

## Multiverse analysis

First Author<sup>1</sup> & Ernst-August Doelle<sup>1,2</sup>

<sup>1</sup> Wilhelm-Wundt-University

<sup>2</sup> Konstanz Business School

### Author Note

Add complete departmental affiliations for each author here. Each new line herein must be indented, like this line.

Enter author note here.

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

Correspondence concerning this article should be addressed to First Author, Postal address. E-mail: my@email.com

## Abstract

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

*Keywords:* keywords

Word count: X

## Multiverse analysis

## Results

### Model diagnostics

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

### Fixed Effect Model

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 fixed-effects models. We estimated the effect of physical activity volume on sleep by age, and the results are presented in Table 2 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 2 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 3 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 3 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 3 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 3 and Figure 6.

### **Log Transforming PA Volume**

Based on preliminary modelling on a subset of the data, we chose to leave physical activity volume in its natural form to enhance interpretability. The log scale meant that the variable became unintepretable towards the edge of its range. Below, we present the results had we not made this decision. These results are all moderated by age, as this was our primary analysis. The associated figures are back-transformed to the scale range.

**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 4 and Figure 7.

**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 5 and Figure 8.

**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 5 and Figure 9.

**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 5 and Figure 10.

**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 5 and Figure 11.

### 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 6 and Figure 12

**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 6 and Figure 13.

**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 7 and Figure 14.

**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 7 and Figure 15.

**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 7 and Figure 16.

**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 7 and Figure 17.

**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 8 and Figure 18

**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 8 and Figure 19.

**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 9 and Figure 20.

**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 9 and Figure 21.

**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 9 and Figure 22.

**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 9 and Figure 23.

**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 10 and Figure 24

**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 10 and Figure 25.

**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 11 and Figure 26.

**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 11 and Figure 27.

**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 11 and Figure 28.

**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 11 and Figure 29.

**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 12 and Figure 30

**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 12 and Figure 31.

**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 13 and Figure 32.

**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 13 and Figure 33.

**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 13 and Figure 34.

**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 13 and Figure 35.

**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 14 and Figure 36

**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 14 and Figure 37.

**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 15 and Figure 38.

**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 15 and Figure 39.

**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 15 and Figure 40.

**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 15 and Figure 41.

**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 16 and Figure 42

**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 16 and Figure 43.

**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 17 and Figure 44.

**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 17 and Figure 45.

**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 17 and Figure 46.

**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 17 and Figure 47.

**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 18 and Figure 48

**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 18 and Figure 49.

**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 19 and Figure 50.

**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 19 and Figure 51.

**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 19 and Figure 52.

**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 19 and Figure 53.

**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 20 and Figure 54

**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 20 and Figure 55.

**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 21 and Figure 56.

**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 21 and Figure 57.

**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 21 and Figure 58.

**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 21 and Figure 59.

**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 22 and Figure 60

**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 22 and Figure 61.

**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 23 and Figure 62.

**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 23 and Figure 63.

**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 23 and Figure 64.

**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 23 and Figure 65.

**ethnicity**

**The effects of physical activity volume on sleep by ethnicity.** 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 ethnicity, and the results are presented in Table 24 and Figure 66

**The effects of physical activity intensity on sleep by ethnicity.** We estimated how physical activity intensity affects sleep across ethnicity. We present the results in Table 24 and Figure 67.

**The effects of sleep duration on physical activity.** We estimated the effect of sleep duration on physical activity by ethnicity. Results, controlling for sex, SES, and BMI are presented in Table 25 and Figure 68.

**The effects of sleep efficiency on physical activity.** We estimated the effect of sleep efficiency on physical activity by ethnicity. Results, controlling for sex, SES, and BMI are presented in Table 25 and Figure 69.

**The effects of sleep onset on physical activity.** We estimated the effect of sleep onset on physical activity by ethnicity. Results, controlling for sex, SES, and BMI are presented in Table 25 and Figure 70.

**The effects of sleep regularity on physical activity.** We estimated the effect of sleep regularity on physical activity by ethnicity. Results are presented in Table 25 and Figure 71.

Table 1

*Model diagnostics*

Model name	Skewness	Kurtosis	Converged (%)
Models moderated by age			
Scale sleep duration by PA volume	0.12	2.72	100.00%
Scale sleep efficiency by PA volume	-0.90	3.53	100.00%
Scale sleep onset by PA volume	0.75	6.17	100.00%
Scale sleep regularity by PA volume	-0.44	1.03	100.00%
Scale sleep duration by PA intensity	0.11	2.71	100.00%
Scale sleep efficiency by PA intensity	-0.90	3.52	100.00%
Scale sleep onset by PA intensity	0.76	6.09	100.00%
Scale sleep regularity by PA intensity	-0.45	1.01	100.00%
Scale PA volume by sleep duration(lagged)	0.88	8.16	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep efficiency(lagged)	0.88	8.17	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep onset(lagged)	0.88	8.16	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep regularity(lagged)	0.91	8.34	100.00%
Scale PA intensity by sleep regularity(lagged)	0.26	2.80	100.00%
Models moderated by age fixeddef			
Scale sleep duration by PA volume	0.12	2.72	100.00%
Scale sleep efficiency by PA volume	-0.89	3.52	100.00%
Scale sleep onset by PA volume	0.75	6.18	100.00%
Scale sleep regularity by PA volume	-0.44	1.03	100.00%
Scale sleep duration by PA intensity	0.11	2.71	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.51	100.00%
Scale sleep onset by PA intensity	0.76	6.10	100.00%
Scale sleep regularity by PA intensity	-0.44	1.01	100.00%
Scale PA volume by sleep duration(lagged)	0.88	8.16	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep efficiency(lagged)	0.87	8.17	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep onset(lagged)	0.87	8.15	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep regularity(lagged)	0.90	8.34	100.00%
Scale PA intensity by sleep regularity(lagged)	0.26	2.80	100.00%

Table 1 continued

Model name		Skewness	Kurtosis	Converged (%)
Models moderated by age log				
Scale sleep duration by log PA volume	0.12	2.71	100.00%	
Scale sleep efficiency by log PA volume	-0.90	3.54	100.00%	
Scale sleep onset by log PA volume	0.75	6.19	100.00%	
Scale sleep regularity by log PA volume	-0.44	1.03	100.00%	
Scale sleep duration by PA intensity	0.11	2.71	100.00%	
Scale sleep efficiency by PA intensity	-0.90	3.52	100.00%	
Scale sleep onset by PA intensity	0.76	6.09	100.00%	
Scale sleep regularity by PA intensity	-0.45	1.01	100.00%	
Log PA volume by sleep duration(lagged)	-0.46	2.44	100.00%	
Scale PA intensity by sleep duration(lagged)	0.22	2.86	100.00%	
Log PA volume by sleep efficiency(lagged)	-0.46	2.45	100.00%	
Scale PA intensity by sleep efficiency(lagged)	0.22	2.85	100.00%	
Log PA volume by sleep onset(lagged)	-0.47	2.44	100.00%	
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%	
Log PA volume by sleep regularity(lagged)	-0.38	2.29	100.00%	
Scale PA intensity by sleep regularity(lagged)	0.26	2.80	100.00%	
Models moderated by bmi				
Scale sleep duration by PA volume	0.11	2.73	100.00%	
Scale sleep efficiency by PA volume	-0.90	3.52	100.00%	
Scale sleep onset by PA volume	0.76	6.17	100.00%	
Scale sleep regularity by PA volume	-0.45	1.04	100.00%	
Scale sleep duration by PA intensity	0.11	2.71	100.00%	
Scale sleep efficiency by PA intensity	-0.90	3.52	100.00%	
Scale sleep onset by PA intensity	0.76	6.08	100.00%	
Scale sleep regularity by PA intensity	-0.45	1.00	100.00%	
Scale PA volume by sleep duration(lagged)	0.88	8.17	100.00%	
Scale PA intensity by sleep duration(lagged)	0.22	2.88	100.00%	
Scale PA volume by sleep efficiency(lagged)	0.88	8.18	100.00%	
Scale PA intensity by sleep efficiency(lagged)	0.22	2.86	100.00%	
Scale PA volume by sleep onset(lagged)	0.88	8.16	100.00%	
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%	
Scale PA volume by sleep regularity(lagged)	0.91	8.37	100.00%	
Scale PA intensity by sleep regularity(lagged)	0.26	2.80	100.00%	
Models moderated by ses				

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep duration by PA volume	0.11	2.72	100.00%
Scale sleep efficiency by PA volume	-0.90	3.53	100.00%
Scale sleep onset by PA volume	0.75	6.18	100.00%
Scale sleep regularity by PA volume	-0.44	1.02	100.00%
Scale sleep duration by PA intensity	0.11	2.72	100.00%
Scale sleep efficiency by PA intensity	-0.90	3.52	100.00%
Scale sleep onset by PA intensity	0.76	6.09	100.00%
Scale sleep regularity by PA intensity	-0.45	0.99	100.00%
Scale PA volume by sleep duration(lagged)	0.88	8.17	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.87	100.00%
Scale PA volume by sleep efficiency(lagged)	0.87	8.16	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep onset(lagged)	0.88	8.13	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep regularity(lagged)	0.91	8.35	100.00%
Scale PA intensity by sleep regularity(lagged)	0.25	2.81	100.00%
Models moderated by weekday			
Scale sleep duration by PA volume	0.10	2.70	100.00%
Scale sleep efficiency by PA volume	-0.89	3.54	100.00%
Scale sleep onset by PA volume	0.76	6.31	100.00%
Scale sleep regularity by PA volume	-0.47	1.21	100.00%
Scale sleep duration by PA intensity	0.10	2.71	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.54	100.00%
Scale sleep onset by PA intensity	0.77	6.20	100.00%
Scale sleep regularity by PA intensity	-0.48	1.23	100.00%
Scale PA volume by sleep duration(lagged)	0.93	8.39	100.00%
Scale PA intensity by sleep duration(lagged)	0.27	2.97	100.00%
Scale PA volume by sleep efficiency(lagged)	0.92	8.42	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.27	3.03	100.00%
Scale PA volume by sleep onset(lagged)	0.93	8.41	100.00%
Scale PA intensity by sleep onset(lagged)	0.28	3.02	100.00%
Scale PA volume by sleep regularity(lagged)	0.94	8.55	100.00%
Scale PA intensity by sleep regularity(lagged)	0.30	2.91	100.00%
Models moderated by season			
Scale sleep duration by PA volume	0.11	2.71	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep efficiency by PA volume	-0.90	3.53	100.00%
Scale sleep onset by PA volume	0.75	6.17	100.00%
Scale sleep regularity by PA volume	-0.44	1.04	100.00%
Scale sleep duration by PA intensity	0.11	2.70	100.00%
Scale sleep efficiency by PA intensity	-0.90	3.52	100.00%
Scale sleep onset by PA intensity	0.76	6.08	100.00%
Scale sleep regularity by PA intensity	-0.45	1.00	100.00%
Scale PA volume by sleep duration(lagged)	0.88	8.13	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.87	100.00%
Scale PA volume by sleep efficiency(lagged)	0.87	8.16	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep onset(lagged)	0.87	8.11	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep regularity(lagged)	0.91	8.33	100.00%
Scale PA intensity by sleep regularity(lagged)	0.25	2.82	100.00%
Models moderated by region			
Scale sleep duration by PA volume	0.11	2.73	100.00%
Scale sleep efficiency by PA volume	-0.89	3.56	100.00%
Scale sleep onset by PA volume	0.74	6.14	100.00%
Scale sleep regularity by PA volume	-0.45	1.04	100.00%
Scale sleep duration by PA intensity	0.11	2.70	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.50	100.00%
Scale sleep onset by PA intensity	0.74	6.05	100.00%
Scale sleep regularity by PA intensity	-0.44	0.98	100.00%
Scale PA volume by sleep duration(lagged)	0.89	8.16	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.88	100.00%
Scale PA volume by sleep efficiency(lagged)	0.88	8.19	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep onset(lagged)	0.88	8.17	100.00%
Scale PA intensity by sleep onset(lagged)	0.21	2.86	100.00%
Scale PA volume by sleep regularity(lagged)	0.91	8.39	100.00%
Scale PA intensity by sleep regularity(lagged)	0.25	2.83	100.00%
Models moderated by daylight			
Scale sleep duration by PA volume	0.11	2.73	100.00%
Scale sleep efficiency by PA volume	-0.90	3.53	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep onset by PA volume	0.76	6.18	100.00%
Scale sleep regularity by PA volume	-0.44	1.03	100.00%
Scale sleep duration by PA intensity	0.11	2.72	100.00%
Scale sleep efficiency by PA intensity	-0.90	3.53	100.00%
Scale sleep onset by PA intensity	0.76	6.08	100.00%
Scale sleep regularity by PA intensity	-0.45	1.00	100.00%
Scale PA volume by sleep duration(lagged)	0.88	8.16	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.88	100.00%
Scale PA volume by sleep efficiency(lagged)	0.88	8.17	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep onset(lagged)	0.88	8.15	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep regularity(lagged)	0.91	8.36	100.00%
Scale PA intensity by sleep regularity(lagged)	0.25	2.84	100.00%
Models moderated by wear location			
Scale sleep duration by PA volume	0.11	2.73	100.00%
Scale sleep efficiency by PA volume	-0.89	3.54	100.00%
Scale sleep onset by PA volume	0.76	6.18	100.00%
Scale sleep regularity by PA volume	-0.44	1.03	100.00%
Scale sleep duration by PA intensity	0.11	2.72	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.50	100.00%
Scale sleep onset by PA intensity	0.76	6.07	100.00%
Scale sleep regularity by PA intensity	-0.45	1.01	100.00%
Scale PA volume by sleep duration(lagged)	0.89	8.18	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep efficiency(lagged)	0.88	8.18	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep onset(lagged)	0.88	8.14	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep regularity(lagged)	0.91	8.35	100.00%
Scale PA intensity by sleep regularity(lagged)	0.27	2.81	100.00%
Models moderated by PA mostactivehr			
Scale sleep duration by PA volume	0.12	2.73	100.00%
Scale sleep efficiency by PA volume	-0.89	3.52	100.00%
Scale sleep onset by PA volume	0.76	6.16	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep regularity by PA volume	-0.44	1.02	100.00%
Scale sleep duration by PA intensity	0.11	2.72	100.00%
Scale sleep efficiency by PA intensity	-0.90	3.52	100.00%
Scale sleep onset by PA intensity	0.76	6.08	100.00%
Scale sleep regularity by PA intensity	-0.45	0.97	100.00%
Scale PA volume by sleep duration(lagged)	0.88	8.17	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.87	100.00%
Scale PA volume by sleep efficiency(lagged)	0.87	8.17	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.86	100.00%
Scale PA volume by sleep onset(lagged)	0.87	8.15	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.85	100.00%
Scale PA volume by sleep regularity(lagged)	0.90	8.36	100.00%
Scale PA intensity by sleep regularity(lagged)	0.25	2.83	100.00%

Table 2

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

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
<b>Sleep duration (z)</b>										
(Intercept)	0.83	[0.70, 0.97]	0.07	11.74	< .001	0.75	[0.61, 0.89]	0.07	10.43	< .001
Physical activity	0.10	[0.06, 0.14]	0.02	5.00	< .001	0.07	[0.03, 0.12]	0.02	3.25	.001
Age	0.00	[-0.01, 0.00]	0.00	-0.75	.455	0.00	[-0.01, 0.00]	0.00	-0.54	.589
Physical activity <sup>2</sup>	-0.01	[-0.02, 0.00]	0.01	-1.44	.151	0.02	[0.00, 0.05]	0.01	1.77	.077
Physical activity × age	0.00	[0.00, 0.00]	0.00	-0.52	.602	0.00	[0.00, 0.00]	0.00	-1.15	.250
Age × Physical activity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-0.96	.335	0.00	[0.00, 0.00]	0.00	-2.48	.013
<b>Sleep efficiency (z)</b>										
(Intercept)	-0.32	[-0.47, -0.17]	0.08	-4.19	< .001	-0.37	[-0.52, -0.22]	0.08	-4.83	< .001
Physical activity	0.10	[0.06, 0.14]	0.02	4.62	< .001	0.03	[-0.01, 0.08]	0.02	1.49	.135
Age	0.00	[0.00, 0.00]	0.00	-0.09	.926	0.00	[0.00, 0.00]	0.00	-0.02	.988
Physical activity <sup>2</sup>	-0.02	[-0.03, -0.01]	0.01	-4.62	< .001	-0.01	[-0.04, 0.01]	0.01	-1.07	.284
Physical activity × age	0.00	[0.00, 0.00]	0.00	-3.22	.001	0.00	[0.00, 0.00]	0.00	-1.02	.309
Age × Physical activity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	2.92	.003	0.00	[0.00, 0.00]	0.00	0.61	.540
<b>Sleep onset (z)</b>										
(Intercept)	-1.03	[-1.14, -0.91]	0.06	-17.73	< .001	-0.98	[-1.09, -0.86]	0.06	-16.75	< .001
Physical activity	-0.02	[-0.05, 0.02]	0.02	-0.92	.358	-0.05	[-0.09, -0.02]	0.02	-3.04	.002
Age	0.00	[0.00, 0.00]	0.00	0.11	.914	0.00	[0.00, 0.00]	0.00	-0.26	.794
Physical activity <sup>2</sup>	0.00	[-0.01, 0.00]	0.00	-0.93	.354	-0.02	[-0.04, 0.00]	0.01	-1.75	.080
Physical activity × age	0.00	[0.00, 0.00]	0.00	-3.85	< .001	0.00	[0.00, 0.00]	0.00	-0.34	.736
Age × Physical activity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	3.23	.001	0.00	[0.00, 0.00]	0.00	2.53	.011
<b>Sleep regularity (z)</b>										

Table 2 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
(Intercept)	0.21 [0.06, 0.36]	0.08	2.79	.006	0.12 [-0.03, 0.27]	0.08	1.59	.113
Physical activity	0.21 [0.17, 0.26]	0.02	9.37	< .001	0.25 [0.20, 0.30]	0.03	9.08	< .001
Age	0.00 [0.00, 0.00]	0.00	-0.25	.803	0.00 [-0.01, 0.00]	0.00	-1.35	.180
Physical activity <sup>2</sup>	-0.03 [-0.05, -0.02]	0.01	-6.02	< .001	-0.10 [-0.13, -0.07]	0.01	-6.83	< .001
Physical activity × age	0.00 [0.00, 0.00]	0.00	0.25	.801	0.00 [0.00, 0.00]	0.00	-6.17	< .001
Age × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-1.23	.220	0.00 [0.00, 0.00]	0.00	2.97	.033

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

Table 3

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

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
<b>Sleep duration (z)</b>										
(Intercept)	0.16	[0.02, 0.30]	0.07	2.27	.024	1.00	[0.89, 1.12]	0.06	16.68	< .001
Sleep duration	0.01	[-0.01, 0.04]	0.01	1.09	.277	0.00	[-0.03, 0.02]	0.01	-0.34	.732
Age	-0.02	[-0.02, -0.02]	0.00	-9.60	< .001	-0.02	[-0.02, -0.02]	0.00	-12.03	< .001
Sleep duration <sup>2</sup>	-0.02	[-0.03, -0.01]	0.01	-3.89	< .001	-0.02	[-0.02, -0.01]	0.00	-3.05	.002
Sleep duration × age	0.00	[0.00, 0.00]	0.00	-1.81	.071	0.00	[0.00, 0.00]	0.00	1.41	.157
Age × Sleep duration <sup>2</sup>	0.00	[0.00, 0.00]	0.00	0.03	.974	0.00	[0.00, 0.00]	0.00	1.22	.223
<b>Sleep efficiency (z)</b>										
(Intercept)	0.15	[0.02, 0.29]	0.07	2.19	.029	1.00	[0.88, 1.12]	0.06	16.74	< .001
Sleep efficiency	0.00	[-0.03, 0.03]	0.02	0.25	.808	0.01	[-0.01, 0.04]	0.01	1.02	.309
Age	-0.02	[-0.02, -0.02]	0.00	-9.56	< .001	-0.02	[-0.02, -0.02]	0.00	-12.00	< .001
Sleep efficiency <sup>2</sup>	0.00	[-0.01, 0.00]	0.00	-0.74	.464	0.00	[-0.01, 0.01]	0.00	-0.13	.894
Sleep efficiency × age	0.00	[0.00, 0.00]	0.00	-0.47	.638	0.00	[0.00, 0.00]	0.00	-0.56	.576
Age × Sleep efficiency <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-0.21	.837	0.00	[0.00, 0.00]	0.00	0.38	.705
<b>Sleep onset (z)</b>										
(Intercept)	0.16	[0.02, 0.29]	0.07	2.23	.026	1.01	[0.89, 1.12]	0.06	16.62	< .001
Sleep onset	0.00	[-0.02, 0.02]	0.01	-0.23	.816	0.02	[0.00, 0.04]	0.01	2.23	.026
Age	-0.02	[-0.02, -0.02]	0.00	-9.56	< .001	-0.02	[-0.02, -0.02]	0.00	-11.94	< .001
Sleep onset <sup>2</sup>	-0.01	[-0.03, 0.02]	0.01	-0.57	.575	0.00	[-0.02, 0.02]	0.01	0.22	.826
Sleep onset × age	0.00	[0.00, 0.00]	0.00	0.73	.468	0.00	[0.00, 0.00]	0.00	-1.01	.313
Age × Sleep onset <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-0.72	.472	0.00	[0.00, 0.00]	0.00	0.00	.996
<b>Sleep regularity (z)</b>										

Table 3 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
(Intercept)	0.12	[0.02, 0.26]	0.07	1.72	.085	0.98	[0.86, 1.10]	0.06	16.34	< .001
Sleep regularity	0.14	[0.11, 0.16]	0.01	11.42	< .001	0.11	[0.08, 0.13]	0.01	9.09	< .001
Age	-0.02	[-0.02, -0.01]	0.00	-9.21	< .001	-0.02	[-0.02, -0.02]	0.00	-11.50	< .001
Sleep regularity <sup>2</sup>	0.01	[-0.01, 0.02]	0.01	0.83	.406	0.01	[-0.01, 0.02]	0.01	0.96	.336
Sleep regularity × age	0.00	[0.00, 0.00]	0.00	-3.86	< .001	0.00	[0.00, 0.00]	0.00	-5.51	< .001
Age × Sleep regularity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-1.24	.216	0.00	[0.00, 0.00]	0.00	-1.41	.159

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

Table 4

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

Term	Physical activity volume (ln)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration (z)</b>								
(Intercept)	0.18 [-0.59, 0.94]	0.39	0.45	.651	0.22 [0.01, 0.43]	0.11	2.03	.042
Log pa volume	-0.16 [-0.57, 0.26]	0.21	-0.74	.459	0.08 [0.03, 0.12]	0.02	3.39	.001
Age	-0.02 [-0.04, 0.00]	0.01	-2.19	.028	0.00 [-0.01, 0.00]	0.00	-1.93	.054
Log pa volume <sup>2</sup>	0.05 [-0.01, 0.11]	0.03	1.56	.118	0.02 [0.00, 0.05]	0.01	1.67	.096
Log pa volume × age	0.01 [0.00, 0.02]	0.01	1.97	.049	0.00 [0.00, 0.00]	0.00	-1.28	.200
Age × log pa volume <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-2.05	.041	0.00 [0.00, 0.00]	0.00	-2.37	.018
<b>Sleep efficiency (z)</b>								
(Intercept)	-1.92 [-2.70, -1.14]	0.40	-4.84	< .001	0.32 [0.09, 0.56]	0.12	2.67	.008
Log pa volume	1.13 [0.70, 1.55]	0.22	5.21	< .001	0.03 [-0.01, 0.08]	0.02	1.40	.161
Age	0.03 [0.01, 0.05]	0.01	2.81	.005	0.00 [0.00, 0.01]	0.00	0.94	.345
Log pa volume <sup>2</sup>	-0.14 [-0.20, -0.08]	0.03	-4.52	< .001	-0.01 [-0.04, 0.01]	0.01	-0.93	.354
Log pa volume × age	-0.01 [-0.03, 0.00]	0.01	-2.25	.025	0.00 [0.00, 0.00]	0.00	-0.92	.357
Age × log pa volume <sup>2</sup>	0.00 [0.00, 0.00]	0.00	1.82	.068	0.00 [0.00, 0.00]	0.00	0.47	.636
<b>Sleep onset (z)</b>								
(Intercept)	-0.94 [-1.59, -0.30]	0.33	-2.86	.004	0.06 [-0.22, 0.34]	0.14	0.41	.683
Log pa volume	0.59 [0.26, 0.92]	0.17	3.51	< .001	-0.05 [-0.09, -0.02]	0.02	-3.07	.002
Age	0.04 [0.02, 0.05]	0.01	4.32	< .001	0.00 [0.00, 0.00]	0.00	0.16	.870
Log pa volume <sup>2</sup>	-0.09 [-0.13, -0.04]	0.02	-3.66	< .001	-0.02 [-0.04, 0.00]	0.01	-1.71	.088
Log pa volume × age	-0.02 [-0.03, -0.01]	0.00	-3.73	< .001	0.00 [0.00, 0.00]	0.00	-0.31	.757
Age × log pa volume <sup>2</sup>	0.00 [0.00, 0.00]	0.00	3.18	.001	0.00 [0.00, 0.00]	0.00	2.49	.013
<b>Sleep regularity (z)</b>								

Table 4 continued

Term	Physical activity volume (ln)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
(Intercept)	-2.49	[-3.28, -1.70]	0.40	-6.16	< .001	0.58	[0.35, 0.81]	0.12	4.94	< .001
Log pa volume	1.32	[0.88, 1.76]	0.22	5.88	< .001	0.25	[0.19, 0.30]	0.03	9.10	< .001
Age	-0.02	[-0.04, 0.00]	0.01	-2.24	.025	0.00	[-0.01, 0.00]	0.00	-0.72	.471
Log pa volume <sup>2</sup>	-0.14	[-0.20, -0.07]	0.03	-4.27	< .001	-0.10	[-0.13, -0.07]	0.01	-6.66	< .001
Log pa volume × age	0.01	[0.00, 0.03]	0.01	2.30	.022	0.00	[0.00, 0.00]	0.00	-6.15	< .001
Age × log pa volume <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-2.28	.023	0.00	[0.00, 0.00]	0.00	2.81	.005

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

Table 5

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

Term	Physical activity volume (ln)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	4.22 [4.06, 4.37]	0.08	53.46	< .001	1.29 [1.10, 1.49]	0.10	13.07	< .001
Sleep duration	0.00 [-0.01, 0.02]	0.01	0.75	.452	0.00 [-0.03, 0.02]	0.01	-0.33	.744
Age	-0.01 [-0.01, -0.01]	0.00	-9.02	< .001	-0.02 [-0.02, -0.02]	0.00	-14.33	< .001
Sleep duration <sup>2</sup>	-0.01 [-0.01, 0.00]	0.00	-3.23	.001	-0.02 [-0.02, -0.01]	0.00	-3.09	.002
Sleep duration × age	0.00 [0.00, 0.00]	0.00	-2.12	.034	0.00 [0.00, 0.00]	0.00	1.41	.159
Age × Sleep duration <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-1.92	.055	0.00 [0.00, 0.00]	0.00	1.25	.212
Sleep efficiency (z)								
(Intercept)	4.21 [4.05, 4.36]	0.08	53.47	< .001	1.28 [1.08, 1.47]	0.10	12.92	< .001
Sleep efficiency	0.01 [0.00, 0.03]	0.01	2.17	.030	0.01 [-0.01, 0.04]	0.01	1.05	.293
Age	-0.01 [-0.01, -0.01]	0.00	-8.99	< .001	-0.02 [-0.02, -0.02]	0.00	-14.29	< .001
Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.40	.686	0.00 [-0.01, 0.01]	0.00	-0.14	.891
Sleep efficiency × age	0.00 [0.00, 0.00]	0.00	-1.79	.074	0.00 [0.00, 0.00]	0.00	-0.59	.558
Age × Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.50	.620	0.00 [0.00, 0.00]	0.00	0.38	.705
Sleep onset (z)								
(Intercept)	4.21 [4.06, 4.37]	0.08	53.29	< .001	1.28 [1.08, 1.47]	0.10	12.86	< .001
Sleep onset	0.01 [-0.01, 0.02]	0.01	0.99	.324	0.02 [0.00, 0.04]	0.01	2.26	.024
Age	-0.01 [-0.01, -0.01]	0.00	-9.00	< .001	-0.02 [-0.02, -0.02]	0.00	-14.21	< .001
Sleep onset <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.35	.728	0.00 [-0.02, 0.02]	0.01	0.19	.849
Sleep onset × age	0.00 [0.00, 0.00]	0.00	0.81	.418	0.00 [0.00, 0.00]	0.00	-1.05	.295
Age × Sleep onset <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-1.54	.129	0.00 [0.00, 0.00]	0.00	0.03	.972
Sleep regularity (z)								

Table 5 continued

Term	Physical activity volume (h)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
(Intercept)	4.16	[4.01, 4.31]	0.08	53.76	< .001	1.22	[1.03, 1.42]	0.10	12.50	< .001
Sleep regularity	0.08	[0.07, 0.09]	0.01	13.97	< .001	0.11	[0.08, 0.13]	0.01	9.17	< .001
Age	-0.01	[-0.01, -0.01]	0.00	-8.82	< .001	-0.02	[-0.02, -0.02]	0.00	-13.83	< .001
Sleep regularity <sup>2</sup>	0.00	[-0.01, 0.00]	0.00	-0.83	.409	0.01	[-0.01, 0.02]	0.01	1.02	.306
Sleep regularity × age	0.00	[0.00, 0.00]	0.00	-3.51	< .001	0.00	[0.00, 0.00]	0.00	-5.55	< .001
Age × Sleep regularity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-1.03	.305	0.00	[0.00, 0.00]	0.00	-1.45	.148

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

Table 6

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

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<i>Sleep duration (z)</i>								
(Intercept)	0.28 [0.05, 0.50]	0.11	2.44	.015	0.25 [0.03, 0.46]	0.11	2.24	.025
Physical activity	0.18 [0.09, 0.27]	0.05	3.88	< .001	0.12 [0.04, 0.19]	0.04	3.12	.002
Physical activity <sup>2</sup>	-0.03 [-0.07, 0.01]	0.02	-1.56	.118	0.01 [-0.03, 0.06]	0.02	0.58	.562
Age	0.00 [-0.01, 0.00]	0.00	-2.08	.037	0.00 [-0.01, 0.00]	0.00	-2.20	.028
Physical activity × bmi	0.00 [-0.01, 0.00]	0.00	-1.92	.055	0.00 [-0.01, 0.00]	0.00	-1.42	.156
<i>Sleep efficiency (z)</i>								
(Intercept)	0.30 [0.06, 0.54]	0.12	2.48	.013	0.31 [0.07, 0.55]	0.12	2.55	.011
Physical activity	0.07 [-0.03, 0.16]	0.05	1.37	.169	0.02 [-0.06, 0.09]	0.04	0.47	.636
Physical activity <sup>2</sup>	0.00 [-0.04, 0.04]	0.02	0.06	.949	0.01 [-0.04, 0.05]	0.02	0.25	.806
Age	0.00 [0.00, 0.01]	0.00	1.24	.214	0.00 [0.00, 0.01]	0.00	1.07	.283
Physical activity × bmi	0.00 [-0.01, 0.00]	0.00	-0.41	.679	0.00 [0.00, 0.00]	0.00	-0.21	.832
<i>Sleep onset (z)</i>								
(Intercept)	0.04 [-0.25, 0.32]	0.15	0.25	.805	0.06 [-0.23, 0.34]	0.14	0.39	.694
Physical activity	-0.02 [-0.09, 0.05]	0.04	-0.60	.551	-0.06 [-0.12, -0.01]	0.03	-2.17	.030
Physical activity <sup>2</sup>	-0.01 [-0.04, 0.02]	0.02	-0.52	.606	-0.01 [-0.05, 0.02]	0.02	-0.66	.512
Age	0.00 [0.00, 0.00]	0.00	0.92	.356	0.00 [0.00, 0.00]	0.00	0.55	.580
Physical activity × bmi	0.00 [-0.01, 0.00]	0.00	-1.14	.253	0.00 [0.00, 0.00]	0.00	-0.15	.883
<i>Sleep regularity (z)</i>								
(Intercept)	0.29 [0.07, 0.51]	0.11	2.59	.011	0.57 [0.33, 0.81]	0.12	4.63	< .001
Physical activity	-0.09 [-0.21, 0.02]	0.06	-1.64	.117	0.17 [0.09, 0.25]	0.04	3.99	< .001
Physical activity <sup>2</sup>	0.10 [0.05, 0.14]	0.02	4.30	< .001	-0.02 [-0.08, 0.04]	0.03	-0.72	.480

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Age	0.00 [0.00, 0.00]	0.00	0.16	.872	0.00 [0.00, 0.00]	0.00	0.05	.961
Physical activity $\times$ bmi	0.02 [0.01, 0.02]	0.00	5.78	< .001	0.00 [-0.01, 0.00]	0.00	-1.92	.056

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

Table 7

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

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.34 [0.99, 1.70]	0.18	7.48	< .001	1.27 [1.08, 1.47]	0.10	12.84	< .001
Sleep duration	0.00 [-0.04, 0.04]	0.02	-0.03	.972	0.02 [-0.02, 0.07]	0.02	1.10	.270
Sleep duration <sup>2</sup>	-0.02 [-0.04, 0.00]	0.01	-1.90	.057	0.00 [-0.01, 0.02]	0.01	0.46	.646
Age	-0.02 [-0.02, -0.02]	0.00	-9.88	< .001	-0.02 [-0.02, -0.02]	0.00	-14.33	< .001
Sleep duration × bmi	0.00 [0.00, 0.00]	0.00	-0.18	.858	0.00 [0.00, 0.00]	0.00	-0.77	.443
Sleep efficiency (z)								
(Intercept)	1.33 [0.98, 1.68]	0.18	7.41	< .001	1.29 [1.09, 1.48]	0.10	12.93	< .001
Sleep efficiency	0.01 [-0.04, 0.07]	0.03	0.44	.659	-0.01 [-0.06, 0.04]	0.03	-0.47	.636
Sleep efficiency <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-0.79	.431	-0.01 [-0.02, 0.01]	0.01	-1.01	.314
Age	-0.02 [-0.02, -0.02]	0.00	-9.86	< .001	-0.02 [-0.02, -0.02]	0.00	-14.32	< .001
Sleep efficiency × bmi	0.00 [0.00, 0.00]	0.00	-0.55	.586	0.00 [0.00, 0.00]	0.00	0.72	.473
Sleep onset (z)								
(Intercept)	1.35 [0.99, 1.70]	0.18	7.47	< .001	1.27 [1.07, 1.47]	0.10	12.64	< .001
Sleep onset	0.00 [-0.06, 0.05]	0.03	-0.19	.853	0.00 [-0.05, 0.05]	0.03	0.15	.881
Sleep onset <sup>2</sup>	-0.02 [-0.05, 0.01]	0.02	-1.16	.249	0.01 [-0.02, 0.04]	0.02	0.66	.511
Age	-0.02 [-0.02, -0.02]	0.00	-9.86	< .001	-0.02 [-0.02, -0.02]	0.00	-14.32	< .001
Sleep onset × bmi	0.00 [0.00, 0.00]	0.00	0.26	.797	0.00 [0.00, 0.00]	0.00	0.47	.639
Sleep regularity (z)								
(Intercept)	1.25 [0.90, 1.60]	0.18	6.99	< .001	1.21 [1.01, 1.40]	0.10	12.16	< .001
Sleep regularity	0.16 [0.10, 0.22]	0.03	5.44	< .001	0.13 [0.07, 0.18]	0.03	4.46	< .001
Sleep regularity <sup>2</sup>	0.00 [-0.04, 0.03]	0.02	-0.16	.871	0.03 [0.00, 0.06]	0.02	1.71	.088

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Age	-0.02	[-0.02, -0.01]	0.00	-9.80	< .001	-0.02	[-0.02, -0.02]	0.00	-14.32	< .001
Sleep regularity $\times$ bmi	0.00	[0.01, 0.00]	0.00	-2.12	.034	0.00	[0.01, 0.00]	0.00	-2.56	.010

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

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

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.23 [0.01, 0.45]	0.11	2.03	.042	0.22 [0.01, 0.43]	0.11	2.03	.042
Physical activity	0.09 [0.05, 0.14]	0.02	3.93	< .001	0.07 [0.04, 0.11]	0.02	3.76	< .001
Physical activity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.43	.670	0.03 [0.00, 0.05]	0.01	2.17	.033
Age	0.00 [-0.01, 0.00]	0.00	-2.06	.039	0.00 [-0.01, 0.00]	0.00	-2.17	.030
Physical activity × sesmedium	0.00 [-0.07, 0.06]	0.03	-0.09	.929	0.00 [-0.05, 0.05]	0.03	-0.08	.934
Physical activity × sesshigh	0.00 [-0.06, 0.06]	0.03	0.02	.987	-0.01 [-0.06, 0.04]	0.02	-0.42	.676
Sleep efficiency (z)								
(Intercept)	0.31 [0.07, 0.54]	0.12	2.59	.010	0.33 [0.09, 0.57]	0.12	2.70	.007
Physical activity	0.02 [-0.03, 0.06]	0.02	0.65	.517	0.00 [-0.04, 0.04]	0.02	-0.05	.959
Physical activity <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-1.09	.278	0.00 [-0.03, 0.02]	0.01	-0.19	.846
Age	0.00 [0.00, 0.01]	0.00	1.14	.255	0.00 [0.00, 0.01]	0.00	0.97	.332
Physical activity × sesmedium	0.02 [-0.04, 0.09]	0.03	0.79	.431	0.01 [-0.04, 0.06]	0.02	0.39	.698
Physical activity × sesshigh	0.06 [0.00, 0.12]	0.03	2.06	.040	0.03 [-0.02, 0.08]	0.03	1.31	.192
Sleep onset (z)								
(Intercept)	0.01 [-0.28, 0.29]	0.15	0.05	.964	0.05 [-0.23, 0.33]	0.14	0.32	.747
Physical activity	-0.10 [-0.14, -0.07]	0.02	-5.48	< .001	-0.09 [-0.12, -0.06]	0.02	-5.56	< .001
Physical activity <sup>2</sup>	0.02 [0.00, 0.03]	0.01	2.66	.008	0.00 [-0.01, 0.02]	0.01	0.46	.647
Age	0.00 [0.00, 0.00]	0.00	0.82	.410	0.00 [0.00, 0.00]	0.00	0.42	.674
Physical activity × sesmedium	0.06 [0.01, 0.11]	0.02	2.35	.019	0.01 [-0.03, 0.05]	0.02	0.50	.619
Physical activity × sesshigh	0.05 [0.00, 0.10]	0.02	2.16	.033	0.03 [-0.01, 0.07]	0.02	1.52	.137
Sleep regularity (z)								

Table 8 continued

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
(Intercept)	0.50 [0.28, 0.71]	0.11	4.60	< .001	0.56 [0.33, 0.78]	0.11	4.86	< .001
Physical activity	0.22 [0.15, 0.29]	0.04	5.98	.001	0.08 [0.04, 0.13]	0.02	3.39	.005
Physical activity <sup>2</sup>	-0.05 [-0.06, -0.03]	0.01	-5.36	< .001	-0.01 [-0.04, 0.01]	0.01	-1.06	.290
Age	0.00 [0.00, 0.00]	0.00	0.19	.851	0.00 [0.00, 0.00]	0.00	-0.08	.936
Physical activity × sesmedium	0.02 [-0.08, 0.11]	0.05	0.33	.754	0.01 [-0.04, 0.07]	0.03	0.53	.599
Physical activity × seshigh	0.00 [-0.10, 0.10]	0.05	0.03	.980	0.03 [-0.03, 0.09]	0.03	0.93	.370

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

Table 9

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

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.34 [0.99, 1.69]	0.18	7.49	< .001	1.29 [1.10, 1.48]	0.10	13.04	< .001
Sleep duration	-0.01 [-0.03, 0.02]	0.01	-0.63	.531	0.01 [-0.01, 0.04]	0.01	0.98	.330
Sleep duration <sup>2</sup>	-0.02 [-0.03, -0.01]	0.01	-2.80	.007	-0.02 [-0.03, -0.01]	0.01	-2.92	.004
Age	-0.02 [-0.02, -0.02]	0.00	-9.89	< .001	-0.02 [-0.02, -0.02]	0.00	-14.29	< .001
Sleep duration × sesmedium	0.00 [-0.03, 0.04]	0.02	0.12	.904	0.01 [-0.03, 0.04]	0.02	0.44	.661
Sleep duration × seshigh	0.01 [-0.03, 0.04]	0.02	0.36	.721	-0.02 [-0.05, 0.02]	0.02	-0.96	.338
Sleep efficiency (z)								
(Intercept)	1.32 [0.97, 1.68]	0.18	7.35	< .001	1.28 [1.08, 1.47]	0.10	12.89	< .001
Sleep efficiency	0.01 [-0.02, 0.04]	0.01	0.88	.380	0.00 [-0.02, 0.03]	0.01	0.35	.726
Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.50	.627	0.00 [-0.01, 0.01]	0.00	0.00	.996
Age	-0.02 [-0.02, -0.02]	0.00	-9.84	< .001	-0.02 [-0.02, -0.02]	0.00	-14.30	< .001
Sleep efficiency × sesmedium	-0.02 [-0.06, 0.02]	0.02	-0.90	.369	0.01 [-0.03, 0.04]	0.02	0.32	.749
Sleep efficiency × seshigh	-0.02 [-0.06, 0.02]	0.02	-1.03	.303	0.00 [-0.04, 0.05]	0.02	0.03	.978
Sleep onset (z)								
(Intercept)	1.35 [1.00, 1.70]	0.18	7.49	< .001	1.28 [1.08, 1.47]	0.10	12.86	< .001
Sleep onset	0.01 [-0.02, 0.04]	0.01	0.70	.486	0.01 [-0.01, 0.04]	0.01	1.02	.309
Sleep onset <sup>2</sup>	-0.02 [-0.04, 0.00]	0.01	-2.43	.018	0.00 [-0.01, 0.02]	0.01	0.39	.696
Age	-0.02 [-0.02, -0.02]	0.00	-9.88	< .001	-0.02 [-0.02, -0.02]	0.00	-14.31	< .001
Sleep onset × sesmedium	0.00 [-0.03, 0.03]	0.02	-0.05	.960	0.01 [-0.03, 0.04]	0.02	0.48	.634
Sleep onset × seshigh	-0.02 [-0.06, 0.02]	0.02	-1.13	.267	0.00 [-0.04, 0.03]	0.02	-0.28	.783
Sleep regularity (z)								

Table 9 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
(Intercept)	1.25 [0.90, 1.60]	0.18	6.99	< .001	1.23 [1.03, 1.42]	0.10	12.39	< .001
Sleep regularity	0.11 [0.07, 0.14]	0.02	6.46	< .001	0.07 [0.04, 0.10]	0.02	4.42	< .001
Sleep regularity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	0.18	.855	0.01 [-0.01, 0.03]	0.01	0.83	.415
Age	-0.02 [-0.02, -0.01]	0.00	-9.80	< .001	-0.02 [-0.02, -0.02]	0.00	-14.25	< .001
Sleep regularity × sesmedium	-0.01 [-0.05, 0.04]	0.02	-0.34	.739	-0.01 [-0.05, 0.03]	0.02	-0.67	.506
Sleep regularity × seshigh	-0.01 [-0.05, 0.03]	0.02	-0.40	.693	-0.01 [-0.05, 0.03]	0.02	-0.55	.585

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

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

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.24 [0.02, 0.46]	0.11	2.15	.032	0.26 [0.05, 0.47]	0.11	2.38	.017
Physical activity	0.10 [0.07, 0.14]	0.02	5.57	< .001	0.06 [0.03, 0.09]	0.01	4.09	< .001
Physical activity <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-2.55	.011	-0.01 [-0.02, 0.01]	0.01	-0.67	.500
Age	0.00 [-0.01, 0.00]	0.00	-2.12	.034	0.00 [-0.01, 0.00]	0.00	-2.26	.024
Physical activity × sexmale	-0.02 [-0.07, 0.03]	0.02	-0.76	.446	0.02 [-0.02, 0.05]	0.02	0.98	.325
Sleep efficiency (z)								
(Intercept)	0.31 [0.08, 0.54]	0.12	2.61	.009	0.33 [0.09, 0.57]	0.12	2.75	.006
Physical activity	0.03 [-0.01, 0.07]	0.02	1.59	.111	-0.01 [-0.04, 0.02]	0.01	-0.65	.518
Physical activity <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-2.30	.021	-0.01 [-0.03, 0.01]	0.01	-1.40	.161
Age	0.00 [0.00, 0.01]	0.00	1.20	.229	0.00 [0.00, 0.01]	0.00	1.05	.293
Physical activity × sexmale	0.03 [-0.02, 0.08]	0.02	1.20	.228	0.04 [0.00, 0.08]	0.02	2.15	.031
Sleep onset (z)								
(Intercept)	0.01 [-0.27, 0.30]	0.15	0.09	.931	0.04 [-0.24, 0.32]	0.14	0.28	.783
Physical activity	-0.08 [-0.11, -0.05]	0.01	-5.46	< .001	-0.07 [-0.10, -0.05]	0.01	-6.48	< .001
Physical activity <sup>2</sup>	0.01 [0.00, 0.02]	0.00	2.06	.040	0.00 [-0.01, 0.02]	0.01	0.24	.809
Age	0.00 [0.00, 0.00]	0.00	0.88	.378	0.00 [0.00, 0.00]	0.00	0.53	.594
Physical activity × sexmale	0.03 [0.00, 0.07]	0.02	1.74	.082	0.00 [-0.03, 0.03]	0.01	0.22	.826
Sleep regularity (z)								
(Intercept)	0.49 [0.28, 0.71]	0.11	4.53	< .001	0.58 [0.35, 0.81]	0.12	5.03	< .001
Physical activity	0.22 [0.18, 0.26]	0.02	10.56	< .001	0.08 [0.05, 0.11]	0.02	5.39	< .001
Physical activity <sup>2</sup>	-0.04 [-0.05, -0.03]	0.01	-7.31	< .001	-0.04 [-0.06, -0.02]	0.01	-4.31	< .001

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Age	0.00 [0.00, 0.00]	0.00	0.23	.820	0.00 [0.00, 0.00]	0.00	-0.04	.966
Physical activity $\times$ sexmale	0.01 [-0.05, 0.06]	0.03	0.20	.842	0.02 [-0.02, 0.07]	0.02	1.12	.267

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

Table 11

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

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	1.35	[1.00, 1.70]	0.18	7.52	< .001	1.29	[1.10, 1.48]	0.10	13.06	< .001
Sleep duration	-0.01	[-0.03, 0.01]	0.01	-1.13	.258	0.01	[-0.01, 0.02]	0.01	0.68	.497
Sleep duration <sup>2</sup>	-0.02	[-0.03, -0.02]	0.00	-5.79	< .001	-0.01	[-0.02, -0.01]	0.00	-3.42	.001
Age	-0.02	[-0.02, -0.02]	0.00	-9.88	< .001	-0.02	[-0.02, -0.02]	0.00	-14.32	< .001
Sleep duration × sexmale	0.01	[-0.01, 0.04]	0.01	1.02	.309	0.01	[-0.02, 0.03]	0.01	0.52	.604
Sleep efficiency (z)										
(Intercept)	1.33	[0.98, 1.68]	0.18	7.41	< .001	1.28	[1.09, 1.48]	0.10	12.94	< .001
Sleep efficiency	0.00	[-0.02, 0.02]	0.01	0.27	.790	0.01	[-0.02, 0.03]	0.01	0.48	.633
Sleep efficiency <sup>2</sup>	-0.01	[-0.01, 0.00]	0.00	-1.90	.057	0.00	[-0.01, 0.00]	0.00	-1.10	.270
Age	-0.02	[-0.02, -0.02]	0.00	-9.87	< .001	-0.02	[-0.02, -0.02]	0.00	-14.31	< .001
Sleep efficiency × sexmale	-0.01	[-0.04, 0.02]	0.02	-0.60	.549	0.00	[-0.03, 0.03]	0.02	0.19	.847
Sleep onset (z)										
(Intercept)	1.33	[0.98, 1.69]	0.18	7.43	< .001	1.28	[1.09, 1.47]	0.10	12.91	< .001
Sleep onset	0.02	[0.00, 0.03]	0.01	1.59	.112	0.01	[-0.01, 0.03]	0.01	0.93	.353
Sleep onset <sup>2</sup>	-0.01	[-0.02, 0.00]	0.01	-1.65	.100	0.00	[-0.01, 0.01]	0.01	-0.07	.946
Age	-0.02	[-0.02, -0.02]	0.00	-9.90	< .001	-0.02	[-0.02, -0.02]	0.00	-14.31	< .001
Sleep onset × sexmale	-0.03	[-0.05, 0.00]	0.01	-2.04	.041	0.01	[-0.01, 0.04]	0.01	0.99	.324
Sleep regularity (z)										
(Intercept)	1.26	[0.91, 1.60]	0.18	7.08	< .001	1.25	[1.05, 1.44]	0.10	12.68	< .001
Sleep regularity	0.09	[0.06, 0.11]	0.01	8.06	< .001	0.05	[0.03, 0.07]	0.01	5.18	< .001
Sleep regularity <sup>2</sup>	-0.01	[-0.02, 0.01]	0.01	-1.02	.309	-0.01	[-0.02, 0.00]	0.01	-1.75	.080

Table 11 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Age	-0.02	[-0.02, -0.01]	0.00	-9.79	< .001	-0.02	[-0.02, -0.02]	0.00	-14.31	< .001
Sleep regularity $\times$ sexmale	0.04	[0.01, 0.07]	0.02	2.30	.022	0.01	[-0.02, 0.04]	0.02	0.71	.475

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

Table 12

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

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.25 [0.02, 0.47]	0.11	2.17	.030	0.27 [0.06, 0.49]	0.11	2.48	.013
Physical activity	0.08 [0.03, 0.13]	0.03	3.06	.002	0.09 [0.05, 0.12]	0.02	4.75	< .001
Weekdaymonday	-0.02 [-0.07, 0.02]	0.02	-0.96	.338	-0.05 [-0.10, 0.01]	0.03	-1.66	.098
Weekdaysaturday	0.07 [0.03, 0.12]	0.03	2.96	.003	0.06 [0.01, 0.12]	0.03	2.16	.031
Weekdaysunday	0.00 [-0.05, 0.05]	0.02	0.04	.965	-0.03 [-0.08, 0.02]	0.03	-1.07	.283
Weekdaythursday	0.00 [-0.05, 0.05]	0.03	0.05	.960	-0.01 [-0.07, 0.04]	0.03	-0.47	.636
Weekdaytuesday	-0.03 [-0.07, 0.02]	0.03	-1.00	.319	-0.03 [-0.09, 0.02]	0.03	-1.11	.266
Weekdaywednesday	-0.07 [-0.12, -0.02]	0.03	-2.76	.006	-0.09 [-0.14, -0.03]	0.03	-2.93	.003
Physical activity <sup>2</sup>	-0.01 [-0.03, 0.00]	0.01	-1.49	.137	-0.02 [-0.04, 0.01]	0.01	-1.20	.228
Age	0.00 [-0.01, 0.00]	0.00	-2.13	.033	0.00 [-0.01, 0.00]	0.00	-2.22	.026
Physical activity × weekdaymonday	0.04 [-0.02, 0.10]	0.03	1.24	.216	0.00 [-0.05, 0.04]	0.02	-0.14	.887
Physical activity × weekdaysaturday	0.02 [-0.04, 0.09]	0.03	0.71	.477	-0.06 [-0.10, -0.01]	0.02	-2.47	.014
Physical activity × weekdaysunday	0.04 [-0.03, 0.10]	0.03	1.11	.268	-0.06 [-0.10, -0.01]	0.02	-2.41	.016
Physical activity × weekdaythursday	0.02 [-0.05, 0.09]	0.03	0.55	.581	0.00 [-0.05, 0.04]	0.02	-0.09	.927
Physical activity × weekdaytuesday	0.01 [-0.06, 0.08]	0.03	0.31	.760	-0.01 [-0.06, 0.03]	0.02	-0.58	.564
Physical activity × weekdaywednesday	-0.03 [-0.10, 0.04]	0.03	-0.86	.390	0.00 [-0.04, 0.05]	0.02	0.09	.925
Weekdaymonday × Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	0.44	.661	0.02 [-0.01, 0.05]	0.02	1.17	.243
Weekdaysaturday × Physical activity <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-0.72	.469	0.00 [-0.03, 0.04]	0.02	0.28	.783
Weekdaysunday × Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.01	.994	0.03 [-0.01, 0.06]	0.02	1.54	.123
Weekdaythursday × Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.04	.969	0.01 [-0.02, 0.05]	0.02	0.72	.474
Weekdaytuesday × Physical activity <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.57	.572	0.01 [-0.02, 0.05]	0.02	0.74	.461

Table 12 continued

## TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekdaywednesday $\times$ Physical activity <sup>2</sup>	0.02 [-0.01, 0.04]	0.01	1.35	.177	0.03 [-0.01, 0.06]	0.02	1.56	.119
Sleep efficiency (z)								
(Intercept)	0.36 [0.12, 0.59]	0.12	2.96	.003	0.38 [0.14, 0.62]	0.12	3.08	.002
Physical activity	0.02 [-0.03, 0.08]	0.03	0.89	.373	-0.01 [-0.05, 0.02]	0.02	-0.66	.508
Weekdaymonday	-0.04 [-0.09, 0.00]	0.03	-1.77	.077	-0.04 [-0.10, 0.01]	0.03	-1.55	.120
Weekdaysaturday	-0.10 [-0.15, -0.05]	0.03	-4.04	< .001	-0.12 [-0.18, -0.07]	0.03	-4.21	< .001
Weekdaysunday	-0.12 [-0.16, -0.07]	0.03	-4.61	< .001	-0.13 [-0.19, -0.08]	0.03	-4.67	< .001
Weekdaythursday	0.01 [-0.04, 0.06]	0.03	0.46	.649	0.01 [-0.05, 0.07]	0.03	0.35	.729
Weekdaytuesday	-0.01 [-0.06, 0.04]	0.03	-0.21	.835	0.01 [-0.05, 0.07]	0.03	0.32	.752
Weekdaywednesday	0.00 [-0.05, 0.05]	0.03	-0.15	.879	0.00 [-0.06, 0.06]	0.03	-0.03	.980
Physical activity <sup>2</sup>	-0.01 [-0.03, 0.00]	0.01	-1.40	.162	-0.01 [-0.03, 0.02]	0.01	-0.54	.591
Age	0.00 [0.00, 0.01]	0.00	1.16	.246	0.00 [0.00, 0.01]	0.00	0.98	.325
Physical activity $\times$ weekdaymonday	0.02 [-0.04, 0.09]	0.03	0.70	.486	0.01 [-0.03, 0.06]	0.02	0.54	.591
Physical activity $\times$ weekdaysaturday	0.04 [-0.03, 0.10]	0.03	1.04	.300	-0.02 [-0.06, 0.03]	0.02	-0.75	.454
Physical activity $\times$ weekdaysunday	0.05 [-0.01, 0.11]	0.03	1.56	.118	0.02 [-0.03, 0.06]	0.02	0.69	.489
Physical activity $\times$ weekdaythursday	-0.01 [-0.08, 0.06]	0.03	-0.25	.804	0.04 [-0.01, 0.08]	0.02	1.55	.122
Physical activity $\times$ weekdaytuesday	-0.02 [-0.09, 0.05]	0.03	-0.49	.623	0.01 [-0.03, 0.06]	0.02	0.60	.547
Physical activity $\times$ weekdaywednesday	-0.01 [-0.08, 0.06]	0.03	-0.21	.838	0.04 [-0.01, 0.09]	0.02	1.66	.097
Weekdaymonday $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	0.01	.989	-0.01 [-0.04, 0.03]	0.02	-0.33	.739
Weekdaysaturday $\times$ Physical activity <sup>2</sup>	0.00 [-0.03, 0.02]	0.01	-0.17	.867	0.01 [-0.02, 0.05]	0.02	0.76	.447
Weekdaysunday $\times$ Physical activity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.29	.771	0.01 [-0.03, 0.04]	0.02	0.39	.695
Weekdaythursday $\times$ Physical activity <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.49	.624	0.00 [-0.03, 0.04]	0.02	0.17	.862
Weekdaytuesday $\times$ Physical activity <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.48	.633	-0.01 [-0.05, 0.03]	0.02	-0.59	.555

Table 12 continued

## TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekdaywednesday $\times$ Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	0.68	.499	0.00 [-0.03, 0.04]	0.02	0.10	.918
Sleep onset (z)								
(Intercept)	0.02 [-0.27, 0.30]	0.15	0.13	.900	0.03 [-0.25, 0.31]	0.14	0.18	.854
Physical activity	-0.04 [-0.08, 0.00]	0.02	-1.81	.071	-0.05 [-0.08, -0.02]	0.01	-3.31	.001
Weekdaymonday	-0.09 [-0.13, -0.06]	0.02	-4.77	< .001	-0.07 [-0.12, -0.03]	0.02	-3.28	.001
Weekdaysaturday	0.07 [0.03, 0.11]	0.02	3.51	< .001	0.07 [0.03, 0.12]	0.02	3.16	.002
Weekdaysunday	0.09 [0.06, 0.13]	0.02	4.79	< .001	0.07 [0.03, 0.12]	0.02	3.34	.001
Weekdaythursday	-0.08 [-0.12, -0.04]	0.02	-3.98	< .001	-0.07 [-0.12, -0.03]	0.02	-3.05	.002
Weekdaytuesday	-0.04 [-0.08, 0.00]	0.02	-2.20	.028	-0.02 [-0.06, 0.03]	0.02	-0.71	.480
Weekdaywednesday	-0.03 [-0.07, 0.01]	0.02	-1.36	.175	0.00 [-0.04, 0.05]	0.02	0.21	.833
Physical activity <sup>2</sup>	0.01 [0.00, 0.02]	0.01	1.37	.172	0.02 [0.00, 0.04]	0.01	1.75	.080
Age	0.00 [0.00, 0.00]	0.00	0.93	.353	0.00 [0.00, 0.00]	0.00	0.58	.564
Physical activity $\times$ weekdaymonday	-0.07 [-0.12, -0.02]	0.03	-2.80	.005	-0.04 [-0.08, -0.01]	0.02	-2.31	.021
Physical activity $\times$ weekdaysaturday	0.06 [0.00, 0.11]	0.03	2.14	.032	0.02 [-0.02, 0.05]	0.02	0.93	.353
Physical activity $\times$ weekdaysunday	0.05 [0.00, 0.10]	0.03	1.89	.058	-0.02 [-0.06, 0.01]	0.02	-1.23	.217
Physical activity $\times$ weekdaythursday	-0.08 [-0.13, -0.02]	0.03	-2.85	.004	-0.03 [-0.07, 0.00]	0.02	-1.71	.086
Physical activity $\times$ weekdaytuesday	-0.08 [-0.14, -0.03]	0.03	-3.08	.002	-0.02 [-0.06, 0.01]	0.02	-1.17	.243
Physical activity $\times$ weekdaywednesday	-0.09 [-0.14, -0.04]	0.03	-3.30	.001	-0.01 [-0.05, 0.03]	0.02	-0.54	.588
Weekdaymonday $\times$ Physical activity <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.28	.780	-0.01 [-0.04, 0.01]	0.01	-1.02	.310
Weekdaysaturday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-0.69	.488	-0.01 [-0.04, 0.02]	0.01	-0.69	.490
Weekdaysunday $\times$ Physical activity <sup>2</sup>	-0.02 [-0.04, 0.00]	0.01	-2.45	.014	-0.01 [-0.04, 0.01]	0.01	-0.88	.378
Weekdaythursday $\times$ Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	1.07	.283	0.00 [-0.03, 0.03]	0.01	0.05	.961
Weekdaytuesday $\times$ Physical activity <sup>2</sup>	0.00 [-0.01, 0.02]	0.01	0.45	.652	-0.02 [-0.05, 0.00]	0.01	-1.65	.100

Table 12 continued

## TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekdaywednesday $\times$ Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	1.29	.197	-0.02 [-0.05, 0.00]	0.01	-1.61	.107
Sleep regularity (z)								
(Intercept)	0.49 [0.27, 0.71]	0.11	4.38	< .001	0.59 [0.35, 0.82]	0.12	4.95	< .001
Physical activity	0.17 [0.11, 0.23]	0.03	5.30	< .001	0.01 [-0.03, 0.05]	0.02	0.40	.687
Weekdaymonday	0.02 [-0.05, 0.08]	0.03	0.57	.575	0.02 [-0.06, 0.09]	0.04	0.48	.642
Weekdaysaturday	-0.13 [-0.20, -0.06]	0.04	-3.56	.006	-0.15 [-0.23, -0.07]	0.04	-3.68	.005
Weekdaysunday	-0.17 [-0.23, -0.10]	0.03	-5.01	< .001	-0.19 [-0.26, -0.12]	0.04	-5.18	< .001
Weekdaythursday	0.15 [0.09, 0.21]	0.03	4.80	< .001	0.18 [0.11, 0.25]	0.04	4.84	< .001
Weekdaytuesday	0.17 [0.11, 0.23]	0.03	5.81	< .001	0.19 [0.12, 0.26]	0.03	5.55	< .001
Weekdaywednesday	0.14 [0.08, 0.20]	0.03	4.60	< .001	0.19 [0.13, 0.25]	0.03	6.05	< .001
Physical activity <sup>2</sup>	-0.03 [-0.05, -0.01]	0.01	-3.14	.002	-0.02 [-0.04, 0.01]	0.01	-1.16	.248
Age	0.00 [0.00, 0.00]	0.00	0.12	.902	0.00 [0.00, 0.00]	0.00	-0.30	.764
Physical activity $\times$ weekdaymonday	0.05 [-0.04, 0.14]	0.05	1.09	.303	0.12 [0.07, 0.17]	0.02	4.96	< .001
Physical activity $\times$ weekdaysaturday	0.05 [-0.02, 0.13]	0.04	1.33	.189	-0.01 [-0.06, 0.04]	0.03	-0.42	.673
Physical activity $\times$ weekdaysunday	0.10 [0.02, 0.18]	0.04	2.37	.033	0.01 [-0.03, 0.06]	0.02	0.61	.544
Physical activity $\times$ weekdaythursday	0.00 [-0.09, 0.09]	0.05	0.03	.976	0.09 [0.04, 0.14]	0.02	3.60	< .001
Physical activity $\times$ weekdaytuesday	-0.01 [-0.08, 0.06]	0.04	-0.38	.704	0.14 [0.09, 0.18]	0.02	5.51	< .001
Physical activity $\times$ weekdaywednesday	-0.01 [-0.13, 0.10]	0.06	-0.21	.839	0.08 [0.03, 0.13]	0.03	3.20	.002
Weekdaymonday $\times$ Physical activity <sup>2</sup>	-0.02 [-0.04, 0.01]	0.01	-1.28	.219	-0.04 [-0.08, 0.00]	0.02	-1.83	.077
Weekdaysaturday $\times$ Physical activity <sup>2</sup>	-0.02 [-0.04, 0.01]	0.01	-1.38	.169	-0.01 [-0.04, 0.03]	0.02	-0.26	.795
Weekdaysunday $\times$ Physical activity <sup>2</sup>	-0.01 [-0.04, 0.01]	0.01	-1.19	.240	-0.02 [-0.06, 0.02]	0.02	-0.96	.340
Weekdaythursday $\times$ Physical activity <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.62	.538	-0.03 [-0.07, 0.01]	0.02	-1.48	.142
Weekdaytuesday $\times$ Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	0.88	.379	-0.02 [-0.06, 0.02]	0.02	-1.02	.308

Table 12 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Weekdaywednesday $\times$ Physical activity <sup>2</sup>	0.00	[ -0.03, 0.03]	0.01	0.01	.993	-0.05	[ -0.09, -0.01]	0.02	-2.65	.009

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

Table 13

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

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.41 [1.06, 1.77]	0.18	7.84	< .001	1.35 [1.16, 1.55]	0.10	13.53	< .001
Sleep duration	0.04 [0.00, 0.07]	0.02	2.15	.031	0.05 [0.02, 0.09]	0.02	3.22	.001
Weekdaymonday	-0.16 [-0.20, -0.12]	0.02	-8.18	< .001	-0.10 [-0.14, -0.07]	0.02	-5.52	< .001
Weekdaysaturday	-0.08 [-0.11, -0.04]	0.02	-3.93	< .001	-0.09 [-0.13, -0.06]	0.02	-4.96	< .001
Weekdaysunday	-0.16 [-0.20, -0.13]	0.02	-8.56	< .001	-0.20 [-0.23, -0.16]	0.02	-10.63	< .001
Weekdaythursday	-0.03 [-0.07, 0.00]	0.02	-1.73	.084	-0.02 [-0.06, 0.02]	0.02	-0.97	.330
Weekdaytuesday	-0.05 [-0.09, -0.01]	0.02	-2.57	.010	-0.05 [-0.09, -0.01]	0.02	-2.75	.006
Weekdaywednesday	-0.03 [-0.07, 0.01]	0.02	-1.66	.098	-0.02 [-0.06, 0.01]	0.02	-1.19	.232
Sleep duration <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-1.32	.188	-0.01 [-0.03, 0.01]	0.01	-1.34	.181
Age	-0.02 [-0.02, -0.01]	0.00	-9.83	< .001	-0.02 [-0.02, -0.02]	0.00	-14.21	< .001
Sleep duration × weekdaymonday	-0.05 [-0.09, -0.01]	0.02	-2.48	.013	-0.07 [-0.11, -0.02]	0.02	-3.10	.002
Sleep duration × weekdaysaturday	-0.05 [-0.09, 0.00]	0.02	-2.15	.031	-0.07 [-0.11, -0.03]	0.02	-3.35	.001
Sleep duration × weekdaysunday	-0.06 [-0.10, -0.02]	0.02	-2.70	.007	-0.09 [-0.13, -0.05]	0.02	-4.26	< .001
Sleep duration × weekdaythursday	-0.01 [-0.06, 0.04]	0.02	-0.46	.644	0.03 [-0.01, 0.08]	0.02	1.40	.161
Sleep duration × weekdaytuesday	-0.01 [-0.05, 0.04]	0.02	-0.38	.703	0.00 [-0.04, 0.04]	0.02	-0.08	.935
Sleep duration × weekdaywednesday	-0.05 [-0.09, 0.00]	0.02	-2.12	.034	-0.01 [-0.05, 0.03]	0.02	-0.46	.644
Weekdaymonday × Sleep duration <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-1.19	.234	0.00 [-0.02, 0.02]	0.01	0.33	.742
Weekdaysaturday × Sleep duration <sup>2</sup>	-0.01 [-0.03, 0.02]	0.01	-0.70	.482	-0.01 [-0.03, 0.02]	0.01	-0.63	.527
Weekdaysunday × Sleep duration <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-0.64	.522	-0.01 [-0.03, 0.01]	0.01	-0.53	.595
Weekdaythursday × Sleep duration <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	0.01	.994	0.02 [0.00, 0.05]	0.01	1.83	.067
Weekdaytuesday × Sleep duration <sup>2</sup>	0.00 [-0.02, 0.03]	0.01	0.37	.712	0.02 [0.00, 0.04]	0.01	1.72	.085

Table 13 continued

## TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Weekdaywednesday × Sleep duration <sup>2</sup>	0.00	[−0.03, 0.02]	0.01	−0.41	.683	0.01	[−0.01, 0.03]	0.01	0.89	.373
Sleep efficiency (z)										
(Intercept)	1.42	[1.06, 1.77]	0.18	7.83	< .001	1.36	[1.16, 1.55]	0.10	13.52	< .001
Sleep efficiency	−0.02	[−0.06, 0.02]	0.02	−1.10	.271	−0.02	[−0.05, 0.02]	0.02	−0.85	.397
Weekdaymonday	−0.17	[−0.21, −0.14]	0.02	−8.96	< .001	−0.11	[−0.14, −0.07]	0.02	−5.76	< .001
Weekdaysaturday	−0.08	[−0.12, −0.05]	0.02	−4.37	< .001	−0.10	[−0.14, −0.07]	0.02	−5.51	< .001
Weekdaysunday	−0.19	[−0.23, −0.15]	0.02	−9.98	< .001	−0.22	[−0.25, −0.18]	0.02	−11.68	< .001
Weekdaythursday	−0.04	[−0.08, −0.01]	0.02	−2.26	.024	−0.01	[−0.05, 0.03]	0.02	−0.59	.556
Weekdaytuesday	−0.05	[−0.09, −0.01]	0.02	−2.75	.006	−0.05	[−0.09, −0.01]	0.02	−2.70	.007
Weekdaywednesday	−0.04	[−0.08, 0.00]	0.02	−1.80	.072	−0.02	[−0.05, 0.02]	0.02	−0.85	.396
Sleep efficiency <sup>2</sup>	−0.01	[−0.02, 0.00]	0.01	−1.29	.196	0.00	[−0.02, 0.01]	0.01	−0.82	.415
Age	−0.02	[−0.02, −0.01]	0.00	−9.80	< .001	−0.02	[−0.02, −0.02]	0.00	−14.22	< .001
Sleep efficiency × weekdaymonday	0.01	[−0.05, 0.06]	0.03	0.26	.798	0.03	[−0.02, 0.07]	0.02	1.13	.260
Sleep efficiency × weekdaysaturday	0.00	[−0.05, 0.05]	0.02	0.00	.999	0.02	[−0.03, 0.06]	0.02	0.72	.472
Sleep efficiency × weekdaysunday	0.06	[0.01, 0.11]	0.02	2.58	.010	0.05	[0.01, 0.10]	0.02	2.39	.017
Sleep efficiency × weekdaythursday	0.02	[−0.04, 0.07]	0.03	0.60	.548	0.00	[−0.06, 0.05]	0.03	−0.10	.921
Sleep efficiency × weekdaytuesday	−0.01	[−0.05, 0.04]	0.03	−0.20	.842	0.02	[−0.03, 0.06]	0.02	0.69	.488
Sleep efficiency × weekdaywednesday	0.00	[−0.06, 0.06]	0.03	0.09	.926	0.00	[−0.05, 0.04]	0.03	−0.20	.845
Weekdaymonday × Sleep efficiency <sup>2</sup>	0.00	[−0.02, 0.02]	0.01	−0.13	.897	0.00	[−0.01, 0.02]	0.01	0.14	.886
Weekdaysaturday × Sleep efficiency <sup>2</sup>	0.00	[−0.02, 0.02]	0.01	−0.23	.821	0.00	[−0.02, 0.02]	0.01	0.02	.982
Weekdaysunday × Sleep efficiency <sup>2</sup>	0.02	[0.00, 0.03]	0.01	1.91	.057	0.01	[−0.01, 0.02]	0.01	0.91	.364
Weekdaythursday × Sleep efficiency <sup>2</sup>	0.01	[−0.01, 0.02]	0.01	1.09	.275	0.01	[−0.01, 0.02]	0.01	0.63	.533
Weekdaytuesday × Sleep efficiency <sup>2</sup>	0.00	[−0.01, 0.02]	0.01	0.35	.730	0.01	[−0.01, 0.02]	0.01	1.05	.296

Table 13 continued

## TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Weekdaywednesday × Sleep efficiency <sup>2</sup>	0.00	[ -0.02, 0.01 ]	0.01	-0.31	.760	0.00	[ -0.02, 0.01 ]	0.01	-0.20	.839
Sleep onset (z)										
(Intercept)	1.42	[ 1.07, 1.77 ]	0.18	7.87	< .001	1.36	[ 1.16, 1.55 ]	0.10	13.49	< .001
Sleep onset	-0.02	[ -0.04, 0.01 ]	0.01	-1.08	.282	-0.01	[ -0.04, 0.01 ]	0.01	-0.93	.353
Weekdaymonday	-0.17	[ -0.22, -0.13 ]	0.02	-7.85	< .001	-0.11	[ -0.16, -0.07 ]	0.02	-5.33	< .001
Weekdaysaturday	-0.09	[ -0.14, -0.05 ]	0.02	-4.08	< .001	-0.12	[ -0.17, -0.08 ]	0.02	-5.68	< .001
Weekdaysunday	-0.19	[ -0.23, -0.14 ]	0.02	-8.48	< .001	-0.21	[ -0.26, -0.17 ]	0.02	-9.84	< .001
Weekdaythursday	-0.05	[ -0.09, 0.00 ]	0.02	-2.11	.035	-0.02	[ -0.06, 0.03 ]	0.02	-0.78	.438
Weekdaytuesday	-0.06	[ -0.10, -0.01 ]	0.02	-2.52	.012	-0.05	[ -0.09, 0.00 ]	0.02	-2.17	.030
Weekdaywednesday	-0.05	[ -0.10, -0.01 ]	0.02	-2.37	.018	-0.02	[ -0.07, 0.02 ]	0.02	-1.01	.312
Sleep onset <sup>2</sup>	-0.01	[ -0.04, 0.01 ]	0.01	-1.28	.201	0.00	[ -0.02, 0.02 ]	0.01	-0.28	.779
Age	-0.02	[ -0.02, -0.01 ]	0.00	-9.82	< .001	-0.02	[ -0.02, -0.02 ]	0.00	-14.24	< .001
Sleep onset × weekdaymonday	0.02	[ -0.01, 0.06 ]	0.02	1.31	.190	0.05	[ 0.01, 0.08 ]	0.02	2.64	.008
Sleep onset × weekdaysaturday	0.02	[ -0.01, 0.06 ]	0.02	1.23	.217	0.05	[ 0.02, 0.09 ]	0.02	2.87	.004
Sleep onset × weekdaysunday	0.06	[ 0.02, 0.09 ]	0.02	3.08	.002	0.09	[ 0.06, 0.13 ]	0.02	5.22	< .001
Sleep onset × weekdaythursday	0.02	[ -0.02, 0.05 ]	0.02	0.86	.387	-0.02	[ -0.05, 0.02 ]	0.02	-0.83	.405
Sleep onset × weekdaytuesday	0.00	[ -0.04, 0.04 ]	0.02	-0.13	.899	0.02	[ -0.02, 0.05 ]	0.02	0.90	.367
Sleep onset × weekdaywednesday	0.01	[ -0.03, 0.05 ]	0.02	0.64	.523	0.00	[ -0.03, 0.04 ]	0.02	0.23	.821
Weekdaymonday × Sleep onset <sup>2</sup>	0.00	[ -0.03, 0.02 ]	0.01	-0.15	.881	0.00	[ -0.02, 0.03 ]	0.01	0.16	.876
Weekdaysaturday × Sleep onset <sup>2</sup>	0.00	[ -0.03, 0.04 ]	0.02	0.32	.750	0.01	[ -0.02, 0.04 ]	0.01	0.82	.410
Weekdaysunday × Sleep onset <sup>2</sup>	0.01	[ -0.02, 0.03 ]	0.01	0.43	.669	-0.01	[ -0.04, 0.02 ]	0.01	-0.67	.501
Weekdaythursday × Sleep onset <sup>2</sup>	0.01	[ -0.02, 0.04 ]	0.02	0.75	.453	0.01	[ -0.01, 0.04 ]	0.02	0.98	.327
Weekdaytuesday × Sleep onset <sup>2</sup>	0.00	[ -0.02, 0.03 ]	0.02	0.32	.751	0.00	[ -0.02, 0.03 ]	0.01	0.24	.808

Table 13 continued

## TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Weekdaywednesday × Sleep onset <sup>2</sup>	0.01	[−0.02, 0.04]	0.02	0.98	.329	0.01	[−0.02, 0.04]	0.01	0.39	.699
Sleep regularity (z)										
(Intercept)	1.33	[0.98, 1.68]	0.18	7.43	< .001	1.33	[1.14, 1.53]	0.10	13.32	< .001
Sleep regularity	0.10	[0.07, 0.13]	0.02	5.66	< .001	0.04	[0.00, 0.07]	0.02	2.19	.029
Weekdaymonday	−0.13	[−0.18, −0.09]	0.02	−5.97	< .001	−0.11	[−0.15, −0.06]	0.02	−4.85	< .001
Weekdaysaturday	−0.05	[−0.10, −0.01]	0.02	−2.31	.021	−0.12	[−0.16, −0.07]	0.02	−5.24	< .001
Weekdaysunday	−0.14	[−0.18, −0.10]	0.02	−6.21	< .001	−0.22	[−0.27, −0.18]	0.02	−10.08	< .001
Weekdaythursday	−0.01	[−0.06, 0.03]	0.02	−0.55	.582	−0.02	[−0.06, 0.03]	0.02	−0.73	.466
Weekdaytuesday	−0.04	[−0.09, 0.00]	0.02	−1.81	.070	−0.05	[−0.09, 0.00]	0.02	−2.03	.042
Weekdaywednesday	−0.05	[−0.10, 0.00]	0.02	−2.08	.037	−0.02	[−0.07, 0.03]	0.02	−0.82	.411
Sleep regularity <sup>2</sup>	0.00	[−0.03, 0.02]	0.01	−0.36	.718	−0.02	[−0.05, 0.00]	0.01	−2.03	.043
Age	−0.02	[−0.02, −0.01]	0.00	−9.79	< .001	−0.02	[−0.02, −0.02]	0.00	−14.23	< .001
Sleep regularity × weekdaymonday	−0.05	[−0.10, −0.01]	0.02	−2.18	.029	0.00	[−0.04, 0.05]	0.02	0.07	.944
Sleep regularity × weekdaysaturday	−0.02	[−0.06, 0.03]	0.02	−0.76	.446	0.02	[−0.03, 0.06]	0.02	0.69	.488
Sleep regularity × weekend sunday	0.03	[−0.02, 0.08]	0.02	1.07	.284	0.05	[0.00, 0.09]	0.02	2.01	.045
Sleep regularity × weekend thursday	−0.04	[−0.09, 0.01]	0.02	−1.71	.088	−0.03	[−0.08, 0.02]	0.02	−1.23	.217
Sleep regularity × weekend tuesday	−0.04	[−0.08, 0.01]	0.02	−1.50	.133	−0.03	[−0.07, 0.02]	0.02	−1.10	.272
Sleep regularity × weekend wednesday	0.01	[−0.04, 0.05]	0.02	0.22	.823	0.00	[−0.05, 0.04]	0.02	−0.13	.900
Weekdaymonday × Sleep regularity <sup>2</sup>	0.00	[−0.03, 0.03]	0.02	−0.15	.883	0.03	[−0.01, 0.06]	0.02	1.61	.106
Weekdaysaturday × Sleep regularity <sup>2</sup>	−0.02	[−0.05, 0.01]	0.02	−1.13	.261	0.03	[−0.01, 0.06]	0.02	1.58	.115
Weekdaysunday × Sleep regularity <sup>2</sup>	0.00	[−0.03, 0.03]	0.02	0.04	.971	0.04	[0.00, 0.07]	0.02	2.23	.026
Weekdaythursday × Sleep regularity <sup>2</sup>	−0.01	[−0.05, 0.02]	0.02	−0.79	.430	0.03	[0.00, 0.06]	0.02	1.67	.094
Weekdaytuesday × Sleep regularity <sup>2</sup>	0.02	[−0.01, 0.05]	0.02	1.13	.257	0.02	[−0.01, 0.05]	0.02	1.35	.178

Table 13 continued

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Weekdaywednesday $\times$ Sleep regularity <sup>2</sup>	0.01 [-0.02, 0.04]	0.02	0.59	.557	0.00 [-0.03, 0.04]	0.02	0.22	.823

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

Table 14

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

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.26 [0.04, 0.48]	0.11	2.27	.023	0.25 [0.03, 0.46]	0.11	2.27	.023
Physical activity	0.13 [0.08, 0.17]	0.02	5.37	< .001	0.09 [0.05, 0.12]	0.02	4.67	< .001
Seasonspring	-0.06 [-0.13, 0.01]	0.03	-1.68	.093	-0.02 [-0.10, 0.05]	0.04	-0.62	.536
Seasonsummer	-0.14 [-0.22, -0.07]	0.04	-3.88	< .001	-0.10 [-0.18, -0.03]	0.04	-2.60	.009
Seasonwinter	0.05 [-0.02, 0.12]	0.03	1.43	.154	0.06 [-0.02, 0.13]	0.04	1.51	.130
Physical activity <sup>2</sup>	-0.02 [-0.03, -0.01]	0.01	-2.87	.004	0.01 [-0.02, 0.03]	0.01	0.69	.493
Age	0.00 [-0.01, 0.00]	0.00	-2.05	.040	0.00 [-0.01, 0.00]	0.00	-2.24	.025
Physical activity × seasonspring	-0.06 [-0.12, 0.01]	0.03	-1.76	.078	-0.02 [-0.07, 0.03]	0.02	-0.77	.439
Physical activity × seasonsummer	-0.01 [-0.09, 0.06]	0.04	-0.35	.727	-0.06 [-0.11, 0.00]	0.03	-2.04	.041
Physical activity × seasonwinter	-0.05 [-0.12, 0.01]	0.03	-1.68	.093	-0.03 [-0.08, 0.02]	0.03	-1.26	.208
Seasonspring × Physical activity <sup>2</sup>	0.03 [0.00, 0.05]	0.01	2.44	.015	-0.01 [-0.04, 0.03]	0.02	-0.32	.745
Seasonsummer × Physical activity <sup>2</sup>	-0.01 [-0.04, 0.01]	0.01	-1.01	.313	-0.05 [-0.09, -0.02]	0.02	-2.83	.005
Seasonwinter × Physical activity <sup>2</sup>	0.01 [-0.01, 0.02]	0.01	1.10	.271	0.00 [-0.03, 0.04]	0.02	0.29	.771
Sleep efficiency (z)								
(Intercept)	0.28 [0.05, 0.51]	0.12	2.35	.019	0.27 [0.03, 0.51]	0.12	2.24	.025
Physical activity	0.10 [0.05, 0.14]	0.02	4.06	< .001	0.05 [0.01, 0.09]	0.02	2.55	.011
Seasonspring	0.04 [-0.03, 0.11]	0.04	1.02	.309	0.06 [-0.02, 0.14]	0.04	1.55	.120
Seasonsummer	-0.02 [-0.09, 0.06]	0.04	-0.42	.675	0.01 [-0.07, 0.09]	0.04	0.34	.732
Seasonwinter	0.07 [0.00, 0.14]	0.04	1.83	.067	0.08 [0.00, 0.15]	0.04	2.03	.042
Physical activity <sup>2</sup>	-0.02 [-0.03, -0.01]	0.01	-2.98	.003	0.00 [-0.02, 0.03]	0.01	0.08	.937
Age	0.00 [0.00, 0.01]	0.00	1.25	.211	0.00 [0.00, 0.01]	0.00	1.11	.269

Table 14 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity $\times$ seasonspring	-0.10 [-0.16, -0.03]	0.03	-2.83	.005	-0.07 [-0.12, -0.02]	0.03	-2.72	.007
Physical activity $\times$ seasonsummer	-0.05 [-0.12, 0.03]	0.04	-1.19	.234	-0.07 [-0.13, -0.02]	0.03	-2.55	.011
Physical activity $\times$ seasonwinter	-0.05 [-0.12, 0.01]	0.03	-1.59	.112	-0.02 [-0.07, 0.03]	0.03	-0.86	.388
Seasonspring $\times$ Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	1.30	.193	-0.01 [-0.04, 0.03]	0.02	-0.35	.729
Seasonsummer $\times$ Physical activity <sup>2</sup>	0.00 [-0.03, 0.03]	0.01	-0.02	.985	-0.03 [-0.07, 0.01]	0.02	-1.54	.124
Seasonwinter $\times$ Physical activity <sup>2</sup>	0.01 [-0.01, 0.02]	0.01	0.78	.438	0.00 [-0.03, 0.03]	0.02	-0.11	.913
Sleep onset (z)								
(Intercept)	0.00 [-0.29, 0.28]	0.15	-0.01	.993	0.03 [-0.25, 0.31]	0.14	0.20	.841
Physical activity	-0.06 [-0.09, -0.02]	0.02	-3.03	.002	-0.05 [-0.08, -0.02]	0.02	-3.27	.001
Seasonspring	0.01 [-0.04, 0.07]	0.03	0.37	.713	0.01 [-0.05, 0.07]	0.03	0.37	.713
Seasonsummer	0.06 [0.00, 0.12]	0.03	1.97	.049	0.05 [-0.01, 0.11]	0.03	1.62	.105
Seasonwinter	0.01 [-0.05, 0.06]	0.03	0.30	.767	0.00 [-0.05, 0.06]	0.03	0.16	.876
Physical activity <sup>2</sup>	0.01 [0.00, 0.02]	0.00	1.79	.074	0.00 [-0.02, 0.02]	0.01	0.12	.908
Age	0.00 [0.00, 0.00]	0.00	0.91	.362	0.00 [0.00, 0.00]	0.00	0.51	.609
Physical activity $\times$ seasonspring	-0.05 [-0.10, 0.01]	0.03	-1.73	.083	-0.04 [-0.07, 0.00]	0.02	-1.79	.074
Physical activity $\times$ seasonsummer	0.00 [-0.06, 0.06]	0.03	-0.14	.893	-0.01 [-0.06, 0.03]	0.02	-0.56	.575
Physical activity $\times$ seasonwinter	0.01 [-0.04, 0.06]	0.03	0.55	.580	-0.03 [-0.07, 0.01]	0.02	-1.50	.133
Seasonspring $\times$ Physical activity <sup>2</sup>	0.01 [0.00, 0.03]	0.01	1.61	.107	0.01 [-0.02, 0.03]	0.01	0.65	.519
Seasonsummer $\times$ Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	1.03	.305	0.01 [-0.02, 0.04]	0.02	0.96	.339
Seasonwinter $\times$ Physical activity <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-1.47	.141	0.00 [-0.03, 0.02]	0.01	-0.38	.705
Sleep regularity (z)								
(Intercept)	0.51 [0.29, 0.73]	0.11	4.57	< .001	0.59 [0.36, 0.82]	0.12	4.97	< .001
Physical activity	0.23 [0.17, 0.29]	0.03	7.39	< .001	0.13 [0.10, 0.17]	0.02	6.72	< .001

Table 14 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Seasonspring	-0.04 [-0.11, 0.04]	0.04	-0.98	.329	-0.06 [-0.14, 0.03]	0.04	-1.32	.192
Seasonsummer	0.02 [-0.06, 0.09]	0.04	0.44	.661	0.03 [-0.06, 0.11]	0.04	0.63	.529
Seasonwinter	-0.04 [-0.11, 0.03]	0.04	-1.11	.270	-0.02 [-0.09, 0.06]	0.04	-0.41	.683
Physical activity <sup>2</sup>	-0.04 [-0.05, -0.03]	0.01	-6.19	< .001	-0.03 [-0.06, 0.00]	0.01	-2.27	.025
Age	0.00 [0.00, 0.00]	0.00	0.23	.821	0.00 [0.00, 0.00]	0.00	-0.05	.961
Physical activity × seasonspring	0.01 [-0.07, 0.09]	0.04	0.22	.829	-0.07 [-0.12, -0.02]	0.03	-2.60	.009
Physical activity × seasonsummer	0.02 [-0.07, 0.11]	0.05	0.42	.678	-0.05 [-0.10, 0.01]	0.03	-1.55	.120
Physical activity × seasonwinter	-0.03 [-0.12, 0.06]	0.05	-0.60	.564	-0.04 [-0.10, 0.01]	0.03	-1.59	.112
Seasonspring × Physical activity <sup>2</sup>	-0.01 [-0.04, 0.01]	0.01	-1.04	.306	0.01 [-0.03, 0.05]	0.02	0.55	.586
Seasonsummer × Physical activity <sup>2</sup>	-0.03 [-0.07, 0.01]	0.02	-1.51	.149	-0.02 [-0.07, 0.02]	0.02	-1.17	.242
Seasonwinter × Physical activity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	1.35	.182	-0.01 [-0.04, 0.03]	0.02	-0.39	.697

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

Table 15

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

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.35 [1.00, 1.70]	0.18	7.48	< .001	1.30 [1.10, 1.49]	0.10	12.98	< .001
Sleep duration	0.00 [-0.03, 0.03]	0.01	0.07	.943	0.02 [-0.01, 0.04]	0.01	1.38	.168
Seasonspring	0.00 [-0.06, 0.07]	0.03	0.06	.950	-0.02 [-0.08, 0.03]	0.03	-0.77	.440
Seasonsummer	-0.06 [-0.12, 0.01]	0.03	-1.73	.083	-0.08 [-0.14, -0.02]	0.03	-2.66	.008
Seasonwinter	-0.01 [-0.07, 0.06]	0.03	-0.21	.831	0.01 [-0.05, 0.06]	0.03	0.27	.787
Sleep duration <sup>2</sup>	-0.02 [-0.03, -0.01]	0.01	-2.87	.004	0.00 [-0.01, 0.01]	0.01	-0.21	.832
Age	-0.02 [-0.02, -0.02]	0.00	-9.92	< .001	-0.02 [-0.02, -0.02]	0.00	-14.32	< .001
Sleep duration × seasonspring	-0.04 [-0.08, 0.00]	0.02	-2.13	.034	-0.01 [-0.05, 0.02]	0.02	-0.83	.407
Sleep duration × seasonsummer	-0.02 [-0.06, 0.03]	0.02	-0.73	.463	-0.02 [-0.06, 0.02]	0.02	-0.99	.323
Sleep duration × seasonwinter	0.03 [-0.01, 0.07]	0.02	1.69	.091	-0.01 [-0.04, 0.03]	0.02	-0.35	.725
Seasonspring × Sleep duration <sup>2</sup>	-0.01 [-0.03, 0.00]	0.01	-1.38	.168	-0.01 [-0.03, 0.00]	0.01	-1.53	.126
Seasonsummer × Sleep duration <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	0.80	.423	-0.01 [-0.03, 0.01]	0.01	-1.34	.181
Seasonwinter × Sleep duration <sup>2</sup>	-0.01 [-0.02, 0.01]	0.01	-0.68	.496	-0.02 [-0.03, 0.00]	0.01	-1.84	.066
Sleep efficiency (z)								
(Intercept)	1.34 [0.98, 1.69]	0.18	7.40	< .001	1.30 [1.10, 1.50]	0.10	13.00	< .001
Sleep efficiency	0.02 [-0.01, 0.05]	0.02	1.58	.115	0.01 [-0.01, 0.04]	0.01	0.96	.338
Seasonspring	0.00 [-0.06, 0.06]	0.03	0.00	.999	-0.03 [-0.09, 0.02]	0.03	-1.14	.253
Seasonsummer	-0.06 [-0.12, 0.01]	0.03	-1.71	.087	-0.10 [-0.16, -0.04]	0.03	-3.29	.001
Seasonwinter	0.00 [-0.06, 0.06]	0.03	-0.02	.980	0.00 [-0.06, 0.05]	0.03	-0.07	.946
Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.00	-0.22	.826	0.00 [-0.01, 0.01]	0.00	-0.02	.984
Age	-0.02 [-0.02, -0.02]	0.00	-9.85	< .001	-0.02 [-0.02, -0.02]	0.00	-14.31	< .001

Table 15 continued

## TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep efficiency × seasonspring	-0.05 [-0.09, -0.01]	0.02	-2.24	.026	-0.02 [-0.06, 0.02]	0.02	-0.87	.384
Sleep efficiency × seasonsummer	0.00 [-0.05, 0.04]	0.02	-0.21	.834	0.02 [-0.03, 0.06]	0.02	0.78	.437
Sleep efficiency × seasonwinter	-0.04 [-0.10, 0.01]	0.03	-1.70	.111	-0.02 [-0.06, 0.02]	0.02	-1.03	.305
Seasonspring × Sleep efficiency <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.78	.435	0.00 [-0.01, 0.01]	0.01	-0.10	.924
Seasonsummer × Sleep efficiency <sup>2</sup>	0.01 [-0.01, 0.02]	0.01	0.83	.404	0.01 [-0.01, 0.02]	0.01	0.87	.384
Seasonwinter × Sleep efficiency <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-1.39	.174	0.00 [-0.02, 0.01]	0.01	-0.67	.505
Sleep onset (z)								
(Intercept)	1.36 [1.00, 1.71]	0.18	7.51	< .001	1.31 [1.11, 1.50]	0.10	13.01	< .001
Sleep onset	0.02 [0.00, 0.05]	0.01	1.82	.068	0.02 [0.00, 0.05]	0.01	1.85	.064
Seasonspring	-0.03 [-0.10, 0.03]	0.03	-0.99	.322	-0.05 [-0.11, 0.01]	0.03	-1.51	.130
Seasonsummer	-0.07 [-0.14, -0.01]	0.03	-2.11	.035	-0.11 [-0.17, -0.05]	0.03	-3.43	.001
Seasonwinter	-0.01 [-0.08, 0.06]	0.03	-0.31	.758	0.00 [-0.06, 0.06]	0.03	0.07	.943
Sleep onset <sup>2</sup>	-0.03 [-0.05, -0.01]	0.01	-2.93	.003	-0.01 [-0.02, 0.01]	0.01	-0.82	.410
Age	-0.02 [-0.02, -0.02]	0.00	-9.86	< .001	-0.02 [-0.02, -0.02]	0.00	-14.31	< .001
Sleep onset × seasonspring	-0.02 [-0.06, 0.01]	0.02	-1.15	.249	-0.01 [-0.05, 0.02]	0.02	-0.78	.435
Sleep onset × seasonsummer	-0.01 [-0.05, 0.03]	0.02	-0.72	.470	0.00 [-0.03, 0.04]	0.02	0.24	.814
Sleep onset × seasonwinter	-0.05 [-0.08, -0.01]	0.02	-2.82	.005	-0.02 [-0.05, 0.02]	0.02	-1.02	.308
Seasonspring × Sleep onset <sup>2</sup>	0.03 [0.00, 0.05]	0.01	2.29	.022	0.01 [-0.01, 0.04]	0.01	1.23	.220
Seasonsummer × Sleep onset <sup>2</sup>	0.02 [0.00, 0.05]	0.01	1.66	.097	0.02 [-0.01, 0.04]	0.01	1.15	.252
Seasonwinter × Sleep onset <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.47	.636	0.00 [-0.03, 0.02]	0.01	-0.37	.708
Sleep regularity (z)								
(Intercept)	1.27 [0.92, 1.62]	0.18	7.08	< .001	1.24 [1.05, 1.44]	0.10	12.47	< .001
Sleep regularity	0.08 [0.05, 0.11]	0.02	4.84	< .001	0.09 [0.06, 0.12]	0.01	6.22	< .001

Table 15 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Seasonspring	0.00 [-0.07, 0.06]	0.03	-0.12	.908	-0.01 [-0.07, 0.05]	0.03	-0.21	.831
Seasonsummer	-0.07 [-0.14, 0.00]	0.03	-2.03	.043	-0.06 [-0.12, 0.01]	0.03	-1.77	.077
Seasonwinter	-0.01 [-0.08, 0.05]	0.03	-0.41	.685	0.01 [-0.05, 0.07]	0.03	0.32	.750
Sleep regularity <sup>2</sup>	-0.01 [-0.03, 0.01]	0.01	-0.96	.337	0.01 [-0.01, 0.03]	0.01	1.02	.308
Age	-0.02 [-0.02, -0.01]	0.00	-9.83	< .001	-0.02 [-0.02, -0.02]	0.00	-14.33	< .001
Sleep regularity × seasonspring	0.04 [0.00, 0.08]	0.02	1.80	.074	-0.04 [-0.08, 0.00]	0.02	-2.07	.039
Sleep regularity × seasonsummer	0.03 [-0.02, 0.08]	0.02	1.24	.216	-0.05 [-0.09, 0.00]	0.02	-2.04	.042
Sleep regularity × seasonwinter	0.02 [-0.02, 0.07]	0.02	1.09	.277	-0.05 [-0.09, -0.01]	0.02	-2.24	.025
Seasonspring × Sleep regularity <sup>2</sup>	0.00 [-0.03, 0.02]	0.01	-0.08	.939	-0.02 [-0.04, 0.01]	0.01	-1.54	.125
Seasonsummer × Sleep regularity <sup>2</sup>	0.02 [0.00, 0.05]	0.01	1.66	.097	-0.03 [-0.06, 0.00]	0.01	-2.06	.040
Seasonwinter × Sleep regularity <sup>2</sup>	0.01 [-0.01, 0.04]	0.01	0.87	.386	0.00 [-0.03, 0.02]	0.01	-0.19	.848

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

Table 16

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

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.40 [0.13, 0.66]	0.14	2.89	.004	0.42 [0.16, 0.68]	0.13	3.15	.002
Physical activity	0.02 [-0.05, 0.09]	0.03	0.61	.545	-0.01 [-0.09, 0.08]	0.04	-0.19	.850
Regioneurope	-0.17 [-0.34, 0.01]	0.09	-1.90	.057	-0.19 [-0.37, -0.01]	0.09	-2.08	.037
Regionafrica	-0.22 [-0.43, -0.02]	0.10	-2.14	.033	-0.26 [-0.47, -0.04]	0.11	-2.36	.018
Regionasia	-0.38 [-0.64, -0.13]	0.13	-2.98	.003	-0.48 [-0.71, -0.25]	0.12	-4.16	< .001
Regionnorth america	0.00 [-0.21, 0.20]	0.11	-0.02	.981	-0.07 [-0.27, 0.13]	0.10	-0.68	.499
Regionsouth america	-0.34 [-0.52, -0.15]	0.10	-3.49	< .001	-0.36 [-0.55, -0.18]	0.10	-3.80	< .001
Physical activity <sup>2</sup>	0.01 [-0.01, 0.02]	0.01	0.82	.411	0.05 [0.01, 0.09]	0.02	2.24	.026
Age	0.00 [-0.01, 0.00]	0.00	-1.88	.061	0.00 [-0.01, 0.00]	0.00	-2.01	.045
Physical activity × regioneurope	0.08 [0.01, 0.16]	0.04	2.16	.031	0.07 [-0.02, 0.16]	0.04	1.62	.105
Physical activity × regionafrica	0.02 [0.12, 0.16]	0.07	0.26	.794	0.09 [-0.11, 0.30]	0.10	0.89	.372
Physical activity × regionasia	0.11 [-0.11, 0.33]	0.11	0.97	.332	0.19 [-0.01, 0.39]	0.10	1.87	.061
Physical activity × regionnorth america	0.09 [-0.04, 0.23]	0.07	1.34	.179	0.07 [-0.08, 0.22]	0.08	0.89	.376
Physical activity × regionsouth america	0.07 [-0.03, 0.18]	0.05	1.40	.162	0.03 [-0.09, 0.15]	0.06	0.49	.628
Regioneurope × Physical activity <sup>2</sup>	-0.02 [-0.04, 0.00]	0.01	-2.41	.016	-0.05 [-0.10, -0.01]	0.02	-2.38	.018
Regionafrica × Physical activity <sup>2</sup>	-0.04 [-0.15, 0.06]	0.05	-0.83	.407	-0.04 [-0.16, 0.09]	0.07	-0.55	.584
Regionasia × Physical activity <sup>2</sup>	-0.08 [-0.27, 0.11]	0.10	-0.84	.400	-0.09 [-0.26, 0.07]	0.08	-1.09	.278
Regionnorth america × Physical activity <sup>2</sup>	-0.01 [-0.05, 0.03]	0.02	-0.48	.628	0.01 [-0.09, 0.11]	0.05	0.22	.826
Regionsouth america × Physical activity <sup>2</sup>	-0.08 [-0.15, -0.01]	0.04	-2.25	.025	-0.05 [-0.13, 0.03]	0.04	-1.25	.210
Sleep efficiency (z)								
(Intercept)	0.36 [0.09, 0.63]	0.14	2.61	.009	0.40 [0.13, 0.67]	0.14	2.86	.004

Table 16 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity	-0.06 [-0.13, 0.01]	0.04	-1.64	.102	-0.05 [-0.13, 0.04]	0.04	-1.08	.280
Regioneurope	-0.07 [-0.25, 0.11]	0.09	-0.80	.426	-0.10 [-0.29, 0.08]	0.09	-1.11	.265
Regionafrica	-0.08 [-0.29, 0.13]	0.11	-0.76	.446	-0.04 [-0.26, 0.18]	0.11	-0.36	.721
Regionasia	-0.41 [-0.67, -0.16]	0.13	-3.13	.002	-0.48 [-0.72, -0.25]	0.12	-4.00	< .001
Regionnorth america	0.17 [-0.04, 0.38]	0.11	1.56	.119	-0.02 [-0.23, 0.19]	0.11	-0.16	.875
Regionsouth america	0.00 [-0.19, 0.19]	0.10	0.01	.990	-0.13 [-0.32, 0.07]	0.10	-1.27	.205
Physical activity <sup>2</sup>	0.01 [-0.01, 0.02]	0.01	0.97	.330	0.02 [-0.02, 0.06]	0.02	0.84	.398
Age	0.00 [0.00, 0.01]	0.00	1.22	.222	0.00 [0.00, 0.01]	0.00	1.18	.238
Physical activity × regioneurope	0.10 [0.02, 0.18]	0.04	2.57	.010	0.06 [-0.02, 0.15]	0.04	1.42	.157
Physical activity × regionafrica	0.00 [-0.14, 0.15]	0.07	0.06	.956	-0.04 [-0.25, 0.17]	0.11	-0.37	.709
Physical activity × regionasia	0.01 [-0.21, 0.24]	0.11	0.12	.904	0.09 [-0.11, 0.30]	0.10	0.90	.366
Physical activity × regionnorth america	0.25 [0.11, 0.39]	0.07	3.49	< .001	0.20 [0.05, 0.35]	0.08	2.60	.009
Physical activity × regionsouth america	0.21 [0.10, 0.31]	0.05	3.92	< .001	-0.01 [-0.13, 0.11]	0.06	-0.13	.893
Regioneurope × Physical activity <sup>2</sup>	-0.02 [-0.03, 0.00]	0.01	-1.80	.071	-0.02 [-0.06, 0.02]	0.02	-0.99	.321
Regionafrica × Physical activity <sup>2</sup>	0.00 [-0.11, 0.11]	0.06	0.02	.983	0.01 [-0.12, 0.14]	0.07	0.16	.874
Regionasia × Physical activity <sup>2</sup>	-0.09 [-0.29, 0.10]	0.10	-0.93	.352	0.04 [-0.13, 0.21]	0.09	0.43	.668
Regionnorth america × Physical activity <sup>2</sup>	-0.08 [-0.12, -0.04]	0.02	-3.70	< .001	-0.06 [-0.16, 0.04]	0.05	-1.18	.240
Regionsouth america × Physical activity <sup>2</sup>	-0.17 [-0.25, -0.10]	0.04	-4.69	< .001	-0.02 [-0.10, 0.06]	0.04	-0.58	.562
Sleep onset (z)								
(Intercept)	-0.15 [-0.45, 0.16]	0.16	-0.93	.353	-0.09 [-0.39, 0.22]	0.15	-0.56	.577
Physical activity	-0.05 [-0.11, 0.00]	0.03	-1.90	.058	-0.07 [-0.13, 0.00]	0.03	-2.09	.036
Regioneurope	0.19 [0.04, 0.33]	0.08	2.47	.014	0.17 [0.02, 0.32]	0.08	2.16	.031
Regionafrica	0.09 [-0.08, 0.26]	0.09	1.03	.303	0.06 [-0.12, 0.24]	0.09	0.65	.515

Table 16 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Regionasia	0.13 [-0.08, 0.33]	0.10	1.22	.222	0.13 [-0.05, 0.32]	0.10	1.39	.165
Regionnorth america	0.14 [-0.03, 0.31]	0.09	1.58	.114	0.04 [-0.13, 0.21]	0.09	0.51	.607
Regionsouth america	0.23 [0.07, 0.39]	0.08	2.85	.004	0.18 [0.02, 0.34]	0.08	2.20	.028
Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.30	.762	-0.03 [-0.06, 0.00]	0.02	-1.67	.095
Age	0.00 [0.00, 0.00]	0.00	0.76	.445	0.00 [0.00, 0.00]	0.00	0.39	.694
Physical activity × regioneurope	-0.02 [-0.08, 0.04]	0.03	-0.70	.484	0.00 [-0.06, 0.07]	0.03	0.12	.903
Physical activity × regionafrica	0.04 [-0.07, 0.15]	0.06	0.74	.458	-0.03 [-0.19, 0.13]	0.08	-0.39	.699
Physical activity × regionasia	-0.11 [-0.28, 0.07]	0.09	-1.19	.234	-0.05 [-0.21, 0.11]	0.08	-0.62	.533
Physical activity × regionnorth america	0.10 [-0.01, 0.22]	0.06	1.84	.065	0.11 [-0.01, 0.23]	0.06	1.84	.066
Physical activity × regionsouth america	0.00 [-0.08, 0.08]	0.04	0.02	.982	-0.05 [-0.14, 0.04]	0.05	-1.15	.252
Regioneurope × Physical activity <sup>2</sup>	0.02 [0.00, 0.03]	0.01	2.55	.011	0.04 [0.00, 0.07]	0.02	2.09	.037
Regionafrica × Physical activity <sup>2</sup>	0.00 [-0.09, 0.08]	0.04	-0.02	.983	0.04 [-0.06, 0.14]	0.05	0.78	.433
Regionasia × Physical activity <sup>2</sup>	-0.03 [-0.18, 0.12]	0.08	-0.34	.731	0.08 [-0.06, 0.21]	0.07	1.13	.258
Regionnorth america × Physical activity <sup>2</sup>	0.01 [-0.02, 0.04]	0.02	0.56	.574	-0.02 [-0.10, 0.06]	0.04	-0.56	.577
Regionsouth america × Physical activity <sup>2</sup>	0.03 [-0.02, 0.09]	0.03	1.09	.275	0.13 [0.07, 0.19]	0.03	4.05	< .001
Sleep regularity (z)								
(Intercept)	0.33 [0.08, 0.58]	0.13	2.61	.009	0.55 [0.28, 0.81]	0.14	4.06	< .001
Physical activity	0.18 [0.11, 0.25]	0.04	4.79	< .001	0.08 [-0.02, 0.19]	0.05	1.66	.110
Regioneurope	0.24 [0.07, 0.41]	0.09	2.75	.006	0.10 [-0.09, 0.29]	0.10	1.05	.294
Regionafrica	0.44 [0.22, 0.65]	0.11	4.02	< .001	0.24 [0.00, 0.47]	0.12	1.99	.048
Regionasia	0.29 [0.04, 0.55]	0.13	2.24	.025	0.19 [-0.05, 0.42]	0.12	1.51	.130
Regionnorth america	0.16 [-0.06, 0.37]	0.11	1.42	.157	-0.11 [-0.33, 0.11]	0.11	-0.96	.341
Regionsouth america	0.11 [-0.08, 0.29]	0.09	1.11	.268	-0.10 [-0.29, 0.09]	0.10	-1.00	.316

Table 16 continued

TITLE

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Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity <sup>2</sup>	-0.02 [-0.04, -0.01]	0.01	-3.28	.001	-0.08 [-0.13, -0.03]	0.02	-3.27	.002
Age	0.00 [0.00, 0.00]	0.00	-0.03	.974	0.00 [0.00, 0.00]	0.00	-0.66	.510
Physical activity × regioneurope	0.05 [-0.04, 0.14]	0.05	1.09	.281	0.00 [-0.11, 0.11]	0.05	-0.03	.975
Physical activity × regionafrica	-0.07 [-0.22, 0.08]	0.08	-0.87	.383	0.31 [0.08, 0.53]	0.12	2.65	.009
Physical activity × regionasia	-0.22 [-0.45, 0.02]	0.12	-1.83	.068	0.21 [-0.01, 0.44]	0.11	1.87	.064
Physical activity × regionnorth america	0.15 [0.00, 0.31]	0.08	1.97	.051	0.21 [0.04, 0.38]	0.09	2.47	.014
Physical activity × regionsouth america	0.05 [-0.06, 0.15]	0.05	0.84	.400	0.14 [0.01, 0.27]	0.07	2.10	.038
Regioneurope × Physical activity <sup>2</sup>	-0.02 [-0.04, 0.00]	0.01	-2.04	.043	0.06 [0.01, 0.11]	0.03	2.17	.040
Regionafrica × Physical activity <sup>2</sup>	-0.15 [-0.26, -0.03]	0.06	-2.54	.011	-0.11 [-0.25, 0.03]	0.07	-1.49	.139
Regionasia × Physical activity <sup>2</sup>	-0.18 [-0.38, 0.03]	0.10	-1.70	.088	-0.11 [-0.29, 0.07]	0.09	-1.23	.219
Regionnorth america × Physical activity <sup>2</sup>	-0.08 [-0.12, -0.03]	0.02	-3.31	.001	-0.06 [-0.17, 0.04]	0.05	-1.18	.237
Regionsouth america × Physical activity <sup>2</sup>	-0.13 [-0.23, -0.03]	0.05	-2.49	.035	-0.03 [-0.13, 0.06]	0.05	-0.74	.463

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

Table 17

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

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.71 [1.34, 2.07]	0.19	9.07	< .001	1.56 [1.35, 1.77]	0.11	14.41	< .001
Sleep duration	0.01 [-0.03, 0.06]	0.02	0.57	.571	-0.03 [-0.07, 0.02]	0.02	-1.24	.216
Regioneurope	-0.42 [-0.60, -0.24]	0.09	-4.50	< .001	-0.29 [-0.44, -0.15]	0.07	-3.95	< .001
Regionafrica	-0.32 [-0.53, -0.12]	0.10	-3.09	.002	-0.20 [-0.37, -0.03]	0.09	-2.26	.024
Regionasia	-0.62 [-0.84, -0.40]	0.11	-5.45	< .001	-0.56 [-0.75, -0.37]	0.10	-5.87	< .001
Regionnorth america	-0.59 [-0.79, -0.38]	0.10	-5.65	< .001	-0.38 [-0.55, -0.21]	0.09	-4.46	< .001
Regionsouth america	-0.49 [-0.68, -0.31]	0.10	-5.13	< .001	-0.46 [-0.61, -0.30]	0.08	-5.80	< .001
Sleep duration <sup>2</sup>	-0.03 [-0.05, -0.02]	0.01	-3.95	< .001	-0.01 [-0.03, 0.00]	0.01	-1.84	.065
Age	-0.02 [-0.02, -0.02]	0.00	-10.03	< .001	-0.02 [-0.02, -0.02]	0.00	-15.03	< .001
Sleep duration × regioneurope	-0.03 [-0.07, 0.02]	0.02	-1.06	.291	0.04 [0.00, 0.09]	0.02	1.98	.048
Sleep duration × regionafrica	0.01 [0.08, 0.09]	0.04	0.17	.868	0.00 [-0.08, 0.09]	0.04	0.10	.921
Sleep duration × regionasia	-0.01 [-0.14, 0.11]	0.06	-0.24	.808	0.04 [-0.08, 0.15]	0.06	0.60	.547
Sleep duration × regionnorth america	0.05 [-0.03, 0.13]	0.04	1.23	.221	0.04 [-0.03, 0.11]	0.04	1.13	.259
Sleep duration × regionsouth america	-0.04 [-0.10, 0.02]	0.03	-1.19	.234	0.01 [-0.04, 0.07]	0.03	0.42	.677
Regioneurope × Sleep duration <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	1.09	.278	0.00 [-0.01, 0.02]	0.01	0.37	.715
Regionafrica × Sleep duration <sup>2</sup>	0.02 [-0.02, 0.06]	0.02	1.10	.273	-0.01 [-0.05, 0.03]	0.02	-0.60	.548
Regionasia × Sleep duration <sup>2</sup>	0.01 [-0.03, 0.06]	0.02	0.57	.567	0.02 [-0.02, 0.07]	0.02	1.03	.304
Regionnorth america × Sleep duration <sup>2</sup>	0.03 [0.00, 0.06]	0.02	2.01	.045	0.01 [-0.02, 0.04]	0.02	0.61	.540
Regionsouth america × Sleep duration <sup>2</sup>	0.03 [0.00, 0.05]	0.01	2.28	.023	0.00 [-0.02, 0.02]	0.01	0.17	.862
Sleep efficiency (z)								
(Intercept)	1.67 [1.30, 2.04]	0.19	8.90	< .001	1.54 [1.33, 1.74]	0.11	14.37	< .001 <sup>62</sup>

Table 17 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep efficiency	-0.07 [-0.17, 0.02]	0.05	-1.58	.181	-0.02 [-0.08, 0.03]	0.03	-0.85	.395
Regioneurope	-0.40 [-0.58, -0.22]	0.09	-4.42	< .001	-0.27 [-0.41, -0.12]	0.07	-3.68	< .001
Regionafrica	-0.28 [-0.48, -0.08]	0.10	-2.78	.005	-0.21 [-0.38, -0.05]	0.08	-2.54	.011
Regionasia	-0.57 [-0.79, -0.36]	0.11	-5.14	< .001	-0.50 [-0.69, -0.32]	0.09	-5.39	< .001
Regionnorth america	-0.51 [-0.71, -0.32]	0.10	-5.12	< .001	-0.35 [-0.51, -0.19]	0.08	-4.27	< .001
Regionsouth america	-0.46 [-0.65, -0.28]	0.09	-4.91	< .001	-0.45 [-0.60, -0.30]	0.08	-5.83	< .001
Sleep efficiency <sup>2</sup>	-0.01 [-0.03, 0.00]	0.01	-1.47	.181	-0.01 [-0.02, 0.01]	0.01	-1.18	.240
Age	-0.02 [-0.02, -0.02]	0.00	-9.91	< .001	-0.02 [-0.02, -0.02]	0.00	-15.09	< .001
Sleep efficiency × regioneurope	0.08 [-0.01, 0.17]	0.05	1.67	.150	0.03 [-0.02, 0.09]	0.03	1.22	.223
Sleep efficiency × regionafrica	0.06 [-0.06, 0.18]	0.06	0.92	.383	-0.04 [-0.13, 0.04]	0.04	-0.96	.336
Sleep efficiency × regionasia	0.10 [-0.04, 0.24]	0.07	1.34	.211	0.12 [0.02, 0.22]	0.05	2.37	.018
Sleep efficiency × regionnorth america	0.08 [-0.04, 0.21]	0.06	1.30	.236	0.07 [-0.02, 0.17]	0.05	1.46	.155
Sleep efficiency × regionsouth america	0.08 [-0.02, 0.19]	0.06	1.51	.188	0.02 [-0.05, 0.08]	0.03	0.46	.645
Regioneurope × Sleep efficiency <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	1.25	.234	0.01 [-0.01, 0.02]	0.01	1.02	.308
Regionafrica × Sleep efficiency <sup>2</sup>	0.01 [-0.02, 0.03]	0.01	0.42	.680	0.00 [-0.02, 0.02]	0.01	-0.22	.828
Regionasia × Sleep efficiency <sup>2</sup>	0.01 [-0.02, 0.04]	0.02	0.67	.511	0.03 [0.00, 0.05]	0.01	2.08	.038
Regionnorth america × Sleep efficiency <sup>2</sup>	0.01 [-0.01, 0.04]	0.01	0.99	.344	0.01 [-0.01, 0.04]	0.01	1.20	.235
Regionsouth america × Sleep efficiency <sup>2</sup>	0.01 [-0.01, 0.04]	0.01	1.22	.255	0.01 [-0.01, 0.02]	0.01	0.87	.386
Sleep onset (z)								
(Intercept)	1.66 [1.29, 2.03]	0.19	8.81	< .001	1.52 [1.31, 1.74]	0.11	14.01	< .001
Sleep onset	-0.02 [-0.06, 0.02]	0.02	-0.93	.354	0.02 [-0.02, 0.06]	0.02	1.02	.308
Regioneurope	-0.38 [-0.57, -0.19]	0.10	-3.99	< .001	-0.25 [-0.40, -0.10]	0.08	-3.31	.001
Regionafrica	-0.31 [-0.53, -0.08]	0.12	-2.68	.007	-0.23 [-0.43, -0.04]	0.10	-2.34	.019

Table 17 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Regionasia	-0.55 [-0.80, -0.30]	0.13	-4.36	< .001	-0.46 [-0.67, -0.24]	0.11	-4.19	< .001
Regionnorth america	-0.51 [-0.73, -0.29]	0.11	-4.48	< .001	-0.34 [-0.53, -0.15]	0.10	-3.53	< .001
Regionsouth america	-0.48 [-0.68, -0.28]	0.10	-4.78	< .001	-0.46 [-0.62, -0.29]	0.08	-5.52	< .001
Sleep onset <sup>2</sup>	0.00 [-0.03, 0.03]	0.02	0.03	.976	0.01 [-0.01, 0.04]	0.01	0.99	.322
Age	-0.02 [-0.02, -0.02]	0.00	-9.95	< .001	-0.02 [-0.02, -0.02]	0.00	-15.10	< .001
Sleep onset × regioneurope	0.03 [-0.02, 0.07]	0.02	1.24	.215	-0.01 [-0.05, 0.04]	0.02	-0.31	.753
Sleep onset × regionafrica	0.07 [0.00, 0.14]	0.04	1.96	.049	0.00 [-0.07, 0.07]	0.04	0.04	.964
Sleep onset × regionasia	0.04 [-0.04, 0.13]	0.04	0.97	.331	0.01 [-0.08, 0.09]	0.04	0.13	.898
Sleep onset × regionnorth america	0.01 [-0.06, 0.08]	0.03	0.20	.840	0.02 [-0.05, 0.09]	0.03	0.62	.538
Sleep onset × regionsouth america	0.01 [-0.04, 0.07]	0.03	0.46	.649	-0.01 [-0.06, 0.04]	0.03	-0.33	.743
Regioneurope × Sleep onset <sup>2</sup>	-0.02 [-0.05, 0.02]	0.02	-0.95	.346	-0.02 [-0.05, 0.01]	0.02	-1.18	.237
Regionafrica × Sleep onset <sup>2</sup>	0.04 [-0.05, 0.14]	0.05	0.86	.389	0.03 [-0.07, 0.12]	0.05	0.52	.604
Regionasia × Sleep onset <sup>2</sup>	-0.03 [-0.14, 0.09]	0.06	-0.45	.651	-0.06 [-0.17, 0.05]	0.06	-1.05	.294
Regionnorth america × Sleep onset <sup>2</sup>	-0.01 [-0.10, 0.08]	0.04	-0.28	.781	0.00 [-0.09, 0.09]	0.05	-0.02	.988
Regionsouth america × Sleep onset <sup>2</sup>	0.01 [-0.04, 0.05]	0.02	0.22	.827	0.01 [-0.04, 0.05]	0.02	0.27	.785
Sleep regularity (z)								
(Intercept)	1.62 [1.25, 1.98]	0.19	8.71	< .001	1.50 [1.29, 1.71]	0.11	13.91	< .001
Sleep regularity	0.14 [0.10, 0.18]	0.02	6.65	< .001	0.04 [0.00, 0.08]	0.02	1.94	.053
Regioneurope	-0.44 [-0.62, -0.26]	0.09	-4.86	< .001	-0.27 [-0.41, -0.12]	0.07	-3.66	< .001
Regionafrica	-0.30 [-0.50, -0.10]	0.10	-2.94	.003	-0.21 [-0.38, -0.04]	0.09	-2.48	.013
Regionasia	-0.64 [-0.86, -0.42]	0.11	-5.71	< .001	-0.53 [-0.72, -0.34]	0.10	-5.54	< .001
Regionnorth america	-0.54 [-0.73, -0.34]	0.10	-5.34	< .001	-0.32 [-0.49, -0.16]	0.08	-3.86	< .001
Regionsouth america	-0.50 [-0.69, -0.32]	0.09	-5.32	< .001	-0.45 [-0.61, -0.30]	0.08	-5.84	< .001 <sup>64</sup>

Table 17 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep regularity <sup>2</sup>	0.00 [-0.03, 0.02]	0.01	-0.23	.819	0.00 [-0.02, 0.02]	0.01	0.01	.989
Age	-0.02 [-0.02, -0.01]	0.00	-9.92	< .001	-0.02 [-0.02, -0.02]	0.00	-15.03	< .001
Sleep regularity × regioneurope	-0.03 [-0.08, 0.01]	0.02	-1.47	.141	0.01 [-0.04, 0.05]	0.02	0.37	.713
Sleep regularity × regionafrica	-0.13 [-0.22, -0.05]	0.04	-3.04	.003	0.00 [-0.08, 0.09]	0.04	0.09	.927
Sleep regularity × regionasia	-0.06 [-0.16, 0.04]	0.05	-1.11	.269	0.07 [-0.03, 0.17]	0.05	1.45	.147
Sleep regularity × regionnorth america	-0.05 [-0.13, 0.03]	0.04	-1.29	.199	0.05 [-0.03, 0.13]	0.04	1.18	.240
Sleep regularity × regionsouth america	-0.03 [-0.09, 0.03]	0.03	-1.00	.320	0.06 [0.00, 0.11]	0.03	1.90	.058
Regioneurope × Sleep regularity <sup>2</sup>	0.00 [-0.03, 0.03]	0.01	-0.09	.929	-0.01 [-0.03, 0.02]	0.01	-0.50	.619
Regionafrica × Sleep regularity <sup>2</sup>	-0.04 [-0.09, 0.01]	0.02	-1.68	.094	0.00 [-0.05, 0.04]	0.02	-0.13	.894
Regionasia × Sleep regularity <sup>2</sup>	0.01 [-0.06, 0.08]	0.04	0.22	.825	0.00 [-0.07, 0.07]	0.04	-0.09	.926
Regionnorth america × Sleep regularity <sup>2</sup>	-0.01 [-0.05, 0.04]	0.02	-0.22	.829	-0.02 [-0.07, 0.03]	0.03	-0.84	.404
Regionsouth america × Sleep regularity <sup>2</sup>	0.02 [-0.02, 0.05]	0.02	1.07	.283	0.03 [-0.01, 0.06]	0.02	1.48	.139

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

Table 18

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

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration (z)</b>								
(Intercept)	0.64 [0.38, 0.89]	0.13	4.94	< .001	0.56 [0.31, 0.81]	0.13	4.42	< .001
Physical activity	0.15 [0.01, 0.28]	0.07	2.14	.032	0.11 [0.01, 0.21]	0.05	2.23	.026
Daylight hours	-0.03 [-0.04, -0.02]	0.01	-5.93	< .001	-0.03 [-0.04, -0.01]	0.01	-4.40	< .001
Physical activity <sup>2</sup>	-0.04 [-0.08, 0.01]	0.02	-1.67	.094	0.05 [-0.01, 0.11]	0.03	1.60	.111
Age	0.00 [-0.01, 0.00]	0.00	-2.06	.040	0.00 [-0.01, 0.00]	0.00	-2.23	.026
Physical activity × daylight hours	0.00 [-0.02, 0.01]	0.01	-0.77	.440	0.00 [-0.01, 0.00]	0.00	-0.93	.354
Daylight hours × Physical activity <sup>2</sup>	0.00 [0.00, 0.01]	0.00	1.23	.219	0.00 [-0.01, 0.00]	0.00	-1.64	.102
<b>Sleep efficiency (z)</b>								
(Intercept)	0.42 [0.15, 0.69]	0.14	3.09	.002	0.38 [0.10, 0.65]	0.14	2.67	.008
Physical activity	0.15 [0.01, 0.29]	0.07	2.16	.031	0.13 [0.03, 0.23]	0.05	2.63	.009
Daylight hours	-0.01 [-0.02, 0.00]	0.01	-1.70	.089	-0.01 [-0.02, 0.01]	0.01	-0.88	.378
Physical activity <sup>2</sup>	-0.04 [-0.08, 0.01]	0.02	-1.71	.088	0.04 [-0.02, 0.10]	0.03	1.22	.222
Age	0.00 [0.00, 0.01]	0.00	1.26	.208	0.00 [0.00, 0.01]	0.00	1.13	.258
Physical activity × daylight hours	-0.01 [-0.02, 0.00]	0.01	-1.51	.131	-0.01 [-0.02, 0.00]	0.00	-2.48	.013
Daylight hours × Physical activity <sup>2</sup>	0.00 [0.00, 0.01]	0.00	1.17	.241	0.00 [-0.01, 0.00]	0.00	-1.42	.156
<b>Sleep onset (z)</b>								
(Intercept)	-0.07 [-0.37, 0.24]	0.15	-0.43	.665	-0.02 [-0.32, 0.28]	0.15	-0.16	.877
Physical activity	-0.06 [-0.17, 0.05]	0.05	-1.10	.271	-0.08 [-0.15, 0.00]	0.04	-1.96	.050
Daylight hours	0.01 [0.00, 0.02]	0.00	1.56	.120	0.01 [0.00, 0.01]	0.00	1.11	.268
Physical activity <sup>2</sup>	-0.03 [-0.06, 0.01]	0.02	-1.63	.104	-0.03 [-0.08, 0.02]	0.02	-1.22	.221
Age	0.00 [0.00, 0.00]	0.00	0.85	.396	0.00 [0.00, 0.00]	0.00	0.51	.611

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Physical activity × daylight hours	0.00	[0.01, 0.01]	0.00	-0.11	.913	0.00	[-0.01, 0.01]	0.00	0.13	.894
Daylight hours × Physical activity <sup>2</sup>	0.00	[0.00, 0.01]	0.00	2.09	.036	0.00	[0.00, 0.01]	0.00	1.44	.150
Sleep regularity (z)										
(Intercept)	0.48	[0.22, 0.73]	0.13	3.64	< .001	0.56	[0.28, 0.84]	0.14	3.90	< .001
Physical activity	0.27	[0.11, 0.42]	0.08	3.37	.001	0.19	[0.08, 0.29]	0.05	3.46	.001
Daylight hours	0.00	[-0.01, 0.01]	0.01	0.08	.940	0.00	[-0.01, 0.01]	0.01	0.07	.941
Physical activity <sup>2</sup>	0.01	[-0.04, 0.06]	0.02	0.37	.713	-0.01	[-0.08, 0.06]	0.04	-0.30	.766
Age	0.00	[0.00, 0.00]	0.00	0.29	.771	0.00	[0.00, 0.00]	0.00	0.01	.991
Physical activity × daylight hours	0.00	[-0.02, 0.01]	0.01	-0.54	.590	-0.01	[-0.02, 0.00]	0.00	-1.78	.077
Daylight hours × Physical activity <sup>2</sup>	0.00	[-0.01, 0.00]	0.00	-1.97	.051	0.00	[-0.01, 0.00]	0.00	-0.67	.509

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

Table 19

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

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	1.30	[0.93, 1.67]	0.19	6.85	< .001	1.40	[1.18, 1.62]	0.11	12.47	< .001
Sleep duration	0.06	[-0.01, 0.14]	0.04	1.70	.090	0.04	[-0.03, 0.11]	0.04	1.13	.259
Daylight hours	0.00	[-0.01, 0.01]	0.01	0.70	.487	-0.01	[-0.02, 0.00]	0.00	-2.09	.037
Sleep duration <sup>2</sup>	-0.01	[-0.05, 0.02]	0.02	-0.65	.516	0.01	[-0.02, 0.04]	0.02	0.51	.608
Age	-0.02	[-0.02, -0.02]	0.00	-9.90	< .001	-0.02	[-0.02, -0.02]	0.00	-14.33	< .001
Sleep duration × daylight hours	-0.01	[-0.01, 0.00]	0.00	-1.84	.066	0.00	[-0.01, 0.00]	0.00	-0.92	.359
Daylight hours × Sleep duration <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-0.49	.624	0.00	[0.00, 0.00]	0.00	-1.15	.250
Sleep efficiency (z)										
(Intercept)	1.29	[0.91, 1.66]	0.19	6.77	< .001	1.42	[1.20, 1.64]	0.11	12.61	< .001
Sleep efficiency	0.00	[-0.09, 0.10]	0.05	0.10	.921	-0.02	[-0.10, 0.07]	0.04	-0.35	.727
Daylight hours	0.00	[-0.01, 0.01]	0.01	0.67	.500	-0.01	[-0.02, 0.00]	0.00	-2.54	.011
Sleep efficiency <sup>2</sup>	-0.01	[-0.04, 0.02]	0.02	-0.73	.470	-0.01	[-0.04, 0.02]	0.01	-0.78	.438
Age	-0.02	[-0.02, -0.02]	0.00	-9.87	< .001	-0.02	[-0.02, -0.02]	0.00	-14.31	< .001
Sleep efficiency × daylight hours	0.00	[-0.01, 0.01]	0.00	-0.14	.890	0.00	[0.00, 0.01]	0.00	0.54	.588
Daylight hours × Sleep efficiency <sup>2</sup>	0.00	[0.00, 0.00]	0.00	0.50	.617	0.00	[0.00, 0.00]	0.00	0.79	.430
Sleep onset (z)										
(Intercept)	1.34	[0.96, 1.71]	0.19	6.99	< .001	1.44	[1.22, 1.67]	0.11	12.64	< .001
Sleep onset	-0.02	[-0.10, 0.05]	0.04	-0.64	.521	0.00	[-0.08, 0.07]	0.04	-0.10	.923
Daylight hours	0.00	[-0.01, 0.01]	0.01	-0.01	.989	-0.01	[-0.02, 0.00]	0.00	-2.83	.005
Sleep onset <sup>2</sup>	-0.05	[-0.10, 0.00]	0.02	-2.12	.034	-0.03	[-0.07, 0.02]	0.02	-1.14	.256
Age	-0.02	[-0.02, -0.02]	0.00	-9.85	< .001	-0.02	[-0.02, -0.02]	0.00	-14.31	< .001

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep onset × daylight hours	0.00 [0.00, 0.01]	0.00	0.68	.498	0.00 [0.00, 0.01]	0.00	0.50	.616
Daylight hours × Sleep onset <sup>2</sup>	0.00 [0.00, 0.01]	0.00	1.64	.102	0.00 [0.00, 0.01]	0.00	1.11	.267
Sleep regularity (z)								
(Intercept)	1.19 [0.82, 1.57]	0.19	6.32	< .001	1.33 [1.10, 1.55]	0.11	11.64	< .001
Sleep regularity	0.08 [0.00, 0.16]	0.04	2.05	.041	0.11 [0.03, 0.19]	0.04	2.77	.006
Daylight hours	0.00 [-0.01, 0.02]	0.01	0.85	.395	-0.01 [-0.02, 0.00]	0.00	-1.54	.123
Sleep regularity <sup>2</sup>	0.01 [-0.04, 0.07]	0.03	0.55	.580	0.04 [-0.01, 0.09]	0.03	1.42	.158
Age	-0.02 [-0.02, -0.01]	0.00	-9.83	< .001	-0.02 [-0.02, -0.02]	0.00	-14.31	< .001
Sleep regularity × daylight hours	0.00 [-0.01, 0.01]	0.00	0.44	.662	0.00 [-0.01, 0.00]	0.00	-1.34	.181
Daylight hours × Sleep regularity <sup>2</sup>	0.00 [-0.01, 0.00]	0.00	-0.65	.519	0.00 [-0.01, 0.00]	0.00	-1.52	.130

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

Table 20

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

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration (z)</b>								
(Intercept)	0.75 [0.52, 0.98]	0.12	6.41	< .001	0.66 [0.43, 0.90]	0.12	5.55	< .001
Physical activity	0.12 [0.08, 0.17]	0.02	5.59	< .001	0.08 [0.03, 0.12]	0.02	3.50	< .001
Acc wear locwrst	-0.66 [-0.90, -0.43]	0.12	-5.47	< .001	-0.55 [-0.79, -0.30]	0.12	-4.44	< .001
Physical activity <sup>2</sup>	-0.03 [-0.07, 0.00]	0.02	-1.73	.085	0.02 [-0.01, 0.05]	0.02	1.08	.281
Age	0.00 [-0.01, 0.00]	0.00	-2.34	.019	0.00 [-0.01, 0.00]	0.00	-2.30	.022
Physical activity × acc wear locwrst	-0.05 [-0.10, 0.01]	0.03	-1.66	.097	-0.02 [-0.07, 0.03]	0.03	-0.68	.495
Acc wear locwrst × Physical activity <sup>2</sup>	0.03 [-0.01, 0.07]	0.02	1.41	.160	-0.02 [-0.05, 0.01]	0.02	-1.15	.251
<b>Sleep efficiency (z)</b>								
(Intercept)	-0.24 [-0.41, -0.08]	0.08	-2.89	.004	-0.35 [-0.52, -0.18]	0.09	-3.97	< .001
Physical activity	0.15 [0.11, 0.20]	0.02	6.81	< .001	0.08 [0.04, 0.13]	0.02	3.50	< .001
Acc wear locwrst	0.77 [0.62, 0.92]	0.08	10.24	< .001	0.87 [0.71, 1.02]	0.08	10.69	< .001
Physical activity <sup>2</sup>	-0.09 [-0.13, -0.05]	0.02	-4.32	< .001	-0.02 [-0.05, 0.01]	0.02	-1.27	.203
Age	0.00 [0.00, 0.00]	0.00	-0.32	.748	0.00 [0.00, 0.00]	0.00	0.02	.986
Physical activity × acc wear locwrst	-0.19 [-0.24, -0.13]	0.03	-6.68	< .001	-0.10 [-0.15, -0.04]	0.03	-3.64	< .001
Acc wear locwrst × Physical activity <sup>2</sup>	0.09 [0.05, 0.13]	0.02	4.39	< .001	0.01 [-0.02, 0.05]	0.02	0.73	.466
<b>Sleep onset (z)</b>								
(Intercept)	-0.73 [-1.12, -0.35]	0.20	-3.70	< .001	-0.71 [-1.09, -0.32]	0.20	-3.60	< .001
Physical activity	-0.01 [-0.05, 0.02]	0.02	-0.62	.535	-0.03 [-0.06, 0.01]	0.02	-1.65	.099
Acc wear locwrst	1.00 [0.57, 1.43]	0.22	4.56	< .001	0.98 [0.55, 1.40]	0.22	4.50	< .001
Physical activity <sup>2</sup>	0.00 [-0.03, 0.03]	0.02	0.23	.818	-0.01 [-0.03, 0.02]	0.01	-0.50	.619
Age	0.00 [0.00, 0.00]	0.00	0.35	.729	0.00 [0.00, 0.00]	0.00	0.08	.936

Table 20 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity $\times$ acc wear locwrist	-0.09 [-0.13, -0.04]	0.02	-3.88	< .001	-0.06 [-0.10, -0.02]	0.02	-2.86	.004
Acc wear locwrist $\times$ Physical activity <sup>2</sup>	0.01 [-0.02, 0.04]	0.02	0.59	.558	0.01 [-0.02, 0.04]	0.01	0.64	.524
Sleep regularity (z)								
(Intercept)	0.35 [0.07, 0.62]	0.14	2.44	.015	0.20 [-0.08, 0.49]	0.14	1.39	.163
Physical activity	0.21 [0.16, 0.25]	0.02	8.49	< .001	0.26 [0.21, 0.31]	0.03	9.58	< .001
Acc wear locwrist	0.23 [-0.06, 0.53]	0.15	1.54	.124	0.56 [0.25, 0.86]	0.16	3.59	< .001
Physical activity <sup>2</sup>	-0.17 [-0.21, -0.13]	0.02	-7.63	< .001	-0.10 [-0.13, -0.07]	0.02	-5.96	< .001
Age	0.00 [0.00, 0.00]	0.00	-0.23	.821	0.00 [-0.01, 0.00]	0.00	-1.25	.214
Physical activity $\times$ acc wear locwrist	0.00 [-0.07, 0.07]	0.03	-0.08	.940	-0.22 [-0.28, -0.16]	0.03	-7.00	< .001
Acc wear locwrist $\times$ Physical activity <sup>2</sup>	0.14 [0.09, 0.18]	0.02	6.18	< .001	0.07 [0.03, 0.10]	0.02	3.65	< .001

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

Table 21

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

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration (z)</b>								
(Intercept)	0.28 [-0.12, 0.68]	0.21	1.37	.172	1.03 [0.74, 1.31]	0.15	7.06	< .001
Sleep duration	0.02 [-0.01, 0.04]	0.01	1.51	.131	0.02 [-0.01, 0.04]	0.01	1.24	.216
Acc wear locwrist	1.42 [0.98, 1.86]	0.22	6.31	< .001	0.37 [0.06, 0.68]	0.16	2.33	.020
Sleep duration <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	0.00	.998	-0.01 [-0.02, 0.00]	0.01	-1.55	.120
Age	-0.02 [-0.02, -0.02]	0.00	-11.30	< .001	-0.02 [-0.03, -0.02]	0.00	-15.02	< .001
Sleep duration × acc wear locwrist	-0.04 [-0.07, -0.01]	0.02	-2.44	.015	-0.01 [-0.04, 0.02]	0.01	-0.58	.559
Acc wear locwrist × Sleep duration <sup>2</sup>	-0.03 [-0.04, -0.02]	0.01	-4.18	< .001	0.00 [-0.02, 0.01]	0.01	-0.45	.653
<b>Sleep efficiency (z)</b>								
(Intercept)	0.29 [-0.11, 0.69]	0.20	1.42	.155	1.03 [0.74, 1.31]	0.15	6.99	< .001
Sleep efficiency	0.03 [0.01, 0.06]	0.01	2.54	.011	0.03 [0.00, 0.05]	0.01	1.84	.080
Acc wear locwrist	1.39 [0.95, 1.83]	0.22	6.21	< .001	0.36 [0.05, 0.67]	0.16	2.27	.023
Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.01]	0.00	0.68	.494	0.00 [0.00, 0.01]	0.00	0.84	.405
Age	-0.02 [-0.02, -0.02]	0.00	-11.27	< .001	-0.02 [-0.03, -0.02]	0.00	-14.94	< .001
Sleep efficiency × acc wear locwrist	-0.06 [-0.09, -0.02]	0.02	-3.09	.005	-0.03 [-0.07, 0.00]	0.02	-1.81	.081
Acc wear locwrist × Sleep efficiency <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-1.50	.140	0.00 [-0.01, 0.01]	0.01	-0.63	.530
<b>Sleep onset (z)</b>								
(Intercept)	0.29 [-0.12, 0.69]	0.21	1.39	.164	1.02 [0.73, 1.31]	0.15	6.87	< .001
Sleep onset	0.02 [0.00, 0.04]	0.01	1.79	.077	0.03 [0.01, 0.05]	0.01	2.74	.006
Acc wear locwrist	1.40 [0.96, 1.84]	0.22	6.22	< .001	0.37 [0.06, 0.68]	0.16	2.31	.021
Sleep onset <sup>2</sup>	0.00 [-0.03, 0.03]	0.02	0.19	.847	0.02 [-0.01, 0.05]	0.01	1.18	.238
Age	-0.02 [-0.02, -0.02]	0.00	-11.26	< .001	-0.02 [-0.03, -0.02]	0.00	-14.94	< .001

Table 21 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep onset × acc wear locwrist	-0.04 [-0.07, -0.01]	0.02	-2.30	.022	-0.02 [-0.06, 0.01]	0.02	-1.61	.109
Acc wear locwrist × Sleep onset <sup>2</sup>	-0.01 [-0.04, 0.02]	0.02	-0.65	.521	-0.02 [-0.05, 0.01]	0.02	-1.02	.310
Sleep regularity (z)								
(Intercept)	0.23 [-0.17, 0.63]	0.20	1.13	.259	0.98 [0.69, 1.27]	0.15	6.67	< .001
Sleep regularity	0.10 [0.07, 0.12]	0.01	7.65	< .001	0.11 [0.09, 0.14]	0.01	8.69	< .001
Acc wear locwrist	1.36 [0.93, 1.80]	0.22	6.14	< .001	0.38 [0.07, 0.69]	0.16	2.37	.018
Sleep regularity <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.15	.882	0.01 [-0.01, 0.02]	0.01	0.90	.366
Age	-0.02 [-0.02, -0.02]	0.00	-11.23	< .001	-0.02 [-0.03, -0.02]	0.00	-14.89	< .001
Sleep regularity × acc wear locwrist	0.01 [-0.03, 0.04]	0.02	0.35	.728	-0.09 [-0.12, -0.06]	0.02	-5.51	< .001
Acc wear locwrist × Sleep regularity <sup>2</sup>	0.00 [-0.02, 0.02]	0.01	-0.19	.847	-0.01 [-0.03, 0.01]	0.01	-0.92	.356

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

Table 22

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

Term	Physical activity volume (z)				Physical activity intensity (z)					
	$\beta$	[95% CI]	SE	t	p	$\beta$	[95% CI]	SE	t	p
<b>Sleep duration (z)</b>										
(Intercept)	0.26	[0.04, 0.48]	0.11	2.30	.021	0.28	[0.07, 0.50]	0.11	2.58	.010
Physical activity	0.07	[0.03, 0.12]	0.02	3.03	.002	0.08	[0.04, 0.12]	0.02	3.89	< .001
Pa mostactivehr	0.00	[0.00, 0.00]	0.00	-1.06	.290	0.00	[-0.01, 0.00]	0.00	-1.48	.138
Physical activity <sup>2</sup>	0.00	[-0.01, 0.01]	0.01	-0.24	.813	0.00	[-0.03, 0.02]	0.01	-0.37	.715
Age	0.00	[-0.01, 0.00]	0.00	-2.15	.031	0.00	[-0.01, 0.00]	0.00	-2.27	.023
Physical activity × pa mostactivehr	0.00	[0.00, 0.01]	0.00	1.06	.290	0.00	[0.00, 0.00]	0.00	-0.50	.620
Pa mostactivehr × Physical activity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-1.53	.127	0.00	[0.00, 0.00]	0.00	0.52	.601
<b>Sleep efficiency (z)</b>										
(Intercept)	0.30	[0.06, 0.53]	0.12	2.49	.013	0.33	[0.09, 0.57]	0.12	2.72	.007
Physical activity	-0.04	[-0.09, 0.01]	0.02	-1.50	.133	0.01	[-0.03, 0.05]	0.02	0.39	.697
Pa mostactivehr	0.00	[0.00, 0.00]	0.00	0.86	.392	0.00	[0.00, 0.00]	0.00	-0.48	.632
Physical activity <sup>2</sup>	0.01	[0.00, 0.02]	0.01	1.58	.114	-0.01	[-0.03, 0.02]	0.01	-0.60	.545
Age	0.00	[0.00, 0.01]	0.00	1.14	.254	0.00	[0.00, 0.01]	0.00	1.06	.289
Physical activity × pa mostactivehr	0.01	[0.00, 0.01]	0.00	4.11	< .001	0.00	[0.00, 0.00]	0.00	0.24	.808
Pa mostactivehr × Physical activity <sup>2</sup>	0.00	[0.00, 0.00]	0.00	-3.87	< .001	0.00	[0.00, 0.00]	0.00	0.36	.715
<b>Sleep onset (z)</b>										
(Intercept)	-0.04	[-0.33, 0.24]	0.15	-0.31	.758	-0.02	[-0.30, 0.26]	0.14	-0.17	.863
Physical activity	-0.09	[-0.13, -0.05]	0.02	-4.55	< .001	-0.05	[-0.08, -0.02]	0.02	-3.39	.001
Pa mostactivehr	0.00	[0.00, 0.01]	0.00	3.91	< .001	0.00	[0.00, 0.01]	0.00	3.58	< .001
Physical activity <sup>2</sup>	0.01	[0.00, 0.02]	0.01	1.94	.052	0.00	[-0.02, 0.02]	0.01	0.43	.667
Age	0.00	[0.00, 0.00]	0.00	0.88	.378	0.00	[0.00, 0.00]	0.00	0.59	.553

Table 22 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Physical activity × pa mostactivehr	0.00 [0.00, 0.00]	0.00	1.41	.157	0.00 [0.00, 0.00]	0.00	-1.45	.146
Pa mostactivehr × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.49	.627	0.00 [0.00, 0.00]	0.00	0.04	.966
Sleep regularity (z)								
(Intercept)	0.51 [0.28, 0.74]	0.12	4.32	< .001	0.63 [0.38, 0.87]	0.12	5.02	< .001
Physical activity	0.13 [0.07, 0.19]	0.03	4.39	< .001	0.05 [0.01, 0.09]	0.02	2.44	.015
Pa mostactivehr	0.00 [0.00, 0.00]	0.00	-0.29	.779	0.00 [-0.01, 0.00]	0.00	-1.72	.118
Physical activity <sup>2</sup>	-0.02 [-0.03, 0.00]	0.01	-2.34	.022	-0.06 [-0.08, -0.03]	0.01	-3.92	< .001
Age	0.00 [0.00, 0.00]	0.00	0.13	.894	0.00 [0.00, 0.00]	0.00	-0.12	.904
Physical activity × pa mostactivehr	0.01 [0.00, 0.01]	0.00	3.31	.005	0.00 [0.00, 0.01]	0.00	2.43	.015
Pa mostactivehr × Physical activity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-3.09	.003	0.00 [0.00, 0.00]	0.00	1.70	.090

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

Table 23

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

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration (z)</b>								
(Intercept)	1.27 [0.91, 1.62]	0.18	7.02	< .001	1.25 [1.06, 1.45]	0.10	12.52	< .001
Sleep duration	0.02 [-0.01, 0.05]	0.02	1.30	.195	0.03 [0.00, 0.06]	0.02	1.76	.079
Pa mostactivehr	0.01 [0.00, 0.01]	0.00	4.90	< .001	0.00 [0.00, 0.00]	0.00	2.11	.035
Sleep duration <sup>2</sup>	-0.02 [-0.03, 0.00]	0.01	-2.55	.011	-0.01 [-0.02, 0.01]	0.01	-0.78	.433
Age	-0.02 [-0.02, -0.01]	0.00	-9.82	< .001	-0.02 [-0.02, -0.02]	0.00	-14.26	< .001
Sleep duration × pa mostactivehr	0.00 [0.00, 0.00]	0.00	-1.91	.056	0.00 [0.00, 0.00]	0.00	-1.33	.185
Pa mostactivehr × Sleep duration <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-0.26	.797	0.00 [0.00, 0.00]	0.00	-0.84	.404
<b>Sleep efficiency (z)</b>								
(Intercept)	1.27 [0.91, 1.62]	0.18	6.99	< .001	1.26 [1.06, 1.46]	0.10	12.53	< .001
Sleep efficiency	-0.03 [-0.07, 0.01]	0.02	-1.57	.128	-0.02 [-0.06, 0.01]	0.02	-1.23	.219
Pa mostactivehr	0.00 [0.00, 0.01]	0.00	4.20	< .001	0.00 [0.00, 0.00]	0.00	1.46	.143
Sleep efficiency <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-2.36	.020	-0.01 [-0.02, 0.00]	0.01	-1.07	.285
Age	-0.02 [-0.02, -0.01]	0.00	-9.83	< .001	-0.02 [-0.02, -0.02]	0.00	-14.26	< .001
Sleep efficiency × pa mostactivehr	0.00 [0.00, 0.01]	0.00	1.71	.097	0.00 [0.00, 0.00]	0.00	1.93	.054
Pa mostactivehr × Sleep efficiency <sup>2</sup>	0.00 [0.00, 0.00]	0.00	1.91	.059	0.00 [0.00, 0.00]	0.00	1.23	.217
<b>Sleep onset (z)</b>								
(Intercept)	1.26 [0.91, 1.62]	0.18	6.97	< .001	1.24 [1.04, 1.44]	0.10	12.28	< .001
Sleep onset	-0.02 [-0.05, 0.01]	0.01	-1.42	.155	-0.02 [-0.05, 0.01]	0.01	-1.51	.132
Pa mostactivehr	0.01 [0.00, 0.01]	0.00	4.06	< .001	0.00 [0.00, 0.01]	0.00	2.44	.015
Sleep onset <sup>2</sup>	-0.01 [-0.04, 0.01]	0.01	-1.28	.202	0.01 [-0.01, 0.04]	0.01	1.43	.153
Age	-0.02 [-0.02, -0.01]	0.00	-9.80	< .001	-0.02 [-0.02, -0.02]	0.00	-14.24	< .001

Table 23 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
Sleep onset × pa mostactivehr	0.00 [0.00, 0.00]	0.00	1.79	.073	0.00 [0.00, 0.00]	0.00	2.92	.003
Pa mostactivehr × Sleep onset <sup>2</sup>	0.00 [0.00, 0.00]	0.00	0.18	.855	0.00 [0.00, 0.00]	0.00	-1.61	.107
Sleep regularity (z)								
(Intercept)	1.17 [0.82, 1.52]	0.18	6.54	< .001	1.23 [1.03, 1.43]	0.10	12.27	< .001
Sleep regularity	0.07 [0.03, 0.10]	0.02	3.84	< .001	0.01 [-0.02, 0.04]	0.02	0.54	.591
Pa mostactivehr	0.01 [0.00, 0.01]	0.00	4.60	< .001	0.00 [0.00, 0.00]	0.00	0.52	.602
Sleep regularity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	0.87	.387	-0.02 [-0.04, 0.00]	0.01	-1.55	.121
Age	-0.02 [-0.02, -0.01]	0.00	-9.77	< .001	-0.02 [-0.02, -0.02]	0.00	-14.22	< .001
Sleep regularity × pa mostactivehr	0.00 [0.00, 0.01]	0.00	1.99	.053	0.00 [0.00, 0.01]	0.00	3.45	.001
Pa mostactivehr × Sleep regularity <sup>2</sup>	0.00 [0.00, 0.00]	0.00	-1.04	.299	0.00 [0.00, 0.00]	0.00	1.58	.115

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

Table 24

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

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration (z)</b>								
(Intercept)	0.31 [0.08, 0.54]	0.12	2.66	.008	0.31 [0.09, 0.53]	0.11	2.77	.006
Physical activity	0.09 [0.06, 0.13]	0.02	5.21	<.001	0.07 [0.04, 0.10]	0.01	4.82	<.001
Ethnicitynon-white	-0.12 [-0.22, -0.01]	0.05	-2.22	.026	-0.18 [-0.28, -0.08]	0.05	-3.59	<.001
Ethnicityunclear	-0.08 [-0.18, 0.01]	0.05	-1.76	.078	-0.08 [-0.18, 0.01]	0.05	-1.77	.077
Physical activity <sup>2</sup>	-0.02 [-0.03, -0.01]	0.01	-3.16	.002	-0.02 [-0.03, 0.00]	0.01	-1.73	.084
Age	0.00 [-0.01, 0.00]	0.00	-2.18	.029	0.00 [-0.01, 0.00]	0.00	-2.19	.029
Physical activity × ethnicitynon-white	0.02 [-0.07, 0.10]	0.04	0.45	.650	0.06 [-0.01, 0.13]	0.04	1.68	.093
Physical activity × ethnicityunclear	-0.01 [-0.07, 0.04]	0.03	-0.53	.598	-0.02 [-0.06, 0.03]	0.02	-0.77	.439
Ethnicitynon-white × Physical activity <sup>2</sup>	-0.05 [-0.11, 0.00]	0.03	-1.87	.062	0.00 [-0.05, 0.05]	0.03	0.03	.975
Ethnicityunclear × Physical activity <sup>2</sup>	0.01 [0.00, 0.03]	0.01	1.98	.048	0.04 [0.01, 0.06]	0.01	2.87	.004
<b>Sleep efficiency (z)</b>								
(Intercept)	0.31 [0.07, 0.55]	0.12	2.56	.011	0.31 [0.06, 0.55]	0.12	2.48	.013
Physical activity	0.06 [0.02, 0.09]	0.02	2.97	.003	0.01 [-0.02, 0.04]	0.01	0.78	.437
Ethnicitynon-white	-0.10 [-0.20, 0.01]	0.05	-1.78	.075	-0.13 [-0.24, -0.03]	0.05	-2.59	.010
Ethnicityunclear	0.02 [-0.08, 0.11]	0.05	0.32	.747	0.04 [-0.06, 0.14]	0.05	0.84	.399
Physical activity <sup>2</sup>	-0.02 [-0.03, 0.00]	0.01	-2.90	.004	0.00 [-0.02, 0.02]	0.01	-0.23	.820
Age	0.00 [0.00, 0.01]	0.00	1.25	.211	0.00 [0.00, 0.01]	0.00	1.18	.240
Physical activity × ethnicitynon-white	0.06 [-0.03, 0.15]	0.04	1.31	.191	0.08 [0.00, 0.15]	0.04	2.05	.041
Physical activity × ethnicityunclear	-0.04 [-0.10, 0.01]	0.03	-1.51	.132	-0.01 [-0.06, 0.03]	0.02	-0.56	.573
Ethnicitynon-white × Physical activity <sup>2</sup>	-0.05 [-0.10, 0.01]	0.03	-1.56	.120	-0.04 [-0.10, 0.01]	0.03	-1.55	.122
Ethnicityunclear × Physical activity <sup>2</sup>	0.01 [0.00, 0.03]	0.01	1.51	.132	0.00 [-0.03, 0.03]	0.01	0.02	.983

Table 24 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep onset (z)</b>								
(Intercept)	-0.05 [-0.34, 0.25]	0.15	-0.31	.758	-0.02 [-0.30, 0.27]	0.15	-0.13	.896
Physical activity	-0.06 [-0.09, -0.03]	0.01	-4.12	< .001	-0.05 [-0.08, -0.03]	0.01	-4.83	< .001
Ethnicitynon-white	0.03 [-0.05, 0.11]	0.04	0.65	.516	0.06 [-0.02, 0.14]	0.04	1.44	.149
Ethnicityunclear	0.08 [0.01, 0.16]	0.04	2.16	.031	0.09 [0.01, 0.17]	0.04	2.31	.021
Physical activity <sup>2</sup>	0.01 [0.00, 0.02]	0.00	2.05	.040	0.01 [0.00, 0.02]	0.01	1.28	.201
Age	0.00 [0.00, 0.00]	0.00	1.00	.319	0.00 [0.00, 0.00]	0.00	0.59	.556
Physical activity × ethnicitynon-white	-0.02 [-0.08, 0.05]	0.03	-0.46	.644	-0.05 [-0.11, 0.00]	0.03	-1.85	.065
Physical activity × ethnicityunclear	0.00 [-0.05, 0.04]	0.02	-0.10	.921	-0.03 [-0.07, 0.00]	0.02	-1.95	.051
Ethnicitynon-white × Physical activity <sup>2</sup>	0.02 [-0.02, 0.07]	0.02	1.05	.295	0.01 [-0.04, 0.05]	0.02	0.23	.816
Ethnicityunclear × Physical activity <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	-0.50	.620	-0.01 [-0.03, 0.01]	0.01	-0.94	.350
<b>Sleep regularity (z)</b>								
(Intercept)	0.53 [0.31, 0.76]	0.12	4.59	< .001	0.57 [0.33, 0.82]	0.12	4.62	< .001
Physical activity	0.24 [0.20, 0.28]	0.02	11.56	< .001	0.10 [0.07, 0.13]	0.02	6.73	< .001
Ethnicitynon-white	0.06 [-0.05, 0.16]	0.05	1.05	.292	0.01 [-0.09, 0.11]	0.05	0.23	.822
Ethnicityunclear	-0.06 [-0.16, 0.03]	0.05	-1.30	.193	0.00 [-0.11, 0.10]	0.05	-0.07	.943
Physical activity <sup>2</sup>	-0.04 [-0.05, -0.03]	0.01	-7.26	< .001	-0.02 [-0.04, 0.00]	0.01	-2.13	.043
Age	0.00 [0.00, 0.00]	0.00	0.12	.901	0.00 [0.00, 0.00]	0.00	-0.05	.961
Physical activity × ethnicitynon-white	0.03 [-0.07, 0.12]	0.05	0.59	.556	0.19 [0.11, 0.27]	0.04	4.76	< .001
Physical activity × ethnicityunclear	-0.05 [-0.11, 0.00]	0.03	-1.80	.072	-0.06 [-0.10, -0.01]	0.02	-2.41	.016
Ethnicitynon-white × Physical activity <sup>2</sup>	-0.08 [-0.14, -0.03]	0.03	-2.83	.005	-0.11 [-0.17, -0.06]	0.03	-3.85	< .001
Ethnicityunclear × Physical activity <sup>2</sup>	0.01 [0.00, 0.03]	0.01	1.44	.151	-0.02 [-0.05, 0.02]	0.02	-0.92	.373

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

Table 25

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

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep duration (z)</b>								
(Intercept)	1.35 [0.99, 1.70]	0.18	7.43	< .001	1.33 [1.13, 1.52]	0.10	13.07	< .001
Sleep duration	0.00 [-0.02, 0.02]	0.01	0.30	.764	0.03 [0.01, 0.05]	0.01	3.18	.002
Ethnicitynon-white	-0.10 [-0.19, -0.01]	0.05	-2.15	.032	-0.05 [-0.12, 0.03]	0.04	-1.16	.247
Ethnicityunclear	0.01 [-0.08, 0.10]	0.05	0.24	.813	-0.05 [-0.13, 0.03]	0.04	-1.21	.226
Sleep duration <sup>2</sup>	-0.01 [-0.02, -0.01]	0.00	-3.15	.002	0.00 [-0.01, 0.01]	0.00	0.11	.909
Age	-0.02 [-0.02, -0.01]	0.00	-9.82	< .001	-0.02 [-0.02, -0.02]	0.00	-14.38	< .001
Sleep duration × ethnicitynon-white	-0.01 [-0.06, 0.03]	0.02	-0.59	.557	-0.05 [-0.10, 0.00]	0.02	-2.14	.32
Sleep duration × ethnicityunclear	-0.02 [-0.05, 0.01]	0.01	-1.22	.223	-0.05 [-0.08, -0.02]	0.01	-3.23	.001
Ethnicitynon-white × Sleep duration <sup>2</sup>	-0.02 [-0.04, 0.00]	0.01	-1.63	.104	-0.02 [-0.05, 0.00]	0.01	-2.05	.040
Ethnicityunclear × Sleep duration <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-1.44	.151	-0.02 [-0.03, -0.01]	0.01	-3.46	.001
<b>Sleep efficiency (z)</b>								
(Intercept)	1.34 [0.99, 1.70]	0.18	7.40	< .001	1.33 [1.13, 1.53]	0.10	13.09	< .001
Sleep efficiency	0.00 [-0.02, 0.03]	0.01	0.43	.670	0.01 [-0.01, 0.04]	0.01	1.14	.262
Ethnicitynon-white	-0.11 [-0.20, -0.03]	0.04	-2.59	.010	-0.07 [-0.15, 0.00]	0.04	-1.90	.058
Ethnicityunclear	-0.01 [-0.10, 0.08]	0.05	-0.21	.831	-0.08 [-0.16, 0.00]	0.04	-1.96	.050
Sleep efficiency <sup>2</sup>	-0.01 [-0.01, 0.00]	0.00	-1.57	.118	0.00 [-0.01, 0.01]	0.00	0.21	.834
Age	-0.02 [-0.02, -0.01]	0.00	-9.81	< .001	-0.02 [-0.02, -0.02]	0.00	-14.37	< .001
Sleep efficiency × ethnicitynon-white	-0.01 [-0.06, 0.05]	0.03	-0.25	.803	0.00 [-0.05, 0.06]	0.03	0.10	.922
Sleep efficiency × ethnicityunclear	-0.02 [-0.05, 0.02]	0.02	-1.07	.286	-0.02 [-0.05, 0.02]	0.02	-1.08	.281
Ethnicitynon-white × Sleep efficiency <sup>2</sup>	0.00 [-0.02, 0.01]	0.01	-0.11	.916	0.00 [-0.02, 0.01]	0.01	-0.08	.937
Ethnicityunclear × Sleep efficiency <sup>2</sup>	0.00 [-0.01, 0.01]	0.01	0.73	.466	0.00 [-0.01, 0.01]	0.00	-0.54	.592

Table 25 continued

## TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	$\beta$ [95% CI]	SE	t	p	$\beta$ [95% CI]	SE	t	p
<b>Sleep onset (z)</b>								
(Intercept)	1.36 [1.00, 1.72]	0.18	7.48	< .001	1.33 [1.13, 1.54]	0.10	13.07	< .001
Sleep onset	0.00 [-0.02, 0.01]	0.01	-0.49	.623	0.00 [-0.01, 0.02]	0.01	0.47	.641
Ethnicitynon-white	-0.13 [-0.23, -0.03]	0.05	-2.66	.008	-0.07 [-0.16, 0.02]	0.04	-1.59	.111
Ethnicityunclear	-0.03 [-0.12, 0.07]	0.05	-0.52	.600	-0.08 [-0.16, 0.00]	0.04	-1.95	.051
Sleep onset <sup>2</sup>	-0.02 [-0.03, -0.01]	0.01	-3.17	.002	0.00 [-0.01, 0.01]	0.01	-0.01	.995
Age	-0.02 [-0.02, -0.01]	0.00	-9.83	< .001	-0.02 [-0.02, -0.02]	0.00	-14.39	< .001
Sleep onset × ethnicitynon-white	0.03 [-0.01, 0.07]	0.02	1.50	.134	0.04 [0.00, 0.08]	0.02	2.03	.042
Sleep onset × ethnicityunclear	0.01 [-0.02, 0.04]	0.02	0.61	.539	0.01 [-0.02, 0.04]	0.02	0.88	.381
Ethnicitynon-white × Sleep onset <sup>2</sup>	0.02 [-0.02, 0.05]	0.02	0.90	.367	0.00 [-0.04, 0.03]	0.02	-0.20	.838
Ethnicityunclear × Sleep onset <sup>2</sup>	0.02 [0.00, 0.04]	0.01	2.16	.031	0.00 [-0.02, 0.02]	0.01	0.23	.816
<b>Sleep regularity (z)</b>								
(Intercept)	1.27 [0.91, 1.62]	0.18	7.04	< .001	1.29 [1.09, 1.49]	0.10	12.76	< .001
Sleep regularity	0.10 [0.07, 0.12]	0.01	8.52	< .001	0.06 [0.04, 0.08]	0.01	5.66	< .001
Ethnicitynon-white	-0.12 [-0.21, -0.03]	0.05	-2.69	.007	-0.08 [-0.16, 0.00]	0.04	-2.08	.038
Ethnicityunclear	-0.01 [-0.10, 0.08]	0.05	-0.24	.807	-0.07 [-0.15, 0.01]	0.04	-1.83	.068
Sleep regularity <sup>2</sup>	-0.01 [-0.02, 0.00]	0.01	-1.40	.160	0.00 [-0.02, 0.01]	0.01	-0.43	.665
Age	-0.02 [-0.02, -0.01]	0.00	-9.78	< .001	-0.02 [-0.02, -0.02]	0.00	-14.36	< .001
Sleep regularity × ethnicitynon-white	-0.01 [-0.06, 0.04]	0.03	-0.53	.593	0.01 [-0.04, 0.06]	0.02	0.55	.584
Sleep regularity × ethnicityunclear	0.02 [-0.01, 0.05]	0.02	1.11	.269	-0.01 [-0.04, 0.02]	0.02	-0.85	.397
Ethnicitynon-white × Sleep regularity <sup>2</sup>	0.01 [-0.02, 0.04]	0.01	0.75	.454	0.01 [-0.02, 0.04]	0.01	0.90	.371
Ethnicityunclear × Sleep regularity <sup>2</sup>	0.01 [-0.01, 0.03]	0.01	1.38	.166	0.00 [-0.02, 0.02]	0.01	-0.30	.763

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

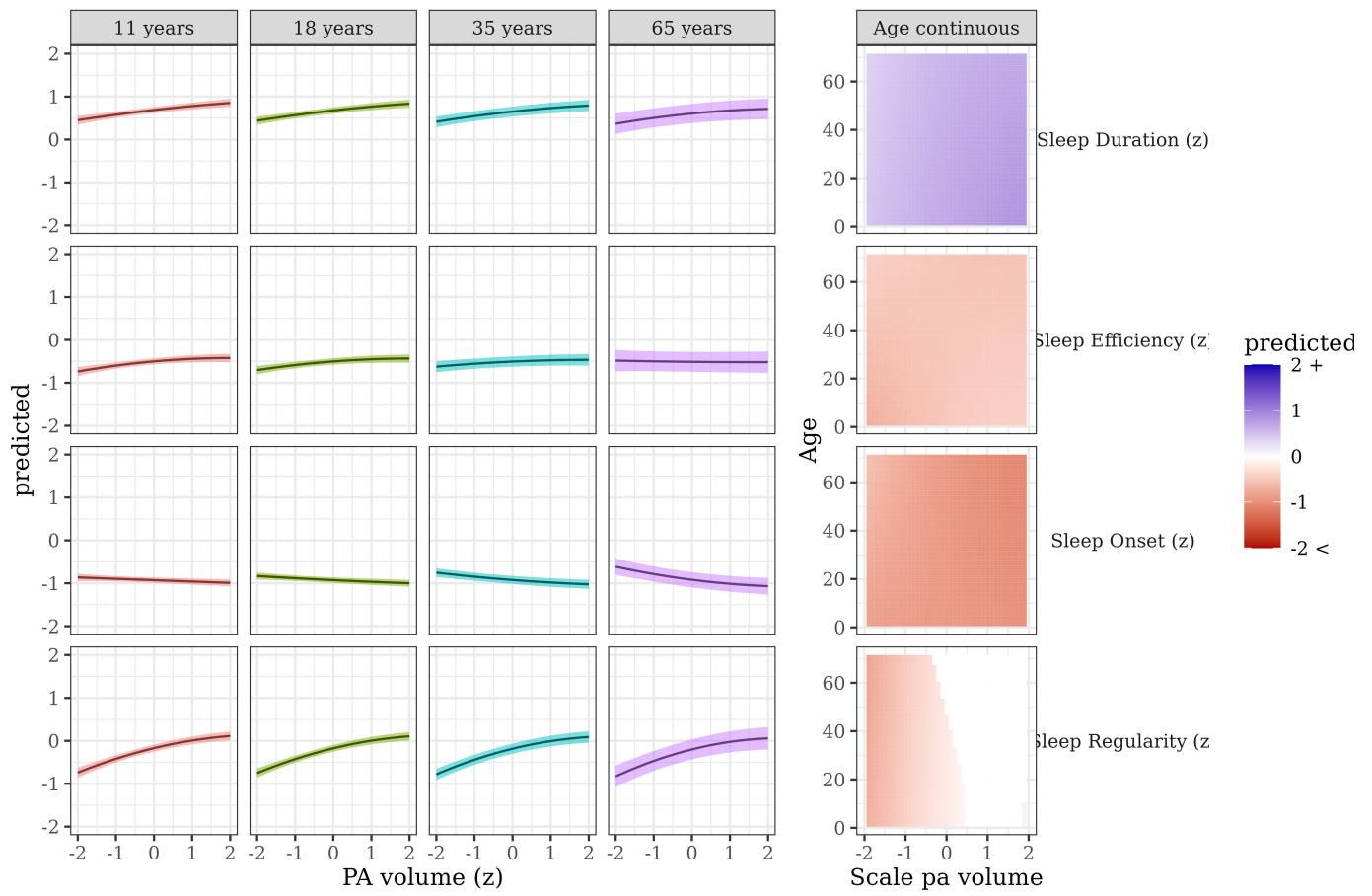


Figure 1. Sleep metrics on Physical activity volume

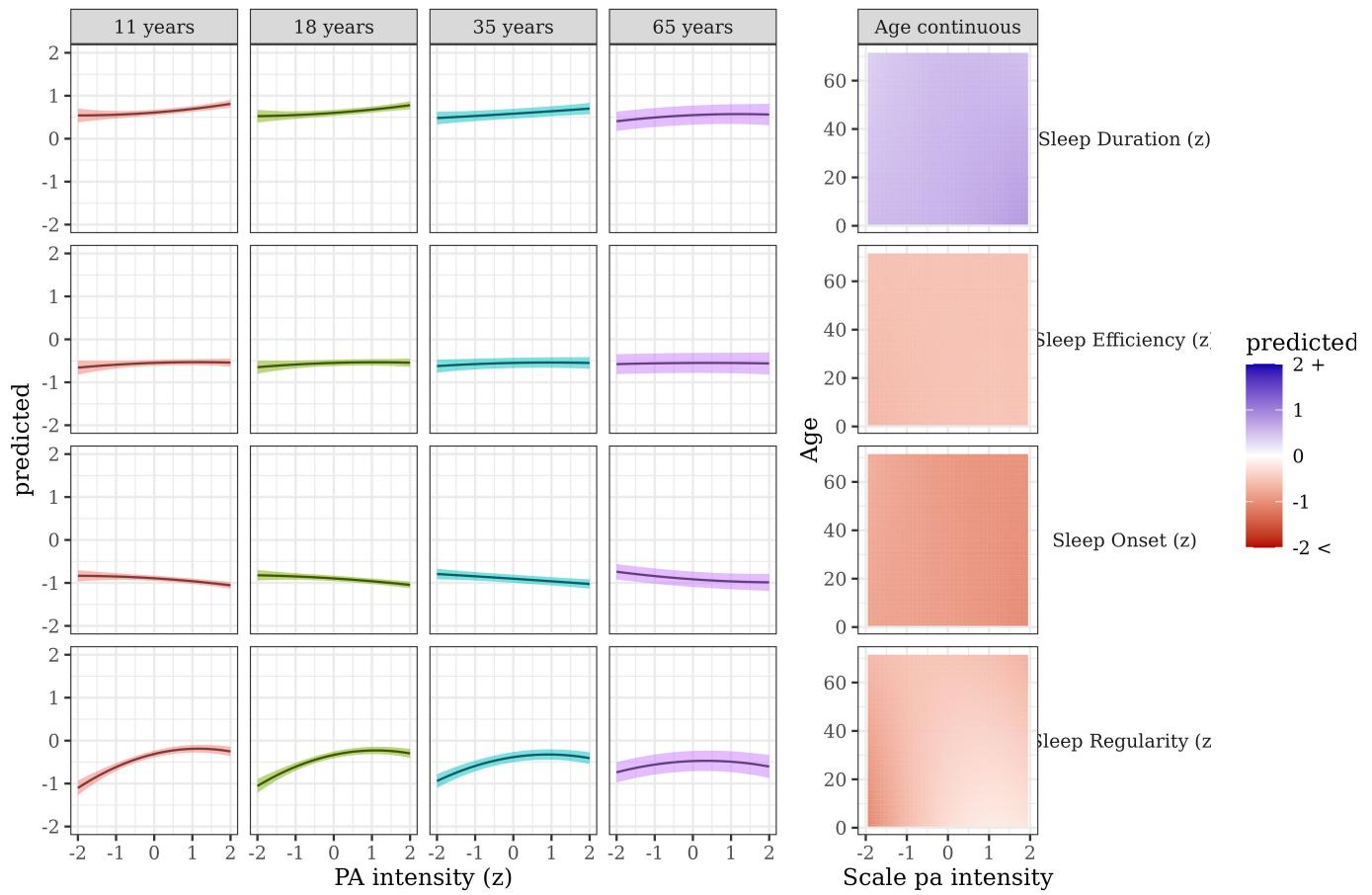


Figure 2. Sleep metrics on Physical activity intensity

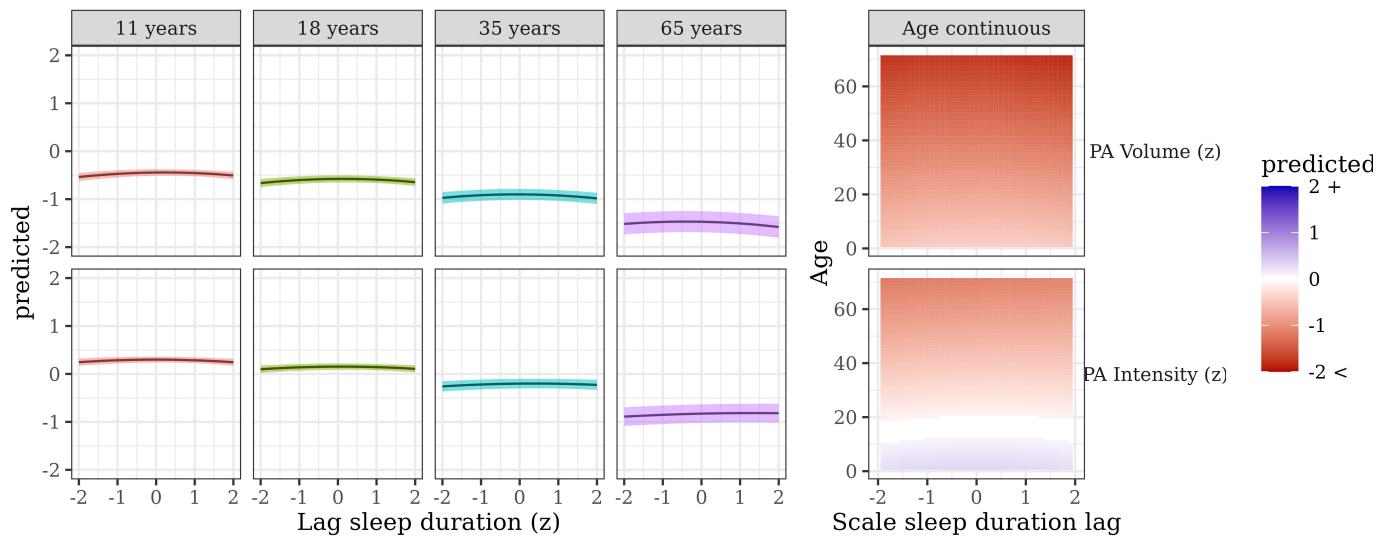


Figure 3. Physical activity by sleep duration

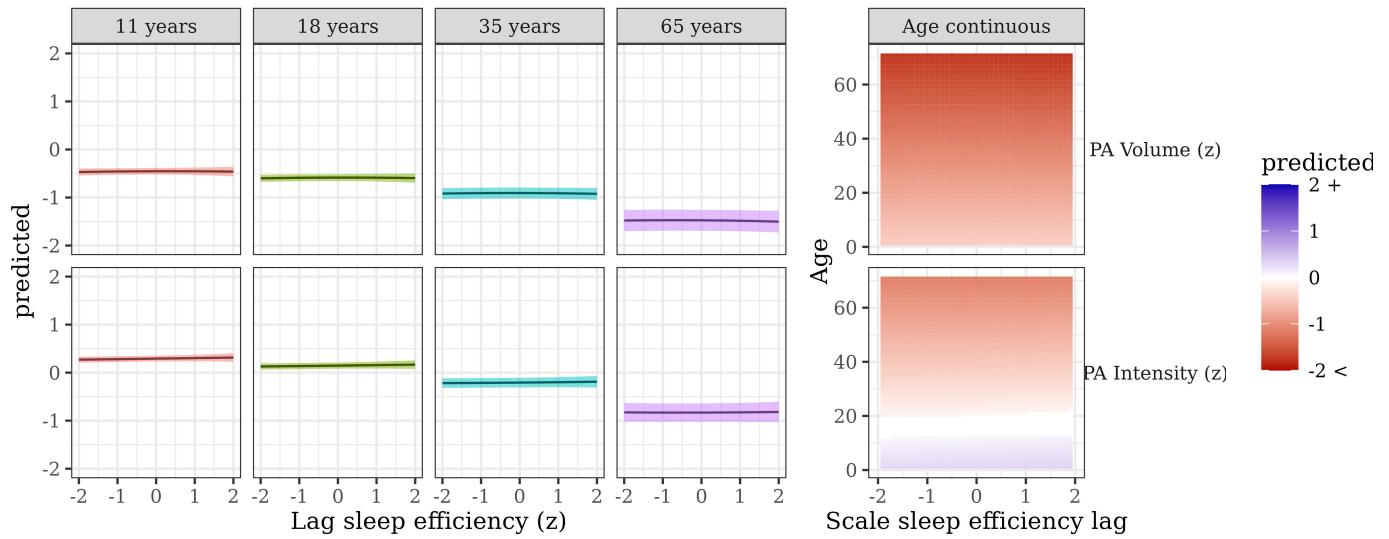


Figure 4. Physical activity by sleep efficiency

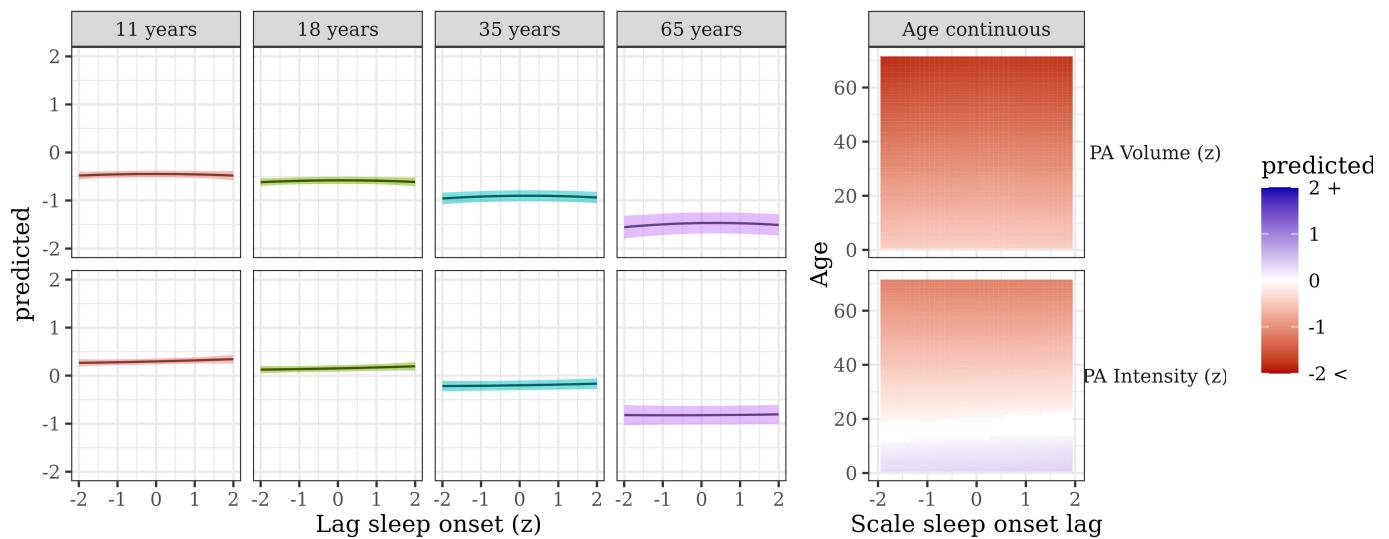


Figure 5. Physical activity by sleep onset

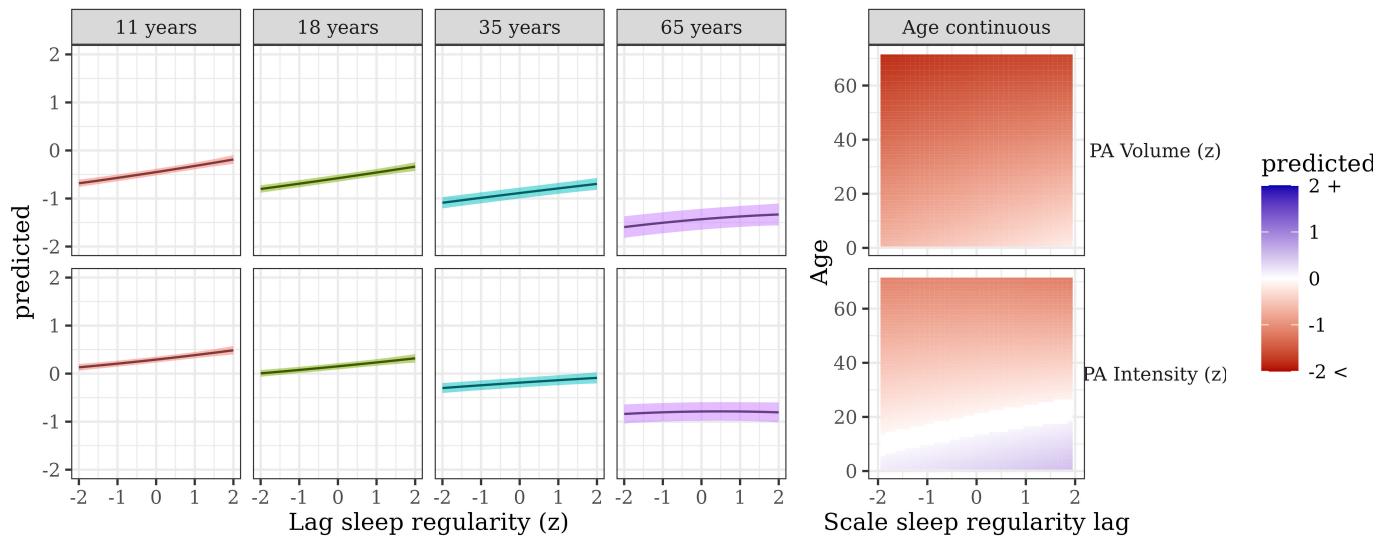


Figure 6. Physical activity by sleep regularity

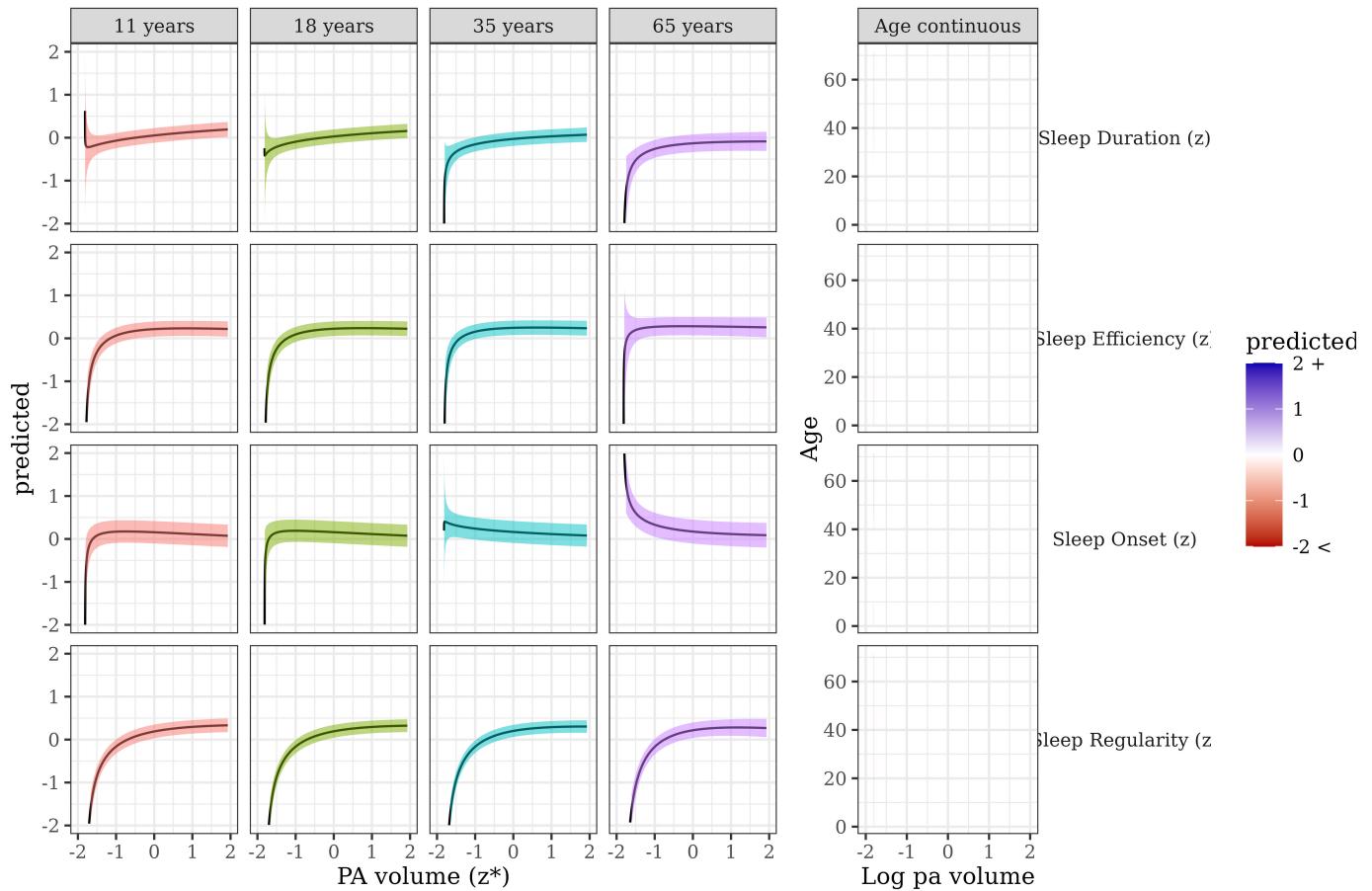


Figure 7. Sleep metrics on Physical activity volume

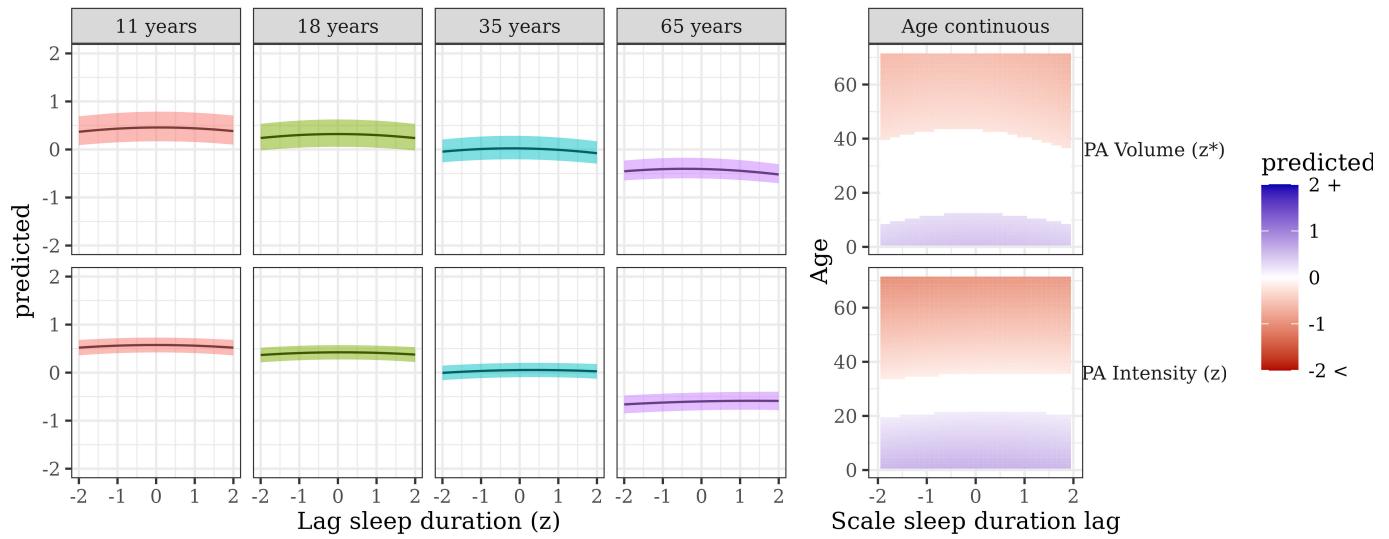


Figure 8. Physical activity by sleep duration

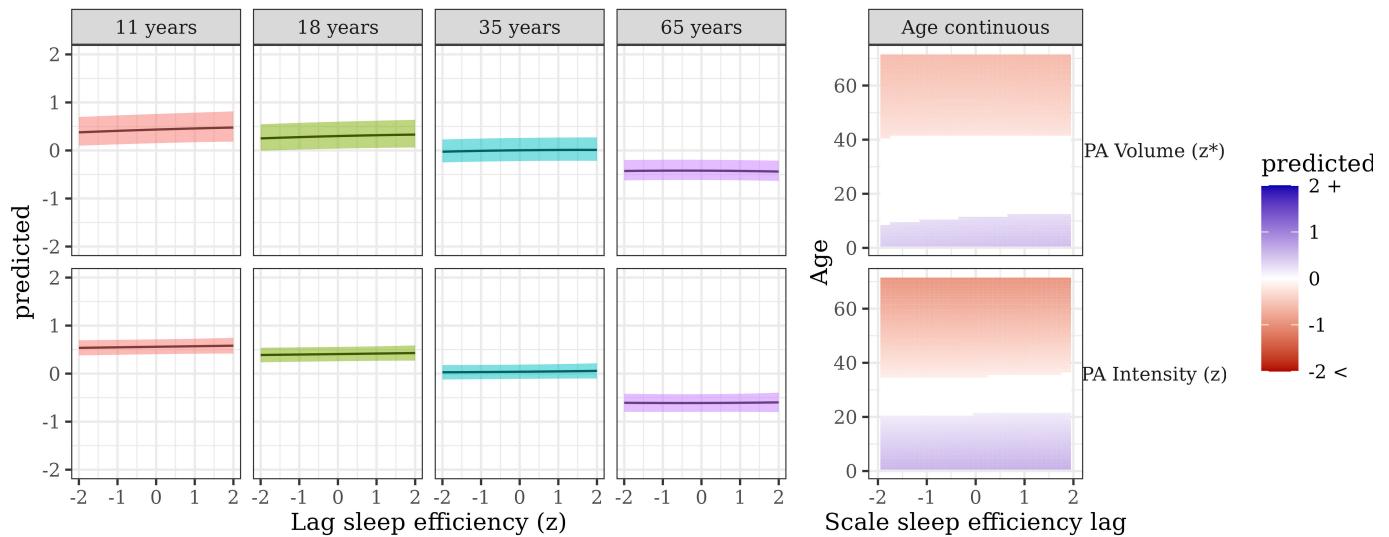


Figure 9. Physical activity by sleep efficiency

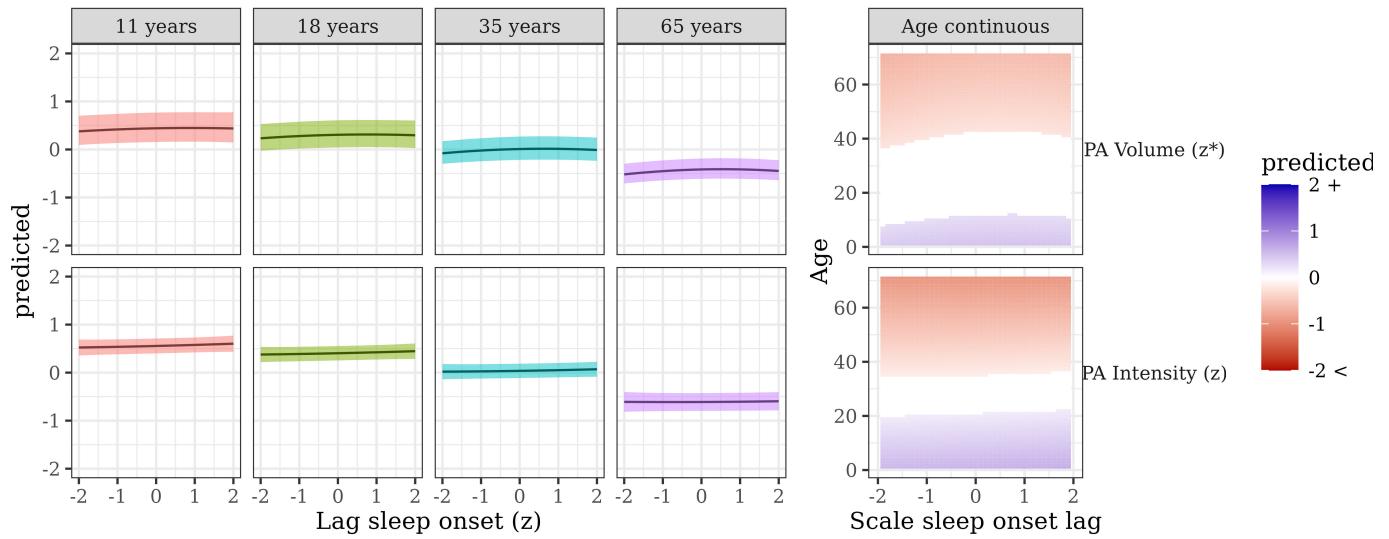


Figure 10. Physical activity by sleep onset

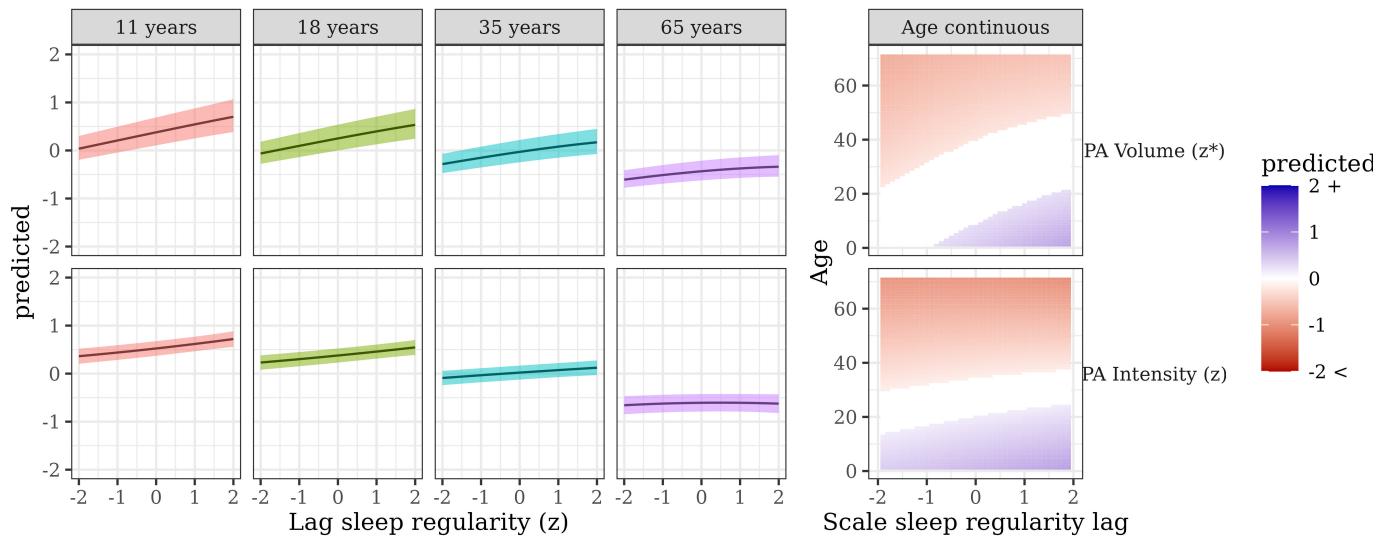


Figure 11. Physical activity by sleep regularity

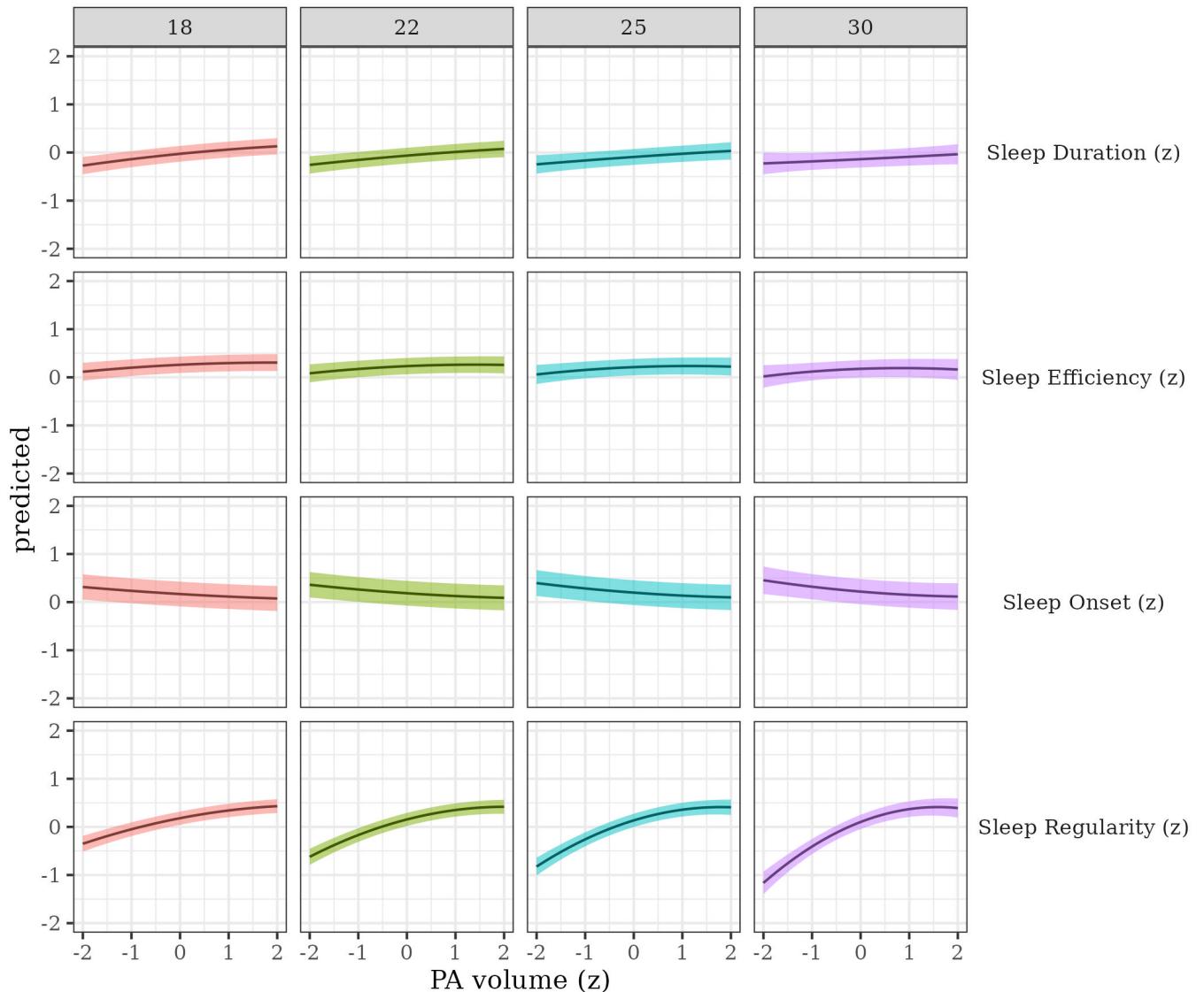


Figure 12. Sleep metrics on Physical activity volume by BMI

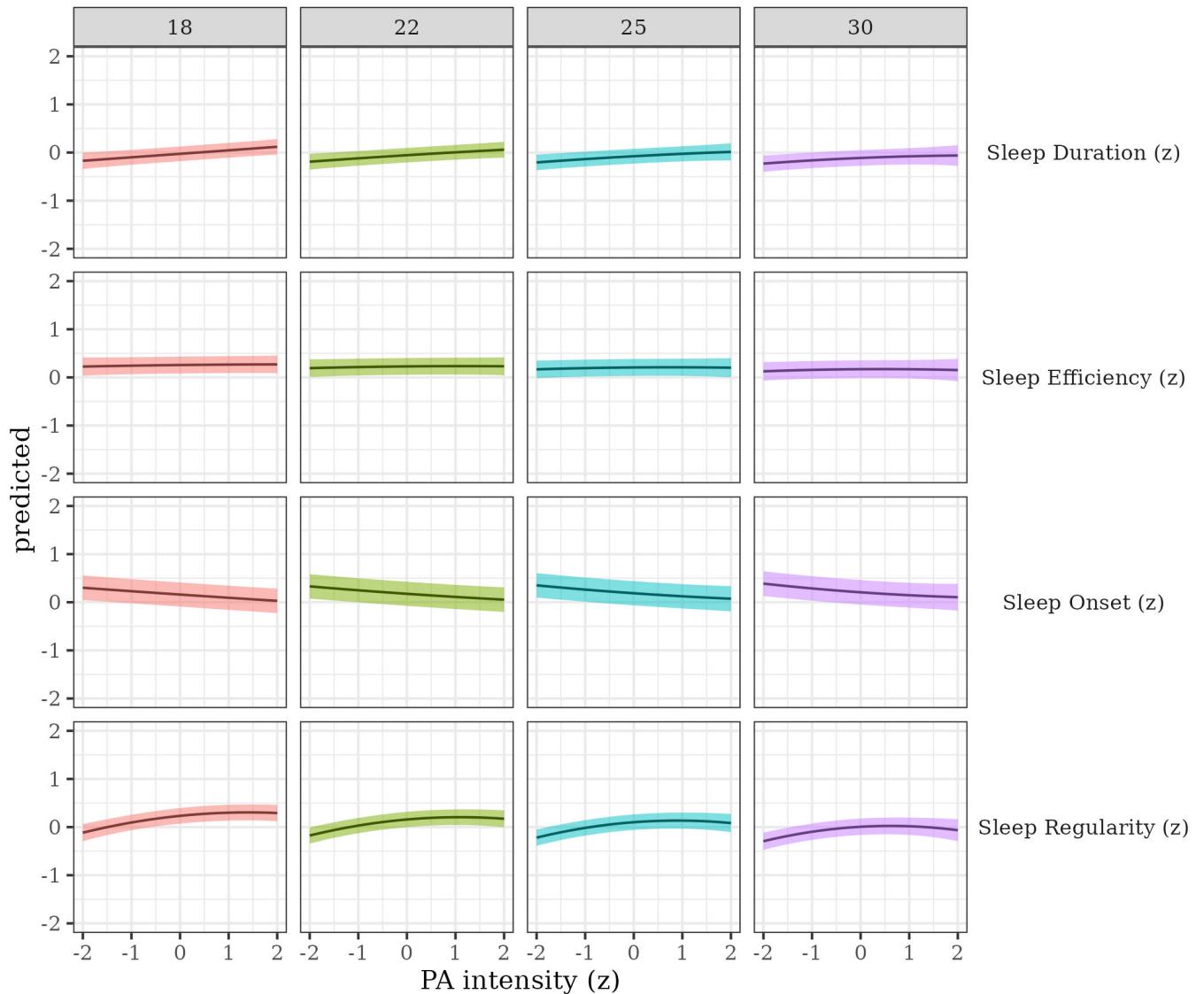


Figure 13. Sleep metrics on Physical activity intensity moderated by BMI

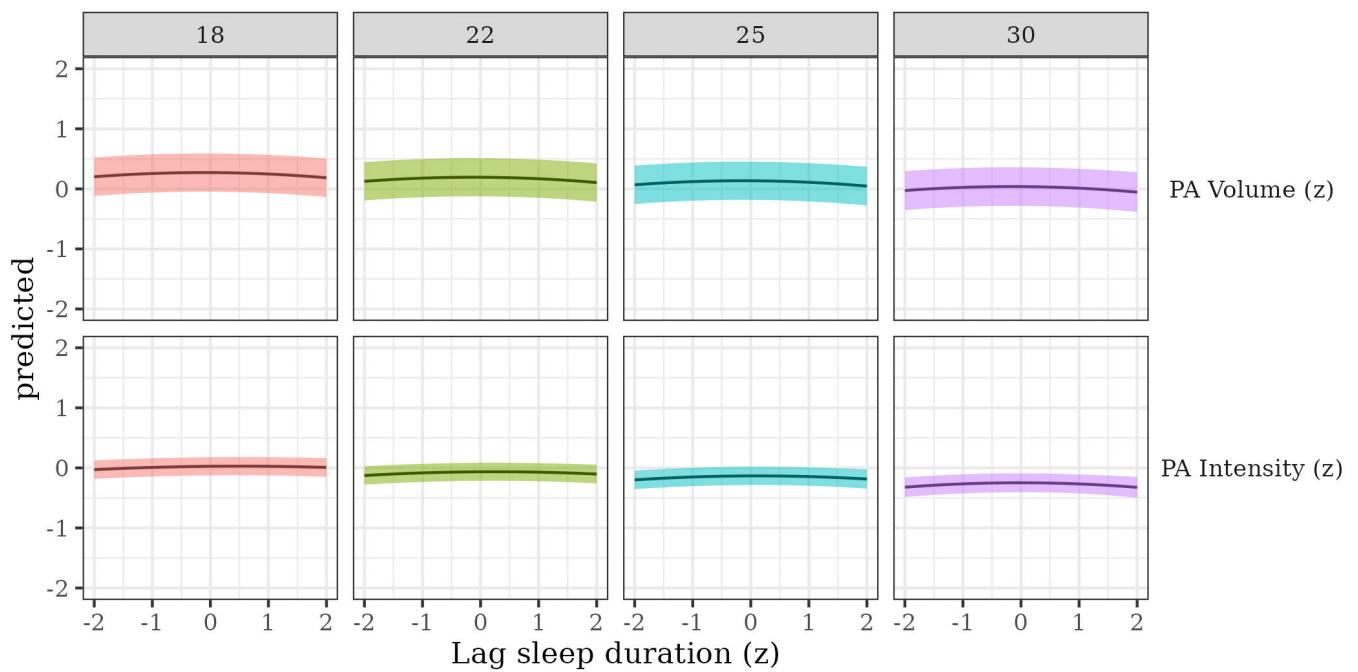


Figure 14. Physical activity by sleep duration moderated by BMI

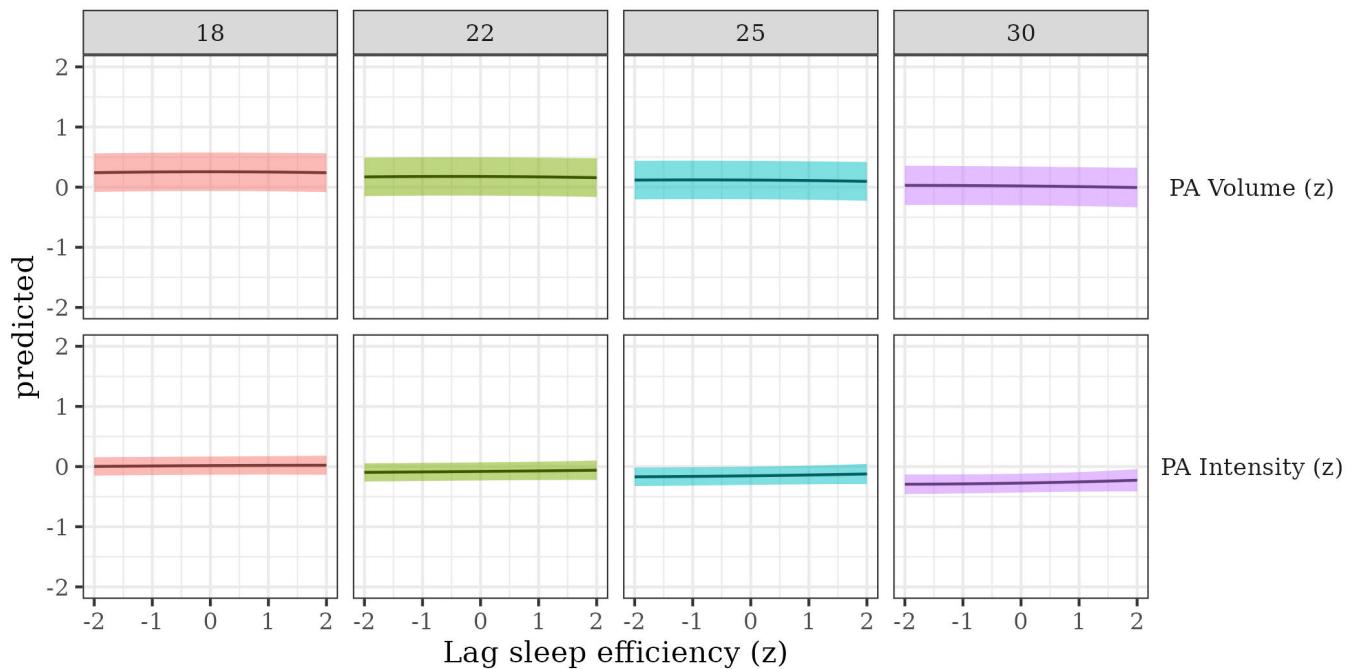


Figure 15. Physical activity by sleep efficiency moderated by BMI

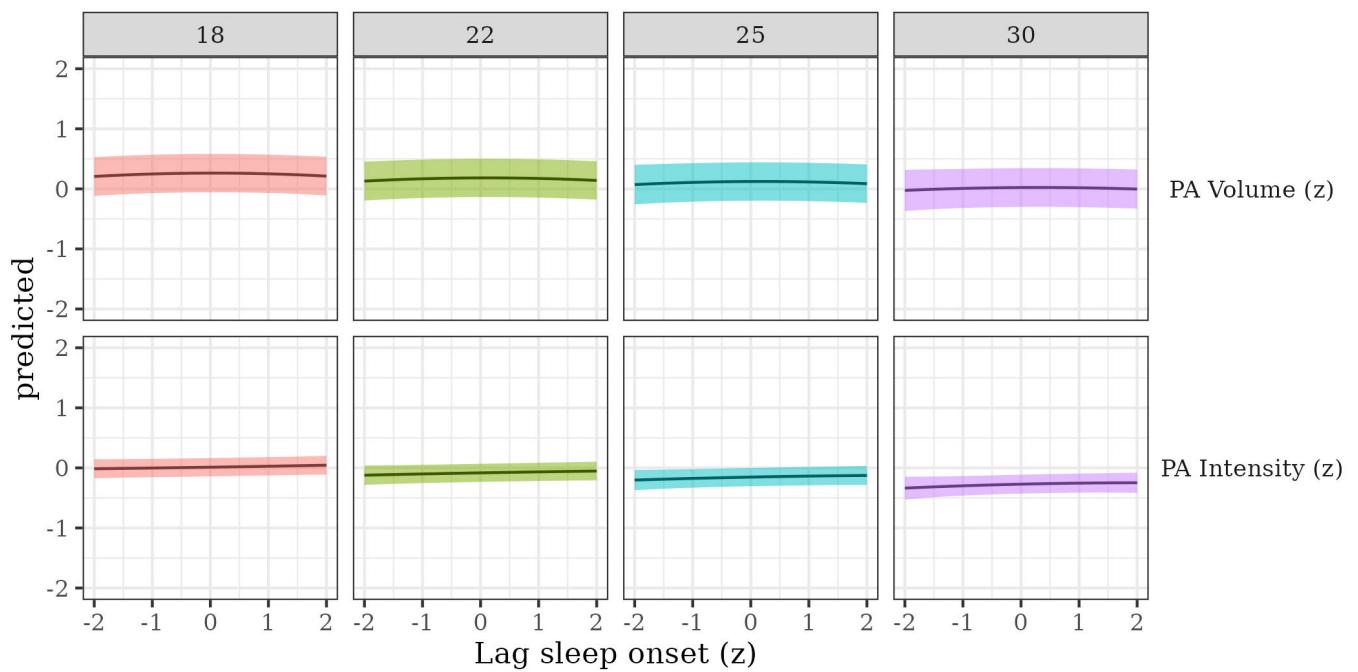


Figure 16. Physical activity by sleep onset moderated by BMI

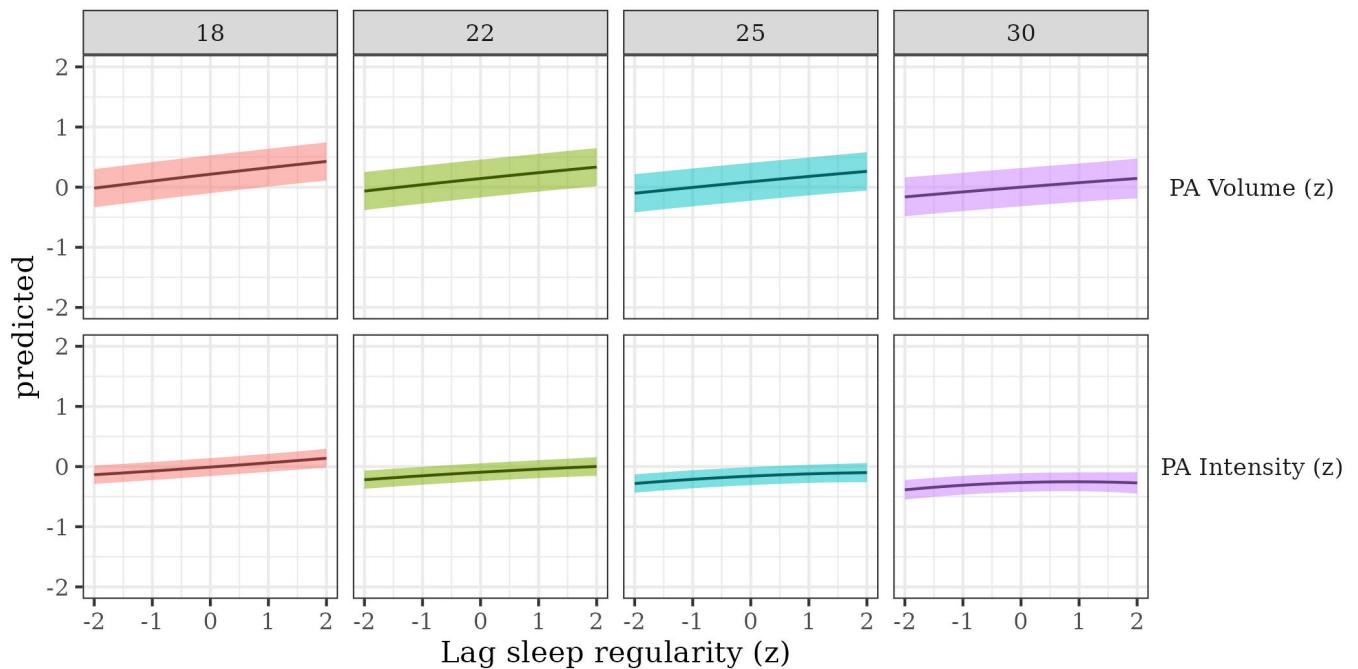


Figure 17. Physical activity by sleep regularity moderated by BMI

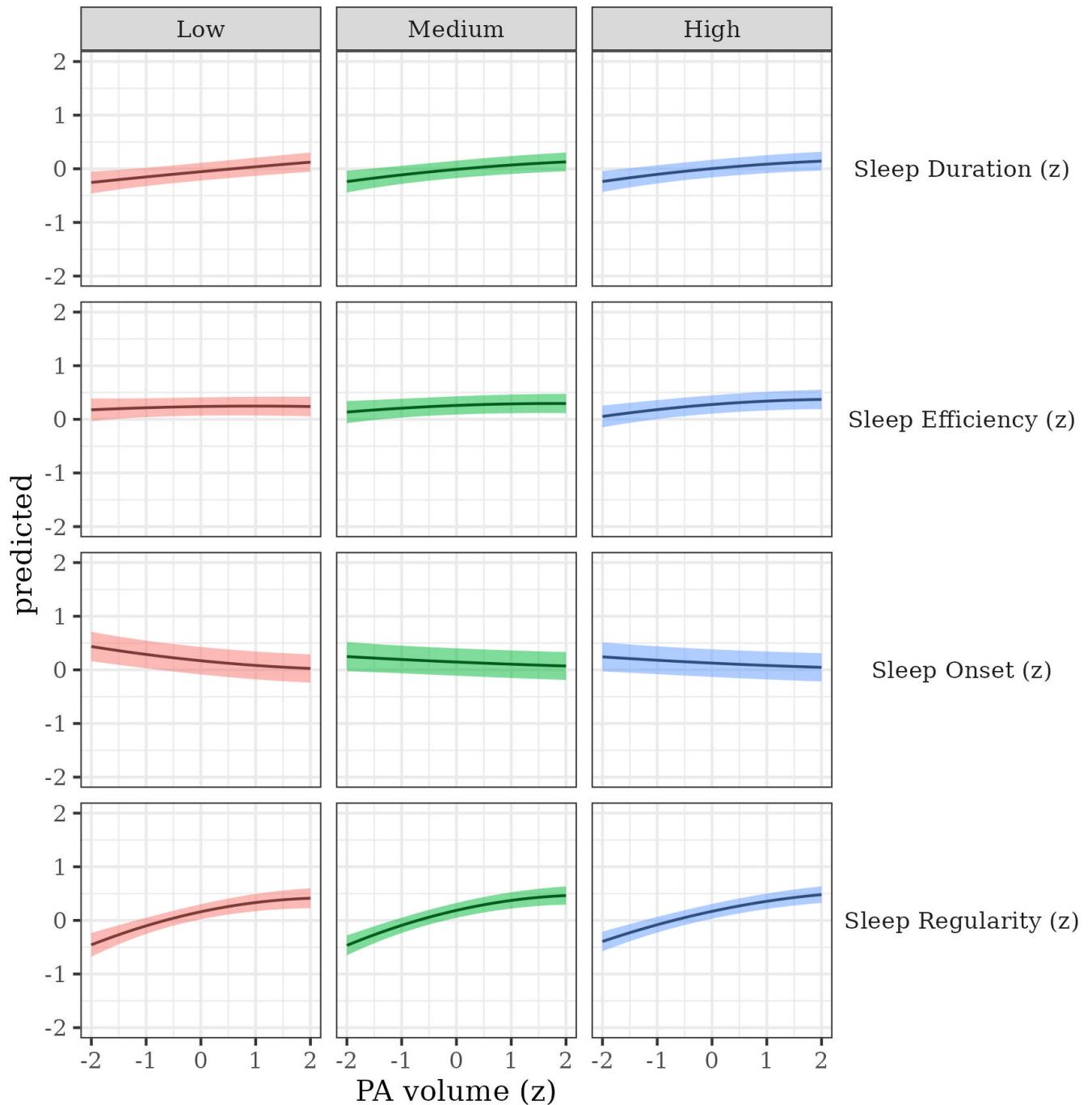


Figure 18. Sleep metrics on Physical activity volume by SES

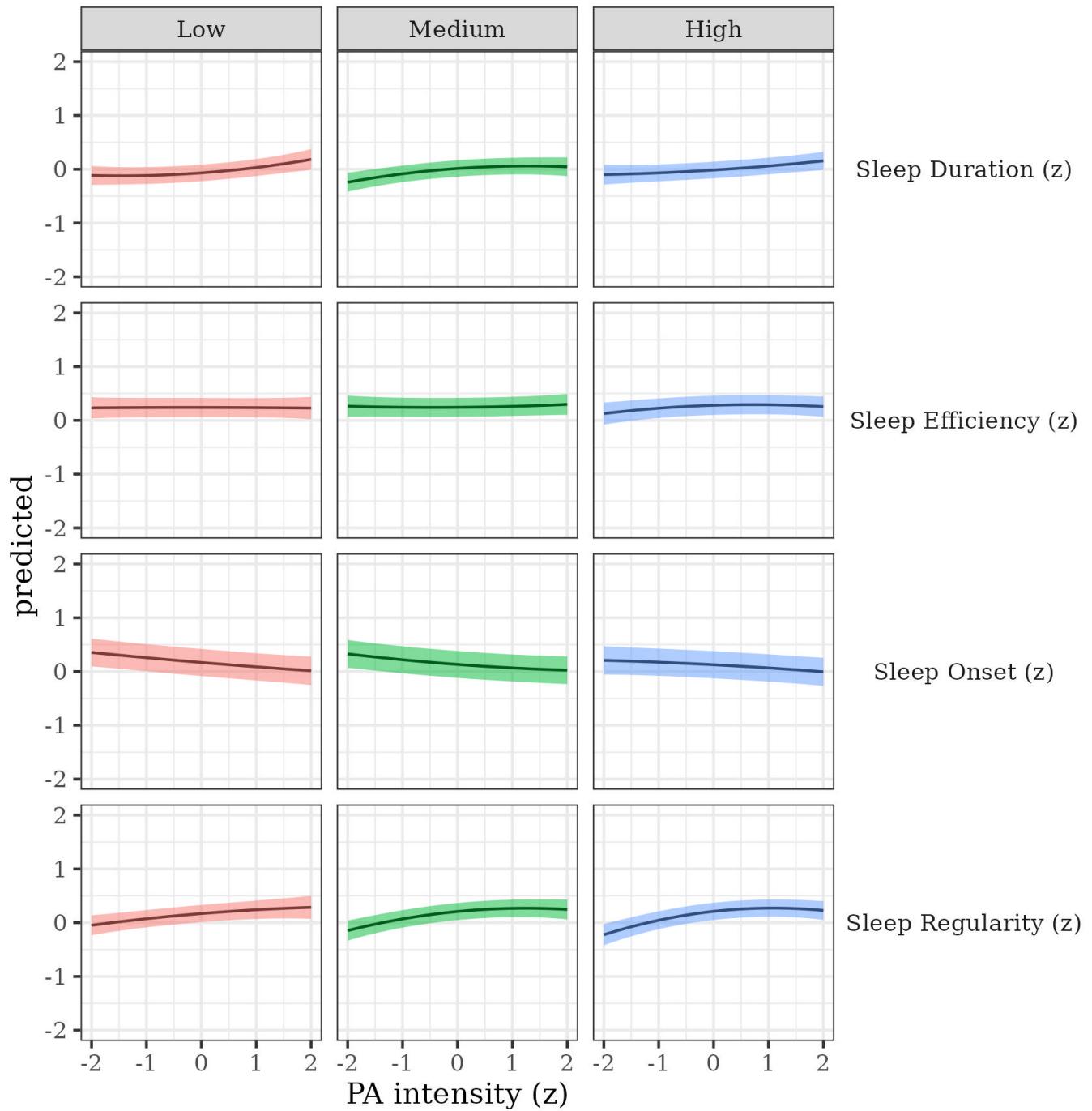


Figure 19. Sleep metrics on Physical activity intensity moderated by SES

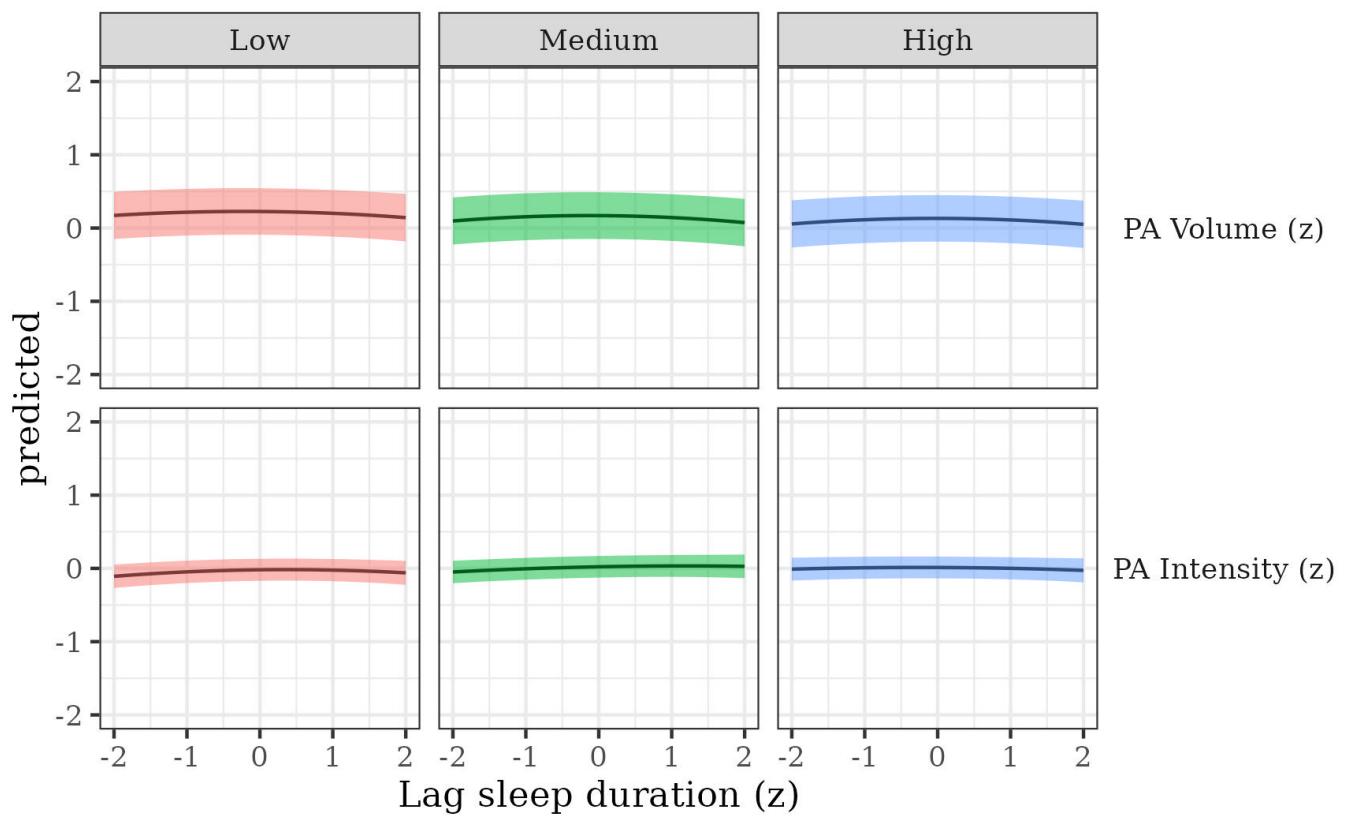


Figure 20. Physical activity by sleep duration moderated by SES

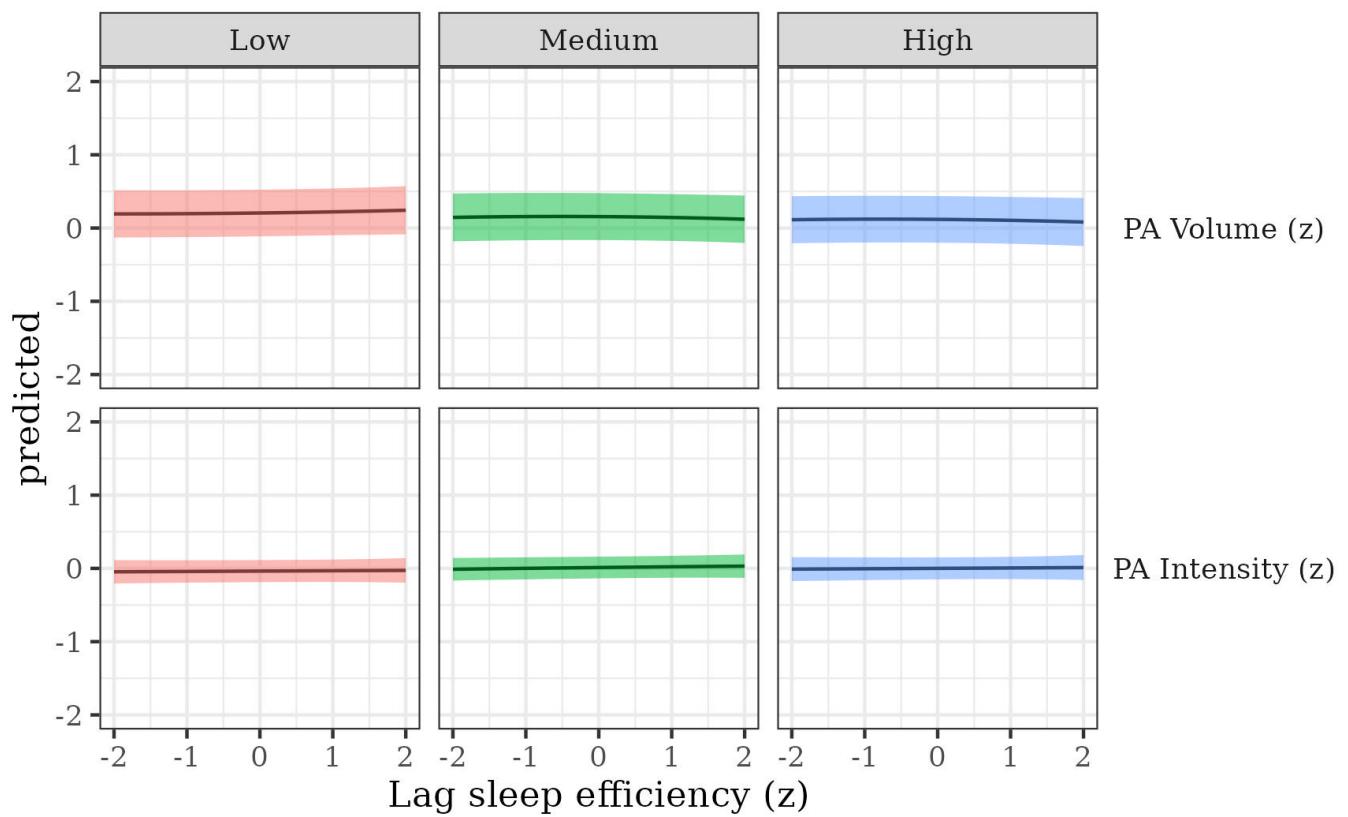


Figure 21. Physical activity by sleep efficiency moderated by SES

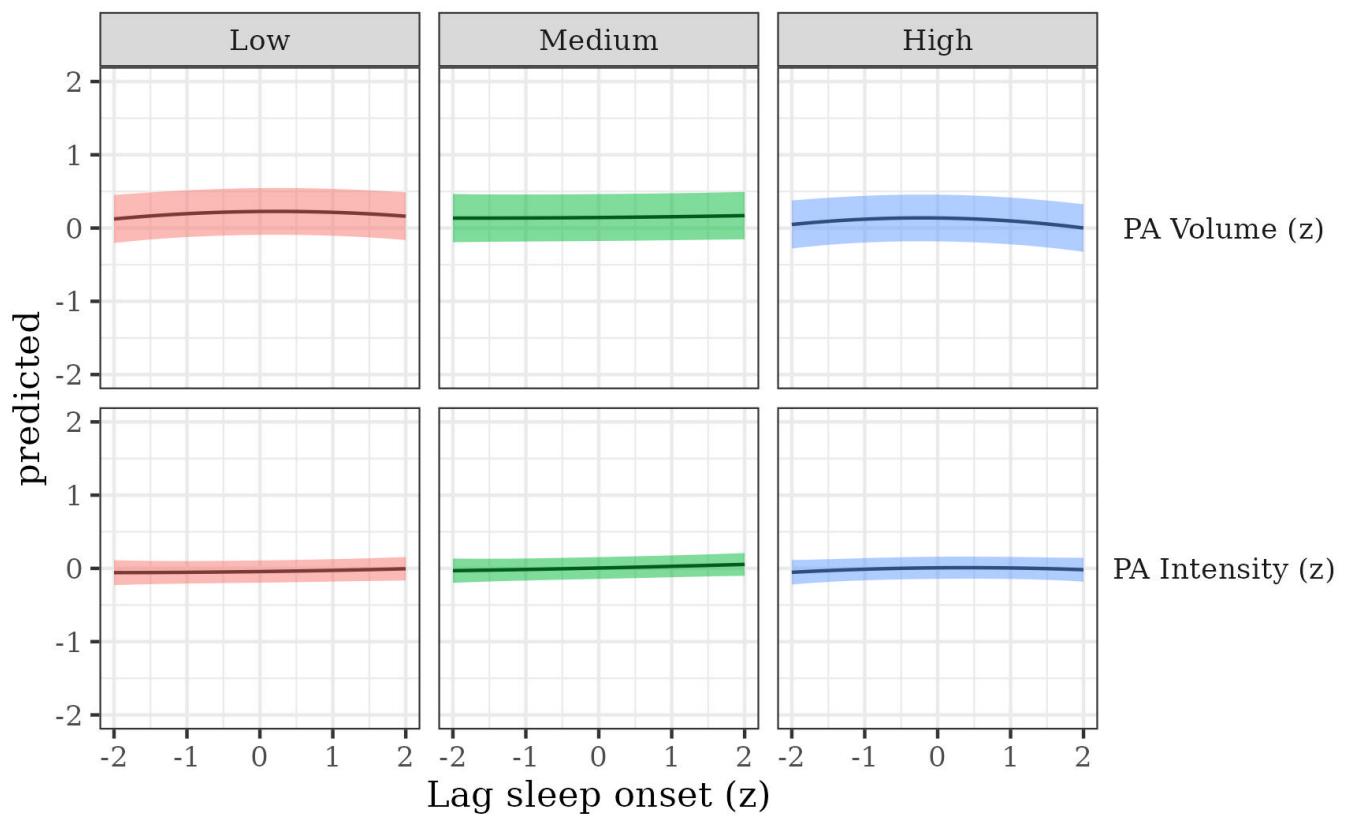


Figure 22. Physical activity by sleep onset moderated by SES

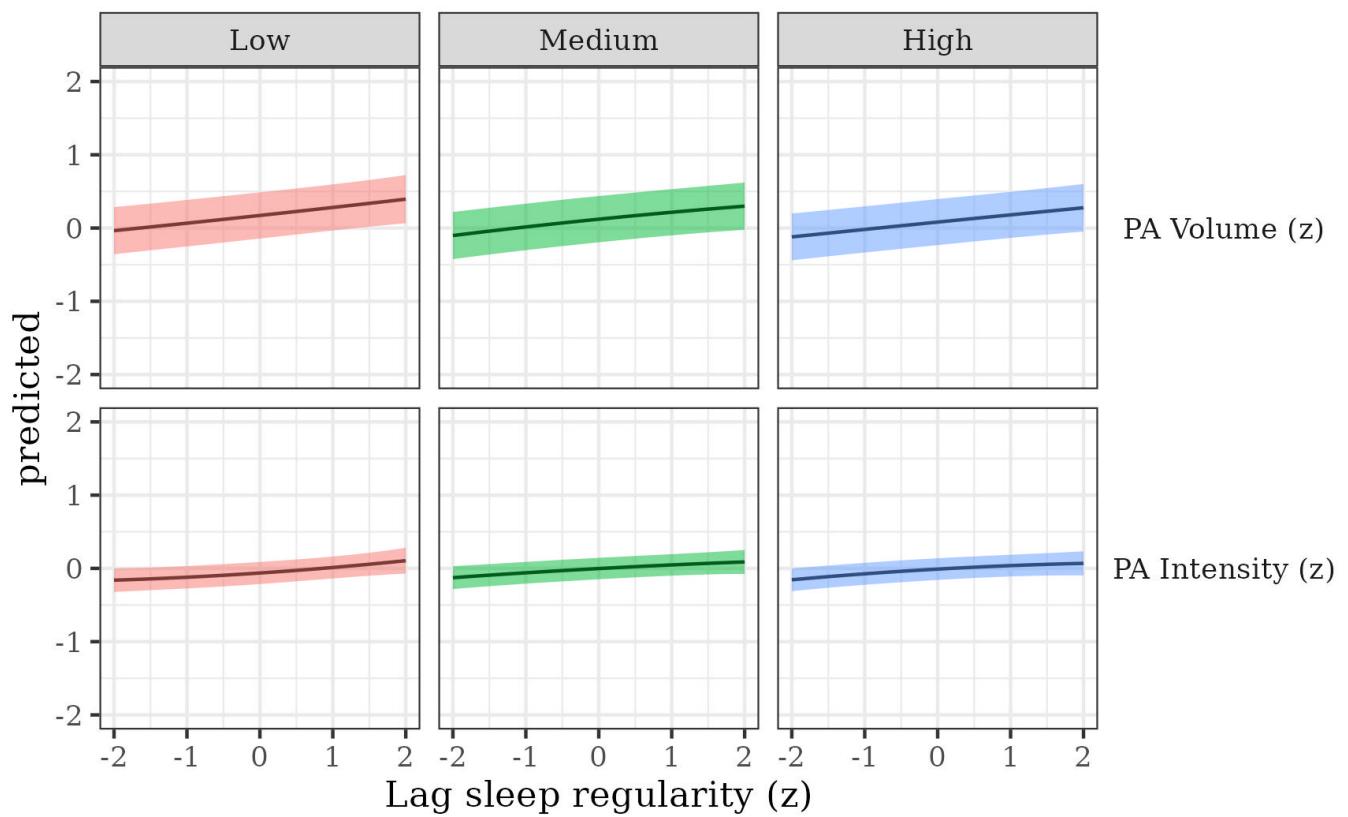


Figure 23. Physical activity by sleep regularity moderated by SES

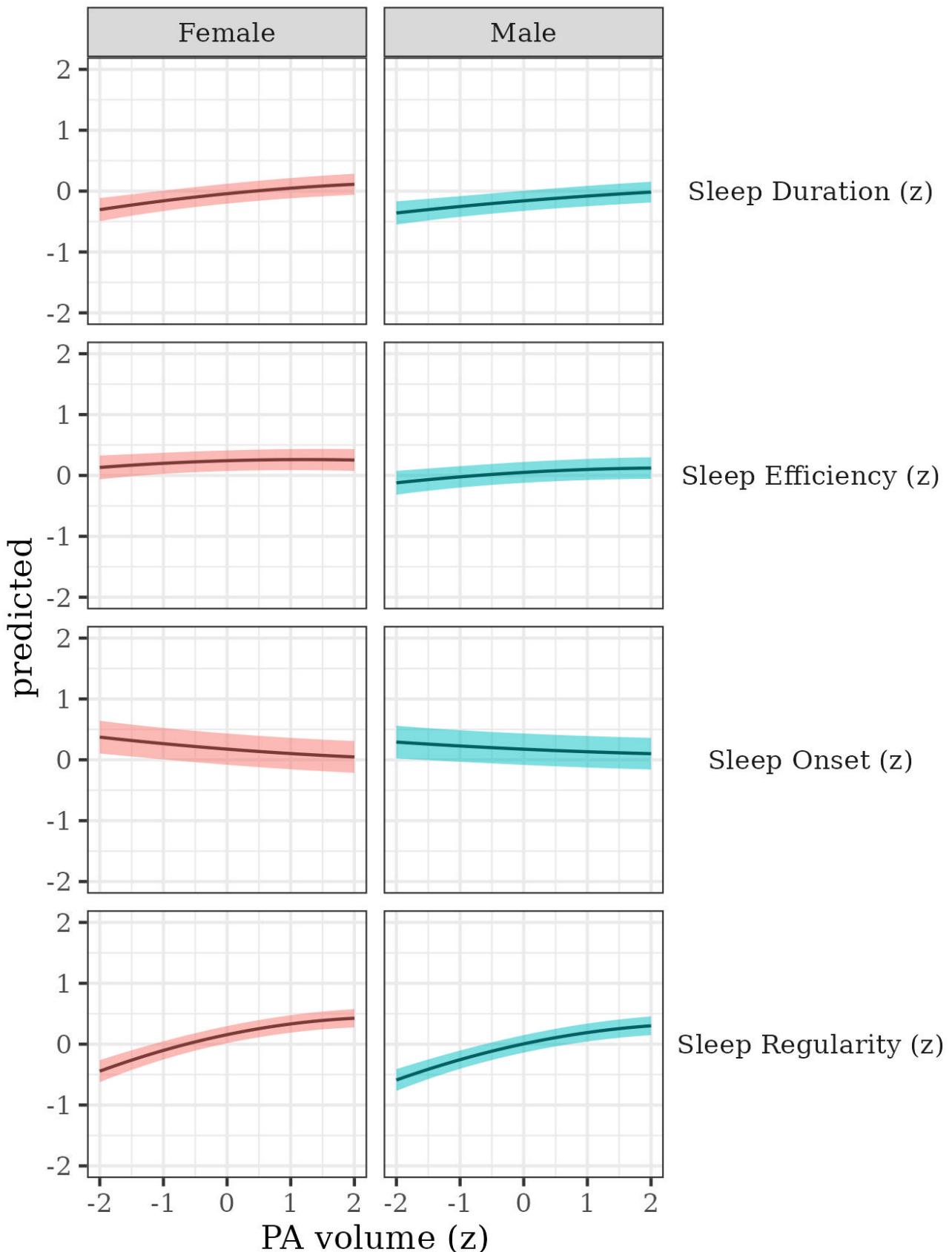


Figure 24. Sleep metrics on Physical activity volume by sex

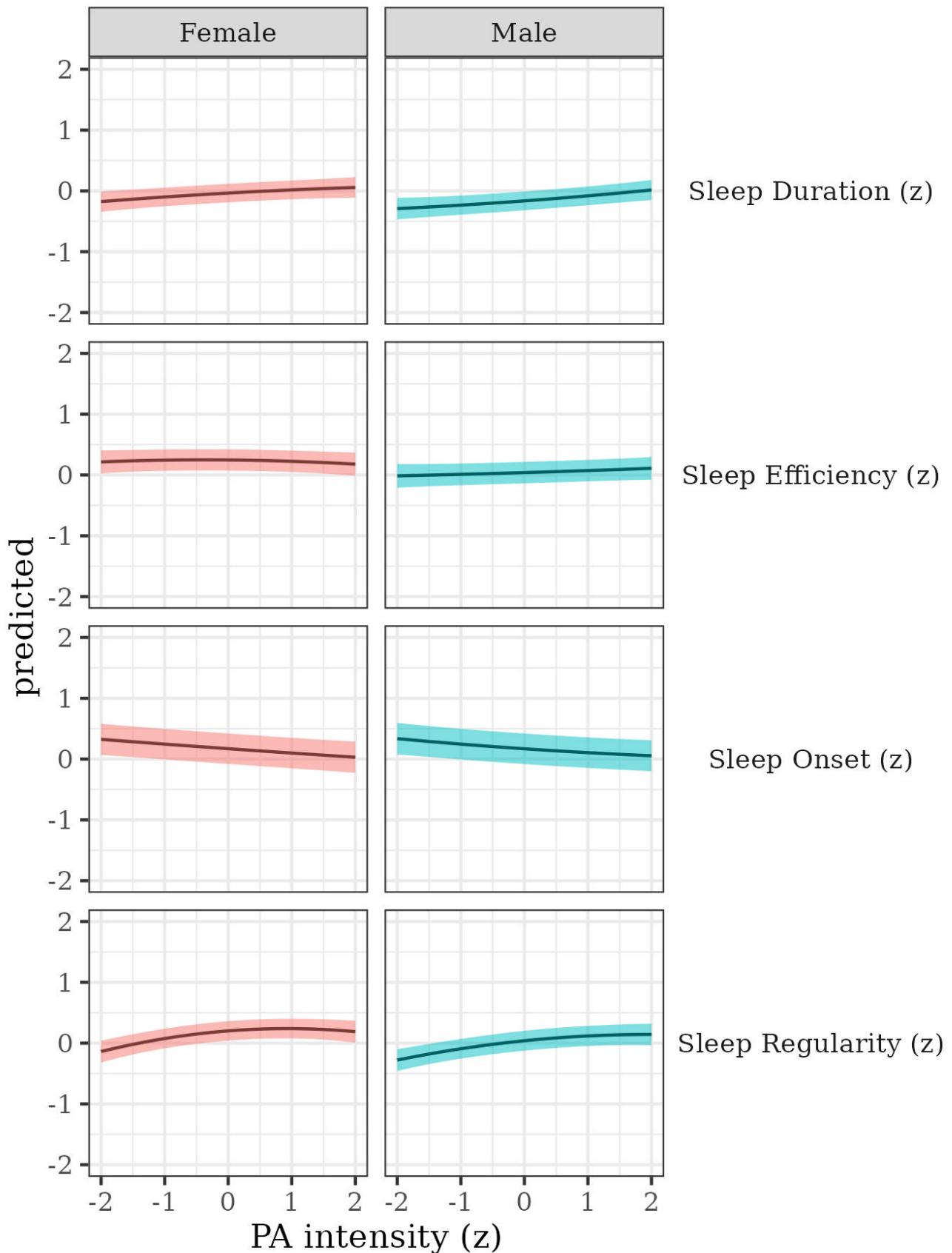


Figure 25. Sleep metrics on Physical activity intensity moderated by sex

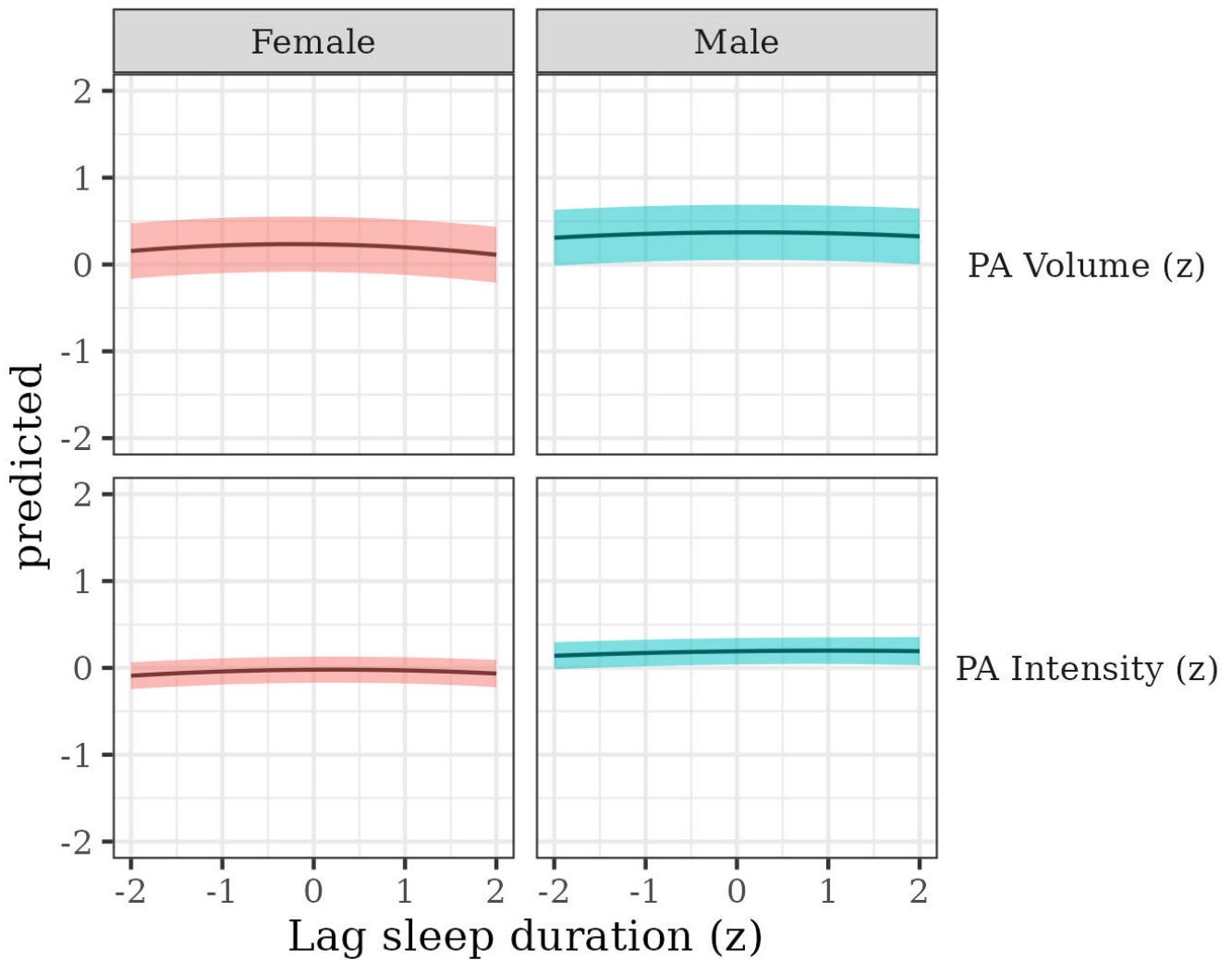


Figure 26. Physical activity by sleep duration moderated by sex

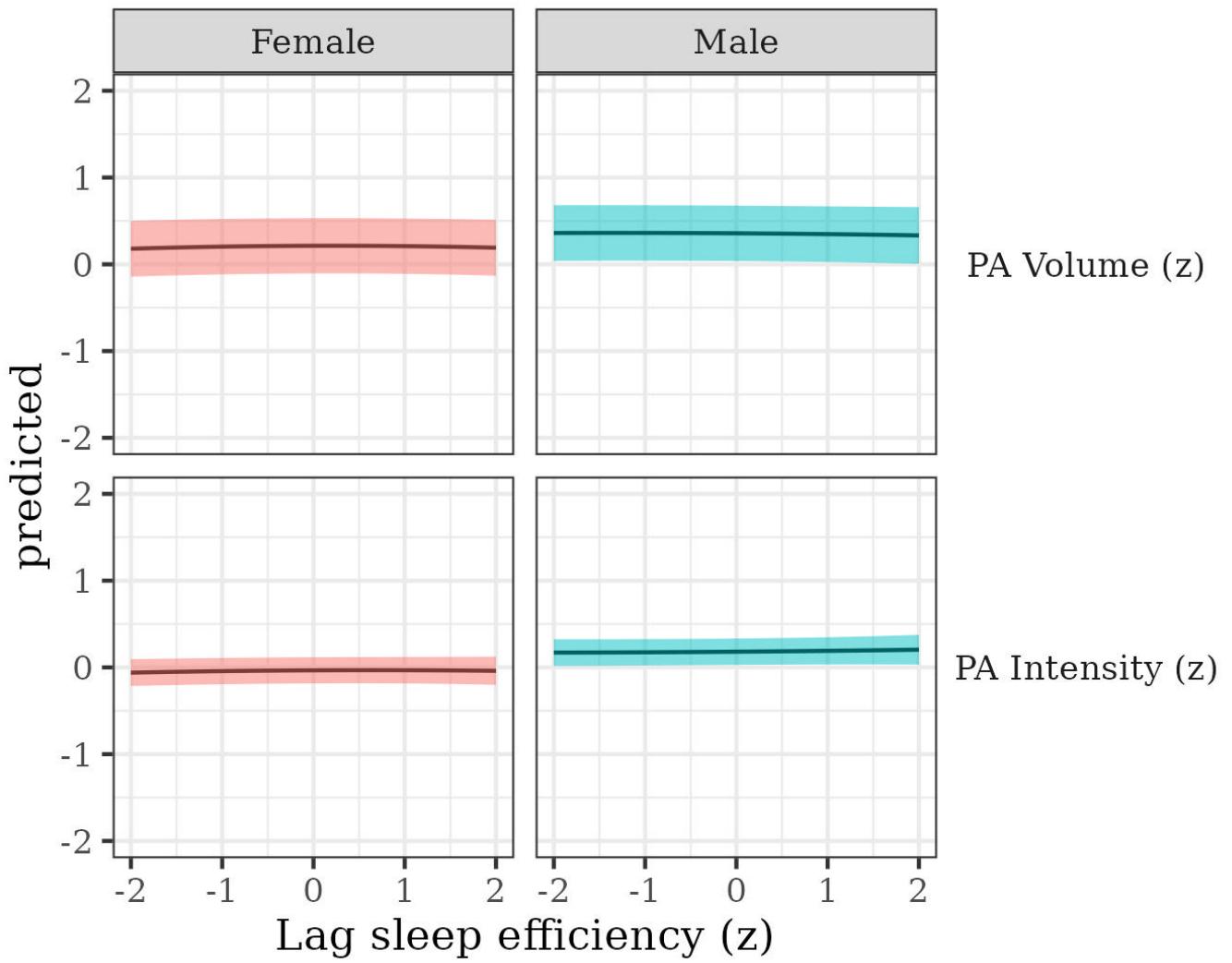


Figure 27. Physical activity by sleep efficiency moderated by sex

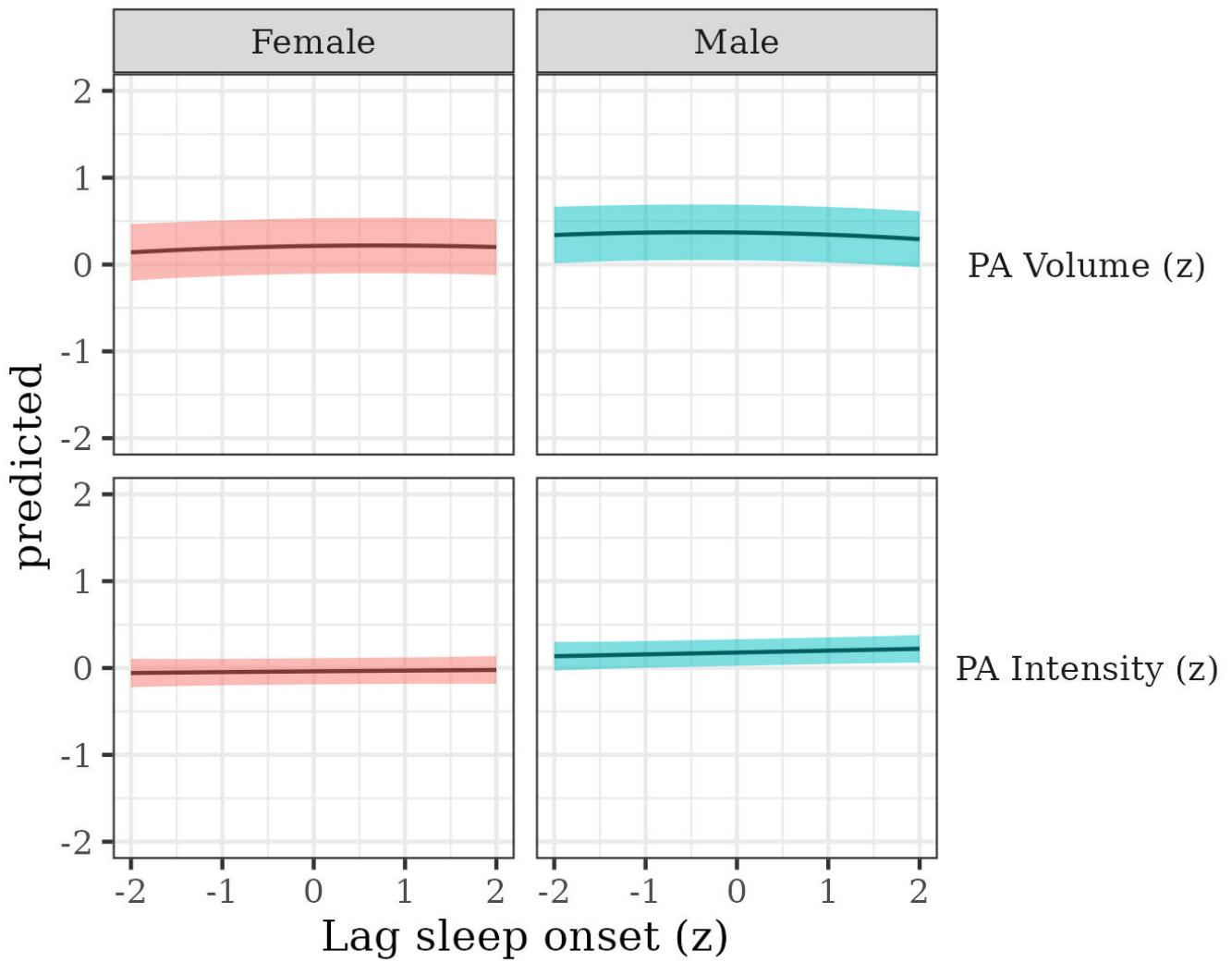


Figure 28. Physical activity by sleep onset moderated by sex

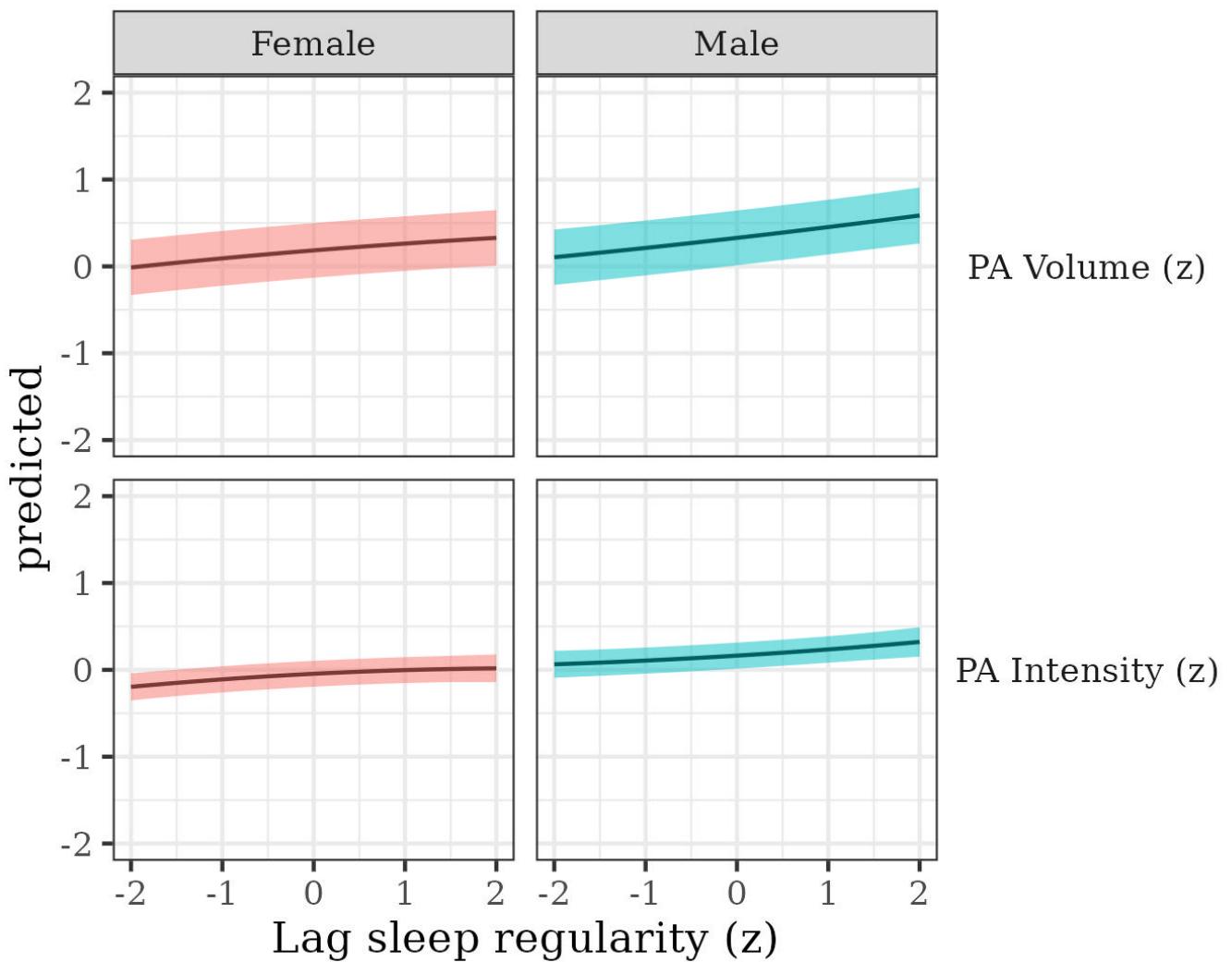


Figure 29. Physical activity by sleep regularity moderated by sex

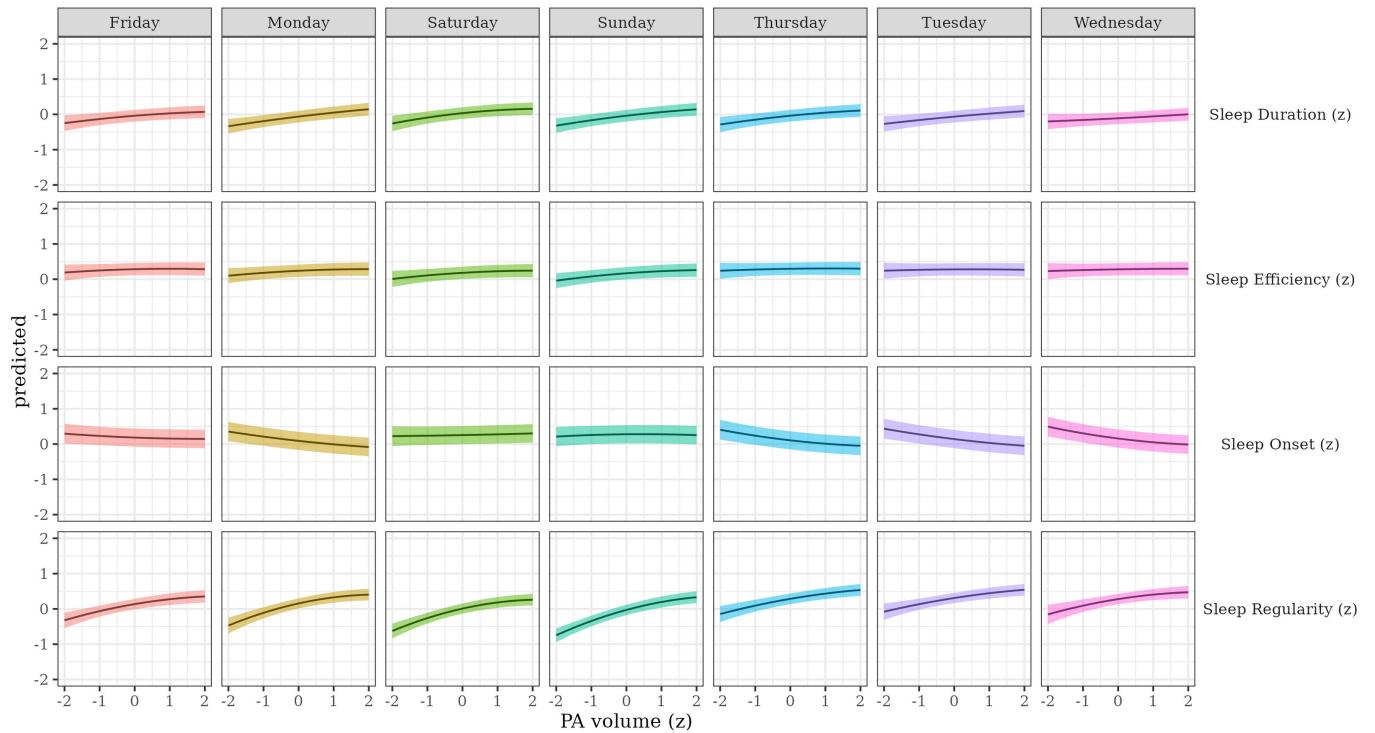


Figure 30. Sleep metrics on Physical activity volume by weekday

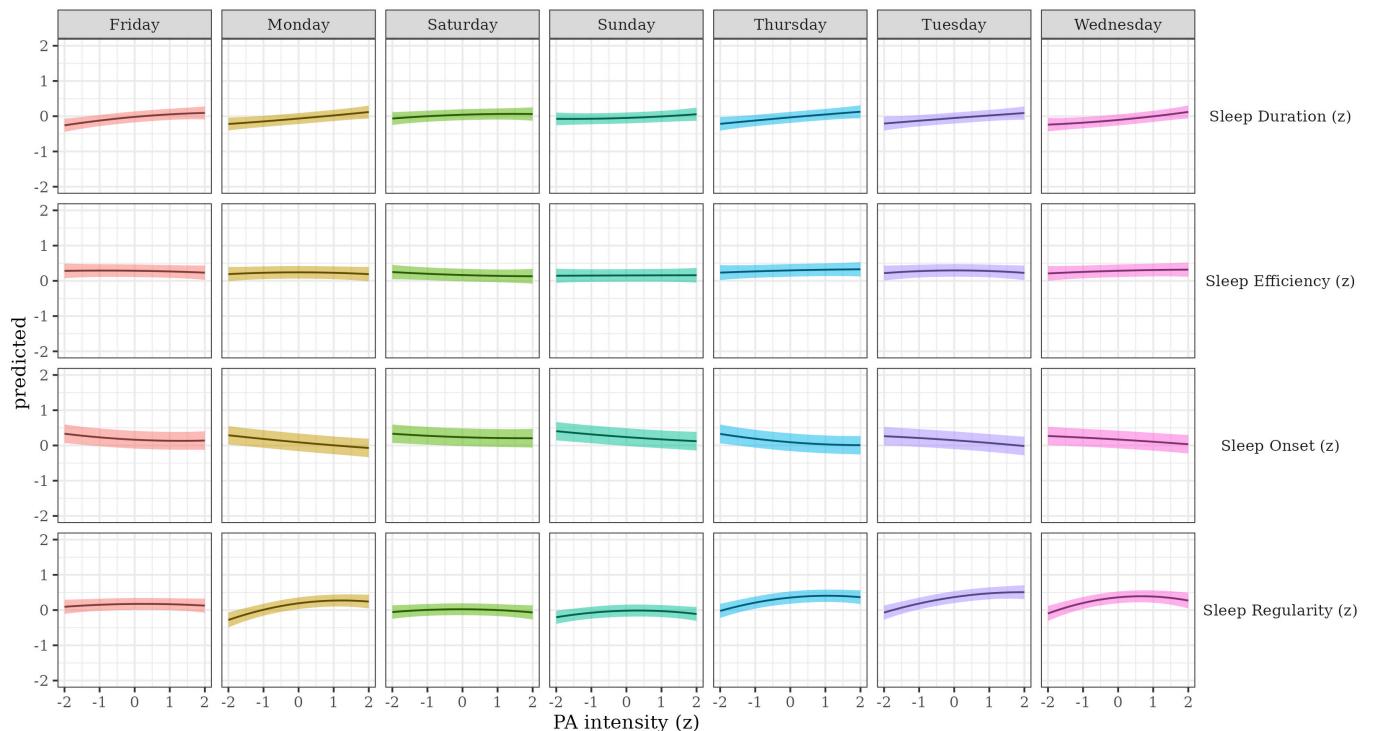


Figure 31. Sleep metrics on Physical activity intensity moderated by weekday

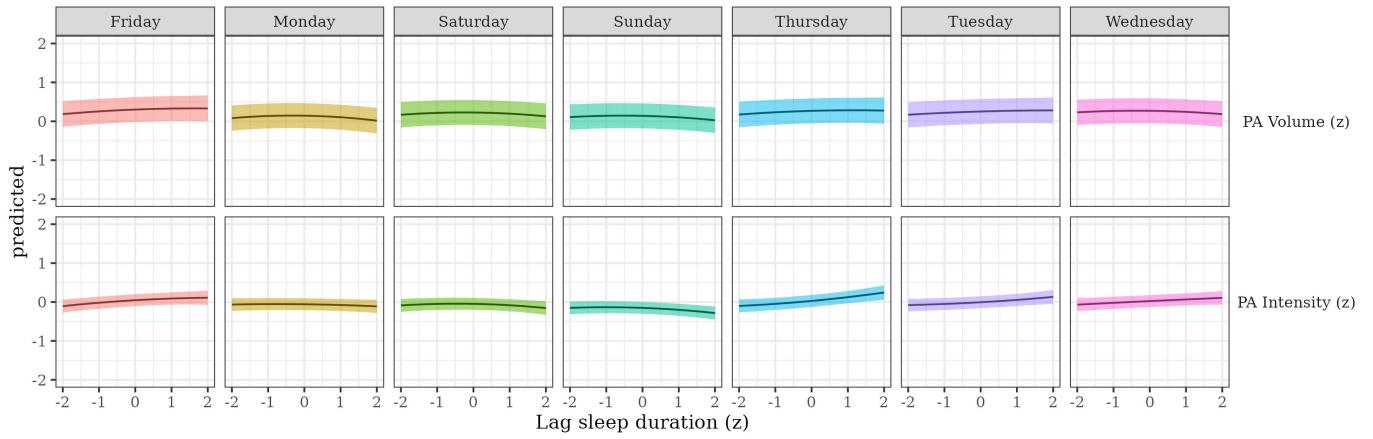


Figure 32. Physical activity by sleep duration moderated by weekday

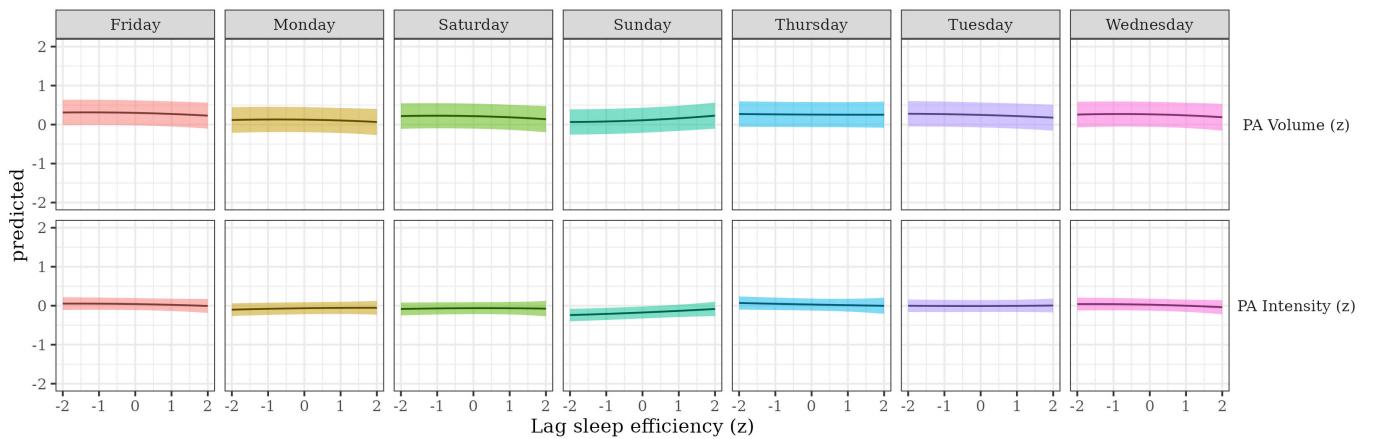


Figure 33. Physical activity by sleep efficiency moderated by weekday

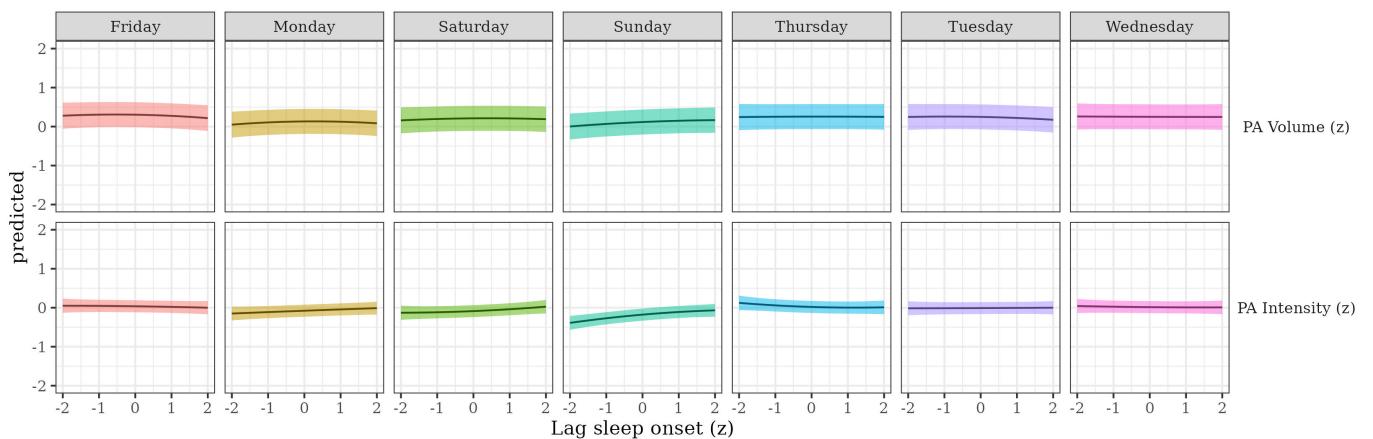


Figure 34. Physical activity by sleep onset moderated by weekday

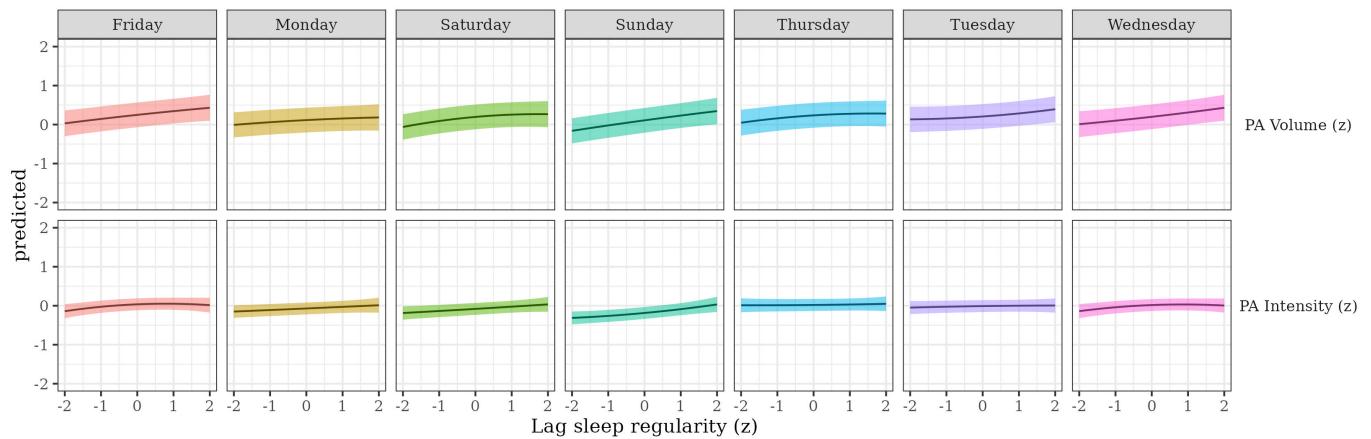


Figure 35. Physical activity by sleep regularity moderated by weekday

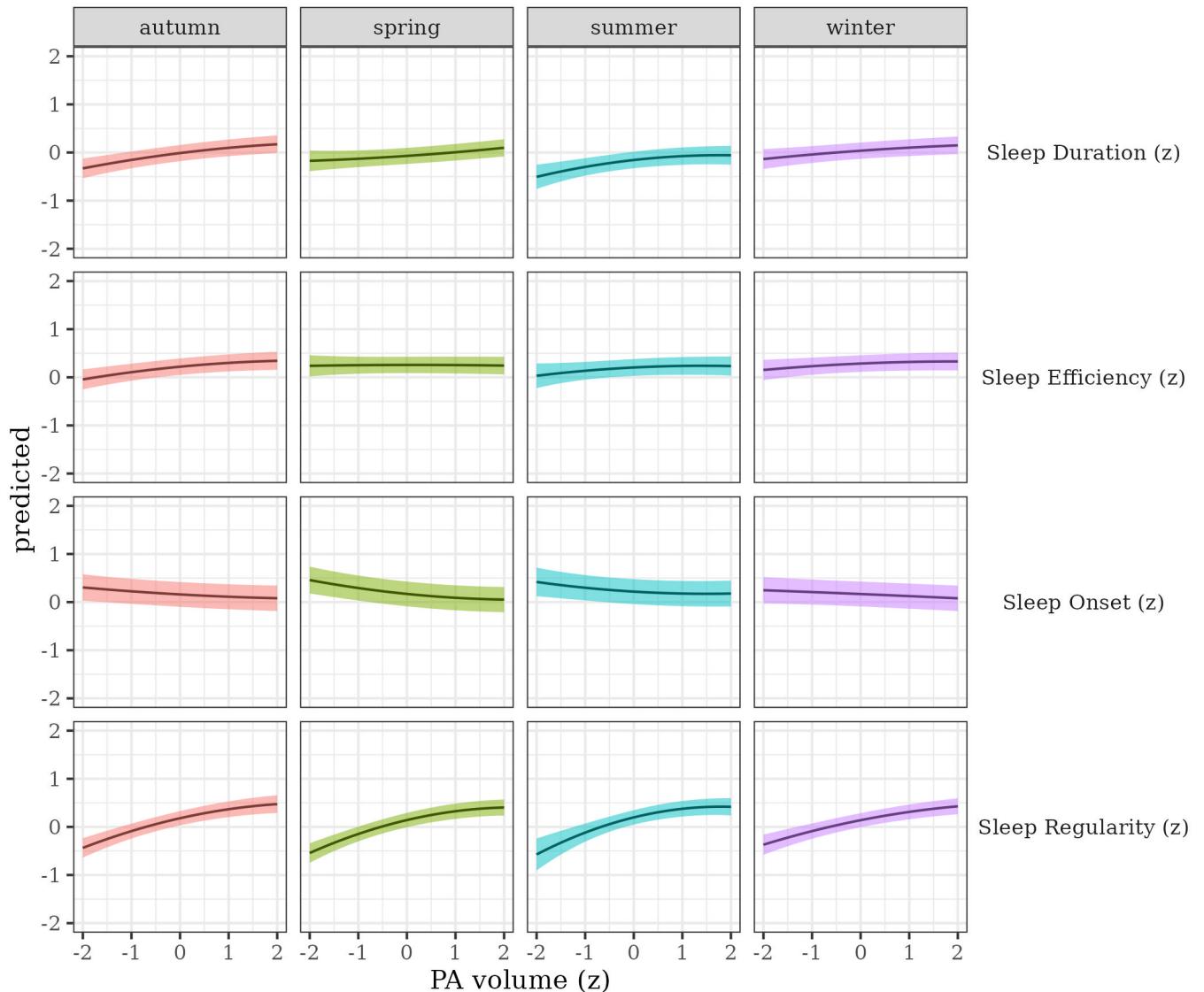


Figure 36. Sleep metrics on Physical activity volume by season

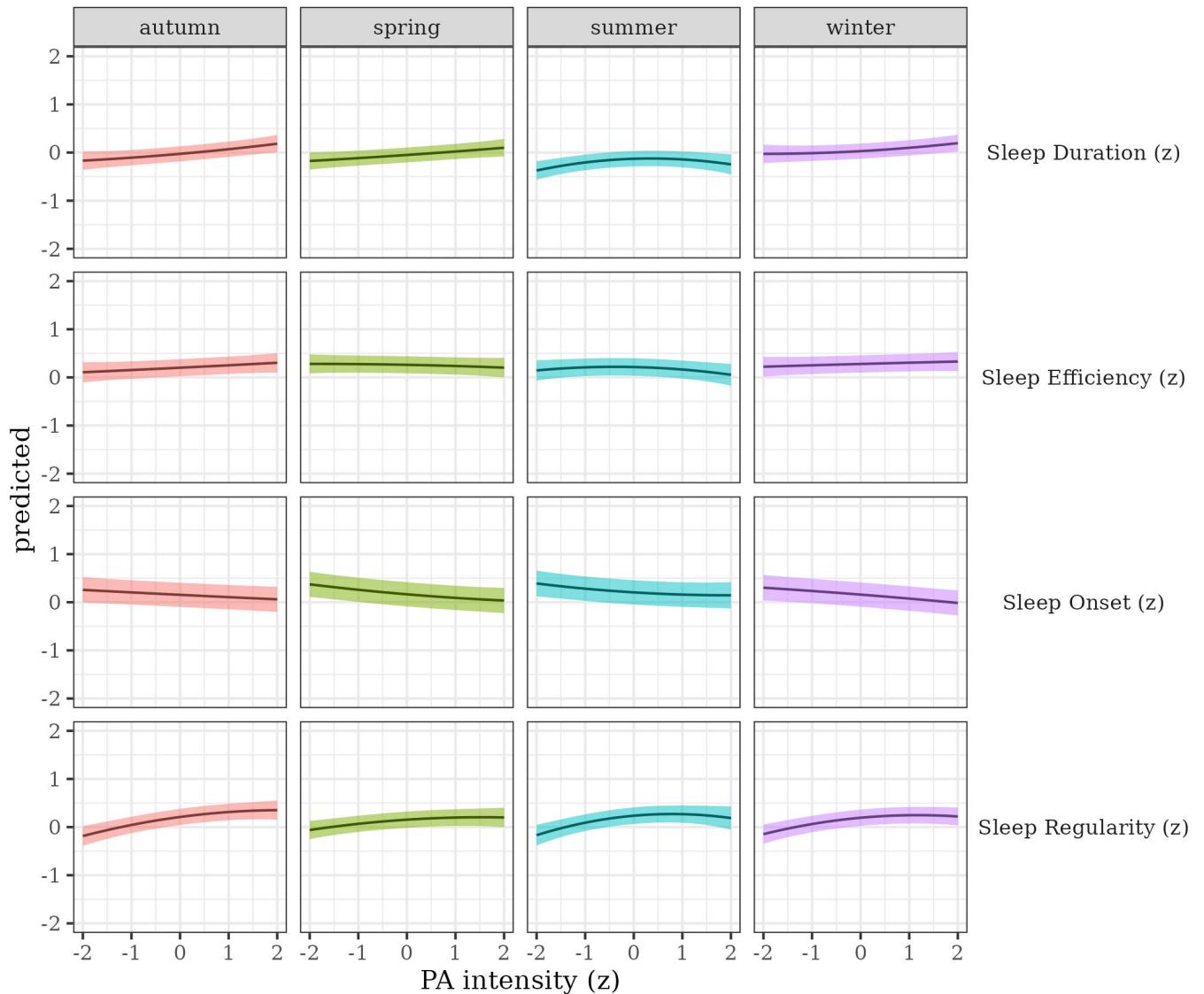


Figure 37. Sleep metrics on Physical activity intensity moderated by season

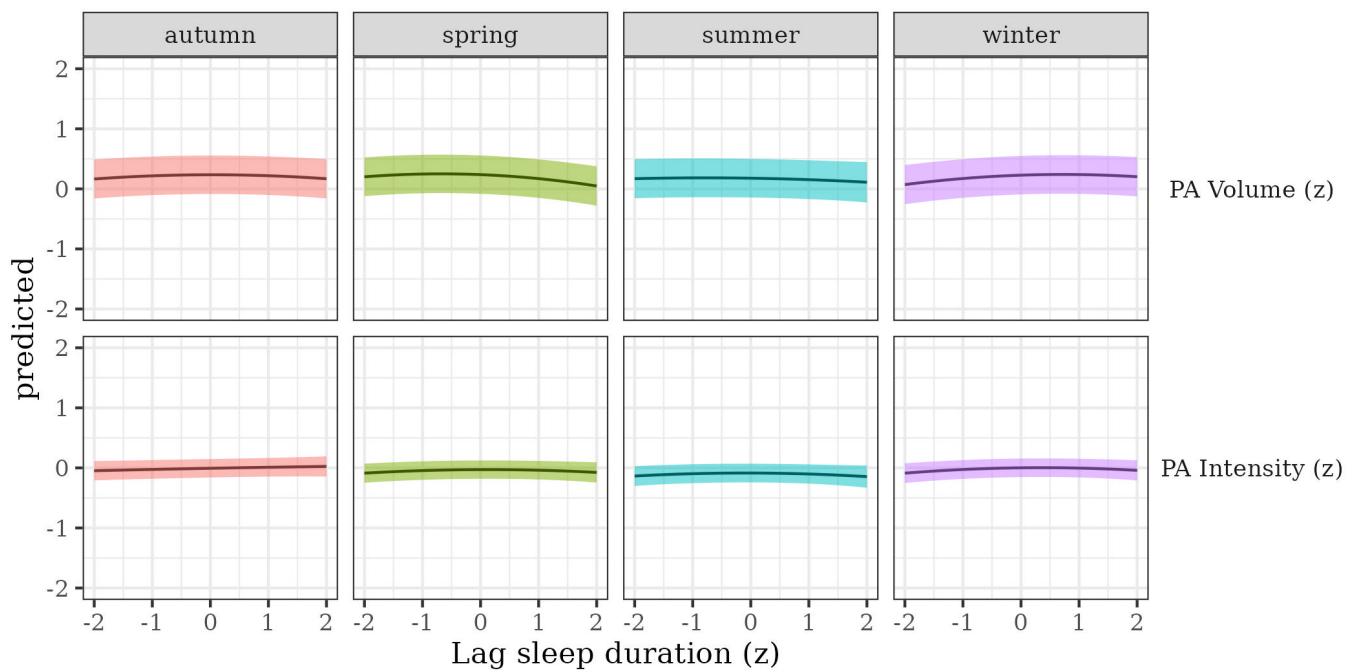


Figure 38. Physical activity by sleep duration moderated by season

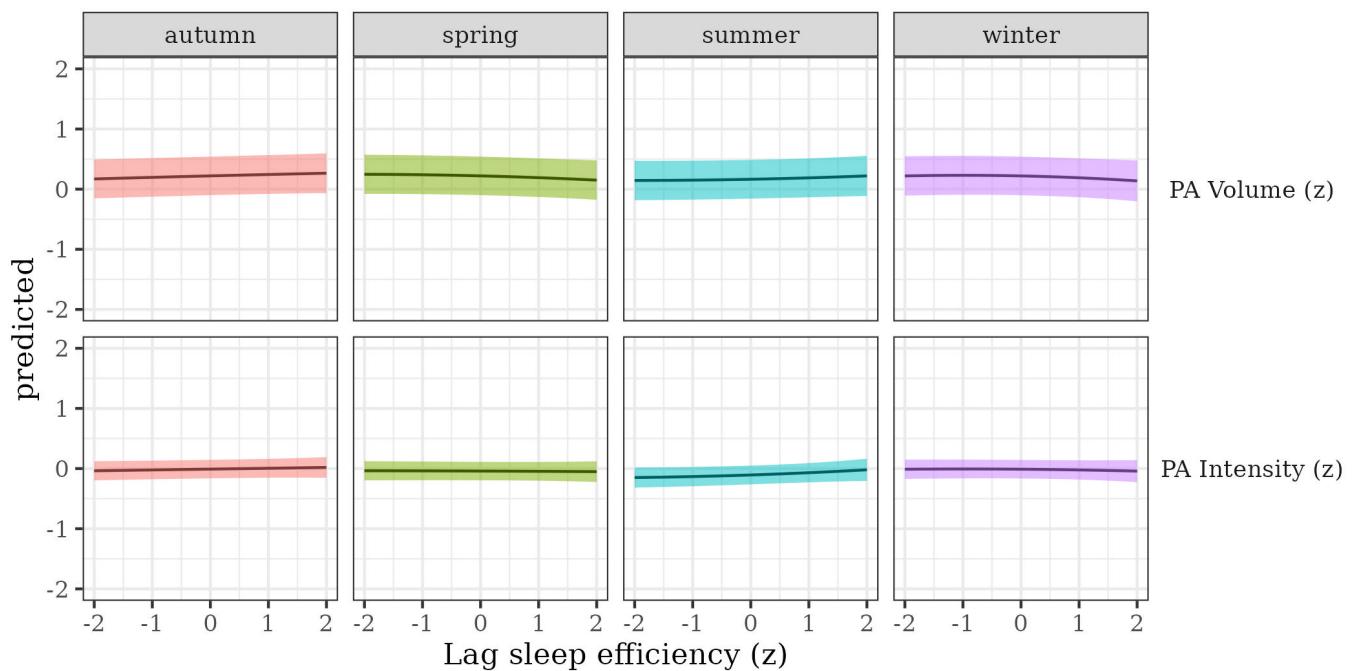


Figure 39. Physical activity by sleep efficiency moderated by season

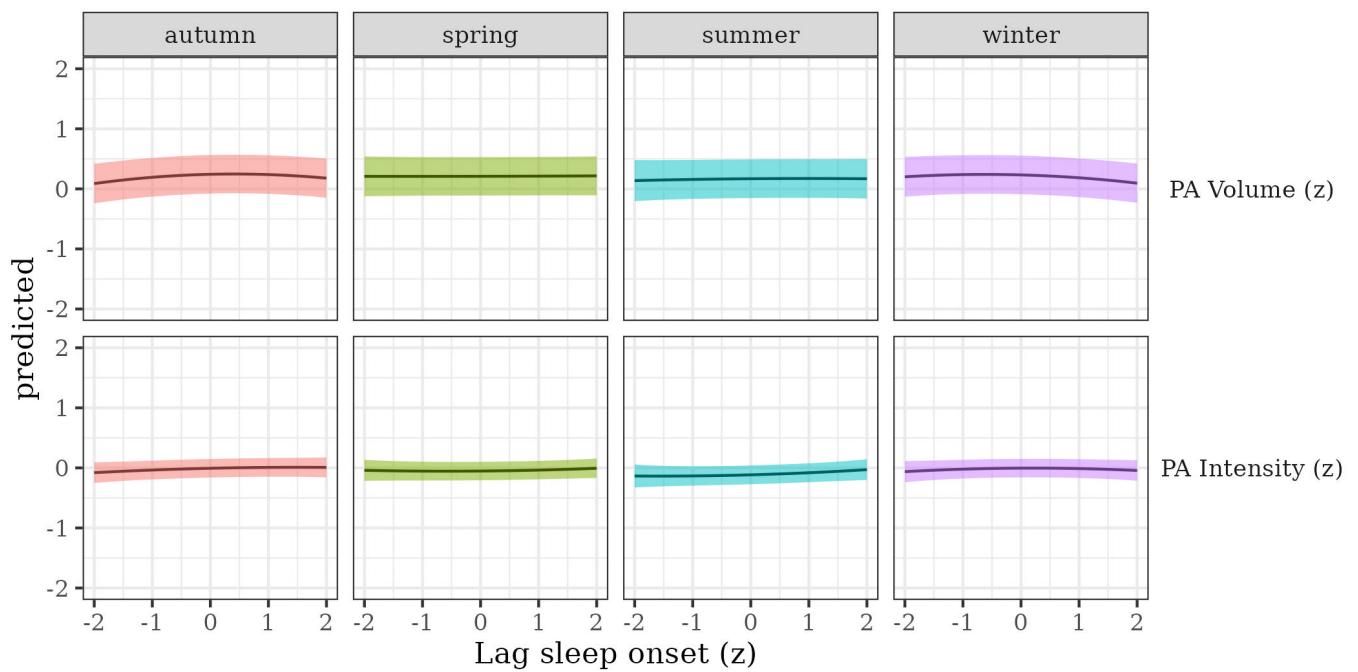


Figure 40. Physical activity by sleep onset moderated by season

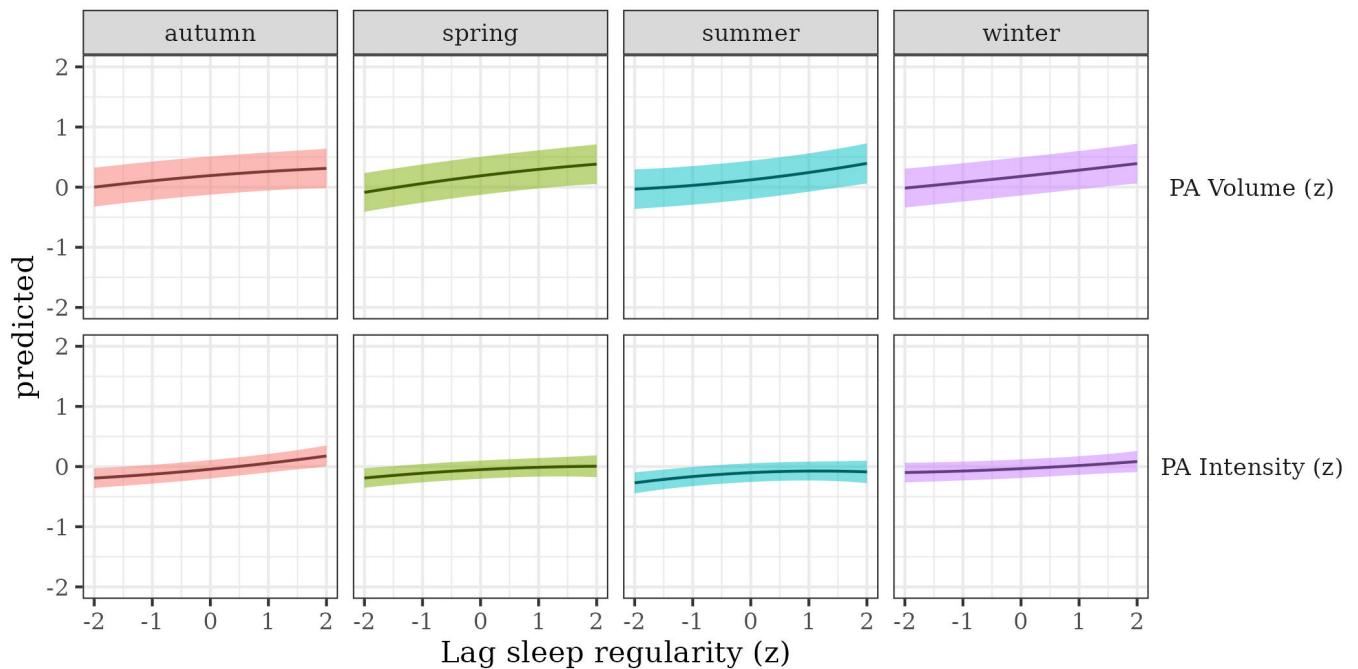


Figure 41. Physical activity by sleep regularity moderated by season

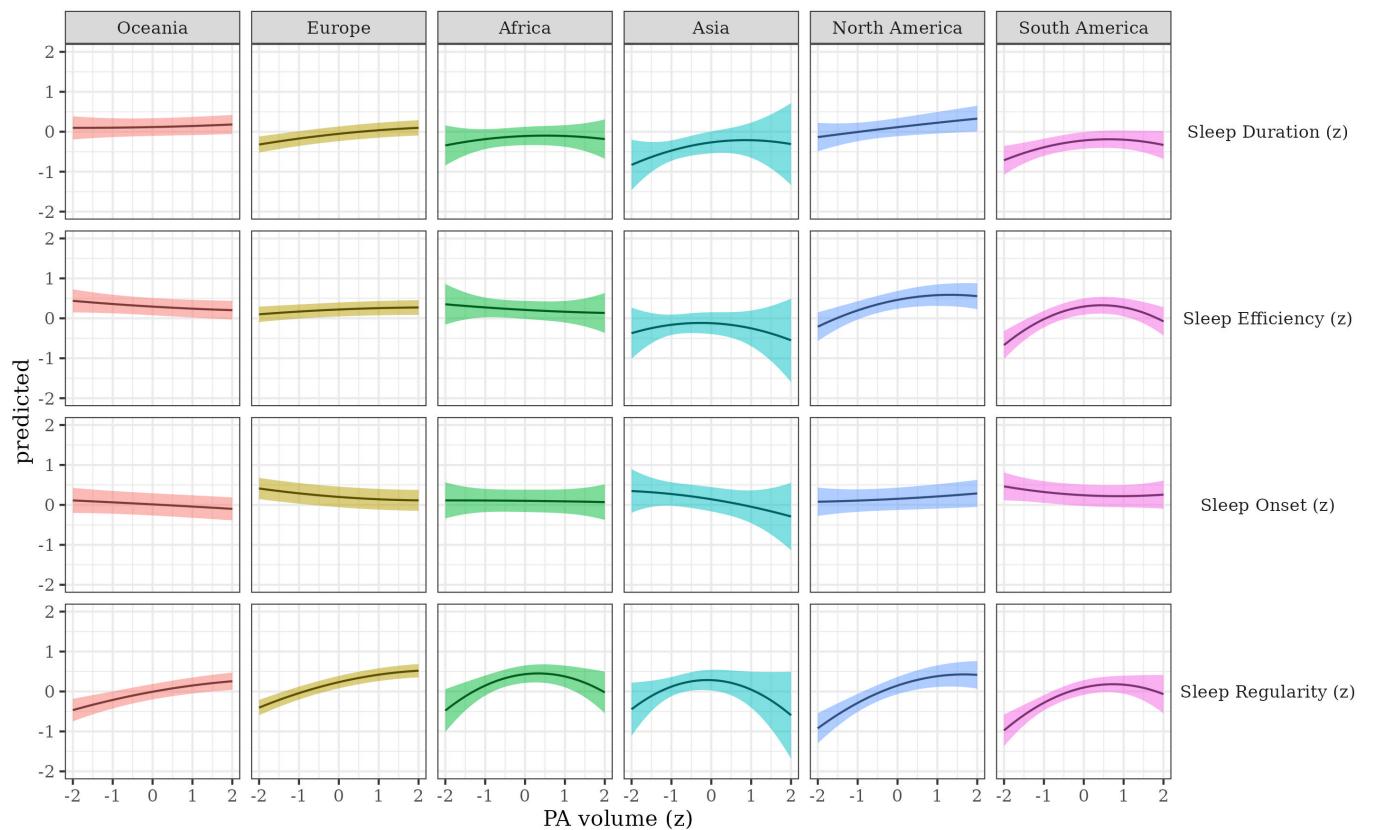


Figure 42. Sleep metrics on Physical activity volume by region

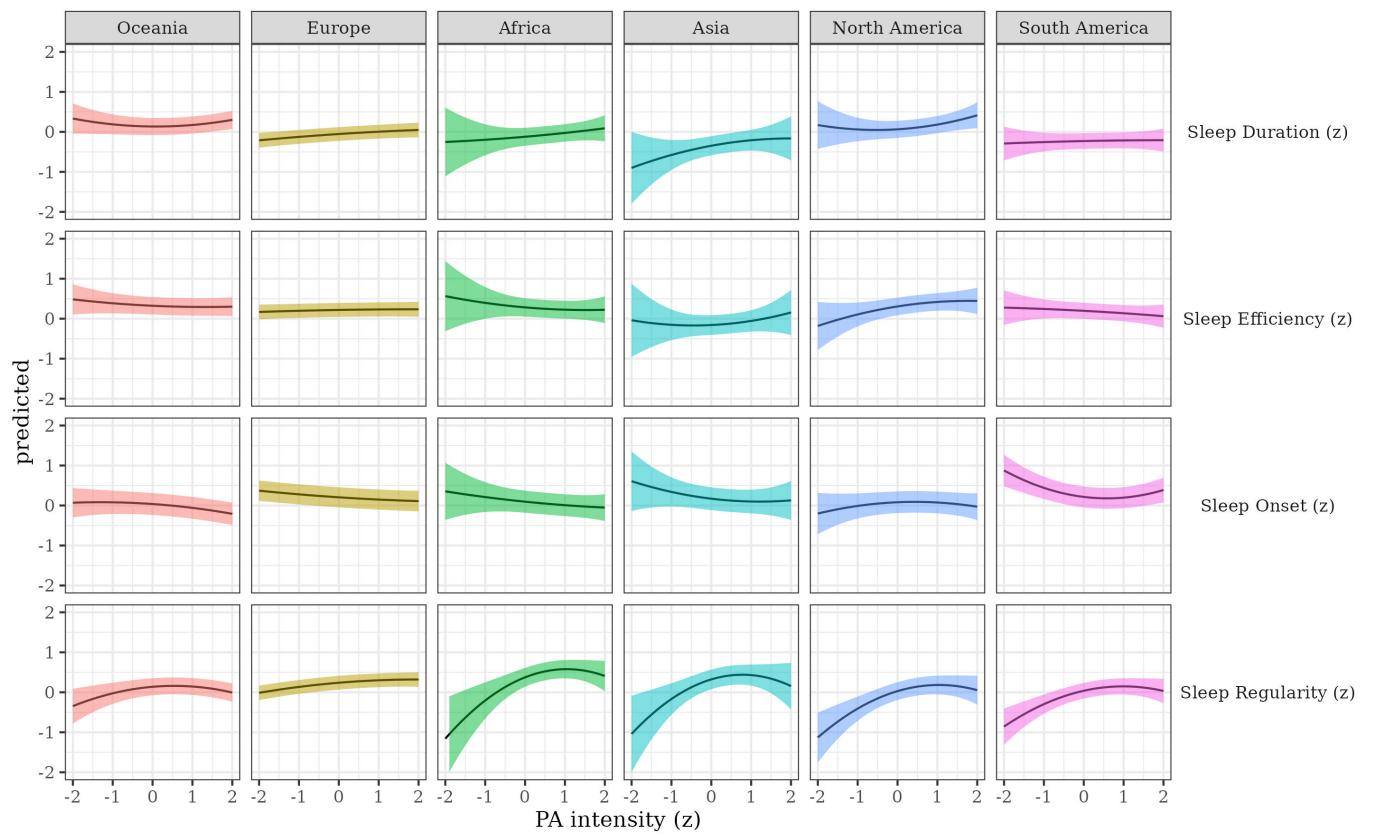


Figure 43. Sleep metrics on Physical activity intensity moderated by region

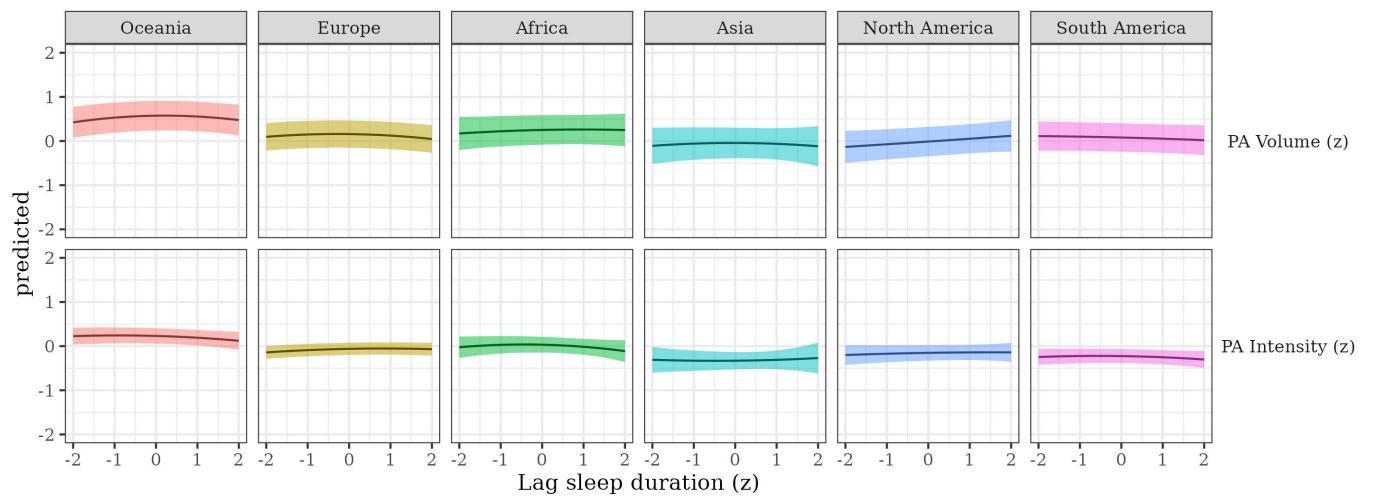


Figure 44. Physical activity by sleep duration moderated by region

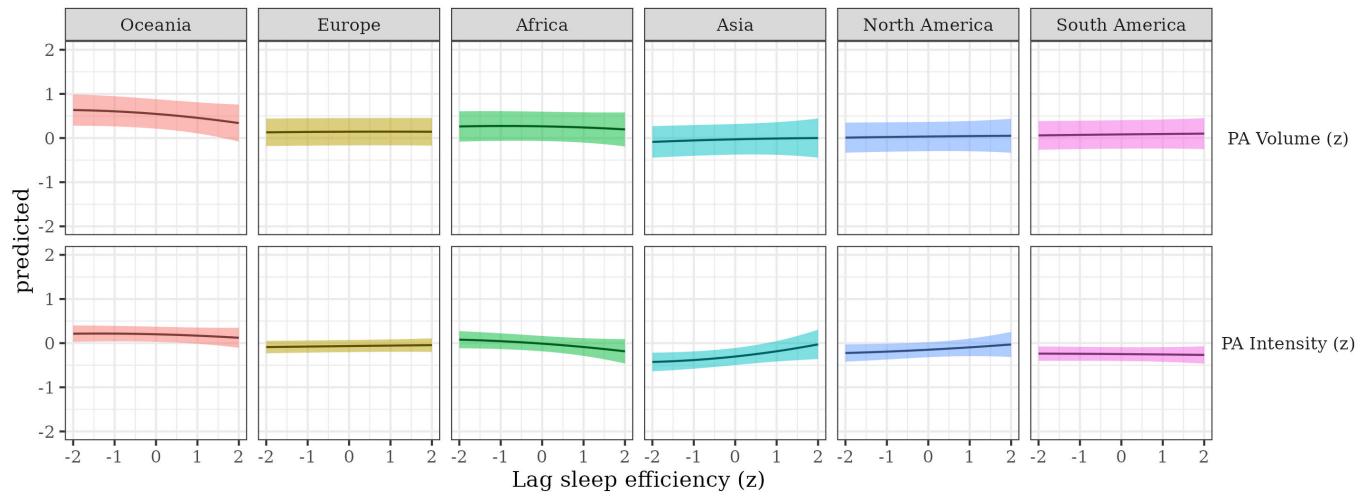


Figure 45. Physical activity by sleep efficiency moderated by region

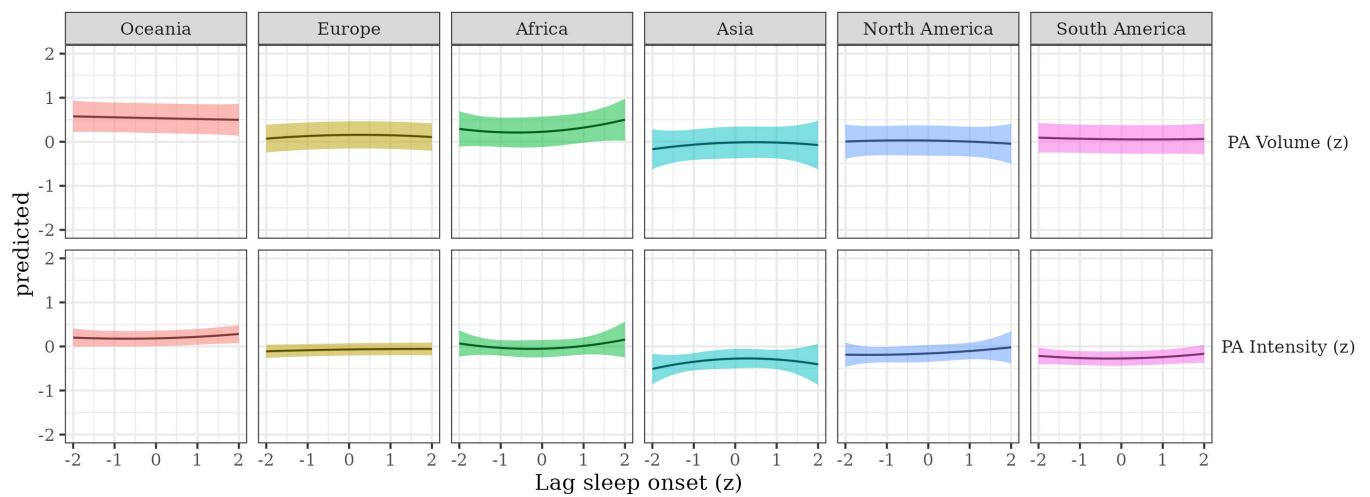


Figure 46. Physical activity by sleep onset moderated by region

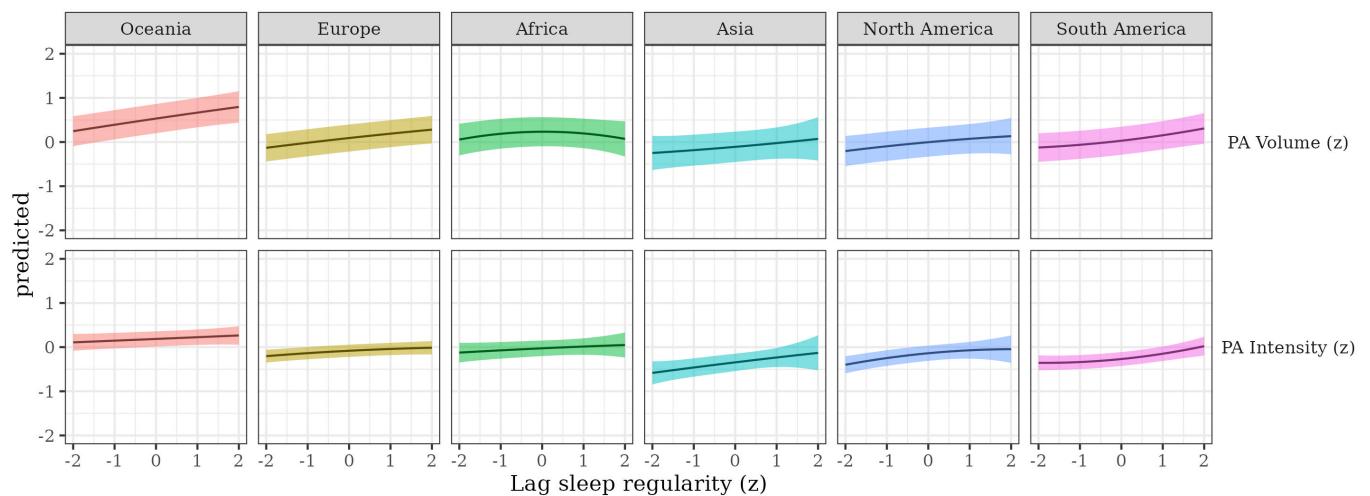


Figure 47. Physical activity by sleep regularity moderated by region

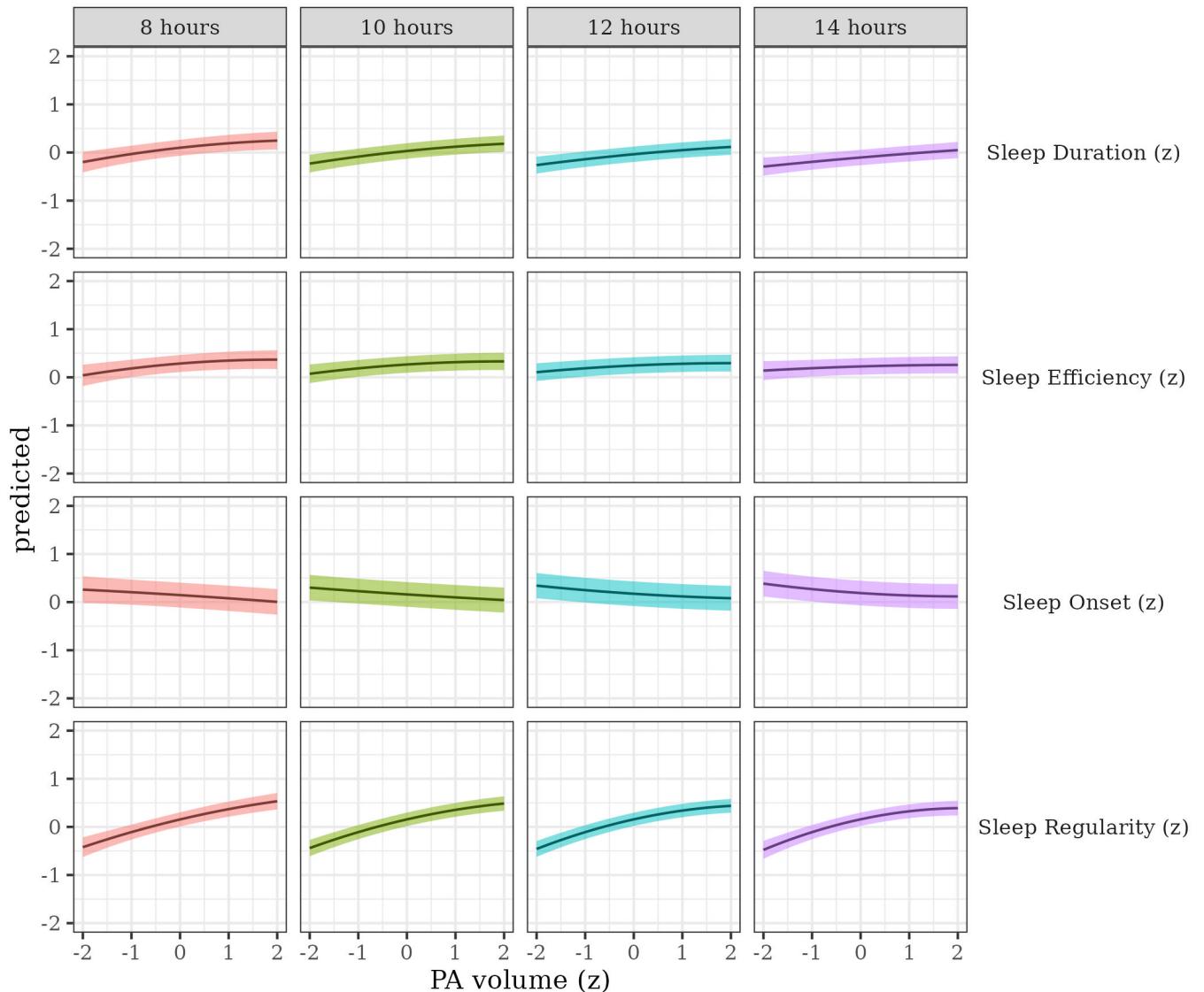


Figure 48. Sleep metrics on Physical activity volume by daylight hours

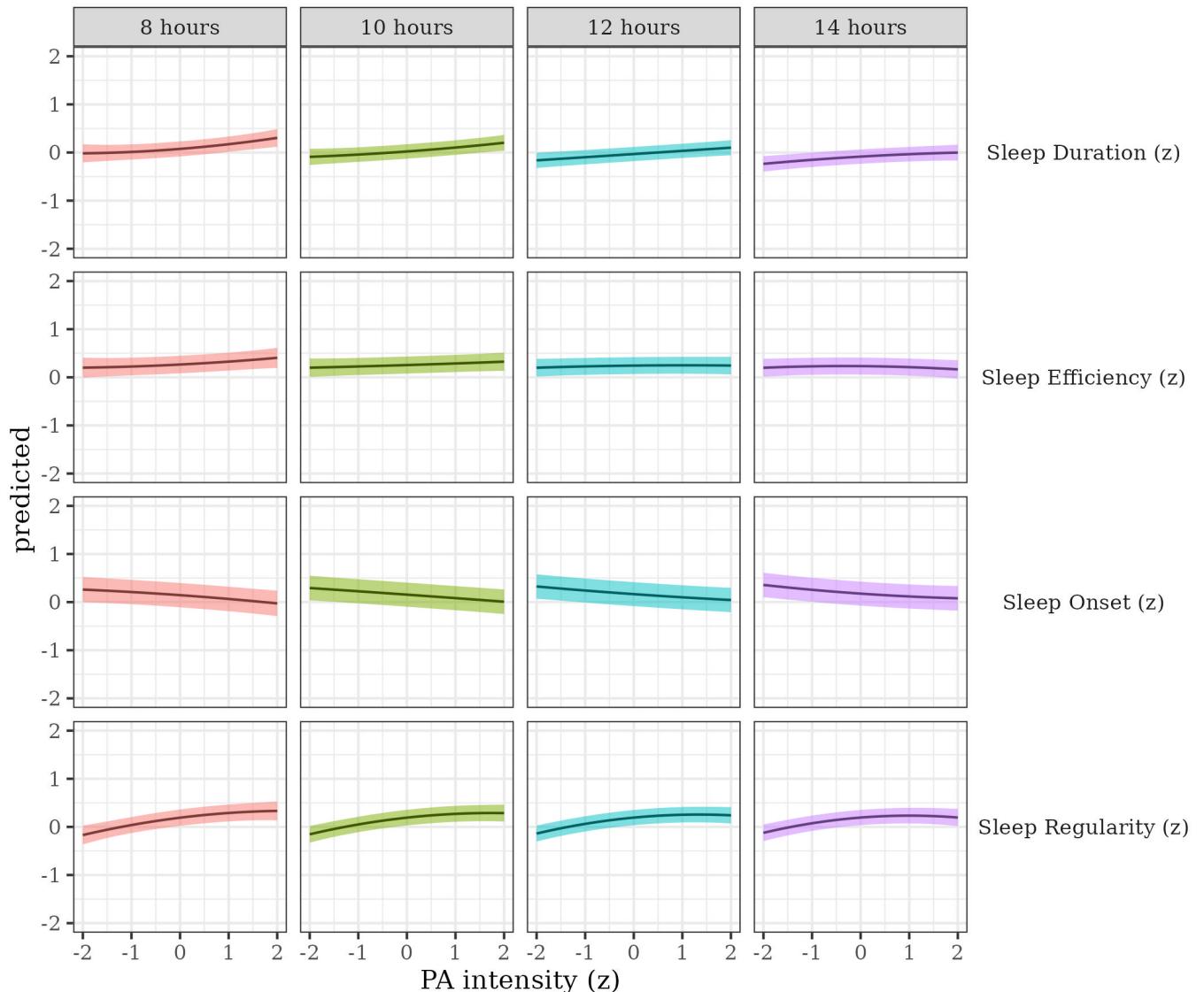


Figure 49. Sleep metrics on Physical activity intensity moderated by daylight hours

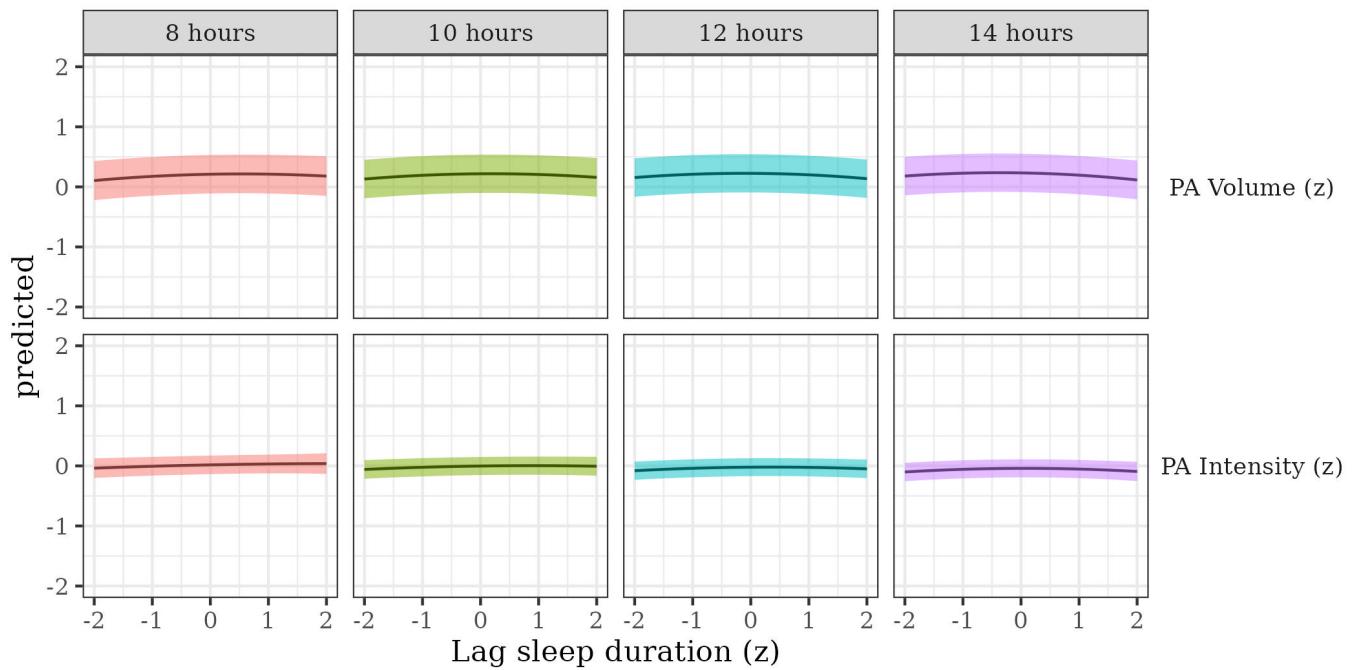


Figure 50. Physical activity by sleep duration moderated by daylight hours

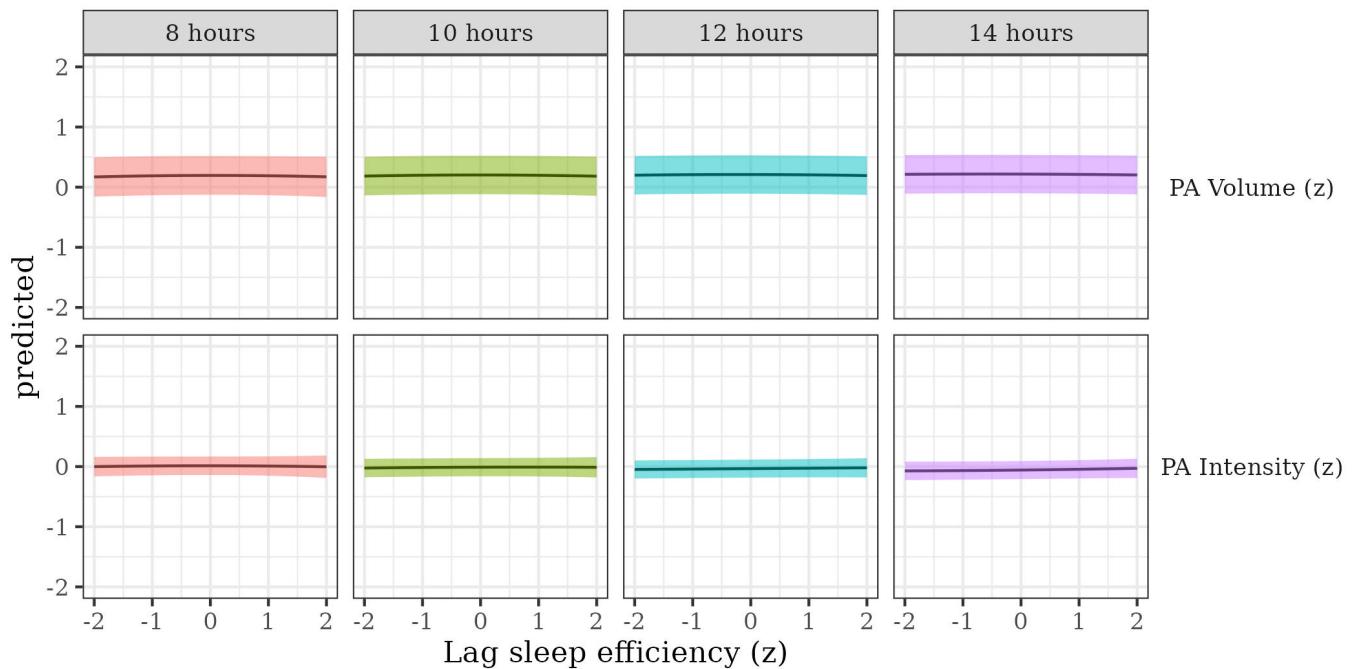


Figure 51. Physical activity by sleep efficiency moderated by daylight hours

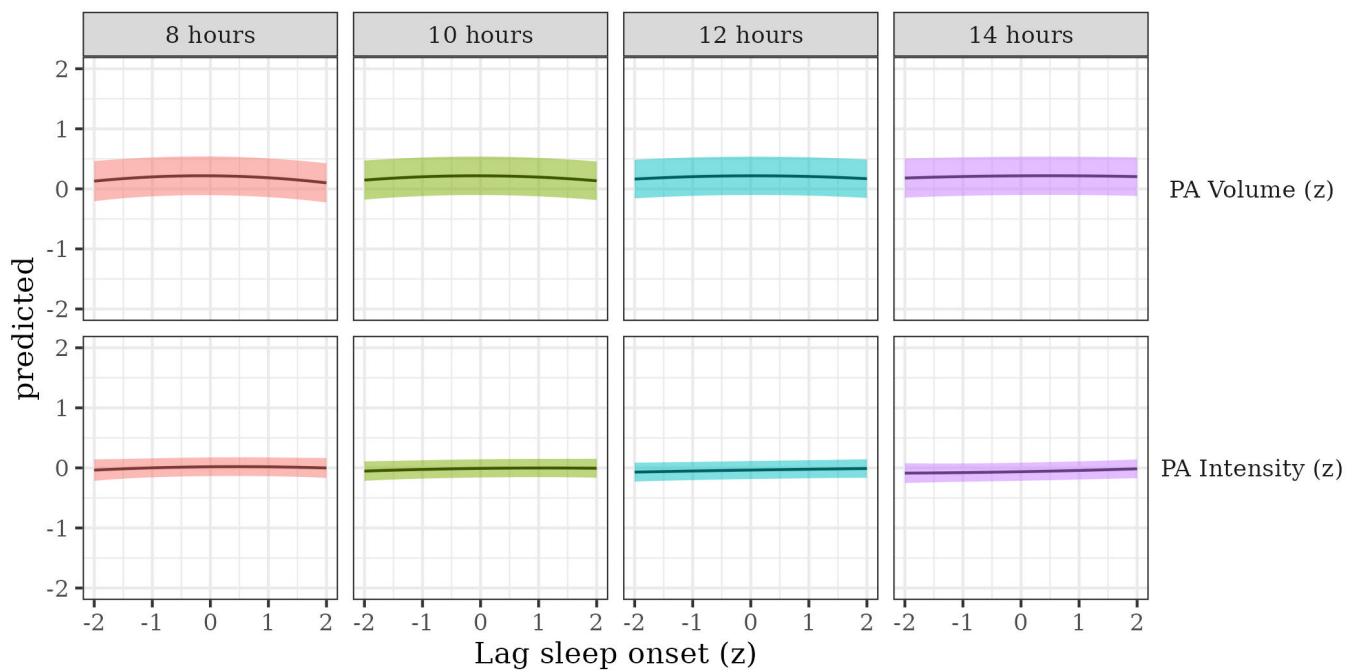


Figure 52. Physical activity by sleep onset moderated by daylight hours

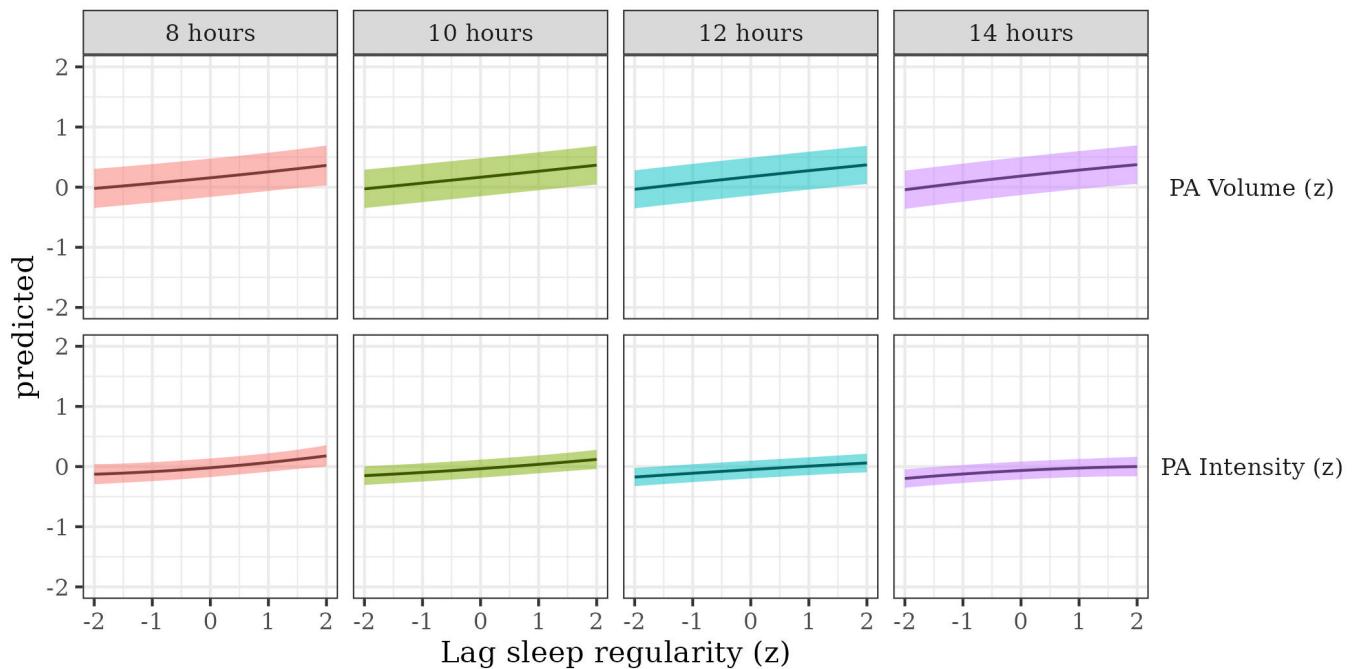


Figure 53. Physical activity by sleep regularity moderated by daylight hours

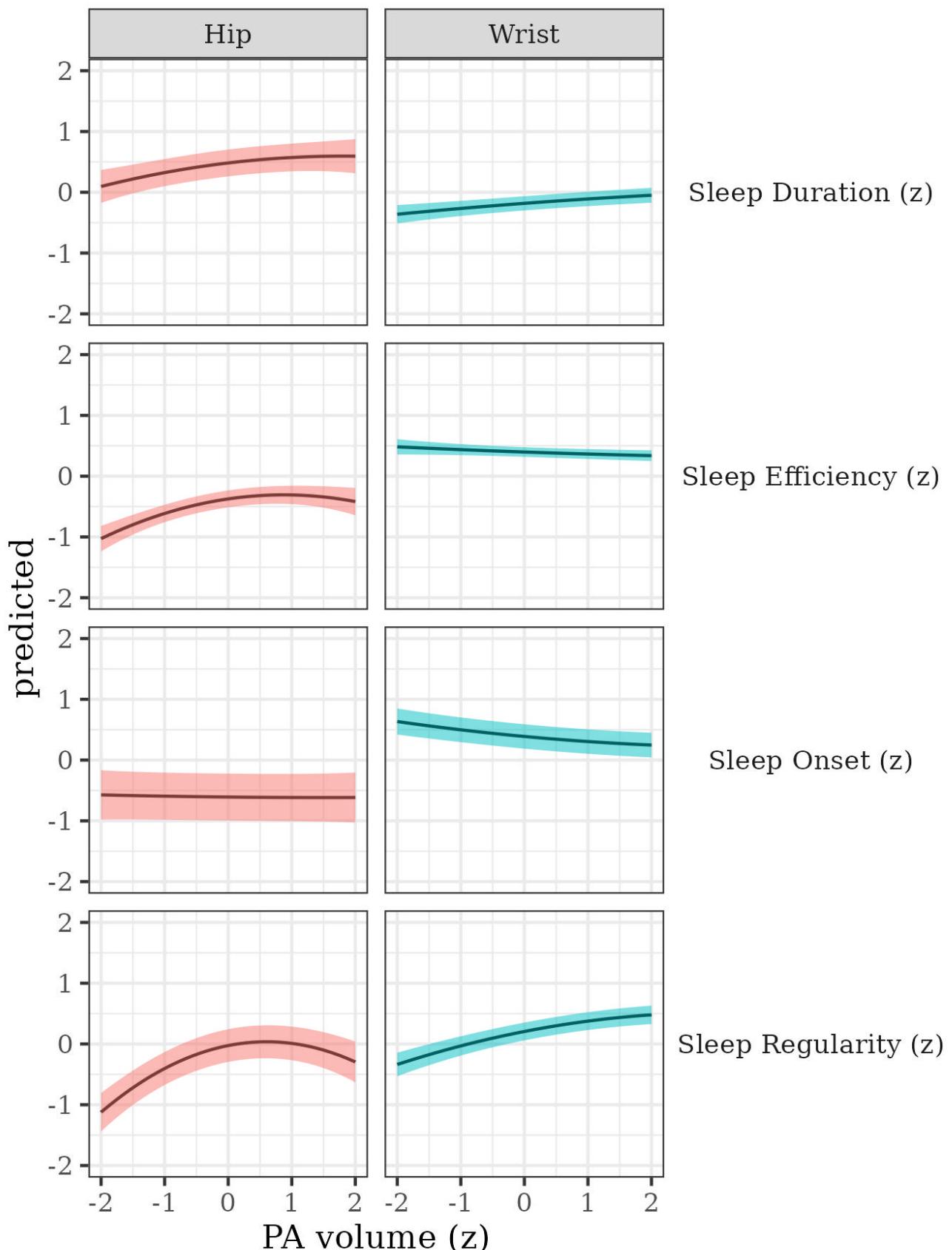


Figure 54. Sleep metrics on Physical activity volume by wear location

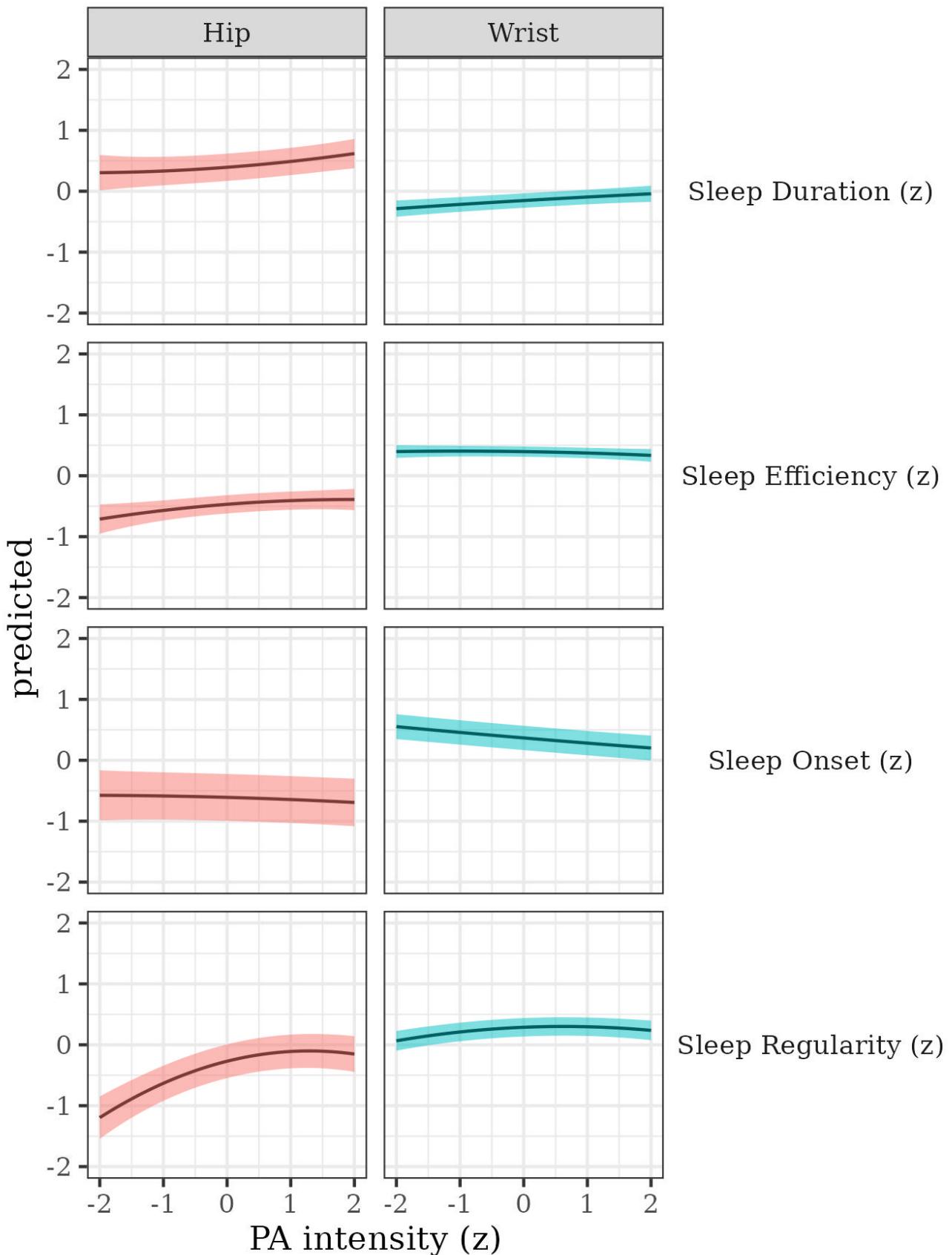


Figure 55. Sleep metrics on Physical activity intensity moderated by wear location

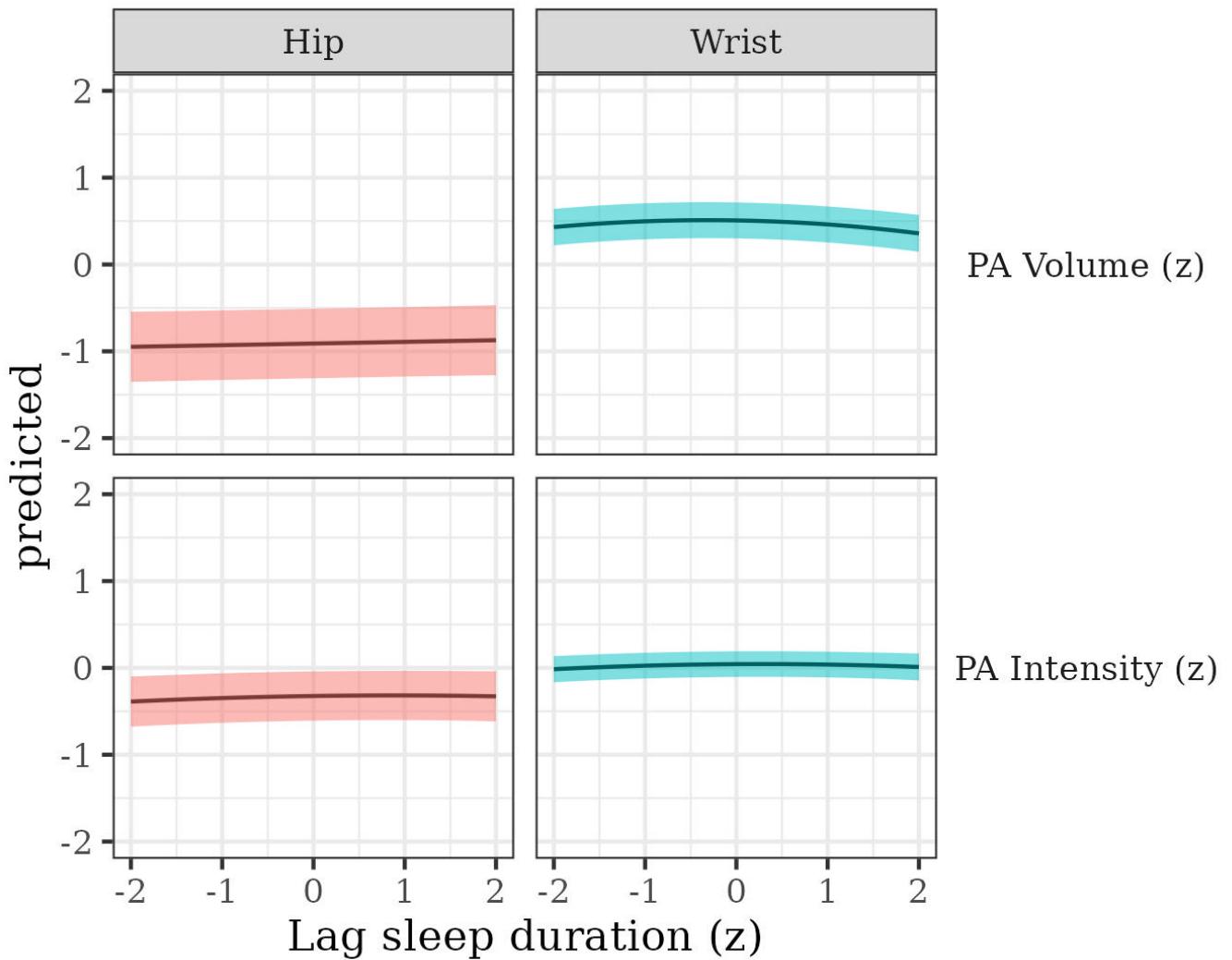


Figure 56. Physical activity by sleep duration moderated by wear location

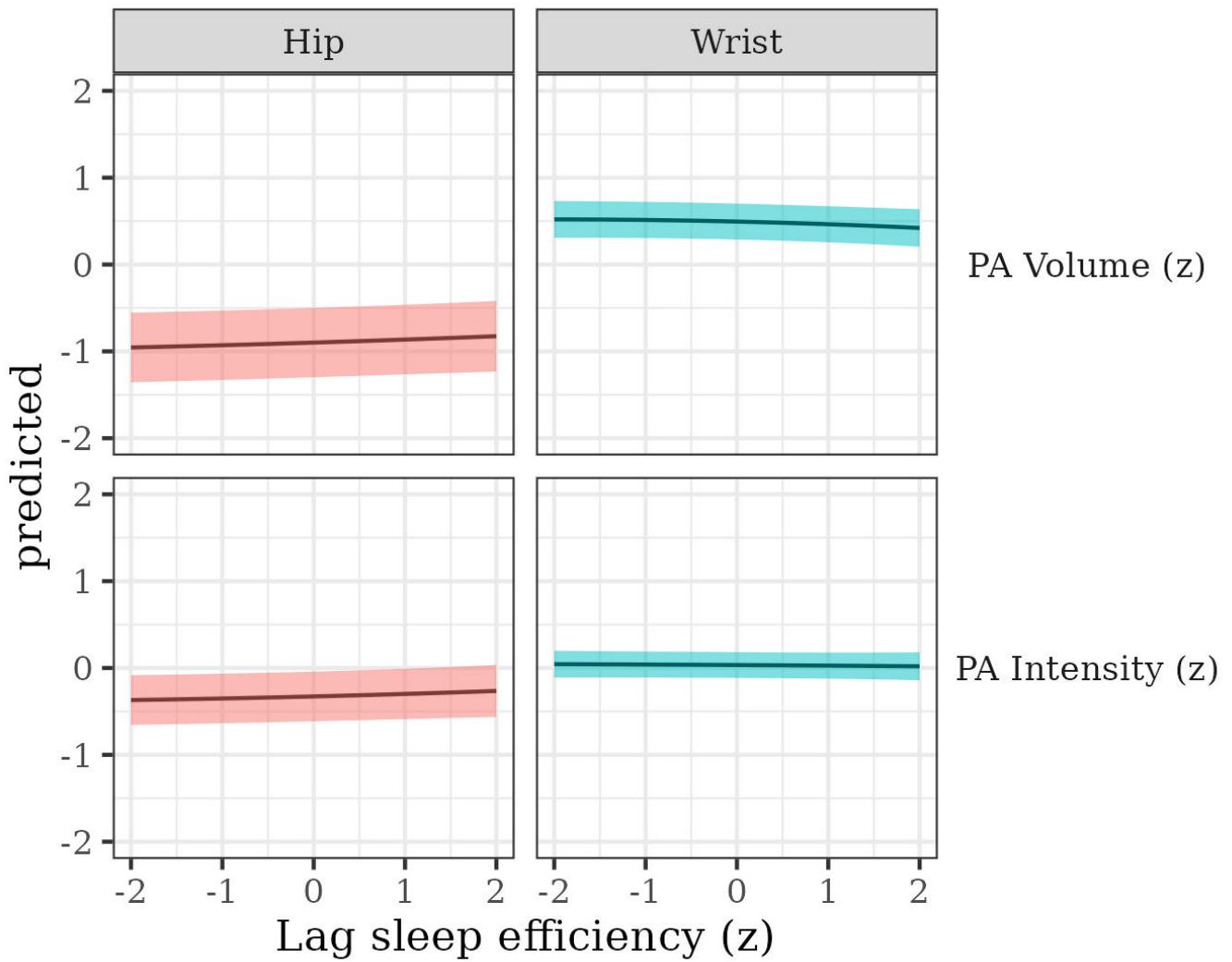


Figure 57. Physical activity by sleep efficiency moderated by wear location

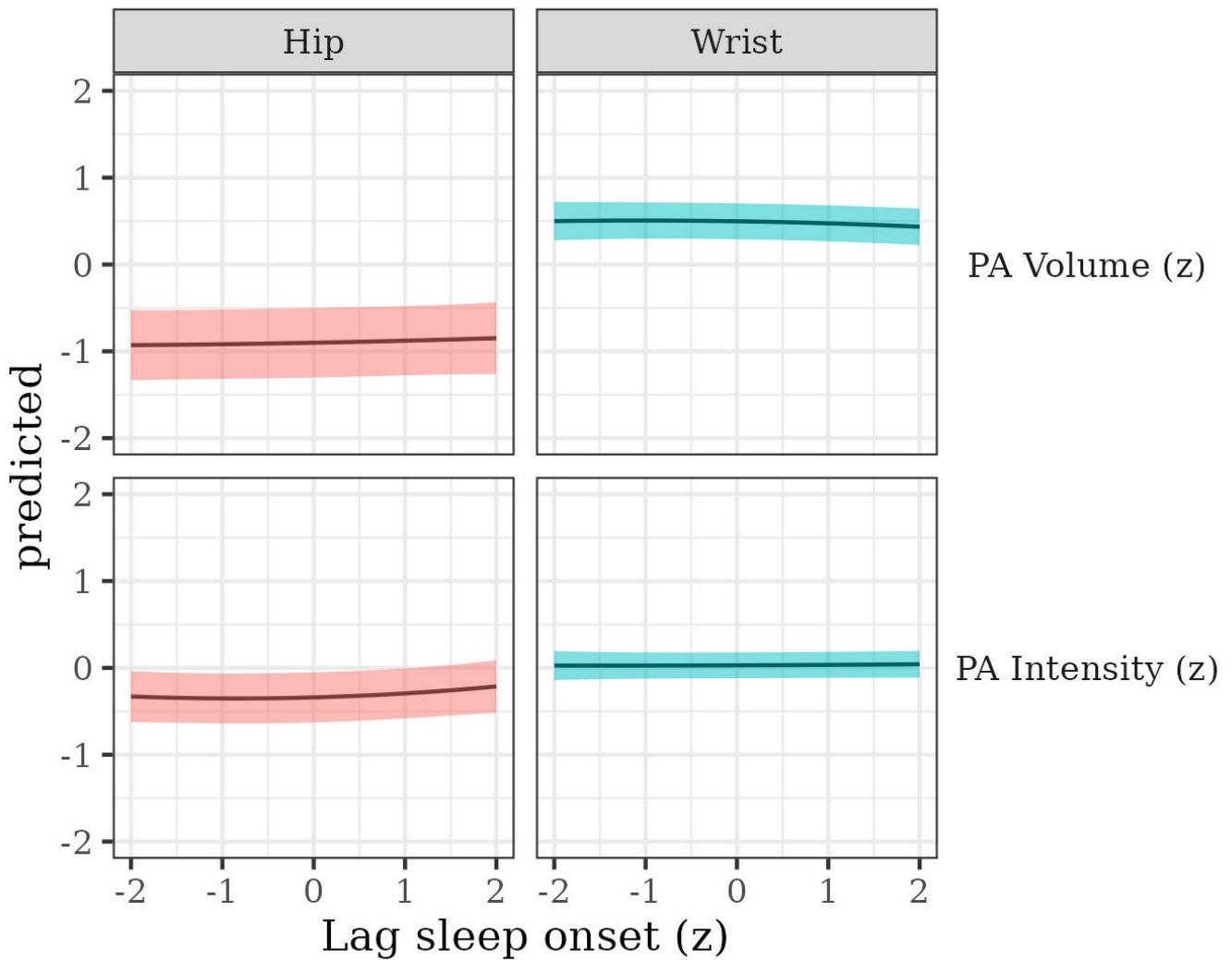


Figure 58. Physical activity by sleep onset moderated by wear location

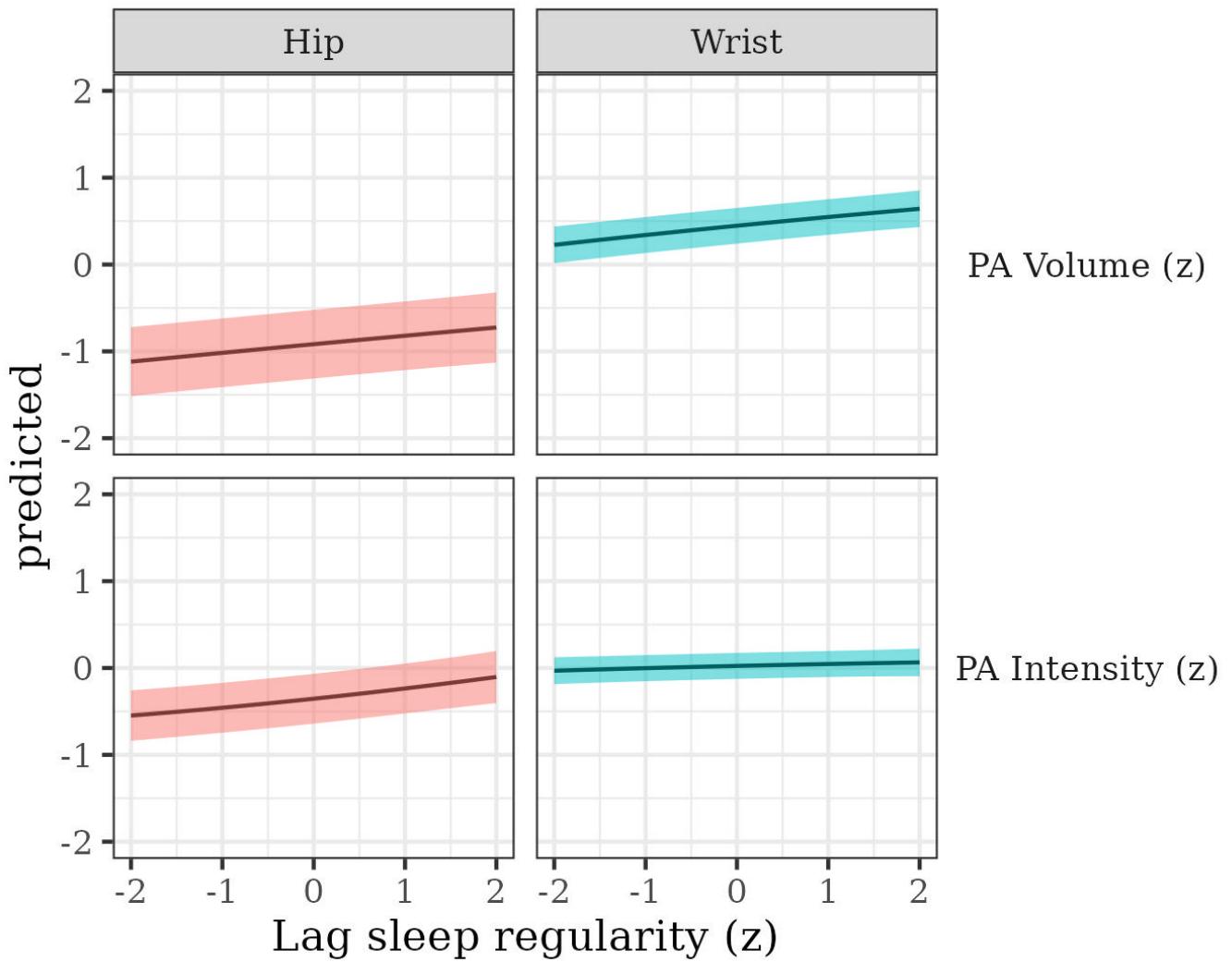


Figure 59. Physical activity by sleep regularity moderated by wear location

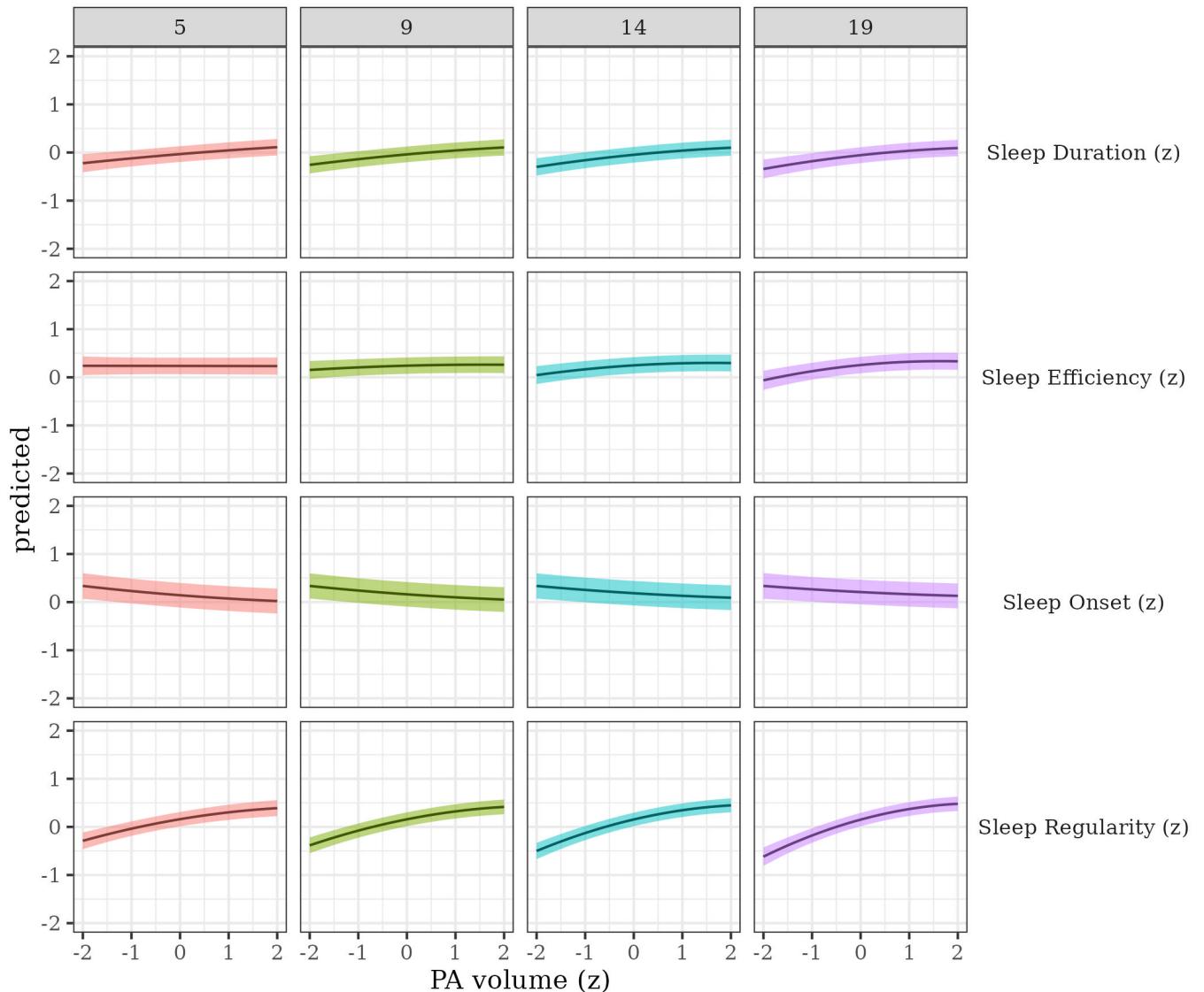


Figure 60. Sleep metrics on Physical activity volume by most active hour

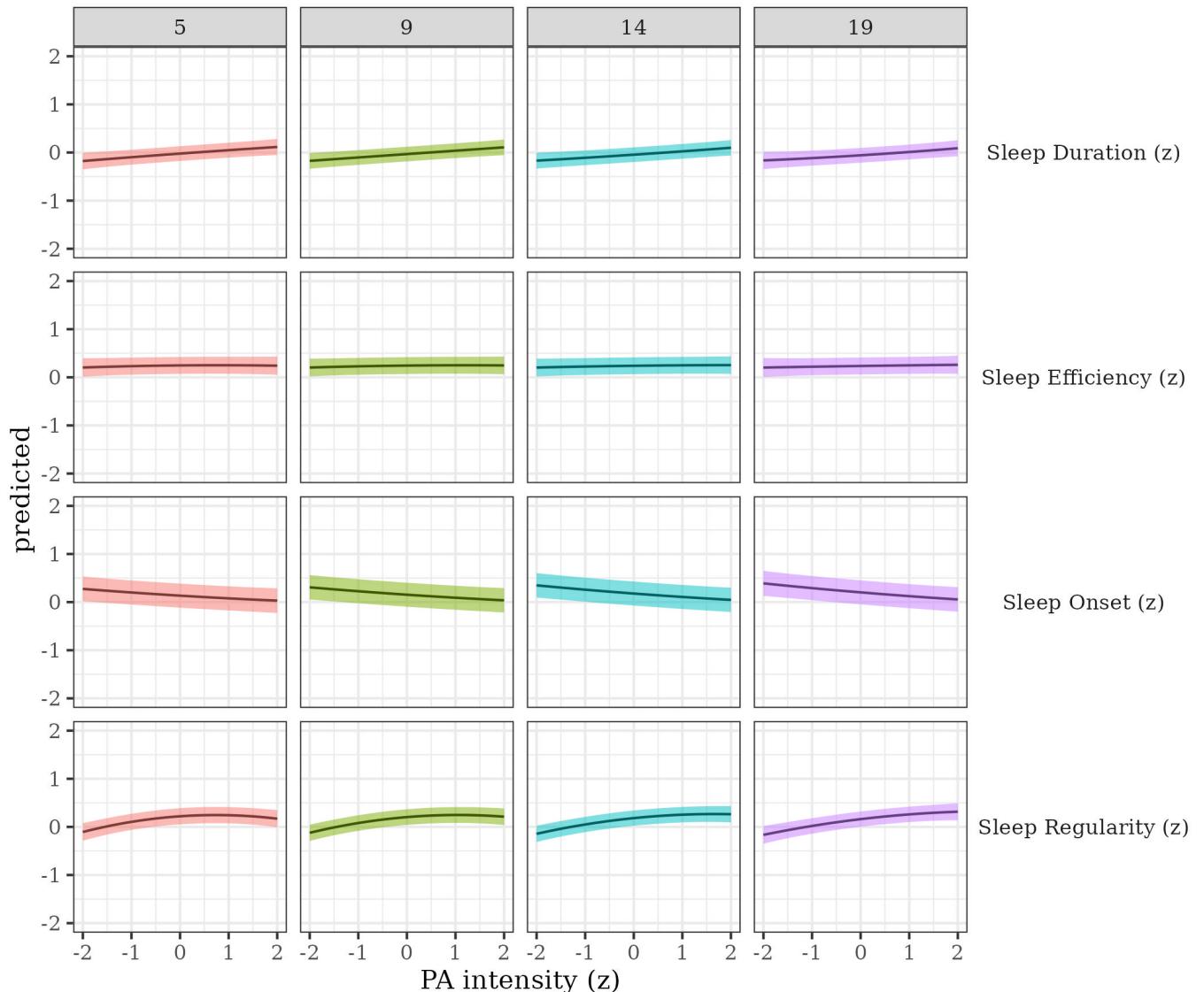


Figure 61. Sleep metrics on Physical activity intensity moderated by most active hour

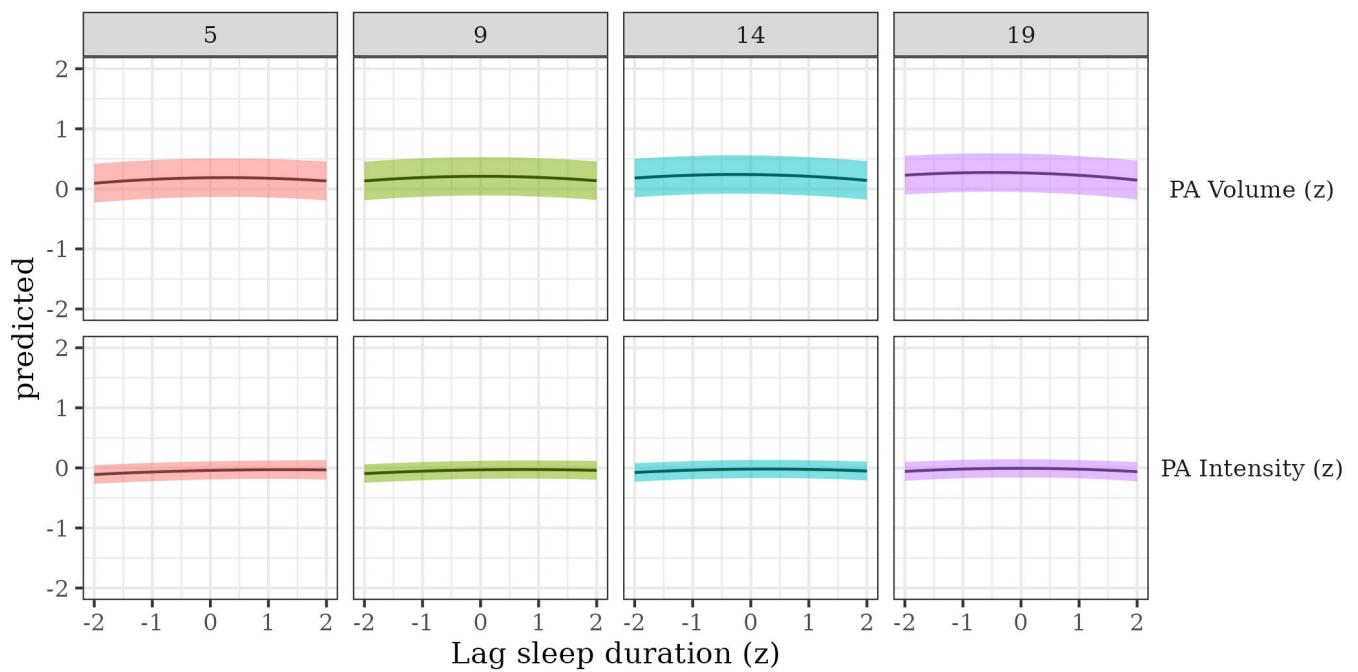


Figure 62. Physical activity by sleep duration moderated by most active hour

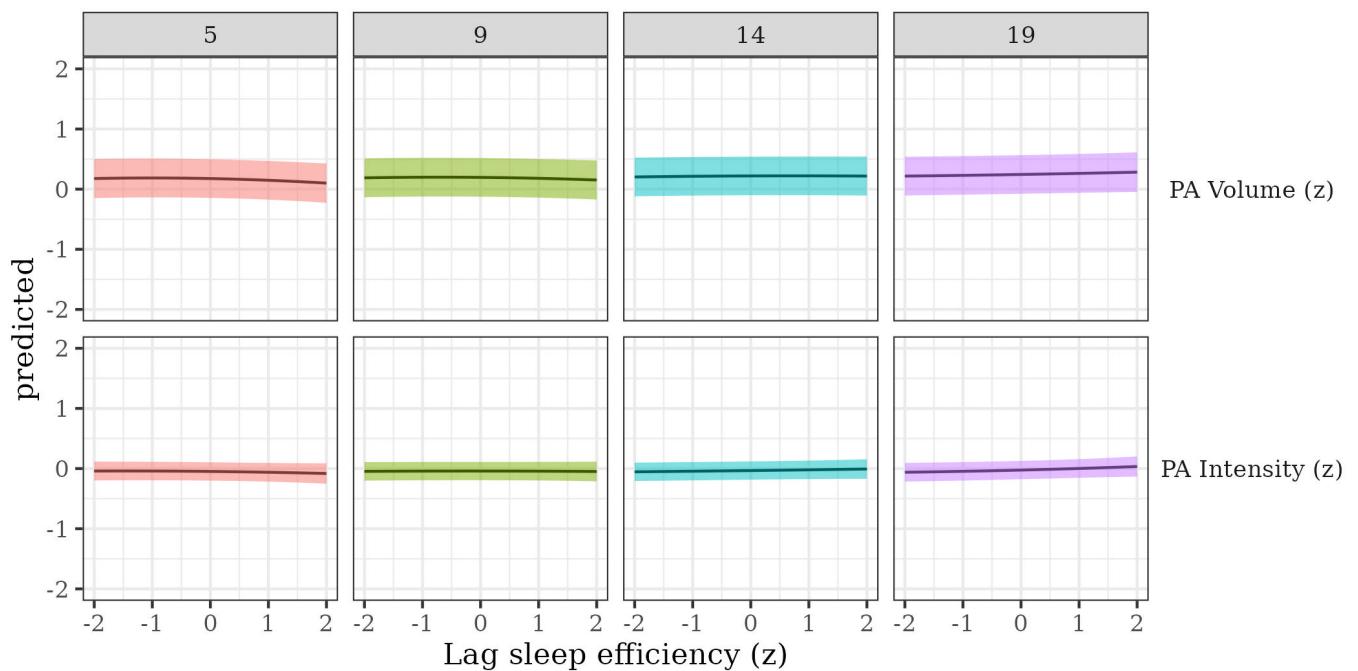


Figure 63. Physical activity by sleep efficiency moderated by most active hour

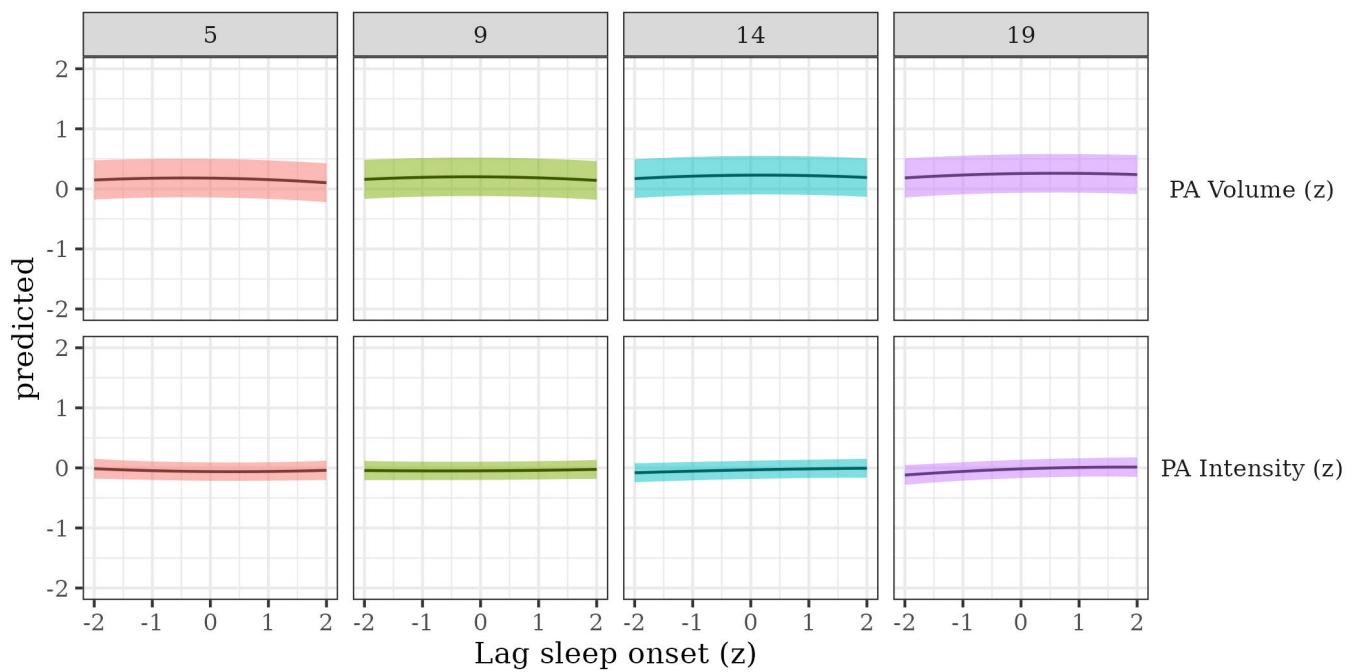


Figure 64. Physical activity by sleep onset moderated by most active hour

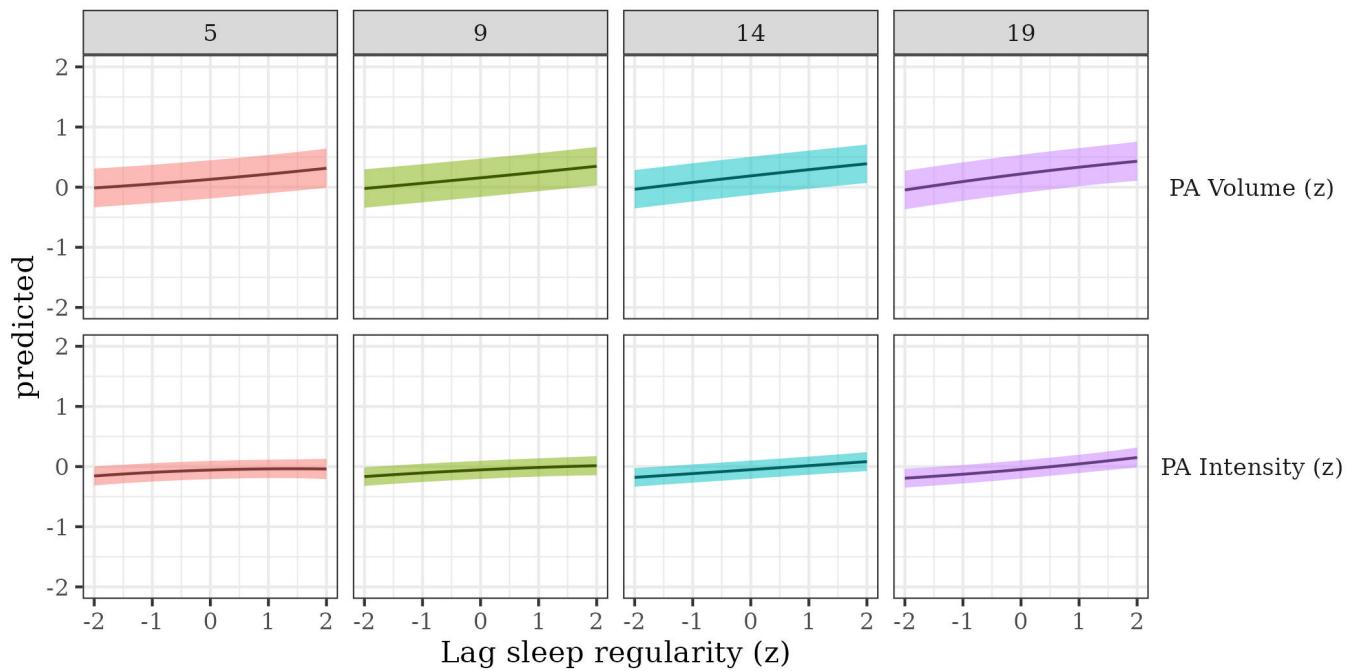


Figure 65. Physical activity by sleep regularity moderated by most active hour

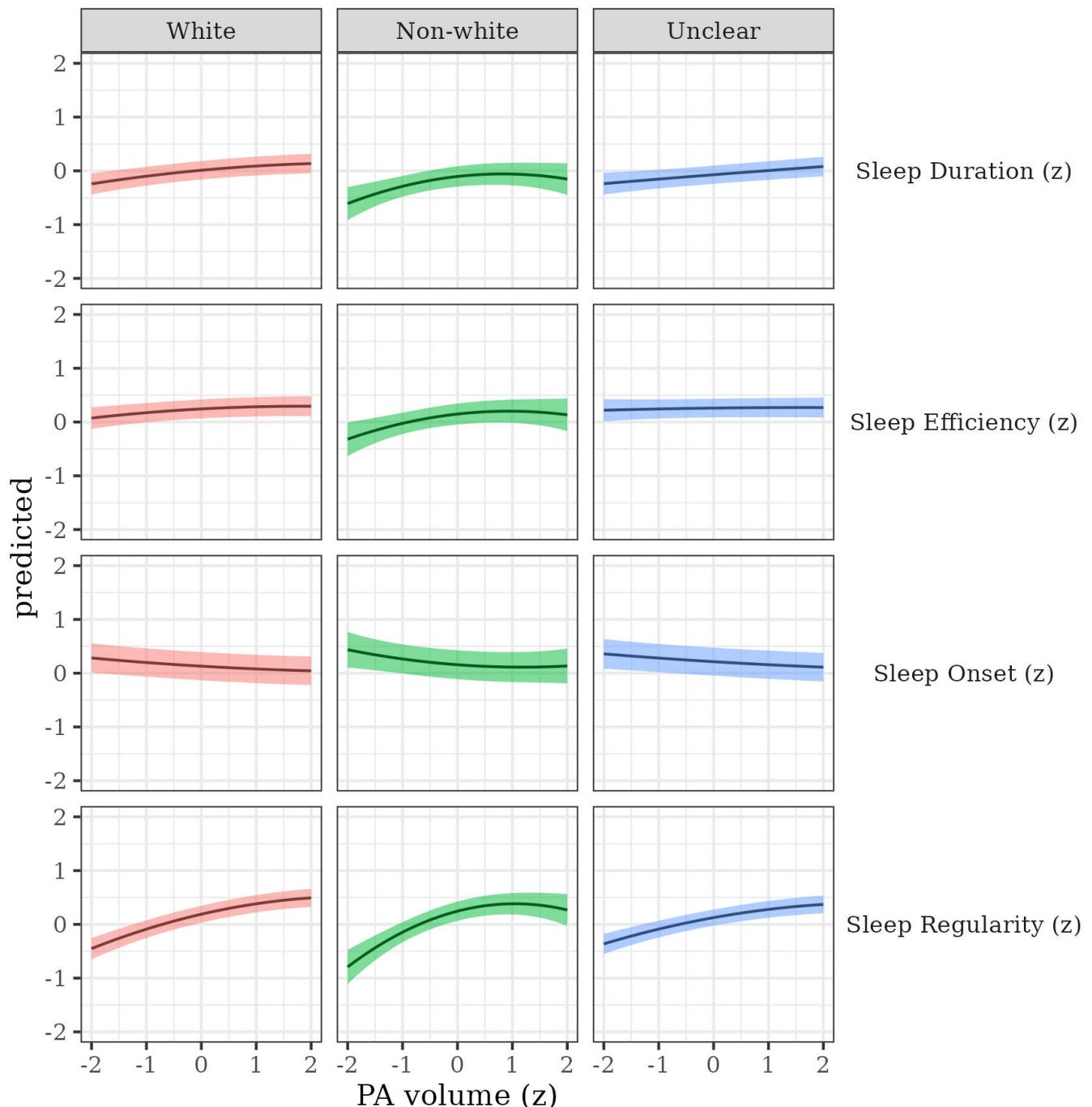


Figure 66. Sleep metrics on Physical activity volume by ethnicity

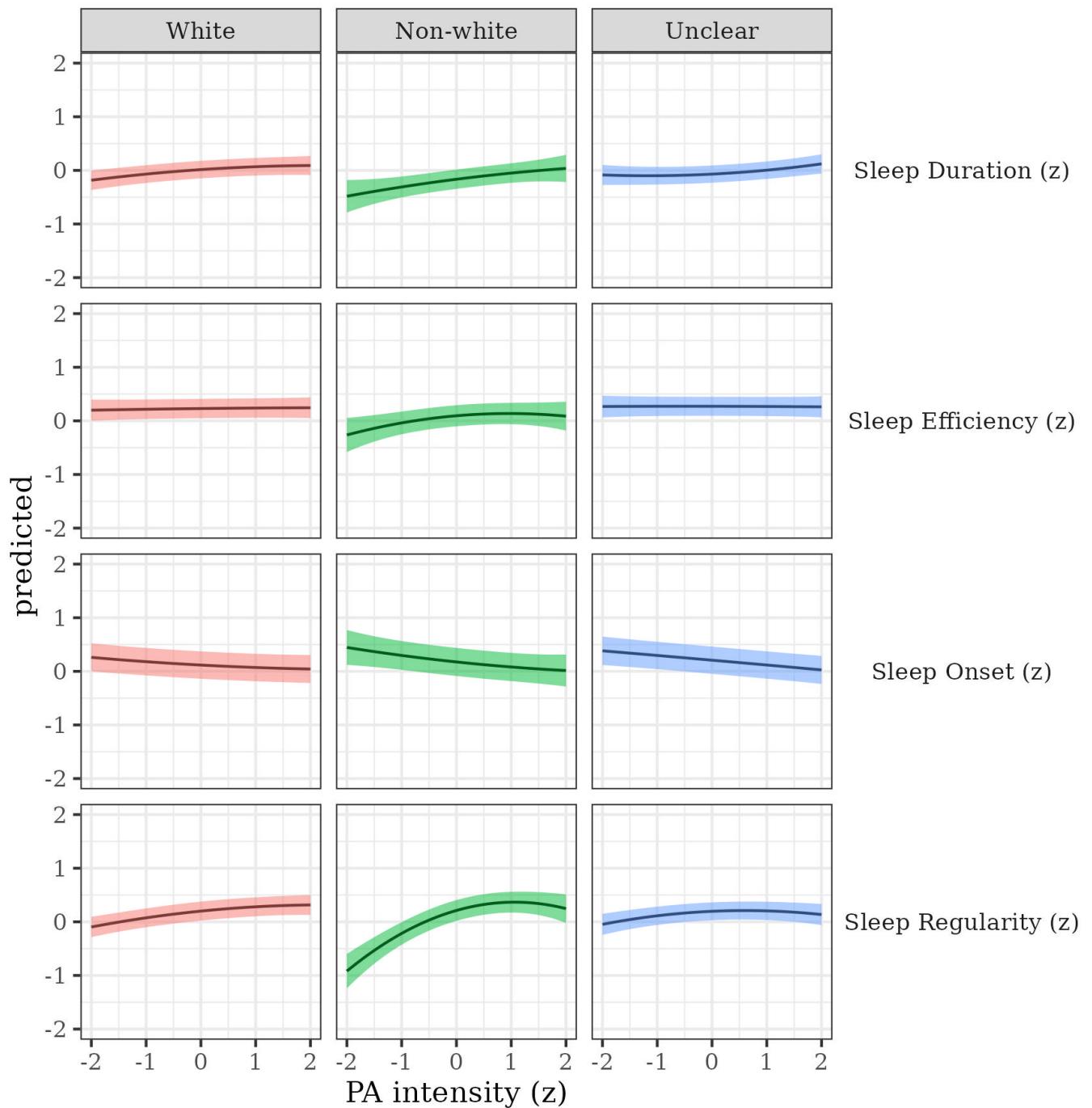


Figure 67. Sleep metrics on Physical activity intensity moderated by ethnicity

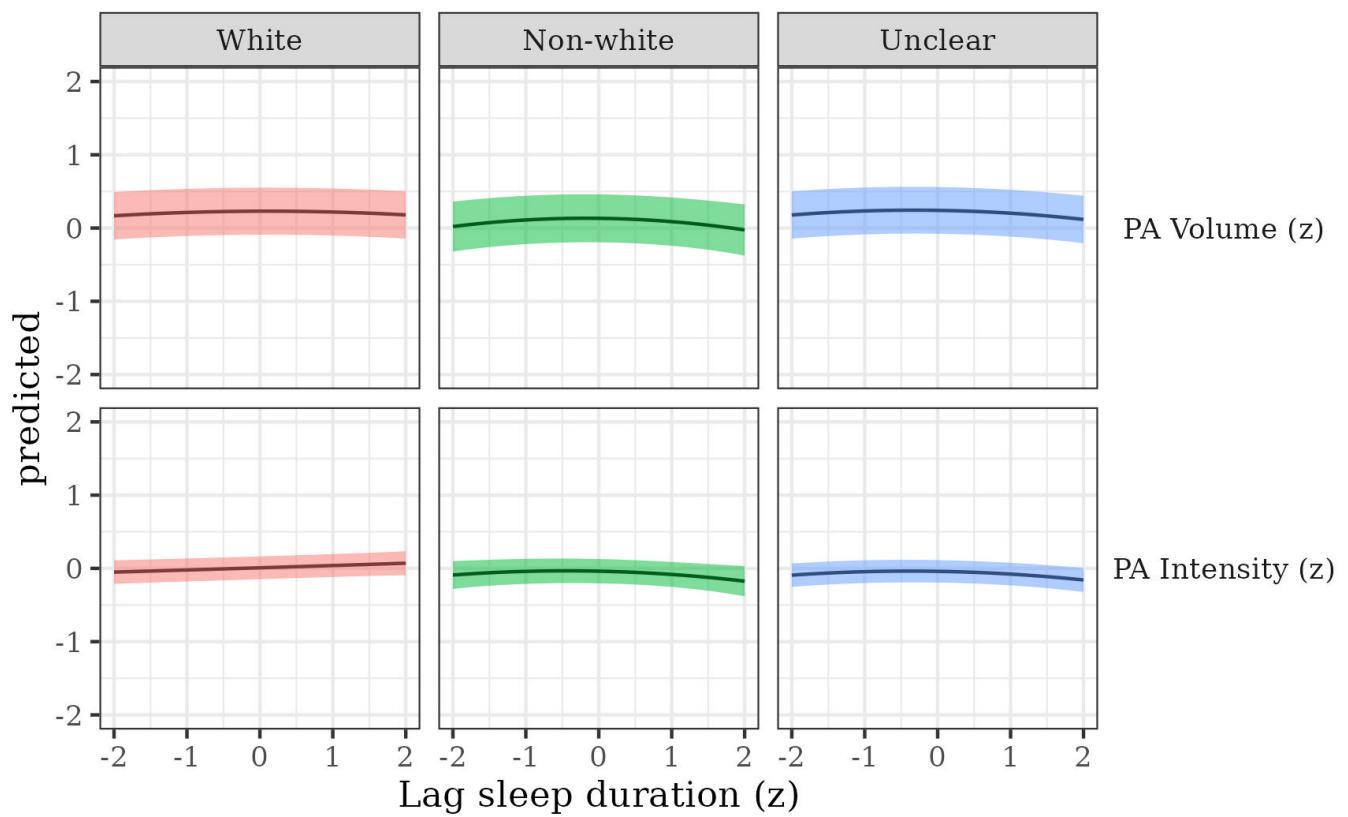


Figure 68. Physical activity by sleep duration moderated by ethnicity

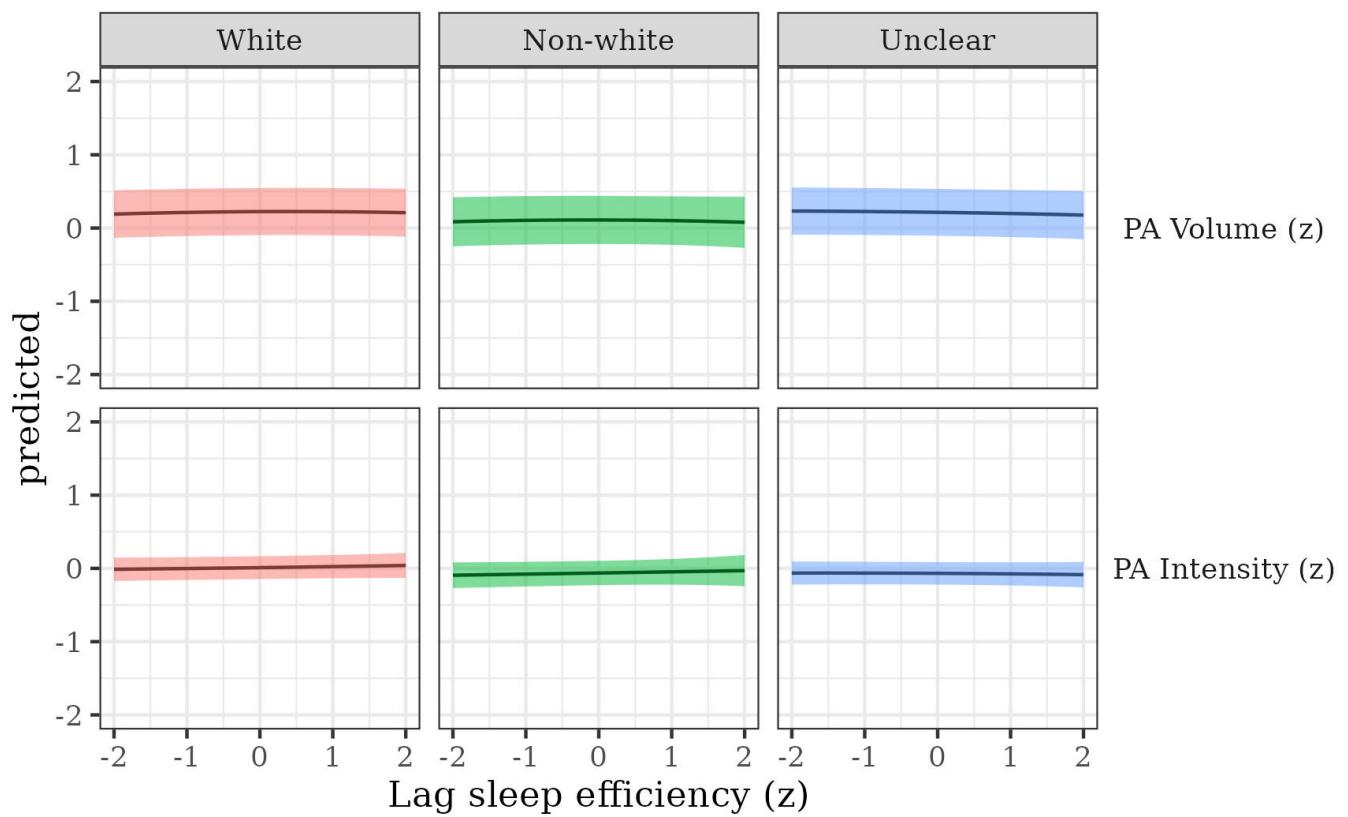


Figure 69. Physical activity by sleep efficiency moderated by ethnicity

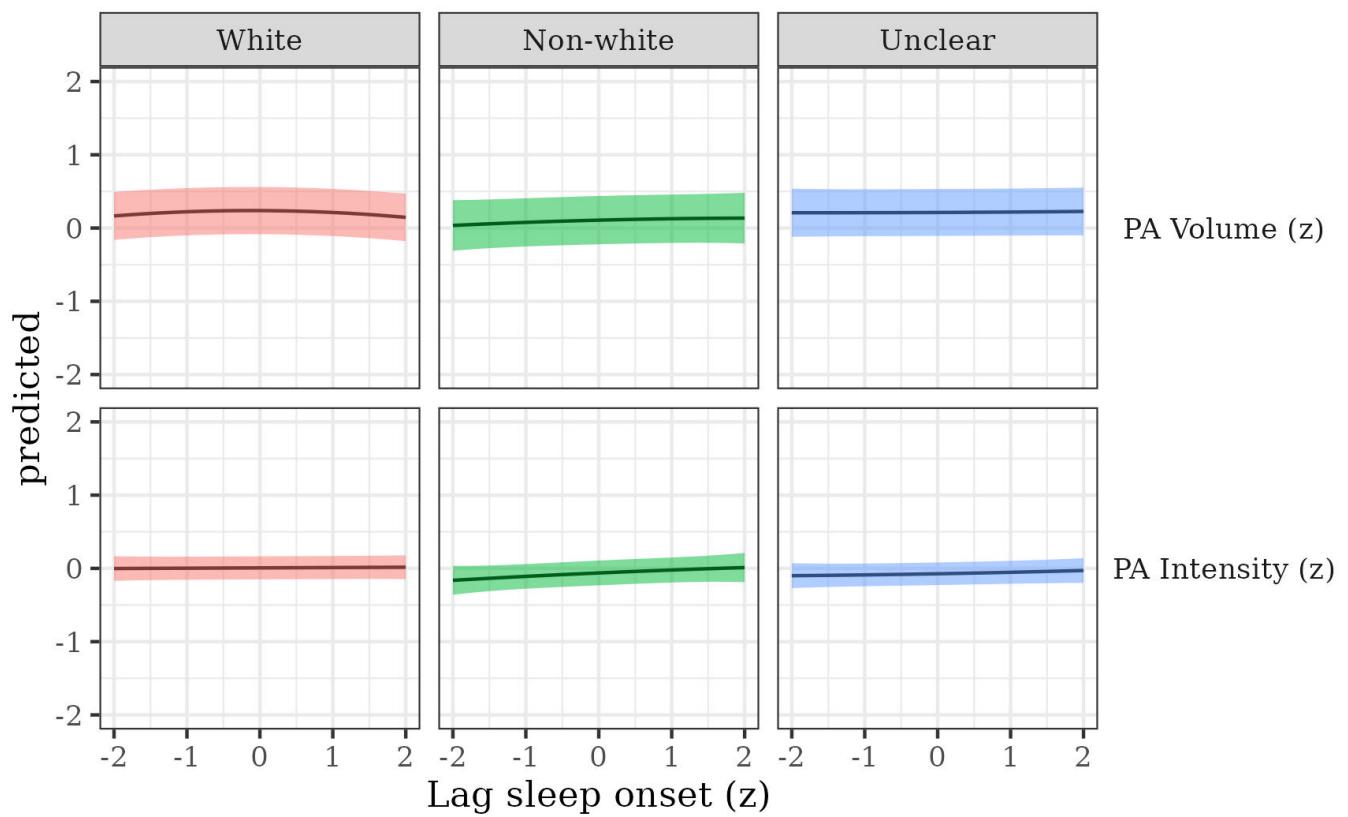


Figure 70. Physical activity by sleep onset moderated by ethnicity

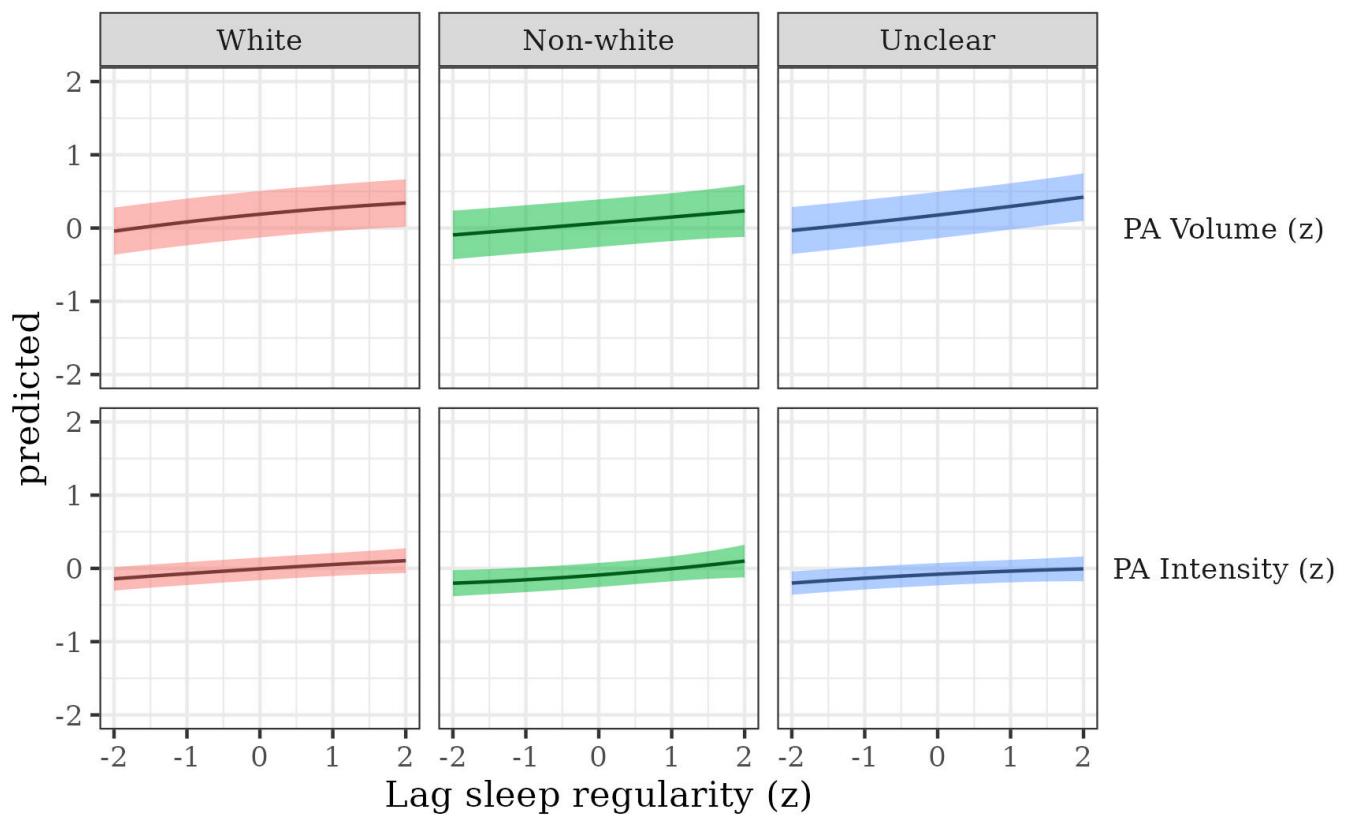


Figure 71. Physical activity by sleep regularity moderated by ethnicity