067

Term	Physical Activity Volume			Physical Activity Intensity						
	$\beta$	[95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p	
Age	0.00	[0.00, 0.00]	0.00	0.03	.980	0.00	[0.00, 0.00]	0.00	0.19	.848
Physical activity $\times$ bmi	0.00	[0.00, 0.00]	0.00	0.50	.617	0.00	[-0.01, 0.00]	0.00	-3.16	.002

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					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Sleep duration										
(Intercept)	1.51	[1.15, 1.87]	0.18	8.27	< .001	1.40	[1.16, 1.64]	0.12	11.44	< .001
Sleep duration	0.00	[0.10, 0.10]	0.05	0.00	.998	0.00	[-0.04, 0.05]	0.02	0.21	.841
Sleep duration <sup>2</sup>	0.00	[-0.04, 0.03]	0.02	-0.05	.961	0.00	[-0.01, 0.02]	0.01	0.32	.754
Age	-0.02	[-0.03, -0.02]	0.00	-9.33	< .001	-0.03	[-0.03, -0.02]	0.00	-8.58	< .001
Sleep duration × bmi	0.00	[0.00, 0.00]	0.00	-0.04	.973	0.00	[0.00, 0.00]	0.00	0.20	.846
Sleep efficiency										
(Intercept)	1.52	[1.16, 1.88]	0.18	8.24	< .001	1.41	[1.17, 1.65]	0.12	11.45	< .001
Sleep efficiency	-0.02	[-0.09, 0.04]	0.03	-0.73	.498	0.00	[-0.03, 0.03]	0.02	-0.09	.927
Sleep efficiency <sup>2</sup>	0.00	[-0.02, 0.02]	0.01	0.20	.849	0.00	[-0.01, 0.01]	0.01	0.52	.613
Age	-0.02	[-0.03, -0.02]	0.00	-9.31	< .001	-0.03	[-0.03, -0.02]	0.00	-8.63	< .001
Sleep efficiency × bmi	0.00	[0.00, 0.00]	0.00	0.77	.460	0.00	[0.00, 0.00]	0.00	0.00	.998
Sleep onset										
(Intercept)	1.53	[1.17, 1.89]	0.18	8.32	< .001	1.42	[1.18, 1.67]	0.12	11.42	< .001
Sleep onset	-0.01	[-0.12, 0.10]	0.06	-0.14	.894	-0.06	[-0.13, 0.01]	0.03	-1.71	.131
Sleep onset <sup>2</sup>	-0.02	[-0.06, 0.02]	0.02	-1.07	.312	-0.01	[-0.04, 0.01]	0.01	-1.12	.268
Age	-0.02	[-0.03, -0.02]	0.00	-9.39	< .001	-0.03	[-0.03, -0.02]	0.00	-8.66	< .001
Sleep onset × bmi	0.00	[0.00, 0.00]	0.00	-0.15	.887	0.00	[0.00, 0.00]	0.00	2.00	.057
Sleep regularity										
(Intercept)	1.47	[1.12, 1.82]	0.18	8.16	< .001	1.39	[1.15, 1.63]	0.12	11.33	< .001
Sleep regularity	0.17	[0.06, 0.28]	0.06	3.04	.066	0.09	[0.06, 0.12]	0.02	5.94	< .001
Sleep regularity <sup>2</sup>	-0.02	[-0.04, 0.01]	0.01	-1.31	.225	-0.01	[-0.03, 0.01]	0.01	-0.72	.504

Term	Physical Activity Volume				Physical Activity Intensity					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Age	-0.02	[-0.03, -0.02]	0.00	-9.33	< .001	-0.03	[-0.03, -0.02]	0.00	-8.74	< .001
Sleep regularity × bmi	0.00	[0.01, 0.00]	0.00	-2.49	.081	0.00	[0.00, 0.00]	0.00	-3.67	.001

*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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration</b>								
(Intercept)	0.44 [0.23, 0.65]	0.11	4.10	< .001	0.42 [0.21, 0.63]	0.11	3.97	< .001
Physical activity	0.06 [0.01, 0.10]	0.02	2.57	.019	0.03 [0.00, 0.06]	0.02	1.95	.051
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.62	.540	0.01 [-0.01, 0.03]	0.01	1.08	.280
Age	-0.01 [-0.01, 0.00]	0.00	-3.05	.002	-0.01 [-0.01, 0.00]	0.00	-3.02	.003
Physical activity × sesmedium	-0.05 [-0.09, 0.00]	0.02	-2.01	.045	0.02 [-0.02, 0.06]	0.02	0.95	.342
Physical activity × sesshigh	-0.02 [-0.07, 0.03]	0.03	-0.69	.497	0.00 [-0.04, 0.05]	0.02	0.18	.856
<b>Sleep efficiency</b>								
(Intercept)	0.22 [-0.02, 0.46]	0.12	1.82	.070	0.25 [0.00, 0.50]	0.13	1.99	.048
Physical activity	0.02 [-0.02, 0.06]	0.02	1.16	.248	-0.01 [-0.05, 0.03]	0.02	-0.53	.596
Physical activity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.66	.515	0.00 [-0.02, 0.02]	0.01	0.01	.995
Age	0.00 [0.00, 0.01]	0.00	1.06	.289	0.00 [0.00, 0.01]	0.00	0.80	.423
Physical activity × sesmedium	-0.01 [-0.06, 0.03]	0.02	-0.49	.626	0.01 [-0.03, 0.06]	0.02	0.51	.608
Physical activity × sesshigh	0.01 [-0.05, 0.07]	0.03	0.31	.760	0.01 [-0.04, 0.06]	0.02	0.51	.610
<b>Sleep onset</b>								
(Intercept)	-0.15 [-0.48, 0.17]	0.16	-0.93	.355	-0.10 [-0.42, 0.23]	0.17	-0.60	.552
Physical activity	-0.05 [-0.09, -0.01]	0.02	-2.62	.037	-0.06 [-0.08, -0.04]	0.01	-4.98	< .001
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.79	.453	-0.01 [-0.02, 0.00]	0.01	-1.37	.172
Age	0.00 [0.00, 0.01]	0.00	1.05	.294	0.00 [0.00, 0.00]	0.00	0.64	.520
Physical activity × sesmedium	0.03 [0.00, 0.07]	0.02	2.05	.042	-0.01 [-0.04, 0.03]	0.02	-0.37	.715
Physical activity × sesshigh	0.04 [0.00, 0.08]	0.02	1.78	.094	0.02 [-0.01, 0.06]	0.02	1.40	.166
Sleep regularity								

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
(Intercept)	0.58 [0.34, 0.82]	0.12	4.78	< .001	0.62 [0.37, 0.87]	0.13	4.88	< .001
Physical activity	0.11 [0.06, 0.16]	0.03	4.34	.002	0.07 [0.03, 0.11]	0.02	3.33	.003
Physical activity <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-0.97	.393	-0.02 [-0.06, 0.02]	0.02	-0.92	.418
Age	0.00 [0.00, 0.00]	0.00	0.17	.864	0.00 [0.00, 0.00]	0.00	0.20	.841
Physical activity × sesmedium	-0.03 [-0.14, 0.08]	0.05	-0.53	.635	0.01 [-0.04, 0.05]	0.02	0.25	.804
Physical activity × seshigh	-0.01 [-0.10, 0.07]	0.04	-0.35	.745	0.02 [-0.04, 0.07]	0.03	0.59	.561

*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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.52 [1.16, 1.89]	0.18	8.26	< .001	1.41 [1.17, 1.65]	0.12	11.66	< .001
Sleep duration	0.00 [-0.04, 0.03]	0.02	-0.19	.854	0.01 [-0.01, 0.03]	0.01	0.86	.401
Sleep duration <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-1.31	.264	0.00 [-0.01, 0.00]	0.00	-0.97	.354
Age	-0.02 [-0.03, -0.02]	0.00	-9.40	< .001	-0.03 [-0.03, -0.02]	0.00	-8.64	< .001
Sleep duration × sesmedium	-0.01 [-0.06, 0.04]	0.03	-0.32	.759	0.00 [-0.04, 0.04]	0.02	-0.01	.990
Sleep duration × seshigh	0.01 [-0.07, 0.09]	0.04	0.27	.807	-0.01 [-0.05, 0.03]	0.02	-0.32	.761
Sleep efficiency								
(Intercept)	1.52 [1.16, 1.88]	0.18	8.22	< .001	1.41 [1.17, 1.65]	0.12	11.60	< .001
Sleep efficiency	-0.02 [-0.08, 0.04]	0.03	-0.67	.544	-0.01 [-0.04, 0.01]	0.01	-0.85	.405
Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	-0.01	.994	0.00 [-0.01, 0.01]	0.00	-0.04	.973
Age	-0.02 [-0.03, -0.02]	0.00	-9.40	< .001	-0.03 [-0.03, -0.02]	0.00	-8.63	< .001
Sleep efficiency × sesmedium	0.02 [-0.04, 0.09]	0.03	0.72	.513	0.02 [-0.01, 0.06]	0.02	1.37	.195
Sleep efficiency × seshigh	0.02 [-0.04, 0.08]	0.03	0.68	.531	0.00 [-0.02, 0.03]	0.01	0.28	.778
Sleep onset								
(Intercept)	1.54 [1.18, 1.90]	0.18	8.34	< .001	1.42 [1.18, 1.66]	0.12	11.81	< .001
Sleep onset	-0.01 [-0.04, 0.02]	0.02	-0.59	.554	0.01 [-0.03, 0.05]	0.02	0.36	.730
Sleep onset <sup>2</sup>	-0.02 [-0.04, 0.00]	0.01	-2.18	.058	0.00 [-0.02, 0.02]	0.01	-0.02	.983
Age	-0.02 [-0.03, -0.02]	0.00	-9.40	< .001	-0.03 [-0.03, -0.02]	0.00	-8.77	< .001
Sleep onset × sesmedium	0.01 [-0.03, 0.05]	0.02	0.35	.725	-0.02 [-0.05, 0.02]	0.02	-0.92	.357
Sleep onset × seshigh	-0.02 [-0.07, 0.03]	0.02	-0.94	.355	-0.02 [-0.08, 0.03]	0.03	-0.86	.425
Sleep regularity								

Table 6 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
(Intercept)	1.46 [1.10, 1.82]	0.18	8.02	< .001	1.39 [1.16, 1.62]	0.12	11.86	< .001
Sleep regularity	0.07 [0.04, 0.10]	0.02	4.36	< .001	0.02 [-0.01, 0.05]	0.02	1.14	.309
Sleep regularity <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.35	.735	-0.01 [-0.03, 0.01]	0.01	-0.73	.523
Age	-0.02 [-0.03, -0.02]	0.00	-9.12	< .001	-0.03 [-0.03, -0.02]	0.00	-8.70	< .001
Sleep regularity × sesmedium	0.01 [-0.05, 0.07]	0.03	0.42	.692	0.02 [-0.02, 0.05]	0.02	0.94	.361
Sleep regularity × seshigh	0.00 [-0.04, 0.03]	0.02	-0.12	.904	0.02 [-0.03, 0.07]	0.03	0.86	.438

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			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration</b>								
(Intercept)	0.44 [0.23, 0.65]	0.11	4.16	< .001	0.42 [0.22, 0.63]	0.11	3.98	< .001
Physical activity	0.03 [-0.03, 0.09]	0.03	1.05	.375	0.04 [0.00, 0.07]	0.02	1.90	.087
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	0.17	.874	0.01 [-0.01, 0.03]	0.01	1.23	.224
Age	-0.01 [-0.01, 0.00]	0.00	-3.15	.002	-0.01 [-0.01, 0.00]	0.00	-2.97	.003
Physical activity × sexmale	-0.01 [-0.06, 0.04]	0.03	-0.21	.838	0.01 [-0.04, 0.06]	0.03	0.51	.622
<b>Sleep efficiency</b>								
(Intercept)	0.23 [-0.01, 0.47]	0.12	1.87	.062	0.25 [0.00, 0.49]	0.12	1.99	.048
Physical activity	0.01 [-0.03, 0.04]	0.02	0.45	.661	-0.03 [-0.07, 0.00]	0.02	-1.74	.108
Physical activity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.59	.589	-0.01 [-0.02, 0.01]	0.01	-0.57	.567
Age	0.00 [0.00, 0.01]	0.00	1.00	.318	0.00 [0.00, 0.01]	0.00	0.89	.375
Physical activity × sexmale	0.01 [-0.04, 0.06]	0.02	0.53	.612	0.06 [0.01, 0.10]	0.02	2.47	.025
<b>Sleep onset</b>								
(Intercept)	-0.15 [-0.47, 0.17]	0.16	-0.94	.346	-0.11 [-0.43, 0.22]	0.17	-0.64	.525
Physical activity	-0.02 [-0.05, 0.01]	0.02	-1.38	.234	-0.05 [-0.07, -0.03]	0.01	-4.54	< .001
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	-0.40	.703	-0.01 [-0.02, 0.00]	0.01	-1.46	.148
Age	0.00 [0.00, 0.01]	0.00	1.14	.255	0.00 [0.00, 0.00]	0.00	0.66	.510
Physical activity × sexmale	0.00 [-0.03, 0.03]	0.02	-0.09	.929	-0.01 [-0.04, 0.01]	0.01	-0.88	.381
<b>Sleep regularity</b>								
(Intercept)	0.59 [0.33, 0.84]	0.13	4.55	< .001	0.61 [0.36, 0.85]	0.12	4.87	< .001
Physical activity	0.08 [-0.03, 0.19]	0.06	1.45	.271	0.06 [0.01, 0.10]	0.02	2.46	.052
Physical activity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.54	.637	-0.01 [-0.04, 0.01]	0.02	-1.00	.364

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Age	0.00 [0.00, 0.00]	0.00	0.09	.930	0.00 [0.00, 0.00]	0.00	0.25	.800
Physical activity $\times$ sexmale	0.01 [-0.09, 0.11]	0.05	0.19	.860	0.04 [-0.01, 0.09]	0.03	1.55	.156

*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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.52 [1.16, 1.88]	0.18	8.30	< .001	1.41 [1.17, 1.65]	0.12	11.55	< .001
Sleep duration	-0.02 [-0.05, 0.01]	0.01	-1.29	.235	0.00 [-0.02, 0.02]	0.01	0.14	.895
Sleep duration <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-1.23	.299	0.00 [-0.01, 0.01]	0.01	-0.61	.574
Age	-0.02 [-0.03, -0.02]	0.00	-9.34	< .001	-0.03 [-0.03, -0.02]	0.00	-8.59	< .001
Sleep duration × sexmale	0.03 [-0.01, 0.08]	0.02	1.46	.205	0.01 [-0.01, 0.04]	0.01	1.02	.319
Sleep efficiency								
(Intercept)	1.52 [1.16, 1.88]	0.18	8.23	< .001	1.41 [1.17, 1.65]	0.12	11.48	< .001
Sleep efficiency	0.00 [-0.03, 0.03]	0.02	0.02	.984	0.00 [-0.02, 0.03]	0.01	0.34	.747
Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	-0.04	.971	0.00 [0.00, 0.01]	0.00	0.67	.529
Age	-0.02 [-0.03, -0.02]	0.00	-9.39	< .001	-0.03 [-0.03, -0.02]	0.00	-8.62	< .001
Sleep efficiency × sexmale	-0.01 [-0.04, 0.02]	0.01	-0.46	.647	-0.01 [-0.03, 0.02]	0.01	-0.64	.528
Sleep onset								
(Intercept)	1.53 [1.17, 1.89]	0.18	8.33	< .001	1.41 [1.17, 1.65]	0.12	11.46	< .001
Sleep onset	0.03 [-0.01, 0.06]	0.02	1.39	.194	0.00 [-0.03, 0.03]	0.01	-0.16	.872
Sleep onset <sup>2</sup>	-0.02 [-0.04, 0.01]	0.01	-1.41	.226	0.00 [-0.02, 0.02]	0.01	0.01	.992
Age	-0.02 [-0.03, -0.02]	0.00	-9.48	< .001	-0.03 [-0.03, -0.02]	0.00	-8.68	< .001
Sleep onset × sexmale	-0.08 [-0.13, -0.03]	0.03	-2.94	.027	-0.01 [-0.04, 0.03]	0.02	-0.36	.721
Sleep regularity								
(Intercept)	1.47 [1.11, 1.82]	0.18	8.07	< .001	1.39 [1.16, 1.63]	0.12	11.60	< .001
Sleep regularity	0.06 [0.01, 0.12]	0.03	2.16	.135	0.03 [0.01, 0.05]	0.01	2.45	.041
Sleep regularity <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	-0.51	.615	0.00 [-0.01, 0.01]	0.01	-0.73	.503

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Age	-0.02 [-0.03, -0.02]	0.00	-9.20	< .001	-0.03 [-0.03, -0.02]	0.00	-8.61	< .001
Sleep regularity $\times$ sexmale	0.01 [-0.04, 0.07]	0.03	0.50	.646	0.01 [-0.02, 0.04]	0.01	0.78	.441

*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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration</b>								
(Intercept)	0.41 [0.19, 0.62]	0.11	3.76	< .001	0.39 [0.19, 0.60]	0.11	3.73	< .001
Physical activity	0.02 [-0.02, 0.07]	0.03	0.98	.338	0.06 [0.03, 0.10]	0.02	3.58	< .001
Weekday xmonday	-0.03 [-0.09, 0.03]	0.03	-0.88	.394	-0.02 [-0.09, 0.04]	0.03	-0.71	.484
Weekday xsaturday	0.06 [-0.02, 0.14]	0.04	1.52	.198	0.07 [0.00, 0.14]	0.04	1.96	.077
Weekday xsunday	0.04 [-0.02, 0.10]	0.03	1.32	.220	0.05 [-0.01, 0.11]	0.03	1.76	.081
Weekday xthursday	-0.02 [-0.08, 0.04]	0.03	-0.57	.584	-0.01 [-0.09, 0.06]	0.04	-0.30	.773
Weekday xtuesday	-0.01 [-0.08, 0.05]	0.03	-0.38	.713	-0.02 [-0.09, 0.06]	0.04	-0.50	.626
Weekday xwednesday	-0.03 [-0.09, 0.04]	0.03	-0.87	.415	-0.02 [-0.08, 0.04]	0.03	-0.69	.491
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	0.10	.924	0.01 [-0.02, 0.03]	0.01	0.54	.592
Age	-0.01 [-0.01, 0.00]	0.00	-3.03	.003	-0.01 [-0.01, 0.00]	0.00	-2.86	.004
Physical activity × weekday xmonday	0.02 [-0.04, 0.08]	0.03	0.62	.538	-0.01 [-0.06, 0.03]	0.02	-0.61	.544
Physical activity × weekday xsaturday	0.01 [-0.05, 0.08]	0.03	0.45	.655	-0.07 [-0.11, -0.02]	0.02	-2.70	.011
Physical activity × weekday xsunday	0.04 [-0.04, 0.12]	0.04	0.88	.416	-0.05 [-0.10, 0.00]	0.02	-2.00	.052
Physical activity × weekday xtuesday	0.00 [-0.08, 0.07]	0.04	-0.09	.930	-0.01 [-0.05, 0.04]	0.02	-0.23	.823
Physical activity × weekday xtuesday	0.02 [-0.03, 0.08]	0.03	0.90	.367	0.00 [-0.04, 0.05]	0.02	0.06	.950
Physical activity × weekday xwednesday	-0.02 [-0.10, 0.05]	0.04	-0.60	.573	-0.01 [-0.05, 0.04]	0.02	-0.38	.705
Weekday xmonday × Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	0.31	.757	0.00 [-0.04, 0.03]	0.02	-0.10	.922
Weekday xsaturday × Physical activity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.65	.546	-0.02 [-0.05, 0.01]	0.02	-1.21	.225
Weekday xsunday × Physical activity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.40	.705	-0.02 [-0.05, 0.01]	0.02	-1.14	.256
Weekday xthursday × Physical activity <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.13	.898	-0.01 [-0.04, 0.03]	0.02	-0.35	.726
Weekday xtuesday × Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.16	.874	0.00 [-0.03, 0.04]	0.02	0.28	.783

Table 9 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekday xwednesday $\times$ Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	0.71	.514	0.00 [-0.03, 0.03]	0.02	0.00	.997
Sleep efficency								
(Intercept)	0.22 [-0.01, 0.45]	0.12	1.90	.057	0.26 [0.03, 0.50]	0.12	2.21	.027
Physical activity	0.01 [-0.04, 0.05]	0.02	0.28	.777	-0.02 [-0.05, 0.02]	0.02	-0.94	.349
Weekday xmunday	0.00 [-0.05, 0.05]	0.03	0.03	.976	-0.02 [-0.07, 0.04]	0.03	-0.56	.575
Weekday xsaturday	-0.06 [-0.12, -0.01]	0.03	-2.12	.057	-0.07 [-0.15, 0.00]	0.04	-1.95	.082
Weekday xsunday	-0.06 [-0.13, 0.00]	0.03	-1.87	.097	-0.09 [-0.14, -0.03]	0.03	-3.19	.001
Weekday xthursday	0.00 [-0.06, 0.05]	0.03	-0.15	.878	-0.01 [-0.07, 0.04]	0.03	-0.42	.673
Weekday xtuesday	-0.01 [-0.06, 0.04]	0.02	-0.33	.738	-0.01 [-0.07, 0.05]	0.03	-0.45	.654
Weekday xwednesday	0.01 [-0.04, 0.06]	0.03	0.54	.592	0.00 [-0.06, 0.06]	0.03	0.08	.936
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	0.17	.861	-0.01 [-0.03, 0.02]	0.01	-0.76	.450
Age	0.00 [0.00, 0.01]	0.00	1.12	.264	0.00 [0.00, 0.01]	0.00	0.88	.377
Physical activity $\times$ weekday xmonday	0.01 [-0.05, 0.07]	0.03	0.34	.735	0.02 [-0.03, 0.07]	0.03	0.73	.474
Physical activity $\times$ weekday xsaturday	0.04 [-0.03, 0.11]	0.04	1.21	.249	-0.02 [-0.07, 0.03]	0.02	-0.75	.456
Physical activity $\times$ weekday xsunday	0.04 [-0.06, 0.13]	0.05	0.79	.470	0.02 [-0.05, 0.08]	0.03	0.49	.638
Physical activity $\times$ weekday xtursday	0.02 [-0.06, 0.10]	0.04	0.40	.701	0.04 [-0.01, 0.09]	0.03	1.69	.105
Physical activity $\times$ weekday xtuesday	-0.01 [-0.07, 0.05]	0.03	-0.43	.669	0.01 [-0.05, 0.07]	0.03	0.29	.781
Physical activity $\times$ weekday xwednesday	-0.01 [-0.07, 0.06]	0.03	-0.16	.876	0.01 [-0.04, 0.05]	0.02	0.22	.823
Weekday xmunday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-0.88	.383	0.01 [-0.03, 0.04]	0.02	0.42	.676
Weekday xsaturday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-0.62	.539	0.00 [-0.04, 0.04]	0.02	-0.04	.966
Weekday xsunday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.06, 0.03]	0.02	-0.50	.655	0.01 [-0.02, 0.05]	0.02	0.63	.529
Weekday xthursday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.67	.530	0.00 [-0.03, 0.03]	0.02	-0.14	.892
Weekday xtuesday $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.21	.835	0.00 [-0.03, 0.04]	0.02	0.22	.829

Table 9 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekday xwednesday $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.17	.870	0.01 [-0.03, 0.05]	0.02	0.45	.658
Sleep onset								
(Intercept)	-0.12 [-0.44, 0.20]	0.16	-0.72	.473	-0.07 [-0.39, 0.26]	0.17	-0.40	.692
Physical activity	-0.02 [-0.05, 0.01]	0.02	-1.06	.288	-0.03 [-0.06, -0.01]	0.01	-2.49	.019
Weekday xmunday	-0.07 [-0.10, -0.03]	0.02	-3.68	.001	-0.08 [-0.12, -0.04]	0.02	-3.68	< .001
Weekday xsaturday	0.07 [0.04, 0.10]	0.02	4.27	< .001	0.05 [0.02, 0.09]	0.02	2.72	.008
Weekday xsunday	0.06 [0.03, 0.10]	0.02	3.48	.002	0.03 [-0.01, 0.06]	0.02	1.49	.136
Weekday xthursday	-0.07 [-0.10, -0.04]	0.02	-4.52	< .001	-0.07 [-0.12, -0.03]	0.02	-3.10	.009
Weekday xtuesday	-0.05 [-0.09, -0.01]	0.02	-2.58	.027	-0.06 [-0.11, -0.01]	0.03	-2.39	.040
Weekday xwednesday	-0.05 [-0.09, -0.02]	0.02	-2.79	.013	-0.06 [-0.10, -0.02]	0.02	-2.99	.004
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.54	.594	-0.01 [-0.03, 0.01]	0.01	-0.84	.410
Age	0.00 [0.00, 0.01]	0.00	1.06	.288	0.00 [0.00, 0.00]	0.00	0.63	.529
Physical activity $\times$ weekday xmonday	-0.04 [-0.08, 0.00]	0.02	-2.10	.040	-0.03 [-0.06, 0.00]	0.02	-1.74	.088
Physical activity $\times$ weekday xsaturday	0.05 [0.01, 0.09]	0.02	2.66	.008	0.01 [-0.02, 0.04]	0.02	0.53	.593
Physical activity $\times$ weekday xsunday	0.02 [-0.04, 0.08]	0.03	0.68	.531	-0.03 [-0.06, 0.00]	0.02	-1.71	.092
Physical activity $\times$ weekday xthursday	-0.02 [-0.07, 0.03]	0.02	-0.85	.410	-0.02 [-0.05, 0.02]	0.02	-0.99	.339
Physical activity $\times$ weekday xtuesday	-0.04 [-0.07, 0.00]	0.02	-1.89	.060	-0.02 [-0.05, 0.01]	0.02	-1.33	.187
Physical activity $\times$ weekday xwednesday	-0.01 [-0.05, 0.02]	0.02	-0.76	.447	-0.02 [-0.06, 0.01]	0.02	-1.30	.209
Weekday xmunday $\times$ Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.16	.872	0.01 [-0.01, 0.03]	0.01	0.84	.402
Weekday xsaturday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-1.10	.273	0.00 [-0.02, 0.03]	0.01	0.27	.792
Weekday xsunday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.04, 0.02]	0.01	-0.77	.504	0.02 [0.00, 0.04]	0.01	1.63	.113
Weekday xthursday $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.31	.761	0.00 [-0.03, 0.04]	0.02	0.08	.937
Weekday xtuesday $\times$ Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.09	.930	0.01 [-0.03, 0.04]	0.02	0.41	.696

Table 9 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekday xwednesday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.01, 0.00]	0.00	-1.05	.295	0.00 [-0.02, 0.03]	0.01	0.28	.783
Sleep regularity								
(Intercept)	0.58 [0.34, 0.82]	0.12	4.76	< .001	0.62 [0.37, 0.86]	0.13	4.88	< .001
Physical activity	0.08 [0.02, 0.13]	0.03	2.83	.013	0.03 [-0.01, 0.07]	0.02	1.51	.135
Weekday xmunday	0.00 [-0.06, 0.06]	0.03	0.04	.967	-0.01 [-0.07, 0.06]	0.03	-0.22	.827
Weekday xsaturday	-0.12 [-0.19, -0.04]	0.04	-2.94	.036	-0.11 [-0.18, -0.03]	0.04	-2.86	.019
Weekday xsunday	-0.15 [-0.19, -0.10]	0.02	-5.89	< .001	-0.16 [-0.25, -0.07]	0.05	-3.41	.021
Weekday xthursday	0.13 [0.07, 0.19]	0.03	4.46	.001	0.14 [0.07, 0.22]	0.04	3.62	.007
Weekday xtuesday	0.14 [0.08, 0.20]	0.03	4.89	< .001	0.14 [0.07, 0.21]	0.04	3.80	.002
Weekday xwednesday	0.14 [0.09, 0.18]	0.02	5.78	< .001	0.14 [0.08, 0.20]	0.03	4.86	< .001
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.65	.518	-0.01 [-0.04, 0.02]	0.02	-0.62	.553
Age	0.00 [0.00, 0.00]	0.00	0.00	.996	0.00 [0.00, 0.00]	0.00	0.05	.963
Physical activity $\times$ weekday xmonday	0.06 [-0.03, 0.15]	0.05	1.23	.275	0.08 [0.04, 0.13]	0.02	3.43	.001
Physical activity $\times$ weekday xsaturday	0.00 [-0.08, 0.07]	0.04	-0.04	.971	-0.03 [-0.08, 0.02]	0.02	-1.15	.259
Physical activity $\times$ weekday xsunday	0.03 [-0.06, 0.12]	0.05	0.67	.532	-0.02 [-0.07, 0.03]	0.03	-0.71	.486
Physical activity $\times$ weekday xtursday	-0.01 [-0.09, 0.08]	0.04	-0.19	.856	0.09 [0.04, 0.13]	0.02	3.67	< .001
Physical activity $\times$ weekday xtuesday	0.01 [-0.06, 0.08]	0.04	0.25	.807	0.07 [0.03, 0.12]	0.02	3.11	.002
Physical activity $\times$ weekday xwednesday	-0.01 [-0.07, 0.05]	0.03	-0.36	.721	0.05 [0.01, 0.09]	0.02	2.23	.026
Weekday xmunday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.04, 0.02]	0.02	-0.64	.563	-0.01 [-0.05, 0.03]	0.02	-0.60	.556
Weekday xsaturday $\times$ Physical activity <sup>2</sup>	0.00 [-0.03, 0.02]	0.01	-0.06	.955	-0.02 [-0.05, 0.02]	0.02	-0.88	.381
Weekday xsunday $\times$ Physical activity <sup>2</sup>	0.00 [-0.04, 0.03]	0.02	-0.18	.867	0.00 [-0.05, 0.04]	0.02	-0.13	.902
Weekday xthursday $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.08	.942	-0.02 [-0.05, 0.02]	0.02	-0.79	.437
Weekday xtuesday $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.17	.872	0.00 [-0.04, 0.03]	0.02	-0.13	.900

Table 9 continued

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekday x wednesday $\times$ Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.06	.953	-0.01 [-0.05, 0.03]	0.02	-0.54	.593

*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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.54 [1.18, 1.90]	0.18	8.37	< .001	1.46 [1.23, 1.70]	0.12	12.06	< .001
Sleep duration	0.02 [-0.03, 0.06]	0.02	0.79	.445	0.04 [0.01, 0.08]	0.02	2.59	.025
Weekday xmonday	-0.18 [-0.23, -0.13]	0.02	-7.20	< .001	-0.06 [-0.10, -0.03]	0.02	-3.54	< .001
Weekday xsaturday	-0.08 [-0.14, -0.02]	0.03	-2.73	.017	-0.04 [-0.08, -0.01]	0.02	-2.59	.010
Weekday xsunday	-0.17 [-0.24, -0.10]	0.04	-4.92	.002	-0.13 [-0.17, -0.09]	0.02	-5.92	< .001
Weekday xthursday	-0.03 [-0.08, 0.01]	0.02	-1.37	.172	0.03 [0.00, 0.07]	0.02	1.73	.089
Weekday xtuesday	-0.06 [-0.16, 0.03]	0.05	-1.29	.280	0.00 [-0.04, 0.05]	0.02	0.10	.919
Weekday xwednesday	-0.06 [-0.11, -0.01]	0.03	-2.30	.025	0.00 [-0.04, 0.04]	0.02	-0.19	.852
Sleep duration <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-1.09	.295	0.00 [-0.01, 0.02]	0.01	0.45	.676
Age	-0.02 [-0.03, -0.02]	0.00	-9.23	< .001	-0.03 [-0.03, -0.02]	0.00	-8.59	.001
Sleep duration × weekday xmonday	-0.01 [-0.08, 0.05]	0.03	-0.45	.664	-0.07 [-0.11, -0.02]	0.02	-3.00	.009
Sleep duration × weekday xsaturday	-0.04 [-0.10, 0.03]	0.03	-1.12	.292	-0.05 [-0.09, -0.01]	0.02	-2.56	.015
Sleep duration × weekday xsunday	-0.03 [-0.07, 0.02]	0.02	-1.11	.270	-0.05 [-0.09, -0.02]	0.02	-3.08	.002
Sleep duration × weekday xthursday	0.00 [-0.10, 0.09]	0.05	-0.04	.969	-0.02 [-0.06, 0.02]	0.02	-0.96	.349
Sleep duration × weekday xtuesday	0.00 [-0.09, 0.09]	0.05	0.02	.985	-0.01 [-0.05, 0.03]	0.02	-0.46	.647
Sleep duration × weekday xwednesday	-0.02 [-0.07, 0.03]	0.03	-0.73	.474	-0.03 [-0.07, 0.01]	0.02	-1.51	.139
Weekday xmonday × Sleep duration <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.48	.651	-0.01 [-0.03, 0.01]	0.01	-1.00	.353
Weekday xsaturday × Sleep duration <sup>2</sup>	0.00 [-0.04, 0.04]	0.02	0.00	.997	-0.02 [-0.03, 0.00]	0.01	-1.99	.068
Weekday xsunday × Sleep duration <sup>2</sup>	0.00 [-0.06, 0.07]	0.03	0.10	.932	-0.01 [-0.03, 0.02]	0.01	-0.52	.635
Weekday xtuesday × Sleep duration <sup>2</sup>	0.00 [-0.04, 0.03]	0.02	-0.17	.869	-0.02 [-0.04, 0.01]	0.01	-1.36	.224
Weekday xtuesday × Sleep duration <sup>2</sup>	0.02 [-0.08, 0.13]	0.05	0.40	.726	-0.01 [-0.03, 0.02]	0.01	-0.49	.642

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekday xwednesday $\times$ Sleep duration <sup>2</sup>	0.00 [-0.04, 0.03]	0.02	-0.06	.953	0.00 [-0.03, 0.03]	0.01	-0.08	.941
Sleep efficiency (Intercept)	1.54 [1.18, 1.90] -0.02 [-0.05, 0.02]	0.18 0.02	8.41 -0.93	< .001 .353	1.48 [1.24, 1.72] -0.02 [-0.05, 0.01]	0.12 0.01	12.12 -1.30	< .001 .206
Sleep efficiency	-0.18 [-0.23, -0.12]	0.03	-6.67	< .001	-0.08 [-0.12, -0.05]	0.02	-4.52	< .001
Weekday xmunday	-0.09 [-0.13, -0.04]	0.02	-3.90	< .001	-0.07 [-0.10, -0.04]	0.02	-4.07	< .001
Weekday xsaturday	-0.18 [-0.23, -0.13]	0.03	-7.00	< .001	-0.14 [-0.17, -0.10]	0.02	-7.83	< .001
Weekday xsunday	-0.04 [-0.08, 0.01]	0.02	-1.72	.086	0.02 [-0.01, 0.05]	0.02	1.18	.237
Weekday xthursday	-0.05 [-0.10, 0.00]	0.03	-1.79	.078	-0.01 [-0.04, 0.03]	0.02	-0.37	.712
Weekday xtuesday	-0.06 [-0.12, -0.01]	0.03	-2.16	.049	0.00 [-0.04, 0.03]	0.02	-0.23	.815
Weekday xwednesday	0.00 [-0.01, 0.00]	0.00	-0.55	.587	0.00 [-0.01, 0.01]	0.00	-0.33	.750
Sleep efficiency <sup>2</sup>	-0.02 [-0.03, -0.02]	0.00	-9.24	< .001	-0.03 [-0.03, -0.02]	0.00	-8.81	< .001
Age	0.02 [-0.04, 0.08]	0.03	0.62	.545	0.06 [0.00, 0.11]	0.03	2.04	.088
Sleep efficiency $\times$ weekday xmonday	0.01 [-0.04, 0.05]	0.02	0.29	.771	0.03 [-0.01, 0.06]	0.02	1.52	.129
Sleep efficiency $\times$ weekday xsaturday	0.02 [-0.04, 0.07]	0.03	0.55	.591	0.05 [0.00, 0.10]	0.02	1.94	.090
Sleep efficiency $\times$ weekday xsunday	0.02 [-0.09, 0.13]	0.06	0.32	.771	0.01 [-0.04, 0.07]	0.03	0.53	.618
Sleep efficiency $\times$ weekday xtuesday	0.02 [-0.03, 0.06]	0.02	0.66	.514	0.00 [-0.04, 0.04]	0.02	-0.13	.899
Sleep efficiency $\times$ weekday xwednesday	0.00 [-0.07, 0.08]	0.04	0.13	.900	-0.01 [-0.05, 0.03]	0.02	-0.44	.663
Weekday xmunday $\times$ Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.45	.670	0.01 [-0.02, 0.03]	0.01	0.58	.610
Weekday xsaturday $\times$ Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.62	.544	0.00 [-0.01, 0.01]	0.00	0.56	.598
Weekday xsunday $\times$ Sleep efficiency <sup>2</sup>	0.01 [-0.01, 0.02]	0.01	0.87	.389	0.00 [-0.01, 0.02]	0.01	0.32	.762
Weekday xthursday $\times$ Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	0.37	.724	0.00 [-0.01, 0.01]	0.00	-0.31	.767
Weekday xtuesday $\times$ Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.28	.779	0.00 [-0.01, 0.01]	0.01	0.56	.590

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekday xwednesday $\times$ Sleep efficiency <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.03	.980	0.00 [-0.02, 0.01]	0.01	-0.15	.886
Sleep onset								
(Intercept)	1.55 [1.19, 1.91]	0.18	8.45	< .001	1.47 [1.23, 1.71]	0.12	12.14	< .001
Sleep onset	-0.03 [-0.06, 0.01]	0.02	-1.60	.109	-0.04 [-0.08, -0.01]	0.02	-2.51	.027
Weekday xmunday	-0.15 [-0.24, -0.07]	0.04	-3.68	.009	-0.07 [-0.12, -0.02]	0.02	-2.79	.011
Weekday xsaturday	-0.09 [-0.15, -0.02]	0.03	-2.73	.015	-0.07 [-0.11, -0.02]	0.02	-2.89	.009
Weekday xsunday	-0.17 [-0.24, -0.10]	0.04	-4.86	< .001	-0.13 [-0.17, -0.08]	0.02	-5.56	< .001
Weekday xthursday	-0.05 [-0.10, 0.01]	0.03	-1.71	.091	0.01 [-0.03, 0.06]	0.02	0.67	.505
Weekday xtuesday	-0.05 [-0.11, 0.01]	0.03	-1.66	.101	0.00 [-0.05, 0.05]	0.03	-0.11	.913
Weekday xwednesday	-0.07 [-0.14, 0.00]	0.03	-2.10	.053	-0.01 [-0.05, 0.03]	0.02	-0.41	.685
Sleep onset <sup>2</sup>	-0.02 [-0.06, 0.02]	0.02	-0.88	.436	0.00 [-0.03, 0.03]	0.01	0.00	.999
Age	-0.02 [-0.03, -0.02]	0.00	-9.19	< .001	-0.03 [-0.03, -0.02]	0.00	-8.84	< .001
Sleep onset $\times$ weekday xmonday	0.02 [-0.04, 0.07]	0.03	0.54	.601	0.08 [0.05, 0.12]	0.02	4.87	< .001
Sleep onset $\times$ weekday xsaturday	0.03 [-0.02, 0.08]	0.03	1.29	.210	0.06 [0.03, 0.09]	0.02	3.39	.001
Sleep onset $\times$ weekday xsunday	0.04 [-0.01, 0.08]	0.02	1.65	.102	0.09 [0.06, 0.13]	0.02	5.57	< .001
Sleep onset $\times$ weekday xthursday	0.01 [-0.04, 0.06]	0.03	0.36	.720	0.03 [-0.02, 0.07]	0.02	1.08	.317
Sleep onset $\times$ weekday xtuesday	0.02 [-0.02, 0.07]	0.02	1.06	.290	0.02 [-0.02, 0.05]	0.02	0.87	.386
Sleep onset $\times$ weekday xwednesday	0.03 [-0.02, 0.07]	0.02	1.11	.268	0.02 [-0.01, 0.06]	0.02	1.45	.147
Weekday xmunday $\times$ Sleep onset <sup>2</sup>	-0.01 [-0.07, 0.04]	0.03	-0.48	.659	-0.01 [-0.04, 0.03]	0.02	-0.46	.659
Weekday xsaturday $\times$ Sleep onset <sup>2</sup>	0.00 [-0.05, 0.06]	0.03	0.14	.898	0.00 [-0.03, 0.03]	0.01	0.04	.970
Weekday xsunday $\times$ Sleep onset <sup>2</sup>	0.00 [-0.05, 0.05]	0.02	0.02	.986	-0.01 [-0.04, 0.02]	0.02	-0.78	.461
Weekday xthursday $\times$ Sleep onset <sup>2</sup>	0.01 [-0.04, 0.06]	0.03	0.46	.666	0.00 [-0.03, 0.04]	0.02	0.22	.832
Weekday xtuesday $\times$ Sleep onset <sup>2</sup>	0.01 [-0.05, 0.06]	0.03	0.23	.825	0.00 [-0.04, 0.04]	0.02	-0.08	.941

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekday xwednesday $\times$ Sleep onset <sup>2</sup>	0.01 [-0.03, 0.05]	0.02	0.43	.671	0.00 [-0.02, 0.03]	0.01	0.21	.839
Sleep regularity								
(Intercept)	1.49 [1.13, 1.84]	0.18	8.26	< .001	1.45 [1.22, 1.69]	0.12	12.07	< .001
Sleep regularity	0.07 [0.03, 0.12]	0.02	3.50	.005	0.03 [0.00, 0.06]	0.02	1.67	.122
Weekday xmunday	-0.16 [-0.23, -0.09]	0.03	-4.72	.001	-0.07 [-0.11, -0.03]	0.02	-3.52	.001
Weekday xsaturday	-0.07 [-0.12, -0.02]	0.02	-2.73	.006	-0.04 [-0.08, -0.01]	0.02	-2.37	.018
Weekday xsunday	-0.15 [-0.21, -0.08]	0.03	-4.45	.001	-0.12 [-0.16, -0.08]	0.02	-6.20	< .001
Weekday xthursday	-0.03 [-0.08, 0.02]	0.02	-1.12	.263	0.02 [-0.01, 0.06]	0.02	1.33	.184
Weekday xtuesday	-0.04 [-0.12, 0.03]	0.04	-1.23	.255	0.00 [-0.04, 0.04]	0.02	0.13	.896
Weekday xwednesday	-0.07 [-0.14, 0.00]	0.04	-1.93	.091	-0.01 [-0.05, 0.03]	0.02	-0.30	.764
Sleep regularity <sup>2</sup>	0.00 [-0.03, 0.02]	0.01	-0.26	.801	0.00 [-0.02, 0.01]	0.01	-0.33	.745
Age	-0.02 [-0.03, -0.02]	0.00	-8.90	< .001	-0.03 [-0.03, -0.02]	0.00	-8.71	< .001
Sleep regularity $\times$ weekday xmonday	-0.02 [-0.07, 0.03]	0.03	-0.76	.458	0.00 [-0.03, 0.04]	0.02	0.24	.809
Sleep regularity $\times$ weekday xsaturday	-0.01 [-0.06, 0.04]	0.03	-0.49	.629	0.01 [-0.03, 0.05]	0.02	0.57	.575
Sleep regularity $\times$ weekday xsunday	0.00 [-0.07, 0.06]	0.03	-0.10	.927	0.01 [-0.02, 0.04]	0.02	0.65	.517
Sleep regularity $\times$ weekday xthursday	0.01 [-0.10, 0.11]	0.05	0.10	.928	0.00 [-0.04, 0.04]	0.02	-0.19	.849
Sleep regularity $\times$ weekday xtuesday	0.01 [-0.05, 0.07]	0.03	0.22	.829	0.00 [-0.05, 0.05]	0.03	-0.03	.975
Sleep regularity $\times$ weekday xwednesday	-0.04 [-0.09, 0.01]	0.03	-1.45	.159	-0.02 [-0.06, 0.01]	0.02	-1.45	.148
Weekday xmunday $\times$ Sleep regularity <sup>2</sup>	0.00 [-0.03, 0.04]	0.02	0.19	.859	0.00 [-0.01, 0.02]	0.01	0.23	.819
Weekday xsaturday $\times$ Sleep regularity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.67	.502	-0.02 [-0.04, 0.00]	0.01	-1.66	.108
Weekday xsunday $\times$ Sleep regularity <sup>2</sup>	-0.01 [-0.05, 0.04]	0.02	-0.36	.741	-0.01 [-0.03, 0.01]	0.01	-0.89	.379
Weekday xthursday $\times$ Sleep regularity <sup>2</sup>	-0.01 [-0.04, 0.02]	0.01	-0.75	.468	-0.01 [-0.02, 0.01]	0.01	-0.70	.482
Weekday xtuesday $\times$ Sleep regularity <sup>2</sup>	0.01 [-0.04, 0.05]	0.02	0.29	.787	0.00 [-0.03, 0.02]	0.01	-0.26	.806

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekday x wednesday $\times$ Sleep regularity <sup>2</sup>	0.01 [-0.02, 0.04]	0.02	0.52	.620	0.00 [-0.02, 0.02]	0.01	0.30	.768

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

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

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.42 [0.21, 0.62]	0.11	3.92	< .001	0.41 [0.21, 0.62]	0.10	3.96	< .001
Physical activity	0.05 [-0.05, 0.14]	0.05	0.98	.415	0.06 [0.02, 0.10]	0.02	3.01	.004
Seasonspring	-0.04 [-0.12, 0.04]	0.04	-1.02	.315	-0.05 [-0.12, 0.02]	0.04	-1.31	.191
Seasonsummer	-0.10 [-0.20, -0.01]	0.05	-2.08	.066	-0.12 [-0.20, -0.03]	0.04	-2.77	.007
Seasonwinter	0.05 [-0.03, 0.14]	0.04	1.23	.241	0.04 [-0.05, 0.13]	0.05	0.85	.409
Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.20	.853	-0.02 [-0.04, 0.01]	0.01	-1.31	.192
Age	-0.01 [-0.01, 0.00]	0.00	-2.87	.004	-0.01 [-0.01, 0.00]	0.00	-2.72	.007
Physical activity × seasonspring	-0.03 [-0.11, 0.04]	0.04	-0.88	.419	-0.03 [-0.07, 0.02]	0.02	-1.07	.287
Physical activity × seasonsummer	0.00 [-0.13, 0.12]	0.06	-0.05	.964	-0.03 [-0.08, 0.02]	0.03	-1.05	.296
Physical activity × seasonwinter	-0.03 [-0.11, 0.04]	0.04	-0.84	.448	-0.02 [-0.08, 0.04]	0.03	-0.52	.611
Seasonspring × Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	0.58	.593	0.02 [-0.01, 0.05]	0.02	1.16	.250
Seasonsummer × Physical activity <sup>2</sup>	0.01 [-0.03, 0.04]	0.02	0.37	.727	0.02 [-0.01, 0.06]	0.02	1.26	.212
Seasonwinter × Physical activity <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.42	.699	0.02 [-0.02, 0.06]	0.02	1.10	.300
Sleep efficiency								
(Intercept)	0.16 [-0.07, 0.39]	0.12	1.37	.170	0.20 [-0.04, 0.43]	0.12	1.63	.103
Physical activity	0.03 [-0.03, 0.10]	0.03	1.02	.376	0.04 [0.00, 0.08]	0.02	1.99	.050
Seasonspring	0.06 [-0.01, 0.12]	0.04	1.56	.118	0.05 [-0.03, 0.13]	0.04	1.30	.196
Seasonsummer	0.02 [-0.06, 0.10]	0.04	0.50	.620	-0.02 [-0.10, 0.06]	0.04	-0.39	.694
Seasonwinter	0.08 [0.01, 0.14]	0.03	2.25	.024	0.08 [0.01, 0.16]	0.04	2.26	.024
Physical activity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.46	.678	-0.01 [-0.04, 0.01]	0.01	-1.09	.276
Age	0.00 [0.00, 0.01]	0.00	1.19	.233	0.00 [0.00, 0.01]	0.00	0.93	.350

Table 11 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity $\times$ seasonspring	-0.03 [-0.12, 0.05]	0.04	-0.75	.495	-0.06 [-0.11, -0.01]	0.03	-2.26	.025
Physical activity $\times$ seasonsummer	0.05 [-0.06, 0.17]	0.06	0.92	.409	-0.06 [-0.12, 0.00]	0.03	-1.88	.069
Physical activity $\times$ seasonwinter	-0.03 [-0.10, 0.04]	0.03	-0.82	.446	-0.05 [-0.11, 0.01]	0.03	-1.61	.127
Seasonspring $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.03]	0.01	0.27	.806	0.01 [-0.02, 0.04]	0.02	0.56	.573
Seasonsummer $\times$ Physical activity <sup>2</sup>	-0.02 [-0.06, 0.02]	0.02	-0.92	.411	0.02 [-0.01, 0.06]	0.02	1.19	.236
Seasonwinter $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	0.28	.793	0.00 [-0.03, 0.03]	0.02	0.07	.944
Sleep onset								
(Intercept)	-0.13 [-0.46, 0.19]	0.17	-0.81	.419	-0.09 [-0.42, 0.23]	0.17	-0.54	.587
Physical activity	-0.02 [-0.07, 0.02]	0.02	-1.03	.372	-0.04 [-0.07, -0.01]	0.02	-2.55	.022
Seasonspring	0.01 [-0.05, 0.07]	0.03	0.24	.808	0.00 [-0.06, 0.07]	0.03	0.13	.899
Seasonsummer	0.06 [0.01, 0.12]	0.03	2.20	.028	0.06 [0.00, 0.12]	0.03	1.91	.057
Seasonwinter	0.01 [-0.05, 0.06]	0.03	0.20	.843	0.01 [-0.05, 0.08]	0.03	0.48	.636
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.02	.988	0.00 [-0.02, 0.02]	0.01	0.20	.840
Age	0.00 [0.00, 0.01]	0.00	0.96	.335	0.00 [0.00, 0.00]	0.00	0.47	.636
Physical activity $\times$ seasonspring	-0.01 [-0.07, 0.04]	0.03	-0.48	.653	-0.02 [-0.06, 0.02]	0.02	-0.94	.360
Physical activity $\times$ seasonsummer	0.02 [-0.03, 0.07]	0.03	0.83	.413	-0.01 [-0.05, 0.03]	0.02	-0.56	.577
Physical activity $\times$ seasonwinter	0.01 [-0.05, 0.06]	0.03	0.23	.825	-0.03 [-0.08, 0.02]	0.03	-1.02	.341
Seasonspring $\times$ Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	0.06	.953	0.00 [-0.02, 0.03]	0.01	0.05	.960
Seasonsummer $\times$ Physical activity <sup>2</sup>	-0.01 [-0.03, 0.00]	0.01	-1.48	.170	-0.01 [-0.04, 0.02]	0.01	-0.60	.552
Seasonwinter $\times$ Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.27	.797	-0.01 [-0.03, 0.01]	0.01	-0.97	.334
Sleep regularity								
(Intercept)	0.61 [0.35, 0.86]	0.13	4.68	< .001	0.65 [0.40, 0.91]	0.13	5.04	< .001
Physical activity	0.07 [-0.05, 0.19]	0.06	1.13	.364	0.07 [0.02, 0.13]	0.03	2.63	.038

Table 11 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Seasonspring	-0.09 [-0.24, 0.05]	0.08	-1.23	.296	-0.12 [-0.23, -0.01]	0.06	-2.05	.079
Seasonsummer	-0.03 [-0.17, 0.10]	0.07	-0.49	.650	-0.07 [-0.20, 0.05]	0.06	-1.14	.298
Seasonwinter	-0.03 [-0.14, 0.09]	0.06	-0.45	.669	-0.04 [-0.13, 0.06]	0.05	-0.72	.484
Physical activity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.47	.677	-0.03 [-0.06, 0.00]	0.01	-1.99	.060
Age	0.00 [0.00, 0.00]	0.00	0.31	.755	0.00 [0.00, 0.01]	0.00	0.39	.694
Physical activity × seasonspring	0.06 [-0.14, 0.25]	0.10	0.56	.623	0.00 [-0.06, 0.06]	0.03	-0.09	.926
Physical activity × seasonsummer	0.10 [-0.08, 0.29]	0.09	1.09	.366	0.01 [-0.06, 0.08]	0.04	0.28	.780
Physical activity × seasonwinter	0.01 [-0.09, 0.11]	0.05	0.19	.858	0.01 [-0.06, 0.08]	0.04	0.31	.768
Seasonspring × Physical activity <sup>2</sup>	0.00 [-0.04, 0.04]	0.02	-0.06	.953	0.03 [0.00, 0.06]	0.02	1.66	.097
Seasonsummer × Physical activity <sup>2</sup>	-0.02 [-0.08, 0.04]	0.03	-0.73	.528	0.02 [-0.03, 0.07]	0.03	0.76	.467
Seasonwinter × Physical activity <sup>2</sup>	0.00 [-0.02, 0.03]	0.01	0.30	.785	0.01 [-0.02, 0.05]	0.02	0.77	.449

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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.49 [1.12, 1.85]	0.18	8.04	< .001	1.46 [1.23, 1.70]	0.12	12.03	< .001
Sleep duration	0.00 [-0.07, 0.07]	0.04	0.06	.957	0.02 [0.00, 0.04]	0.01	1.65	.102
Seasonspring	-0.03 [-0.10, 0.03]	0.03	-0.94	.347	-0.05 [-0.11, 0.00]	0.03	-1.80	.074
Seasonsummer	-0.02 [-0.10, 0.05]	0.04	-0.64	.528	-0.04 [-0.09, 0.02]	0.03	-1.24	.216
Seasonwinter	-0.05 [-0.12, 0.02]	0.04	-1.38	.177	-0.06 [-0.11, 0.00]	0.03	-2.00	.047
Sleep duration <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-1.11	.266	0.00 [-0.01, 0.02]	0.01	0.28	.793
Age	-0.02 [-0.03, -0.02]	0.00	-9.20	< .001	-0.03 [-0.03, -0.02]	0.00	-8.55	.001
Sleep duration × seasonspring	-0.01 [-0.07, 0.05]	0.03	-0.39	.711	-0.01 [-0.05, 0.02]	0.02	-0.80	.437
Sleep duration × seasonsummer	-0.02 [-0.10, 0.05]	0.04	-0.64	.552	-0.02 [-0.06, 0.02]	0.02	-0.94	.359
Sleep duration × seasonwinter	0.02 [-0.06, 0.09]	0.04	0.38	.726	-0.01 [-0.06, 0.03]	0.02	-0.52	.627
Seasonspring × Sleep duration <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.24	.813	-0.01 [-0.02, 0.00]	0.01	-1.33	.211
Seasonsummer × Sleep duration <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-0.74	.459	-0.01 [-0.03, 0.02]	0.01	-0.70	.520
Seasonwinter × Sleep duration <sup>2</sup>	0.00 [-0.04, 0.03]	0.02	-0.28	.800	-0.01 [-0.02, 0.01]	0.01	-0.98	.339
Sleep efficiency								
(Intercept)	1.49 [1.13, 1.85]	0.19	8.04	< .001	1.48 [1.23, 1.72]	0.13	11.78	< .001
Sleep efficiency	0.01 [-0.02, 0.03]	0.01	0.53	.599	0.00 [-0.03, 0.02]	0.02	-0.30	.774
Seasonspring	-0.03 [-0.10, 0.04]	0.03	-0.87	.388	-0.07 [-0.12, -0.01]	0.03	-2.38	.018
Seasonsummer	-0.03 [-0.11, 0.05]	0.04	-0.69	.499	-0.05 [-0.11, 0.01]	0.03	-1.65	.099
Seasonwinter	-0.06 [-0.12, 0.01]	0.03	-1.71	.089	-0.07 [-0.13, -0.01]	0.03	-2.26	.032
Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.01]	0.00	0.34	.739	0.00 [-0.01, 0.00]	0.00	-0.34	.745
Age	-0.02 [-0.03, -0.02]	0.00	-9.21	< .001	-0.03 [-0.03, -0.02]	0.00	-8.63	< .001

Table 12 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep efficiency $\times$ seasonspring	-0.01 [-0.04, 0.03]	0.02	-0.49	.623	0.01 [-0.03, 0.05]	0.02	0.32	.764
Sleep efficiency $\times$ seasonsummer	0.00 [-0.05, 0.05]	0.03	0.08	.940	0.01 [-0.04, 0.06]	0.03	0.37	.724
Sleep efficiency $\times$ seasonwinter	-0.03 [-0.15, 0.08]	0.06	-0.62	.588	0.01 [-0.03, 0.04]	0.02	0.41	.686
Seasonspring $\times$ Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.00]	0.00	-0.28	.776	0.00 [-0.01, 0.01]	0.00	0.30	.779
Seasonsummer $\times$ Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.39	.702	0.00 [-0.01, 0.01]	0.01	0.19	.852
Seasonwinter $\times$ Sleep efficiency <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.42	.687	0.00 [-0.01, 0.02]	0.01	0.78	.472
Sleep onset								
(Intercept)	1.50 [1.14, 1.86]	0.18	8.12	< .001	1.47 [1.23, 1.71]	0.12	12.02	< .001
Sleep onset	0.00 [-0.05, 0.04]	0.02	-0.08	.941	0.00 [-0.03, 0.03]	0.02	-0.02	.986
Seasonspring	-0.03 [-0.10, 0.05]	0.04	-0.69	.498	-0.05 [-0.10, 0.01]	0.03	-1.57	.117
Seasonsummer	-0.04 [-0.11, 0.04]	0.04	-1.03	.303	-0.04 [-0.10, 0.02]	0.03	-1.25	.212
Seasonwinter	-0.07 [-0.13, 0.00]	0.04	-1.83	.069	-0.06 [-0.12, -0.01]	0.03	-2.13	.036
Sleep onset <sup>2</sup>	-0.02 [-0.04, 0.00]	0.01	-1.63	.116	0.01 [-0.01, 0.03]	0.01	0.58	.576
Age	-0.02 [-0.03, -0.02]	0.00	-9.31	< .001	-0.03 [-0.03, -0.02]	0.00	-8.71	< .001
Sleep onset $\times$ seasonspring	-0.01 [-0.07, 0.04]	0.03	-0.47	.644	0.00 [-0.04, 0.04]	0.02	0.00	.998
Sleep onset $\times$ seasonsummer	0.02 [-0.04, 0.07]	0.03	0.54	.587	0.01 [-0.04, 0.05]	0.02	0.29	.771
Sleep onset $\times$ seasonwinter	-0.04 [-0.11, 0.03]	0.04	-1.06	.334	-0.01 [-0.05, 0.02]	0.02	-0.73	.469
Seasonspring $\times$ Sleep onset <sup>2</sup>	0.00 [-0.03, 0.03]	0.01	-0.25	.806	-0.02 [-0.04, 0.00]	0.01	-1.76	.080
Seasonsummer $\times$ Sleep onset <sup>2</sup>	0.00 [-0.04, 0.04]	0.02	0.16	.875	-0.01 [-0.04, 0.02]	0.02	-0.52	.611
Seasonwinter $\times$ Sleep onset <sup>2</sup>	0.00 [-0.02, 0.03]	0.01	0.26	.793	0.00 [-0.02, 0.02]	0.01	-0.21	.836
Sleep regularity								
(Intercept)	1.44 [1.08, 1.79]	0.18	7.92	< .001	1.45 [1.21, 1.69]	0.12	11.95	< .001
Sleep regularity	0.06 [-0.03, 0.15]	0.05	1.24	.320	0.02 [0.00, 0.05]	0.01	1.68	.104

Table 12 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Seasonspring	-0.03 [-0.10, 0.04]	0.04	-0.83	.414	-0.06 [-0.12, -0.01]	0.03	-2.18	.030
Seasonsummer	-0.03 [-0.12, 0.05]	0.04	-0.80	.429	-0.04 [-0.10, 0.02]	0.03	-1.32	.188
Seasonwinter	-0.06 [-0.14, 0.01]	0.04	-1.59	.131	-0.07 [-0.12, -0.01]	0.03	-2.22	.029
Sleep regularity <sup>2</sup>	-0.01 [-0.04, 0.02]	0.01	-0.77	.480	-0.01 [-0.02, 0.01]	0.01	-0.98	.332
Age	-0.02 [-0.03, -0.02]	0.00	-8.87	< .001	-0.03 [-0.03, -0.02]	0.00	-8.58	.001
Sleep regularity $\times$ seasonspring	0.02 [-0.05, 0.09]	0.04	0.63	.565	0.02 [-0.01, 0.05]	0.02	1.05	.297
Sleep regularity $\times$ seasonsummer	0.00 [-0.09, 0.09]	0.05	0.03	.981	0.00 [-0.05, 0.05]	0.02	0.08	.940
Sleep regularity $\times$ seasonwinter	0.03 [-0.06, 0.11]	0.04	0.66	.552	0.02 [-0.01, 0.05]	0.02	1.27	.208
Seasonspring $\times$ Sleep regularity <sup>2</sup>	0.01 [-0.02, 0.04]	0.01	0.55	.600	0.00 [-0.01, 0.02]	0.01	0.33	.746
Seasonsummer $\times$ Sleep regularity <sup>2</sup>	0.01 [-0.02, 0.04]	0.01	0.82	.415	0.00 [-0.02, 0.02]	0.01	-0.16	.876
Seasonwinter $\times$ Sleep regularity <sup>2</sup>	0.01 [-0.04, 0.06]	0.02	0.44	.691	0.00 [-0.02, 0.02]	0.01	0.22	.831

*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.*

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.42 [0.17, 0.66]	0.13	3.33	.001	0.42 [0.16, 0.67]	0.13	3.18	.002
Physical activity	0.01 [-0.04, 0.05]	0.02	0.32	.764	-0.02 [-0.12, 0.08]	0.05	-0.36	.725
Regioneurope	-0.21 [-0.39, -0.02]	0.09	-2.22	.027	-0.21 [-0.40, -0.01]	0.10	-2.07	.042
Regionafrica	-0.20 [-0.42, 0.01]	0.11	-1.82	.070	-0.26 [-0.49, -0.04]	0.11	-2.30	.023
Regionasia	-0.42 [-0.67, -0.17]	0.13	-3.23	.002	-0.50 [-0.74, -0.27]	0.12	-4.13	< .001
Regionnorth america	-0.05 [-0.28, 0.18]	0.12	-0.44	.660	-0.09 [-0.34, 0.15]	0.12	-0.77	.445
Regionsouth america	-0.38 [-0.58, -0.19]	0.10	-3.82	< .001	-0.40 [-0.61, -0.19]	0.11	-3.78	< .001
Physical activity <sup>2</sup>	0.00 [0.00, 0.01]	0.00	0.76	.480	0.03 [-0.01, 0.08]	0.02	1.45	.165
Age	-0.01 [-0.01, 0.00]	0.00	-3.27	.001	-0.01 [-0.01, 0.00]	0.00	-3.09	.002
Physical activity × regioneurope	0.03 [-0.03, 0.09]	0.03	1.09	.311	0.06 [-0.04, 0.15]	0.05	1.12	.278
Physical activity × regionafrica	0.08 [0.06, 0.21]	0.07	1.13	.275	0.15 [0.00, 0.31]	0.08	1.96	.054
Physical activity × regionasia	0.13 [-0.05, 0.31]	0.09	1.40	.188	0.09 [-0.06, 0.24]	0.08	1.12	.262
Physical activity × regionnorth america	0.04 [-0.06, 0.14]	0.05	0.86	.387	0.03 [-0.19, 0.25]	0.11	0.29	.783
Physical activity × regionsouth america	0.04 [-0.04, 0.11]	0.04	0.98	.334	0.03 [-0.11, 0.16]	0.07	0.40	.700
Regioneurope × Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	0.25	.807	-0.04 [-0.09, 0.01]	0.02	-1.62	.126
Regionafrica × Physical activity <sup>2</sup>	0.00 [-0.09, 0.09]	0.04	0.03	.974	-0.06 [-0.20, 0.08]	0.07	-0.81	.456
Regionasia × Physical activity <sup>2</sup>	-0.05 [-0.16, 0.06]	0.06	-0.92	.360	-0.07 [-0.20, 0.06]	0.07	-1.03	.302
Regionnorth america × Physical activity <sup>2</sup>	-0.01 [-0.04, 0.02]	0.02	-0.60	.551	0.02 [-0.11, 0.15]	0.07	0.32	.756
Regionsouth america × Physical activity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.64	.534	-0.01 [-0.10, 0.08]	0.04	-0.19	.854
Sleep efficiency								
(Intercept)	0.28 [0.03, 0.52]	0.13	2.19	.031	0.29 [0.05, 0.53]	0.12	2.33	.021

Table 13 continued

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity	-0.01 [-0.04, 0.02]	0.02	-0.64	.530	0.05 [-0.09, 0.18]	0.07	0.69	.523
Regioneurope	-0.11 [-0.34, 0.12]	0.12	-0.94	.364	-0.10 [-0.33, 0.12]	0.12	-0.88	.393
Regionafrica	-0.04 [-0.27, 0.19]	0.12	-0.32	.753	-0.07 [-0.28, 0.15]	0.11	-0.59	.556
Regionasia	-0.13 [-0.38, 0.12]	0.13	-0.99	.327	-0.32 [-0.56, -0.09]	0.12	-2.69	.008
Regionnorth america	-0.02 [-0.28, 0.24]	0.13	-0.14	.887	-0.05 [-0.28, 0.18]	0.12	-0.43	.669
Regionsouth america	-0.32 [-0.61, -0.04]	0.14	-2.22	.066	-0.38 [-0.60, -0.16]	0.11	-3.46	.001
Physical activity <sup>2</sup>	0.00 [-0.01, 0.00]	0.00	-0.43	.668	-0.03 [-0.08, 0.02]	0.03	-1.24	.246
Age	0.00 [0.00, 0.01]	0.00	0.70	.482	0.00 [0.00, 0.01]	0.00	0.62	.533
Physical activity × regioneurope	0.02 [-0.02, 0.06]	0.02	0.91	.364	-0.05 [-0.18, 0.07]	0.06	-0.83	.437
Physical activity × regionafrica	0.03 [-0.13, 0.18]	0.08	0.33	.749	-0.04 [-0.19, 0.11]	0.08	-0.48	.633
Physical activity × regionasia	0.21 [0.03, 0.39]	0.09	2.23	.045	-0.02 [-0.19, 0.15]	0.08	-0.24	.807
Physical activity × regionnorth america	0.06 [-0.07, 0.20]	0.07	0.89	.393	-0.05 [-0.31, 0.20]	0.13	-0.41	.700
Physical activity × regionsouth america	0.15 [0.00, 0.29]	0.07	1.99	.136	-0.10 [-0.27, 0.07]	0.09	-1.17	.294
Regioneurope × Physical activity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.15	.881	0.02 [-0.03, 0.08]	0.03	0.81	.443
Regionafrica × Physical activity <sup>2</sup>	-0.01 [-0.10, 0.09]	0.05	-0.12	.907	0.05 [-0.04, 0.15]	0.05	1.11	.270
Regionasia × Physical activity <sup>2</sup>	-0.15 [-0.48, 0.19]	0.17	-0.86	.465	0.03 [-0.14, 0.20]	0.09	0.35	.732
Regionnorth america × Physical activity <sup>2</sup>	0.00 [-0.03, 0.04]	0.02	0.20	.844	0.06 [-0.05, 0.18]	0.06	1.06	.301
Regionsouth america × Physical activity <sup>2</sup>	-0.01 [-0.06, 0.03]	0.02	-0.54	.626	0.06 [-0.01, 0.13]	0.04	1.61	.113
Sleep onset								
(Intercept)	-0.13 [-0.45, 0.19]	0.16	-0.78	.435	-0.09 [-0.41, 0.22]	0.16	-0.59	.553
Physical activity	-0.01 [-0.03, 0.02]	0.01	-0.78	.463	-0.03 [-0.11, 0.04]	0.04	-0.87	.413
Regioneurope	0.17 [0.01, 0.33]	0.08	2.14	.033	0.16 [0.00, 0.33]	0.08	1.95	.051
Regionafrica	0.11 [-0.07, 0.28]	0.09	1.22	.225	0.09 [-0.08, 0.27]	0.09	1.04	.298

Table 13 continued

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Regionasia	0.29 [0.07, 0.51]	0.11	2.55	.019	0.20 [0.01, 0.40]	0.10	2.02	.048
Regionnorth america	0.07 [-0.16, 0.31]	0.12	0.61	.554	0.05 [-0.13, 0.24]	0.10	0.56	.574
Regionsouth america	0.10 [-0.08, 0.27]	0.09	1.08	.284	0.06 [-0.12, 0.23]	0.09	0.66	.511
Physical activity <sup>2</sup>	0.00 [-0.01, 0.00]	0.00	-0.59	.579	-0.03 [-0.08, 0.01]	0.02	-1.51	.193
Age	0.00 [0.00, 0.01]	0.00	0.95	.341	0.00 [0.00, 0.01]	0.00	0.71	.477
Physical activity × regioneurope	-0.05 [-0.09, -0.01]	0.02	-2.19	.077	-0.02 [-0.10, 0.07]	0.04	-0.36	.729
Physical activity × regionafrica	-0.01 [-0.12, 0.09]	0.05	-0.27	.789	-0.05 [-0.24, 0.14]	0.10	-0.50	.643
Physical activity × regionasia	0.02 [-0.08, 0.13]	0.06	0.42	.676	0.03 [-0.09, 0.15]	0.06	0.45	.653
Physical activity × regionnorth america	0.02 [-0.14, 0.18]	0.08	0.22	.841	0.02 [-0.11, 0.14]	0.06	0.25	.807
Physical activity × regionsouth america	0.04 [-0.01, 0.09]	0.02	1.64	.101	-0.02 [-0.11, 0.06]	0.04	-0.55	.587
Regioneurope × Physical activity <sup>2</sup>	0.00 [0.00, 0.01]	0.00	0.79	.427	0.04 [0.00, 0.08]	0.02	1.74	.133
Regionafrica × Physical activity <sup>2</sup>	-0.01 [-0.08, 0.06]	0.04	-0.38	.713	0.05 [-0.06, 0.15]	0.05	0.86	.435
Regionasia × Physical activity <sup>2</sup>	-0.05 [-0.17, 0.07]	0.06	-0.79	.465	0.03 [-0.08, 0.13]	0.05	0.47	.645
Regionnorth america × Physical activity <sup>2</sup>	0.01 [-0.04, 0.06]	0.03	0.29	.790	0.00 [-0.09, 0.08]	0.04	-0.10	.921
Regionsouth america × Physical activity <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.30	.764	0.02 [-0.05, 0.09]	0.04	0.62	.561
Sleep regularity								
(Intercept)	0.10 [-0.13, 0.33]	0.12	0.86	.391	0.14 [-0.09, 0.38]	0.12	1.18	.238
Physical activity	0.05 [-0.01, 0.11]	0.03	1.52	.228	0.16 [0.05, 0.27]	0.06	2.84	.021
Regioneurope	0.24 [0.04, 0.43]	0.10	2.41	.017	0.22 [0.03, 0.42]	0.10	2.21	.027
Regionafrica	0.32 [0.08, 0.56]	0.12	2.62	.011	0.29 [0.06, 0.52]	0.12	2.42	.016
Regionasia	0.29 [0.02, 0.56]	0.14	2.11	.041	0.17 [-0.07, 0.40]	0.12	1.40	.162
Regionnorth america	0.03 [-0.23, 0.28]	0.13	0.19	.848	0.06 [-0.22, 0.34]	0.14	0.39	.703
Regionsouth america	-0.10 [-0.31, 0.10]	0.11	-0.99	.325	-0.14 [-0.36, 0.07]	0.11	-1.34	.181

Table 13 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.24	.823	-0.06 [-0.13, 0.01]	0.03	-1.79	.140
Age	0.00 [-0.01, 0.00]	0.00	-1.05	.305	0.00 [-0.01, 0.00]	0.00	-1.28	.205
Physical activity × regioneurope	0.11 [-0.01, 0.23]	0.06	1.74	.198	-0.10 [-0.23, 0.03]	0.07	-1.48	.191
Physical activity × regionafrica	0.01 [-0.14, 0.16]	0.08	0.14	.892	0.05 [-0.11, 0.20]	0.08	0.59	.558
Physical activity × regionasia	0.09 [-0.13, 0.31]	0.11	0.79	.461	0.03 [-0.15, 0.21]	0.09	0.34	.737
Physical activity × regionnorth america	0.05 [-0.19, 0.29]	0.12	0.38	.729	-0.07 [-0.36, 0.23]	0.15	-0.44	.681
Physical activity × regionsouth america	0.12 [0.03, 0.21]	0.05	2.61	.024	-0.01 [-0.17, 0.15]	0.08	-0.10	.922
Regioneurope × Physical activity <sup>2</sup>	-0.02 [-0.05, 0.00]	0.01	-1.93	.151	0.05 [-0.02, 0.12]	0.04	1.51	.196
Regionafrica × Physical activity <sup>2</sup>	-0.05 [-0.18, 0.08]	0.07	-0.71	.510	-0.02 [-0.11, 0.07]	0.05	-0.39	.695
Regionasia × Physical activity <sup>2</sup>	-0.13 [-0.40, 0.14]	0.14	-0.92	.428	0.03 [-0.14, 0.20]	0.09	0.32	.754
Regionnorth america × Physical activity <sup>2</sup>	-0.01 [-0.07, 0.06]	0.03	-0.21	.847	-0.01 [-0.23, 0.22]	0.12	-0.04	.967
Regionsouth america × Physical activity <sup>2</sup>	-0.01 [-0.06, 0.03]	0.02	-0.52	.636	0.00 [-0.10, 0.10]	0.05	0.04	.971

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*

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.18 [0.82, 1.54]	0.18	6.41	< .001	1.10 [0.88, 1.33]	0.11	9.58	< .001
Sleep duration	0.05 [-0.01, 0.11]	0.03	1.65	.162	0.02 [-0.04, 0.08]	0.03	0.59	.590
Regioneurope	-0.13 [-0.35, 0.08]	0.11	-1.22	.231	-0.12 [-0.28, 0.04]	0.08	-1.52	.129
Regionafrica	-0.12 [-0.33, 0.10]	0.11	-1.07	.284	-0.04 [-0.22, 0.13]	0.09	-0.49	.627
Regionasia	-0.39 [-0.62, -0.17]	0.12	-3.40	.001	-0.37 [-0.57, -0.18]	0.10	-3.71	< .001
Regionnorth america	-0.25 [-0.46, -0.04]	0.11	-2.29	.022	-0.17 [-0.37, 0.04]	0.10	-1.62	.114
Regionsouth america	-0.30 [-0.50, -0.09]	0.10	-2.87	.005	-0.27 [-0.43, -0.11]	0.08	-3.33	.001
Sleep duration <sup>2</sup>	0.01 [-0.07, 0.08]	0.04	0.16	.888	0.00 [-0.01, 0.01]	0.01	-0.29	.772
Age	-0.02 [-0.03, -0.02]	0.00	-9.91	< .001	-0.03 [-0.03, -0.02]	0.00	-9.48	< .001
Sleep duration × regioneurope	-0.07 [-0.13, -0.01]	0.03	-2.14	.071	0.00 [-0.07, 0.07]	0.03	0.01	.990
Sleep duration × regionafrica	-0.05 [-0.13, 0.04]	0.04	-1.14	.264	-0.03 [-0.10, 0.03]	0.03	-1.06	.295
Sleep duration × regionasia	-0.03 [-0.17, 0.11]	0.07	-0.41	.698	0.01 [-0.07, 0.08]	0.04	0.22	.829
Sleep duration × regionnorth america	-0.05 [-0.13, 0.03]	0.04	-1.13	.268	-0.04 [-0.10, 0.02]	0.03	-1.31	.191
Sleep duration × regionsouth america	-0.06 [-0.11, 0.00]	0.03	-2.08	.042	-0.03 [-0.08, 0.01]	0.02	-1.40	.179
Regioneurope × Sleep duration <sup>2</sup>	-0.02 [-0.09, 0.05]	0.03	-0.55	.636	-0.01 [-0.02, 0.01]	0.01	-0.87	.385
Regionafrica × Sleep duration <sup>2</sup>	-0.01 [-0.06, 0.05]	0.03	-0.25	.817	0.00 [-0.03, 0.02]	0.01	-0.26	.796
Regionasia × Sleep duration <sup>2</sup>	0.02 [-0.04, 0.08]	0.03	0.61	.564	0.00 [-0.04, 0.03]	0.02	-0.14	.889
Regionnorth america × Sleep duration <sup>2</sup>	-0.02 [-0.09, 0.05]	0.03	-0.60	.593	-0.01 [-0.04, 0.02]	0.02	-0.73	.497
Regionsouth america × Sleep duration <sup>2</sup>	-0.01 [-0.08, 0.07]	0.04	-0.23	.838	0.00 [-0.02, 0.01]	0.01	-0.61	.544
Sleep efficiency								
(Intercept)	1.23 [0.89, 1.57]	0.18	7.01	< .001	1.11 [0.90, 1.32]	0.11	10.15	< .001

Table 14 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep efficiency	-0.07 [-0.14, -0.01]	0.03	-2.11	.074	0.01 [-0.03, 0.05]	0.02	0.50	.617
Regioneurope	-0.20 [-0.39, -0.01]	0.10	-2.07	.040	-0.13 [-0.29, 0.02]	0.08	-1.69	.092
Regionafrica	-0.16 [-0.37, 0.05]	0.11	-1.46	.148	-0.07 [-0.24, 0.10]	0.09	-0.80	.427
Regionasia	-0.40 [-0.65, -0.15]	0.13	-3.19	.004	-0.35 [-0.55, -0.15]	0.10	-3.42	.002
Regionnorth america	-0.30 [-0.53, -0.07]	0.12	-2.53	.016	-0.21 [-0.40, -0.01]	0.10	-2.07	.046
Regionsouth america	-0.35 [-0.54, -0.15]	0.10	-3.54	< .001	-0.29 [-0.45, -0.13]	0.08	-3.49	.001
Sleep efficiency <sup>2</sup>	-0.01 [-0.04, 0.01]	0.01	-0.90	.433	0.00 [-0.01, 0.02]	0.01	0.27	.801
Age	-0.02 [-0.03, -0.02]	0.00	-9.86	< .001	-0.03 [-0.03, -0.02]	0.00	-9.55	< .001
Sleep efficiency × regioneurope	0.08 [0.01, 0.15]	0.04	2.14	.070	-0.01 [-0.05, 0.03]	0.02	-0.34	.733
Sleep efficiency × regionafrica	0.06 [-0.01, 0.14]	0.04	1.63	.111	-0.03 [-0.09, 0.04]	0.03	-0.82	.425
Sleep efficiency × regionasia	0.11 [0.03, 0.20]	0.04	2.60	.014	-0.01 [-0.11, 0.10]	0.05	-0.10	.925
Sleep efficiency × regionnorth america	0.06 [-0.05, 0.16]	0.05	1.06	.307	-0.04 [-0.10, 0.03]	0.03	-1.10	.273
Sleep efficiency × regionsouth america	0.05 [-0.04, 0.14]	0.05	1.01	.353	-0.01 [-0.06, 0.04]	0.03	-0.51	.611
Regioneurope × Sleep efficiency <sup>2</sup>	0.01 [-0.01, 0.04]	0.01	0.95	.410	0.00 [-0.02, 0.01]	0.01	-0.26	.806
Regionafrica × Sleep efficiency <sup>2</sup>	0.01 [-0.02, 0.04]	0.01	0.87	.432	0.00 [-0.02, 0.02]	0.01	-0.23	.832
Regionasia × Sleep efficiency <sup>2</sup>	0.02 [-0.02, 0.06]	0.02	1.15	.317	-0.01 [-0.03, 0.01]	0.01	-1.18	.256
Regionnorth america × Sleep efficiency <sup>2</sup>	0.00 [-0.03, 0.04]	0.02	0.24	.822	0.00 [-0.03, 0.02]	0.01	-0.30	.775
Regionsouth america × Sleep efficiency <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.55	.608	0.00 [-0.02, 0.02]	0.01	-0.15	.889
Sleep onset								
(Intercept)	1.22 [0.84, 1.60]	0.19	6.34	< .001	1.11 [0.87, 1.34]	0.12	9.32	< .001
Sleep onset	-0.06 [-0.17, 0.06]	0.06	-0.98	.386	-0.04 [-0.11, 0.02]	0.03	-1.26	.242
Regioneurope	-0.18 [-0.43, 0.07]	0.13	-1.42	.178	-0.13 [-0.30, 0.04]	0.09	-1.45	.152
Regionafrica	-0.08 [-0.36, 0.19]	0.14	-0.61	.547	-0.08 [-0.30, 0.14]	0.11	-0.70	.485

Table 14 continued

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Regionasia	-0.40 [-0.66, -0.14]	0.13	-2.97	.004	-0.35 [-0.56, -0.14]	0.11	-3.29	.001
Regionnorth america	-0.25 [-0.51, 0.01]	0.13	-1.90	.058	-0.21 [-0.48, 0.07]	0.14	-1.49	.168
Regionsouth america	-0.31 [-0.54, -0.07]	0.12	-2.59	.012	-0.28 [-0.46, -0.11]	0.09	-3.19	.001
Sleep onset <sup>2</sup>	-0.03 [-0.09, 0.03]	0.03	-0.98	.396	-0.02 [-0.05, 0.01]	0.02	-1.20	.270
Age	-0.02 [-0.03, -0.02]	0.00	-9.71	< .001	-0.03 [-0.03, -0.02]	0.00	-9.74	< .001
Sleep onset × regioneurope	0.05 [-0.08, 0.18]	0.07	0.70	.529	0.04 [-0.03, 0.12]	0.04	1.07	.324
Sleep onset × regionafrica	0.12 [-0.11, 0.36]	0.12	1.05	.303	0.01 [-0.17, 0.19]	0.09	0.11	.910
Sleep onset × regionasia	0.01 [-0.25, 0.26]	0.13	0.05	.963	0.08 [-0.11, 0.26]	0.09	0.83	.408
Sleep onset × regionnorth america	0.07 [-0.19, 0.33]	0.13	0.54	.615	0.02 [-0.11, 0.16]	0.07	0.36	.721
Sleep onset × regionsouth america	0.04 [-0.08, 0.16]	0.06	0.72	.488	0.03 [-0.05, 0.11]	0.04	0.72	.478
Regioneurope × Sleep onset <sup>2</sup>	0.01 [-0.04, 0.07]	0.03	0.48	.662	0.02 [-0.01, 0.05]	0.02	1.17	.281
Regionafrica × Sleep onset <sup>2</sup>	0.03 [-0.10, 0.17]	0.07	0.50	.618	0.01 [-0.13, 0.15]	0.07	0.19	.851
Regionasia × Sleep onset <sup>2</sup>	-0.01 [-0.17, 0.16]	0.08	-0.07	.947	0.04 [-0.07, 0.14]	0.05	0.66	.510
Regionnorth america × Sleep onset <sup>2</sup>	0.01 [-0.11, 0.13]	0.06	0.16	.876	0.02 [-0.06, 0.09]	0.04	0.43	.665
Regionsouth america × Sleep onset <sup>2</sup>	0.00 [-0.06, 0.06]	0.03	0.00	.997	0.02 [-0.03, 0.06]	0.02	0.77	.457
Sleep regularity								
(Intercept)	1.24 [0.91, 1.58]	0.17	7.27	< .001	1.12 [0.90, 1.33]	0.11	10.09	< .001
Sleep regularity	0.15 [0.03, 0.27]	0.06	2.37	.115	0.04 [0.01, 0.07]	0.02	2.77	.006
Regioneurope	-0.27 [-0.46, -0.08]	0.10	-2.80	.006	-0.15 [-0.31, 0.00]	0.08	-1.93	.054
Regionafrica	-0.21 [-0.41, -0.01]	0.10	-2.03	.043	-0.11 [-0.28, 0.06]	0.09	-1.23	.219
Regionasia	-0.47 [-0.69, -0.25]	0.11	-4.22	< .001	-0.38 [-0.57, -0.19]	0.10	-3.91	< .001
Regionnorth america	-0.36 [-0.56, -0.15]	0.11	-3.38	.001	-0.20 [-0.40, 0.00]	0.10	-2.01	.052
Regionsouth america	-0.40 [-0.58, -0.21]	0.10	-4.13	< .001	-0.29 [-0.45, -0.14]	0.08	-3.66	< .001

Table 14 continued

## TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep regularity <sup>2</sup>	-0.02 [-0.05, 0.01]	0.02	-1.22	.280	-0.01 [-0.03, 0.00]	0.01	-1.52	.130
Age	-0.02 [-0.03, -0.02]	0.00	-9.14	< .001	-0.03 [-0.03, -0.02]	0.00	-9.45	< .001
Sleep regularity × regioneurope	-0.09 [-0.19, 0.02]	0.05	-1.57	.217	-0.02 [-0.05, 0.02]	0.02	-0.96	.341
Sleep regularity × regionafrica	-0.10 [-0.23, 0.04]	0.07	-1.44	.212	0.02 [-0.06, 0.10]	0.04	0.45	.659
Sleep regularity × regionasia	-0.08 [-0.22, 0.05]	0.07	-1.24	.261	0.00 [-0.08, 0.07]	0.04	-0.10	.919
Sleep regularity × regionnorth america	-0.11 [-0.22, 0.00]	0.06	-2.01	.075	0.00 [-0.09, 0.09]	0.04	-0.06	.954
Sleep regularity × regionsouth america	-0.06 [-0.12, 0.00]	0.03	-2.02	.044	0.01 [-0.04, 0.07]	0.03	0.44	.667
Regioneurope × Sleep regularity <sup>2</sup>	0.02 [-0.02, 0.05]	0.02	0.97	.381	0.00 [-0.02, 0.03]	0.01	0.41	.695
Regionafrica × Sleep regularity <sup>2</sup>	-0.01 [-0.07, 0.04]	0.03	-0.43	.671	0.03 [-0.03, 0.09]	0.03	0.96	.385
Regionasia × Sleep regularity <sup>2</sup>	0.01 [-0.03, 0.06]	0.02	0.57	.574	0.00 [-0.04, 0.03]	0.02	-0.20	.845
Regionnorth america × Sleep regularity <sup>2</sup>	0.00 [-0.04, 0.04]	0.02	0.17	.870	-0.01 [-0.06, 0.05]	0.03	-0.22	.839
Regionsouth america × Sleep regularity <sup>2</sup>	0.03 [-0.03, 0.10]	0.03	0.98	.402	0.02 [-0.01, 0.04]	0.01	1.21	.256

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			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.75 [0.48, 1.01]	0.14	5.49	< .001	0.73 [0.45, 1.02]	0.14	5.10	< .001
Physical activity	0.05 [-0.15, 0.25]	0.10	0.50	.649	0.13 [0.02, 0.24]	0.06	2.31	.029
Daylight hours	-0.03 [-0.05, -0.01]	0.01	-3.23	.017	-0.03 [-0.05, -0.01]	0.01	-3.36	.008
Physical activity <sup>2</sup>	0.00 [-0.04, 0.04]	0.02	-0.01	.994	0.01 [-0.06, 0.08]	0.03	0.29	.777
Age	-0.01 [-0.01, 0.00]	0.00	-2.79	.006	0.00 [-0.01, 0.00]	0.00	-2.61	.010
Physical activity × daylight hours	0.00 [-0.02, 0.01]	0.01	-0.23	.829	-0.01 [-0.02, 0.00]	0.00	-1.56	.135
Daylight hours × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.06	.954	0.00 [-0.01, 0.00]	0.00	-0.29	.774
Sleep efficiency								
(Intercept)	0.24 [-0.03, 0.50]	0.14	1.72	.086	0.26 [-0.01, 0.54]	0.14	1.89	.059
Physical activity	0.02 [-0.13, 0.17]	0.08	0.25	.809	0.04 [-0.06, 0.14]	0.05	0.79	.427
Daylight hours	0.00 [-0.01, 0.01]	0.01	-0.46	.642	0.00 [-0.02, 0.01]	0.01	-0.49	.623
Physical activity <sup>2</sup>	-0.01 [-0.04, 0.03]	0.02	-0.39	.705	-0.01 [-0.07, 0.06]	0.03	-0.19	.852
Age	0.00 [0.00, 0.01]	0.00	1.13	.260	0.00 [0.00, 0.01]	0.00	0.97	.331
Physical activity × daylight hours	0.00 [-0.01, 0.01]	0.01	-0.05	.961	0.00 [-0.01, 0.00]	0.00	-0.86	.389
Daylight hours × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.32	.756	0.00 [0.00, 0.01]	0.00	0.03	.975
Sleep onset								
(Intercept)	-0.26 [-0.60, 0.08]	0.17	-1.52	.130	-0.21 [-0.56, 0.14]	0.18	-1.17	.243
Physical activity	-0.02 [-0.12, 0.08]	0.05	-0.40	.703	-0.05 [-0.14, 0.03]	0.04	-1.22	.245
Daylight hours	0.01 [0.00, 0.02]	0.00	2.52	.012	0.01 [0.00, 0.02]	0.01	2.20	.029
Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	0.00	.998	-0.01 [-0.05, 0.04]	0.02	-0.31	.755
Age	0.00 [0.00, 0.01]	0.00	0.80	.422	0.00 [0.00, 0.00]	0.00	0.34	.731

Table 15 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity $\times$ daylight hours	0.00 [-0.01, 0.01]	0.00	-0.03	.975	0.00 [-0.01, 0.01]	0.00	-0.02	.981
Daylight hours $\times$ Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.11	.916	0.00 [0.00, 0.00]	0.00	0.18	.854
Sleep regularity								
(Intercept)	0.61 [0.29, 0.92]	0.16	3.80	.001	0.67 [0.36, 0.98]	0.16	4.21	< .001
Physical activity	-0.03 [-0.29, 0.23]	0.13	-0.22	.842	0.09 [-0.01, 0.19]	0.05	1.85	.064
Daylight hours	0.00 [-0.02, 0.01]	0.01	-0.26	.802	-0.01 [-0.02, 0.01]	0.01	-0.69	.497
Physical activity <sup>2</sup>	0.01 [-0.06, 0.07]	0.03	0.24	.825	-0.04 [-0.12, 0.04]	0.04	-0.91	.388
Age	0.00 [0.00, 0.00]	0.00	0.14	.891	0.00 [0.00, 0.00]	0.00	0.28	.779
Physical activity $\times$ daylight hours	0.01 [-0.01, 0.03]	0.01	0.99	.395	0.00 [-0.01, 0.01]	0.00	-0.31	.759
Daylight hours $\times$ Physical activity <sup>2</sup>	0.00 [-0.01, 0.00]	0.00	-0.35	.754	0.00 [0.00, 0.01]	0.00	0.65	.530

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			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.36 [0.98, 1.73]	0.19	7.08	< .001	1.43 [1.18, 1.69]	0.13	11.16	< .001
Sleep duration	0.06 [-0.03, 0.15]	0.04	1.39	.171	0.05 [-0.02, 0.11]	0.03	1.43	.156
Daylight hours	0.01 [0.00, 0.02]	0.01	1.48	.145	0.00 [-0.01, 0.01]	0.01	-0.06	.955
Sleep duration <sup>2</sup>	0.00 [-0.04, 0.04]	0.02	-0.04	.971	0.01 [-0.02, 0.04]	0.01	0.61	.552
Age	-0.02 [-0.03, -0.02]	0.00	-9.15	< .001	-0.03 [-0.03, -0.02]	0.00	-8.66	< .001
Sleep duration × daylight hours	-0.01 [-0.01, 0.00]	0.00	-1.46	.148	0.00 [-0.01, 0.00]	0.00	-1.25	.211
Daylight hours × Sleep duration <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.31	.759	0.00 [0.00, 0.00]	0.00	-0.98	.339
Sleep efficiency								
(Intercept)	1.36 [0.99, 1.74]	0.19	7.08	< .001	1.45 [1.19, 1.71]	0.13	11.02	< .001
Sleep efficiency	-0.02 [-0.11, 0.07]	0.05	-0.41	.687	-0.04 [-0.14, 0.05]	0.05	-0.90	.403
Daylight hours	0.01 [0.00, 0.02]	0.01	1.53	.127	0.00 [-0.01, 0.01]	0.00	-0.29	.773
Sleep efficiency <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.13	.904	0.00 [-0.01, 0.02]	0.01	0.55	.603
Age	-0.02 [-0.03, -0.02]	0.00	-9.19	< .001	-0.03 [-0.03, -0.02]	0.00	-8.73	< .001
Sleep efficiency × daylight hours	0.00 [-0.01, 0.01]	0.00	0.38	.708	0.00 [0.00, 0.01]	0.00	0.94	.380
Daylight hours × Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.14	.899	0.00 [0.00, 0.00]	0.00	-0.45	.672
Sleep onset								
(Intercept)	1.37 [0.99, 1.75]	0.19	7.03	< .001	1.42 [1.17, 1.67]	0.13	11.27	< .001
Sleep onset	-0.04 [-0.14, 0.05]	0.05	-0.88	.380	-0.04 [-0.12, 0.04]	0.04	-0.92	.357
Daylight hours	0.01 [0.00, 0.02]	0.01	1.38	.176	0.00 [-0.01, 0.01]	0.01	0.18	.858
Sleep onset <sup>2</sup>	-0.01 [-0.09, 0.07]	0.04	-0.24	.820	0.03 [-0.03, 0.09]	0.03	1.11	.308
Age	-0.02 [-0.03, -0.02]	0.00	-9.21	< .001	-0.03 [-0.03, -0.02]	0.00	-8.74	< .001

Table 16 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep onset × daylight hours	0.00 [-0.01, 0.01]	0.00	0.59	.558	0.00 [0.00, 0.01]	0.00	0.87	.384
Daylight hours × Sleep onset <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	-0.19	.858	0.00 [-0.01, 0.00]	0.00	-1.21	.266
Sleep regularity								
(Intercept)	1.30 [0.92, 1.69]	0.20	6.66	< .001	1.43 [1.16, 1.71]	0.14	10.40	< .001
Sleep regularity	0.09 [-0.01, 0.19]	0.05	1.68	.125	0.05 [-0.02, 0.12]	0.04	1.49	.145
Daylight hours	0.01 [0.00, 0.02]	0.01	1.60	.113	0.00 [-0.01, 0.01]	0.01	-0.32	.749
Sleep regularity <sup>2</sup>	0.00 [-0.08, 0.07]	0.04	-0.11	.921	-0.02 [-0.08, 0.05]	0.03	-0.49	.659
Age	-0.02 [-0.03, -0.02]	0.00	-8.91	< .001	-0.03 [-0.03, -0.02]	0.00	-8.71	< .001
Sleep regularity × daylight hours	0.00 [-0.01, 0.01]	0.00	-0.39	.698	0.00 [-0.01, 0.00]	0.00	-0.51	.619
Daylight hours × Sleep regularity <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.03	.978	0.00 [0.00, 0.01]	0.00	0.35	.746

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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration</b>								
(Intercept)	0.78 [0.53, 1.03]	0.13	6.09	< .001	0.72 [0.48, 0.97]	0.13	5.72	< .001
Physical activity	0.07 [0.02, 0.11]	0.02	2.87	.009	0.05 [0.00, 0.09]	0.02	2.19	.030
Wrist	-0.48 [-0.74, -0.21]	0.13	-3.55	< .001	-0.43 [-0.69, -0.17]	0.13	-3.27	.001
Physical activity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.38	.723	0.01 [-0.02, 0.04]	0.02	0.49	.628
Age	-0.01 [-0.01, 0.00]	0.00	-3.07	.002	0.00 [-0.01, 0.00]	0.00	-2.82	.005
Physical activity × wrist	-0.04 [-0.09, 0.00]	0.02	-1.82	.079	-0.01 [-0.05, 0.04]	0.02	-0.32	.749
Wrist × Physical activity <sup>2</sup>	0.01 [-0.02, 0.04]	0.01	0.54	.621	-0.01 [-0.04, 0.03]	0.02	-0.47	.642
<b>Sleep efficiency</b>								
(Intercept)	-0.40 [-0.54, -0.26]	0.07	-5.70	< .001	-0.44 [-0.57, -0.31]	0.07	-6.67	< .001
Physical activity	0.12 [0.07, 0.17]	0.03	4.46	.001	0.02 [-0.03, 0.07]	0.03	0.66	.521
Wrist	0.76 [0.63, 0.89]	0.07	11.07	< .001	0.81 [0.69, 0.93]	0.06	13.24	< .001
Physical activity <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.43	.693	0.00 [-0.03, 0.03]	0.01	-0.08	.937
Age	0.00 [0.00, 0.00]	0.00	0.81	.418	0.00 [0.00, 0.00]	0.00	0.74	.457
Physical activity × wrist	-0.13 [-0.18, -0.08]	0.03	-4.74	< .001	-0.03 [-0.09, 0.03]	0.03	-1.07	.302
Wrist × Physical activity <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.42	.691	-0.01 [-0.04, 0.02]	0.02	-0.56	.578
<b>Sleep onset</b>								
(Intercept)	-1.05 [-1.46, -0.64]	0.21	-5.00	< .001	-1.02 [-1.42, -0.61]	0.21	-4.88	< .001
Physical activity	0.02 [-0.01, 0.05]	0.01	1.19	.238	-0.02 [-0.06, 0.01]	0.02	-1.38	.186
Wrist	1.14 [0.70, 1.59]	0.23	5.02	< .001	1.15 [0.72, 1.59]	0.22	5.17	< .001
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.33	.744	-0.01 [-0.05, 0.02]	0.02	-0.85	.432
Age	0.00 [0.00, 0.01]	0.00	0.95	.343	0.00 [0.00, 0.00]	0.00	0.40	.686

Table 17 continued

Term	Physical Activity Volume				Physical Activity Intensity					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Physical activity $\times$ wrist	-0.05	[-0.09, -0.01]	0.02	-2.19	.066	-0.04	[-0.08, -0.01]	0.02	-2.45	.016
Wrist $\times$ Physical activity <sup>2</sup>	0.00	[0.01, 0.01]	0.01	0.23	.818	0.01	[-0.03, 0.05]	0.02	0.52	.632
Sleep regularity										
(Intercept)	0.24	[0.04, 0.51]	0.14	1.70	.089	0.16	[0.12, 0.44]	0.14	1.14	.256
Physical activity	0.14	[0.09, 0.18]	0.02	5.44	< .001	0.17	[0.13, 0.22]	0.02	7.50	< .001
Wrist	0.49	[0.20, 0.78]	0.15	3.30	.001	0.61	[0.32, 0.90]	0.15	4.13	< .001
Physical activity <sup>2</sup>	-0.02	[-0.06, 0.03]	0.02	-0.70	.540	-0.06	[-0.10, -0.02]	0.02	-2.82	.030
Age	0.00	[0.00, 0.00]	0.00	-0.46	.643	0.00	[0.00, 0.00]	0.00	-0.53	.599
Physical activity $\times$ wrist	-0.07	[-0.13, -0.01]	0.03	-2.27	.047	-0.12	[-0.17, -0.08]	0.03	-4.97	< .001
Wrist $\times$ Physical activity <sup>2</sup>	0.01	[-0.03, 0.05]	0.02	0.72	.530	0.05	[0.01, 0.09]	0.02	2.72	.012

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				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.35 [-0.12, 0.82]	0.24	1.45	.148	1.08 [0.71, 1.45]	0.19	5.72	< .001
Sleep duration	0.00 [-0.03, 0.04]	0.02	0.16	.883	0.00 [-0.03, 0.04]	0.02	0.21	.850
Wrist	1.37 [0.85, 1.89]	0.27	5.17	< .001	0.45 [0.05, 0.86]	0.21	2.19	.029
Sleep duration <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.15	.889	0.00 [-0.01, 0.00]	0.00	-0.69	.511
Age	-0.02 [-0.03, -0.02]	0.00	-9.77	< .001	-0.03 [-0.03, -0.02]	0.00	-9.08	< .001
Sleep duration × wrist	0.00 [-0.03, 0.03]	0.02	-0.27	.785	0.01 [-0.04, 0.05]	0.02	0.29	.790
Wrist × Sleep duration <sup>2</sup>	-0.01 [-0.05, 0.03]	0.02	-0.45	.689	-0.01 [-0.02, 0.01]	0.01	-0.91	.406
Sleep efficiency								
(Intercept)	0.35 [-0.12, 0.82]	0.24	1.46	.145	1.08 [0.70, 1.45]	0.19	5.64	< .001
Sleep efficiency	0.00 [-0.02, 0.03]	0.01	0.12	.907	0.00 [-0.02, 0.01]	0.01	-0.32	.752
Wrist	1.37 [0.85, 1.89]	0.26	5.19	< .001	0.45 [0.04, 0.87]	0.21	2.15	.032
Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.43	.678	0.00 [0.00, 0.00]	0.00	0.51	.632
Age	-0.02 [-0.03, -0.02]	0.00	-9.91	< .001	-0.03 [-0.03, -0.02]	0.00	-9.13	< .001
Sleep efficiency × wrist	-0.01 [-0.05, 0.02]	0.02	-0.75	.457	0.01 [-0.02, 0.03]	0.01	0.65	.517
Wrist × Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	-0.07	.949	0.00 [-0.01, 0.00]	0.00	-0.49	.639
Sleep onset								
(Intercept)	0.35 [-0.12, 0.82]	0.24	1.46	.145	1.06 [0.69, 1.44]	0.19	5.59	< .001
Sleep onset	0.00 [-0.06, 0.07]	0.03	0.12	.901	-0.03 [-0.09, 0.04]	0.03	-0.80	.443
Wrist	1.38 [0.86, 1.90]	0.26	5.22	< .001	0.47 [0.05, 0.89]	0.21	2.19	.029
Sleep onset <sup>2</sup>	0.00 [-0.04, 0.04]	0.02	-0.07	.948	-0.01 [-0.04, 0.02]	0.01	-0.55	.590
Age	-0.02 [-0.03, -0.02]	0.00	-9.94	< .001	-0.03 [-0.03, -0.02]	0.00	-9.19	< .001

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep onset × wrist	-0.02 [-0.09, 0.05]	0.04	-0.48	.629	0.02 [-0.04, 0.09]	0.03	0.78	.441
Wrist × Sleep onset <sup>2</sup>	-0.02 [-0.06, 0.02]	0.02	-0.82	.416	0.01 [-0.02, 0.04]	0.02	0.48	.637
Sleep regularity								
(Intercept)	0.34 [-0.13, 0.80]	0.24	1.42	.155	1.09 [0.71, 1.46]	0.19	5.72	< .001
Sleep regularity	0.08 [0.03, 0.12]	0.02	3.32	.023	0.07 [0.05, 0.09]	0.01	6.16	< .001
Wrist	1.32 [0.81, 1.83]	0.26	5.07	< .001	0.43 [0.02, 0.83]	0.21	2.05	.041
Sleep regularity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.48	.635	-0.01 [-0.02, 0.00]	0.01	-1.28	.210
Age	-0.02 [-0.03, -0.02]	0.00	-9.67	< .001	-0.03 [-0.03, -0.02]	0.00	-9.17	< .001
Sleep regularity × wrist	-0.01 [-0.05, 0.03]	0.02	-0.55	.584	-0.05 [-0.08, -0.02]	0.01	-3.54	.001
Wrist × Sleep regularity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	0.29	.783	0.00 [-0.01, 0.02]	0.01	0.66	.522

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

Table 19

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

Term	Physical Activity Volume				Physical Activity Intensity					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
<b>Sleep duration</b>										
(Intercept)	0.48	[0.27, 0.68]	0.10	4.54	< .001	0.46	[0.25, 0.66]	0.10	4.37	< .001
Physical activity	0.03	[-0.03, 0.09]	0.03	1.02	.357	0.03	[-0.01, 0.06]	0.02	1.48	.141
Pa mostactivehr	-0.01	[-0.01, 0.00]	0.00	-2.75	.026	0.00	[-0.01, 0.00]	0.00	-2.25	.037
Physical activity <sup>2</sup>	0.00	[-0.01, 0.01]	0.00	-0.17	.867	0.01	[-0.02, 0.03]	0.01	0.75	.454
Age	-0.01	[-0.01, 0.00]	0.00	-3.12	.002	-0.01	[-0.01, 0.00]	0.00	-2.99	.003
Physical activity × pa mostactivehr	0.00	[0.00, 0.00]	0.00	0.20	.847	0.00	[0.00, 0.00]	0.00	0.94	.345
Pa mostactivehr × Physical activity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	0.60	.551	0.00	[0.00, 0.00]	0.00	-0.72	.476
<b>Sleep efficiency</b>										
(Intercept)	0.24	[0.01, 0.48]	0.12	2.06	.040	0.26	[0.02, 0.50]	0.12	2.14	.033
Physical activity	-0.01	[-0.06, 0.05]	0.03	-0.19	.855	0.00	[-0.04, 0.04]	0.02	0.16	.876
Pa mostactivehr	0.00	[-0.01, 0.00]	0.00	-2.08	.045	0.00	[-0.01, 0.00]	0.00	-0.97	.361
Physical activity <sup>2</sup>	0.00	[-0.01, 0.01]	0.01	-0.13	.896	0.00	[-0.03, 0.03]	0.02	0.19	.849
Age	0.00	[0.00, 0.01]	0.00	1.07	.286	0.00	[0.00, 0.01]	0.00	0.91	.361
Physical activity × pa mostactivehr	0.00	[0.00, 0.01]	0.00	1.09	.311	0.00	[0.00, 0.00]	0.00	-0.27	.794
Pa mostactivehr × Physical activity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-0.11	.915	0.00	[0.00, 0.00]	0.00	-0.53	.605
<b>Sleep onset</b>										
(Intercept)	-0.18	[-0.50, 0.14]	0.16	-1.10	.273	-0.15	[-0.47, 0.17]	0.16	-0.93	.351
Physical activity	-0.04	[-0.09, 0.00]	0.02	-1.81	.154	-0.04	[-0.08, -0.01]	0.02	-2.25	.056
Pa mostactivehr	0.00	[0.00, 0.01]	0.00	4.89	< .001	0.01	[0.00, 0.01]	0.00	4.58	< .001
Physical activity <sup>2</sup>	0.01	[-0.01, 0.02]	0.01	0.93	.416	0.01	[-0.01, 0.02]	0.01	0.91	.361
Age	0.00	[0.00, 0.01]	0.00	0.99	.320	0.00	[0.00, 0.00]	0.00	0.63	.529

Table 19 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity × pa mostactivehr	0.00 [0.00, 0.00]	0.00	0.88	.424	0.00 [0.00, 0.00]	0.00	-0.92	.385
Pa mostactivehr × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-1.21	.302	0.00 [0.00, 0.00]	0.00	-1.39	.167
Sleep regularity								
(Intercept)	0.60 [0.37, 0.83]	0.12	5.11	< .001	0.63 [0.38, 0.88]	0.13	4.91	< .001
Physical activity	0.08 [0.04, 0.12]	0.02	3.73	.001	0.05 [0.02, 0.09]	0.02	2.82	.005
Pa mostactivehr	0.00 [0.00, 0.00]	0.00	-0.90	.373	0.00 [-0.01, 0.00]	0.00	-0.61	.564
Physical activity <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-0.63	.569	-0.02 [-0.07, 0.03]	0.03	-0.64	.560
Age	0.00 [0.00, 0.00]	0.00	0.08	.933	0.00 [0.00, 0.00]	0.00	0.19	.847
Physical activity × pa mostactivehr	0.00 [0.00, 0.00]	0.00	0.66	.520	0.00 [0.00, 0.00]	0.00	1.28	.207
Pa mostactivehr × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.50	.640	0.00 [0.00, 0.00]	0.00	0.18	.867

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

Table 20

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

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration</b>								
(Intercept)	1.43 [1.07, 1.79]	0.18	7.84	< .001	1.41 [1.17, 1.65]	0.12	11.73	< .001
Sleep duration	0.01 [-0.03, 0.06]	0.02	0.55	.595	0.03 [0.01, 0.06]	0.01	2.54	.013
Pa mostactivehr	0.00 [0.00, 0.01]	0.00	1.03	.334	0.00 [0.00, 0.00]	0.00	1.39	.172
Sleep duration <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.69	.494	0.00 [-0.01, 0.02]	0.01	0.46	.664
Age	-0.02 [-0.03, -0.02]	0.00	-9.08	< .001	-0.03 [-0.03, -0.02]	0.00	-8.73	< .001
Sleep duration × pa mostactivehr	0.00 [0.00, 0.00]	0.00	-0.65	.543	0.00 [0.00, 0.00]	0.00	-2.16	.032
Pa mostactivehr × Sleep duration <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.33	.750	0.00 [0.00, 0.00]	0.00	-1.21	.274
<b>Sleep efficiency</b>								
(Intercept)	1.43 [1.07, 1.79]	0.18	7.83	< .001	1.42 [1.19, 1.66]	0.12	11.82	< .001
Sleep efficiency	-0.02 [-0.08, 0.04]	0.03	-0.76	.496	-0.01 [-0.04, 0.02]	0.02	-0.35	.733
Pa mostactivehr	0.00 [0.00, 0.01]	0.00	1.01	.350	0.00 [0.00, 0.00]	0.00	0.93	.354
Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	0.45	.681	0.00 [-0.01, 0.01]	0.00	-0.03	.975
Age	-0.02 [-0.03, -0.02]	0.00	-9.16	< .001	-0.03 [-0.03, -0.02]	0.00	-8.76	< .001
Sleep efficiency × pa mostactivehr	0.00 [0.00, 0.00]	0.00	0.93	.391	0.00 [0.00, 0.00]	0.00	0.45	.659
Pa mostactivehr × Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.44	.677	0.00 [0.00, 0.00]	0.00	0.25	.816
<b>Sleep onset</b>								
(Intercept)	1.44 [1.08, 1.80]	0.18	7.84	< .001	1.41 [1.18, 1.65]	0.12	11.66	< .001
Sleep onset	-0.04 [-0.09, 0.01]	0.02	-1.67	.120	-0.02 [-0.06, 0.01]	0.02	-1.32	.207
Pa mostactivehr	0.00 [0.00, 0.01]	0.00	1.00	.341	0.00 [0.00, 0.00]	0.00	1.17	.244
Sleep onset <sup>2</sup>	-0.02 [-0.04, 0.01]	0.01	-1.42	.168	0.00 [-0.02, 0.02]	0.01	0.12	.902
Age	-0.02 [-0.03, -0.02]	0.00	-9.19	< .001	-0.03 [-0.03, -0.02]	0.00	-8.83	< .001

Table 20 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep onset × pa mostactivehr	0.00 [0.00, 0.01]	0.00	1.07	.327	0.00 [0.00, 0.00]	0.00	1.61	.108
Pa mostactivehr × Sleep onset <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.20	.844	0.00 [0.00, 0.00]	0.00	-0.22	.828
Sleep regularity								
(Intercept)	1.38 [1.03, 1.74]	0.18	7.70	< .001	1.40 [1.17, 1.63]	0.12	12.03	< .001
Sleep regularity	0.06 [0.03, 0.09]	0.02	3.88	< .001	0.01 [-0.02, 0.04]	0.01	0.80	.426
Pa mostactivehr	0.00 [0.00, 0.01]	0.00	0.86	.407	0.00 [0.00, 0.00]	0.00	0.70	.491
Sleep regularity <sup>2</sup>	-0.01 [-0.04, 0.02]	0.02	-0.45	.683	-0.01 [-0.04, 0.02]	0.01	-0.57	.611
Age	-0.02 [-0.03, -0.02]	0.00	-8.81	< .001	-0.03 [-0.03, -0.02]	0.00	-8.67	< .001
Sleep regularity × pa mostactivehr	0.00 [0.00, 0.01]	0.00	0.36	.741	0.00 [0.00, 0.00]	0.00	2.05	.042
Pa mostactivehr × Sleep regularity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.32	.765	0.00 [0.00, 0.00]	0.00	0.24	.826

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

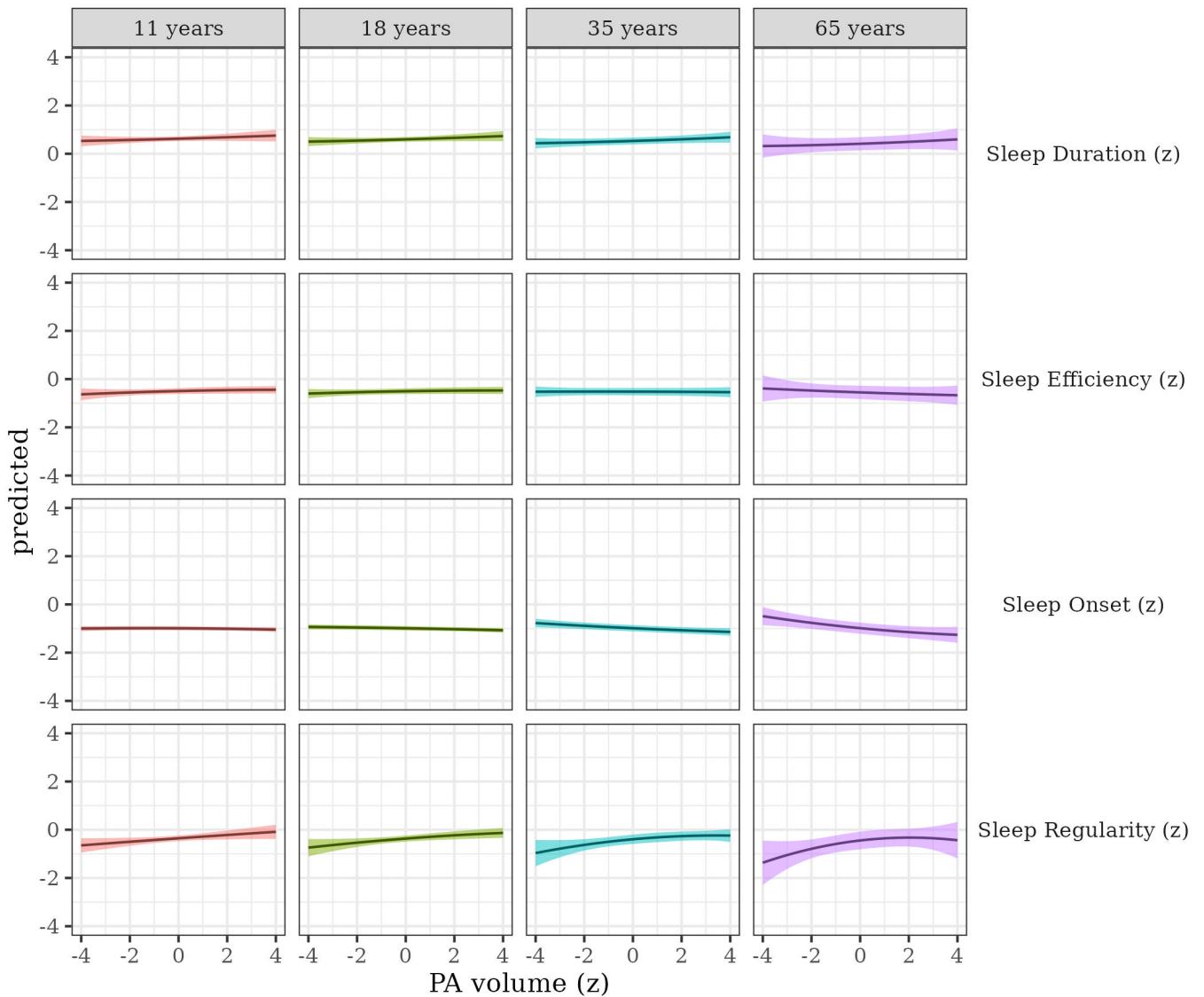


Figure 1. Sleep metrics on Physical activity volume

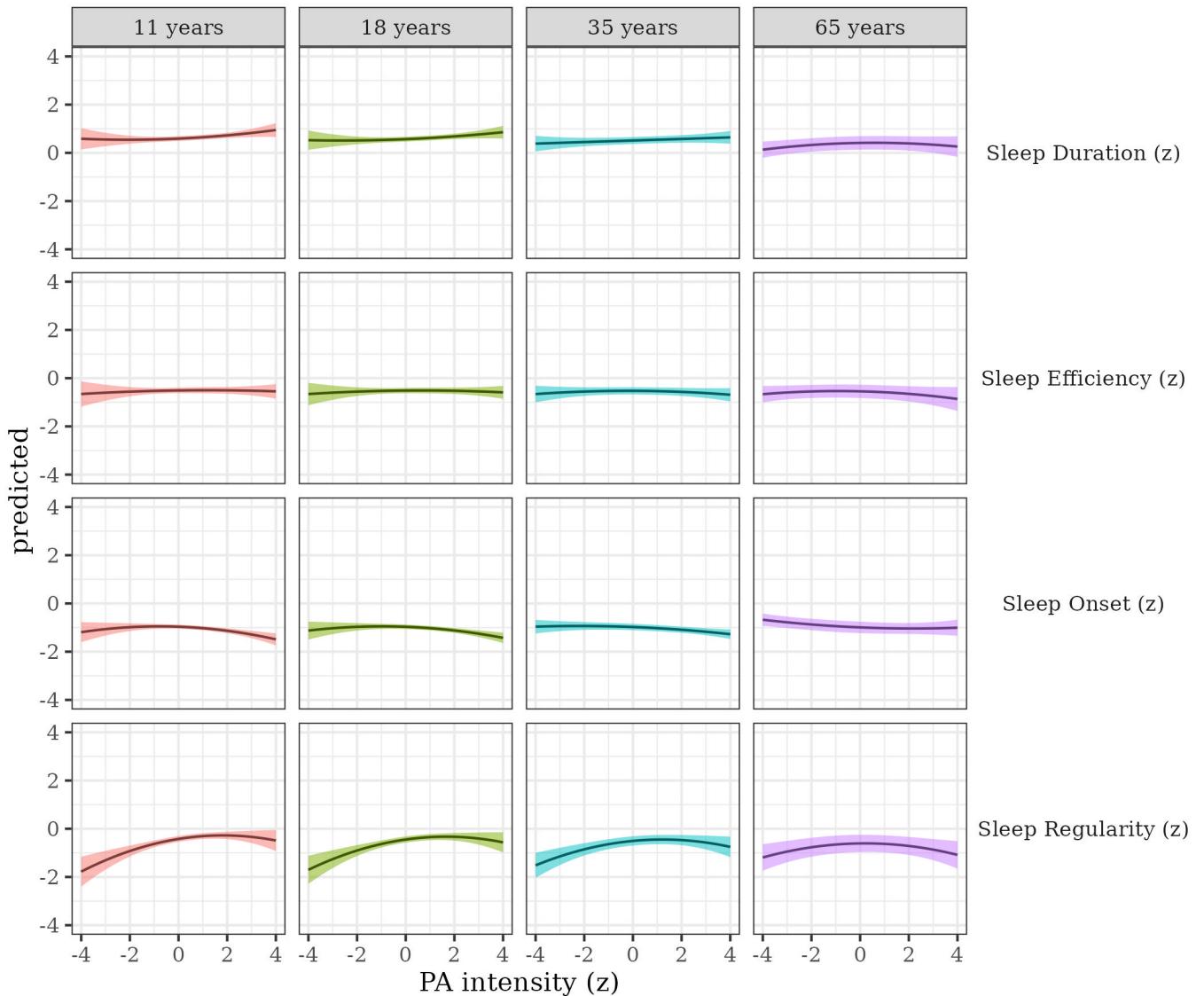


Figure 2. Sleep metrics on Physical activity intensity

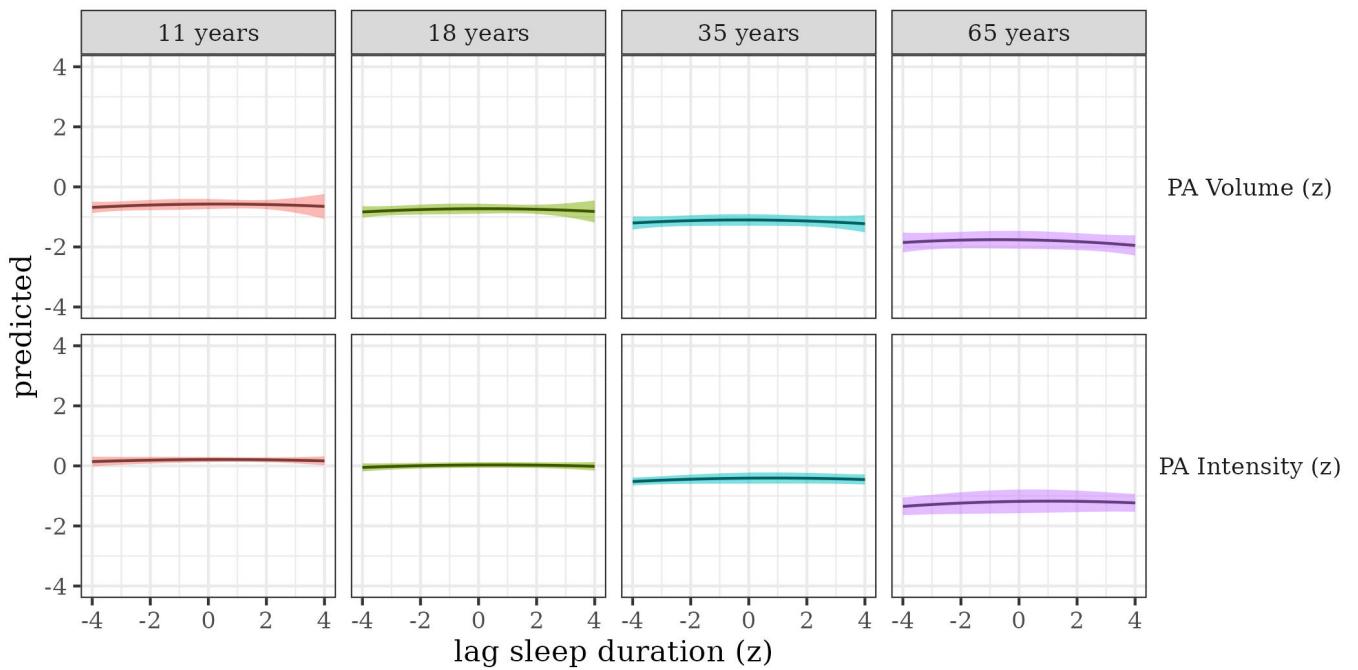


Figure 3. Physical activity by sleep duration

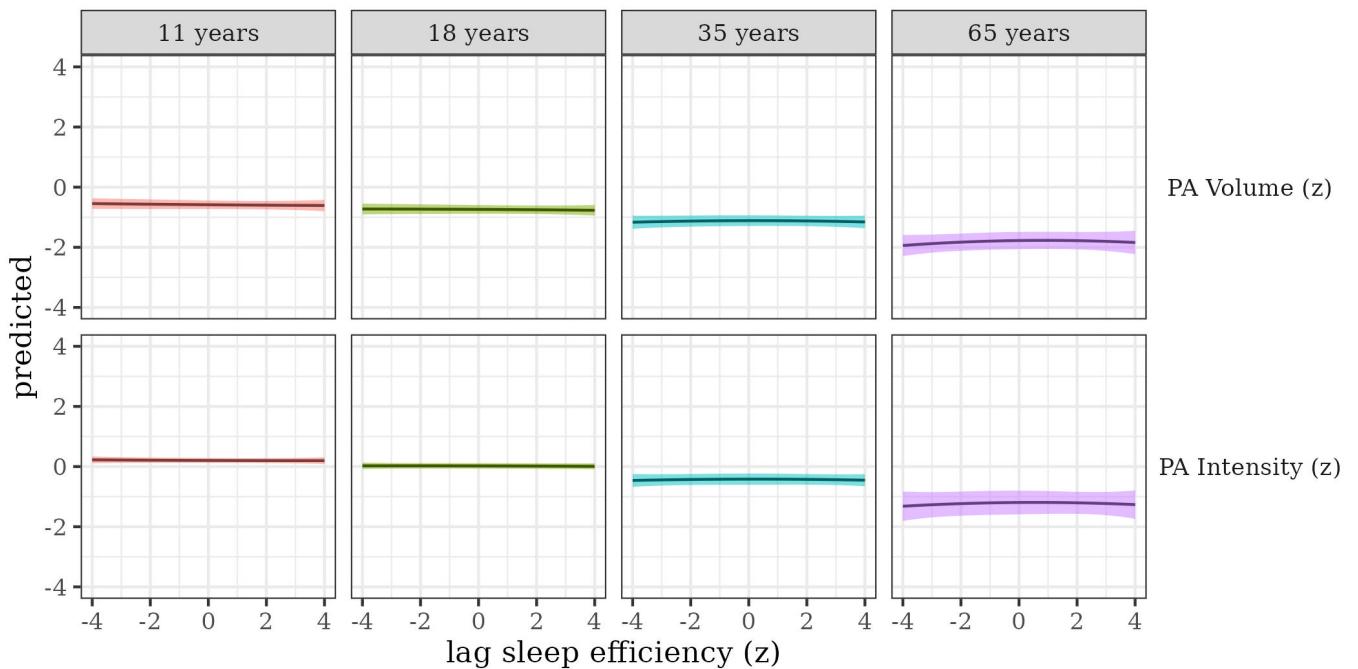


Figure 4. Physical activity by sleep efficiency

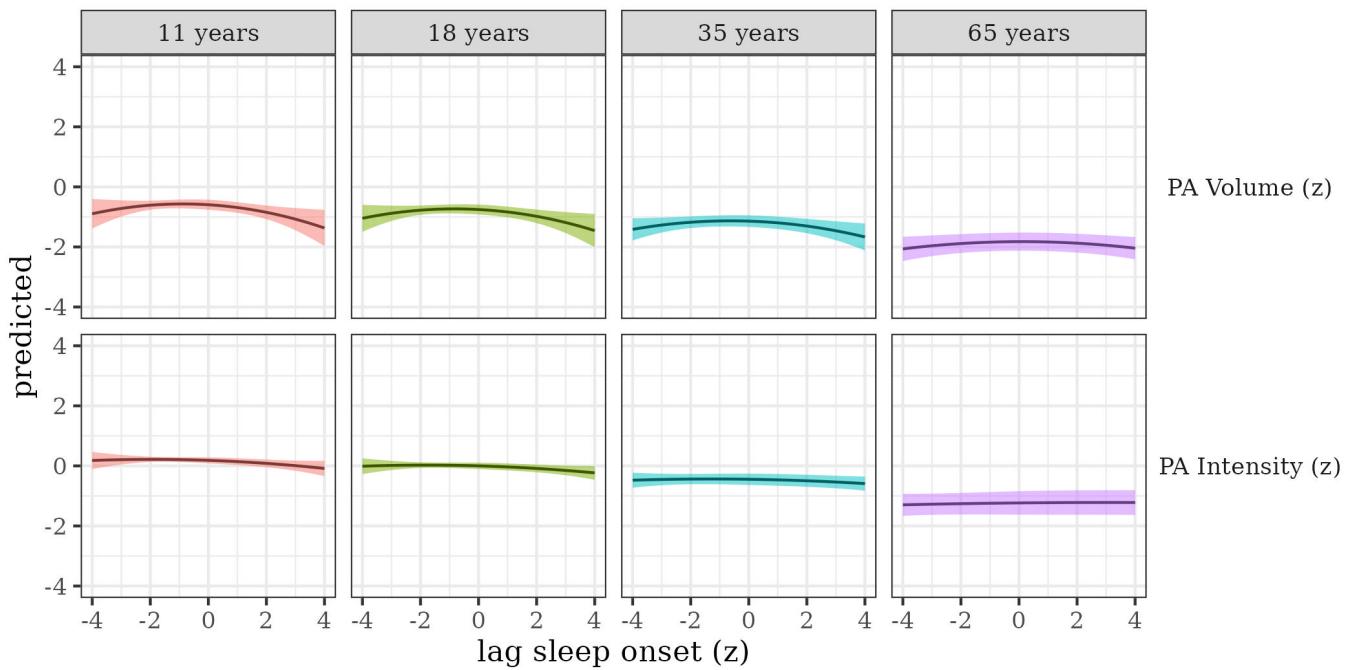


Figure 5. Physical activity by sleep onset

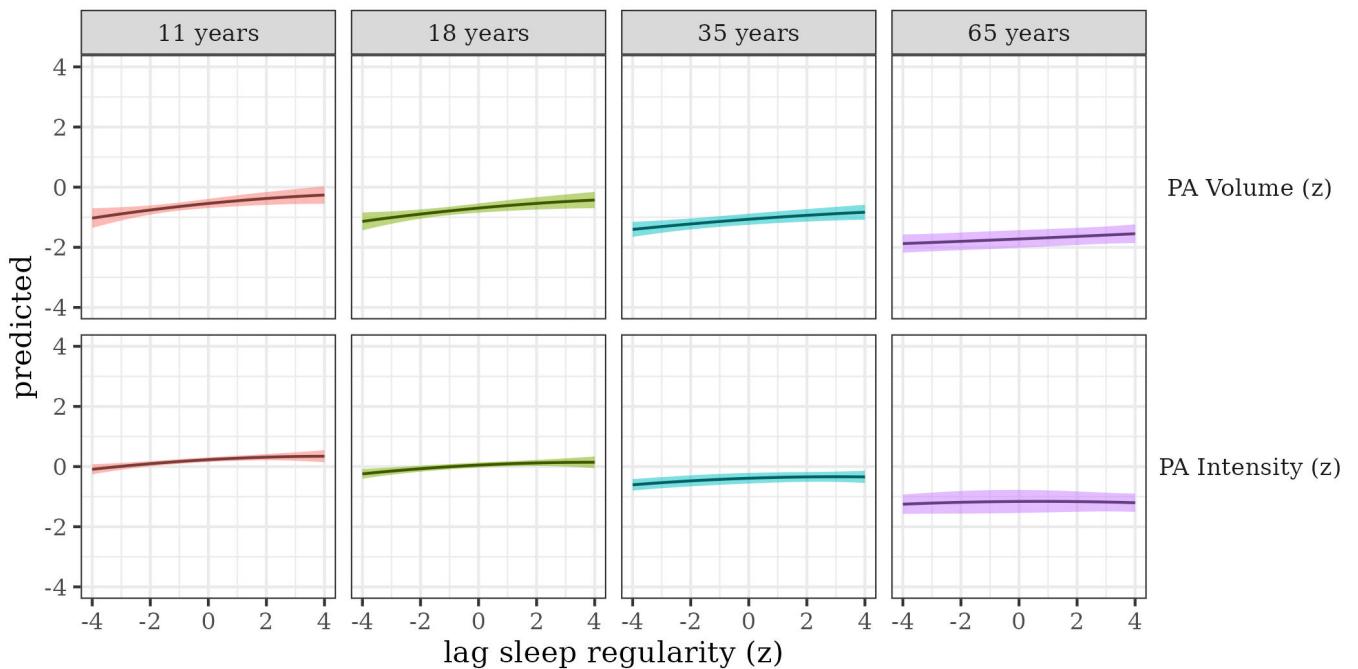


Figure 6. Physical activity by sleep regularity

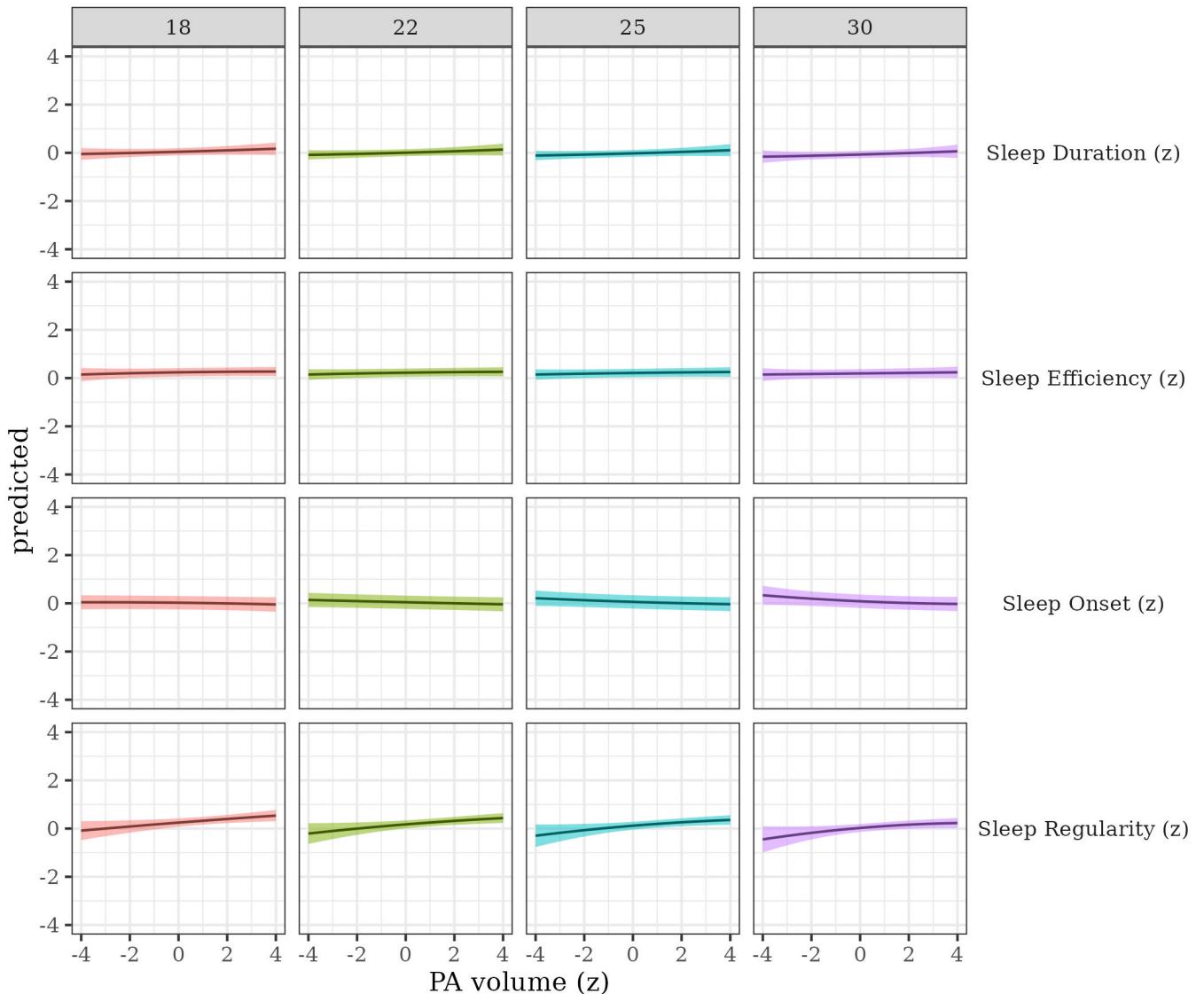


Figure 7. Sleep metrics on Physical activity volume by BMI

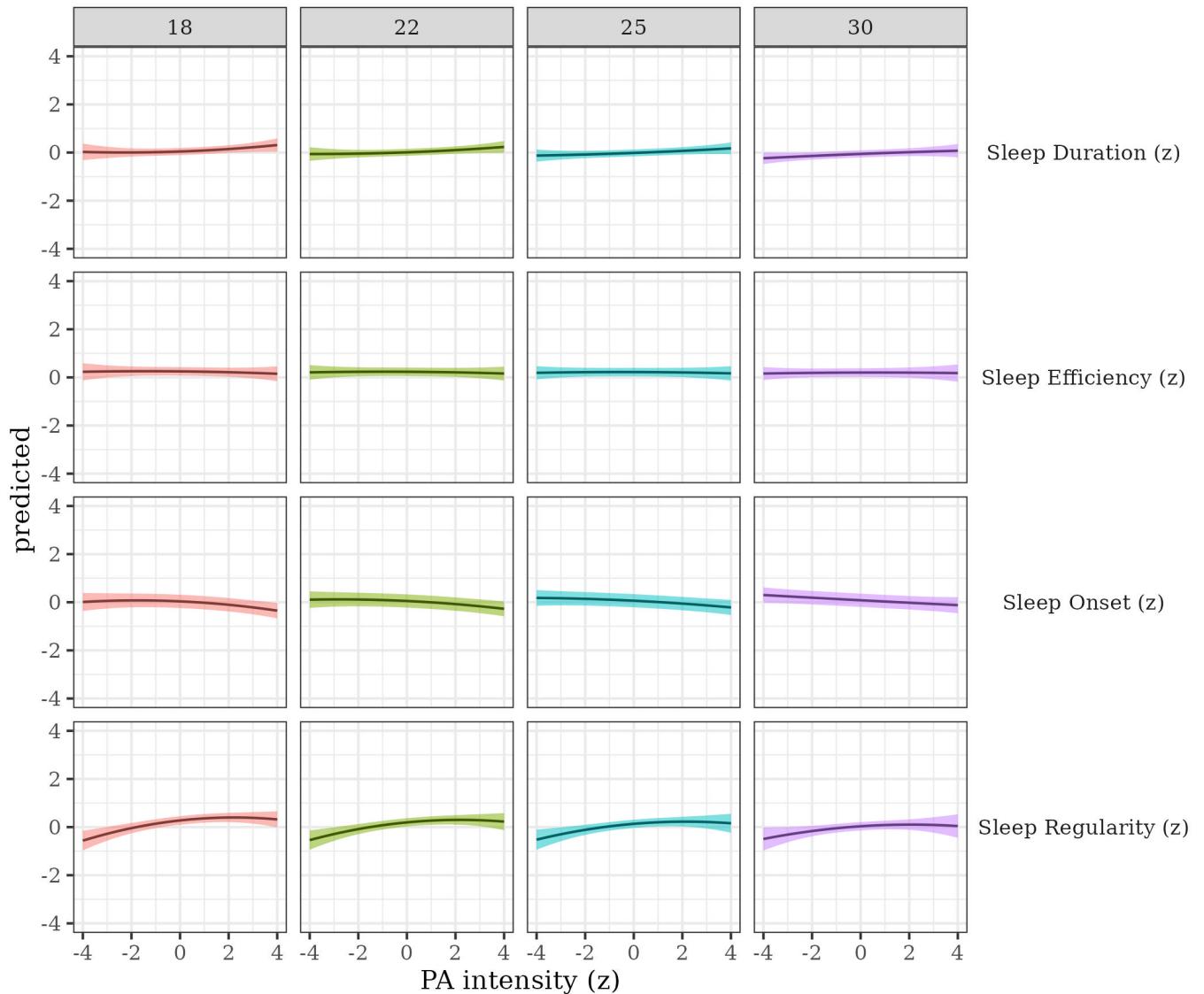


Figure 8. Sleep metrics on Physical activity intensity moderated by BMI

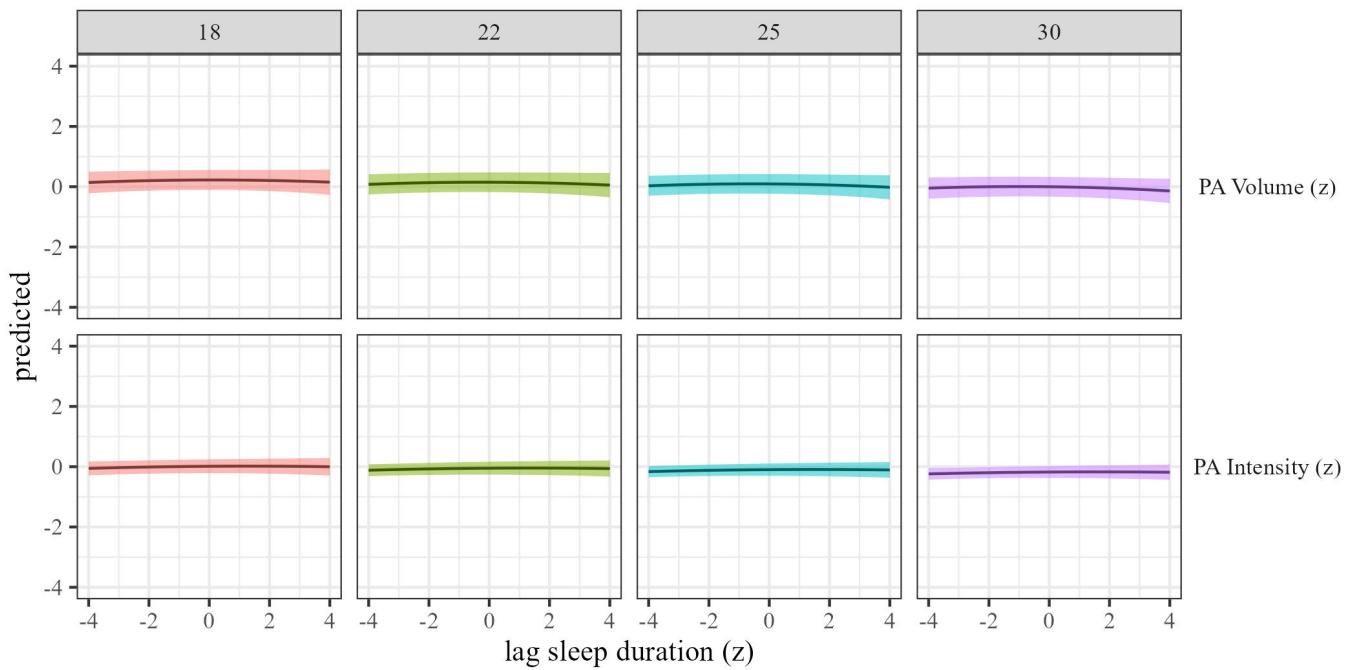


Figure 9. Physical activity by sleep duration moderated by BMI

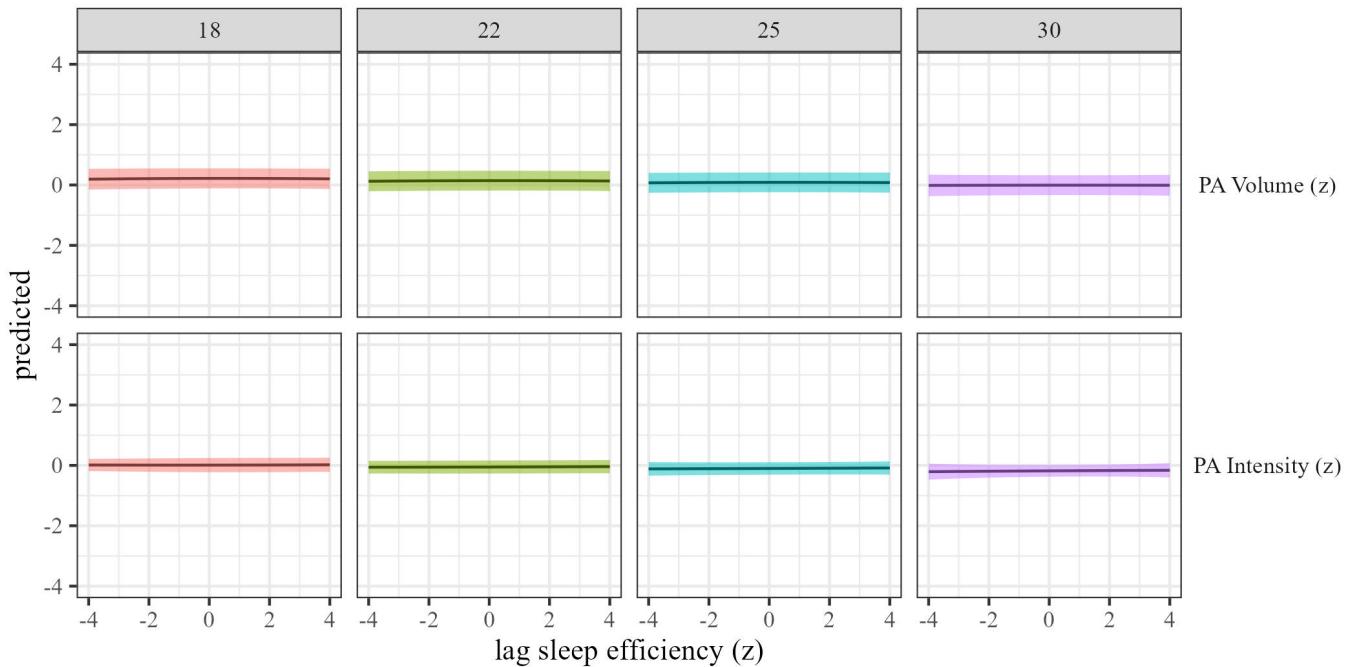


Figure 10. Physical activity by sleep efficiency moderated by BMI

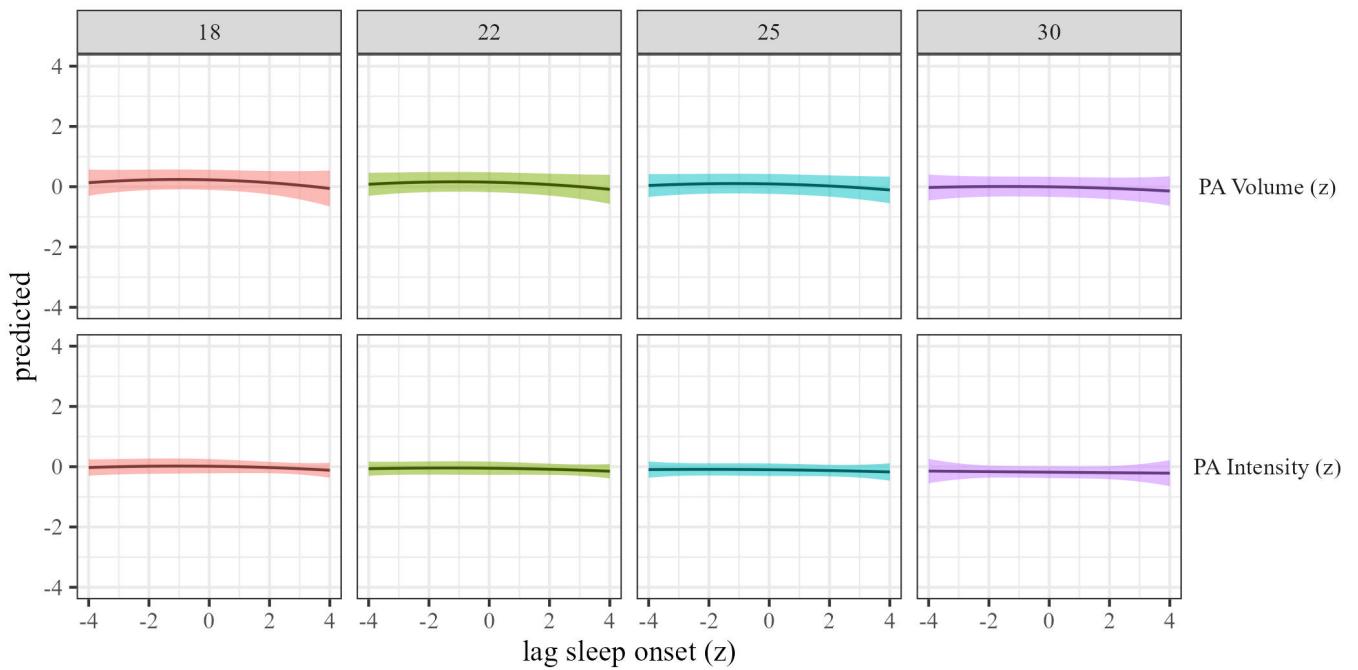


Figure 11. Physical activity by sleep onset moderated by BMI

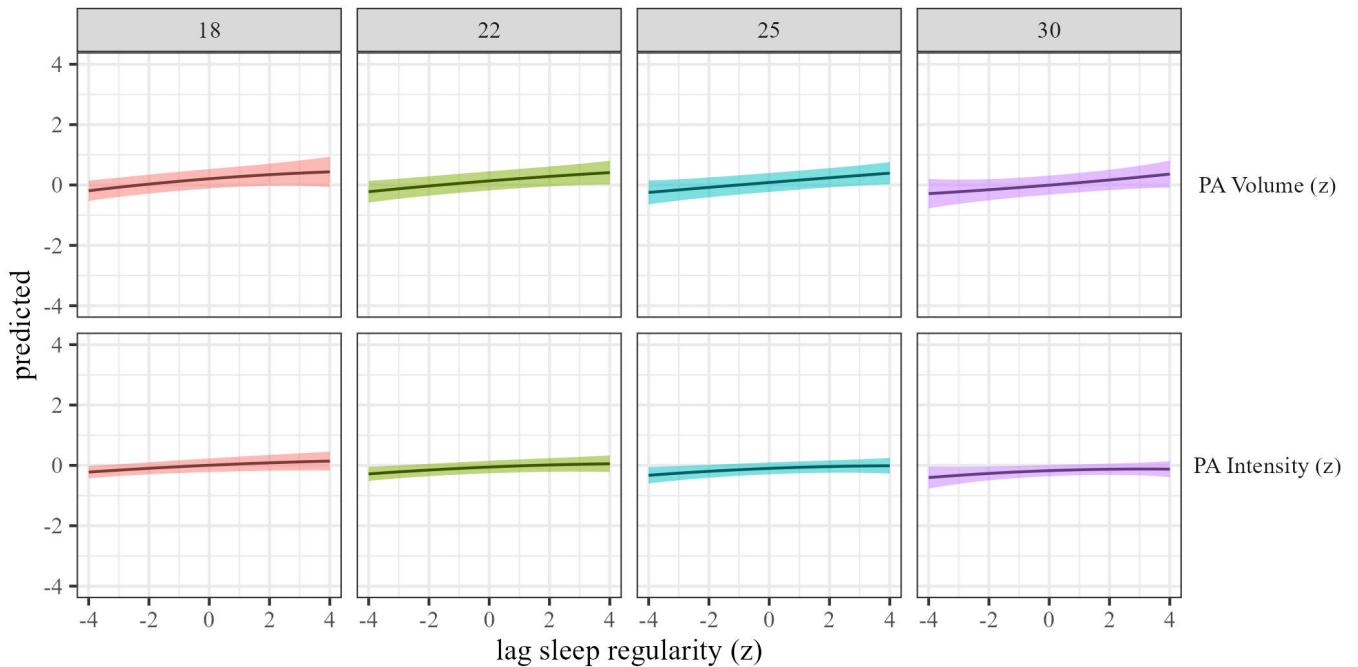


Figure 12. Physical activity by sleep regularity moderated by BMI

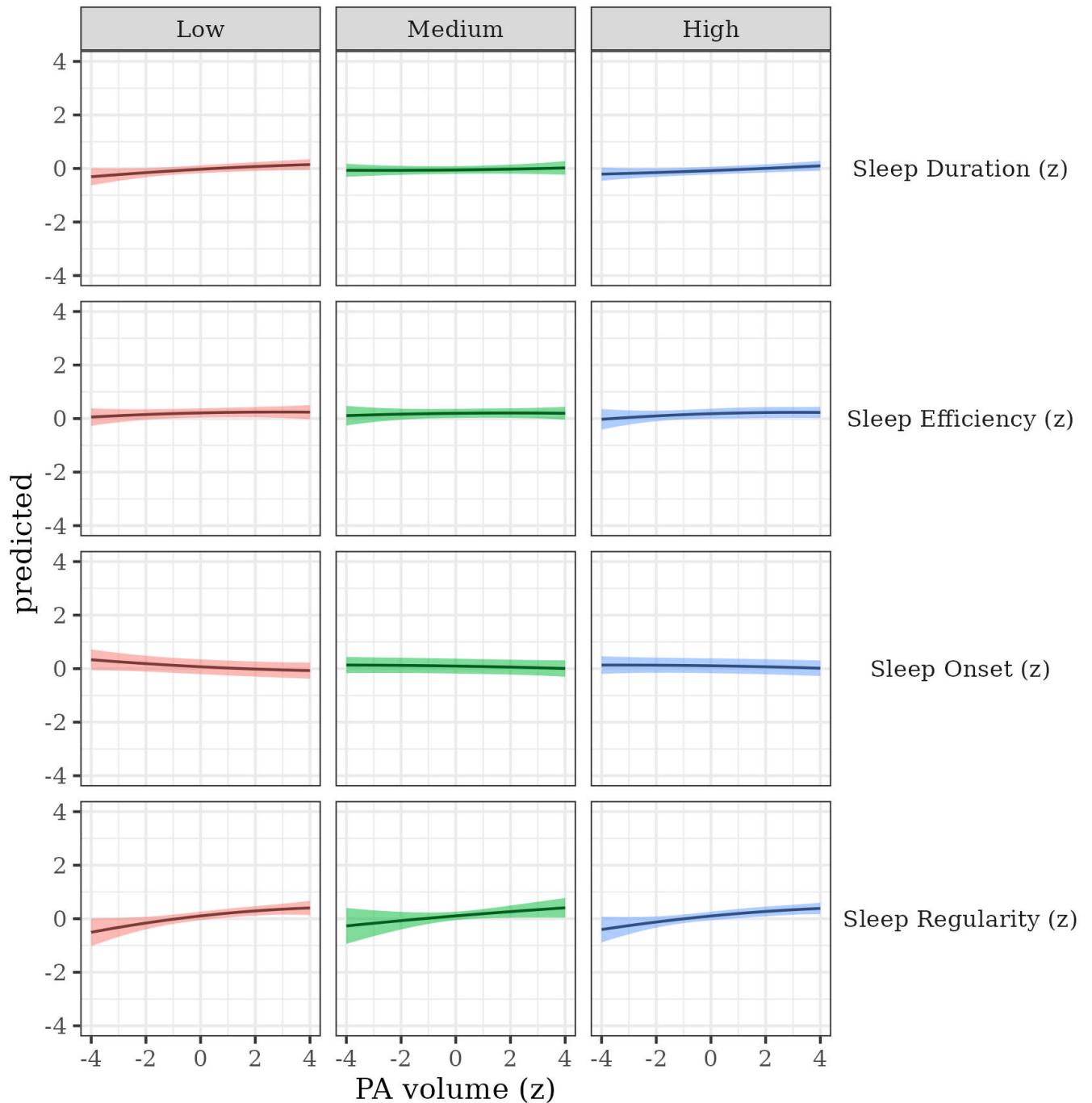


Figure 13. Sleep metrics on Physical activity volume by SES

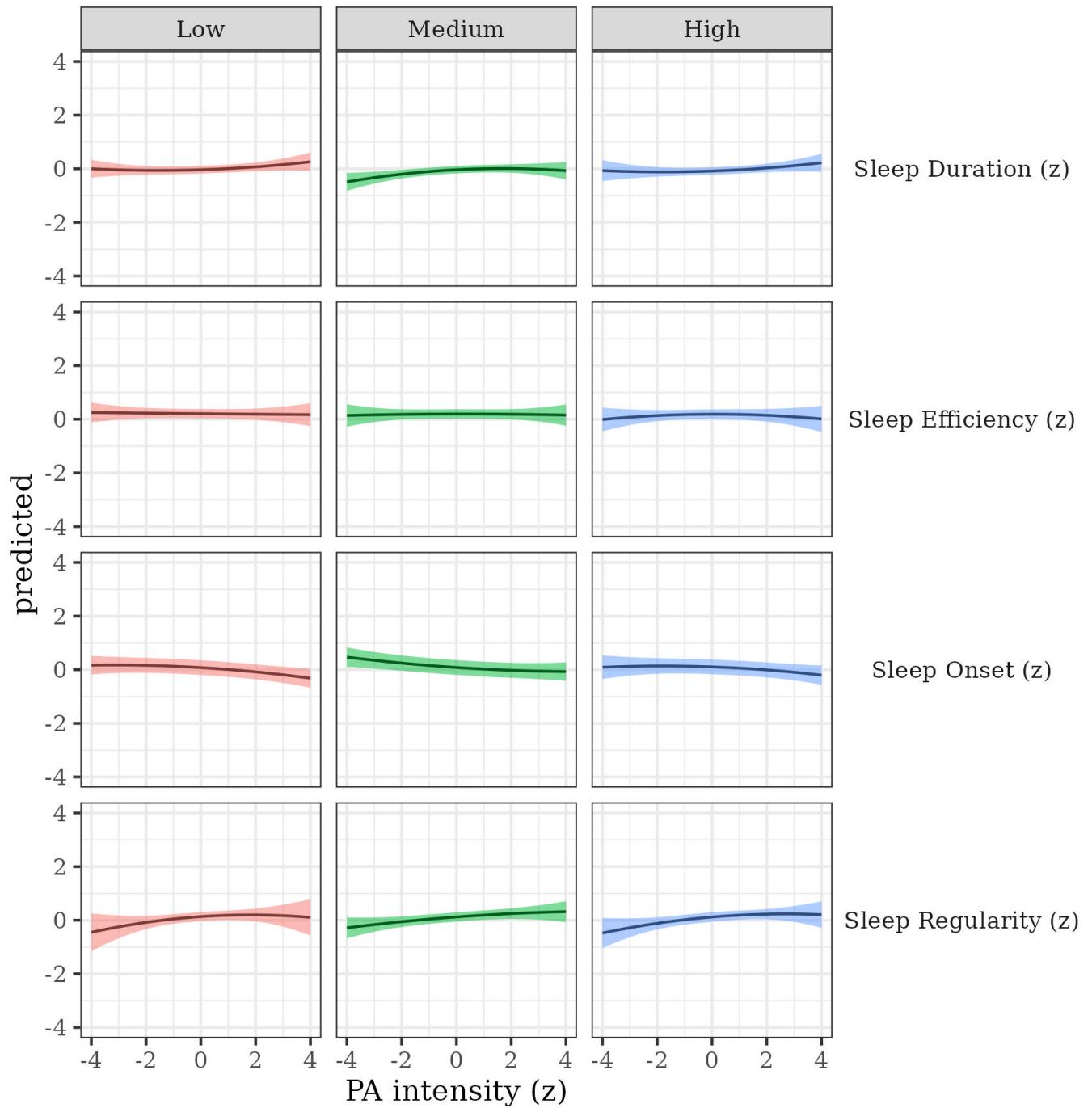


Figure 14. Sleep metrics on Physical activity intensity moderated by SES

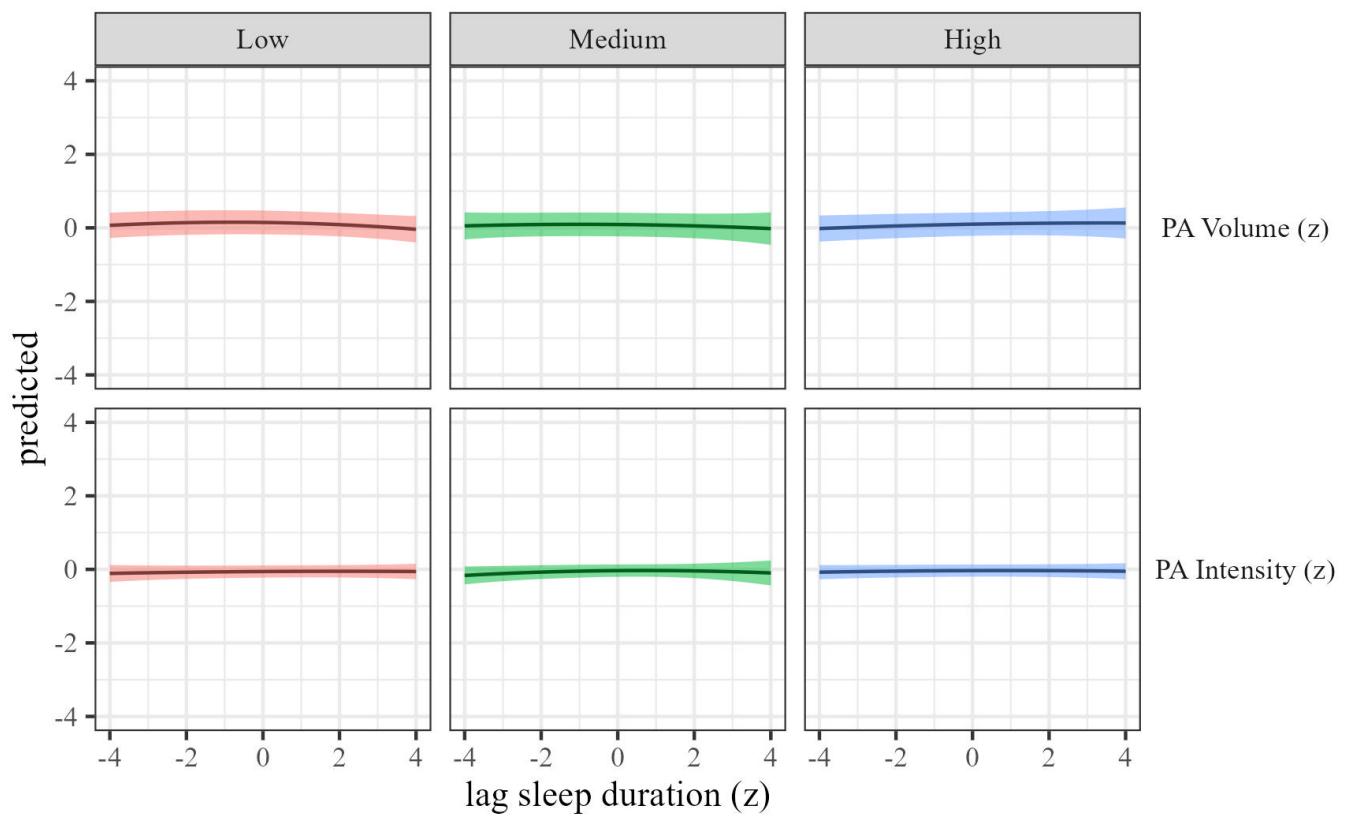


Figure 15. Physical activity by sleep duration moderated by SES

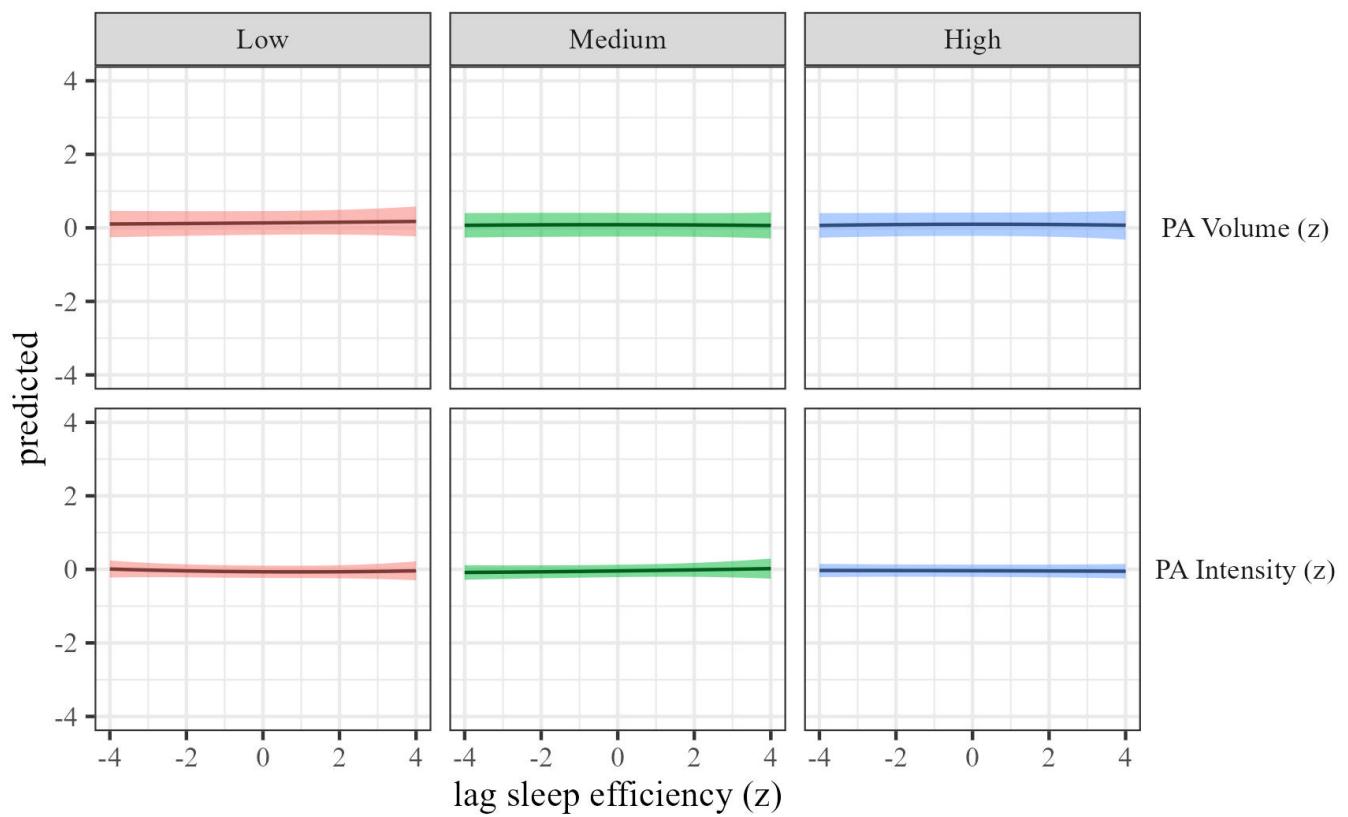


Figure 16. Physical activity by sleep efficiency moderated by SES

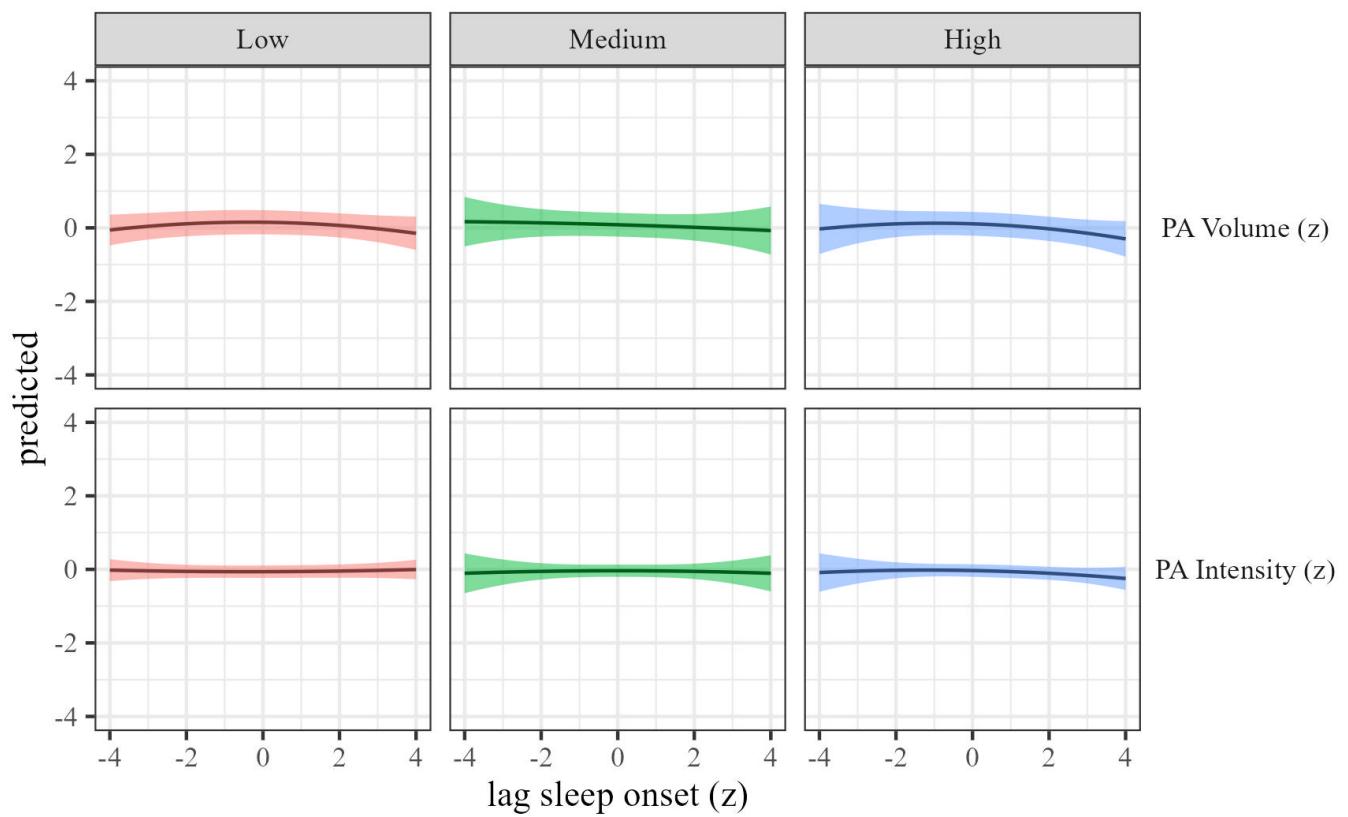


Figure 17. Physical activity by sleep onset moderated by SES

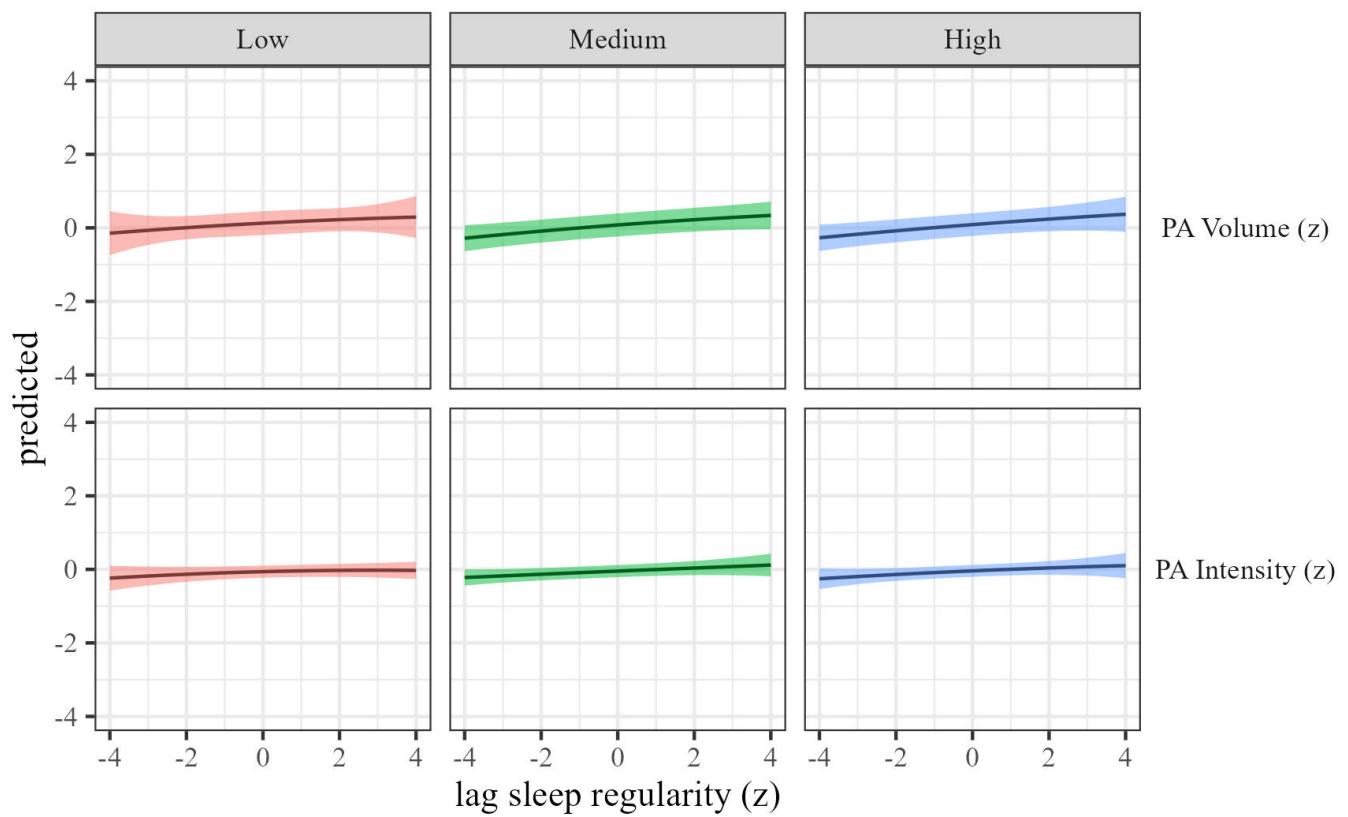


Figure 18. Physical activity by sleep regularity moderated by SES

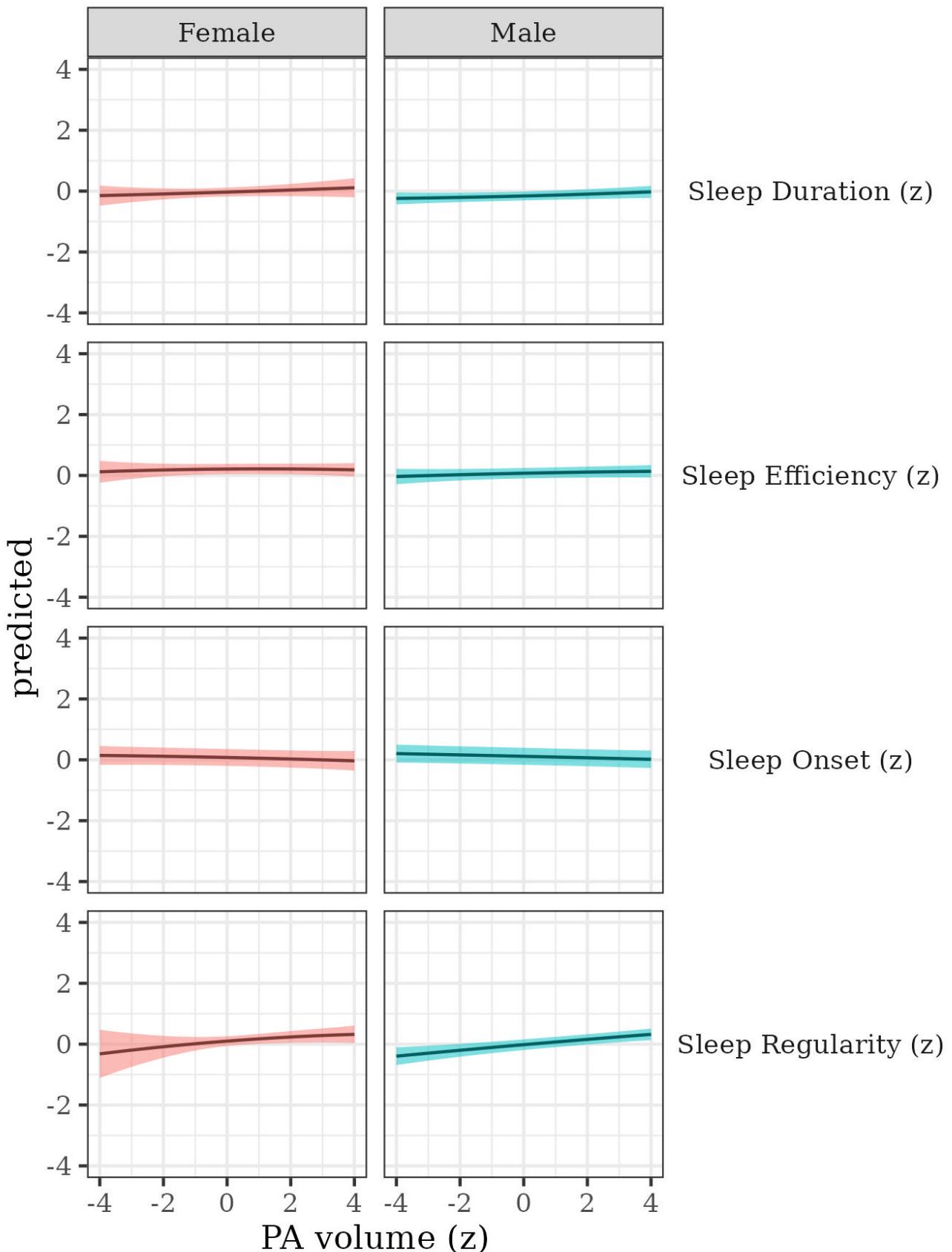


Figure 19. Sleep metrics on Physical activity volume by sex

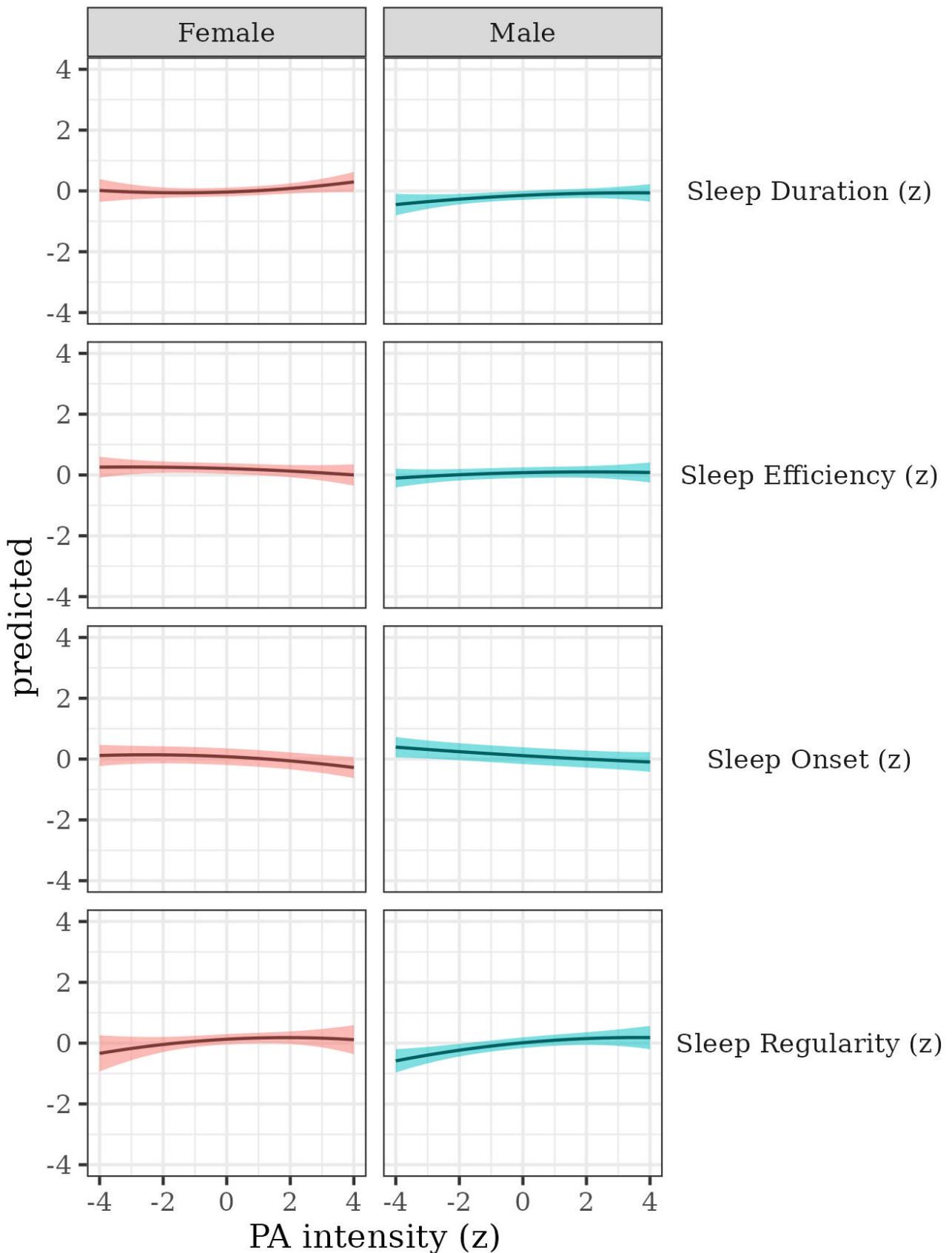


Figure 20. Sleep metrics on Physical activity intensity moderated by sex

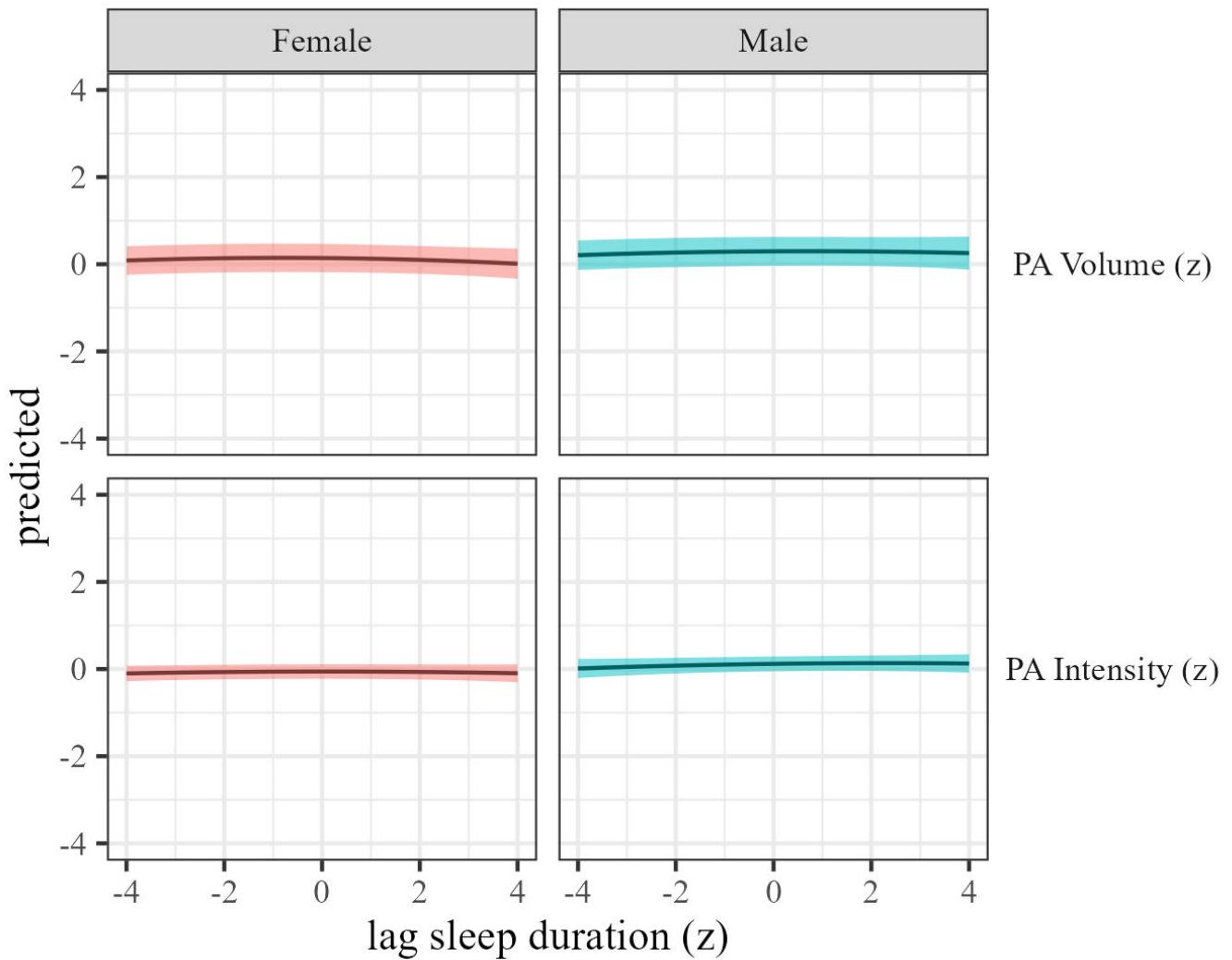


Figure 21. Physical activity by sleep duration moderated by sex

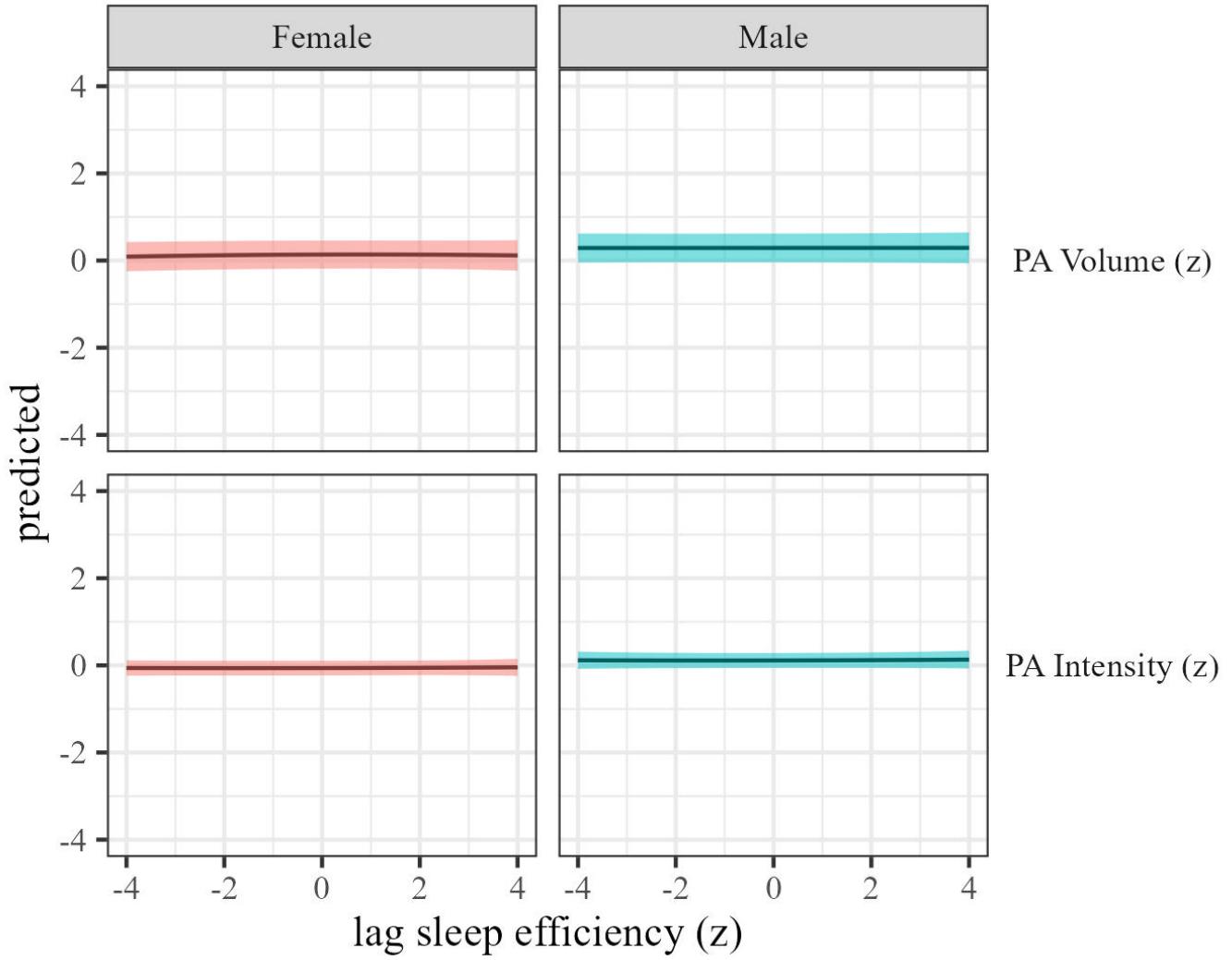


Figure 22. Physical activity by sleep efficiency moderated by sex

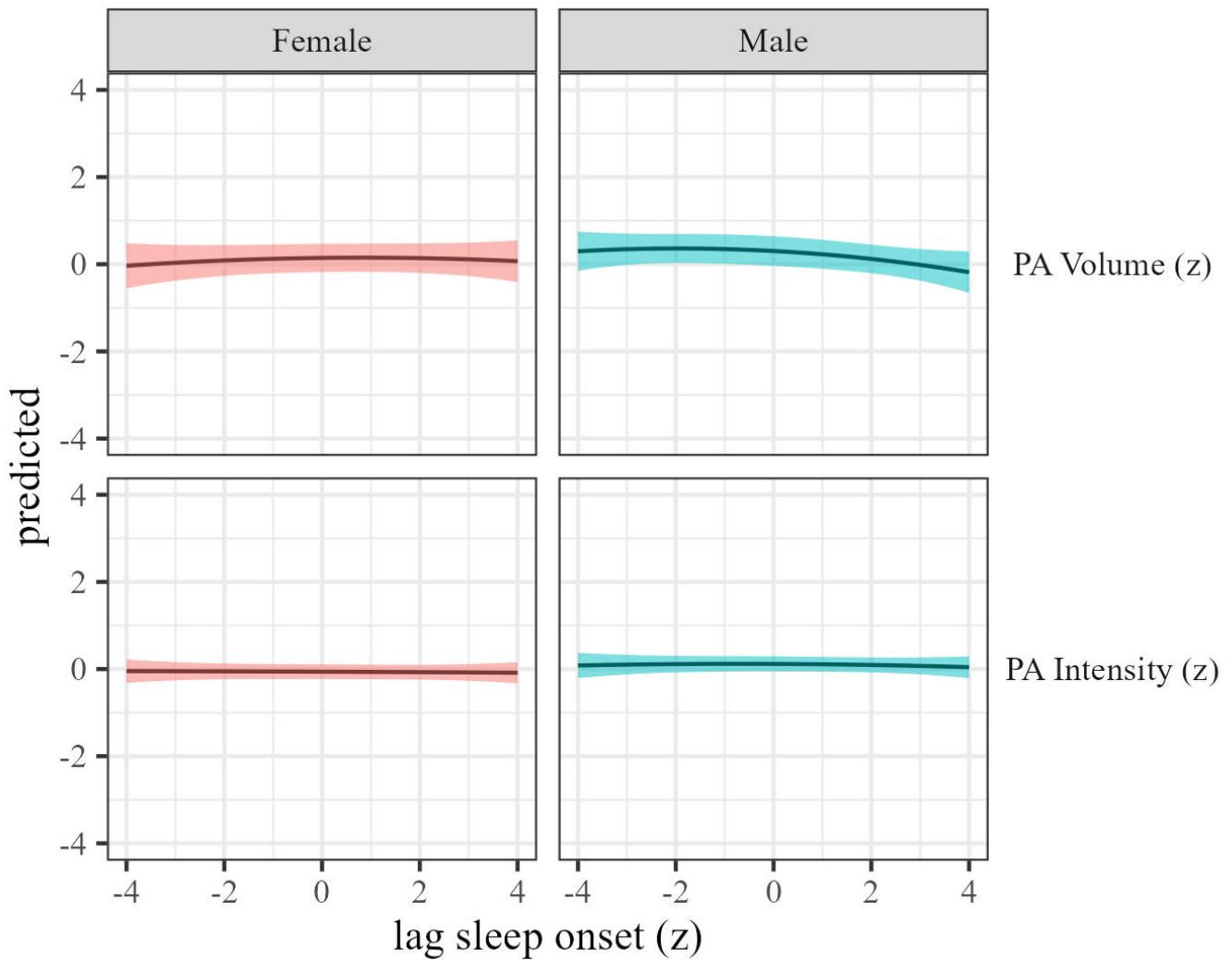


Figure 23. Physical activity by sleep onset moderated by sex

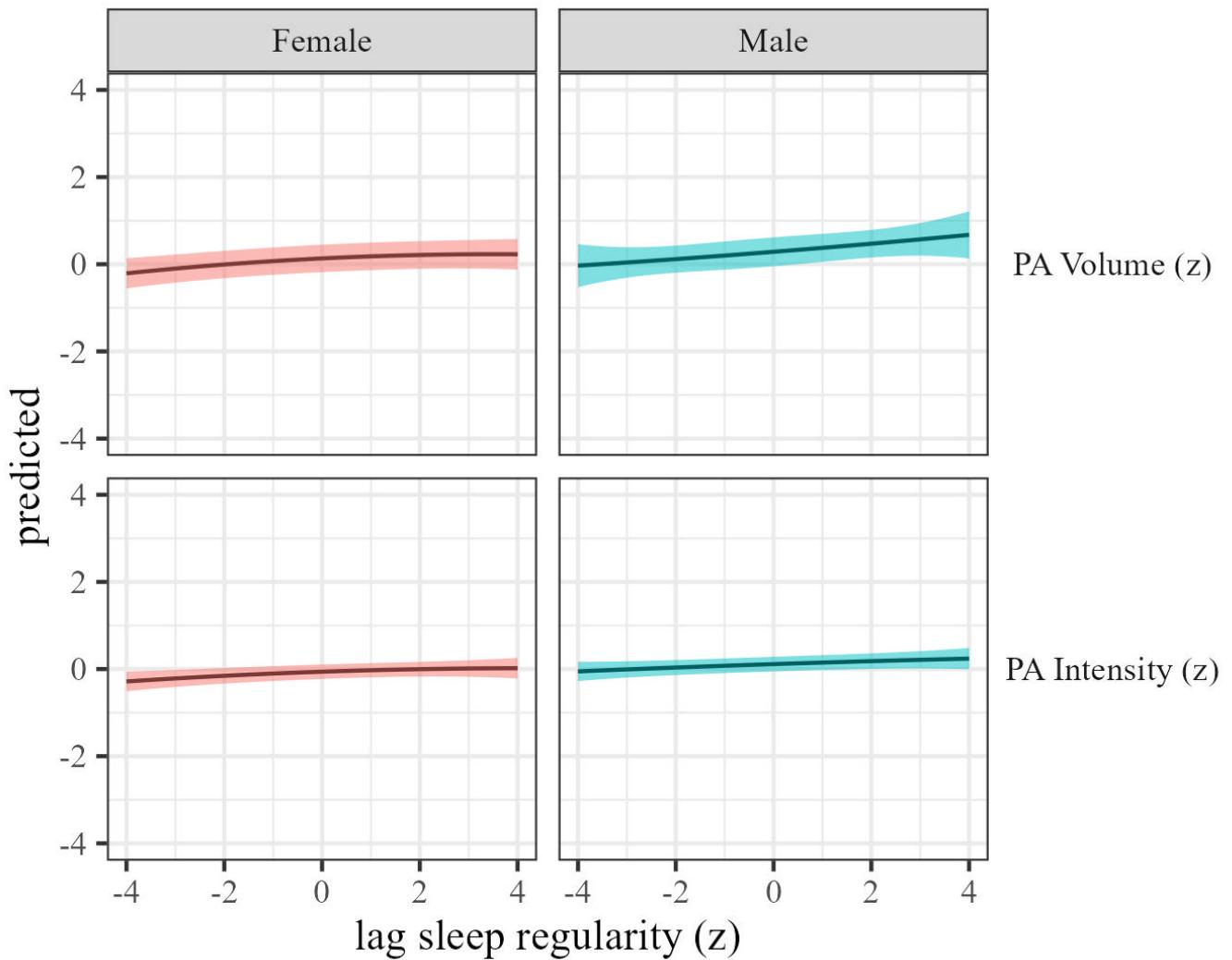


Figure 24. Physical activity by sleep regularity moderated by sex

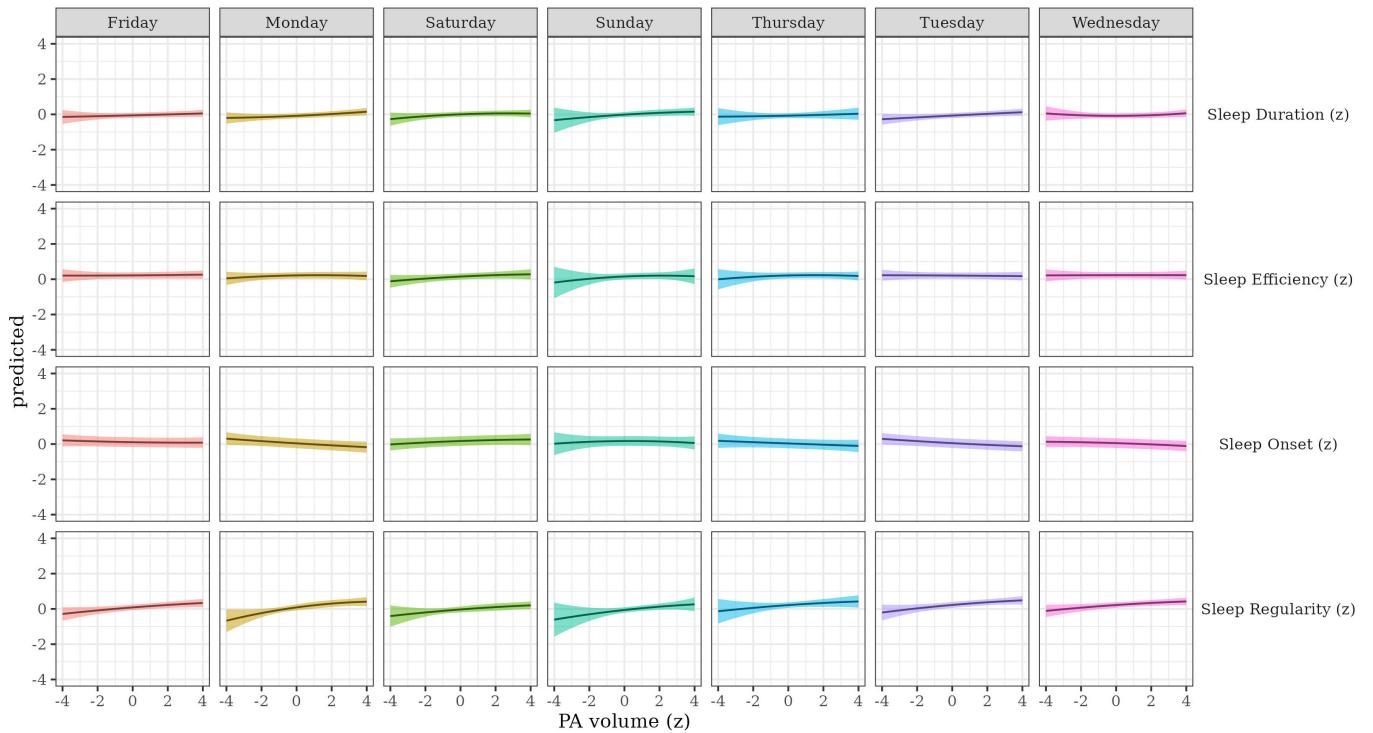


Figure 25. Sleep metrics on Physical activity volume by weekday

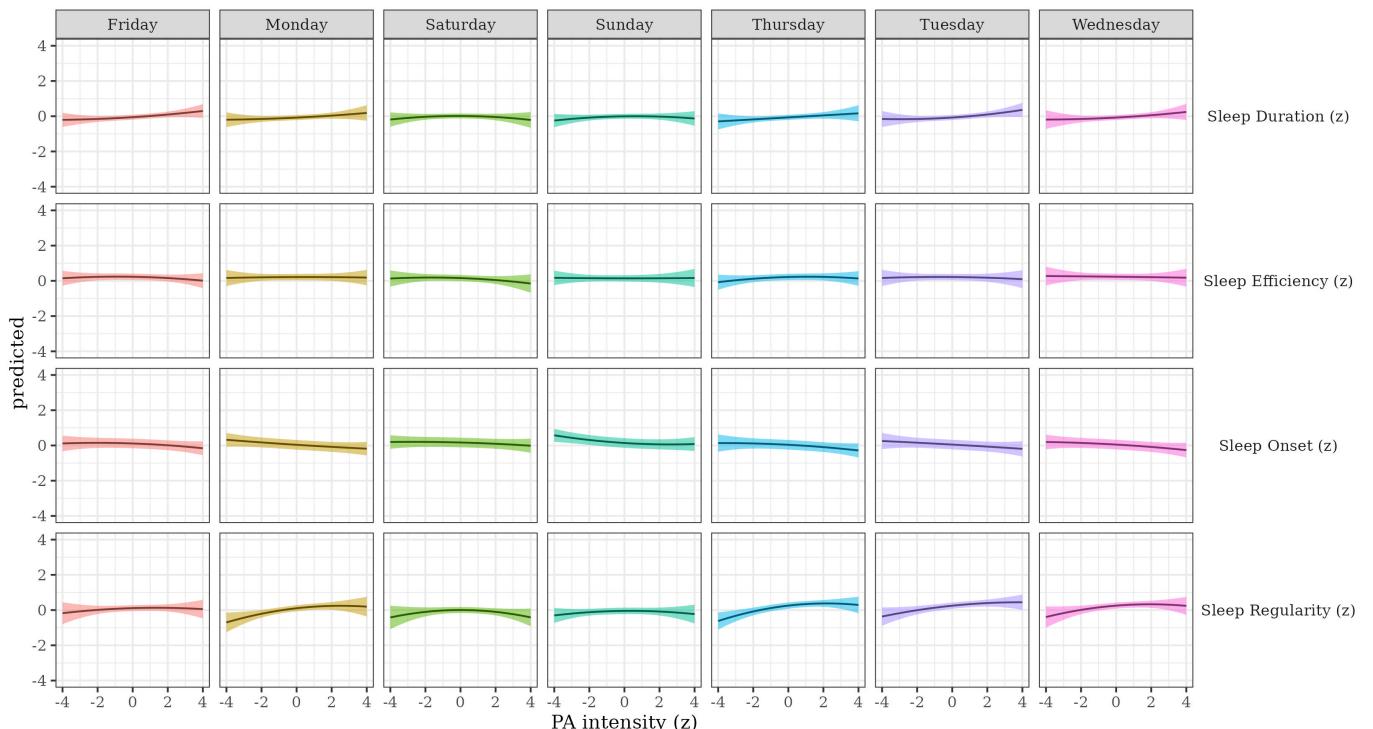


Figure 26. Sleep metrics on Physical activity intensity moderated by weekday

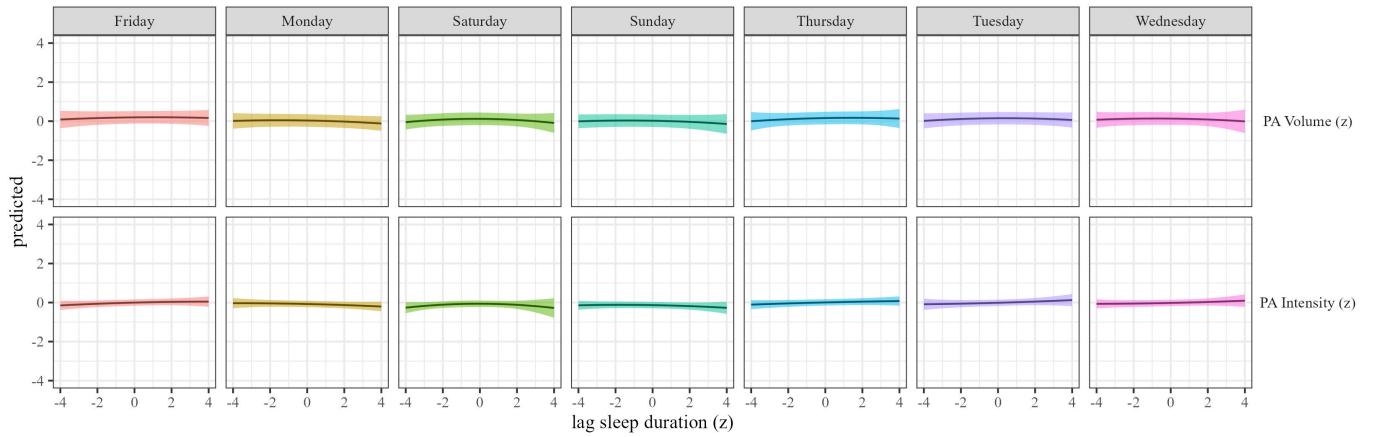


Figure 27. Physical activity by sleep duration moderated by weekday

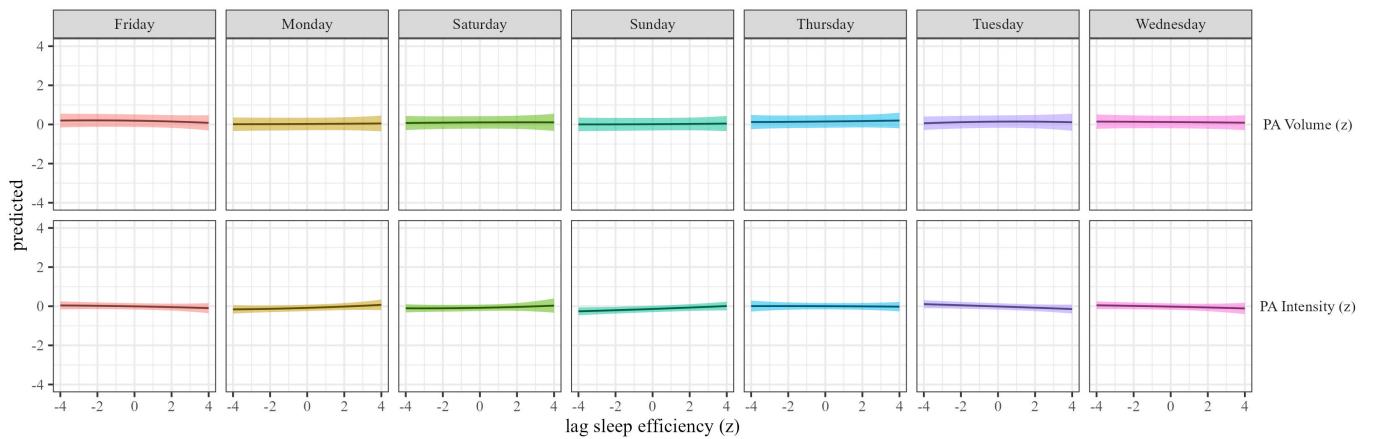


Figure 28. Physical activity by sleep efficiency moderated by weekday

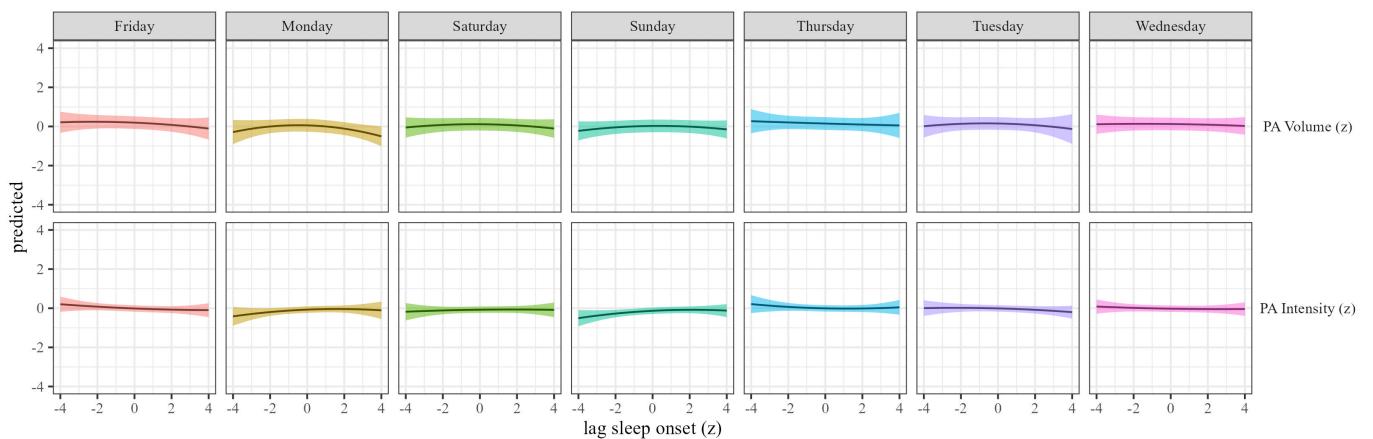


Figure 29. Physical activity by sleep onset moderated by weekday

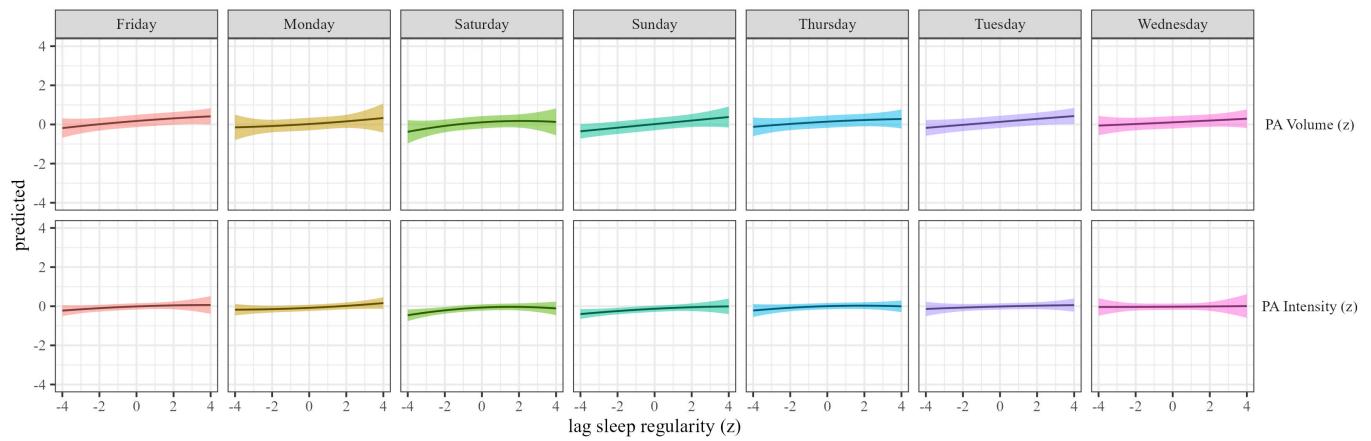


Figure 30. Physical activity by sleep regularity moderated by weekday

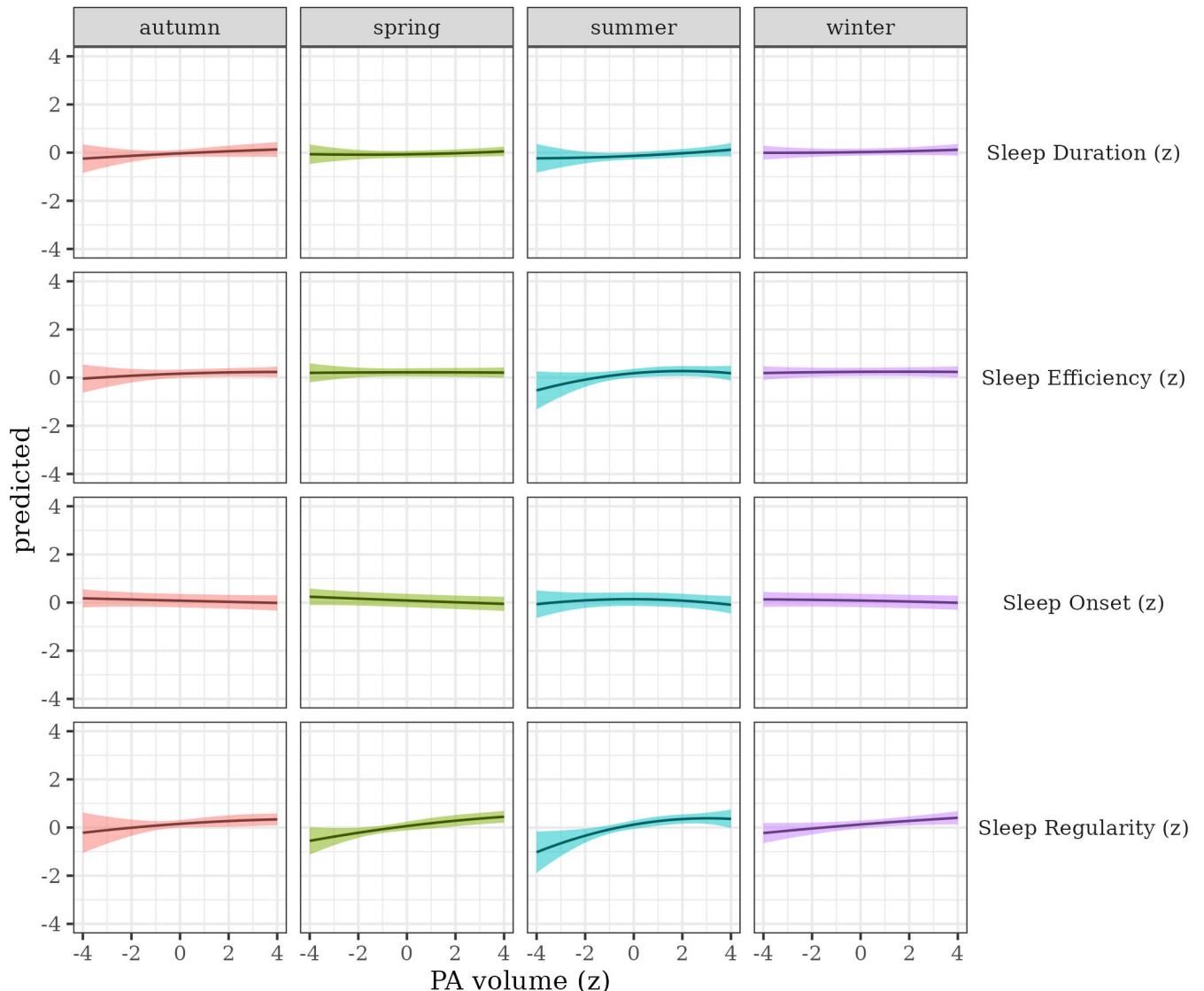


Figure 31. Sleep metrics on Physical activity volume by season

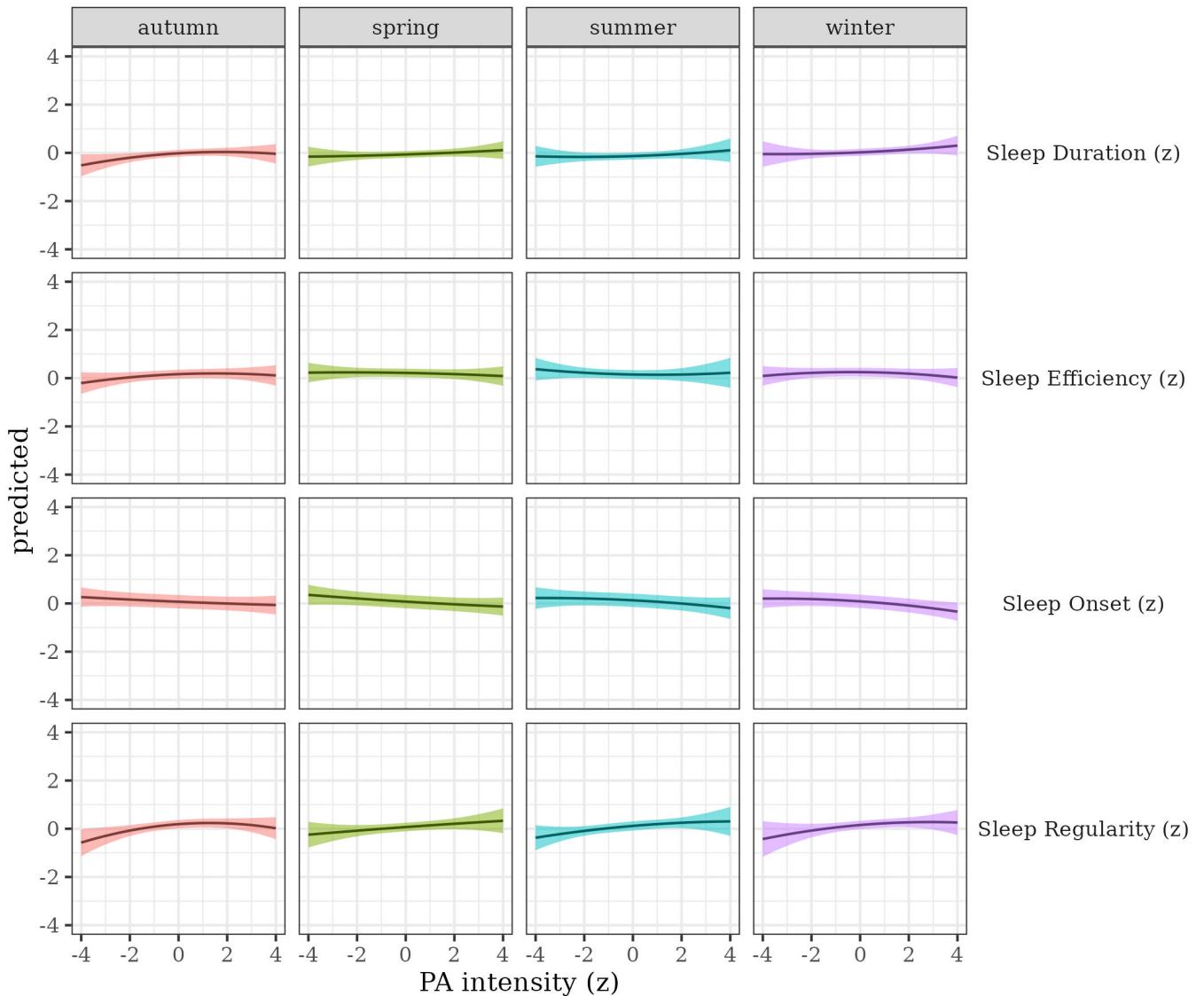


Figure 32. Sleep metrics on Physical activity intensity moderated by season

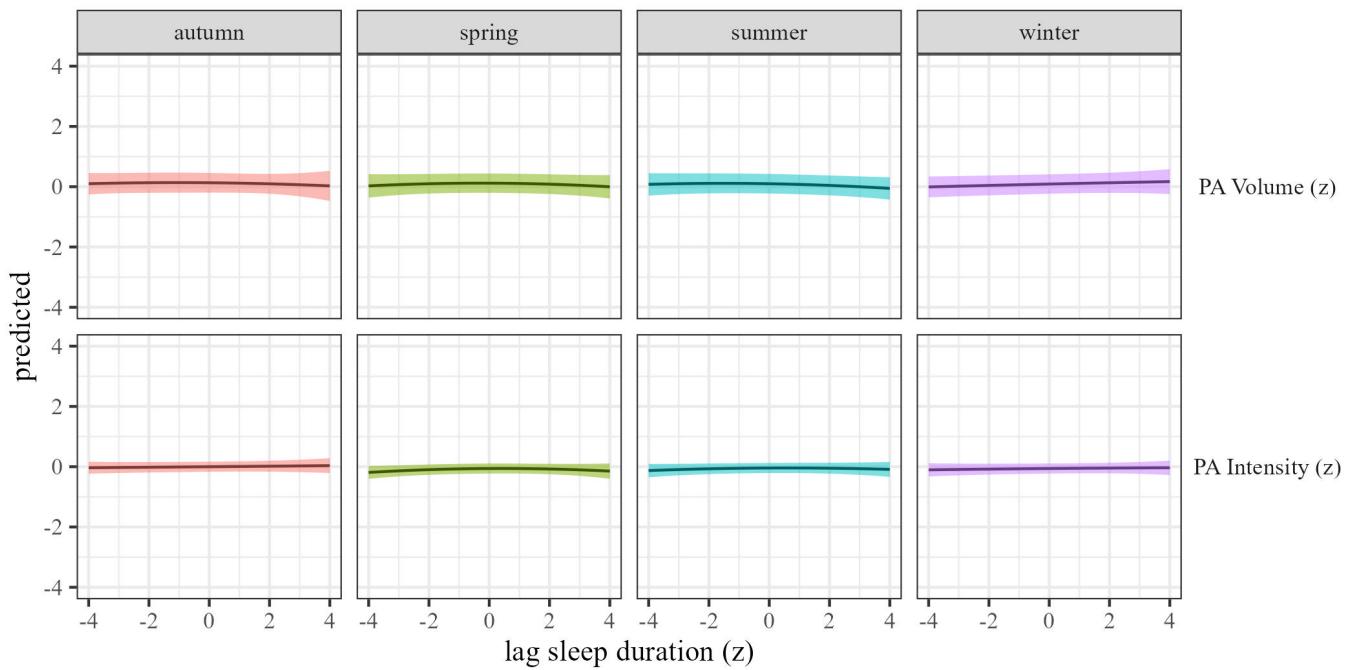


Figure 33. Physical activity by sleep duration moderated by season

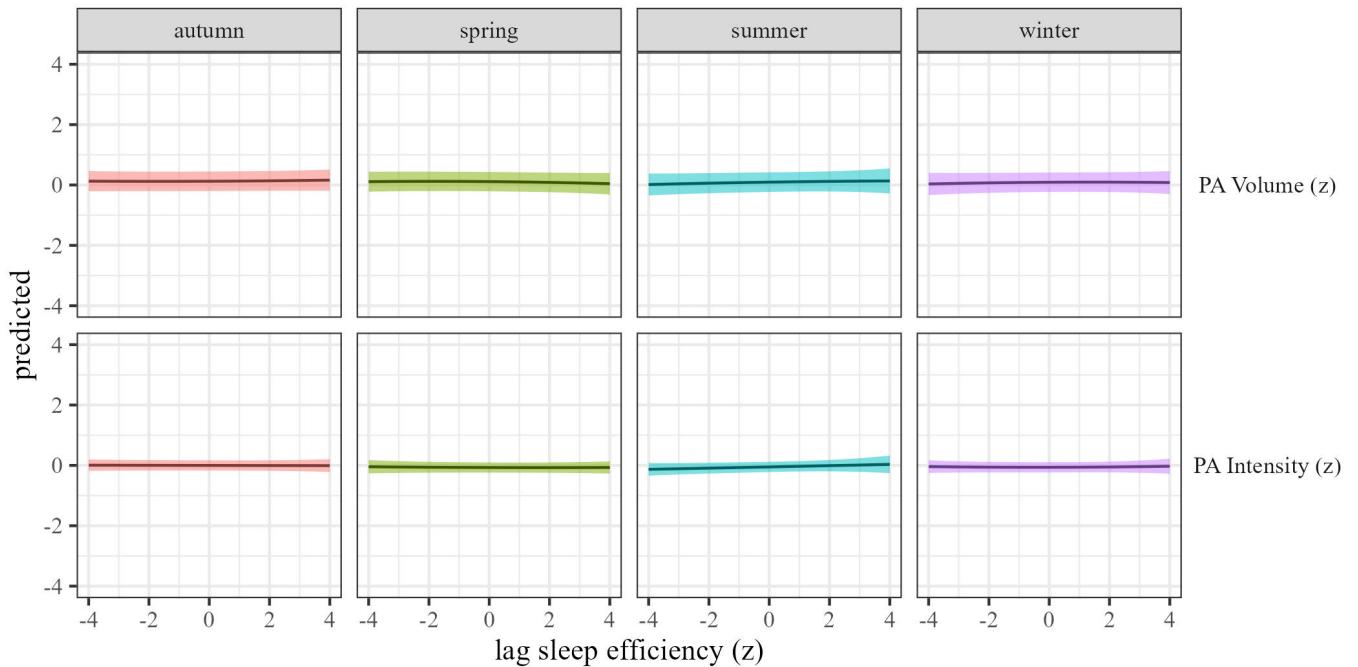


Figure 34. Physical activity by sleep efficiency moderated by season

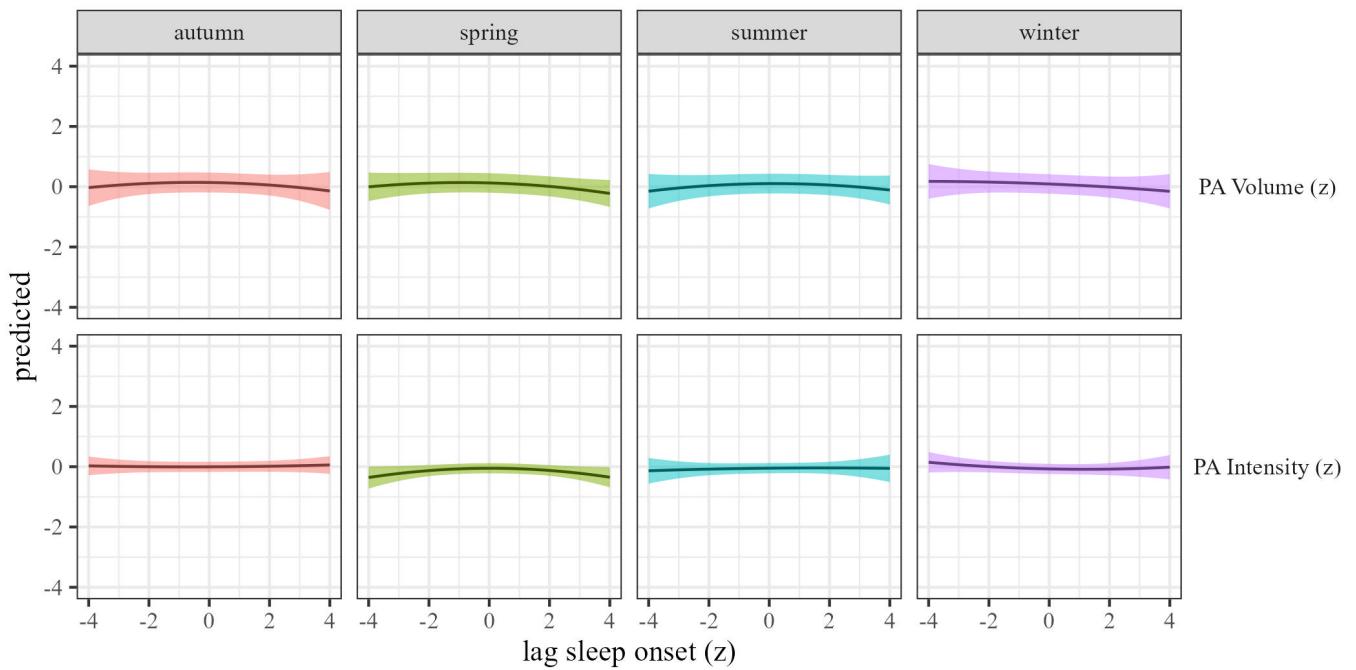


Figure 35. Physical activity by sleep onset moderated by season

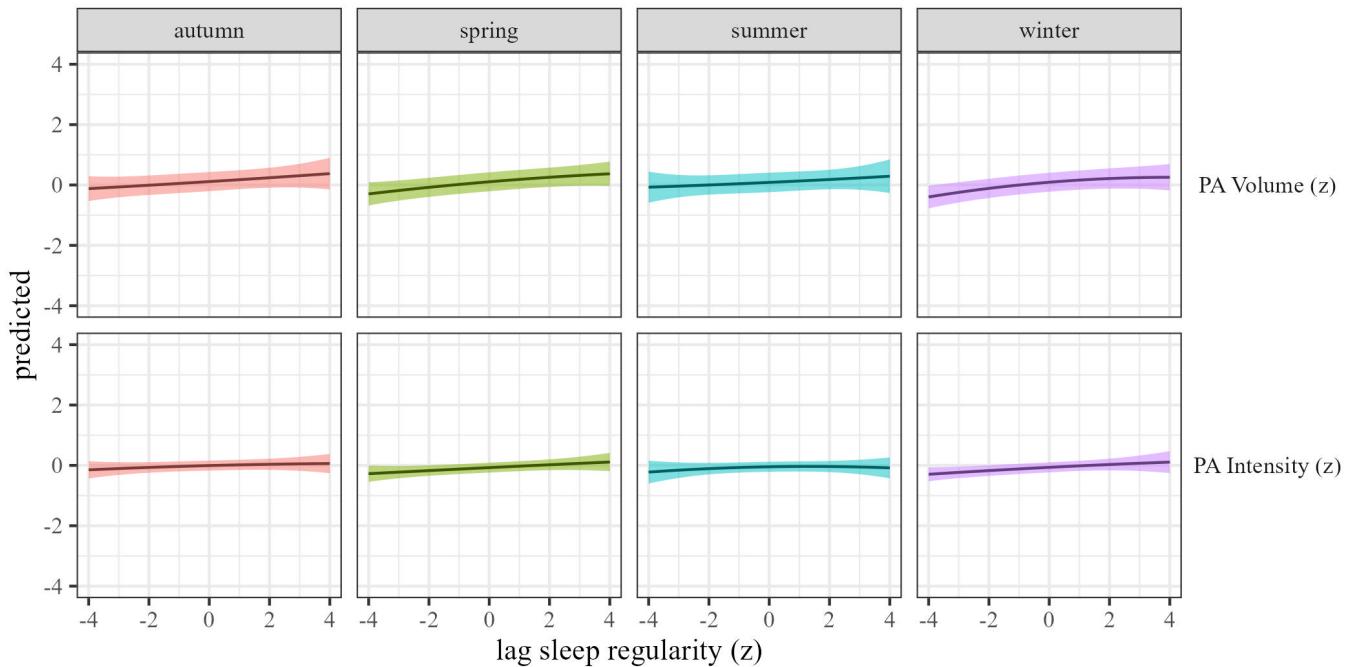


Figure 36. Physical activity by sleep regularity moderated by season

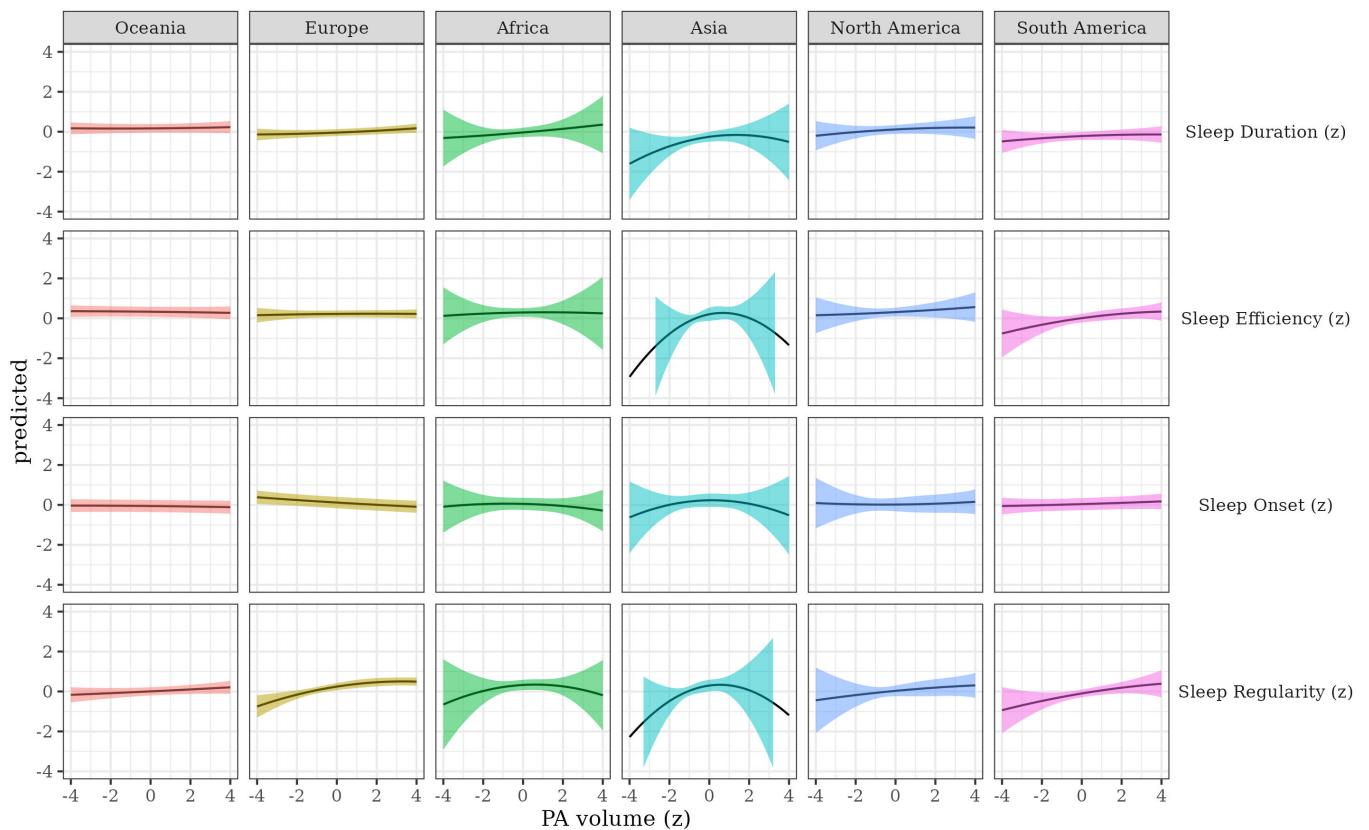


Figure 37. Sleep metrics on Physical activity volume by region

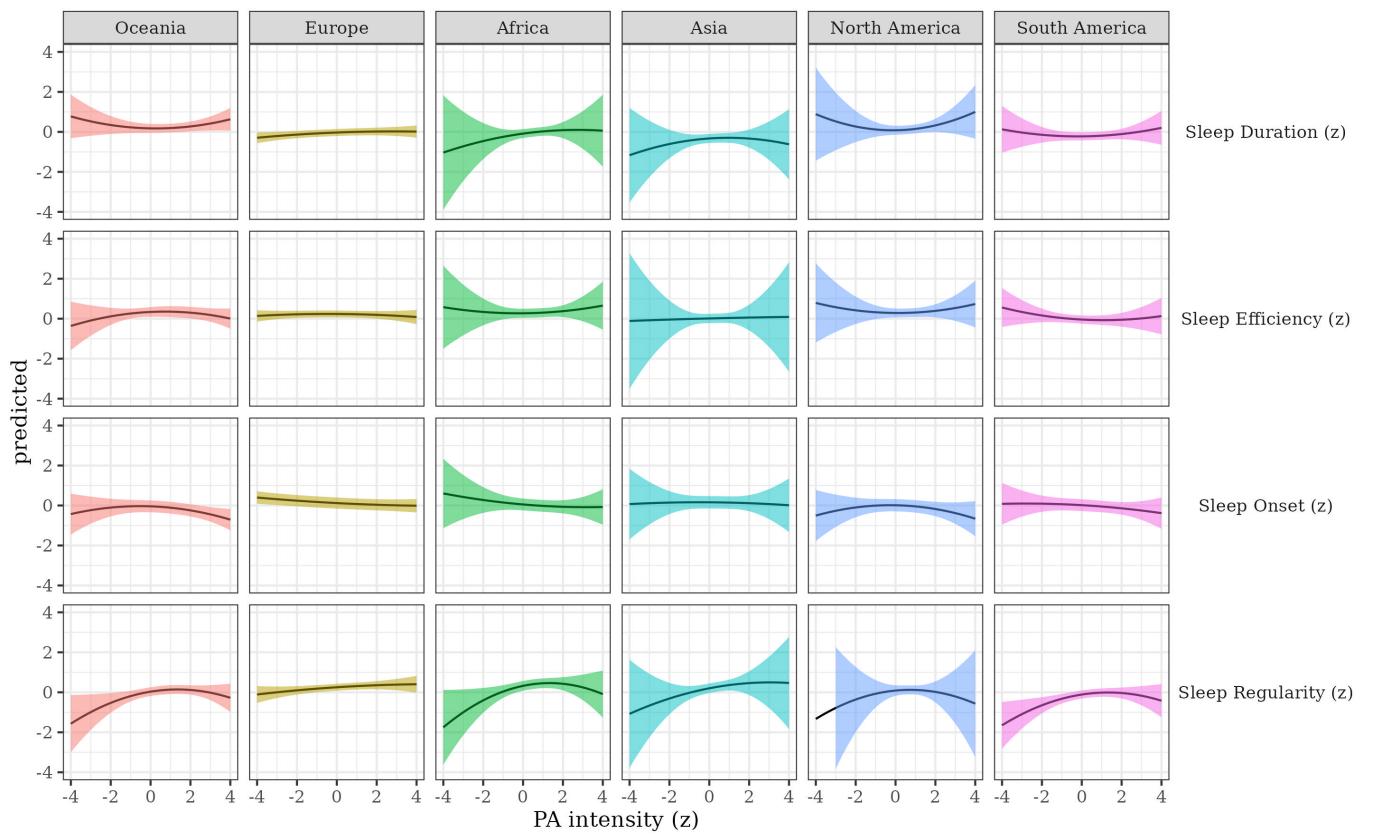


Figure 38. Sleep metrics on Physical activity intensity moderated by region

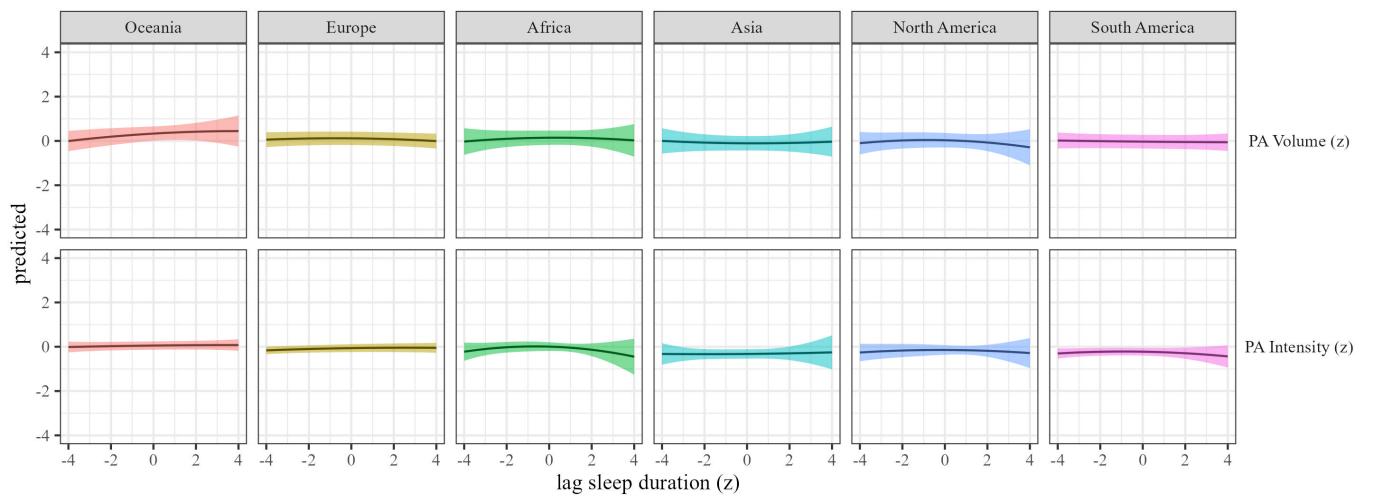
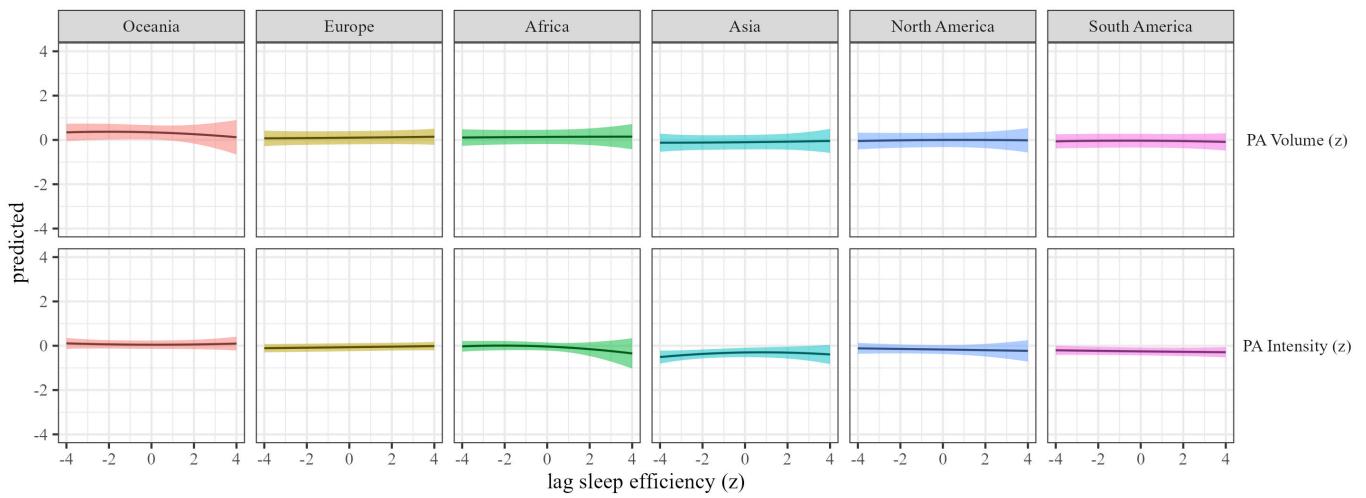
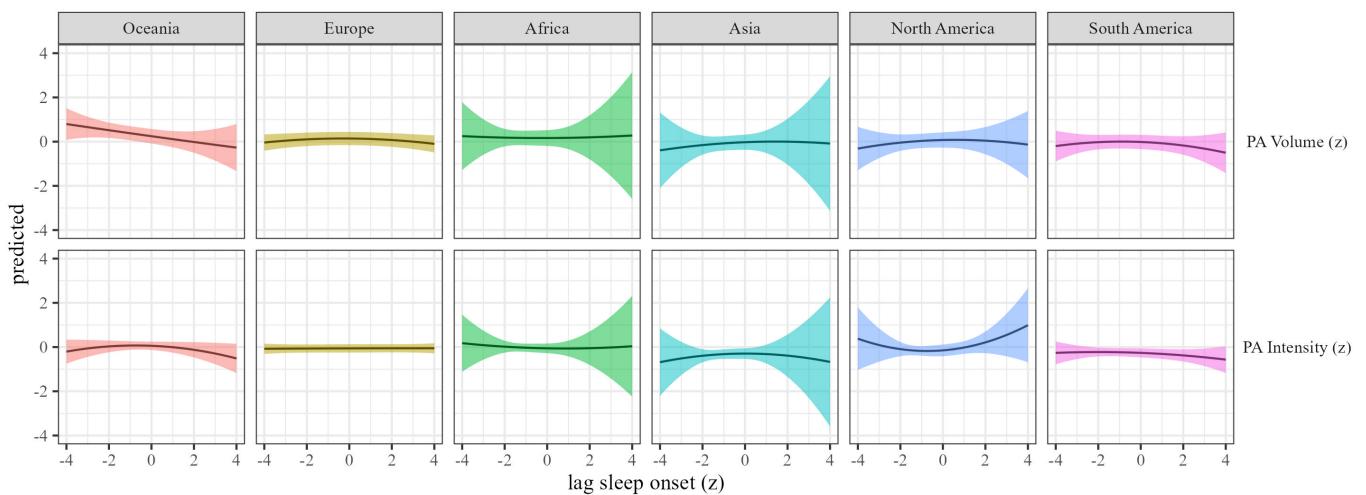


Figure 39. Physical activity by sleep duration moderated by region



*Figure 40.* Physical activity by sleep efficiency moderated by region



*Figure 41.* Physical activity by sleep onset moderated by region

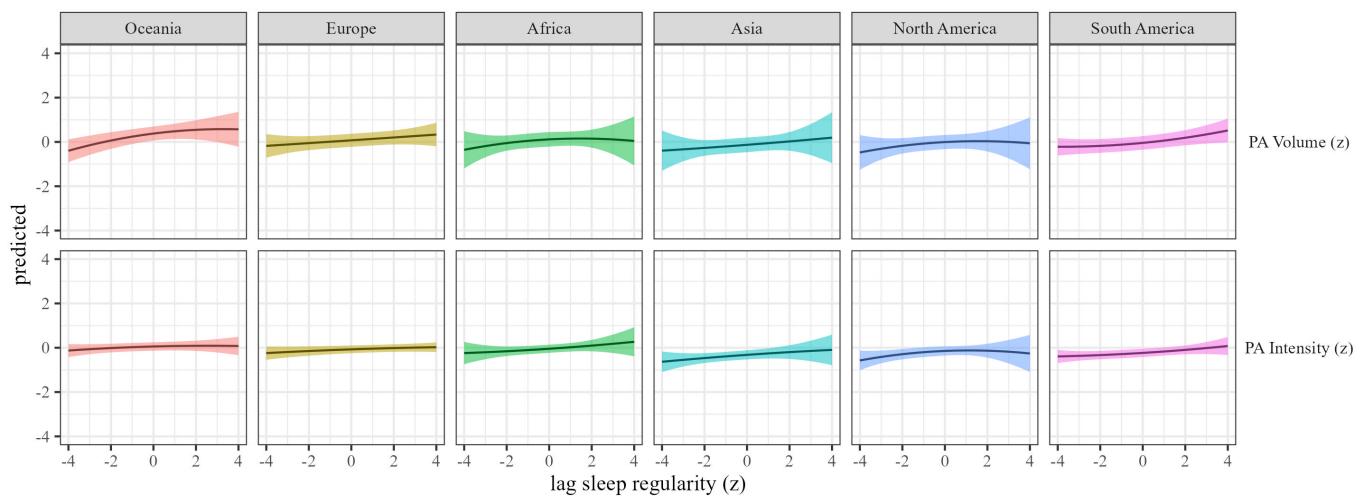


Figure 42. Physical activity by sleep regularity moderated by region

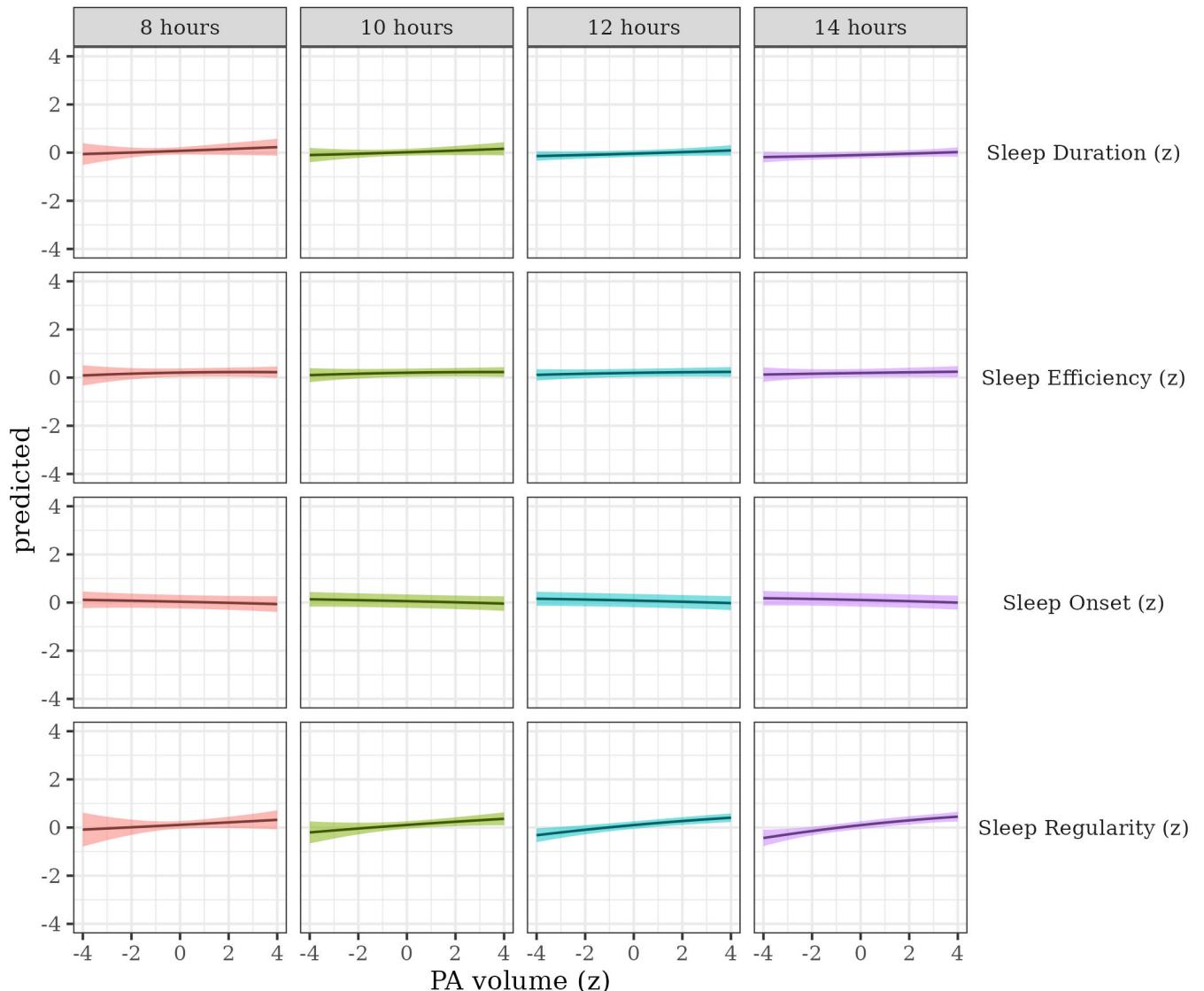


Figure 43. Sleep metrics on Physical activity volume by daylight hours

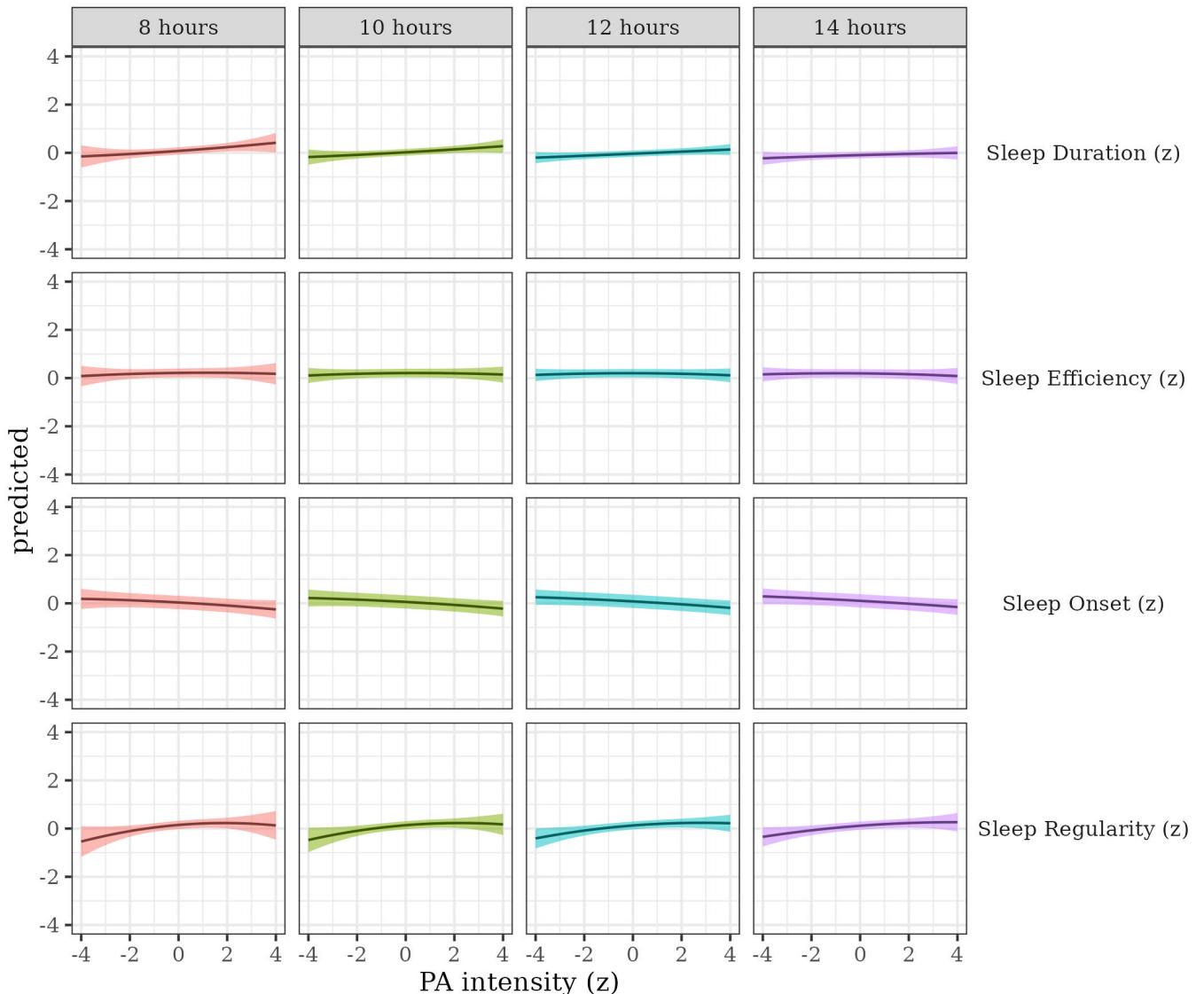


Figure 44. Sleep metrics on Physical activity intensity moderated by daylight hours

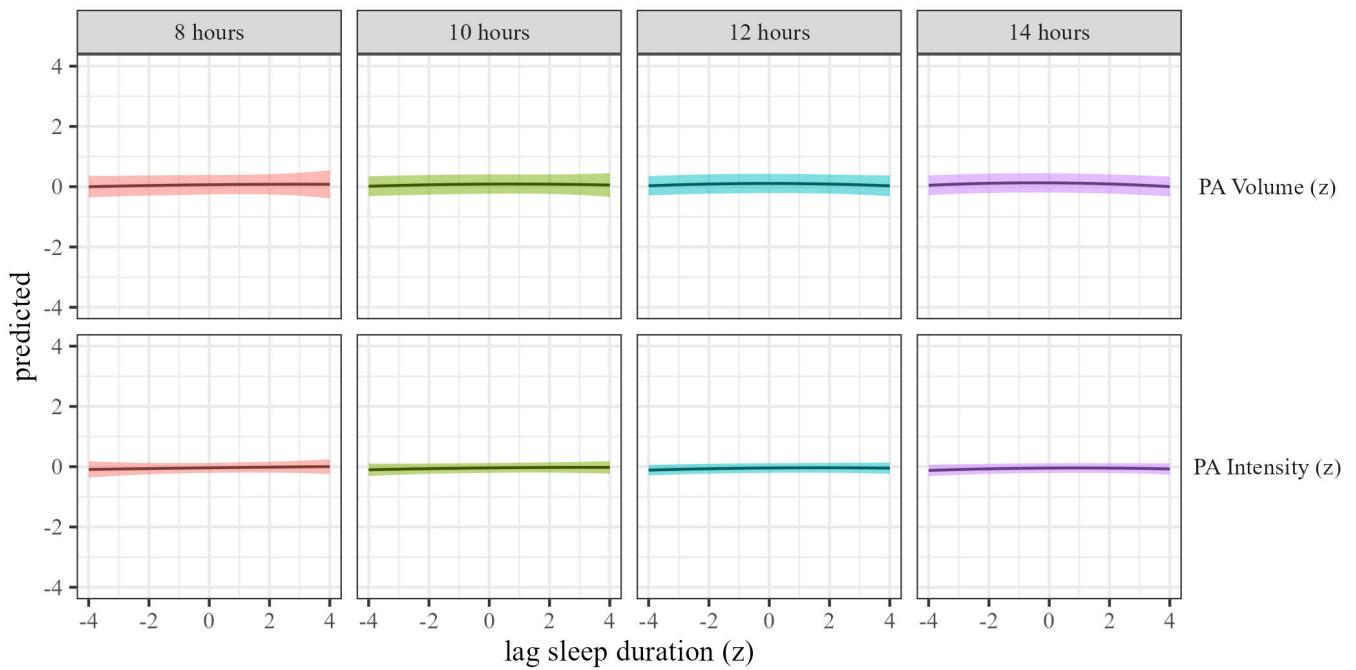


Figure 45. Physical activity by sleep duration moderated by daylight hours

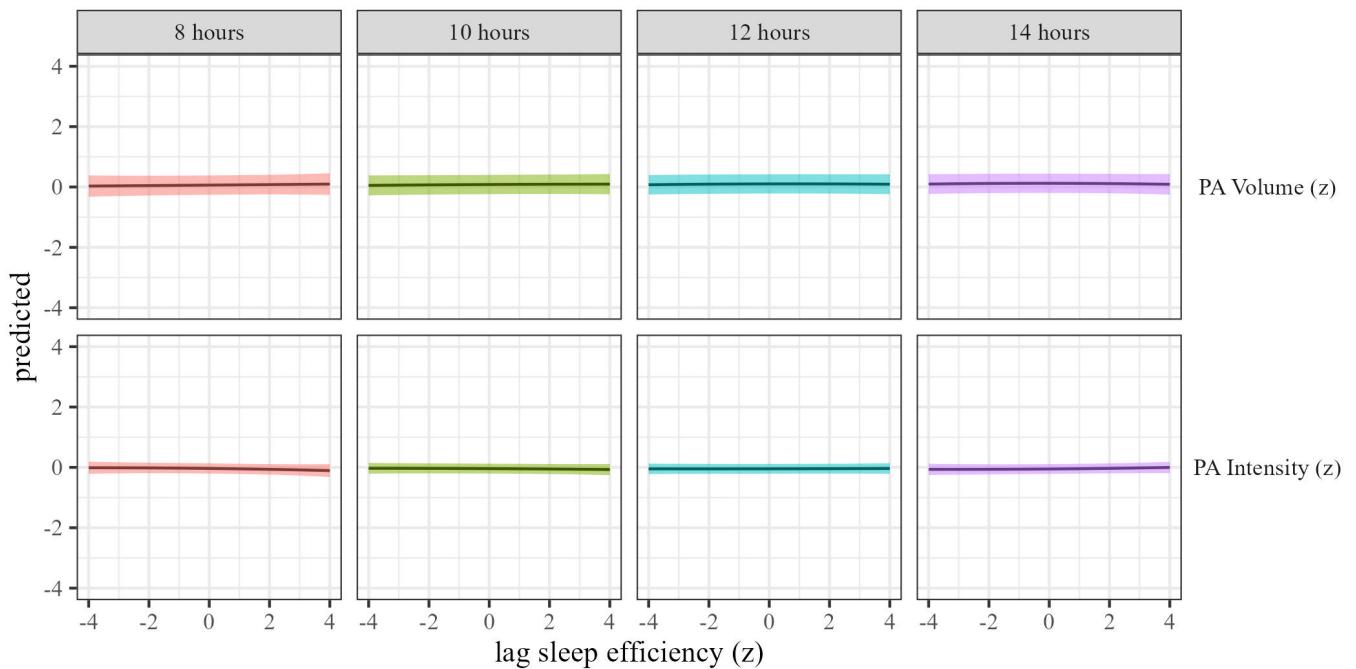


Figure 46. Physical activity by sleep efficiency moderated by daylight hours

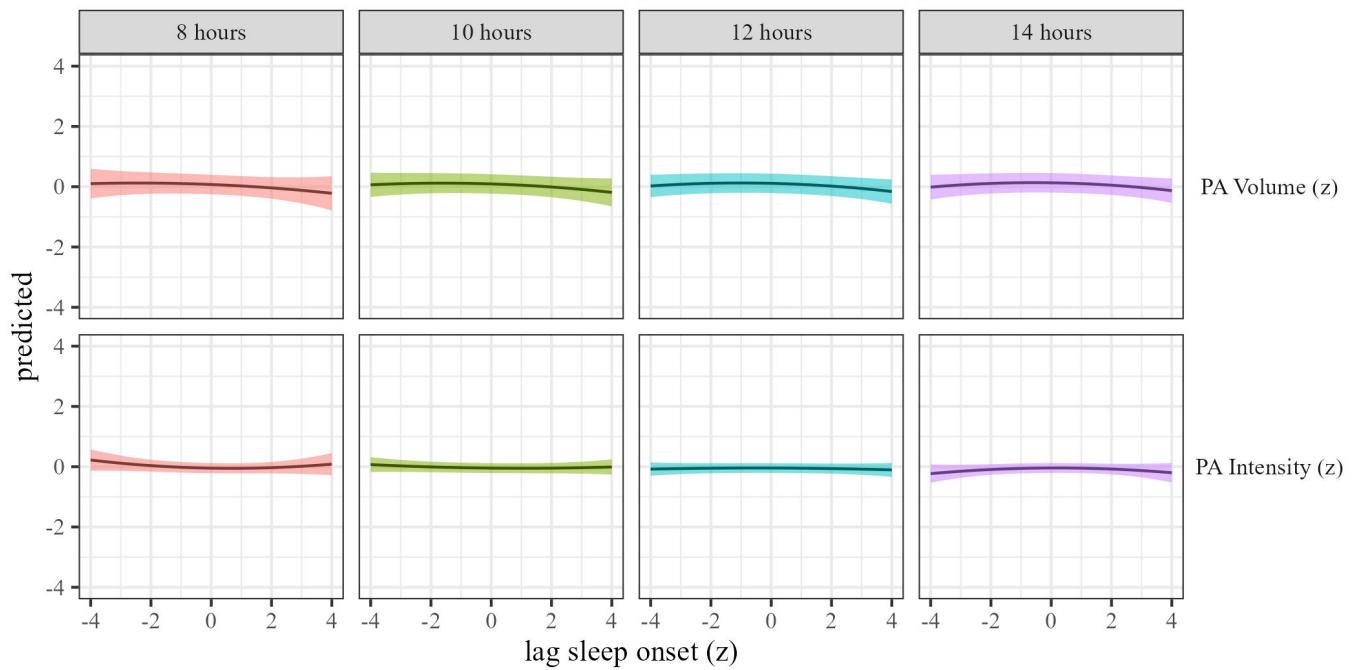


Figure 47. Physical activity by sleep onset moderated by daylight hours

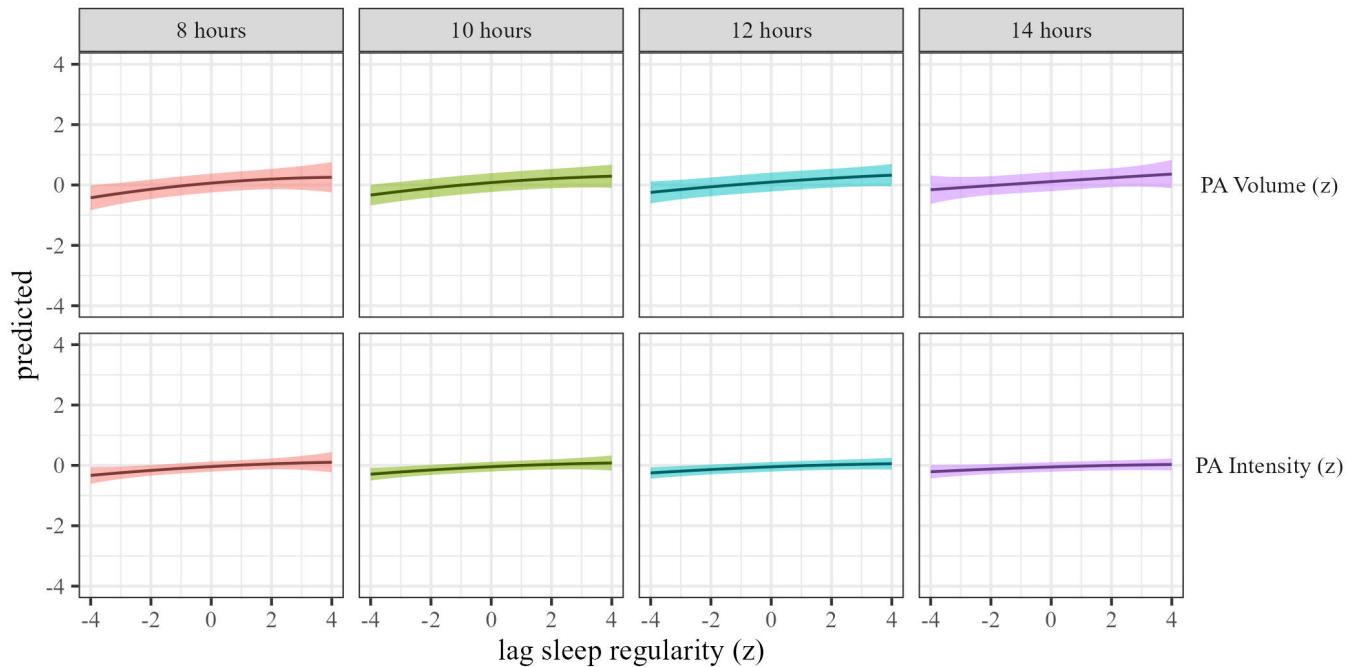


Figure 48. Physical activity by sleep regularity moderated by daylight hours

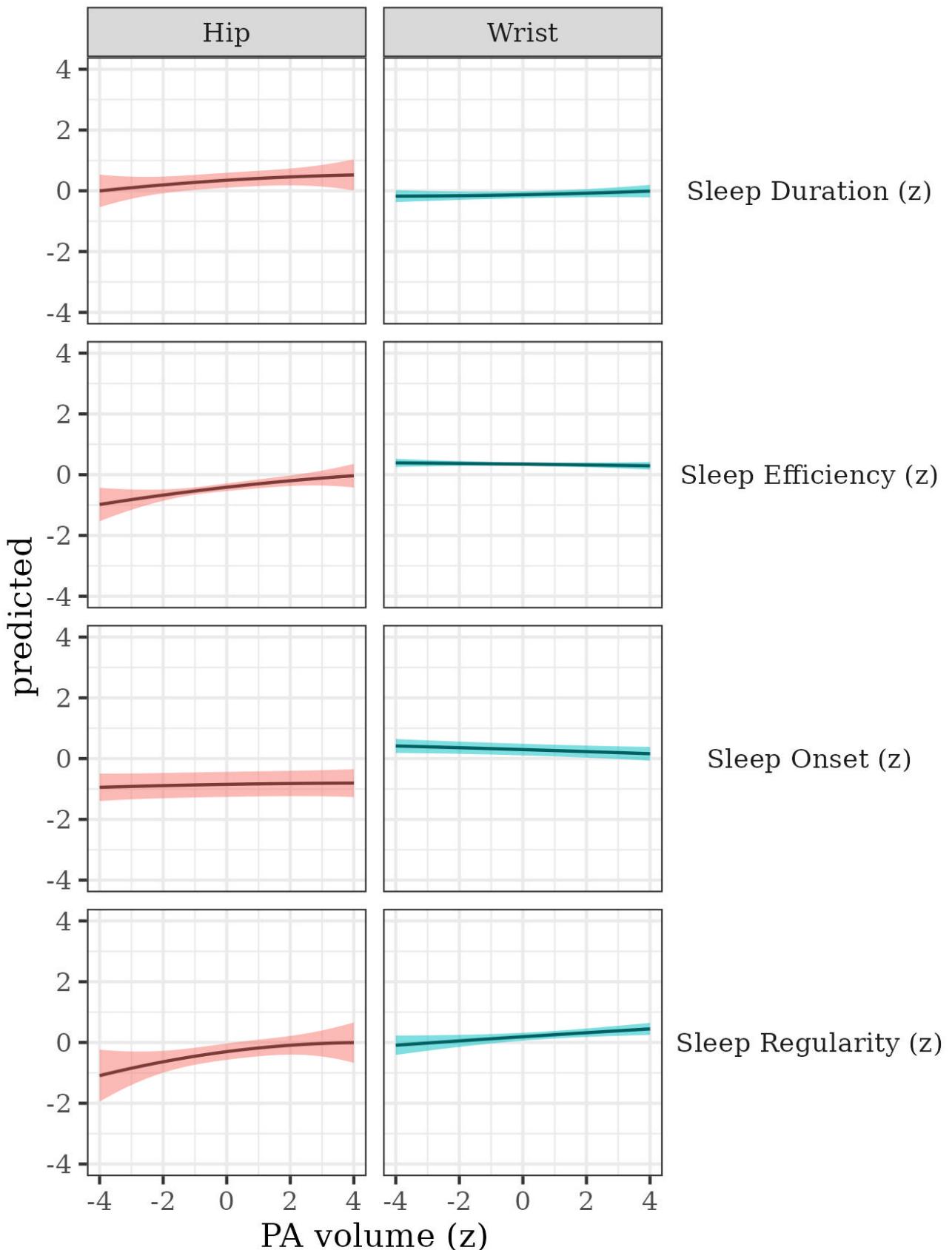


Figure 49. Sleep metrics on Physical activity volume by wear location

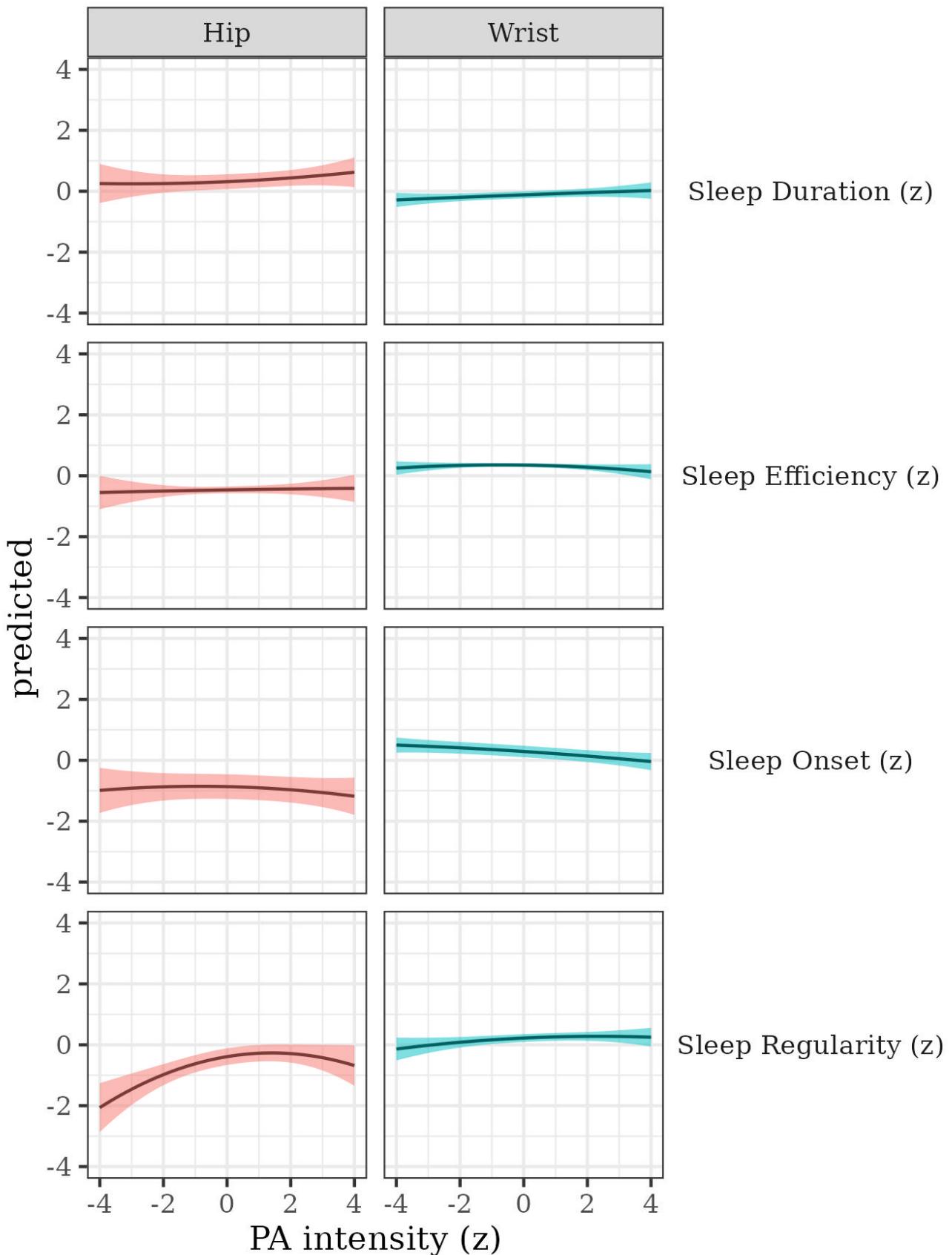


Figure 50. Sleep metrics on Physical activity intensity moderated by wear location

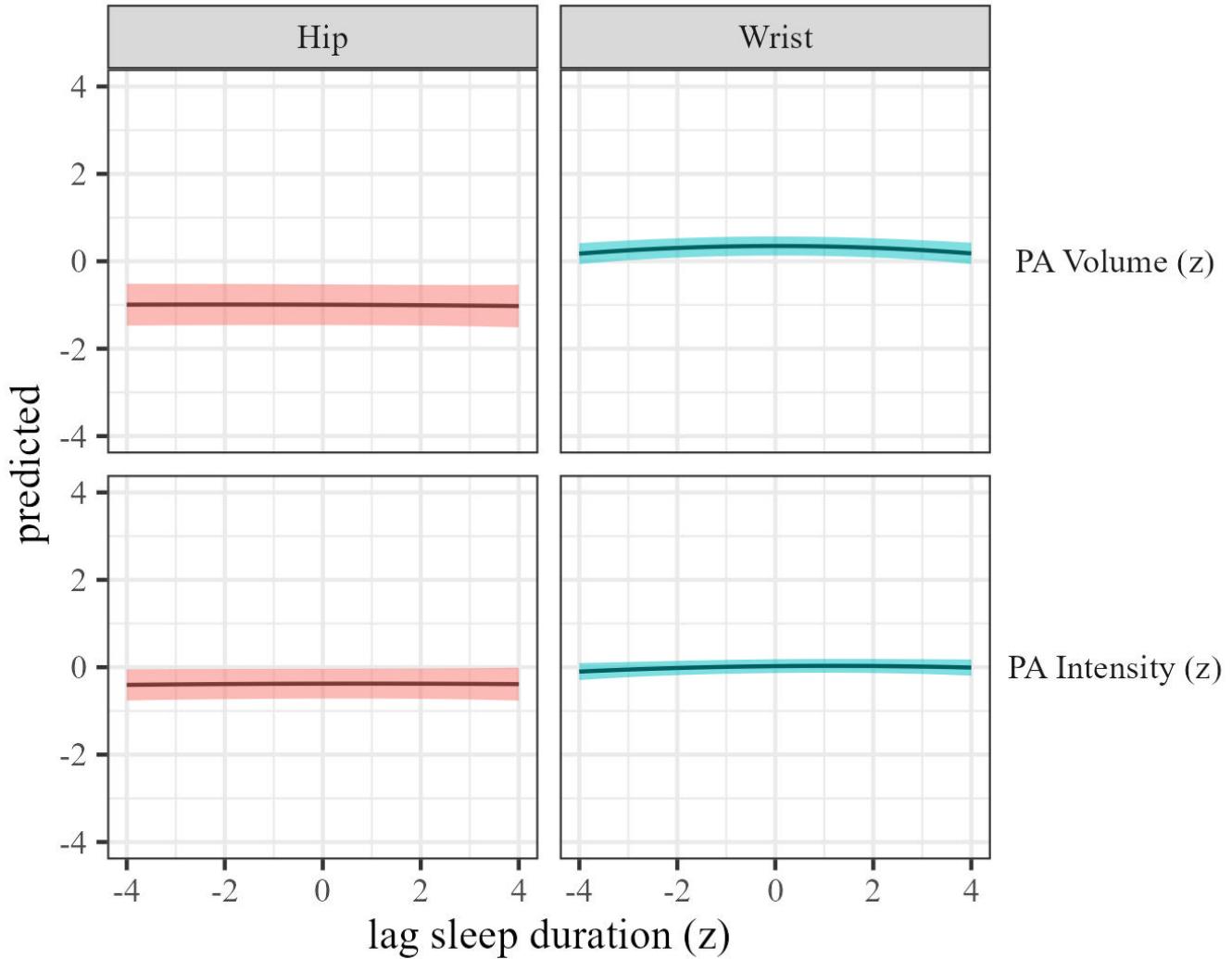


Figure 51. Physical activity by sleep duration moderated by wear location

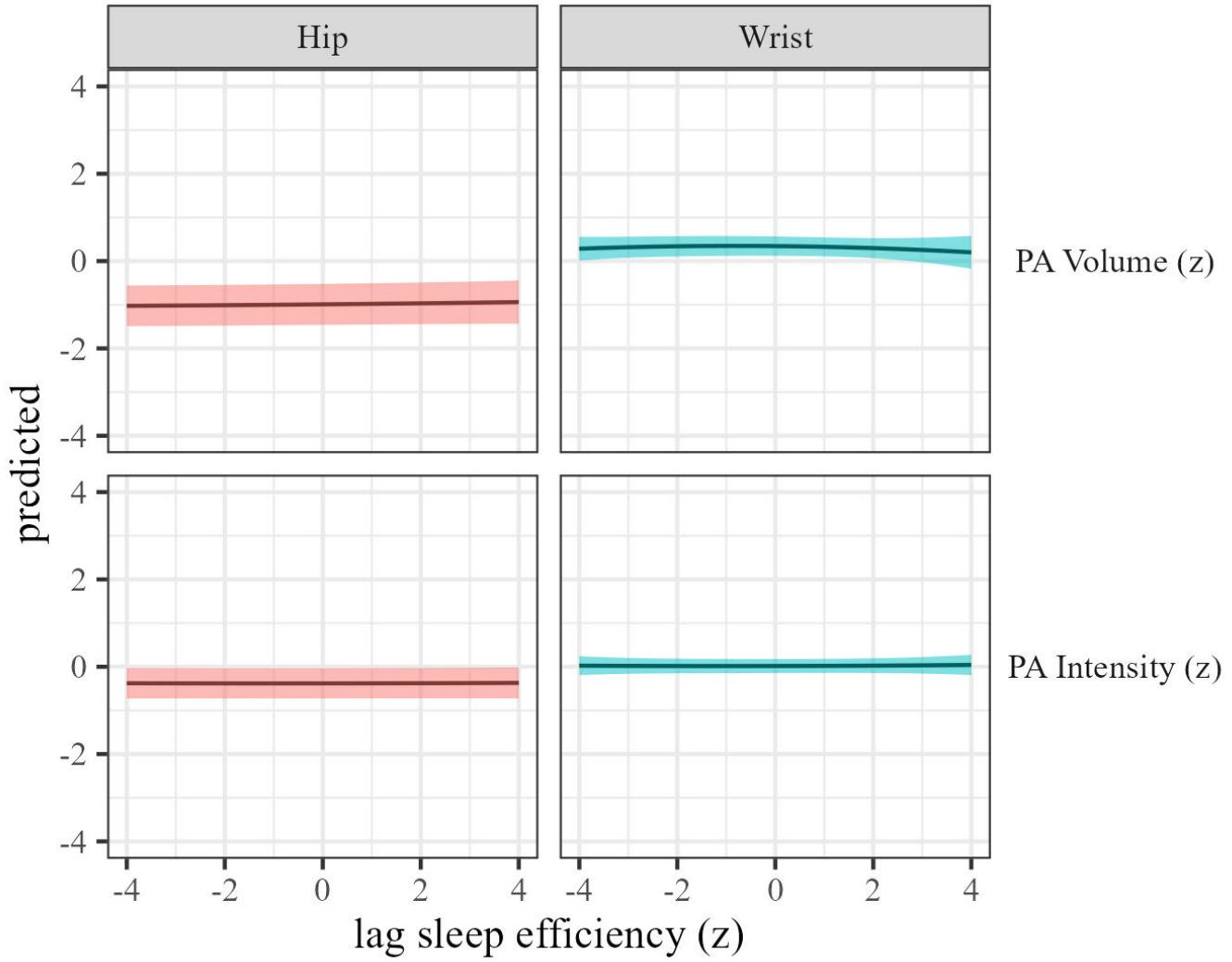


Figure 52. Physical activity by sleep efficiency moderated by wear location

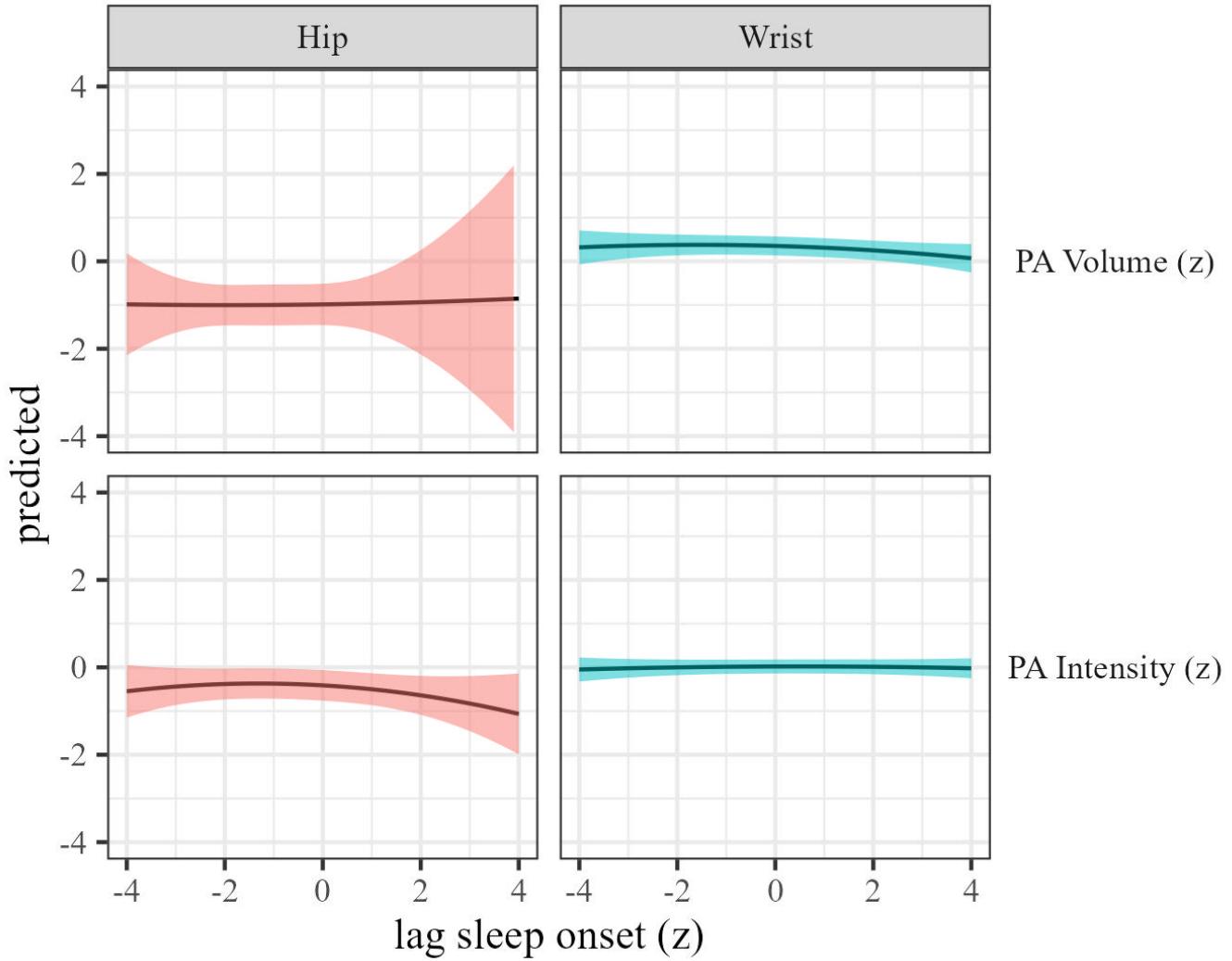


Figure 53. Physical activity by sleep onset moderated by wear location

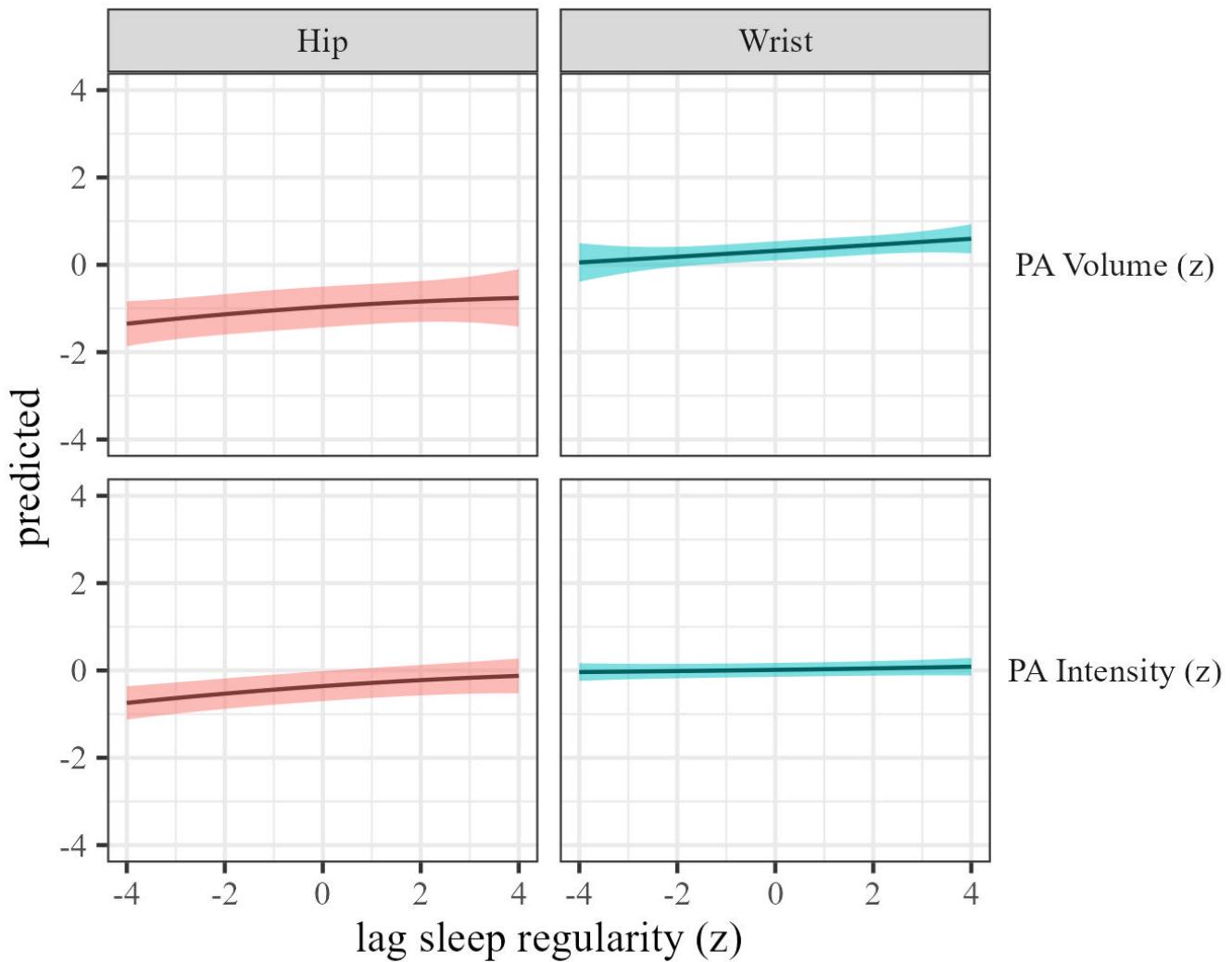


Figure 54. Physical activity by sleep regularity moderated by wear location

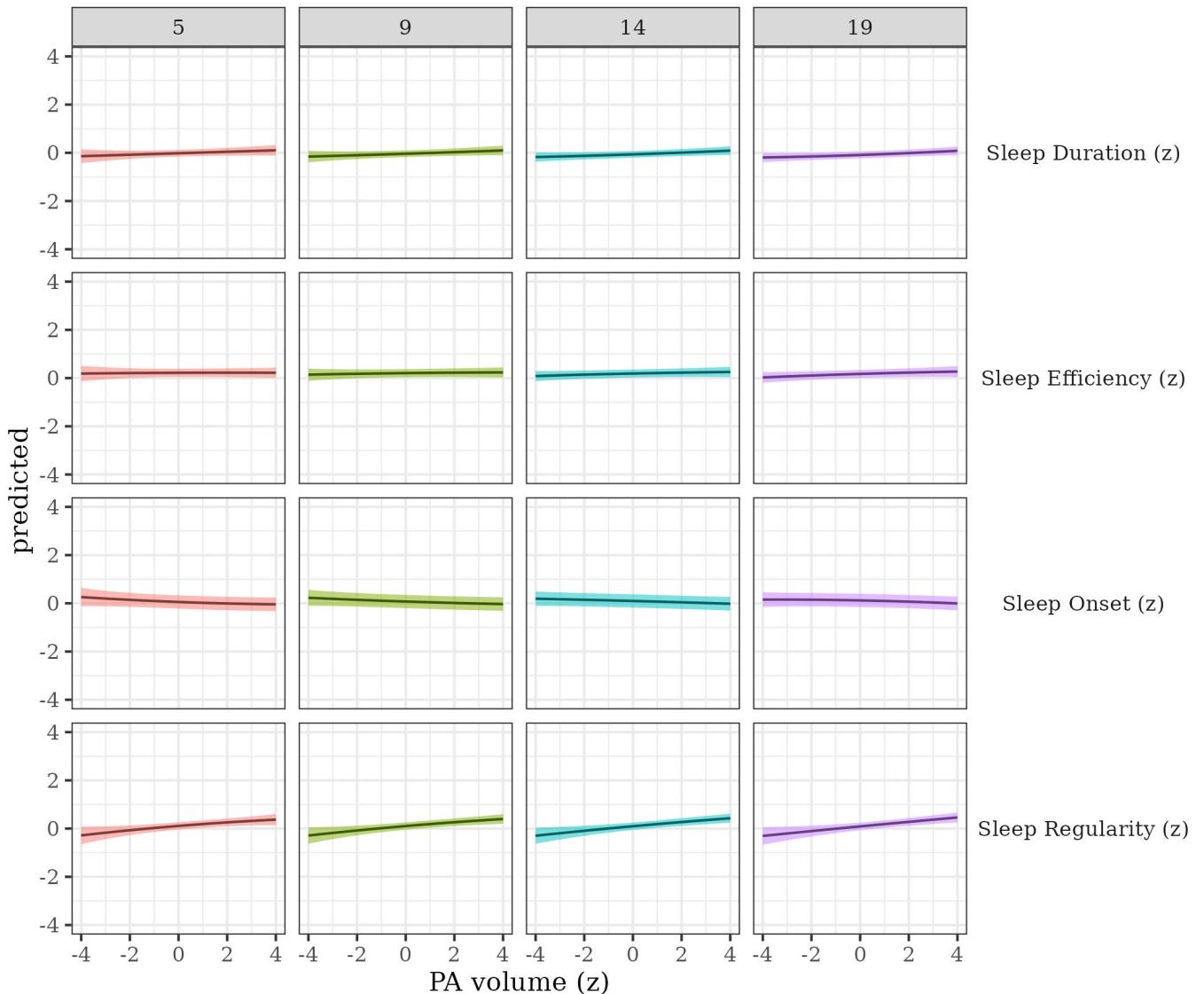


Figure 55. Sleep metrics on Physical activity volume by most active hour

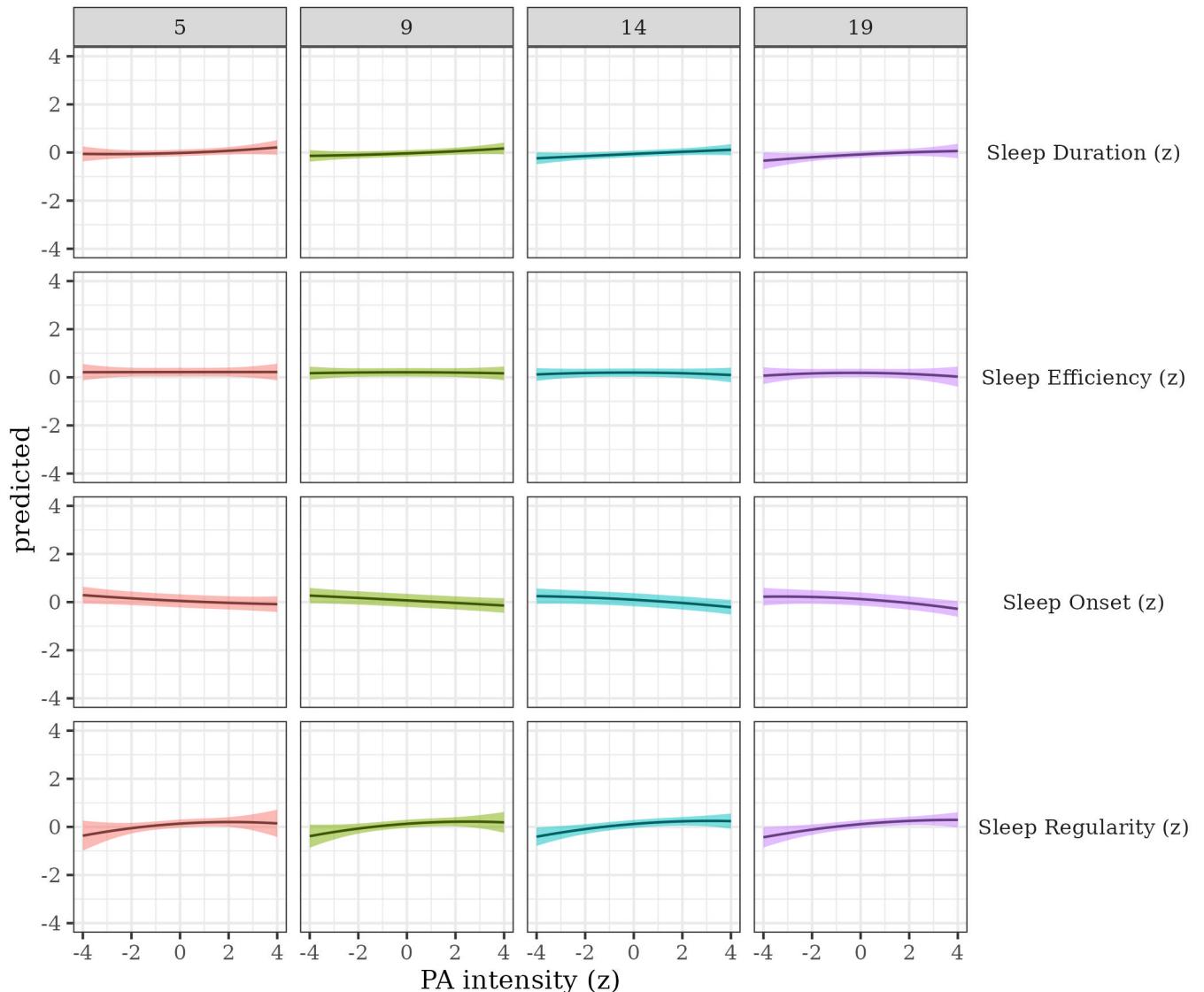


Figure 56. Sleep metrics on Physical activity intensity moderated by most active hour

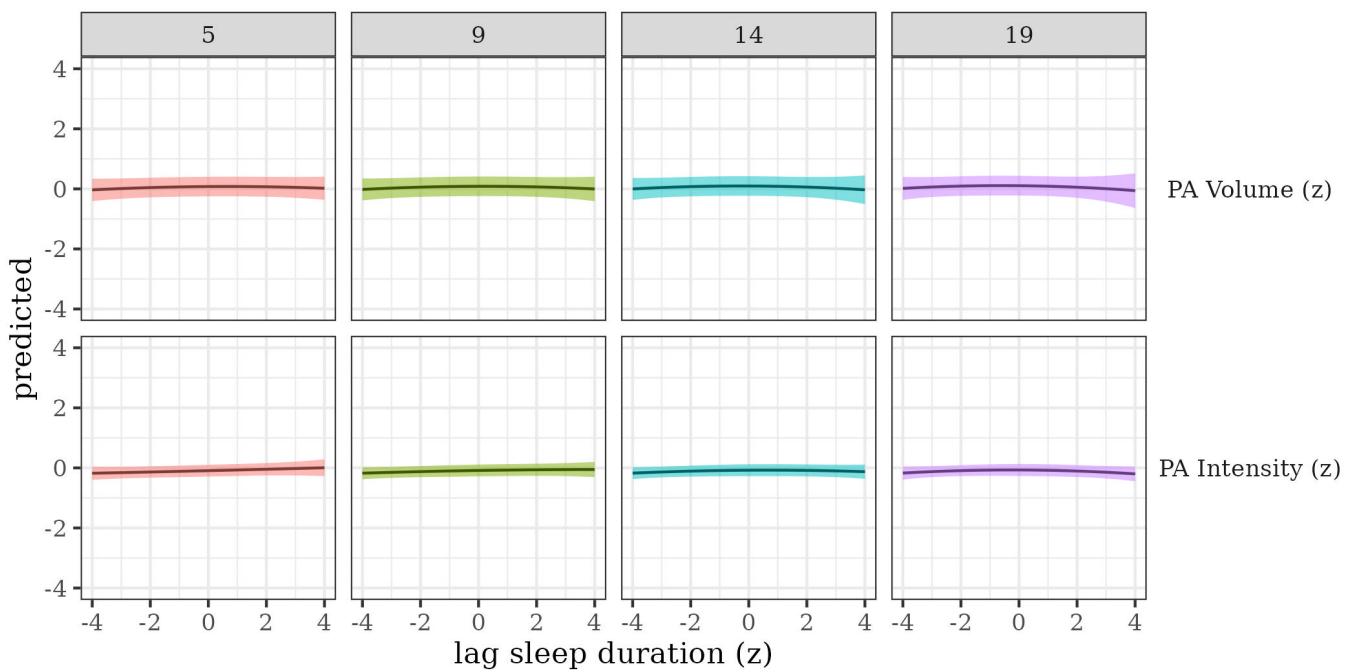


Figure 57. Physical activity by sleep duration moderated by most active hour

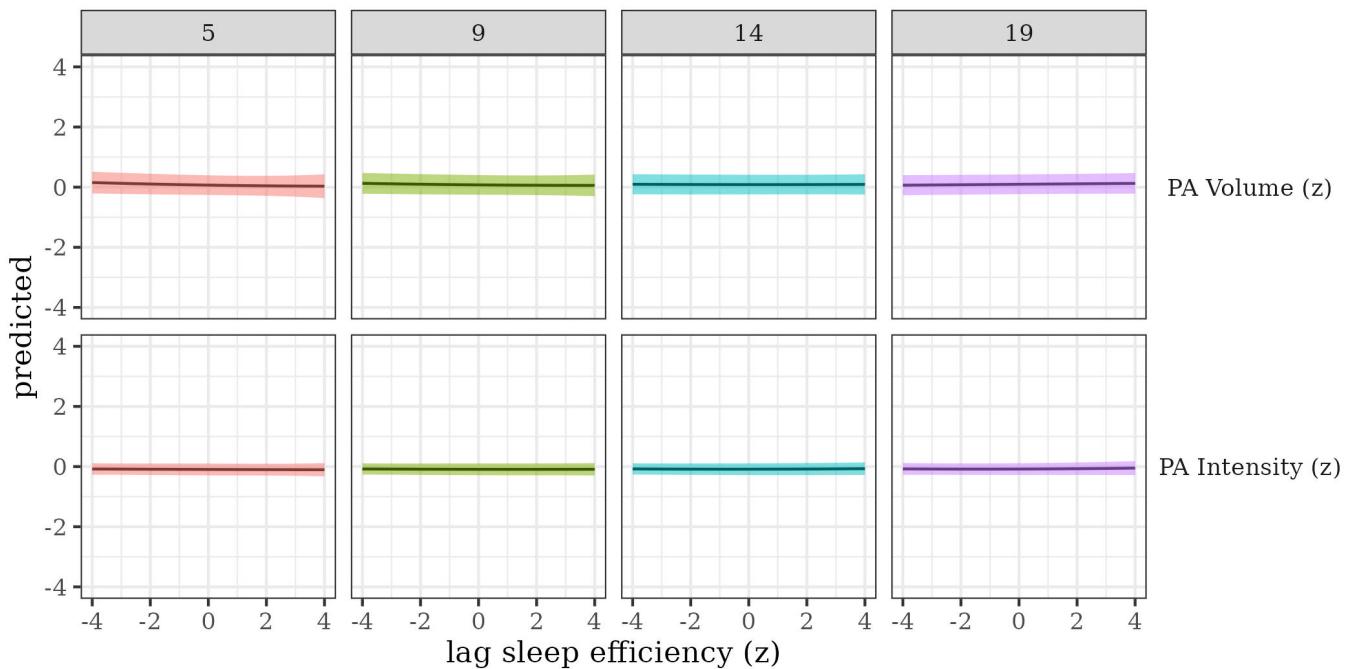


Figure 58. Physical activity by sleep efficiency moderated by most active hour

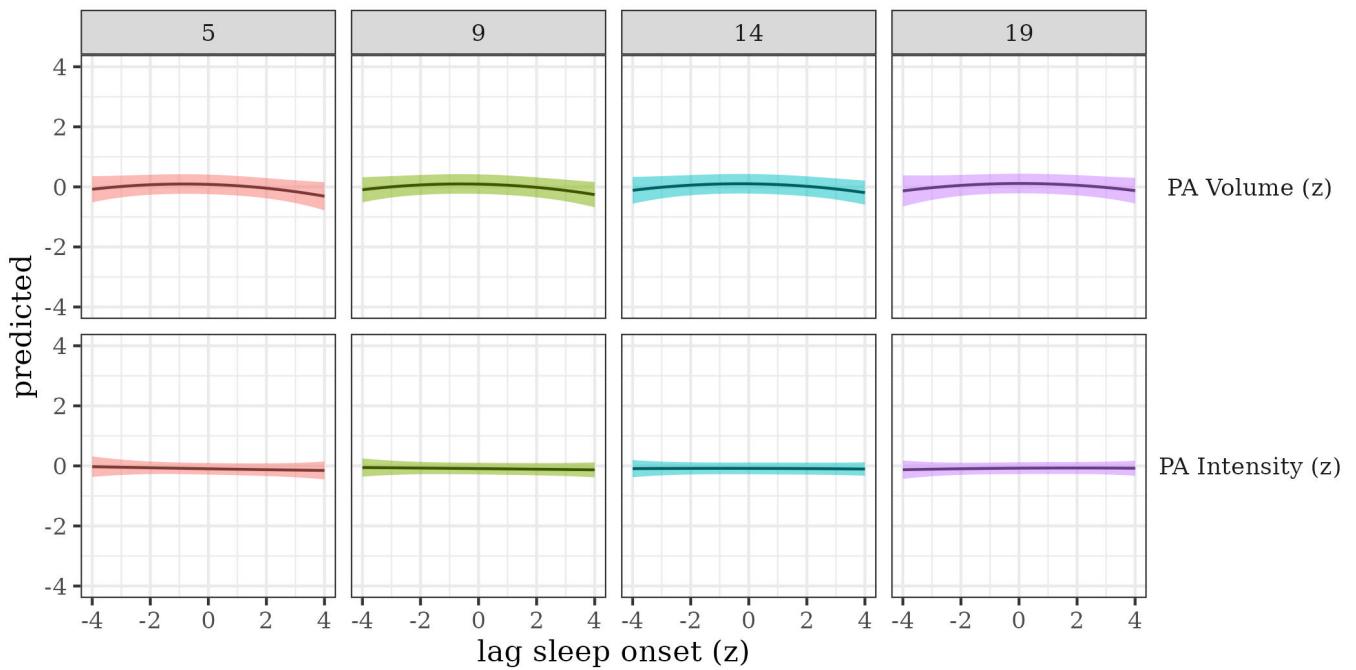


Figure 59. Physical activity by sleep onset moderated by most active hour

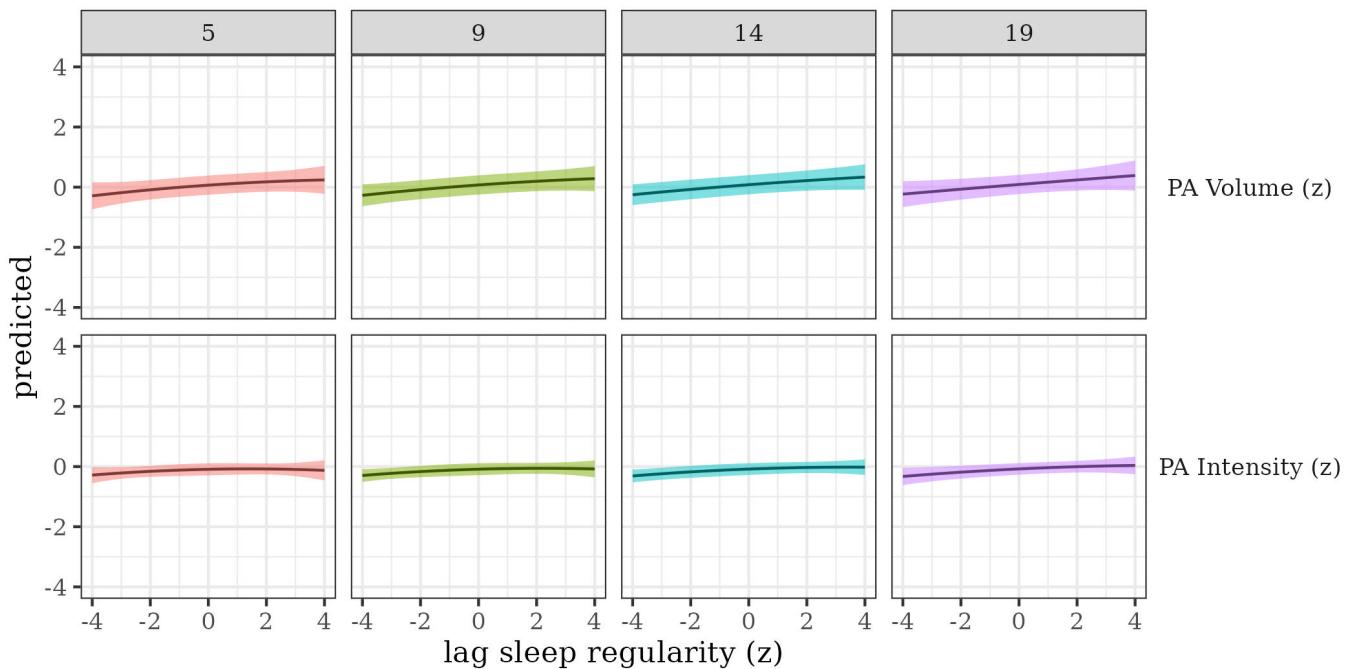


Figure 60. Physical activity by sleep regularity moderated by most active hour