

Multiverse analysis

First Author¹ & Ernst-August Doelle^{1,2}

¹ Wilhelm-Wundt-University

² 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	0.08	2.49	100.00%
Scale sleep efficiency by PA volume	-0.89	3.46	100.00%
Scale sleep onset by PA volume	0.81	5.82	100.00%
Scale sleep regularity by PA volume	-0.46	1.03	100.00%
Scale sleep duration by PA intensity	0.07	2.49	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.45	100.00%
Scale sleep onset by PA intensity	0.81	5.75	100.00%
Scale sleep regularity by PA intensity	-0.46	1.01	100.00%
Scale PA volume by sleep duration(lagged)	1.28	15.40	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.78	100.00%
Scale PA volume by sleep efficiency(lagged)	1.28	15.40	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.77	100.00%
Scale PA volume by sleep onset(lagged)	1.28	15.36	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.76	100.00%
Scale PA volume by sleep regularity(lagged)	1.32	15.82	100.00%
Scale PA intensity by sleep regularity(lagged)	0.27	2.72	100.00%
Models moderated by age fixeddef			
Scale sleep duration by PA volume	0.08	2.49	100.00%
Scale sleep efficiency by PA volume	-0.88	3.45	100.00%
Scale sleep onset by PA volume	0.81	5.83	100.00%
Scale sleep regularity by PA volume	-0.46	1.03	100.00%
Scale sleep duration by PA intensity	0.08	2.49	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.44	100.00%
Scale sleep onset by PA intensity	0.81	5.76	100.00%
Scale sleep regularity by PA intensity	-0.46	1.01	100.00%
Scale PA volume by sleep duration(lagged)	1.28	15.39	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.78	100.00%
Scale PA volume by sleep efficiency(lagged)	1.27	15.39	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.77	100.00%
Scale PA volume by sleep onset(lagged)	1.27	15.35	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.76	100.00%
Scale PA volume by sleep regularity(lagged)	1.32	15.81	100.00%
Scale PA intensity by sleep regularity(lagged)	0.27	2.72	100.00%

Table 1 continued

Model name		Skewness	Kurtosis	Converged (%)
Models moderated by age log				
Scale sleep duration by log PA volume	0.08	2.48	100.00%	
Scale sleep efficiency by log PA volume	-0.89	3.47	100.00%	
Scale sleep onset by log PA volume	0.81	5.84	100.00%	
Scale sleep regularity by log PA volume	-0.46	1.04	100.00%	
Scale sleep duration by PA intensity	0.07	2.49	100.00%	
Scale sleep efficiency by PA intensity	-0.89	3.45	100.00%	
Scale sleep onset by PA intensity	0.81	5.75	100.00%	
Scale sleep regularity by PA intensity	-0.46	1.01	100.00%	
Log PA volume by sleep duration(lagged)	-0.42	2.72	100.00%	
Scale PA intensity by sleep duration(lagged)	0.22	2.78	100.00%	
Log PA volume by sleep efficiency(lagged)	-0.42	2.72	100.00%	
Scale PA intensity by sleep efficiency(lagged)	0.22	2.77	100.00%	
Log PA volume by sleep onset(lagged)	-0.42	2.72	100.00%	
Scale PA intensity by sleep onset(lagged)	0.22	2.76	100.00%	
Log PA volume by sleep regularity(lagged)	-0.34	2.59	100.00%	
Scale PA intensity by sleep regularity(lagged)	0.27	2.72	100.00%	
Models moderated by bmi				
Scale sleep duration by PA volume	0.08	2.49	100.00%	
Scale sleep efficiency by PA volume	-0.89	3.47	100.00%	
Scale sleep onset by PA volume	0.81	5.83	100.00%	
Scale sleep regularity by PA volume	-0.46	1.03	100.00%	
Scale sleep duration by PA intensity	0.07	2.49	100.00%	
Scale sleep efficiency by PA intensity	-0.89	3.46	100.00%	
Scale sleep onset by PA intensity	0.81	5.75	100.00%	
Scale sleep regularity by PA intensity	-0.46	1.00	100.00%	
Scale PA volume by sleep duration(lagged)	1.28	15.40	100.00%	
Scale PA intensity by sleep duration(lagged)	0.22	2.77	100.00%	
Scale PA volume by sleep efficiency(lagged)	1.28	15.40	100.00%	
Scale PA intensity by sleep efficiency(lagged)	0.22	2.77	100.00%	
Scale PA volume by sleep onset(lagged)	1.28	15.38	100.00%	
Scale PA intensity by sleep onset(lagged)	0.22	2.76	100.00%	
Scale PA volume by sleep regularity(lagged)	1.32	15.83	100.00%	
Scale PA intensity by sleep regularity(lagged)	0.26	2.73	100.00%	
Models moderated by ses				

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep duration by PA volume	0.08	2.49	100.00%
Scale sleep efficiency by PA volume	-0.89	3.45	100.00%
Scale sleep onset by PA volume	0.81	5.84	100.00%
Scale sleep regularity by PA volume	-0.46	1.03	100.00%
Scale sleep duration by PA intensity	0.08	2.49	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.45	100.00%
Scale sleep onset by PA intensity	0.81	5.75	100.00%
Scale sleep regularity by PA intensity	-0.47	0.99	100.00%
Scale PA volume by sleep duration(lagged)	1.28	15.40	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.78	100.00%
Scale PA volume by sleep efficiency(lagged)	1.28	15.40	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.77	100.00%
Scale PA volume by sleep onset(lagged)	1.28	15.37	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.76	100.00%
Scale PA volume by sleep regularity(lagged)	1.32	15.78	100.00%
Scale PA intensity by sleep regularity(lagged)	0.26	2.73	100.00%
Models moderated by weekday			
Scale sleep duration by PA volume	0.06	2.45	100.00%
Scale sleep efficiency by PA volume	-0.88	3.45	100.00%
Scale sleep onset by PA volume	0.81	5.94	100.00%
Scale sleep regularity by PA volume	-0.49	1.23	100.00%
Scale sleep duration by PA intensity	0.06	2.47	100.00%
Scale sleep efficiency by PA intensity	-0.88	3.46	100.00%
Scale sleep onset by PA intensity	0.82	5.86	100.00%
Scale sleep regularity by PA intensity	-0.50	1.25	100.00%
Scale PA volume by sleep duration(lagged)	1.34	15.87	100.00%
Scale PA intensity by sleep duration(lagged)	0.28	2.88	100.00%
Scale PA volume by sleep efficiency(lagged)	1.33	15.90	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.27	2.94	100.00%
Scale PA volume by sleep onset(lagged)	1.33	15.87	100.00%
Scale PA intensity by sleep onset(lagged)	0.28	2.93	100.00%
Scale PA volume by sleep regularity(lagged)	1.35	16.12	100.00%
Scale PA intensity by sleep regularity(lagged)	0.30	2.84	100.00%
Models moderated by season			
Scale sleep duration by PA volume	0.07	2.48	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep efficiency by PA volume	-0.89	3.43	100.00%
Scale sleep onset by PA volume	0.81	5.82	100.00%
Scale sleep regularity by PA volume	-0.46	1.04	100.00%
Scale sleep duration by PA intensity	0.07	2.48	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.43	100.00%
Scale sleep onset by PA intensity	0.81	5.74	100.00%
Scale sleep regularity by PA intensity	-0.47	1.00	100.00%
Scale PA volume by sleep duration(lagged)	1.28	15.41	100.00%
Scale PA intensity by sleep duration(lagged)	0.23	2.79	100.00%
Scale PA volume by sleep efficiency(lagged)	1.27	15.42	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.77	100.00%
Scale PA volume by sleep onset(lagged)	1.28	15.31	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.77	100.00%
Scale PA volume by sleep regularity(lagged)	1.32	15.77	100.00%
Scale PA intensity by sleep regularity(lagged)	0.26	2.74	100.00%
Models moderated by region			
Scale sleep duration by PA volume	0.08	2.50	100.00%
Scale sleep efficiency by PA volume	-0.89	3.48	100.00%
Scale sleep onset by PA volume	0.80	5.80	100.00%
Scale sleep regularity by PA volume	-0.46	1.05	100.00%
Scale sleep duration by PA intensity	0.07	2.48	100.00%
Scale sleep efficiency by PA intensity	-0.88	3.43	100.00%
Scale sleep onset by PA intensity	0.80	5.71	100.00%
Scale sleep regularity by PA intensity	-0.45	0.97	100.00%
Scale PA volume by sleep duration(lagged)	1.29	15.41	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.79	100.00%
Scale PA volume by sleep efficiency(lagged)	1.27	15.34	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.78	100.00%
Scale PA volume by sleep onset(lagged)	1.28	15.38	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.77	100.00%
Scale PA volume by sleep regularity(lagged)	1.32	15.80	100.00%
Scale PA intensity by sleep regularity(lagged)	0.26	2.75	100.00%
Models moderated by daylight			
Scale sleep duration by PA volume	0.07	2.50	100.00%
Scale sleep efficiency by PA volume	-0.89	3.46	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep onset by PA volume	0.81	5.83	100.00%
Scale sleep regularity by PA volume	-0.46	1.04	100.00%
Scale sleep duration by PA intensity	0.07	2.50	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.46	100.00%
Scale sleep onset by PA intensity	0.81	5.74	100.00%
Scale sleep regularity by PA intensity	-0.47	1.01	100.00%
Scale PA volume by sleep duration(lagged)	1.28	15.41	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.79	100.00%
Scale PA volume by sleep efficiency(lagged)	1.28	15.40	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.77	100.00%
Scale PA volume by sleep onset(lagged)	1.28	15.36	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.76	100.00%
Scale PA volume by sleep regularity(lagged)	1.32	15.79	100.00%
Scale PA intensity by sleep regularity(lagged)	0.26	2.75	100.00%
Models moderated by wear location			
Scale sleep duration by PA volume	0.07	2.49	100.00%
Scale sleep efficiency by PA volume	-0.88	3.48	100.00%
Scale sleep onset by PA volume	0.81	5.83	100.00%
Scale sleep regularity by PA volume	-0.46	1.04	100.00%
Scale sleep duration by PA intensity	0.07	2.49	100.00%
Scale sleep efficiency by PA intensity	-0.88	3.43	100.00%
Scale sleep onset by PA intensity	0.82	5.73	100.00%
Scale sleep regularity by PA intensity	-0.46	1.02	100.00%
Scale PA volume by sleep duration(lagged)	1.29	15.40	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.78	100.00%
Scale PA volume by sleep efficiency(lagged)	1.28	15.39	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.76	100.00%
Scale PA volume by sleep onset(lagged)	1.28	15.36	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.76	100.00%
Scale PA volume by sleep regularity(lagged)	1.32	15.78	100.00%
Scale PA intensity by sleep regularity(lagged)	0.27	2.72	100.00%
Models moderated by PA mostactivehr			
Scale sleep duration by PA volume	0.08	2.49	100.00%
Scale sleep efficiency by PA volume	-0.89	3.44	100.00%
Scale sleep onset by PA volume	0.81	5.82	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
Scale sleep regularity by PA volume	-0.46	1.02	100.00%
Scale sleep duration by PA intensity	0.07	2.49	100.00%
Scale sleep efficiency by PA intensity	-0.89	3.46	100.00%
Scale sleep onset by PA intensity	0.82	5.74	100.00%
Scale sleep regularity by PA intensity	-0.46	0.97	100.00%
Scale PA volume by sleep duration(lagged)	1.28	15.27	100.00%
Scale PA intensity by sleep duration(lagged)	0.22	2.78	100.00%
Scale PA volume by sleep efficiency(lagged)	1.27	15.30	100.00%
Scale PA intensity by sleep efficiency(lagged)	0.22	2.77	100.00%
Scale PA volume by sleep onset(lagged)	1.27	15.26	100.00%
Scale PA intensity by sleep onset(lagged)	0.22	2.76	100.00%
Scale PA volume by sleep regularity(lagged)	1.31	15.66	100.00%
Scale PA intensity by sleep regularity(lagged)	0.26	2.74	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)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	0.81	[0.68, 0.93]	0.06	12.66	< .001	0.73	[0.61, 0.86]	0.06	11.45	< .001
Physical activity	0.08	[0.04, 0.12]	0.02	4.08	< .001	0.08	[0.03, 0.12]	0.02	3.23	.001
Age	0.00	[-0.01, 0.00]	0.00	-0.92	.355	0.00	[-0.01, 0.00]	0.00	-0.80	.426
Physical activity ²	0.00	[-0.01, 0.01]	0.00	-0.18	.856	0.02	[-0.01, 0.05]	0.01	1.30	.195
Physical activity × age	0.00	[0.00, 0.00]	0.00	0.15	.884	0.00	[0.00, 0.00]	0.00	-1.10	.269
Age × Physical activity ²	0.00	[0.00, 0.00]	0.00	-1.73	.084	0.00	[0.00, 0.00]	0.00	-2.18	.030
Sleep efficiency (z)										
(Intercept)	-0.38	[-0.53, -0.24]	0.07	-5.33	< .001	-0.42	[-0.57, -0.28]	0.07	-5.79	< .001
Physical activity	0.08	[0.04, 0.12]	0.02	3.84	< .001	0.03	[-0.01, 0.08]	0.02	1.36	.175
Age	0.00	[0.00, 0.00]	0.00	-0.08	.936	0.00	[0.00, 0.00]	0.00	-0.06	.952
Physical activity ²	-0.02	[-0.03, -0.01]	0.00	-4.09	< .001	-0.02	[-0.05, 0.01]	0.01	-1.32	.186
Physical activity × age	0.00	[0.00, 0.00]	0.00	-2.62	.009	0.00	[0.00, 0.00]	0.00	-0.84	.402
Age × Physical activity ²	0.00	[0.00, 0.00]	0.00	2.46	.014	0.00	[0.00, 0.00]	0.00	0.83	.405
Sleep onset (z)										
(Intercept)	-0.97	[-1.07, -0.87]	0.05	-18.78	< .001	-0.92	[-1.02, -0.82]	0.05	-17.78	< .001
Physical activity	-0.01	[-0.04, 0.02]	0.02	-0.71	.478	-0.06	[-0.10, -0.03]	0.02	-3.34	.001
Age	0.00	[0.00, 0.00]	0.00	-0.04	.966	0.00	[0.00, 0.00]	0.00	-0.38	.706
Physical activity ²	-0.01	[-0.01, 0.00]	0.00	-1.43	.152	-0.02	[-0.04, 0.01]	0.01	-1.47	.142
Physical activity × age	0.00	[0.00, 0.00]	0.00	-4.08	< .001	0.00	[0.00, 0.00]	0.00	-0.10	.917
Age × Physical activity ²	0.00	[0.00, 0.00]	0.00	3.57	< .001	0.00	[0.00, 0.00]	0.00	2.35	.019
Sleep regularity (z)										

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	0.13 [-0.02, 0.28]	0.07	1.74	.093	0.04 [-0.10, 0.19]	0.07	0.60	.552
Physical activity	0.21 [0.16, 0.26]	0.02	8.36	< .001	0.26 [0.20, 0.33]	0.03	8.38	< .001
Age	0.00 [0.00, 0.00]	0.00	-0.05	.963	0.00 [-0.01, 0.00]	0.00	-1.27	.208
Physical activity ²	-0.03 [-0.04, -0.02]	0.01	-5.79	< .001	-0.11 [-0.15, -0.08]	0.02	-6.81	< .001
Physical activity × age	0.00 [0.00, 0.00]	0.00	0.22	.828	0.00 [0.00, 0.00]	0.00	-5.64	< .001
Age × Physical activity ²	0.00 [0.00, 0.00]	0.00	-1.37	.178	0.00 [0.00, 0.00]	0.00	3.57	< .001

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)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	0.10	[0.02, 0.23]	0.06	1.68	.094	0.91	[0.79, 1.02]	0.06	15.83	< .001
Sleep duration	0.01	[-0.01, 0.04]	0.01	1.22	.222	0.00	[-0.03, 0.02]	0.01	-0.35	.723
Age	-0.02	[-0.02, -0.02]	0.00	-9.59	< .001	-0.02	[-0.03, -0.02]	0.00	-10.88	< .001
Sleep duration ²	-0.02	[-0.03, -0.01]	0.01	-4.63	< .001	-0.02	[-0.03, -0.01]	0.00	-3.39	.001
Sleep duration × age	0.00	[0.00, 0.00]	0.00	-1.86	.063	0.00	[0.00, 0.00]	0.00	1.41	.159
Age × Sleep duration ²	0.00	[0.00, 0.00]	0.00	0.68	.497	0.00	[0.00, 0.00]	0.00	1.50	.133
Sleep efficiency (z)										
(Intercept)	0.10	[-0.03, 0.22]	0.06	1.56	.120	0.90	[0.79, 1.01]	0.06	15.71	< .001
Sleep efficiency	0.00	[-0.04, 0.04]	0.02	0.19	.857	0.02	[-0.01, 0.04]	0.01	1.13	.266
Age	-0.02	[-0.02, -0.02]	0.00	-9.37	< .001	-0.02	[-0.03, -0.02]	0.00	-10.69	< .001
Sleep efficiency ²	0.00	[-0.01, 0.00]	0.00	-1.04	.327	0.00	[-0.01, 0.01]	0.00	0.24	.807
Sleep efficiency × age	0.00	[0.00, 0.00]	0.00	-0.26	.804	0.00	[0.00, 0.00]	0.00	-0.60	.551
Age × Sleep efficiency ²	0.00	[0.00, 0.00]	0.00	0.30	.766	0.00	[0.00, 0.00]	0.00	0.24	.812
Sleep onset (z)										
(Intercept)	0.11	[-0.02, 0.24]	0.06	1.68	.096	0.91	[0.79, 1.02]	0.06	15.66	< .001
Sleep onset	0.00	[-0.02, 0.02]	0.01	0.04	.965	0.02	[0.00, 0.04]	0.01	2.42	.016
Age	-0.02	[-0.02, -0.02]	0.00	-9.45	< .001	-0.02	[-0.03, -0.02]	0.00	-10.83	< .001
Sleep onset ²	-0.01	[-0.04, 0.01]	0.01	-1.16	.252	0.00	[-0.02, 0.02]	0.01	0.03	.977
Sleep onset × age	0.00	[0.00, 0.00]	0.00	0.59	.554	0.00	[0.00, 0.00]	0.00	-1.10	.272
Age × Sleep onset ²	0.00	[0.00, 0.00]	0.00	-0.18	.856	0.00	[0.00, 0.00]	0.00	0.20	.843
Sleep regularity (z)										

Table 3 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
(Intercept)	0.06	[0.06, 0.19]	0.06	1.05	.293	0.88	[0.77, 0.99]	0.06	15.64	< .001
Sleep regularity	0.14	[0.12, 0.16]	0.01	11.55	< .001	0.11	[0.09, 0.13]	0.01	9.39	< .001
Age	-0.02	[-0.02, -0.02]	0.00	-9.30	< .001	-0.02	[-0.02, -0.02]	0.00	-10.43	< .001
Sleep regularity ²	0.01	[-0.01, 0.02]	0.01	1.25	.211	0.01	[-0.01, 0.02]	0.01	1.02	.310
Sleep regularity × age	0.00	[0.00, 0.00]	0.00	-3.99	< .001	0.00	[0.00, 0.00]	0.00	-5.58	< .001
Age × Sleep regularity ²	0.00	[0.00, 0.00]	0.00	-1.43	.154	0.00	[0.00, 0.00]	0.00	-1.42	.154

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

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

Term	Physical activity volume (ln)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	0.21	[0.55, 0.97]	0.39	0.53	.596	0.18	[-0.03, 0.40]	0.11	1.69	.091
Log pa volume	-0.19	[-0.61, 0.22]	0.21	-0.90	.368	0.08	[0.03, 0.12]	0.02	3.35	.001
Age	-0.02	[-0.04, 0.00]	0.01	-2.25	.025	0.00	[-0.01, 0.00]	0.00	-1.90	.057
Log pa volume ²	0.05	[-0.01, 0.11]	0.03	1.68	.094	0.02	[-0.01, 0.04]	0.01	1.22	.221
Log pa volume × age	0.01	[0.00, 0.02]	0.01	1.99	.046	0.00	[0.00, 0.00]	0.00	-1.22	.224
Age × log pa volume ²	0.00	[0.00, 0.00]	0.00	-2.04	.042	0.00	[0.00, 0.00]	0.00	-2.09	.036
Sleep efficiency (z)										
(Intercept)	-1.82	[-2.59, -1.04]	0.40	-4.60	< .001	0.29	[0.05, 0.54]	0.12	2.34	.020
Log pa volume	1.07	[0.64, 1.49]	0.22	4.91	< .001	0.03	[-0.02, 0.07]	0.02	1.27	.204
Age	0.03	[0.01, 0.05]	0.01	2.59	.010	0.00	[0.00, 0.01]	0.00	0.82	.410
Log pa volume ²	-0.13	[-0.19, -0.07]	0.03	-4.30	< .001	-0.02	[0.04, 0.01]	0.01	-1.19	.235
Log pa volume × age	-0.01	[-0.02, 0.00]	0.01	-2.10	.035	0.00	[0.00, 0.00]	0.00	-0.75	.454
Age × log pa volume ²	0.00	[0.00, 0.00]	0.00	1.74	.082	0.00	[0.00, 0.00]	0.00	0.70	.486
Sleep onset (z)										
(Intercept)	-0.90	[-1.55, -0.25]	0.33	-2.72	.007	0.13	[-0.17, 0.43]	0.15	0.88	.379
Log pa volume	0.62	[0.29, 0.94]	0.17	3.68	< .001	-0.06	[-0.10, -0.03]	0.02	-3.37	.001
Age	0.04	[0.02, 0.05]	0.01	4.37	< .001	0.00	[0.00, 0.00]	0.00	-0.02	.981
Log pa volume ²	-0.09	[-0.14, -0.04]	0.02	-3.83	< .001	-0.02	[-0.04, 0.01]	0.01	-1.43	.152
Log pa volume × age	-0.02	[-0.03, -0.01]	0.00	-3.81	< .001	0.00	[0.00, 0.00]	0.00	-0.08	.933
Age × log pa volume ²	0.00	[0.00, 0.00]	0.00	3.25	.001	0.00	[0.00, 0.00]	0.00	2.31	.021
Sleep regularity (z)										

Table 4 continued

Term	Physical activity volume (ln)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
(Intercept)	-2.67	[-3.57, -1.78]	0.46	-5.85	< .001	0.54	[0.31, 0.77]	0.12	4.63	< .001
Log pa volume	1.39	[0.91, 1.86]	0.24	5.72	< .001	0.26	[0.20, 0.32]	0.03	8.31	< .001
Age	-0.02	[-0.04, 0.00]	0.01	-1.94	.053	0.00	[0.00, 0.00]	0.00	-0.54	.593
Log pa volume ²	-0.14	[-0.21, -0.08]	0.03	-4.24	< .001	-0.11	[-0.15, -0.08]	0.02	-6.65	< .001
Log pa volume × age	0.01	[0.00, 0.03]	0.01	2.12	.034	0.00	[0.00, 0.00]	0.00	-5.57	< .001
Age × log pa volume ²	0.00	[0.00, 0.00]	0.00	-2.11	.035	0.00	[0.00, 0.00]	0.00	3.39	.001

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	4.23 [4.08, 4.39]	0.08	52.11	< .001	1.22 [1.01, 1.43]	0.11	11.53	< .001
Sleep duration	0.00 [-0.01, 0.02]	0.01	0.69	.493	0.00 [-0.03, 0.02]	0.01	-0.33	.741
Age	-0.01 [-0.01, -0.01]	0.00	-8.80	< .001	-0.02 [-0.03, -0.02]	0.00	-12.91	< .001
Sleep duration ²	-0.01 [-0.01, 0.00]	0.00	-3.84	< .001	-0.02 [-0.03, -0.01]	0.00	-3.41	.001
Sleep duration × age	0.00 [0.00, 0.00]	0.00	-1.99	.046	0.00 [0.00, 0.00]	0.00	1.39	.164
Age × Sleep duration ²	0.00 [0.00, 0.00]	0.00	-1.37	.171	0.00 [0.00, 0.00]	0.00	1.52	.128
Sleep efficiency (z)								
(Intercept)	4.22 [4.06, 4.38]	0.08	51.90	< .001	1.20 [0.99, 1.41]	0.11	11.23	< .001
Sleep efficiency	0.01 [0.00, 0.03]	0.01	1.47	.174	0.02 [-0.01, 0.04]	0.01	1.16	.255
Age	-0.01 [-0.01, -0.01]	0.00	-8.66	< .001	-0.02 [-0.03, -0.02]	0.00	-12.67	< .001
Sleep efficiency ²	0.00 [-0.01, 0.00]	0.00	-0.62	.540	0.00 [-0.01, 0.01]	0.00	0.24	.809
Sleep efficiency × age	0.00 [0.00, 0.00]	0.00	-1.17	.264	0.00 [0.00, 0.00]	0.00	-0.62	.536
Age × Sleep efficiency ²	0.00 [0.00, 0.00]	0.00	-0.07	.947	0.00 [0.00, 0.00]	0.00	0.23	.814
Sleep onset (z)								
(Intercept)	4.23 [4.07, 4.39]	0.08	51.97	< .001	1.20 [0.99, 1.41]	0.11	11.29	< .001
Sleep onset	0.01 [0.00, 0.02]	0.01	1.30	.195	0.02 [0.00, 0.04]	0.01	2.45	.014
Age	-0.01 [-0.01, -0.01]	0.00	-8.72	< .001	-0.02 [-0.03, -0.02]	0.00	-12.83	< .001
Sleep onset ²	0.00 [-0.01, 0.01]	0.01	-0.31	.757	0.00 [-0.02, 0.02]	0.01	0.00	.998
Sleep onset × age	0.00 [0.00, 0.00]	0.00	0.72	.469	0.00 [0.00, 0.00]	0.00	-1.14	.255
Age × Sleep onset ²	0.00 [0.00, 0.00]	0.00	-1.71	.087	0.00 [0.00, 0.00]	0.00	0.22	.823
Sleep regularity (z)								

Table 5 continued

Term	Physical activity volume (h)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	4.18 [4.02, 4.33]	0.08	53.51	< .001	1.15 [0.95, 1.35]	0.10	11.12	< .001
Sleep regularity	0.08 [0.07, 0.10]	0.01	14.12	< .001	0.11 [0.09, 0.13]	0.01	9.45	< .001
Age	-0.01 [-0.01, -0.01]	0.00	-8.75	< .001	-0.02 [-0.02, -0.02]	0.00	-12.47	< .001
Sleep regularity ²	0.00 [-0.01, 0.01]	0.00	-0.54	.590	0.01 [-0.01, 0.02]	0.01	1.05	.295
Sleep regularity × age	0.00 [0.00, 0.00]	0.00	-3.64	< .001	0.00 [0.00, 0.00]	0.00	-5.59	< .001
Age × Sleep regularity ²	0.00 [0.00, 0.00]	0.00	-1.14	.256	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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.18 [-0.04, 0.40]	0.11	1.60	.110	0.19 [-0.03, 0.40]	0.11	1.73	.085
Physical activity	0.08 [0.01, 0.14]	0.03	2.41	.016	0.08 [0.01, 0.15]	0.04	2.22	.039
Physical activity ²	0.01 [-0.02, 0.03]	0.01	0.55	.579	0.02 [-0.02, 0.06]	0.02	0.94	.353
Age	0.00 [-0.01, 0.00]	0.00	-2.10	.035	0.00 [-0.01, 0.00]	0.00	-2.17	.030
Physical activity × bmi	0.00 [0.00, 0.00]	0.00	0.27	.786	0.00 [0.00, 0.00]	0.00	-0.44	.665
Sleep efficiency (z)								
(Intercept)	0.29 [0.05, 0.53]	0.12	2.38	.018	0.29 [0.04, 0.53]	0.13	2.31	.021
Physical activity	0.11 [0.05, 0.18]	0.03	3.36	.001	0.07 [0.02, 0.13]	0.03	2.47	.014
Physical activity ²	-0.03 [-0.05, -0.01]	0.01	-2.48	.013	-0.01 [-0.05, 0.02]	0.02	-0.66	.512
Age	0.00 [0.00, 0.01]	0.00	1.01	.311	0.00 [0.00, 0.01]	0.00	0.92	.359
Physical activity × bmi	0.00 [-0.01, 0.00]	0.00	-2.37	.018	0.00 [0.00, 0.00]	0.00	-2.28	.023
Sleep onset (z)								
(Intercept)	0.14 [-0.17, 0.44]	0.16	0.87	.386	0.14 [-0.16, 0.44]	0.15	0.90	.366
Physical activity	0.01 [-0.04, 0.07]	0.03	0.56	.577	-0.03 [-0.08, 0.02]	0.02	-1.34	.182
Physical activity ²	-0.03 [-0.05, -0.01]	0.01	-3.29	.001	-0.02 [-0.05, 0.01]	0.02	-1.20	.232
Age	0.00 [0.00, 0.00]	0.00	0.52	.604	0.00 [0.00, 0.00]	0.00	0.21	.832
Physical activity × bmi	0.00 [-0.01, 0.00]	0.00	-3.30	.001	0.00 [0.00, 0.00]	0.00	-1.65	.100
Sleep regularity (z)								
(Intercept)	0.41 [0.22, 0.61]	0.10	4.08	< .001	0.59 [0.35, 0.83]	0.12	4.89	< .001
Physical activity	0.29 [0.17, 0.40]	0.06	5.00	.004	0.22 [0.15, 0.29]	0.04	6.17	< .001
Physical activity ²	-0.02 [-0.06, 0.01]	0.02	-1.41	.201	-0.10 [-0.14, -0.06]	0.02	-5.19	< .001

Table 6 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Age	0.00	[0.00, 0.00]	0.00	0.64	.523	0.00	[0.00, 0.00]	0.00	0.14	.893
Physical activity × bmi	0.00	[-0.01, 0.00]	0.00	-1.03	.364	0.00	[-0.01, 0.00]	0.00	-3.63	.001

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)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	1.39	[1.03, 1.74]	0.18	7.70	< .001	1.23	[1.02, 1.44]	0.11	11.66	< .001
Sleep duration	0.02	[-0.02, 0.05]	0.02	1.02	.306	-0.03	[-0.06, 0.01]	0.02	-1.57	.117
Sleep duration ²	-0.03	[-0.04, -0.01]	0.01	-3.51	< .001	-0.03	[-0.04, -0.01]	0.01	-3.81	< .001
Age	-0.02	[-0.02, -0.02]	0.00	-9.86	< .001	-0.02	[-0.03, -0.02]	0.00	-12.86	< .001
Sleep duration × bmi	0.00	[0.00, 0.00]	0.00	-1.35	.178	0.00	[0.00, 0.00]	0.00	2.23	.027
Sleep efficiency (z)										
(Intercept)	1.37	[1.02, 1.73]	0.18	7.55	< .001	1.20	[0.99, 1.41]	0.11	11.16	< .001
Sleep efficiency	0.00	[-0.06, 0.05]	0.03	-0.13	.903	0.03	[-0.01, 0.08]	0.02	1.45	.159
Sleep efficiency ²	-0.01	[-0.03, 0.01]	0.01	-1.33	.210	0.00	[-0.01, 0.01]	0.01	-0.06	.955
Age	-0.02	[-0.02, -0.02]	0.00	-9.87	< .001	-0.02	[-0.03, -0.02]	0.00	-12.87	< .001
Sleep efficiency × bmi	0.00	[0.00, 0.00]	0.00	0.16	.872	0.00	[0.00, 0.00]	0.00	-1.14	.260
Sleep onset (z)										
(Intercept)	1.36	[1.00, 1.71]	0.18	7.50	< .001	1.20	[0.99, 1.41]	0.11	11.30	< .001
Sleep onset	0.01	[-0.02, 0.05]	0.02	0.80	.425	0.04	[0.01, 0.07]	0.02	2.40	.016
Sleep onset ²	0.00	[-0.03, 0.03]	0.01	0.04	.964	0.00	[-0.03, 0.03]	0.01	-0.02	.985
Age	-0.02	[-0.02, -0.02]	0.00	-9.89	< .001	-0.02	[-0.03, -0.02]	0.00	-12.86	< .001
Sleep onset × bmi	0.00	[0.00, 0.00]	0.00	-0.47	.638	0.00	[0.00, 0.00]	0.00	-1.54	.124
Sleep regularity (z)										
(Intercept)	1.27	[0.92, 1.62]	0.18	7.16	< .001	1.16	[0.95, 1.37]	0.11	10.82	< .001
Sleep regularity	0.18	[0.12, 0.23]	0.03	6.73	< .001	0.12	[0.07, 0.18]	0.03	4.37	< .001
Sleep regularity ²	0.01	[-0.02, 0.04]	0.02	0.85	.394	0.00	[-0.03, 0.03]	0.02	-0.05	.958

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Age	-0.02	[-0.02, -0.02]	0.00	-9.85	< .001	-0.02	[-0.03, -0.02]	0.00	-12.90	< .001
Sleep regularity × bmi	0.00	[0.01, 0.00]	0.00	-2.90	.004	0.00	[0.01, 0.00]	0.00	-2.24	.037

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)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.19 [-0.04, 0.41]	0.11	1.65	.999	0.19 [-0.03, 0.40]	0.11	1.70	.090
Physical activity	0.08 [0.03, 0.13]	0.03	3.13	.003	0.07 [0.04, 0.11]	0.02	3.86	< .001
Physical activity ²	0.00 [-0.01, 0.02]	0.01	0.10	.921	0.02 [0.00, 0.04]	0.01	1.75	.081
Age	0.00 [-0.01, 0.00]	0.00	-2.08	.038	0.00 [-0.01, 0.00]	0.00	-2.11	.035
Physical activity × sesmedium	0.00 [-0.06, 0.06]	0.03	-0.04	.966	0.00 [-0.05, 0.04]	0.02	-0.12	.904
Physical activity × sesshigh	0.01 [-0.06, 0.08]	0.04	0.38	.709	0.00 [-0.05, 0.05]	0.03	-0.14	.889
Sleep efficiency (z)								
(Intercept)	0.28 [0.04, 0.52]	0.12	2.30	.022	0.29 [0.05, 0.53]	0.12	2.38	.018
Physical activity	0.01 [-0.04, 0.06]	0.02	0.32	.753	0.00 [-0.04, 0.04]	0.02	-0.09	.931
Physical activity ²	-0.01 [-0.02, 0.01]	0.01	-1.05	.299	0.00 [-0.03, 0.02]	0.01	-0.27	.788
Age	0.00 [0.00, 0.01]	0.00	0.99	.321	0.00 [0.00, 0.01]	0.00	0.88	.381
Physical activity × sesmedium	0.02 [-0.04, 0.09]	0.03	0.78	.438	0.01 [-0.04, 0.06]	0.03	0.38	.706
Physical activity × sesshigh	0.07 [0.01, 0.13]	0.03	2.12	.036	0.03 [-0.02, 0.08]	0.02	1.29	.198
Sleep onset (z)								
(Intercept)	0.09 [-0.21, 0.40]	0.16	0.59	.554	0.12 [-0.18, 0.42]	0.15	0.78	.433
Physical activity	-0.09 [-0.13, -0.05]	0.02	-4.42	< .001	-0.09 [-0.12, -0.06]	0.02	-5.50	< .001
Physical activity ²	0.01 [0.00, 0.02]	0.01	2.11	.035	0.01 [-0.01, 0.02]	0.01	0.56	.578
Age	0.00 [0.00, 0.00]	0.00	0.62	.536	0.00 [0.00, 0.00]	0.00	0.21	.830
Physical activity × sesmedium	0.05 [-0.01, 0.10]	0.03	1.76	.085	0.01 [-0.02, 0.05]	0.02	0.76	.450
Physical activity × sesshigh	0.04 [-0.02, 0.10]	0.03	1.41	.175	0.03 [-0.02, 0.07]	0.02	1.16	.257
Sleep regularity (z)								

Table 8 continued

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	0.44 [0.24, 0.64]	0.10	4.33	< .001	0.52 [0.29, 0.74]	0.11	4.50	< .001
Physical activity	0.20 [0.14, 0.27]	0.03	6.04	< .001	0.08 [0.03, 0.12]	0.02	3.06	.009
Physical activity ²	-0.04 [-0.06, -0.03]	0.01	-5.79	< .001	-0.02 [-0.04, 0.01]	0.01	-1.29	.201
Age	0.00 [0.00, 0.00]	0.00	0.61	.542	0.00 [0.00, 0.00]	0.00	0.18	.860
Physical activity × sesmedium	0.02 [-0.05, 0.09]	0.04	0.62	.538	0.03 [-0.03, 0.08]	0.03	0.90	.378
Physical activity × seshigh	0.02 [-0.07, 0.12]	0.05	0.50	.636	0.04 [-0.04, 0.11]	0.04	0.89	.412

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)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.38 [1.02, 1.73]	0.18	7.65	< .001	1.21 [1.01, 1.42]	0.11	11.44	< .001
Sleep duration	-0.01 [-0.03, 0.02]	0.01	-0.46	.647	0.01 [-0.01, 0.03]	0.01	0.86	.393
Sleep duration ²	-0.02 [-0.03, 0.00]	0.01	-2.79	.005	-0.02 [-0.03, 0.00]	0.01	-2.65	.008
Age	-0.02 [-0.02, -0.02]	0.00	-9.88	< .001	-0.02 [-0.03, -0.02]	0.00	-12.86	< .001
Sleep duration × sesmedium	0.00 [-0.04, 0.03]	0.02	-0.27	.787	0.01 [-0.02, 0.04]	0.02	0.47	.640
Sleep duration × sesshigh	0.01 [-0.03, 0.05]	0.02	0.52	.606	-0.01 [-0.04, 0.02]	0.02	-0.68	.497
Sleep efficiency (z)								
(Intercept)	1.36 [1.01, 1.72]	0.18	7.53	< .001	1.20 [0.99, 1.41]	0.11	11.26	< .001
Sleep efficiency	0.01 [-0.03, 0.04]	0.02	0.35	.726	0.00 [-0.02, 0.03]	0.01	0.26	.795
Sleep efficiency ²	0.00 [-0.01, 0.01]	0.01	-0.10	.918	0.00 [-0.01, 0.01]	0.01	0.04	.967
Age	-0.02 [-0.02, -0.02]	0.00	-9.88	< .001	-0.02 [-0.03, -0.02]	0.00	-12.87	< .001
Sleep efficiency × sesmedium	-0.01 [-0.05, 0.03]	0.02	-0.37	.715	0.01 [-0.02, 0.05]	0.02	0.65	.516
Sleep efficiency × sesshigh	-0.01 [-0.05, 0.04]	0.02	-0.30	.763	0.00 [-0.03, 0.04]	0.02	0.24	.813
Sleep onset (z)								
(Intercept)	1.38 [1.03, 1.73]	0.18	7.63	< .001	1.20 [0.99, 1.41]	0.11	11.23	< .001
Sleep onset	0.01 [-0.02, 0.03]	0.01	0.71	.479	0.01 [-0.01, 0.04]	0.01	1.14	.256
Sleep onset ²	-0.02 [-0.04, 0.00]	0.01	-2.20	.030	0.01 [-0.01, 0.02]	0.01	0.71	.478
Age	-0.02 [-0.02, -0.02]	0.00	-9.86	< .001	-0.02 [-0.03, -0.02]	0.00	-12.86	< .001
Sleep onset × sesmedium	0.00 [-0.03, 0.04]	0.02	0.16	.870	0.01 [-0.02, 0.04]	0.02	0.59	.552
Sleep onset × sesshigh	-0.01 [-0.05, 0.02]	0.02	-0.86	.391	0.00 [-0.03, 0.03]	0.02	-0.20	.839
Sleep regularity (z)								

Table 9 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	1.29 [0.94, 1.64]	0.18	7.28	< .001	1.16 [0.96, 1.36]	0.10	11.14	< .001
Sleep regularity	0.10 [0.06, 0.13]	0.02	5.76	< .001	0.06 [0.03, 0.09]	0.02	4.08	< .001
Sleep regularity ²	0.00 [-0.02, 0.02]	0.01	-0.02	.982	0.00 [-0.01, 0.02]	0.01	0.47	.636
Age	-0.02 [-0.02, -0.02]	0.00	-9.86	< .001	-0.02 [-0.03, -0.02]	0.00	-12.97	< .001
Sleep regularity × sesmedium	0.01 [-0.03, 0.05]	0.02	0.40	.691	-0.01 [-0.05, 0.03]	0.02	-0.50	.615
Sleep regularity × seshigh	0.01 [-0.03, 0.05]	0.02	0.44	.662	0.00 [-0.04, 0.04]	0.02	0.18	.861

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.20 [-0.02, 0.42]	0.11	1.77	.077	0.22 [0.01, 0.43]	0.11	2.01	.044
Physical activity	0.10 [0.06, 0.13]	0.02	5.12	< .001	0.06 [0.03, 0.09]	0.01	4.09	< .001
Physical activity ²	-0.01 [-0.02, 0.00]	0.01	-2.10	.036	-0.01 [-0.03, 0.01]	0.01	-0.88	.378
Age	0.00 [-0.01, 0.00]	0.00	-2.11	.035	0.00 [-0.01, 0.00]	0.00	-2.19	.029
Physical activity × sexmale	-0.02 [-0.07, 0.03]	0.02	-0.86	.391	0.02 [-0.02, 0.05]	0.02	0.99	.323
Sleep efficiency (z)								
(Intercept)	0.28 [0.04, 0.52]	0.12	2.27	.024	0.30 [0.06, 0.54]	0.12	2.41	.016
Physical activity	0.02 [-0.02, 0.06]	0.02	1.10	.273	-0.01 [-0.04, 0.02]	0.01	-0.80	.424
Physical activity ²	-0.01 [-0.02, 0.00]	0.01	-2.37	.018	-0.02 [-0.03, 0.00]	0.01	-1.84	.066
Age	0.00 [0.00, 0.01]	0.00	1.06	.290	0.00 [0.00, 0.01]	0.00	0.94	.346
Physical activity × sexmale	0.04 [-0.01, 0.09]	0.02	1.46	.144	0.04 [0.01, 0.08]	0.02	2.23	.026
Sleep onset (z)								
(Intercept)	0.10 [-0.21, 0.40]	0.16	0.61	.539	0.12 [-0.18, 0.41]	0.15	0.76	.449
Physical activity	-0.09 [-0.12, -0.06]	0.01	-5.87	< .001	-0.08 [-0.10, -0.05]	0.01	-6.78	< .001
Physical activity ²	0.01 [0.00, 0.02]	0.00	1.86	.062	0.00 [-0.01, 0.02]	0.01	0.40	.686
Age	0.00 [0.00, 0.00]	0.00	0.65	.515	0.00 [0.00, 0.00]	0.00	0.31	.760
Physical activity × sexmale	0.05 [0.01, 0.09]	0.02	2.45	.014	0.01 [-0.02, 0.03]	0.01	0.41	.684
Sleep regularity (z)								
(Intercept)	0.43 [0.23, 0.64]	0.10	4.18	< .001	0.54 [0.31, 0.77]	0.12	4.66	< .001
Physical activity	0.22 [0.18, 0.26]	0.02	10.48	< .001	0.08 [0.05, 0.11]	0.02	5.24	< .001
Physical activity ²	-0.04 [-0.05, -0.03]	0.01	-6.59	< .001	-0.04 [-0.06, -0.03]	0.01	-4.70	< .001

Table 10 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Age	0.00 [0.00, 0.00]	0.00	0.66	.512	0.00 [0.00, 0.00]	0.00	0.22	.828
Physical activity \times sexmale	0.00 [-0.06, 0.05]	0.03	-0.02	.982	0.02 [-0.02, 0.06]	0.02	0.92	.356

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)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	1.39	[1.03, 1.74]	0.18	7.69	< .001	1.21	[1.01, 1.42]	0.11	11.49	< .001
Sleep duration	-0.01	[-0.03, 0.01]	0.01	-1.06	.290	0.01	[-0.01, 0.03]	0.01	0.79	.429
Sleep duration ²	-0.03	[-0.03, -0.02]	0.00	-5.87	< .001	-0.01	[-0.02, -0.01]	0.00	-3.37	.001
Age	-0.02	[-0.02, -0.02]	0.00	-9.86	< .001	-0.02	[-0.03, -0.02]	0.00	-12.87	< .001
Sleep duration × sexmale	0.01	[-0.01, 0.04]	0.01	1.06	.288	0.00	[-0.02, 0.03]	0.01	0.32	.751
Sleep efficiency (z)										
(Intercept)	1.37	[1.01, 1.72]	0.18	7.57	< .001	1.21	[1.00, 1.41]	0.11	11.32	< .001
Sleep efficiency	0.01	[-0.01, 0.03]	0.01	0.64	.523	0.01	[-0.01, 0.03]	0.01	0.76	.449
Sleep efficiency ²	-0.01	[-0.01, 0.00]	0.00	-1.92	.056	0.00	[-0.01, 0.00]	0.00	-1.12	.261
Age	-0.02	[-0.02, -0.02]	0.00	-9.87	< .001	-0.02	[-0.03, -0.02]	0.00	-12.85	< .001
Sleep efficiency × sexmale	-0.01	[-0.05, 0.02]	0.02	-0.90	.369	0.00	[-0.03, 0.03]	0.01	0.16	.873
Sleep onset (z)										
(Intercept)	1.38	[1.02, 1.73]	0.18	7.63	< .001	1.20	[0.99, 1.41]	0.11	11.32	< .001
Sleep onset	0.02	[0.00, 0.04]	0.01	2.11	.035	0.01	[-0.01, 0.03]	0.01	1.09	.274
Sleep onset ²	-0.02	[-0.03, 0.00]	0.01	-2.69	.007	0.00	[-0.01, 0.01]	0.01	-0.16	.876
Age	-0.02	[-0.02, -0.02]	0.00	-9.90	< .001	-0.02	[-0.03, -0.02]	0.00	-12.85	< .001
Sleep onset × sexmale	-0.03	[-0.06, 0.00]	0.01	-2.29	.022	0.01	[-0.01, 0.04]	0.01	0.99	.324
Sleep regularity (z)										
(Intercept)	1.29	[0.94, 1.64]	0.18	7.32	< .001	1.17	[0.97, 1.38]	0.10	11.29	< .001
Sleep regularity	0.09	[0.07, 0.11]	0.01	8.27	< .001	0.05	[0.03, 0.07]	0.01	5.24	< .001
Sleep regularity ²	0.00	[-0.01, 0.01]	0.01	-0.03	.978	-0.01	[-0.02, 0.00]	0.01	-1.55	.120

Table 11 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Age	-0.02	[-0.02, -0.02]	0.00	-9.86	< .001	-0.02	[-0.03, -0.02]	0.00	-12.99	< .001
Sleep regularity \times sexmale	0.03	[0.00, 0.06]	0.02	1.90	.058	0.01	[-0.02, 0.04]	0.02	0.92	.361

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.

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.21 [-0.01, 0.43]	0.11	1.83	.067	0.24 [0.02, 0.45]	0.11	2.17	.030
Physical activity	0.07 [0.02, 0.13]	0.03	2.83	.005	0.09 [0.05, 0.13]	0.02	4.91	< .001
Weekdaymonday	-0.03 [-0.08, 0.02]	0.03	-1.31	.189	-0.06 [-0.12, 0.00]	0.03	-2.11	.035
Weekdaysaturday	0.06 [0.01, 0.10]	0.02	2.34	.020	0.06 [0.00, 0.12]	0.03	2.12	.034
Weekdaysunday	-0.01 [-0.05, 0.04]	0.02	-0.25	.805	-0.04 [-0.09, 0.02]	0.03	-1.30	.195
Weekdaythursday	0.00 [-0.05, 0.05]	0.03	-0.16	.870	-0.02 [-0.08, 0.04]	0.03	-0.69	.491
Weekdaytuesday	-0.03 [-0.08, 0.02]	0.03	-1.36	.172	-0.04 [-0.10, 0.02]	0.03	-1.43	.154
Weekdaywednesday	-0.08 [-0.13, -0.03]	0.03	-3.20	.001	-0.10 [-0.16, -0.04]	0.03	-3.42	.001
Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.21	.228	-0.02 [-0.05, 0.01]	0.01	-1.52	.130
Age	0.00 [-0.01, 0.00]	0.00	-2.13	.033	0.00 [-0.01, 0.00]	0.00	-2.16	.031
Physical activity × weekdaymonday	0.05 [-0.02, 0.11]	0.03	1.45	.148	0.00 [-0.05, 0.04]	0.02	-0.22	.829
Physical activity × weekdaysaturday	-0.01 [-0.07, 0.05]	0.03	-0.30	.764	-0.06 [-0.10, -0.01]	0.02	-2.62	.009
Physical activity × weekdaysunday	0.03 [-0.03, 0.09]	0.03	0.90	.367	-0.07 [-0.11, -0.02]	0.02	-2.85	.004
Physical activity × weekdaythursday	0.02 [-0.04, 0.09]	0.03	0.68	.496	0.00 [-0.05, 0.04]	0.02	-0.15	.881
Physical activity × weekdaytuesday	0.00 [-0.06, 0.07]	0.03	0.12	.905	-0.01 [-0.06, 0.03]	0.02	-0.55	.581
Physical activity × weekdaywednesday	-0.03 [-0.09, 0.04]	0.03	-0.78	.432	0.00 [-0.05, 0.04]	0.02	-0.16	.876
Weekdaymonday × Physical activity ²	0.00 [-0.02, 0.03]	0.01	0.45	.650	0.02 [-0.01, 0.06]	0.02	1.47	.141
Weekdaysaturday × Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.67	.500	0.00 [-0.03, 0.04]	0.02	0.24	.810
Weekdaysunday × Physical activity ²	0.00 [-0.02, 0.02]	0.01	-0.17	.865	0.02 [-0.01, 0.06]	0.02	1.37	.169
Weekdaythursday × Physical activity ²	0.00 [-0.02, 0.02]	0.01	0.01	.991	0.01 [-0.02, 0.05]	0.02	0.82	.411
Weekdaytuesday × Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.90	.369	0.02 [-0.02, 0.05]	0.02	0.98	.326

Table 12 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekdaywednesday \times Physical activity ²	0.01 [-0.01, 0.04]	0.01	1.19	.235	0.03 [0.00, 0.07]	0.02	1.71	.088
Sleep efficiency (z)								
(Intercept)	0.33 [0.09, 0.57]	0.12	2.65	.008	0.35 [0.10, 0.59]	0.13	2.78	.006
Physical activity	0.02 [-0.03, 0.08]	0.03	0.86	.389	-0.01 [-0.05, 0.02]	0.02	-0.65	.515
Weekdaymonday	-0.06 [-0.11, -0.01]	0.03	-2.18	.029	-0.05 [-0.11, 0.00]	0.03	-1.90	.058
Weekdaysaturday	-0.11 [-0.16, -0.06]	0.02	-4.56	< .001	-0.12 [-0.18, -0.07]	0.03	-4.30	< .001
Weekdaysunday	-0.12 [-0.17, -0.07]	0.03	-4.75	< .001	-0.14 [-0.19, -0.08]	0.03	-4.81	< .001
Weekdaythursday	0.01 [-0.04, 0.06]	0.03	0.26	.795	0.00 [-0.06, 0.06]	0.03	0.04	.966
Weekdaytuesday	0.00 [-0.05, 0.05]	0.03	-0.10	.918	0.00 [-0.05, 0.06]	0.03	0.16	.876
Weekdaywednesday	-0.01 [-0.06, 0.04]	0.03	-0.47	.638	-0.01 [-0.07, 0.05]	0.03	-0.25	.799
Physical activity ²	-0.01 [-0.03, 0.00]	0.01	-1.39	.164	-0.01 [-0.04, 0.02]	0.01	-0.75	.452
Age	0.00 [0.00, 0.01]	0.00	1.03	.305	0.00 [0.00, 0.01]	0.00	0.88	.378
Physical activity \times weekdaymonday	0.02 [-0.05, 0.08]	0.03	0.48	.633	0.01 [-0.04, 0.05]	0.02	0.34	.731
Physical activity \times weekdaysaturday	0.02 [-0.05, 0.08]	0.03	0.53	.593	-0.02 [-0.06, 0.03]	0.02	-0.67	.504
Physical activity \times weekdaysunday	0.05 [-0.02, 0.11]	0.03	1.42	.157	0.02 [-0.03, 0.06]	0.02	0.68	.499
Physical activity \times weekdaythursday	-0.01 [-0.08, 0.06]	0.03	-0.26	.795	0.04 [-0.01, 0.08]	0.02	1.65	.099
Physical activity \times weekdaytuesday	-0.01 [-0.08, 0.06]	0.04	-0.29	.773	0.01 [-0.03, 0.06]	0.02	0.60	.548
Physical activity \times weekdaywednesday	-0.02 [-0.09, 0.05]	0.03	-0.51	.613	0.03 [-0.02, 0.08]	0.02	1.27	.206
Weekdaymonday \times Physical activity ²	0.00 [-0.02, 0.02]	0.01	0.19	.847	0.00 [-0.04, 0.03]	0.02	-0.21	.831
Weekdaysaturday \times Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.65	.515	0.02 [-0.02, 0.05]	0.02	0.84	.402
Weekdaysunday \times Physical activity ²	0.00 [-0.02, 0.02]	0.01	-0.18	.854	0.01 [-0.03, 0.04]	0.02	0.48	.630
Weekdaythursday \times Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.68	.498	0.01 [-0.03, 0.05]	0.02	0.50	.617
Weekdaytuesday \times Physical activity ²	0.00 [-0.03, 0.02]	0.01	-0.27	.784	-0.01 [-0.05, 0.02]	0.02	-0.65	.516

Table 12 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekdaywednesday \times Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.67	.502	0.00 [-0.04, 0.04]	0.02	0.02	.985
Sleep onset (z)								
(Intercept)	0.10 [-0.20, 0.41]	0.16	0.65	.513	0.10 [-0.19, 0.40]	0.15	0.69	.493
Physical activity	-0.03 [-0.07, 0.01]	0.02	-1.53	.125	-0.05 [-0.08, -0.02]	0.01	-3.51	< .001
Weekdaymonday	-0.10 [-0.14, -0.06]	0.02	-5.02	< .001	-0.08 [-0.12, -0.03]	0.02	-3.35	.001
Weekdaysaturday	0.07 [0.03, 0.11]	0.02	3.77	< .001	0.07 [0.02, 0.11]	0.02	3.04	.002
Weekdaysunday	0.09 [0.05, 0.13]	0.02	4.52	< .001	0.07 [0.03, 0.11]	0.02	3.13	.002
Weekdaythursday	-0.08 [-0.12, -0.04]	0.02	-4.01	< .001	-0.07 [-0.12, -0.02]	0.02	-3.01	.003
Weekdaytuesday	-0.05 [-0.09, -0.01]	0.02	-2.33	.020	-0.02 [-0.07, 0.02]	0.02	-1.08	.281
Weekdaywednesday	-0.03 [-0.07, 0.01]	0.02	-1.34	.181	0.01 [-0.04, 0.05]	0.02	0.39	.699
Physical activity ²	0.01 [-0.01, 0.02]	0.01	0.92	.357	0.02 [0.00, 0.04]	0.01	1.72	.086
Age	0.00 [0.00, 0.00]	0.00	0.72	.472	0.00 [0.00, 0.00]	0.00	0.35	.728
Physical activity \times weekdaymonday	-0.08 [-0.14, -0.03]	0.03	-3.31	.001	-0.04 [-0.08, -0.01]	0.02	-2.37	.018
Physical activity \times weekdaysaturday	0.07 [0.02, 0.12]	0.03	2.62	.009	0.02 [-0.02, 0.05]	0.02	0.96	.337
Physical activity \times weekdaysunday	0.04 [-0.01, 0.09]	0.03	1.50	.133	-0.03 [-0.06, 0.01]	0.02	-1.43	.153
Physical activity \times weekdaythursday	-0.08 [-0.13, -0.02]	0.03	-2.83	.005	-0.03 [-0.07, 0.01]	0.02	-1.67	.095
Physical activity \times weekdaytuesday	-0.08 [-0.14, -0.03]	0.03	-3.09	.002	-0.02 [-0.05, 0.02]	0.02	-0.95	.342
Physical activity \times weekdaywednesday	-0.10 [-0.15, -0.05]	0.03	-3.73	< .001	-0.01 [-0.04, 0.03]	0.02	-0.46	.646
Weekdaymonday \times Physical activity ²	0.01 [-0.01, 0.02]	0.01	0.79	.427	-0.01 [-0.04, 0.01]	0.01	-0.93	.352
Weekdaysaturday \times Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.34	.180	-0.01 [-0.04, 0.02]	0.01	-0.62	.539
Weekdaysunday \times Physical activity ²	-0.02 [-0.04, 0.00]	0.01	-2.30	.021	-0.01 [-0.04, 0.01]	0.01	-0.87	.385
Weekdaythursday \times Physical activity ²	0.01 [-0.01, 0.03]	0.01	1.13	.260	0.00 [-0.03, 0.03]	0.01	-0.01	.994
Weekdaytuesday \times Physical activity ²	0.01 [-0.01, 0.02]	0.01	0.59	.558	-0.02 [-0.05, 0.01]	0.01	-1.18	.237

Table 12 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekdaywednesday \times Physical activity ²	0.01 [0.00, 0.03]	0.01	1.65	.099	-0.02 [-0.05, 0.00]	0.01	-1.67	.096
Sleep regularity (z)								
(Intercept)	0.44 [0.23, 0.65]	0.11	4.05	< .001	0.55 [0.31, 0.79]	0.12	4.54	< .001
Physical activity	0.17 [0.10, 0.23]	0.03	5.30	< .001	0.00 [-0.04, 0.04]	0.02	-0.15	.884
Weekdaymonday	0.03 [-0.03, 0.08]	0.03	0.97	.331	0.02 [-0.05, 0.09]	0.03	0.63	.532
Weekdaysaturday	-0.14 [-0.20, -0.08]	0.03	-4.84	< .001	-0.14 [-0.21, -0.08]	0.03	-4.12	< .001
Weekdaysunday	-0.16 [-0.21, -0.11]	0.03	-6.03	< .001	-0.19 [-0.25, -0.13]	0.03	-6.12	< .001
Weekdaythursday	0.16 [0.10, 0.21]	0.03	5.74	< .001	0.18 [0.12, 0.24]	0.03	5.82	< .001
Weekdaytuesday	0.17 [0.11, 0.22]	0.03	5.76	< .001	0.19 [0.12, 0.26]	0.04	5.23	< .001
Weekdaywednesday	0.14 [0.09, 0.20]	0.03	4.90	< .001	0.20 [0.13, 0.27]	0.04	5.61	< .001
Physical activity ²	-0.03 [-0.05, -0.01]	0.01	-2.90	.006	-0.02 [-0.05, 0.01]	0.01	-1.27	.204
Age	0.00 [0.00, 0.00]	0.00	0.51	.609	0.00 [0.00, 0.00]	0.00	-0.05	.960
Physical activity \times weekdaymonday	0.07 [-0.01, 0.15]	0.04	1.72	.099	0.15 [0.10, 0.20]	0.03	5.96	< .001
Physical activity \times weekdaysaturday	0.03 [-0.06, 0.11]	0.04	0.57	.582	-0.02 [-0.07, 0.03]	0.03	-0.63	.530
Physical activity \times weekdaysunday	0.10 [0.02, 0.18]	0.04	2.48	.020	0.02 [-0.03, 0.07]	0.03	0.77	.441
Physical activity \times weekdaythursday	0.00 [-0.09, 0.09]	0.05	0.00	.996	0.10 [0.05, 0.14]	0.02	3.95	< .001
Physical activity \times weekdaytuesday	-0.01 [-0.08, 0.06]	0.04	-0.32	.752	0.16 [0.11, 0.21]	0.03	6.27	< .001
Physical activity \times weekdaywednesday	-0.01 [-0.13, 0.10]	0.06	-0.26	.806	0.09 [0.04, 0.14]	0.02	3.49	< .001
Weekdaymonday \times Physical activity ²	-0.02 [-0.04, 0.00]	0.01	-1.61	.112	-0.04 [-0.08, 0.01]	0.02	-1.65	.113
Weekdaysaturday \times Physical activity ²	0.00 [-0.03, 0.02]	0.01	-0.14	.890	-0.02 [-0.05, 0.02]	0.02	-0.81	.420
Weekdaysunday \times Physical activity ²	-0.01 [-0.04, 0.01]	0.01	-1.07	.295	-0.02 [-0.06, 0.02]	0.02	-1.01	.312
Weekdaythursday \times Physical activity ²	0.01 [-0.02, 0.04]	0.01	0.46	.653	-0.03 [-0.07, 0.01]	0.02	-1.30	.194
Weekdaytuesday \times Physical activity ²	0.01 [-0.01, 0.04]	0.01	0.91	.364	-0.03 [-0.07, 0.02]	0.02	-1.16	.254

Table 12 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Weekdaywednesday \times Physical activity ²	0.00	[-0.02, 0.03]	0.01	0.34	.738	-0.06	[-0.10, -0.02]	0.02	-2.74	.010

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.45 [1.10, 1.81]	0.18	8.00	< .001	1.28 [1.07, 1.49]	0.11	12.05	< .001
Sleep duration	0.03 [0.00, 0.06]	0.02	1.81	.071	0.05 [0.01, 0.08]	0.02	2.84	.005
Weekdaymonday	-0.15 [-0.19, -0.11]	0.02	-7.87	< .001	-0.10 [-0.14, -0.07]	0.02	-5.52	< .001
Weekdaysaturday	-0.07 [-0.11, -0.03]	0.02	-3.64	< .001	-0.10 [-0.14, -0.06]	0.02	-5.23	< .001
Weekdaysunday	-0.16 [-0.20, -0.12]	0.02	-8.47	< .001	-0.20 [-0.23, -0.16]	0.02	-10.55	< .001
Weekdaythursday	-0.04 [-0.08, 0.00]	0.02	-1.89	.059	-0.02 [-0.06, 0.02]	0.02	-1.15	.251
Weekdaytuesday	-0.05 [-0.09, -0.02]	0.02	-2.75	.006	-0.05 [-0.09, -0.02]	0.02	-2.76	.006
Weekdaywednesday	-0.03 [-0.07, 0.01]	0.02	-1.47	.142	-0.02 [-0.06, 0.01]	0.02	-1.24	.214
Sleep duration ²	-0.01 [-0.03, 0.00]	0.01	-1.52	.128	-0.01 [-0.03, 0.00]	0.01	-1.58	.113
Age	-0.02 [-0.02, -0.02]	0.00	-9.83	< .001	-0.02 [-0.03, -0.02]	0.00	-12.81	< .001
Sleep duration × weekdaymonday	-0.05 [-0.09, 0.00]	0.02	-2.15	.031	-0.06 [-0.10, -0.02]	0.02	-2.81	.005
Sleep duration × weekdaysaturday	-0.04 [-0.08, 0.00]	0.02	-1.86	.063	-0.06 [-0.10, -0.02]	0.02	-2.88	.004
Sleep duration × weekdaysunday	-0.05 [-0.09, -0.01]	0.02	-2.28	.022	-0.08 [-0.12, -0.04]	0.02	-4.09	< .001
Sleep duration × weekdaythursday	-0.01 [-0.05, 0.04]	0.02	-0.31	.754	0.03 [-0.01, 0.08]	0.02	1.52	.129
Sleep duration × weekdaytuesday	0.00 [-0.05, 0.04]	0.02	-0.13	.895	0.00 [-0.04, 0.05]	0.02	0.16	.875
Sleep duration × weekdaywednesday	-0.03 [-0.08, 0.01]	0.02	-1.43	.153	0.00 [-0.05, 0.04]	0.02	-0.11	.913
Weekdaymonday × Sleep duration ²	-0.01 [-0.03, 0.01]	0.01	-0.93	.350	0.01 [-0.01, 0.03]	0.01	0.73	.466
Weekdaysaturday × Sleep duration ²	-0.01 [-0.03, 0.01]	0.01	-0.72	.473	0.00 [-0.03, 0.02]	0.01	-0.36	.716
Weekdaysunday × Sleep duration ²	-0.01 [-0.03, 0.01]	0.01	-1.14	.256	-0.01 [-0.03, 0.01]	0.01	-0.58	.564
Weekdaytuesday × Sleep duration ²	0.00 [-0.03, 0.02]	0.01	-0.06	.952	0.02 [0.00, 0.05]	0.01	1.91	.056
Weekdaythursday × Sleep duration ²	0.01 [-0.02, 0.03]	0.01	0.50	.619	0.02 [0.00, 0.04]	0.01	1.71	.088

Table 13 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Weekdaywednesday × Sleep duration ²	0.00	[-0.02, 0.02]	0.01	-0.19	.846	0.01	[-0.01, 0.03]	0.01	0.99	.320
Sleep efficiency (z)										
(Intercept)	1.45	[1.10, 1.81]	0.18	7.98	< .001	1.28	[1.07, 1.49]	0.11	11.76	< .001
Sleep efficiency	-0.02	[-0.06, 0.01]	0.02	-1.31	.193	-0.01	[-0.06, 0.03]	0.02	-0.69	.497
Weekdaymonday	-0.17	[-0.21, -0.14]	0.02	-9.13	< .001	-0.11	[-0.14, -0.07]	0.02	-5.75	< .001
Weekdaysaturday	-0.08	[-0.12, -0.04]	0.02	-4.20	< .001	-0.11	[-0.15, -0.07]	0.02	-5.67	< .001
Weekdaysunday	-0.19	[-0.22, -0.15]	0.02	-9.53	< .001	-0.21	[-0.25, -0.18]	0.02	-11.04	< .001
Weekdaythursday	-0.05	[-0.09, -0.01]	0.02	-2.42	.016	-0.02	[-0.05, 0.02]	0.02	-0.87	.383
Weekdaytuesday	-0.06	[-0.10, -0.02]	0.02	-3.09	.002	-0.05	[-0.09, -0.01]	0.02	-2.65	.008
Weekdaywednesday	-0.03	[-0.07, 0.00]	0.02	-1.73	.084	-0.02	[-0.06, 0.02]	0.02	-1.05	.292
Sleep efficiency ²	-0.01	[-0.02, 0.00]	0.01	-1.71	.088	-0.01	[-0.02, 0.01]	0.01	-0.80	.427
Age	-0.02	[-0.02, -0.02]	0.00	-9.82	< .001	-0.02	[-0.03, -0.02]	0.00	-12.75	< .001
Sleep efficiency × weekdaymonday	0.02	[-0.03, 0.06]	0.02	0.66	.511	0.03	[-0.03, 0.08]	0.03	0.99	.328
Sleep efficiency × weekdaysaturday	0.01	[-0.04, 0.06]	0.02	0.36	.719	0.03	[-0.03, 0.08]	0.03	0.98	.340
Sleep efficiency × weekdaysunday	0.06	[0.01, 0.11]	0.03	2.53	.013	0.06	[0.00, 0.12]	0.03	2.03	.064
Sleep efficiency × weekdaythursday	0.01	[-0.05, 0.07]	0.03	0.41	.690	0.00	[-0.05, 0.05]	0.03	0.02	.982
Sleep efficiency × weekdaytuesday	0.00	[-0.04, 0.05]	0.02	0.20	.841	0.01	[-0.03, 0.06]	0.02	0.55	.583
Sleep efficiency × weekdaywednesday	0.02	[-0.03, 0.07]	0.03	0.79	.430	0.00	[-0.05, 0.05]	0.03	0.01	.994
Weekdaymonday × Sleep efficiency ²	0.01	[-0.01, 0.02]	0.01	0.94	.349	0.01	[-0.01, 0.02]	0.01	0.82	.413
Weekdaysaturday × Sleep efficiency ²	0.00	[-0.02, 0.02]	0.01	0.08	.933	0.00	[-0.02, 0.02]	0.01	0.15	.844
Weekdaysunday × Sleep efficiency ²	0.01	[-0.01, 0.03]	0.01	0.80	.426	0.01	[-0.02, 0.03]	0.01	0.50	.620
Weekdaythursday × Sleep efficiency ²	0.01	[-0.01, 0.03]	0.01	1.06	.297	0.01	[-0.01, 0.02]	0.01	0.96	.339
Weekdaytuesday × Sleep efficiency ²	0.01	[-0.01, 0.02]	0.01	0.86	.388	0.01	[-0.01, 0.02]	0.01	0.92	.359

Table 13 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Weekdaywednesday × Sleep efficiency ²	0.00	[−0.02, 0.02]	0.01	−0.06	.950	0.00	[−0.01, 0.02]	0.01	0.34	.737
Sleep onset (z)										
(Intercept)	1.46	[1.10, 1.81]	0.18	8.01	< .001	1.28	[1.07, 1.49]	0.11	11.86	< .001
Sleep onset	−0.01	[−0.04, 0.02]	0.01	−0.90	.368	−0.01	[−0.04, 0.02]	0.01	−0.74	.460
Weekdaymonday	−0.17	[−0.21, −0.13]	0.02	−7.57	< .001	−0.11	[−0.15, −0.07]	0.02	−5.12	< .001
Weekdaysaturday	−0.09	[−0.13, −0.04]	0.02	−3.83	< .001	−0.13	[−0.17, −0.08]	0.02	−5.80	< .001
Weekdaysunday	−0.18	[−0.22, −0.14]	0.02	−8.13	< .001	−0.22	[−0.26, −0.18]	0.02	−10.08	< .001
Weekdaythursday	−0.06	[−0.10, −0.01]	0.02	−2.40	.016	−0.03	[−0.07, 0.02]	0.02	−1.13	.257
Weekdaytuesday	−0.06	[−0.10, −0.01]	0.02	−2.61	.009	−0.05	[−0.09, −0.01]	0.02	−2.28	.022
Weekdaywednesday	−0.04	[−0.09, 0.00]	0.02	−1.85	.064	−0.02	[−0.06, 0.02]	0.02	−0.88	.379
Sleep onset ²	−0.01	[−0.04, 0.01]	0.01	−1.33	.185	0.00	[−0.02, 0.02]	0.01	−0.42	.672
Age	−0.02	[−0.02, −0.02]	0.00	−9.84	< .001	−0.02	[−0.03, −0.02]	0.00	−12.79	< .001
Sleep onset × weekdaymonday	0.02	[−0.01, 0.06]	0.02	1.29	.198	0.04	[0.01, 0.08]	0.02	2.45	.014
Sleep onset × weekdaysaturday	0.02	[−0.01, 0.06]	0.02	1.27	.205	0.05	[0.01, 0.08]	0.02	2.72	.007
Sleep onset × weekdaysunday	0.05	[0.02, 0.09]	0.02	2.94	.003	0.09	[0.06, 0.13]	0.02	5.24	< .001
Sleep onset × weekdaythursday	0.02	[−0.02, 0.05]	0.02	0.81	.420	−0.02	[−0.05, 0.02]	0.02	−0.86	.391
Sleep onset × weekdaytuesday	0.00	[−0.04, 0.03]	0.02	−0.16	.877	0.02	[−0.02, 0.05]	0.02	0.91	.364
Sleep onset × weekdaywednesday	0.02	[−0.02, 0.06]	0.02	1.02	.308	0.00	[−0.03, 0.04]	0.02	0.24	.807
Weekdaymonday × Sleep onset ²	0.00	[−0.03, 0.03]	0.01	0.06	.949	0.00	[−0.02, 0.03]	0.01	0.15	.878
Weekdaysaturday × Sleep onset ²	0.00	[−0.03, 0.03]	0.01	0.15	.884	0.01	[−0.02, 0.04]	0.01	0.90	.367
Weekdaysunday × Sleep onset ²	−0.01	[−0.03, 0.02]	0.01	−0.35	.725	−0.01	[−0.03, 0.02]	0.01	−0.49	.625
Weekdaythursday × Sleep onset ²	0.02	[−0.02, 0.05]	0.02	0.99	.322	0.02	[−0.01, 0.05]	0.02	1.32	.188
Weekdaytuesday × Sleep onset ²	0.00	[−0.03, 0.03]	0.02	0.31	.757	0.01	[−0.02, 0.03]	0.01	0.41	.681

Table 13 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Weekdaywednesday × Sleep onset ²	0.01	[0.02, 0.04]	0.02	0.48	.631	0.00	[-0.03, 0.03]	0.02	0.17	.865
Sleep regularity (z)										
(Intercept)	1.37	[1.02, 1.72]	0.18	7.69	< .001	1.26	[1.06, 1.47]	0.11	11.98	< .001
Sleep regularity	0.09	[0.06, 0.13]	0.02	5.14	< .001	0.04	[0.00, 0.07]	0.02	2.02	.043
Weekdaymonday	-0.14	[-0.18, -0.09]	0.02	-5.99	< .001	-0.11	[-0.16, -0.07]	0.02	-5.09	< .001
Weekdaysaturday	-0.05	[-0.10, -0.01]	0.02	-2.27	.023	-0.13	[-0.17, -0.08]	0.02	-5.67	< .001
Weekdaysunday	-0.15	[-0.20, -0.11]	0.02	-6.63	< .001	-0.23	[-0.27, -0.18]	0.02	-10.19	< .001
Weekdaythursday	-0.02	[-0.07, 0.03]	0.02	-0.76	.445	-0.02	[-0.07, 0.03]	0.02	-0.80	.421
Weekdaytuesday	-0.04	[-0.09, 0.00]	0.02	-1.84	.066	-0.05	[-0.10, -0.01]	0.02	-2.25	.024
Weekdaywednesday	-0.04	[-0.09, 0.00]	0.02	-1.77	.076	-0.02	[-0.07, 0.02]	0.02	-1.01	.312
Sleep regularity ²	-0.01	[-0.03, 0.02]	0.01	-0.47	.640	-0.03	[-0.05, -0.01]	0.01	-2.41	.016
Age	-0.02	[-0.02, -0.02]	0.00	-9.85	< .001	-0.02	[-0.03, -0.02]	0.00	-12.85	< .001
Sleep regularity × weekdaymonday	-0.04	[-0.09, 0.01]	0.03	-1.43	.155	0.02	[-0.03, 0.07]	0.02	0.88	.377
Sleep regularity × weekdaysaturday	-0.01	[-0.05, 0.04]	0.02	-0.23	.817	0.02	[-0.03, 0.06]	0.02	0.85	.393
Sleep regularity × weekend sunday	0.04	[-0.01, 0.09]	0.02	1.70	.090	0.06	[0.01, 0.10]	0.02	2.33	.020
Sleep regularity × weekend thursday	-0.03	[-0.08, 0.02]	0.03	-1.29	.197	-0.02	[-0.07, 0.02]	0.02	-1.01	.312
Sleep regularity × weekend tuesday	-0.03	[-0.08, 0.02]	0.02	-1.24	.216	-0.02	[-0.06, 0.03]	0.02	-0.85	.394
Weekdaymonday × Sleep regularity ²	0.01	[-0.02, 0.04]	0.02	0.65	.516	0.04	[0.01, 0.07]	0.02	2.34	.019
Weekdaysaturday × Sleep regularity ²	-0.02	[-0.05, 0.02]	0.02	-0.90	.369	0.03	[0.00, 0.07]	0.02	2.08	.038
Weekdaysunday × Sleep regularity ²	0.01	[-0.02, 0.04]	0.02	0.55	.584	0.04	[0.01, 0.07]	0.02	2.57	.010
Weekdaythursday × Sleep regularity ²	-0.01	[-0.05, 0.02]	0.02	-0.82	.410	0.02	[-0.01, 0.06]	0.02	1.45	.147
Weekdaytuesday × Sleep regularity ²	0.02	[-0.02, 0.05]	0.02	0.92	.357	0.03	[-0.01, 0.06]	0.02	1.63	.104

Table 13 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Weekdaywednesday \times Sleep regularity ²	0.01	[-0.02, 0.04]	0.02	0.57	.566	0.01	[-0.02, 0.04]	0.02	0.58	.561

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.22 [-0.01, 0.44]	0.11	1.91	.056	0.22 [0.01, 0.43]	0.11	2.05	.040
Physical activity	0.11 [0.06, 0.15]	0.02	4.67	< .001	0.09 [0.05, 0.12]	0.02	4.53	< .001
Seasonspring	-0.05 [-0.12, 0.02]	0.04	-1.50	.135	-0.03 [-0.10, 0.05]	0.04	-0.73	.466
Seasonsummer	-0.14 [-0.21, -0.06]	0.04	-3.64	< .001	-0.11 [-0.18, -0.03]	0.04	-2.70	.007
Seasonwinter	0.06 [-0.01, 0.12]	0.03	1.60	.110	0.05 [-0.02, 0.12]	0.04	1.36	.173
Physical activity ²	-0.01 [-0.02, 0.00]	0.01	-1.35	.178	0.00 [-0.02, 0.03]	0.01	0.30	.765
Age	0.00 [-0.01, 0.00]	0.00	-2.06	.040	0.00 [-0.01, 0.00]	0.00	-2.19	.029
Physical activity × seasonspring	-0.05 [-0.11, 0.02]	0.03	-1.41	.160	-0.02 [-0.07, 0.03]	0.02	-0.90	.371
Physical activity × seasonsummer	0.00 [-0.07, 0.08]	0.04	0.07	.941	-0.05 [-0.10, 0.00]	0.03	-1.79	.073
Physical activity × seasonwinter	-0.04 [-0.10, 0.02]	0.03	-1.28	.200	-0.03 [-0.07, 0.02]	0.03	-1.01	.314
Seasonspring × Physical activity ²	0.02 [0.00, 0.04]	0.01	1.48	.140	-0.01 [-0.04, 0.03]	0.02	-0.32	.748
Seasonsummer × Physical activity ²	-0.02 [-0.05, 0.01]	0.01	-1.48	.139	-0.05 [-0.08, -0.01]	0.02	-2.41	.016
Seasonwinter × Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.07	.947	0.01 [-0.02, 0.04]	0.02	0.50	.617
Sleep efficiency (z)								
(Intercept)	0.25 [0.01, 0.49]	0.12	2.00	.047	0.24 [-0.01, 0.49]	0.13	1.91	.058
Physical activity	0.09 [0.05, 0.14]	0.02	3.91	< .001	0.05 [0.01, 0.09]	0.02	2.60	.009
Seasonspring	0.03 [-0.04, 0.11]	0.04	0.95	.344	0.06 [-0.02, 0.13]	0.04	1.49	.136
Seasonsummer	0.00 [-0.07, 0.08]	0.04	0.07	.943	0.03 [-0.05, 0.11]	0.04	0.80	.424
Seasonwinter	0.07 [0.00, 0.14]	0.04	1.89	.058	0.08 [0.01, 0.16]	0.04	2.14	.032
Physical activity ²	-0.01 [-0.02, 0.00]	0.01	-2.55	.011	0.00 [-0.02, 0.03]	0.01	0.36	.716
Age	0.00 [0.00, 0.01]	0.00	1.09	.275	0.00 [0.00, 0.01]	0.00	0.99	.324

Table 14 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity \times seasonspring	-0.10 [-0.17, -0.03]	0.03	-2.95	.003	-0.07 [-0.12, -0.02]	0.03	-2.76	.006
Physical activity \times seasonsummer	-0.04 [-0.12, 0.04]	0.04	-1.02	.308	-0.08 [-0.13, -0.02]	0.03	-2.78	.005
Physical activity \times seasonwinter	-0.05 [-0.12, 0.01]	0.03	-1.60	.109	-0.03 [-0.08, 0.02]	0.03	-1.01	.313
Seasonspring \times Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.96	.336	-0.01 [-0.04, 0.02]	0.02	-0.51	.609
Seasonsummer \times Physical activity ²	-0.02 [-0.05, 0.01]	0.01	-1.33	.183	-0.05 [-0.08, -0.01]	0.02	-2.36	.018
Seasonwinter \times Physical activity ²	0.00 [-0.01, 0.02]	0.01	0.15	.885	-0.01 [-0.04, 0.03]	0.02	-0.46	.647
Sleep onset (z)								
(Intercept)	0.08 [-0.22, 0.39]	0.16	0.52	.601	0.10 [-0.20, 0.40]	0.15	0.68	.496
Physical activity	-0.04 [-0.08, -0.01]	0.02	-2.40	.016	-0.05 [-0.08, -0.02]	0.02	-3.45	.001
Seasonspring	0.01 [-0.05, 0.06]	0.03	0.29	.772	0.01 [-0.05, 0.07]	0.03	0.36	.719
Seasonsummer	0.06 [0.00, 0.12]	0.03	2.00	.045	0.05 [-0.01, 0.12]	0.03	1.72	.086
Seasonwinter	0.00 [-0.05, 0.06]	0.03	0.14	.887	0.01 [-0.05, 0.06]	0.03	0.20	.843
Physical activity ²	0.00 [0.00, 0.01]	0.00	1.01	.315	0.00 [-0.02, 0.02]	0.01	0.01	.989
Age	0.00 [0.00, 0.00]	0.00	0.67	.501	0.00 [0.00, 0.00]	0.00	0.28	.780
Physical activity \times seasonspring	-0.06 [-0.11, 0.00]	0.03	-2.15	.032	-0.03 [-0.07, 0.01]	0.02	-1.65	.098
Physical activity \times seasonsummer	-0.02 [-0.08, 0.04]	0.03	-0.56	.576	-0.01 [-0.05, 0.04]	0.02	-0.32	.747
Physical activity \times seasonwinter	-0.01 [-0.06, 0.04]	0.03	-0.26	.792	-0.03 [-0.07, 0.01]	0.02	-1.64	.101
Seasonspring \times Physical activity ²	0.02 [0.00, 0.03]	0.01	2.15	.031	0.01 [-0.01, 0.04]	0.01	0.89	.372
Seasonsummer \times Physical activity ²	0.02 [-0.01, 0.04]	0.01	1.42	.155	0.02 [-0.01, 0.05]	0.02	1.17	.241
Seasonwinter \times Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.71	.479	0.00 [-0.03, 0.02]	0.01	-0.30	.762
Sleep regularity (z)								
(Intercept)	0.44 [0.23, 0.65]	0.11	4.07	< .001	0.55 [0.32, 0.78]	0.12	4.63	< .001
Physical activity	0.22 [0.17, 0.27]	0.03	8.33	< .001	0.13 [0.09, 0.17]	0.02	6.10	< .001

Table 14 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Seasonspring	-0.02 [-0.09, 0.05]	0.04	-0.65	.519	-0.06 [-0.14, 0.02]	0.04	-1.57	.115
Seasonsummer	0.03 [-0.04, 0.11]	0.04	0.85	.394	0.05 [-0.04, 0.13]	0.04	1.10	.271
Seasonwinter	-0.02 [-0.09, 0.05]	0.04	-0.57	.570	-0.01 [-0.08, 0.07]	0.04	-0.16	.870
Physical activity ²	-0.03 [-0.04, -0.02]	0.01	-6.00	< .001	-0.04 [-0.07, -0.01]	0.01	-2.46	.017
Age	0.00 [0.00, 0.00]	0.00	0.67	.503	0.00 [0.00, 0.00]	0.00	0.21	.834
Physical activity × seasonspring	0.02 [-0.05, 0.09]	0.03	0.66	.507	-0.06 [-0.12, -0.01]	0.03	-2.37	.018
Physical activity × seasonsummer	0.05 [-0.04, 0.13]	0.04	1.06	.291	-0.03 [-0.09, 0.03]	0.03	-0.89	.375
Physical activity × seasonwinter	-0.02 [-0.09, 0.06]	0.04	-0.48	.636	-0.05 [-0.11, 0.01]	0.03	-1.50	.145
Seasonspring × Physical activity ²	-0.03 [-0.05, -0.01]	0.01	-2.53	.011	0.02 [-0.02, 0.05]	0.02	0.91	.366
Seasonsummer × Physical activity ²	-0.03 [-0.06, 0.00]	0.02	-1.94	.053	-0.03 [-0.07, 0.01]	0.02	-1.31	.193
Seasonwinter × Physical activity ²	0.00 [-0.01, 0.02]	0.01	0.48	.629	-0.01 [-0.04, 0.03]	0.02	-0.30	.761

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)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.39 [1.03, 1.74]	0.18	7.66	< .001	1.22 [1.02, 1.43]	0.11	11.50	< .001
Sleep duration	0.01 [-0.02, 0.03]	0.01	0.55	.585	0.02 [-0.01, 0.05]	0.01	1.49	.138
Seasonspring	0.00 [-0.07, 0.06]	0.03	-0.06	.954	-0.02 [-0.08, 0.03]	0.03	-0.83	.409
Seasonsummer	-0.06 [-0.12, 0.01]	0.03	-1.65	.098	-0.08 [-0.14, -0.02]	0.03	-2.68	.007
Seasonwinter	0.01 [-0.06, 0.07]	0.03	0.19	.850	0.01 [-0.05, 0.06]	0.03	0.25	.805
Sleep duration ²	-0.02 [-0.03, -0.01]	0.01	-3.13	.002	0.00 [-0.01, 0.01]	0.01	-0.46	.646
Age	-0.02 [-0.02, -0.02]	0.00	-9.88	< .001	-0.02 [-0.03, -0.02]	0.00	-12.88	< .001
Sleep duration × seasonspring	-0.05 [-0.09, -0.01]	0.02	-2.75	.006	-0.02 [-0.06, 0.01]	0.02	-1.30	.193
Sleep duration × seasonsummer	-0.02 [-0.06, 0.03]	0.02	-0.77	.442	-0.02 [-0.06, 0.02]	0.02	-0.94	.348
Sleep duration × seasonwinter	0.02 [-0.01, 0.06]	0.02	1.21	.226	-0.01 [-0.04, 0.03]	0.02	-0.28	.779
Seasonspring × Sleep duration ²	-0.01 [-0.03, 0.00]	0.01	-1.50	.133	-0.01 [-0.03, 0.00]	0.01	-1.59	.111
Seasonsummer × Sleep duration ²	0.01 [-0.01, 0.03]	0.01	0.76	.446	-0.01 [-0.03, 0.01]	0.01	-1.22	.223
Seasonwinter × Sleep duration ²	0.00 [-0.02, 0.01]	0.01	-0.54	.589	-0.01 [-0.03, 0.00]	0.01	-1.50	.133
Sleep efficiency (z)								
(Intercept)	1.37 [1.02, 1.73]	0.18	7.56	< .001	1.22 [1.01, 1.43]	0.11	11.43	< .001
Sleep efficiency	0.03 [0.00, 0.06]	0.02	1.75	.082	0.02 [-0.01, 0.05]	0.01	1.21	.227
Seasonspring	0.00 [-0.07, 0.06]	0.03	-0.13	.893	-0.03 [-0.09, 0.02]	0.03	-1.12	.263
Seasonsummer	-0.06 [-0.12, 0.01]	0.03	-1.69	.091	-0.10 [-0.16, -0.04]	0.03	-3.30	.001
Seasonwinter	0.01 [-0.05, 0.07]	0.03	0.36	.722	0.00 [-0.06, 0.05]	0.03	-0.04	.971
Sleep efficiency ²	0.00 [-0.01, 0.01]	0.00	-0.58	.562	0.00 [-0.01, 0.01]	0.00	0.20	.839
Age	-0.02 [-0.02, -0.02]	0.00	-9.86	< .001	-0.02 [-0.03, -0.02]	0.00	-12.89	< .001

Table 15 continued

TITLE

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep efficiency × seasonspring	-0.05 [-0.10, 0.00]	0.02	-2.14	.042	-0.02 [-0.06, 0.03]	0.02	-0.77	.448
Sleep efficiency × seasonsummer	0.00 [-0.05, 0.04]	0.02	-0.17	.861	0.01 [-0.03, 0.06]	0.02	0.53	.594
Sleep efficiency × seasonwinter	-0.05 [-0.09, 0.00]	0.02	-2.18	.029	-0.02 [-0.06, 0.02]	0.02	-0.98	.328
Seasonspring × Sleep efficiency ²	0.00 [-0.02, 0.01]	0.01	-0.68	.499	0.00 [-0.01, 0.01]	0.01	-0.32	.752
Seasonsummer × Sleep efficiency ²	0.01 [-0.01, 0.02]	0.01	0.93	.350	0.01 [-0.01, 0.02]	0.01	1.02	.309
Seasonwinter × Sleep efficiency ²	-0.01 [-0.02, 0.01]	0.01	-1.13	.259	0.00 [-0.01, 0.01]	0.01	-0.34	.735
Sleep onset (z)								
(Intercept)	1.40 [1.05, 1.76]	0.18	7.75	< .001	1.23 [1.02, 1.44]	0.11	11.52	< .001
Sleep onset	0.02 [0.00, 0.05]	0.01	1.93	.053	0.02 [0.00, 0.05]	0.01	1.92	.055
Seasonspring	-0.05 [-0.11, 0.02]	0.03	-1.32	.186	-0.05 [-0.11, 0.01]	0.03	-1.55	.120
Seasonsummer	-0.08 [-0.15, -0.01]	0.04	-2.23	.026	-0.11 [-0.17, -0.05]	0.03	-3.47	.001
Seasonwinter	-0.01 [-0.07, 0.06]	0.03	-0.21	.834	0.01 [-0.05, 0.07]	0.03	0.22	.828
Sleep onset ²	-0.03 [-0.05, -0.02]	0.01	-3.86	< .001	-0.01 [-0.02, 0.01]	0.01	-0.82	.414
Age	-0.02 [-0.02, -0.02]	0.00	-9.86	< .001	-0.02 [-0.03, -0.02]	0.00	-12.88	< .001
Sleep onset × seasonspring	-0.02 [-0.05, 0.02]	0.02	-0.84	.401	-0.01 [-0.04, 0.03]	0.02	-0.50	.615
Sleep onset × seasonsummer	-0.02 [-0.06, 0.02]	0.02	-0.87	.386	0.00 [-0.03, 0.04]	0.02	0.24	.812
Sleep onset × seasonwinter	-0.05 [-0.08, -0.01]	0.02	-2.68	.007	-0.02 [-0.05, 0.01]	0.02	-1.16	.245
Seasonspring × Sleep onset ²	0.03 [0.01, 0.06]	0.01	2.71	.007	0.01 [-0.01, 0.04]	0.01	1.13	.259
Seasonsummer × Sleep onset ²	0.03 [0.00, 0.06]	0.01	2.16	.031	0.02 [-0.01, 0.04]	0.01	1.24	.213
Seasonwinter × Sleep onset ²	0.02 [-0.01, 0.04]	0.01	1.21	.227	-0.01 [-0.03, 0.02]	0.01	-0.49	.624
Sleep regularity (z)								
(Intercept)	1.30 [0.95, 1.65]	0.18	7.35	< .001	1.17 [0.97, 1.38]	0.10	11.27	< .001
Sleep regularity	0.08 [0.05, 0.11]	0.02	5.14	< .001	0.09 [0.06, 0.12]	0.01	6.13	< .001

Table 15 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Seasonspring	0.00 [-0.07, 0.06]	0.03	-0.12	.901	-0.01 [-0.07, 0.05]	0.03	-0.36	.719
Seasonsummer	-0.07 [-0.14, 0.00]	0.04	-2.08	.038	-0.06 [-0.13, 0.00]	0.03	-2.00	.045
Seasonwinter	0.00 [-0.06, 0.07]	0.03	0.15	.881	0.01 [-0.05, 0.07]	0.03	0.45	.652
Sleep regularity ²	-0.01 [-0.02, 0.01]	0.01	-0.64	.519	0.01 [-0.01, 0.03]	0.01	0.86	.391
Age	-0.02 [-0.02, -0.02]	0.00	-9.90	< .001	-0.02 [-0.03, -0.02]	0.00	-12.99	< .001
Sleep regularity × seasonspring	0.03 [-0.01, 0.07]	0.02	1.62	.105	-0.04 [-0.08, 0.00]	0.02	-1.89	.060
Sleep regularity × seasonsummer	0.03 [-0.01, 0.08]	0.02	1.36	.175	-0.04 [-0.08, 0.01]	0.02	-1.61	.108
Sleep regularity × seasonwinter	0.02 [-0.02, 0.06]	0.02	0.86	.392	-0.05 [-0.09, -0.01]	0.02	-2.47	.014
Seasonspring × Sleep regularity ²	0.00 [-0.03, 0.02]	0.01	-0.26	.792	-0.02 [-0.04, 0.01]	0.01	-1.36	.175
Seasonsummer × Sleep regularity ²	0.03 [0.00, 0.06]	0.01	1.78	.076	-0.02 [-0.05, 0.00]	0.01	-1.68	.093
Seasonwinter × Sleep regularity ²	0.01 [-0.02, 0.03]	0.01	0.62	.537	0.00 [-0.03, 0.02]	0.01	-0.32	.747

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.34 [0.08, 0.61]	0.14	2.51	.012	0.37 [0.10, 0.63]	0.13	2.74	.006
Physical activity	0.02 [-0.05, 0.08]	0.03	0.49	.627	0.00 [-0.09, 0.09]	0.05	-0.08	.938
Regioneurope	-0.17 [-0.34, 0.01]	0.09	-1.88	.060	-0.18 [-0.36, 0.00]	0.09	-1.97	.049
Regionafrica	-0.22 [-0.42, -0.01]	0.10	-2.07	.039	-0.25 [-0.47, -0.04]	0.11	-2.31	.021
Regionasia	-0.38 [-0.63, -0.13]	0.13	-2.95	.003	-0.48 [-0.71, -0.25]	0.12	-4.13	< .001
Regionnorth america	0.00 [-0.20, 0.21]	0.11	0.05	.964	-0.06 [-0.27, 0.14]	0.10	-0.61	.541
Regionsouth america	-0.33 [-0.51, -0.14]	0.10	-3.42	.001	-0.36 [-0.55, -0.18]	0.10	-3.78	< .001
Physical activity ²	0.01 [0.00, 0.02]	0.01	1.64	.101	0.05 [0.00, 0.09]	0.02	2.07	.041
Age	0.00 [-0.01, 0.00]	0.00	-1.93	.054	0.00 [-0.01, 0.00]	0.00	-1.99	.046
Physical activity × regioneurope	0.08 [0.00, 0.15]	0.04	2.09	.036	0.06 [-0.03, 0.16]	0.05	1.37	.174
Physical activity × regionafrica	0.02 [0.11, 0.16]	0.07	0.34	.732	0.09 [-0.12, 0.30]	0.11	0.85	.393
Physical activity × regionasia	0.11 [-0.11, 0.34]	0.11	1.02	.308	0.19 [-0.02, 0.39]	0.10	1.80	.073
Physical activity × regionnorth america	0.10 [-0.04, 0.24]	0.07	1.43	.154	0.07 [-0.09, 0.23]	0.08	0.87	.387
Physical activity × regionsouth america	0.08 [-0.02, 0.18]	0.05	1.59	.112	0.04 [-0.07, 0.16]	0.06	0.74	.462
Regioneurope × Physical activity ²	-0.02 [-0.04, -0.01]	0.01	-3.04	.002	-0.06 [-0.10, -0.01]	0.02	-2.43	.016
Regionafrica × Physical activity ²	-0.05 [-0.16, 0.06]	0.05	-0.91	.361	-0.04 [-0.16, 0.09]	0.07	-0.54	.587
Regionasia × Physical activity ²	-0.09 [-0.28, 0.11]	0.10	-0.88	.378	-0.09 [-0.26, 0.08]	0.09	-1.07	.283
Regionnorth america × Physical activity ²	-0.02 [-0.06, 0.03]	0.02	-0.74	.461	0.01 [-0.10, 0.11]	0.05	0.12	.906
Regionsouth america × Physical activity ²	-0.09 [-0.16, -0.02]	0.04	-2.64	.008	-0.06 [-0.14, 0.02]	0.04	-1.53	.125
Sleep efficiency (z)								
(Intercept)	0.31 [0.04, 0.59]	0.14	2.25	.025	0.35 [0.07, 0.63]	0.14	2.49	.013

Table 16 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity	-0.05 [-0.12, 0.01]	0.03	-1.60	.109	-0.03 [-0.12, 0.06]	0.04	-0.69	.491
Regioneurope	-0.06 [-0.24, 0.12]	0.09	-0.67	.503	-0.09 [-0.28, 0.09]	0.09	-0.97	.334
Regionafrica	-0.07 [-0.28, 0.15]	0.11	-0.61	.539	-0.03 [-0.25, 0.19]	0.11	-0.25	.805
Regionasia	-0.40 [-0.66, -0.14]	0.13	-3.02	.003	-0.47 [-0.71, -0.23]	0.12	-3.89	< .001
Regionnorth america	0.18 [-0.03, 0.39]	0.11	1.66	.097	-0.01 [-0.23, 0.20]	0.11	-0.14	.891
Regionsouth america	0.01 [-0.18, 0.21]	0.10	0.15	.880	-0.12 [-0.31, 0.08]	0.10	-1.18	.239
Physical activity ²	0.01 [-0.01, 0.02]	0.01	1.02	.309	0.01 [-0.04, 0.05]	0.02	0.29	.775
Age	0.00 [0.00, 0.01]	0.00	1.03	.304	0.00 [0.00, 0.01]	0.00	1.04	.299
Physical activity × regioneurope	0.09 [0.01, 0.16]	0.04	2.30	.022	0.04 [-0.05, 0.13]	0.05	0.97	.331
Physical activity × regionafrica	0.00 [-0.14, 0.14]	0.07	0.01	.994	-0.05 [-0.26, 0.16]	0.11	-0.49	.622
Physical activity × regionasia	0.01 [-0.22, 0.23]	0.11	0.08	.937	0.08 [-0.13, 0.28]	0.11	0.75	.454
Physical activity × regionnorth america	0.25 [0.11, 0.39]	0.07	3.53	< .001	0.19 [0.03, 0.34]	0.08	2.35	.019
Physical activity × regionsouth america	0.21 [0.11, 0.31]	0.05	4.05	< .001	-0.02 [-0.14, 0.10]	0.06	-0.32	.749
Regioneurope × Physical activity ²	-0.01 [-0.03, 0.00]	0.01	-1.83	.068	-0.01 [-0.05, 0.03]	0.02	-0.51	.610
Regionafrica × Physical activity ²	0.00 [-0.11, 0.11]	0.06	0.03	.978	0.02 [-0.11, 0.15]	0.07	0.32	.752
Regionasia × Physical activity ²	-0.09 [-0.29, 0.10]	0.10	-0.92	.359	0.05 [-0.12, 0.22]	0.09	0.56	.577
Regionnorth america × Physical activity ²	-0.08 [-0.12, -0.04]	0.02	-3.63	< .001	-0.04 [-0.15, 0.06]	0.05	-0.82	.410
Regionsouth america × Physical activity ²	-0.18 [-0.25, -0.10]	0.04	-4.75	< .001	-0.02 [-0.10, 0.06]	0.04	-0.52	.603
Sleep onset (z)								
(Intercept)	-0.05 [-0.38, 0.27]	0.16	-0.32	.748	0.01 [-0.31, 0.33]	0.16	0.04	.969
Physical activity	-0.06 [-0.12, -0.01]	0.03	-2.39	.017	-0.07 [-0.14, 0.00]	0.04	-2.06	.040
Regioneurope	0.18 [0.04, 0.33]	0.08	2.45	.014	0.16 [0.01, 0.31]	0.08	2.03	.042
Regionafrica	0.08 [-0.09, 0.25]	0.09	0.96	.336	0.05 [-0.13, 0.23]	0.09	0.55	.585

Table 16 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Regionasia	0.13 [-0.08, 0.33]	0.10	1.21	.227	0.13 [-0.06, 0.31]	0.10	1.33	.184
Regionnorth america	0.13 [-0.04, 0.31]	0.09	1.53	.126	0.04 [-0.13, 0.21]	0.09	0.43	.667
Regionsouth america	0.23 [0.07, 0.38]	0.08	2.82	.005	0.18 [0.02, 0.34]	0.08	2.20	.028
Physical activity ²	0.00 [-0.01, 0.01]	0.00	-0.07	.942	-0.03 [-0.06, 0.01]	0.02	-1.62	.105
Age	0.00 [0.00, 0.00]	0.00	0.55	.582	0.00 [0.00, 0.00]	0.00	0.17	.862
Physical activity × regioneurope	-0.01 [-0.07, 0.05]	0.03	-0.32	.751	0.01 [-0.06, 0.08]	0.04	0.26	.794
Physical activity × regionafrica	0.05 [-0.06, 0.16]	0.06	0.92	.359	-0.03 [-0.19, 0.13]	0.08	-0.35	.726
Physical activity × regionasia	-0.10 [-0.27, 0.08]	0.09	-1.07	.283	-0.05 [-0.21, 0.11]	0.08	-0.57	.568
Physical activity × regionnorth america	0.11 [0.00, 0.22]	0.06	1.98	.048	0.12 [-0.01, 0.24]	0.06	1.86	.062
Physical activity × regionsouth america	0.01 [-0.06, 0.09]	0.04	0.37	.712	-0.07 [-0.17, 0.02]	0.05	-1.53	.126
Regioneurope × Physical activity ²	0.02 [0.00, 0.03]	0.01	2.46	.014	0.04 [0.00, 0.07]	0.02	2.15	.032
Regionafrica × Physical activity ²	0.00 [-0.09, 0.08]	0.04	-0.05	.961	0.04 [-0.06, 0.14]	0.05	0.80	.423
Regionasia × Physical activity ²	-0.03 [-0.18, 0.12]	0.08	-0.36	.720	0.08 [-0.06, 0.21]	0.07	1.14	.255
Regionnorth america × Physical activity ²	0.01 [-0.02, 0.04]	0.02	0.47	.641	-0.02 [-0.10, 0.06]	0.04	-0.58	.561
Regionsouth america × Physical activity ²	0.03 [-0.02, 0.09]	0.03	1.10	.273	0.13 [0.07, 0.20]	0.03	3.96	< .001
Sleep regularity (z)								
(Intercept)	0.29 [0.05, 0.53]	0.12	2.39	.018	0.51 [0.25, 0.78]	0.13	3.84	< .001
Physical activity	0.18 [0.11, 0.24]	0.04	4.97	< .001	0.10 [0.00, 0.20]	0.05	2.00	.051
Regioneurope	0.24 [0.07, 0.41]	0.08	2.81	.005	0.11 [-0.07, 0.29]	0.09	1.17	.244
Regionafrica	0.41 [0.21, 0.61]	0.10	4.03	< .001	0.23 [0.01, 0.45]	0.11	2.01	.045
Regionasia	0.27 [0.02, 0.53]	0.13	2.12	.034	0.19 [-0.05, 0.42]	0.12	1.54	.125
Regionnorth america	0.14 [-0.08, 0.36]	0.11	1.24	.220	-0.13 [-0.35, 0.08]	0.11	-1.20	.232
Regionsouth america	0.10 [-0.08, 0.28]	0.09	1.05	.294	-0.08 [-0.27, 0.11]	0.10	-0.84	.399

Table 16 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity ²	-0.02 [-0.04, -0.01]	0.01	-3.63	< .001	-0.09 [-0.14, -0.05]	0.02	-3.93	< .001
Age	0.00 [0.00, 0.00]	0.00	0.30	.766	0.00 [0.00, 0.00]	0.00	-0.41	.683
Physical activity × regioneurope	0.06 [-0.02, 0.13]	0.04	1.41	.157	-0.02 [-0.12, 0.09]	0.05	-0.36	.718
Physical activity × regionafrica	-0.07 [-0.21, 0.08]	0.08	-0.90	.370	0.31 [0.07, 0.55]	0.12	2.51	.014
Physical activity × regionasia	-0.22 [-0.45, 0.02]	0.12	-1.81	.071	0.21 [-0.01, 0.43]	0.11	1.90	.058
Physical activity × regionnorth america	0.17 [0.00, 0.33]	0.08	2.01	.053	0.21 [0.05, 0.38]	0.08	2.56	.011
Physical activity × regionsouth america	0.05 [-0.06, 0.15]	0.05	0.90	.367	0.12 [-0.02, 0.25]	0.07	1.69	.095
Regioneurope × Physical activity ²	-0.02 [-0.04, 0.00]	0.01	-2.16	.031	0.07 [0.02, 0.12]	0.03	2.75	.008
Regionafrica × Physical activity ²	-0.14 [-0.26, -0.02]	0.06	-2.27	.023	-0.11 [-0.27, 0.04]	0.08	-1.45	.156
Regionasia × Physical activity ²	-0.17 [-0.37, 0.04]	0.11	-1.60	.109	-0.12 [-0.29, 0.06]	0.09	-1.26	.207
Regionnorth america × Physical activity ²	-0.08 [-0.13, -0.04]	0.02	-3.56	< .001	-0.05 [-0.16, 0.06]	0.06	-0.87	.387
Regionsouth america × Physical activity ²	-0.13 [-0.22, -0.04]	0.04	-2.90	.007	-0.05 [-0.15, 0.05]	0.05	-1.01	.321

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.70 [1.33, 2.07]	0.19	8.97	< .001	1.44 [1.21, 1.66]	0.11	12.55	< .001
Sleep duration	0.04 [-0.01, 0.08]	0.02	1.73	.085	0.00 [-0.04, 0.04]	0.02	-0.09	.932
Regioneurope	-0.38 [-0.56, -0.20]	0.09	-4.13	< .001	-0.25 [-0.40, -0.10]	0.08	-3.33	.001
Regionafrica	-0.29 [-0.49, -0.09]	0.10	-2.80	.005	-0.15 [-0.33, 0.02]	0.09	-1.75	.080
Regionasia	-0.60 [-0.82, -0.37]	0.11	-5.25	< .001	-0.53 [-0.72, -0.34]	0.10	-5.50	< .001
Regionnorth america	-0.56 [-0.76, -0.36]	0.10	-5.44	< .001	-0.35 [-0.52, -0.18]	0.09	-4.03	< .001
Regionsouth america	-0.45 [-0.64, -0.26]	0.10	-4.73	< .001	-0.41 [-0.57, -0.25]	0.08	-5.12	< .001
Sleep duration ²	-0.03 [-0.04, -0.01]	0.01	-3.42	.001	-0.01 [-0.02, 0.01]	0.01	-1.24	.215
Age	-0.02 [-0.02, -0.02]	0.00	-9.97	< .001	-0.02 [-0.03, -0.02]	0.00	-13.31	< .001
Sleep duration × regioneurope	-0.05 [-0.10, -0.01]	0.02	-2.28	.023	0.02 [-0.03, 0.06]	0.02	0.75	.455
Sleep duration × regionafrica	-0.02 [-0.10, 0.06]	0.04	-0.43	.667	-0.02 [-0.10, 0.06]	0.04	-0.58	.559
Sleep duration × regionasia	-0.03 [-0.15, 0.10]	0.06	-0.43	.670	0.02 [-0.09, 0.14]	0.06	0.41	.686
Sleep duration × regionnorth america	0.03 [-0.05, 0.10]	0.04	0.66	.508	0.02 [-0.06, 0.09]	0.04	0.46	.648
Sleep duration × regionsouth america	-0.06 [-0.12, 0.00]	0.03	-2.02	.043	-0.02 [-0.07, 0.04]	0.03	-0.58	.565
Regioneurope × Sleep duration ²	0.00 [-0.02, 0.02]	0.01	0.25	.799	0.00 [-0.02, 0.01]	0.01	-0.26	.799
Regionafrica × Sleep duration ²	0.02 [-0.02, 0.05]	0.02	0.92	.360	-0.02 [-0.05, 0.02]	0.02	-0.92	.356
Regionasia × Sleep duration ²	0.01 [-0.04, 0.06]	0.02	0.52	.604	0.02 [-0.02, 0.07]	0.02	0.95	.342
Regionnorth america × Sleep duration ²	0.03 [0.00, 0.06]	0.02	1.76	.079	0.01 [-0.03, 0.04]	0.02	0.32	.748
Regionsouth america × Sleep duration ²	0.02 [0.00, 0.04]	0.01	1.59	.112	-0.01 [-0.03, 0.02]	0.01	-0.64	.525
Sleep efficiency (z)								
(Intercept)	1.69 [1.32, 2.06]	0.19	8.93	< .001	1.43 [1.20, 1.65]	0.11	12.55	< .001 ⁶²

Table 17 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep efficiency	-0.06 [-0.14, 0.03]	0.04	-1.29	.251	0.00 [-0.06, 0.06]	0.03	-0.10	.923
Regioneurope	-0.39 [-0.56, -0.21]	0.09	-4.26	< .001	-0.24 [-0.39, -0.10]	0.07	-3.28	.001
Regionafrica	-0.27 [-0.47, -0.07]	0.10	-2.70	.007	-0.19 [-0.36, -0.03]	0.08	-2.28	.023
Regionasia	-0.57 [-0.78, -0.35]	0.11	-5.13	< .001	-0.49 [-0.68, -0.31]	0.09	-5.22	< .001
Regionnorth america	-0.51 [-0.70, -0.32]	0.10	-5.14	< .001	-0.34 [-0.50, -0.17]	0.08	-4.03	< .001
Regionsouth america	-0.45 [-0.64, -0.27]	0.09	-4.78	< .001	-0.43 [-0.58, -0.27]	0.08	-5.48	< .001
Sleep efficiency ²	-0.01 [-0.03, 0.01]	0.01	-1.28	.232	0.00 [-0.02, 0.01]	0.01	-0.69	.493
Age	-0.02 [-0.02, -0.02]	0.00	-10.01	< .001	-0.02 [-0.03, -0.02]	0.00	-13.37	< .001
Sleep efficiency × regioneurope	0.06 [-0.02, 0.14]	0.04	1.47	.185	0.02 [-0.04, 0.08]	0.03	0.59	.561
Sleep efficiency × regionafrica	0.06 [-0.04, 0.16]	0.05	1.11	.278	-0.03 [-0.12, 0.06]	0.05	-0.69	.493
Sleep efficiency × regionasia	0.09 [-0.04, 0.21]	0.06	1.39	.178	0.09 [-0.01, 0.19]	0.05	1.74	.082
Sleep efficiency × regionnorth america	0.06 [-0.05, 0.17]	0.06	1.05	.313	0.04 [-0.05, 0.14]	0.05	0.92	.361
Sleep efficiency × regionsouth america	0.06 [-0.04, 0.15]	0.05	1.15	.282	-0.02 [-0.09, 0.05]	0.03	-0.54	.589
Regioneurope × Sleep efficiency ²	0.00 [-0.01, 0.02]	0.01	0.50	.623	0.00 [-0.01, 0.02]	0.01	0.58	.563
Regionafrica × Sleep efficiency ²	0.01 [-0.02, 0.03]	0.01	0.64	.521	0.01 [-0.02, 0.03]	0.01	0.52	.605
Regionasia × Sleep efficiency ²	0.01 [-0.02, 0.04]	0.01	0.68	.498	0.02 [0.00, 0.05]	0.01	1.64	.102
Regionnorth america × Sleep efficiency ²	0.01 [-0.01, 0.03]	0.01	0.78	.443	0.01 [-0.01, 0.03]	0.01	0.83	.412
Regionsouth america × Sleep efficiency ²	0.01 [-0.01, 0.03]	0.01	0.96	.354	0.00 [-0.01, 0.02]	0.01	0.25	.800
Sleep onset (z)								
(Intercept)	1.68 [1.31, 2.05]	0.19	8.82	< .001	1.42 [1.19, 1.64]	0.12	12.27	< .001
Sleep onset	-0.03 [-0.07, 0.02]	0.02	-1.21	.225	0.02 [-0.02, 0.05]	0.02	0.78	.433
Regioneurope	-0.36 [-0.55, -0.18]	0.09	-3.83	< .001	-0.23 [-0.38, -0.08]	0.08	-2.92	.003
Regionafrica	-0.31 [-0.54, -0.07]	0.12	-2.55	.012	-0.20 [-0.40, 0.00]	0.10	-1.99	.047

Table 17 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Regionasia	-0.56 [-0.80, -0.31]	0.13	-4.41	< .001	-0.45 [-0.67, -0.23]	0.11	-4.05	< .001
Regionnorth america	-0.54 [-0.76, -0.31]	0.11	-4.70	< .001	-0.35 [-0.55, -0.16]	0.10	-3.56	< .001
Regionsouth america	-0.47 [-0.67, -0.27]	0.10	-4.70	< .001	-0.43 [-0.59, -0.26]	0.08	-5.10	< .001
Sleep onset ²	-0.01 [-0.04, 0.03]	0.02	-0.35	.729	0.01 [-0.02, 0.04]	0.02	0.63	.528
Age	-0.02 [-0.02, -0.02]	0.00	-9.94	< .001	-0.02 [-0.03, -0.02]	0.00	-13.33	< .001
Sleep onset × regioneurope	0.04 [0.00, 0.09]	0.02	1.82	.068	0.00 [-0.04, 0.04]	0.02	0.07	.944
Sleep onset × regionafrica	0.08 [0.00, 0.15]	0.04	2.01	.047	0.00 [-0.07, 0.07]	0.04	0.07	.944
Sleep onset × regionasia	0.05 [-0.03, 0.14]	0.04	1.23	.220	0.01 [-0.07, 0.10]	0.04	0.30	.766
Sleep onset × regionnorth america	0.02 [-0.04, 0.09]	0.03	0.72	.472	0.03 [-0.03, 0.10]	0.03	1.03	.303
Sleep onset × regionsouth america	0.02 [-0.03, 0.07]	0.03	0.78	.438	0.00 [-0.05, 0.05]	0.03	-0.14	.890
Regioneurope × Sleep onset ²	-0.01 [-0.05, 0.02]	0.02	-0.78	.436	-0.01 [-0.05, 0.02]	0.02	-0.84	.400
Regionafrica × Sleep onset ²	0.05 [-0.06, 0.17]	0.06	0.90	.381	0.02 [-0.08, 0.12]	0.05	0.43	.666
Regionasia × Sleep onset ²	-0.01 [-0.12, 0.10]	0.06	-0.19	.846	-0.05 [-0.17, 0.07]	0.06	-0.85	.396
Regionnorth america × Sleep onset ²	0.02 [-0.07, 0.11]	0.05	0.50	.615	0.03 [-0.06, 0.12]	0.05	0.59	.554
Regionsouth america × Sleep onset ²	0.02 [-0.03, 0.07]	0.03	0.69	.494	0.01 [-0.04, 0.05]	0.02	0.35	.724
Sleep regularity (z)								
(Intercept)	1.64 [1.27, 2.00]	0.19	8.81	< .001	1.39 [1.17, 1.61]	0.11	12.38	< .001
Sleep regularity	0.15 [0.11, 0.19]	0.02	7.44	< .001	0.04 [0.00, 0.08]	0.02	1.88	.060
Regioneurope	-0.43 [-0.61, -0.25]	0.09	-4.78	< .001	-0.24 [-0.39, -0.10]	0.07	-3.28	.001
Regionafrica	-0.29 [-0.48, -0.09]	0.10	-2.83	.005	-0.19 [-0.36, -0.02]	0.09	-2.20	.028
Regionasia	-0.64 [-0.85, -0.42]	0.11	-5.69	< .001	-0.51 [-0.70, -0.32]	0.10	-5.31	< .001
Regionnorth america	-0.53 [-0.72, -0.33]	0.10	-5.29	< .001	-0.31 [-0.47, -0.14]	0.08	-3.63	< .001
Regionsouth america	-0.48 [-0.67, -0.30]	0.09	-5.14	< .001	-0.43 [-0.58, -0.27]	0.08	-5.44	< .001 ⁶⁴

Table 17 continued

TITLE

Term	Physical activity volume (z)					Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p	
Sleep regularity ²	0.00 [-0.02, 0.02]	0.01	0.11	.912	0.00 [-0.02, 0.02]	0.01	0.06	.951	
Age	-0.02 [-0.02, -0.02]	0.00	-9.97	< .001	-0.02 [-0.03, -0.02]	0.00	-13.42	< .001	
Sleep regularity × regioneurope	-0.05 [-0.10, -0.01]	0.02	-2.22	.026	0.01 [-0.03, 0.06]	0.02	0.67	.502	
Sleep regularity × regionafrica	-0.15 [-0.23, -0.06]	0.04	-3.43	.001	0.01 [-0.07, 0.10]	0.04	0.33	.742	
Sleep regularity × regionasia	-0.07 [-0.17, 0.03]	0.05	-1.31	.190	0.07 [-0.03, 0.17]	0.05	1.46	.144	
Sleep regularity × regionnorth america	-0.08 [-0.16, 0.00]	0.04	-1.85	.065	0.05 [-0.03, 0.13]	0.04	1.30	.193	
Sleep regularity × regionsouth america	-0.04 [-0.10, 0.01]	0.03	-1.48	.139	0.05 [0.00, 0.11]	0.03	1.92	.055	
Regioneurope × Sleep regularity ²	0.00 [-0.03, 0.02]	0.01	-0.20	.841	-0.01 [-0.03, 0.02]	0.01	-0.60	.547	
Regionafrica × Sleep regularity ²	-0.04 [-0.09, 0.00]	0.02	-1.87	.062	0.00 [-0.05, 0.04]	0.02	-0.06	.950	
Regionasia × Sleep regularity ²	0.01 [-0.06, 0.08]	0.04	0.21	.836	-0.01 [-0.07, 0.06]	0.03	-0.16	.874	
Regionnorth america × Sleep regularity ²	-0.01 [-0.06, 0.04]	0.02	-0.54	.588	-0.02 [-0.07, 0.02]	0.02	-0.93	.355	
Regionsouth america × Sleep regularity ²	0.01 [-0.02, 0.05]	0.02	0.81	.416	0.02 [-0.01, 0.06]	0.02	1.42	.156	

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.57 [0.32, 0.82]	0.13	4.41	< .001	0.52 [0.27, 0.77]	0.13	4.08	< .001
Physical activity	0.10 [-0.03, 0.24]	0.07	1.54	.124	0.11 [0.01, 0.20]	0.05	2.21	.027
Daylight hours	-0.03 [-0.04, -0.02]	0.01	-5.55	< .001	-0.03 [-0.04, -0.01]	0.01	-4.32	< .001
Physical activity ²	-0.02 [-0.06, 0.03]	0.02	-0.76	.447	0.05 [-0.01, 0.11]	0.03	1.51	.132
Age	0.00 [-0.01, 0.00]	0.00	-2.07	.039	0.00 [-0.01, 0.00]	0.00	-2.17	.030
Physical activity × daylight hours	0.00 [-0.01, 0.01]	0.01	-0.28	.776	0.00 [-0.01, 0.00]	0.00	-0.87	.384
Daylight hours × Physical activity ²	0.00 [0.00, 0.00]	0.00	0.48	.632	0.00 [-0.01, 0.00]	0.00	-1.62	.106
Sleep efficiency (z)								
(Intercept)	0.37 [0.09, 0.64]	0.14	2.58	.010	0.32 [0.04, 0.61]	0.14	2.23	.026
Physical activity	0.14 [0.00, 0.28]	0.07	2.02	.044	0.12 [0.02, 0.22]	0.05	2.43	.015
Daylight hours	-0.01 [-0.02, 0.00]	0.01	-1.39	.165	0.00 [-0.02, 0.01]	0.01	-0.62	.538
Physical activity ²	-0.03 [-0.07, 0.02]	0.02	-1.23	.219	0.04 [-0.02, 0.10]	0.03	1.30	.193
Age	0.00 [0.00, 0.01]	0.00	1.13	.259	0.00 [0.00, 0.01]	0.00	1.03	.304
Physical activity × daylight hours	-0.01 [-0.02, 0.00]	0.01	-1.45	.148	-0.01 [-0.02, 0.00]	0.00	-2.30	.022
Daylight hours × Physical activity ²	0.00 [0.00, 0.01]	0.00	0.73	.468	0.00 [-0.01, 0.00]	0.00	-1.55	.121
Sleep onset (z)								
(Intercept)	0.02 [-0.30, 0.34]	0.16	0.13	.895	0.06 [-0.26, 0.38]	0.16	0.37	.712
Physical activity	-0.06 [-0.16, 0.05]	0.05	-1.09	.275	-0.08 [-0.15, 0.00]	0.04	-2.04	.042
Daylight hours	0.01 [0.00, 0.02]	0.00	1.43	.153	0.00 [0.00, 0.01]	0.00	0.97	.335
Physical activity ²	-0.03 [-0.06, 0.00]	0.02	-1.80	.072	-0.03 [-0.08, 0.02]	0.02	-1.27	.203
Age	0.00 [0.00, 0.00]	0.00	0.63	.528	0.00 [0.00, 0.00]	0.00	0.29	.774

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity \times daylight hours	0.00 [-0.01, 0.01]	0.00	-0.12	.903	0.00 [-0.01, 0.01]	0.00	0.15	.882
Daylight hours \times Physical activity ²	0.00 [0.00, 0.01]	0.00	2.20	.028	0.00 [0.00, 0.01]	0.00	1.52	.129
Sleep regularity (z)								
(Intercept)	0.40 [0.17, 0.64]	0.12	3.35	.001	0.49 [0.23, 0.75]	0.13	3.66	< .001
Physical activity	0.24 [0.08, 0.40]	0.08	2.94	.006	0.16 [0.05, 0.27]	0.06	2.80	.007
Daylight hours	0.00 [-0.01, 0.01]	0.01	0.34	.732	0.00 [-0.01, 0.02]	0.01	0.51	.610
Physical activity ²	0.01 [-0.03, 0.06]	0.02	0.58	.559	0.00 [-0.07, 0.06]	0.03	-0.11	.911
Age	0.00 [0.00, 0.00]	0.00	0.72	.473	0.00 [0.00, 0.00]	0.00	0.26	.799
Physical activity \times daylight hours	0.00 [-0.01, 0.01]	0.01	-0.21	.836	-0.01 [-0.01, 0.00]	0.00	-1.18	.245
Daylight hours \times Physical activity ²	0.00 [-0.01, 0.00]	0.00	-2.23	.026	0.00 [-0.01, 0.00]	0.00	-1.08	.278

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)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	1.34	[0.96, 1.71]	0.19	7.01	< .001	1.33	[1.09, 1.56]	0.12	11.20	< .001
Sleep duration	0.07	[-0.01, 0.14]	0.04	1.83	.068	0.05	[-0.03, 0.12]	0.04	1.27	.204
Daylight hours	0.00	[-0.01, 0.01]	0.01	0.71	.480	-0.01	[-0.02, 0.00]	0.00	-2.07	.038
Sleep duration ²	-0.01	[-0.05, 0.02]	0.02	-0.72	.469	0.01	[-0.02, 0.05]	0.02	0.63	.529
Age	-0.02	[-0.02, -0.02]	0.00	-9.87	< .001	-0.02	[-0.03, -0.02]	0.00	-12.91	< .001
Sleep duration × daylight hours	-0.01	[-0.01, 0.00]	0.00	-1.95	.051	0.00	[-0.01, 0.00]	0.00	-1.08	.279
Daylight hours × Sleep duration ²	0.00	[0.00, 0.00]	0.00	-0.50	.615	0.00	[0.00, 0.00]	0.00	-1.30	.194
Sleep efficiency (z)										
(Intercept)	1.33	[0.95, 1.70]	0.19	6.95	< .001	1.35	[1.11, 1.58]	0.12	11.37	< .001
Sleep efficiency	0.00	[-0.09, 0.08]	0.04	-0.08	.939	-0.01	[-0.10, 0.07]	0.04	-0.32	.747
Daylight hours	0.00	[-0.01, 0.01]	0.01	0.60	.552	-0.01	[-0.02, 0.00]	0.00	-2.60	.009
Sleep efficiency ²	-0.02	[-0.05, 0.01]	0.01	-1.21	.227	-0.01	[-0.04, 0.01]	0.01	-0.94	.346
Age	-0.02	[-0.02, -0.02]	0.00	-9.87	< .001	-0.02	[-0.03, -0.02]	0.00	-12.88	< .001
Sleep efficiency × daylight hours	0.00	[-0.01, 0.01]	0.00	0.09	.931	0.00	[0.00, 0.01]	0.00	0.56	.580
Daylight hours × Sleep efficiency ²	0.00	[0.00, 0.00]	0.00	0.90	.367	0.00	[0.00, 0.00]	0.00	1.01	.312
Sleep onset (z)										
(Intercept)	1.38	[1.00, 1.76]	0.19	7.17	< .001	1.37	[1.14, 1.61]	0.12	11.46	< .001
Sleep onset	-0.02	[-0.10, 0.05]	0.04	-0.54	.586	-0.01	[-0.08, 0.07]	0.04	-0.18	.856
Daylight hours	0.00	[-0.01, 0.01]	0.01	-0.06	.955	-0.01	[-0.02, 0.00]	0.00	-2.91	.004
Sleep onset ²	-0.06	[-0.10, -0.01]	0.02	-2.28	.022	-0.03	[-0.08, 0.02]	0.02	-1.28	.200
Age	-0.02	[-0.02, -0.02]	0.00	-9.86	< .001	-0.02	[-0.03, -0.02]	0.00	-12.88	< .001

Table 19 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep onset × daylight hours	0.00 [0.00, 0.01]	0.00	0.66	.509	0.00 [0.00, 0.01]	0.00	0.62	.534
Daylight hours × Sleep onset ²	0.00 [0.00, 0.01]	0.00	1.72	.085	0.00 [0.00, 0.01]	0.00	1.26	.209
Sleep regularity (z)								
(Intercept)	1.24 [0.87, 1.61]	0.19	6.60	< .001	1.26 [1.03, 1.50]	0.12	10.74	< .001
Sleep regularity	0.07 [-0.01, 0.15]	0.04	1.80	.072	0.10 [0.02, 0.17]	0.04	2.43	.015
Daylight hours	0.00 [-0.01, 0.01]	0.01	0.70	.483	-0.01 [-0.02, 0.00]	0.00	-1.74	.082
Sleep regularity ²	0.01 [-0.04, 0.06]	0.03	0.25	.800	0.03 [-0.02, 0.08]	0.03	1.13	.257
Age	-0.02 [-0.02, -0.02]	0.00	-9.90	< .001	-0.02 [-0.03, -0.02]	0.00	-13.02	< .001
Sleep regularity × daylight hours	0.00 [0.00, 0.01]	0.00	0.79	.429	0.00 [-0.01, 0.00]	0.00	-0.93	.352
Daylight hours × Sleep regularity ²	0.00 [0.00, 0.00]	0.00	-0.27	.786	0.00 [-0.01, 0.00]	0.00	-1.25	.211

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.76 [0.50, 1.02]	0.13	5.64	< .001	0.66 [0.39, 0.93]	0.14	4.80	< .001
Physical activity	0.12 [0.07, 0.16]	0.02	5.16	< .001	0.08 [0.04, 0.13]	0.02	3.68	< .001
Acc wear locwrist	-0.69 [-0.96, -0.41]	0.14	-4.85	< .001	-0.56 [-0.84, -0.27]	0.15	-3.83	< .001
Physical activity ²	-0.04 [-0.08, 0.00]	0.02	-1.84	.066	0.01 [-0.02, 0.04]	0.02	0.82	.413
Age	0.00 [-0.01, 0.00]	0.00	-2.25	.024	0.00 [-0.01, 0.00]	0.00	-2.19	.029
Physical activity × acc wear locwrist	-0.05 [-0.10, 0.01]	0.03	-1.70	.089	-0.02 [-0.08, 0.03]	0.03	-0.93	.354
Acc wear locwrist × Physical activity ²	0.04 [-0.01, 0.08]	0.02	1.71	.087	-0.02 [-0.05, 0.01]	0.02	-1.10	.270
Sleep efficiency (z)								
(Intercept)	-0.37 [-0.47, -0.27]	0.05	-7.32	< .001	-0.49 [-0.58, -0.39]	0.05	-9.73	< .001
Physical activity	0.15 [0.10, 0.19]	0.02	6.44	< .001	0.07 [0.03, 0.12]	0.02	3.16	.002
Acc wear locwrist	0.86 [0.78, 0.94]	0.04	20.76	< .001	0.97 [0.88, 1.05]	0.04	23.06	< .001
Physical activity ²	-0.08 [-0.12, -0.04]	0.02	-3.85	< .001	-0.02 [-0.05, 0.01]	0.02	-1.23	.220
Age	0.00 [0.00, 0.00]	0.00	-1.20	.231	0.00 [0.00, 0.00]	0.00	-0.55	.580
Physical activity × acc wear locwrist	-0.19 [-0.24, -0.13]	0.03	-6.59	< .001	-0.09 [-0.14, -0.04]	0.03	-3.36	.001
Acc wear locwrist × Physical activity ²	0.08 [0.04, 0.12]	0.02	3.92	< .001	0.01 [-0.03, 0.04]	0.02	0.45	.653
Sleep onset (z)								
(Intercept)	-0.90 [-1.32, -0.48]	0.21	-4.18	< .001	-0.87 [-1.29, -0.46]	0.21	-4.10	< .001
Physical activity	0.00 [-0.04, 0.03]	0.02	-0.21	.835	-0.04 [-0.07, 0.00]	0.02	-2.11	.035
Acc wear locwrist	1.24 [0.78, 1.69]	0.23	5.32	< .001	1.21 [0.76, 1.66]	0.23	5.23	< .001
Physical activity ²	0.01 [-0.03, 0.04]	0.02	0.33	.743	0.00 [-0.03, 0.02]	0.01	-0.26	.797
Age	0.00 [0.00, 0.00]	0.00	0.17	.866	0.00 [0.00, 0.00]	0.00	-0.06	.952

Table 20 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity \times acc wear locwrist	-0.09 [-0.14, -0.05]	0.02	-4.18	< .001	-0.05 [-0.09, -0.01]	0.02	-2.43	.015
Acc wear locwrist \times Physical activity ²	0.01 [-0.03, 0.04]	0.02	0.38	.706	0.01 [-0.02, 0.03]	0.01	0.47	.640
Sleep regularity (z)								
(Intercept)	0.27 [-0.01, 0.54]	0.14	1.91	.056	0.12 [-0.17, 0.40]	0.15	0.79	.428
Physical activity	0.21 [0.16, 0.26]	0.03	7.69	< .001	0.26 [0.21, 0.32]	0.03	9.45	< .001
Acc wear locwrist	0.25 [-0.03, 0.53]	0.14	1.72	.085	0.58 [0.28, 0.88]	0.15	3.82	< .001
Physical activity ²	-0.17 [-0.22, -0.13]	0.02	-7.41	< .001	-0.11 [-0.15, -0.08]	0.02	-6.15	< .001
Age	0.00 [0.00, 0.00]	0.00	0.24	.811	0.00 [-0.01, 0.00]	0.00	-0.85	.399
Physical activity \times acc wear locwrist	-0.01 [-0.09, 0.07]	0.04	-0.27	.791	-0.22 [-0.28, -0.16]	0.03	-6.75	< .001
Acc wear locwrist \times Physical activity ²	0.14 [0.09, 0.19]	0.02	5.79	< .001	0.07 [0.04, 0.11]	0.02	3.89	< .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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.21 [-0.28, 0.69]	0.25	0.84	.400	0.95 [0.59, 1.31]	0.18	5.23	< .001
Sleep duration	0.02 [-0.01, 0.04]	0.01	1.48	.138	0.01 [-0.01, 0.04]	0.01	0.95	.343
Acc wear locwrst	1.45 [0.92, 1.98]	0.27	5.41	< .001	0.34 [-0.05, 0.72]	0.20	1.71	.088
Sleep duration ²	0.00 [-0.01, 0.01]	0.01	-0.44	.659	-0.01 [-0.02, 0.00]	0.01	-1.74	.082
Age	-0.02 [-0.02, -0.02]	0.00	-10.87	< .001	-0.02 [-0.03, -0.02]	0.00	-13.05	< .001
Sleep duration × acc wear locwrist	-0.04 [-0.07, -0.01]	0.02	-2.30	.022	0.00 [-0.03, 0.03]	0.02	-0.27	.785
Acc wear locwrst × Sleep duration ²	-0.03 [-0.04, -0.01]	0.01	-3.83	< .001	0.00 [-0.02, 0.01]	0.01	-0.28	.776
Sleep efficiency (z)								
(Intercept)	0.22 [-0.26, 0.70]	0.25	0.89	.372	0.95 [0.59, 1.31]	0.18	5.17	< .001
Sleep efficiency	0.03 [0.00, 0.06]	0.01	2.28	.025	0.03 [0.00, 0.05]	0.01	2.28	.024
Acc wear locwrst	1.42 [0.90, 1.95]	0.27	5.30	< .001	0.33 [-0.06, 0.72]	0.20	1.67	.095
Sleep efficiency ²	0.00 [-0.01, 0.01]	0.00	0.29	.770	0.00 [0.00, 0.01]	0.00	1.40	.162
Age	-0.02 [-0.02, -0.02]	0.00	-10.86	< .001	-0.02 [-0.03, -0.02]	0.00	-13.00	< .001
Sleep efficiency × acc wear locwrist	-0.05 [-0.08, -0.02]	0.02	-3.09	.002	-0.03 [-0.06, 0.00]	0.02	-2.05	.041
Acc wear locwrst × Sleep efficiency ²	-0.01 [-0.02, 0.00]	0.00	-1.64	.102	-0.01 [-0.01, 0.00]	0.00	-1.09	.276
Sleep onset (z)								
(Intercept)	0.20 [-0.29, 0.68]	0.25	0.80	.422	0.93 [0.57, 1.29]	0.18	5.05	< .001
Sleep onset	0.03 [0.01, 0.05]	0.01	2.44	.015	0.03 [0.01, 0.05]	0.01	3.14	.002
Acc wear locwrst	1.45 [0.92, 1.97]	0.27	5.38	< .001	0.35 [-0.04, 0.74]	0.20	1.73	.083
Sleep onset ²	0.02 [-0.01, 0.05]	0.02	1.32	.186	0.03 [0.00, 0.06]	0.02	1.80	.075
Age	-0.02 [-0.02, -0.02]	0.00	-10.85	< .001	-0.02 [-0.03, -0.02]	0.00	-12.99	< .001

Table 21 continued

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep onset × acc wear locwrist	-0.03 [-0.06, 0.00]	0.02	-2.13	.034	-0.03 [-0.06, 0.00]	0.02	-1.71	.088
Acc wear locwrist × Sleep onset ²	-0.03 [-0.07, 0.00]	0.02	-2.00	.046	-0.03 [-0.06, 0.00]	0.02	-1.73	.086
Sleep regularity (z)								
(Intercept)	0.17 [-0.30, 0.64]	0.24	0.71	.476	0.92 [0.56, 1.27]	0.18	5.07	< .001
Sleep regularity	0.10 [0.07, 0.12]	0.01	7.69	< .001	0.11 [0.09, 0.14]	0.01	8.95	< .001
Acc wear locwrist	1.38 [0.87, 1.89]	0.26	5.28	< .001	0.34 [-0.05, 0.72]	0.20	1.71	.087
Sleep regularity ²	0.00 [-0.02, 0.01]	0.01	-0.09	.928	0.01 [-0.01, 0.02]	0.01	1.09	.274
Age	-0.02 [-0.02, -0.02]	0.00	-10.90	< .001	-0.02 [-0.03, -0.02]	0.00	-13.08	< .001
Sleep regularity × acc wear locwrist	0.01 [-0.03, 0.04]	0.02	0.39	.698	-0.09 [-0.12, -0.06]	0.02	-5.56	< .001
Acc wear locwrist × Sleep regularity ²	0.00 [-0.02, 0.02]	0.01	0.03	.978	-0.01 [-0.03, 0.01]	0.01	-1.15	.251

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)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration (z)										
(Intercept)	0.22	[0.00, 0.44]	0.11	1.94	.052	0.24	[0.03, 0.46]	0.11	2.19	.028
Physical activity	0.08	[0.03, 0.12]	0.02	3.14	.002	0.07	[0.04, 0.11]	0.02	3.75	< .001
Pa mostactivehr	0.00	[-0.01, 0.00]	0.00	-1.46	.144	0.00	[-0.01, 0.00]	0.00	-1.35	.176
Physical activity ²	0.00	[-0.02, 0.01]	0.01	-0.46	.646	0.00	[-0.03, 0.02]	0.01	-0.39	.699
Age	0.00	[-0.01, 0.00]	0.00	-2.14	.032	0.00	[-0.01, 0.00]	0.00	-2.20	.028
Physical activity × pa mostactivehr	0.00	[0.00, 0.00]	0.00	0.47	.637	0.00	[0.00, 0.00]	0.00	-0.31	.759
Pa mostactivehr × Physical activity ²	0.00	[0.00, 0.00]	0.00	-0.50	.617	0.00	[0.00, 0.00]	0.00	0.30	.764
Sleep efficiency (z)										
(Intercept)	0.26	[0.02, 0.51]	0.12	2.14	.033	0.29	[0.04, 0.54]	0.13	2.31	.022
Physical activity	-0.03	[-0.08, 0.02]	0.02	-1.24	.216	0.01	[-0.03, 0.05]	0.02	0.34	.736
Pa mostactivehr	0.00	[0.00, 0.00]	0.00	0.54	.586	0.00	[0.00, 0.00]	0.00	-0.17	.862
Physical activity ²	0.01	[-0.01, 0.02]	0.01	1.04	.296	-0.01	[-0.03, 0.02]	0.01	-0.40	.693
Age	0.00	[0.00, 0.01]	0.00	1.02	.306	0.00	[0.00, 0.01]	0.00	0.96	.335
Physical activity × pa mostactivehr	0.01	[0.00, 0.01]	0.00	3.47	.001	0.00	[0.00, 0.00]	0.00	0.24	.811
Pa mostactivehr × Physical activity ²	0.00	[0.00, 0.00]	0.00	-2.98	.003	0.00	[0.00, 0.00]	0.00	-0.03	.977
Sleep onset (z)										
(Intercept)	0.03	[-0.27, 0.34]	0.16	0.21	.836	0.05	[-0.25, 0.34]	0.15	0.30	.763
Physical activity	-0.09	[-0.13, -0.05]	0.02	-4.67	< .001	-0.05	[-0.09, -0.02]	0.02	-3.50	< .001
Pa mostactivehr	0.01	[0.00, 0.01]	0.00	4.58	< .001	0.01	[0.00, 0.01]	0.00	4.01	< .001
Physical activity ²	0.01	[0.00, 0.02]	0.01	2.00	.045	0.01	[-0.01, 0.03]	0.01	0.54	.591
Age	0.00	[0.00, 0.00]	0.00	0.66	.508	0.00	[0.00, 0.00]	0.00	0.37	.710

Table 22 continued

TITLE

75

Term	Physical activity volume (z)				Physical activity intensity (z)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity × pa mostactivehr	0.00 [0.00, 0.00]	0.00	1.63	.103	0.00 [0.00, 0.00]	0.00	-1.51	.132
Pa mostactivehr × Physical activity ²	0.00 [0.00, 0.00]	0.00	-0.96	.336	0.00 [0.00, 0.00]	0.00	0.00	.999
Sleep regularity (z)								
(Intercept)	0.46 [0.26, 0.66]	0.10	4.43	< .001	0.59 [0.36, 0.82]	0.12	5.06	< .001
Physical activity	0.14 [0.09, 0.19]	0.03	5.35	< .001	0.04 [0.00, 0.09]	0.02	1.93	.058
Pa mostactivehr	0.00 [-0.01, 0.00]	0.00	-1.21	.232	0.00 [-0.01, 0.00]	0.00	-2.24	.031
Physical activity ²	-0.02 [-0.04, -0.01]	0.01	-3.38	.001	-0.06 [-0.09, -0.03]	0.02	-3.87	< .001
Age	0.00 [0.00, 0.00]	0.00	0.57	.573	0.00 [0.00, 0.00]	0.00	0.13	.895
Physical activity × pa mostactivehr	0.01 [0.00, 0.01]	0.00	3.53	< .001	0.00 [0.00, 0.01]	0.00	2.39	.023
Pa mostactivehr × Physical activity ²	0.00 [0.00, 0.00]	0.00	-2.01	.044	0.00 [0.00, 0.00]	0.00	1.29	.215

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.30 [0.94, 1.66]	0.18	7.16	< .001	1.18 [0.97, 1.39]	0.11	11.03	< .001
Sleep duration	0.03 [0.00, 0.06]	0.02	1.73	.083	0.03 [0.00, 0.05]	0.01	1.71	.087
Pa mostactivehr	0.01 [0.00, 0.01]	0.00	5.26	< .001	0.00 [0.00, 0.00]	0.00	1.83	.067
Sleep duration ²	-0.02 [-0.03, 0.00]	0.01	-2.51	.012	0.00 [-0.02, 0.01]	0.01	-0.68	.495
Age	-0.02 [-0.02, -0.02]	0.00	-9.82	< .001	-0.02 [-0.03, -0.02]	0.00	-12.84	< .001
Sleep duration × pa mostactivehr	0.00 [0.00, 0.00]	0.00	-2.34	.019	0.00 [0.00, 0.00]	0.00	-1.25	.211
Pa mostactivehr × Sleep duration ²	0.00 [0.00, 0.00]	0.00	-0.59	.556	0.00 [0.00, 0.00]	0.00	-1.09	.277
Sleep efficiency (z)								
(Intercept)	1.30 [0.94, 1.66]	0.18	7.10	< .001	1.19 [0.97, 1.40]	0.11	10.93	< .001
Sleep efficiency	-0.02 [-0.06, 0.02]	0.02	-0.97	.341	-0.02 [-0.06, 0.02]	0.02	-1.06	.291
Pa mostactivehr	0.01 [0.00, 0.01]	0.00	4.63	< .001	0.00 [0.00, 0.00]	0.00	1.16	.245
Sleep efficiency ²	-0.01 [-0.02, 0.00]	0.01	-1.88	.066	0.00 [-0.01, 0.01]	0.01	-0.49	.624
Age	-0.02 [-0.02, -0.02]	0.00	-9.83	< .001	-0.02 [-0.03, -0.02]	0.00	-12.81	< .001
Sleep efficiency × pa mostactivehr	0.00 [0.00, 0.00]	0.00	1.26	.208	0.00 [0.00, 0.00]	0.00	1.82	.071
Pa mostactivehr × Sleep efficiency ²	0.00 [0.00, 0.00]	0.00	1.33	.183	0.00 [0.00, 0.00]	0.00	0.78	.439
Sleep onset (z)								
(Intercept)	1.31 [0.95, 1.67]	0.18	7.19	< .001	1.17 [0.95, 1.38]	0.11	10.81	< .001
Sleep onset	-0.02 [-0.05, 0.01]	0.01	-1.28	.201	-0.02 [-0.05, 0.01]	0.01	-1.32	.187
Pa mostactivehr	0.00 [0.00, 0.01]	0.00	3.55	< .001	0.00 [0.00, 0.01]	0.00	2.16	.031
Sleep onset ²	-0.03 [-0.05, -0.01]	0.01	-2.59	.010	0.01 [-0.01, 0.04]	0.01	1.45	.148
Age	-0.02 [-0.02, -0.02]	0.00	-9.81	< .001	-0.02 [-0.03, -0.02]	0.00	-12.81	< .001

Table 23 continued

Term	Physical activity volume (z)				Physical activity intensity (z)					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep onset × pa mostactivehr	0.00	[0.00, 0.00]	0.00	1.89	.058	0.00	[0.00, 0.00]	0.00	2.86	.004
Pa mostactivehr × Sleep onset ²	0.00	[0.00, 0.00]	0.00	1.43	.154	0.00	[0.00, 0.00]	0.00	-1.69	.091
Sleep regularity (z)										
(Intercept)	1.21	[0.85, 1.56]	0.18	6.74	< .001	1.16	[0.95, 1.37]	0.11	10.96	< .001
Sleep regularity	0.08	[0.05, 0.11]	0.02	4.73	< .001	0.01	[-0.02, 0.04]	0.02	0.80	.425
Pa mostactivehr	0.01	[0.00, 0.01]	0.00	5.21	< .001	0.00	[0.00, 0.00]	0.00	0.30	.762
Sleep regularity ²	0.01	[-0.01, 0.03]	0.01	1.36	.174	-0.01	[-0.03, 0.01]	0.01	-1.36	.173
Age	-0.02	[-0.02, -0.02]	0.00	-9.85	< .001	-0.02	[-0.03, -0.02]	0.00	-12.93	< .001
Sleep regularity × pa mostactivehr	0.00	[0.00, 0.00]	0.00	1.73	.083	0.00	[0.00, 0.01]	0.00	3.32	.001
Pa mostactivehr × Sleep regularity ²	0.00	[0.00, 0.00]	0.00	-1.46	.144	0.00	[0.00, 0.00]	0.00	1.36	.173

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	0.28 [0.05, 0.50]	0.12	2.42	.015	0.28 [0.06, 0.50]	0.11	2.49	.013
Physical activity	0.09 [0.06, 0.13]	0.02	5.05	<.001	0.07 [0.04, 0.10]	0.01	4.79	<.001
Ethnicitynon-white	-0.10 [-0.21, 0.00]	0.05	-1.99	.047	-0.18 [-0.27, -0.08]	0.05	-3.50	<.001
Ethnicityunclear	-0.11 [-0.20, -0.02]	0.05	-2.29	.022	-0.10 [-0.20, -0.01]	0.05	-2.16	.030
Physical activity ²	-0.01 [-0.02, 0.00]	0.01	-2.91	.004	-0.02 [-0.03, 0.00]	0.01	-2.02	.043
Age	0.00 [-0.01, 0.00]	0.00	-2.22	.026	0.00 [-0.01, 0.00]	0.00	-2.17	.030
Physical activity × ethnicitynon-white	0.03 [-0.06, 0.11]	0.04	0.58	.561	0.06 [-0.01, 0.14]	0.04	1.76	.078
Physical activity × ethnicityunclear	-0.03 [-0.08, 0.02]	0.03	-1.09	.275	-0.01 [-0.06, 0.03]	0.02	-0.63	.526
Ethnicitynon-white × Physical activity ²	-0.06 [-0.11, 0.00]	0.03	-2.00	.045	0.00 [-0.05, 0.06]	0.03	0.12	.905
Ethnicityunclear × Physical activity ²	0.02 [0.00, 0.03]	0.01	2.67	.008	0.04 [0.01, 0.06]	0.01	2.74	.006
Sleep efficiency (z)								
(Intercept)	0.28 [0.04, 0.53]	0.12	2.26	.025	0.27 [0.02, 0.52]	0.13	2.15	.032
Physical activity	0.06 [0.02, 0.09]	0.02	3.04	.002	0.01 [-0.02, 0.04]	0.01	0.81	.415
Ethnicitynon-white	-0.10 [-0.21, 0.00]	0.05	-1.90	.058	-0.14 [-0.24, -0.04]	0.05	-2.65	.008
Ethnicityunclear	0.01 [-0.09, 0.10]	0.05	0.19	.850	0.04 [-0.05, 0.14]	0.05	0.89	.371
Physical activity ²	-0.02 [-0.03, -0.01]	0.01	-3.08	.002	0.00 [-0.02, 0.01]	0.01	-0.27	.785
Age	0.00 [0.00, 0.01]	0.00	1.10	.273	0.00 [0.00, 0.01]	0.00	1.07	.285
Physical activity × ethnicitynon-white	0.05 [-0.04, 0.14]	0.04	1.14	.255	0.07 [0.00, 0.15]	0.04	2.00	.046
Physical activity × ethnicityunclear	-0.06 [-0.11, 0.00]	0.03	-2.06	.039	-0.02 [-0.06, 0.03]	0.02	-0.78	.435
Ethnicitynon-white × Physical activity ²	-0.04 [-0.10, 0.01]	0.03	-1.49	.135	-0.04 [-0.10, 0.01]	0.03	-1.55	.121
Ethnicityunclear × Physical activity ²	0.02 [0.00, 0.03]	0.01	2.11	.035	0.00 [-0.03, 0.02]	0.01	-0.25	.806

Table 24 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep onset (z)								
(Intercept)	0.04 [-0.27, 0.35]	0.16	0.24	.807	0.06 [-0.24, 0.36]	0.15	0.37	.711
Physical activity	-0.06 [-0.09, -0.03]	0.01	-3.92	< .001	-0.05 [-0.07, -0.03]	0.01	-4.74	< .001
Ethnicitynon-white	0.02 [-0.06, 0.10]	0.04	0.54	.586	0.06 [-0.02, 0.13]	0.04	1.40	.161
Ethnicityunclear	0.08 [0.01, 0.16]	0.04	2.15	.031	0.09 [0.02, 0.17]	0.04	2.40	.016
Physical activity ²	0.01 [0.00, 0.02]	0.00	1.92	.055	0.01 [0.00, 0.02]	0.01	1.42	.155
Age	0.00 [0.00, 0.00]	0.00	0.81	.418	0.00 [0.00, 0.00]	0.00	0.40	.690
Physical activity × ethnicitynon-white	-0.02 [-0.09, 0.05]	0.03	-0.59	.555	-0.06 [-0.11, 0.00]	0.03	-1.94	.053
Physical activity × ethnicityunclear	-0.01 [-0.05, 0.04]	0.02	-0.29	.775	-0.05 [-0.08, -0.01]	0.02	-2.51	.012
Ethnicitynon-white × Physical activity ²	0.02 [-0.02, 0.07]	0.02	1.09	.277	0.00 [-0.04, 0.05]	0.02	0.20	.845
Ethnicityunclear × Physical activity ²	0.00 [-0.01, 0.01]	0.01	-0.72	.471	-0.01 [-0.03, 0.01]	0.01	-0.99	.324
Sleep regularity (z)								
(Intercept)	0.47 [0.25, 0.69]	0.11	4.16	< .001	0.53 [0.29, 0.77]	0.12	4.31	< .001
Physical activity	0.24 [0.19, 0.28]	0.02	10.38	< .001	0.10 [0.07, 0.13]	0.02	6.53	< .001
Ethnicitynon-white	0.05 [-0.06, 0.16]	0.06	0.86	.389	0.03 [-0.08, 0.13]	0.05	0.46	.645
Ethnicityunclear	-0.06 [-0.15, 0.04]	0.05	-1.15	.250	0.00 [-0.09, 0.10]	0.05	0.07	.942
Physical activity ²	-0.04 [-0.05, -0.03]	0.01	-6.96	< .001	-0.03 [-0.04, -0.01]	0.01	-2.69	.008
Age	0.00 [0.00, 0.00]	0.00	0.54	.594	0.00 [0.00, 0.00]	0.00	0.21	.835
Physical activity × ethnicitynon-white	0.01 [-0.08, 0.10]	0.05	0.30	.763	0.19 [0.11, 0.26]	0.04	4.72	< .001
Physical activity × ethnicityunclear	-0.05 [-0.12, 0.01]	0.03	-1.62	.113	-0.06 [-0.11, -0.01]	0.03	-2.29	.028
Ethnicitynon-white × Physical activity ²	-0.08 [-0.14, -0.02]	0.03	-2.56	.011	-0.13 [-0.19, -0.07]	0.03	-4.40	< .001
Ethnicityunclear × Physical activity ²	0.01 [-0.01, 0.02]	0.01	1.28	.200	-0.02 [-0.04, 0.01]	0.01	-1.15	.250

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)			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration (z)								
(Intercept)	1.38 [1.03, 1.74]	0.18	7.62	< .001	1.25 [1.04, 1.46]	0.11	11.72	< .001
Sleep duration	0.00 [-0.01, 0.02]	0.01	0.42	.675	0.03 [0.01, 0.05]	0.01	3.14	.002
Ethnicitynon-white	-0.10 [-0.18, -0.01]	0.05	-2.11	.035	-0.05 [-0.13, 0.03]	0.04	-1.22	.222
Ethnicityunclear	0.02 [-0.07, 0.11]	0.05	0.36	.716	-0.05 [-0.13, 0.03]	0.04	-1.20	.231
Sleep duration ²	-0.01 [-0.02, -0.01]	0.00	-3.31	.001	0.00 [-0.01, 0.01]	0.00	0.05	.960
Age	-0.02 [-0.02, -0.02]	0.00	-9.82	< .001	-0.02 [-0.03, -0.02]	0.00	-12.90	< .001
Sleep duration × ethnicitynon-white	-0.01 [-0.06, 0.04]	0.02	-0.50	.617	-0.05 [-0.09, 0.00]	0.02	-2.04	.041
Sleep duration × ethnicityunclear	-0.02 [-0.05, 0.01]	0.02	-1.37	.171	-0.05 [-0.08, -0.02]	0.01	-3.19	.001
Ethnicitynon-white × Sleep duration ²	-0.02 [-0.04, 0.00]	0.01	-1.63	.103	-0.02 [-0.05, 0.00]	0.01	-2.11	.035
Ethnicityunclear × Sleep duration ²	-0.01 [-0.02, 0.00]	0.01	-1.76	.078	-0.02 [-0.04, -0.01]	0.01	-3.59	< .001
Sleep efficiency (z)								
(Intercept)	1.38 [1.02, 1.73]	0.18	7.57	< .001	1.25 [1.04, 1.46]	0.11	11.71	< .001
Sleep efficiency	0.01 [-0.01, 0.03]	0.01	0.91	.361	0.02 [-0.01, 0.04]	0.01	1.43	.153
Ethnicitynon-white	-0.11 [-0.20, -0.02]	0.04	-2.51	.012	-0.08 [-0.15, 0.00]	0.04	-2.03	.043
Ethnicityunclear	0.00 [-0.10, 0.09]	0.05	-0.09	.929	-0.08 [-0.16, 0.00]	0.04	-1.97	.049
Sleep efficiency ²	0.00 [-0.01, 0.00]	0.00	-1.31	.191	0.00 [-0.01, 0.01]	0.00	0.47	.637
Age	-0.02 [-0.02, -0.02]	0.00	-9.84	< .001	-0.02 [-0.03, -0.02]	0.00	-12.93	< .001
Sleep efficiency × ethnicitynon-white	-0.01 [-0.06, 0.04]	0.03	-0.50	.621	0.01 [-0.05, 0.06]	0.03	0.26	.799
Sleep efficiency × ethnicityunclear	-0.02 [-0.07, 0.02]	0.02	-1.10	.295	-0.02 [-0.05, 0.01]	0.02	-1.07	.284
Ethnicitynon-white × Sleep efficiency ²	0.00 [-0.02, 0.01]	0.01	-0.43	.668	0.00 [-0.01, 0.02]	0.01	0.32	.749
Ethnicityunclear × Sleep efficiency ²	0.00 [-0.01, 0.01]	0.01	-0.02	.986	0.00 [-0.01, 0.01]	0.00	-0.65	.513

Table 25 continued

TITLE

Term	Physical activity volume (z)			Physical activity intensity (z)				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep onset (z)								
(Intercept)	1.40 [1.04, 1.75]	0.18	7.68	< .001	1.25 [1.04, 1.46]	0.11	11.72	< .001
Sleep onset	0.00 [-0.02, 0.02]	0.01	-0.18	.857	0.01 [-0.01, 0.03]	0.01	0.74	.457
Ethnicitynon-white	-0.13 [-0.23, -0.04]	0.05	-2.72	.006	-0.07 [-0.15, 0.02]	0.04	-1.55	.120
Ethnicityunclear	-0.03 [-0.12, 0.07]	0.05	-0.55	.585	-0.08 [-0.16, 0.01]	0.04	-1.84	.066
Sleep onset ²	-0.02 [-0.04, -0.01]	0.01	-3.60	< .001	0.00 [-0.01, 0.01]	0.01	0.32	.745
Age	-0.02 [-0.02, -0.02]	0.00	-9.84	< .001	-0.02 [-0.03, -0.02]	0.00	-12.94	< .001
Sleep onset × ethnicitynon-white	0.03 [-0.01, 0.07]	0.02	1.42	.156	0.04 [0.00, 0.07]	0.02	1.91	.056
Sleep onset × ethnicityunclear	0.01 [-0.02, 0.04]	0.02	0.61	.542	0.01 [-0.02, 0.04]	0.01	0.72	.471
Ethnicitynon-white × Sleep onset ²	0.02 [-0.01, 0.05]	0.02	1.17	.244	-0.01 [-0.04, 0.02]	0.02	-0.44	.662
Ethnicityunclear × Sleep onset ²	0.03 [0.00, 0.05]	0.01	2.23	.028	0.00 [-0.02, 0.02]	0.01	-0.32	.752
Sleep regularity (z)								
(Intercept)	1.30 [0.95, 1.65]	0.18	7.32	< .001	1.22 [1.01, 1.42]	0.10	11.68	< .001
Sleep regularity	0.10 [0.07, 0.12]	0.01	8.56	< .001	0.07 [0.04, 0.09]	0.01	5.64	< .001
Ethnicitynon-white	-0.12 [-0.21, -0.03]	0.05	-2.62	.009	-0.09 [-0.17, -0.01]	0.04	-2.14	.033
Ethnicityunclear	-0.01 [-0.10, 0.08]	0.05	-0.18	.855	-0.07 [-0.15, 0.00]	0.04	-1.85	.064
Sleep regularity ²	-0.01 [-0.02, 0.01]	0.01	-1.03	.304	0.00 [-0.02, 0.01]	0.01	-0.44	.659
Age	-0.02 [-0.02, -0.02]	0.00	-9.86	< .001	-0.02 [-0.03, -0.02]	0.00	-13.07	< .001
Sleep regularity × ethnicitynon-white	-0.01 [-0.06, 0.04]	0.03	-0.44	.659	0.01 [-0.04, 0.06]	0.03	0.44	.661
Sleep regularity × ethnicityunclear	0.02 [-0.01, 0.05]	0.02	1.16	.247	-0.02 [-0.05, 0.01]	0.02	-1.16	.247
Ethnicitynon-white × Sleep regularity ²	0.01 [-0.02, 0.04]	0.01	0.65	.514	0.01 [-0.02, 0.04]	0.01	0.91	.365
Ethnicityunclear × Sleep regularity ²	0.01 [-0.01, 0.03]	0.01	1.27	.206	0.00 [-0.02, 0.02]	0.01	-0.27	.784

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

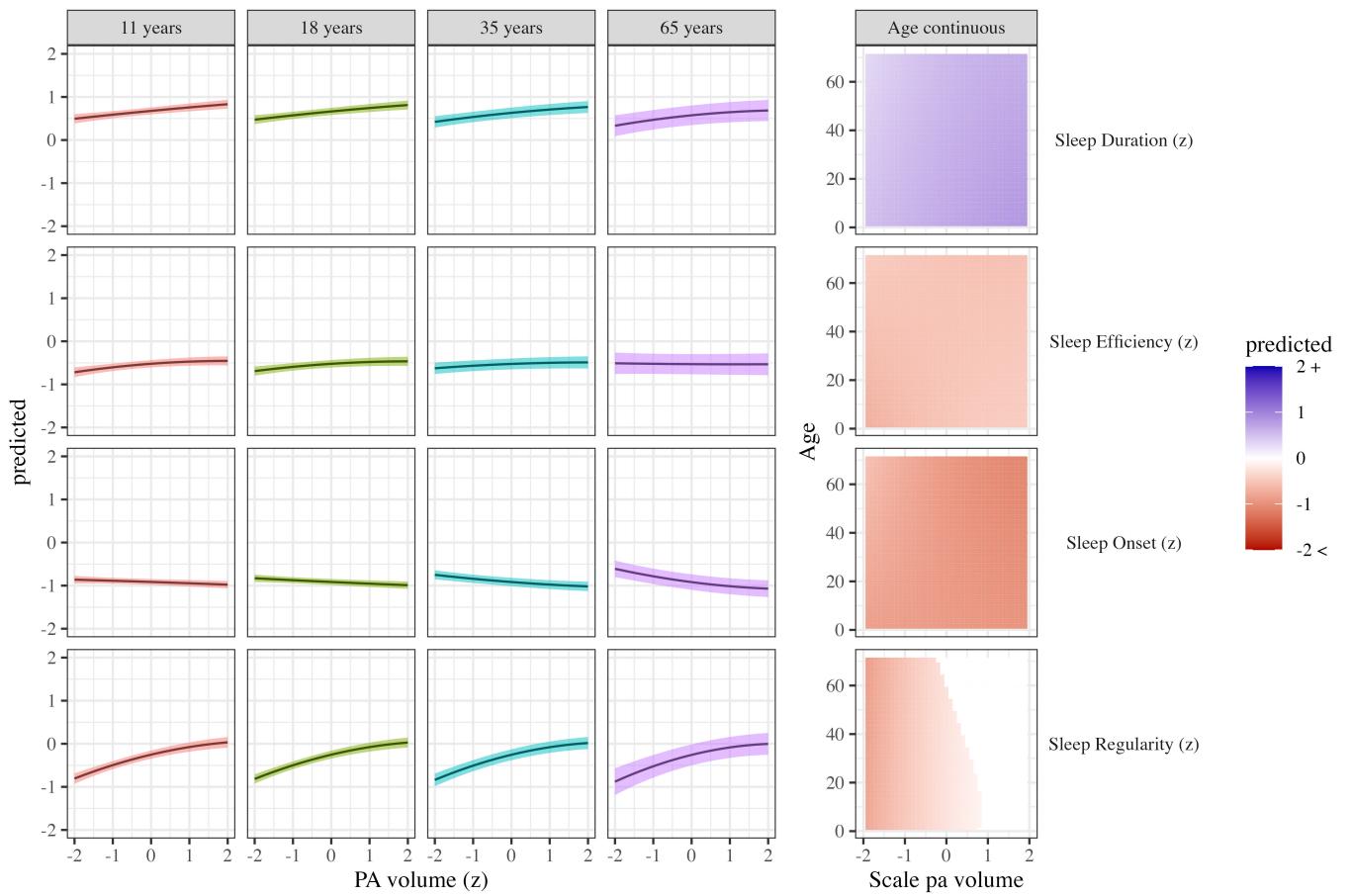


Figure 1. Sleep metrics on Physical activity volume

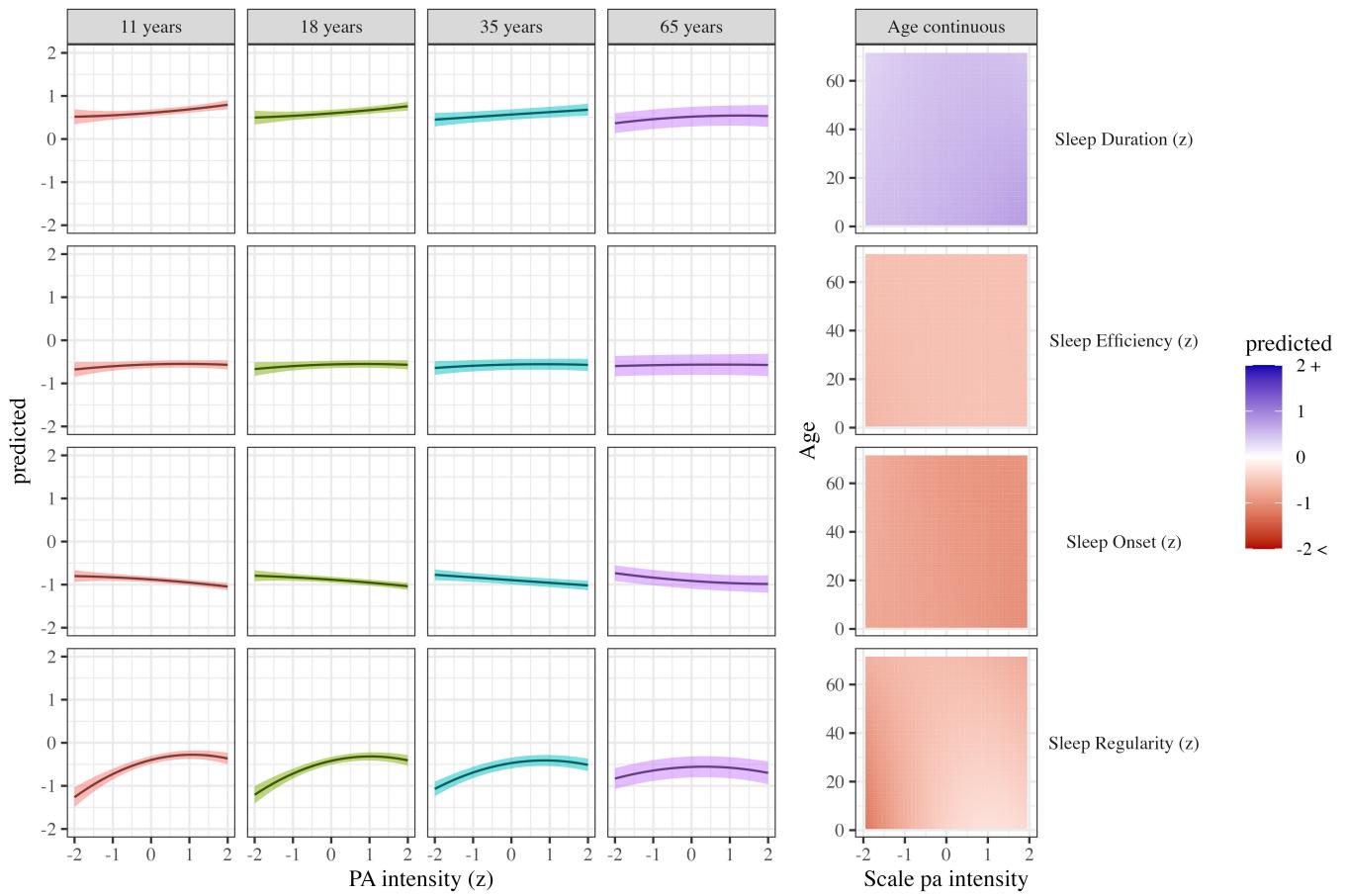


Figure 2. Sleep metrics on Physical activity intensity

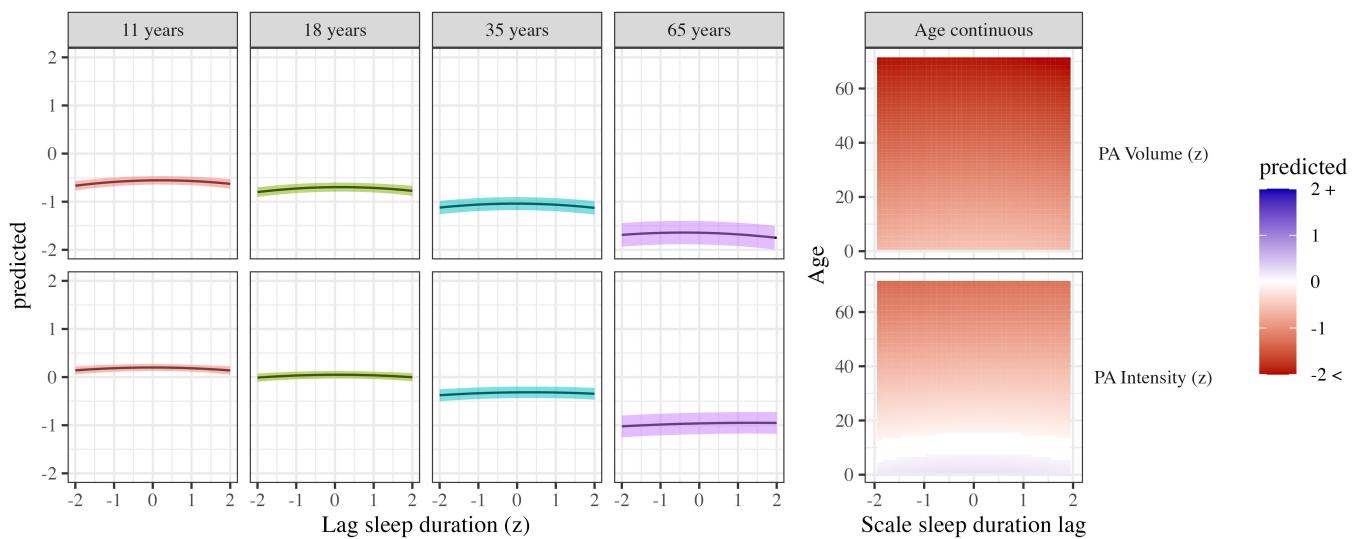


Figure 3. Physical activity by sleep duration

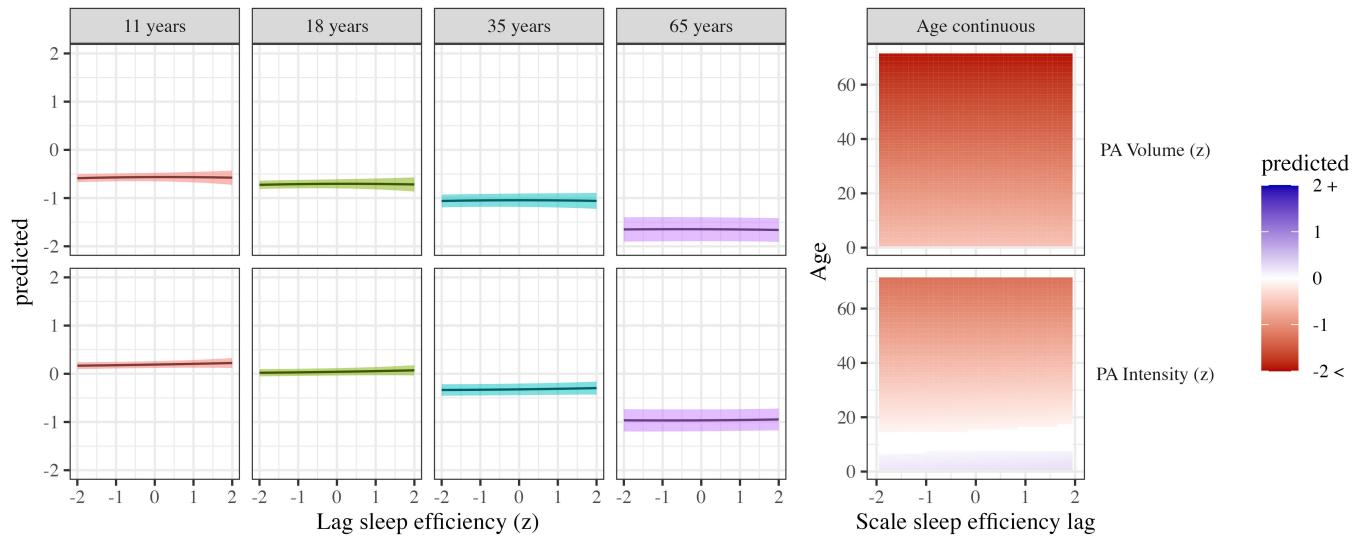


Figure 4. Physical activity by sleep efficiency

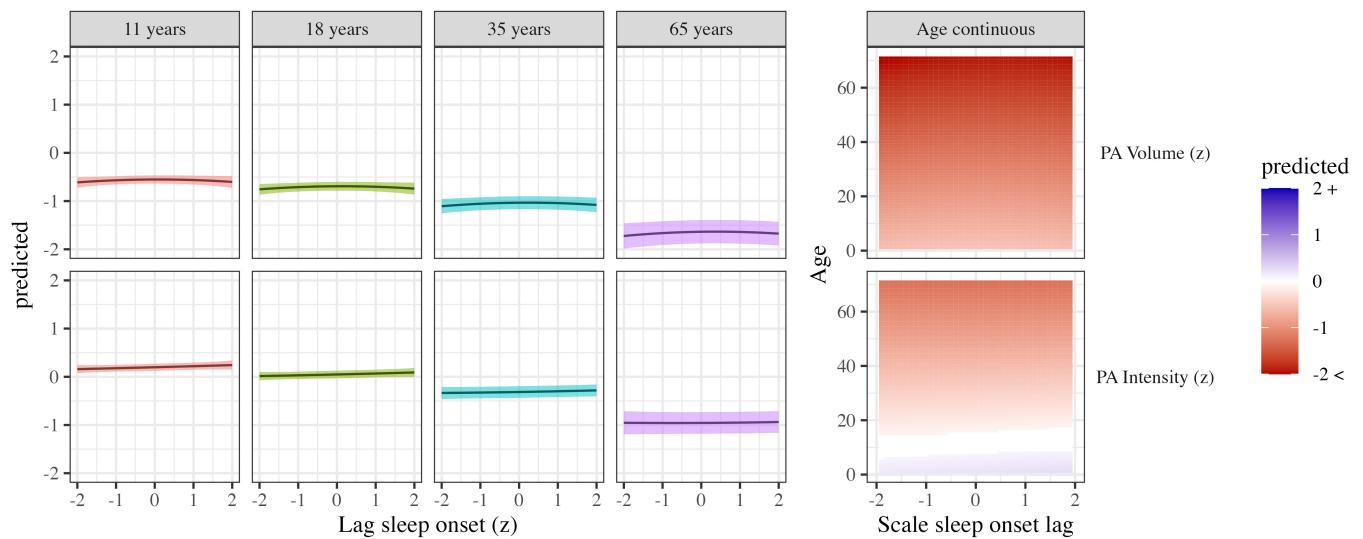


Figure 5. Physical activity by sleep onset

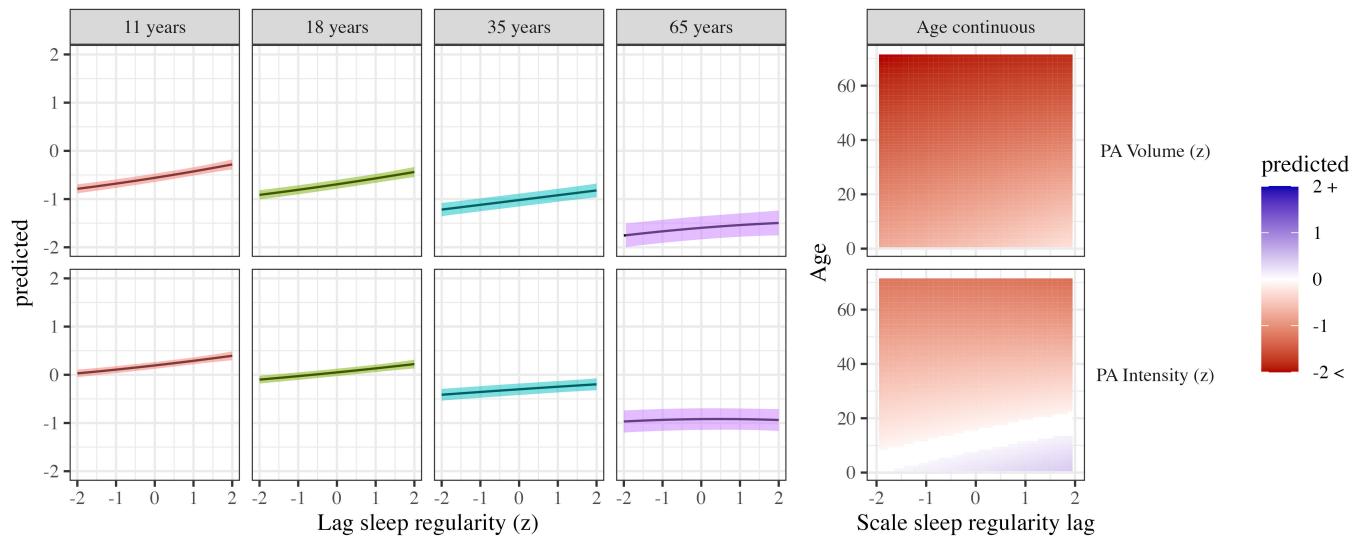


Figure 6. Physical activity by sleep regularity

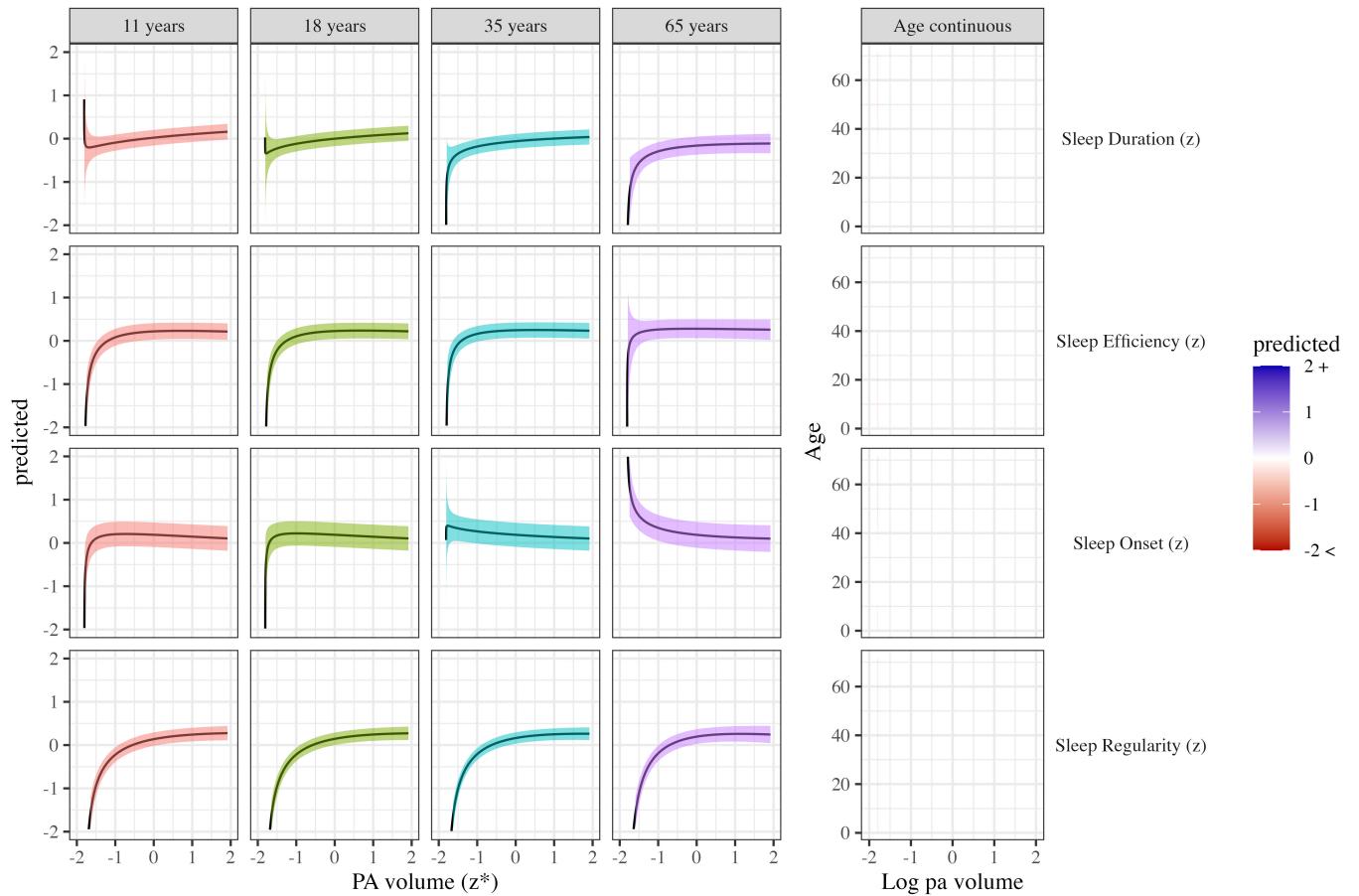


Figure 7. Sleep metrics on Physical activity volume

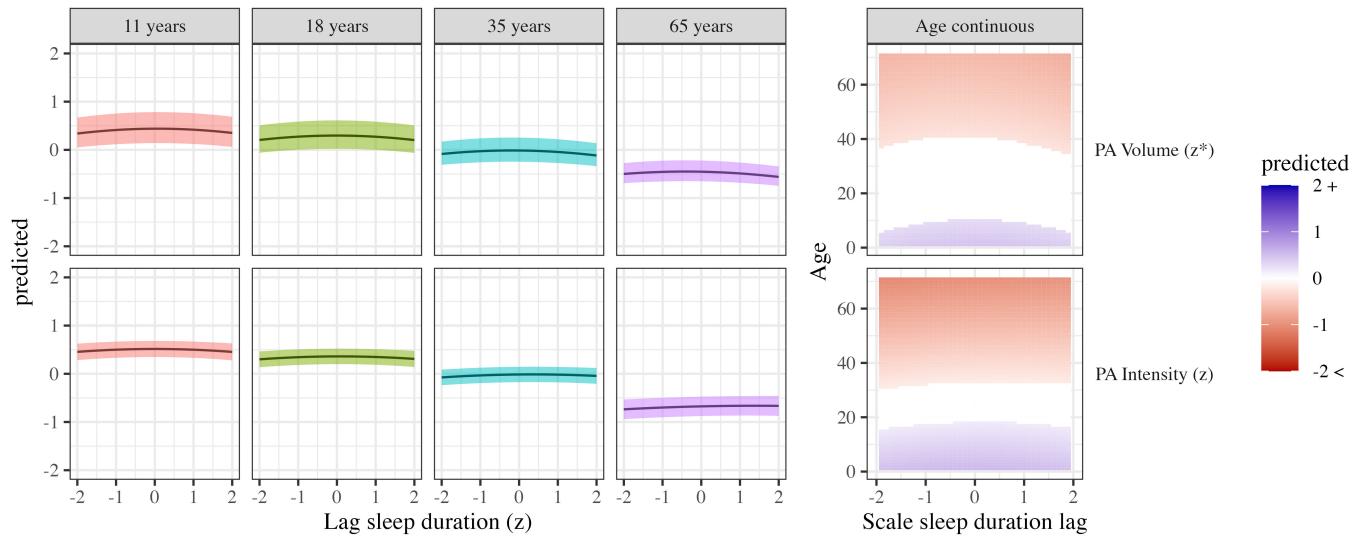


Figure 8. Physical activity by sleep duration

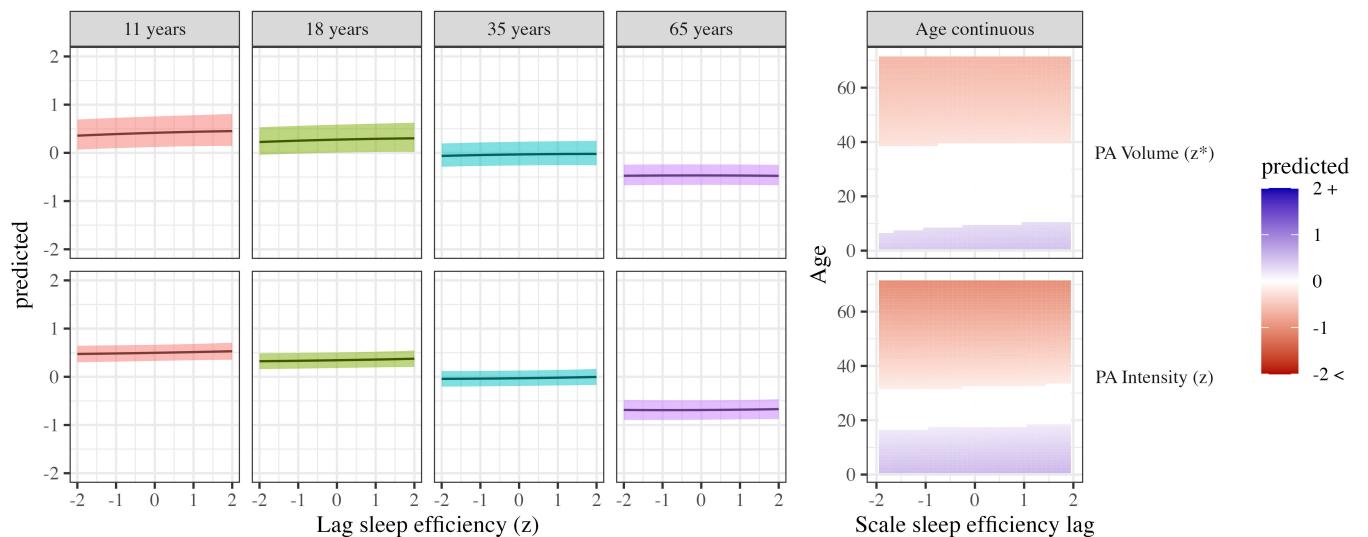


Figure 9. Physical activity by sleep efficiency

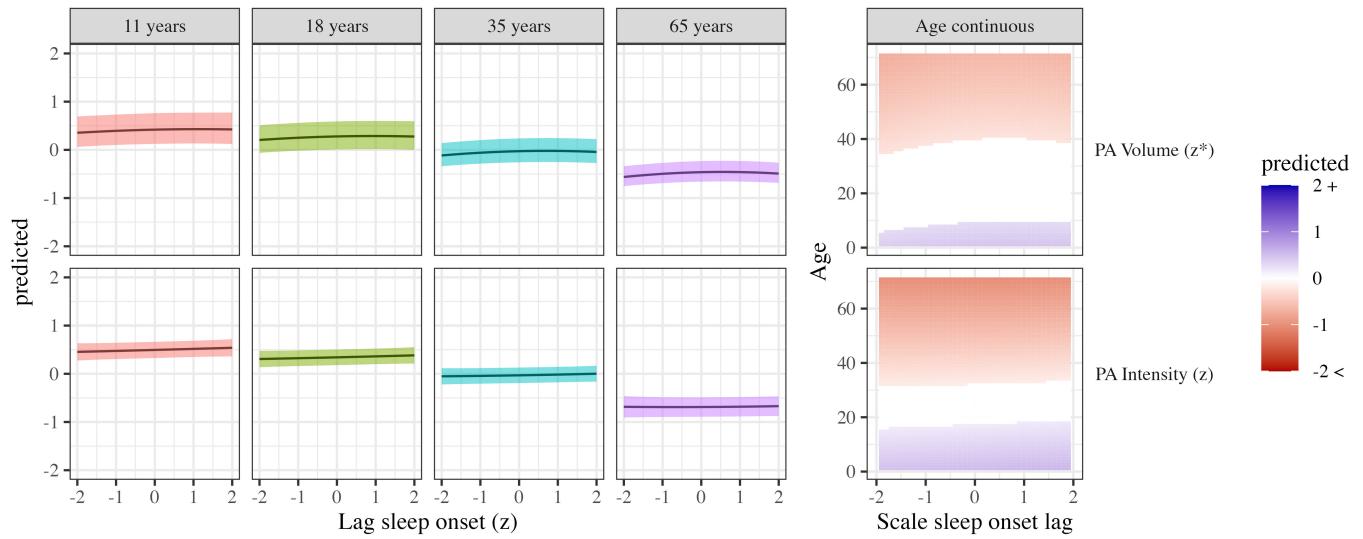


Figure 10. Physical activity by sleep onset

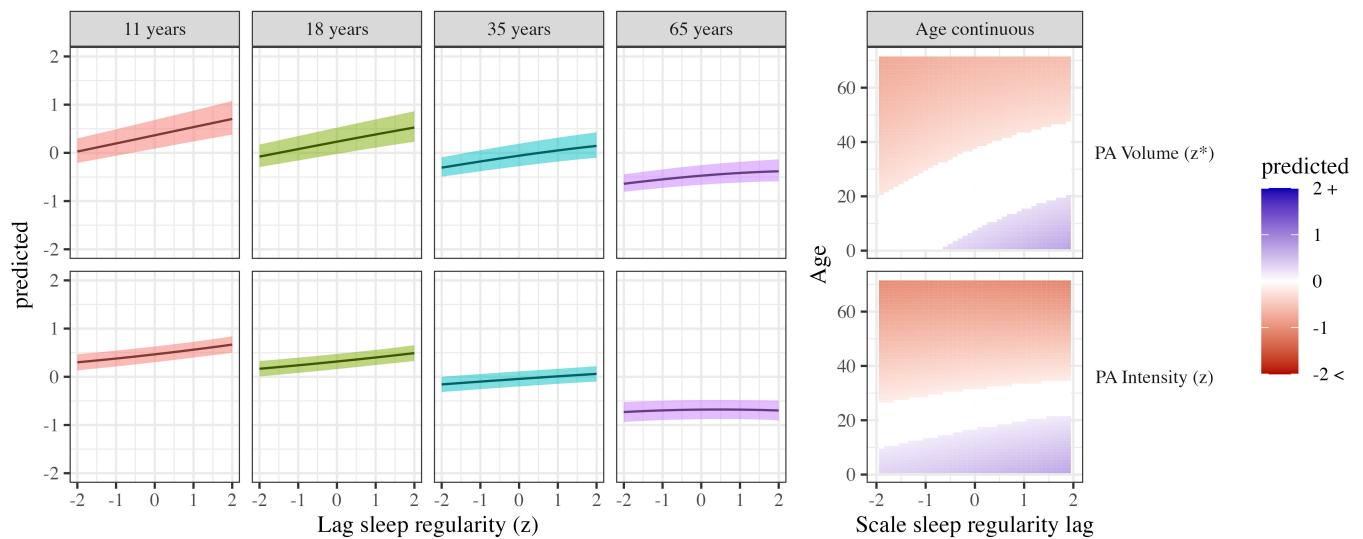


Figure 11. Physical activity by sleep regularity

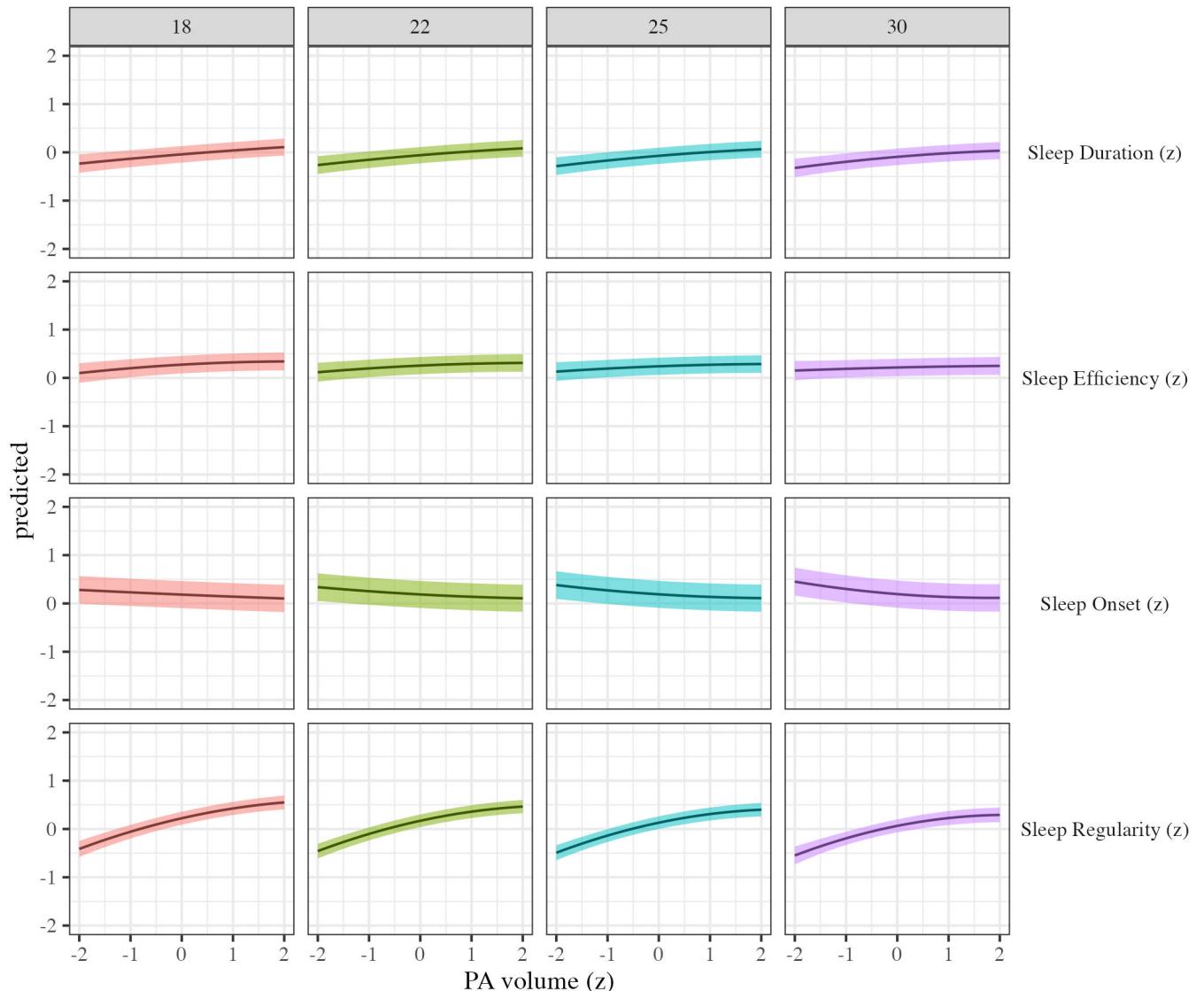


Figure 12. Sleep metrics on Physical activity volume by BMI

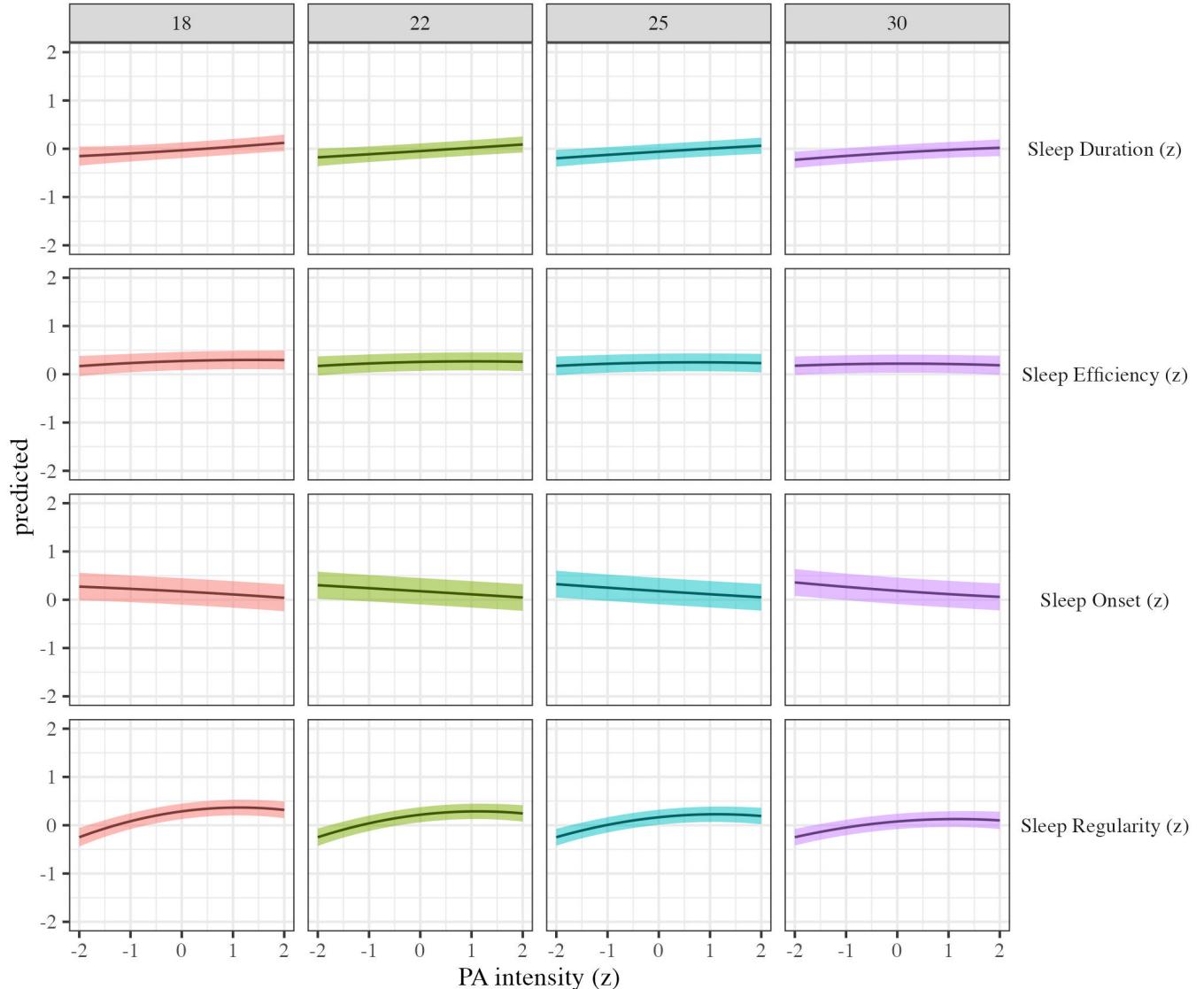


Figure 13. Sleep metrics on Physical activity intensity moderated by BMI

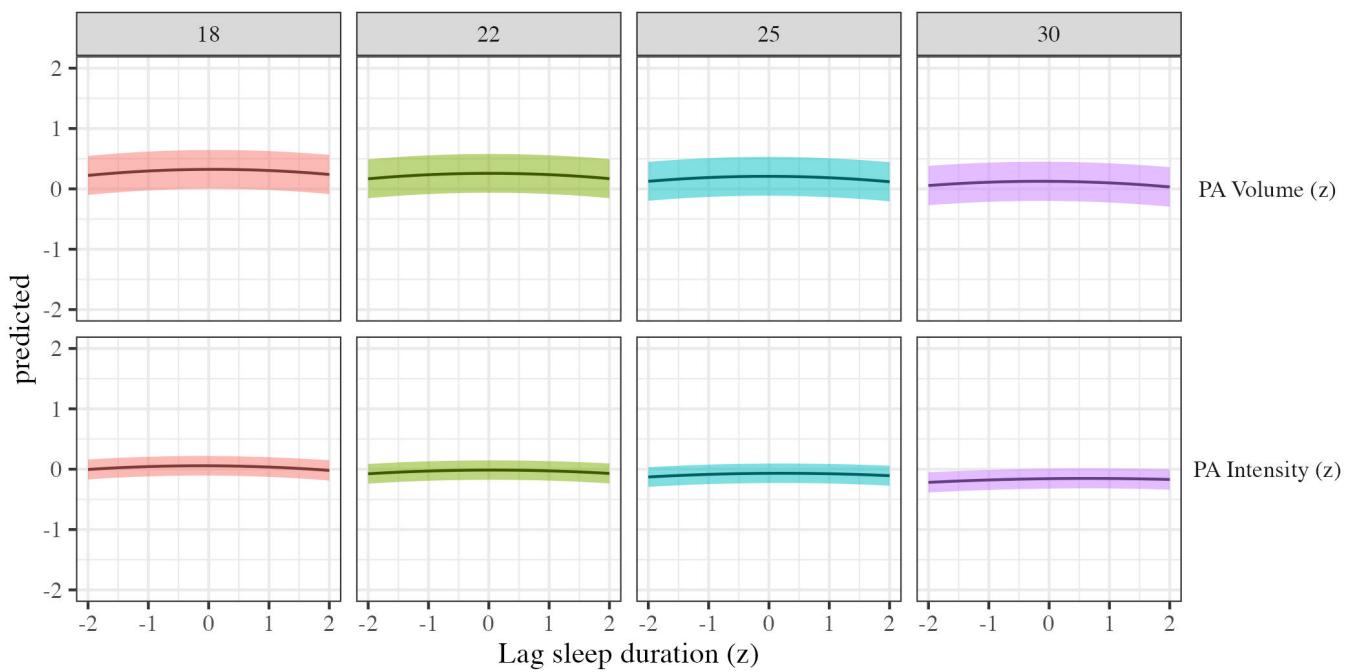


Figure 14. Physical activity by sleep duration moderated by BMI

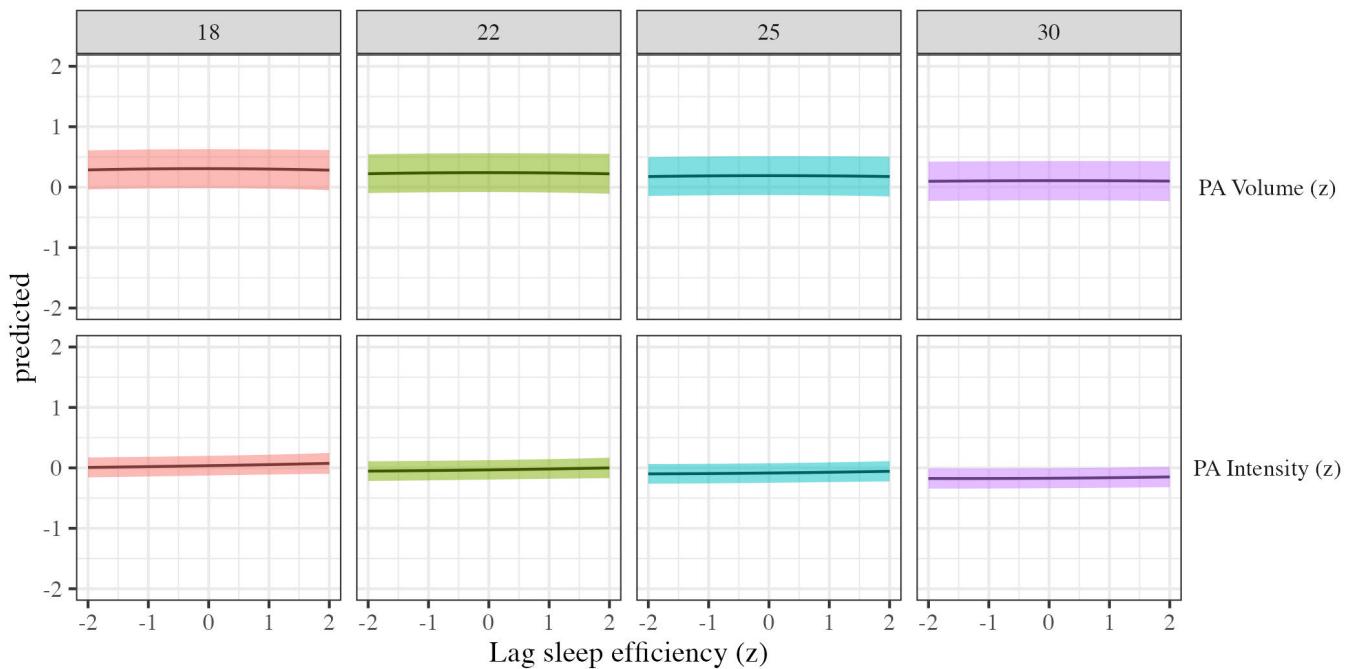


Figure 15. Physical activity by sleep efficiency moderated by BMI

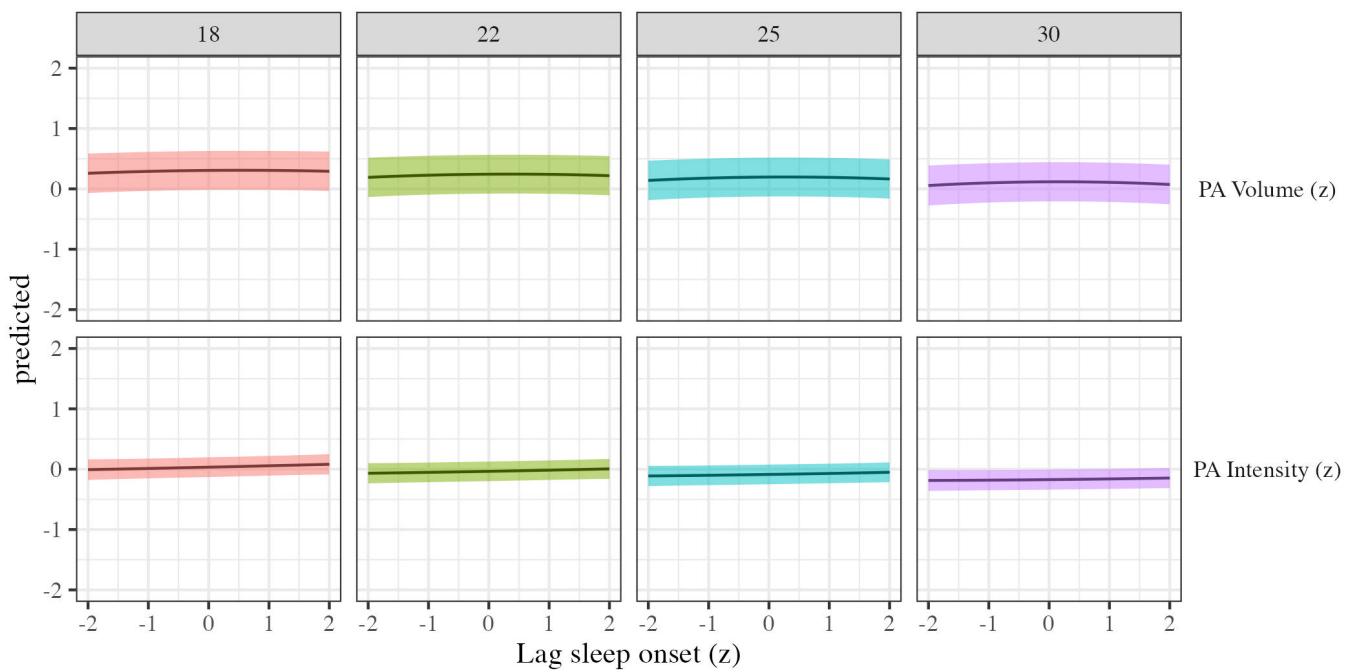


Figure 16. Physical activity by sleep onset moderated by BMI

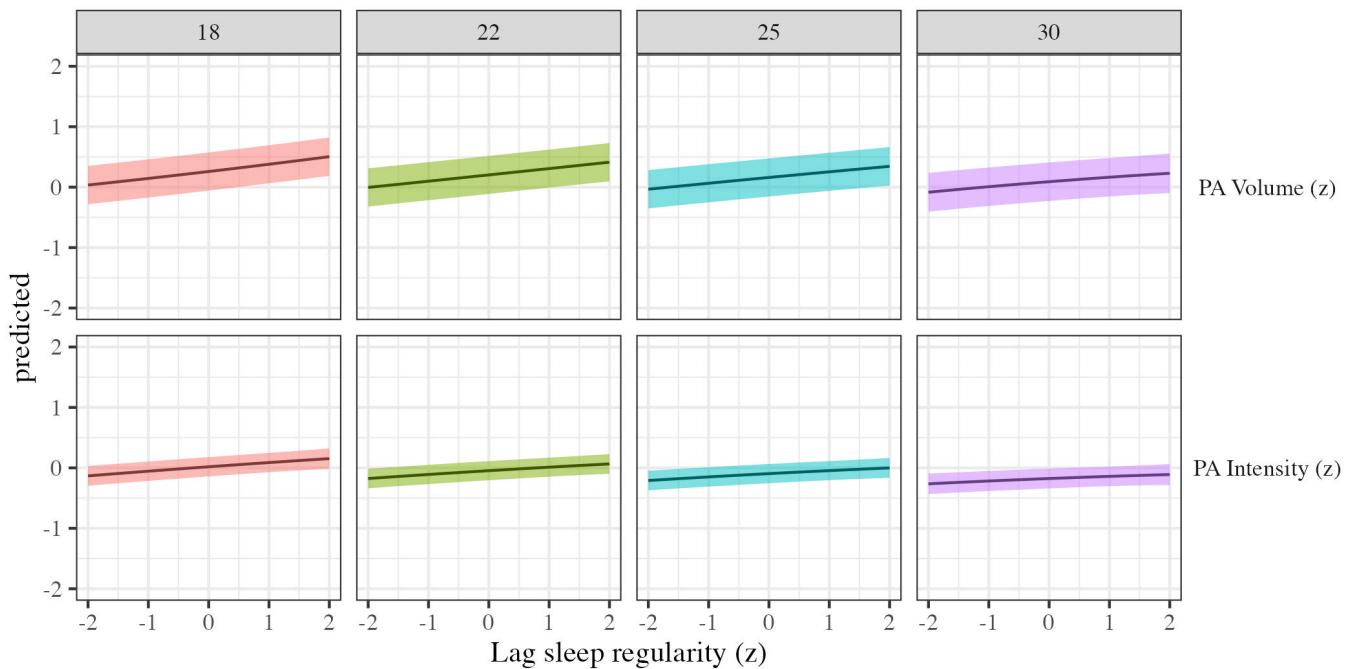


Figure 17. Physical activity by sleep regularity moderated by BMI

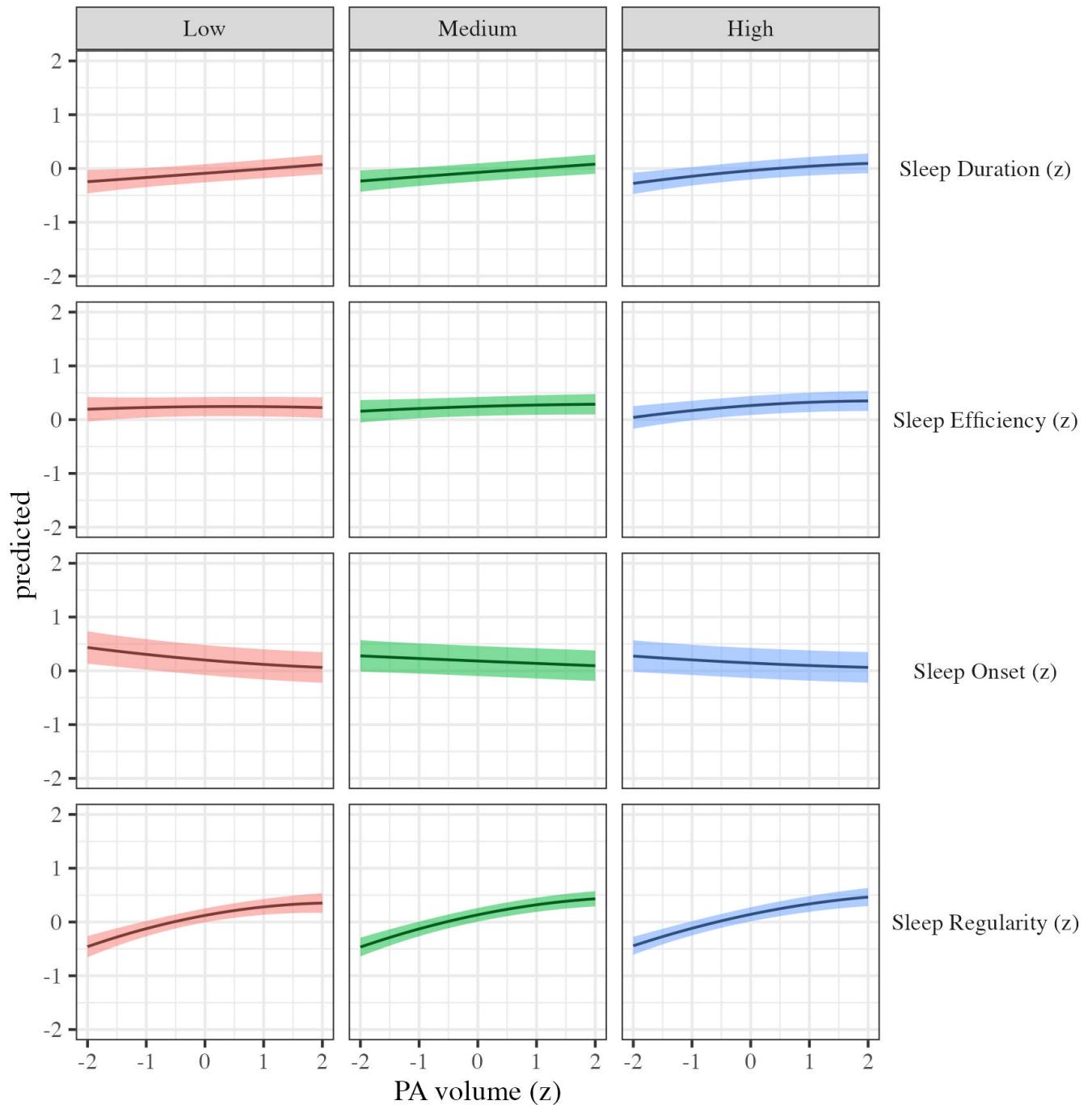


Figure 18. Sleep metrics on Physical activity volume by SES

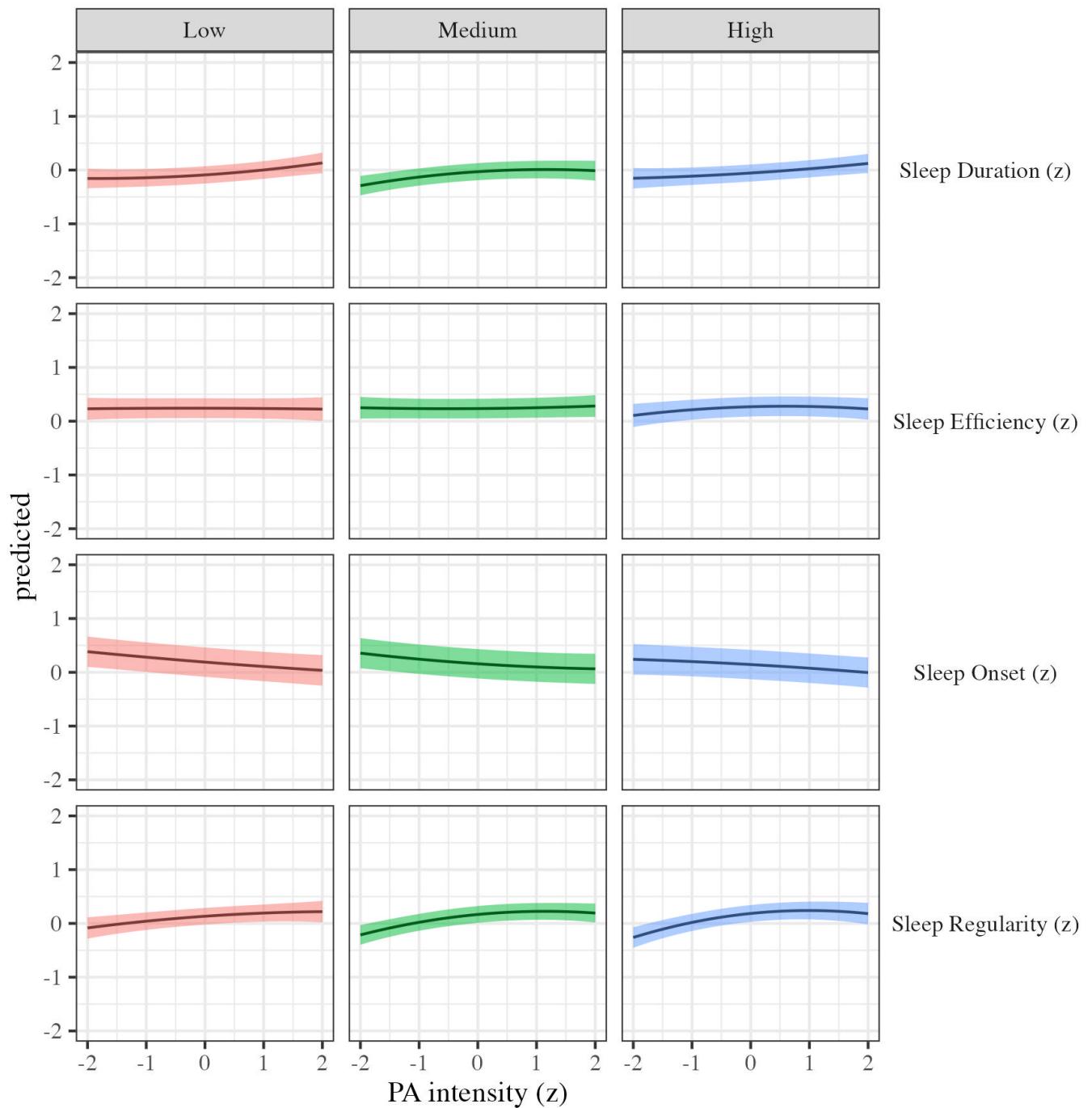


Figure 19. Sleep metrics on Physical activity intensity moderated by SES

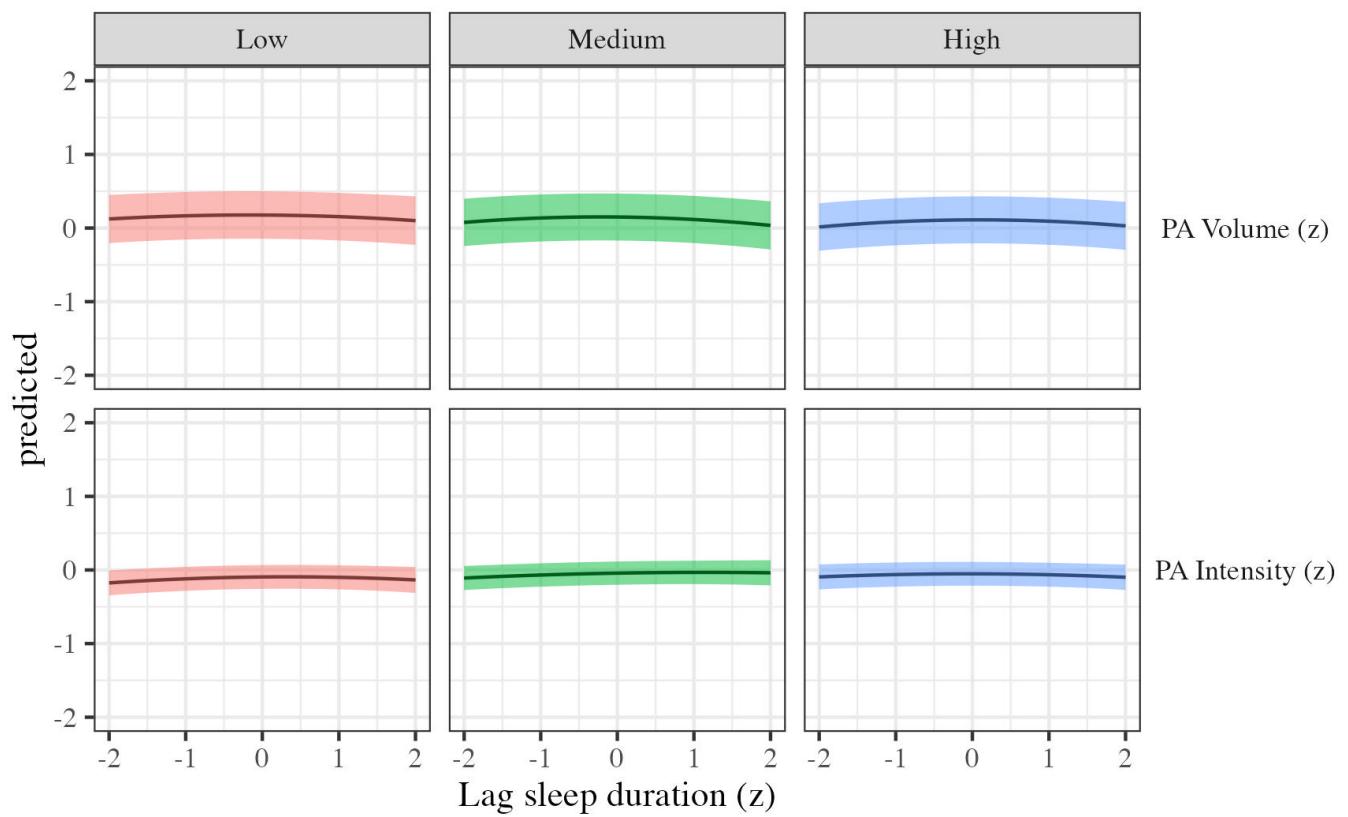


Figure 20. Physical activity by sleep duration moderated by SES

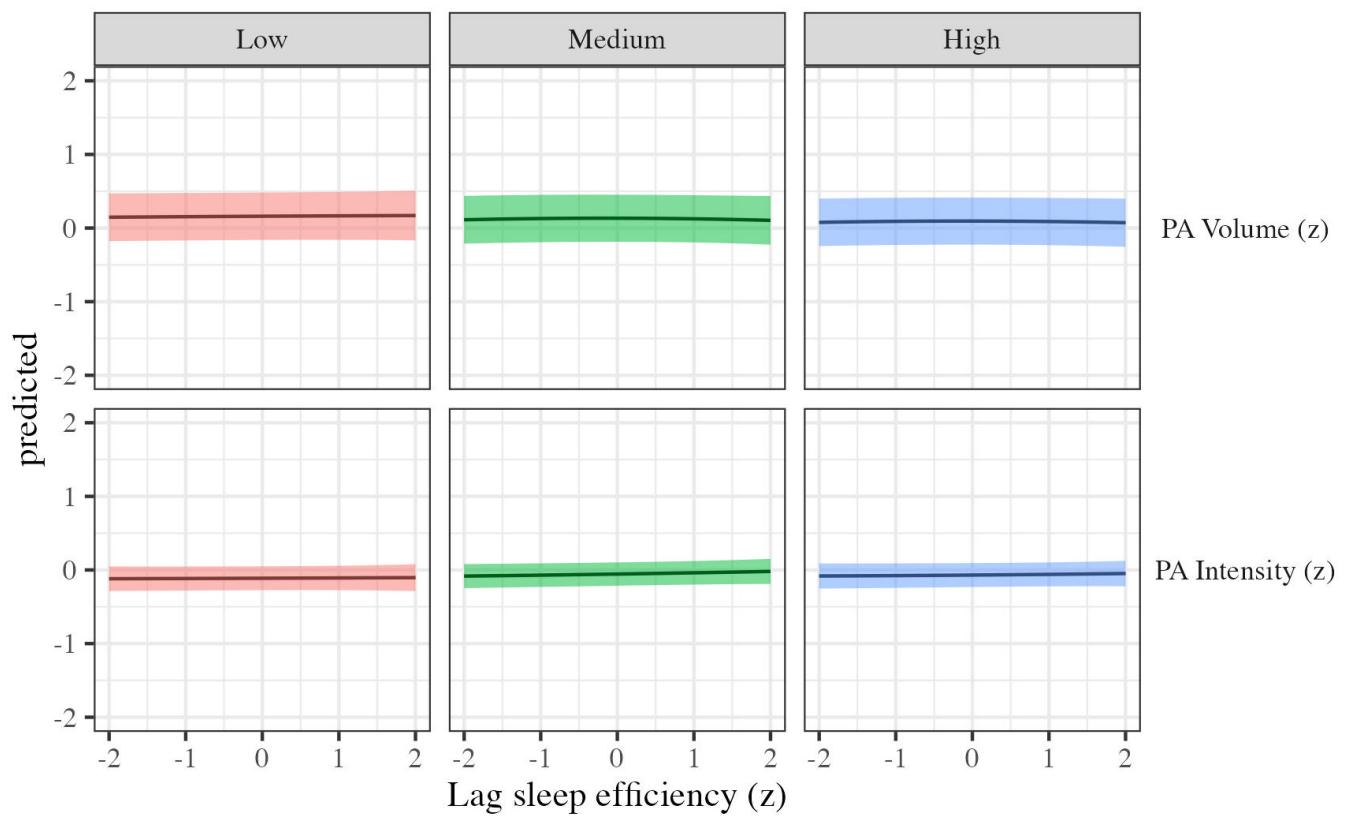


Figure 21. Physical activity by sleep efficiency moderated by SES

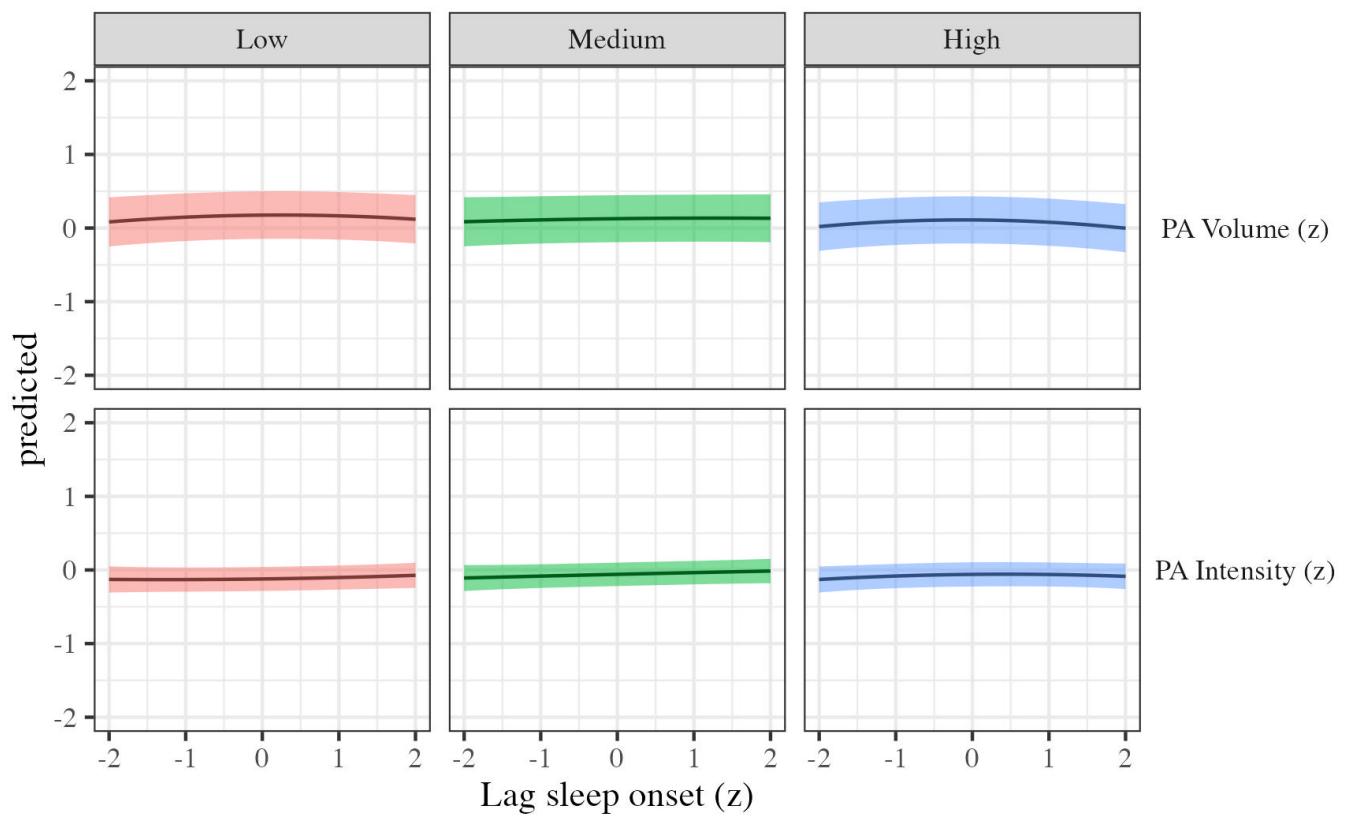


Figure 22. Physical activity by sleep onset moderated by SES

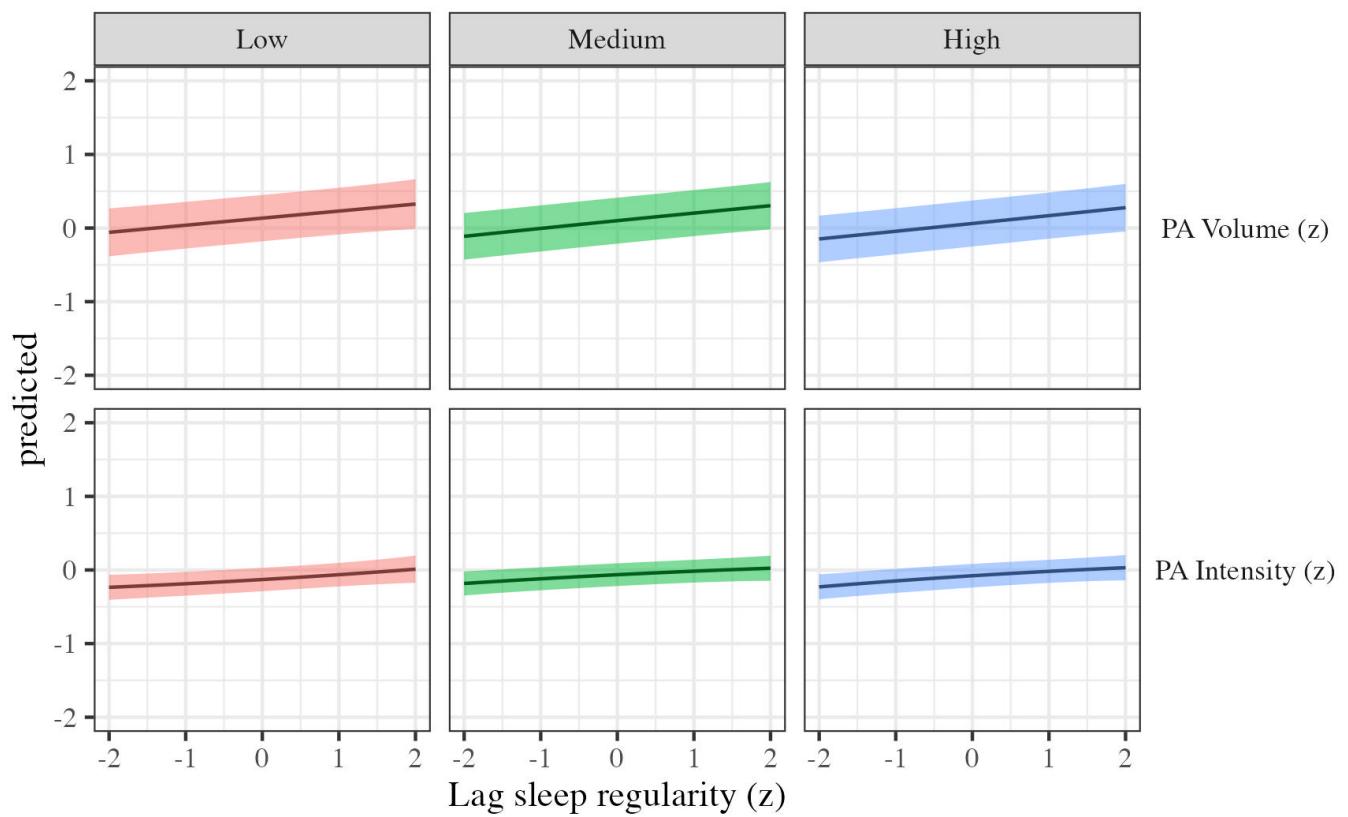


Figure 23. Physical activity by sleep regularity moderated by SES

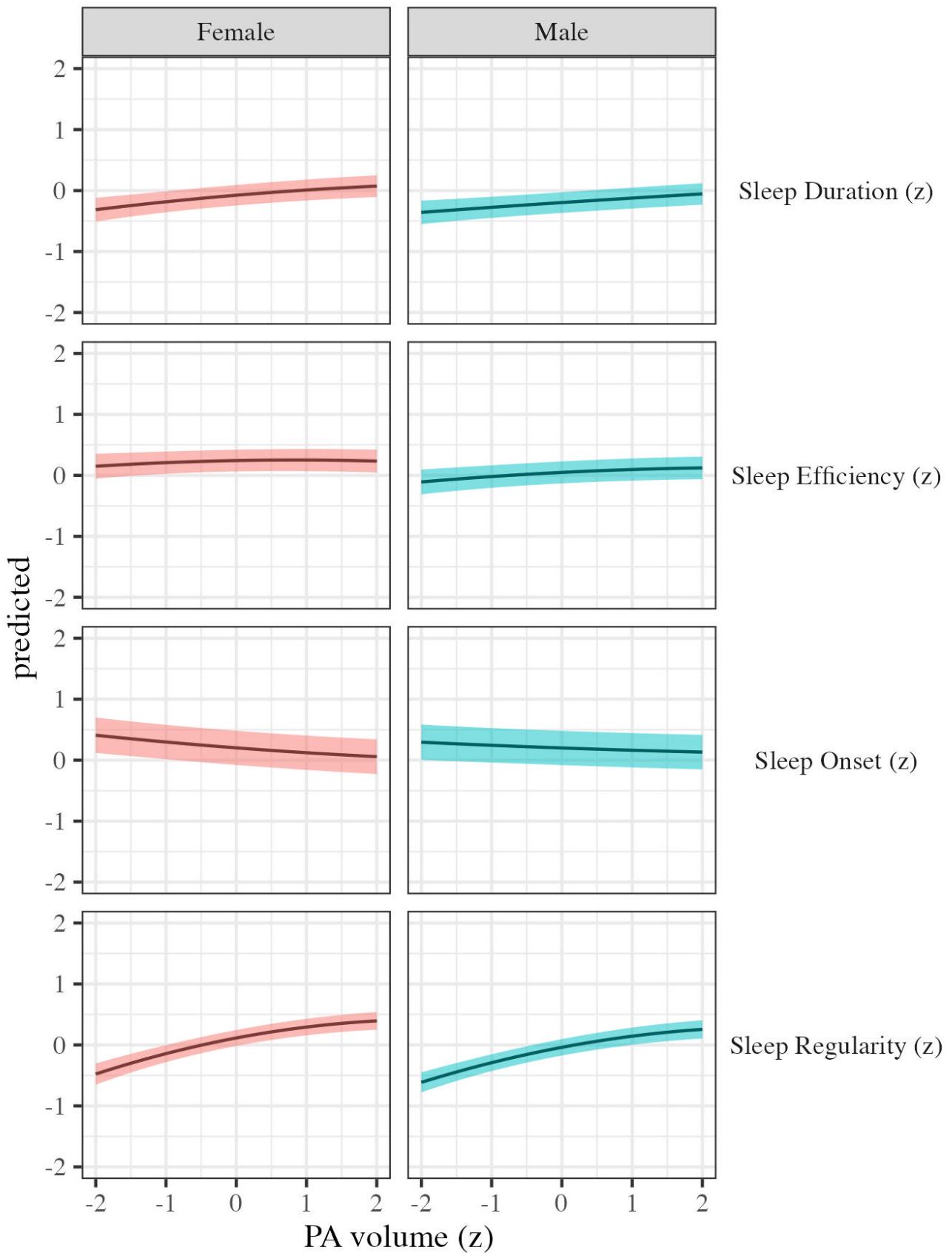


Figure 24. Sleep metrics on Physical activity volume by sex

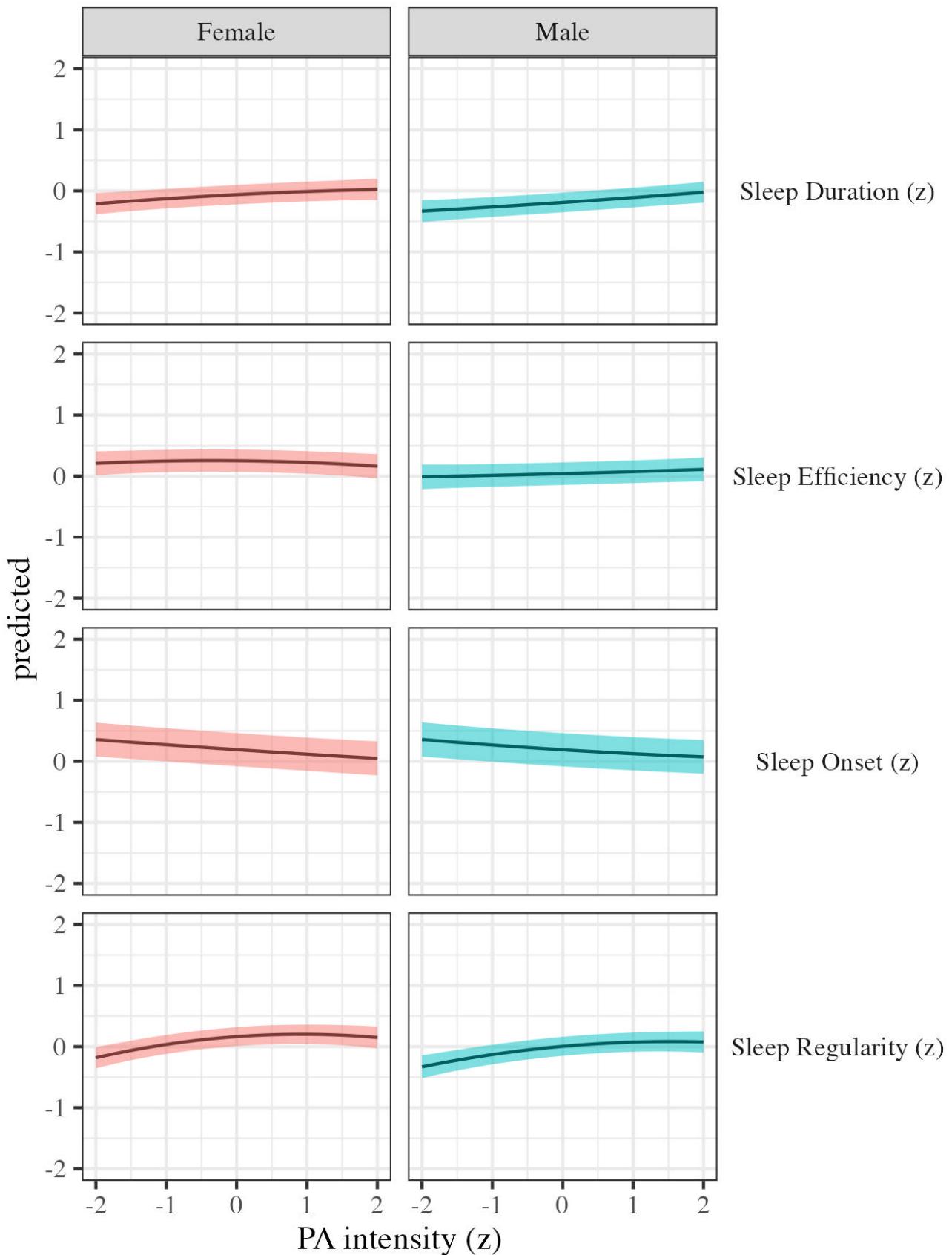


Figure 25. Sleep metrics on Physical activity intensity moderated by sex

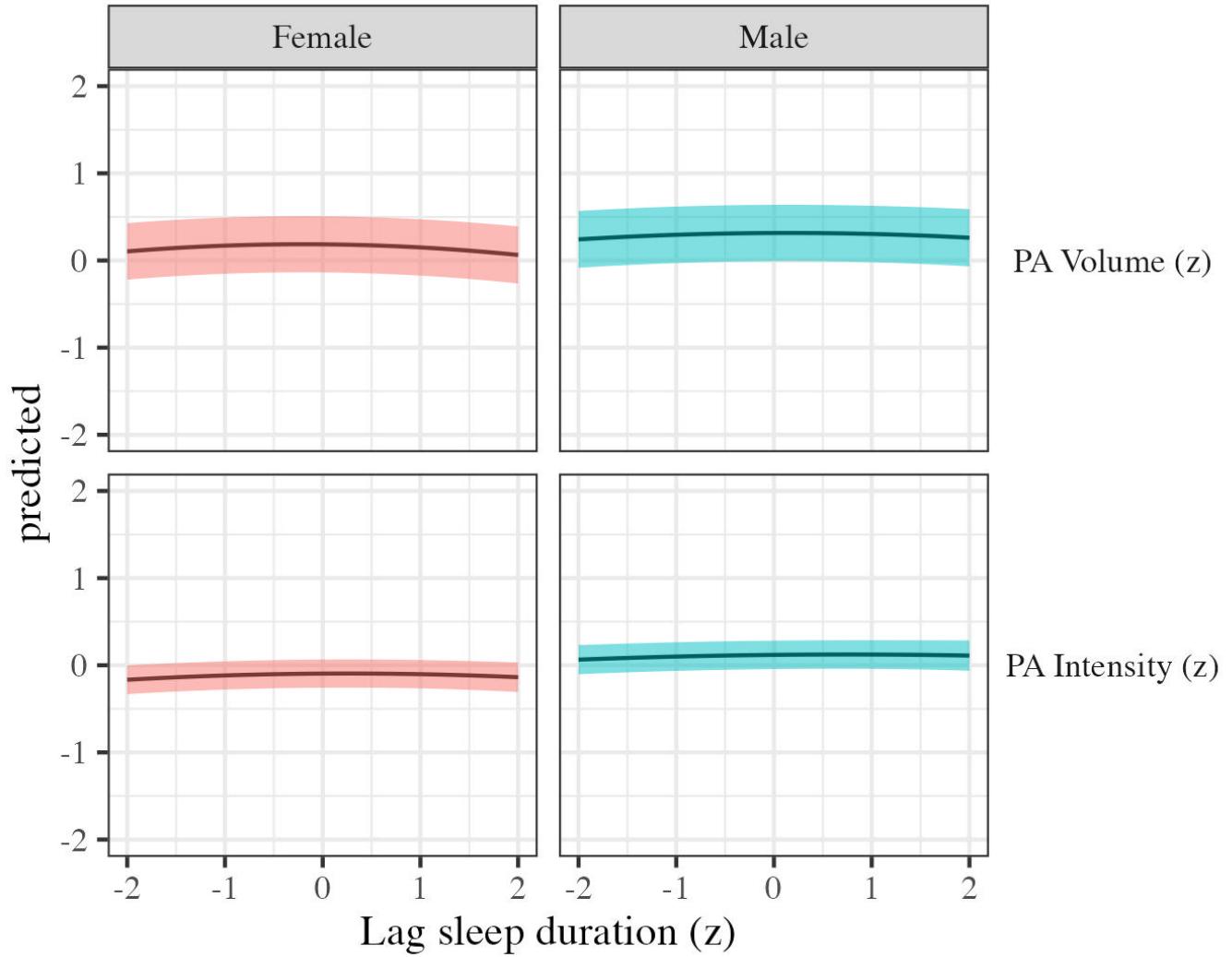


Figure 26. Physical activity by sleep duration moderated by sex

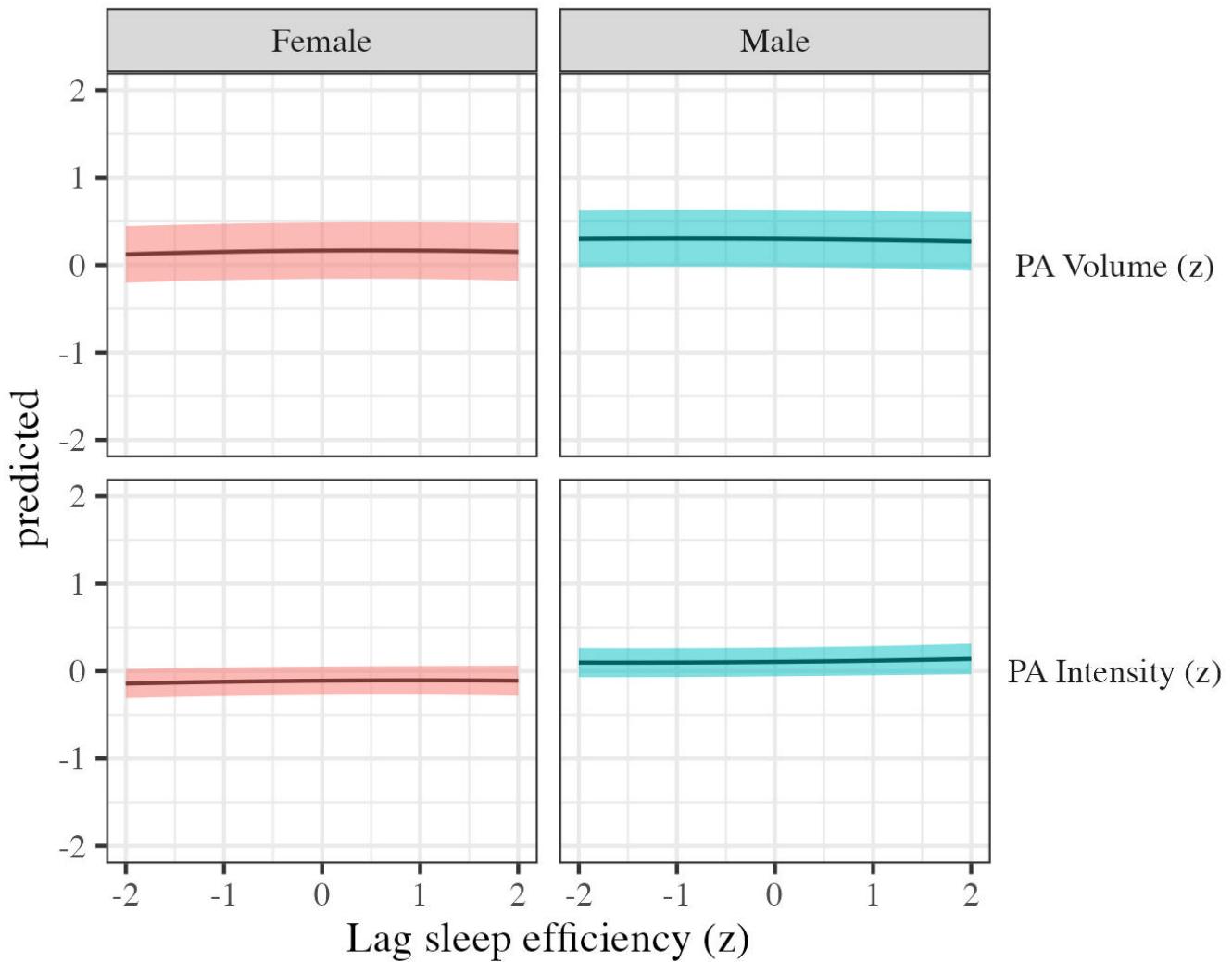


Figure 27. Physical activity by sleep efficiency moderated by sex

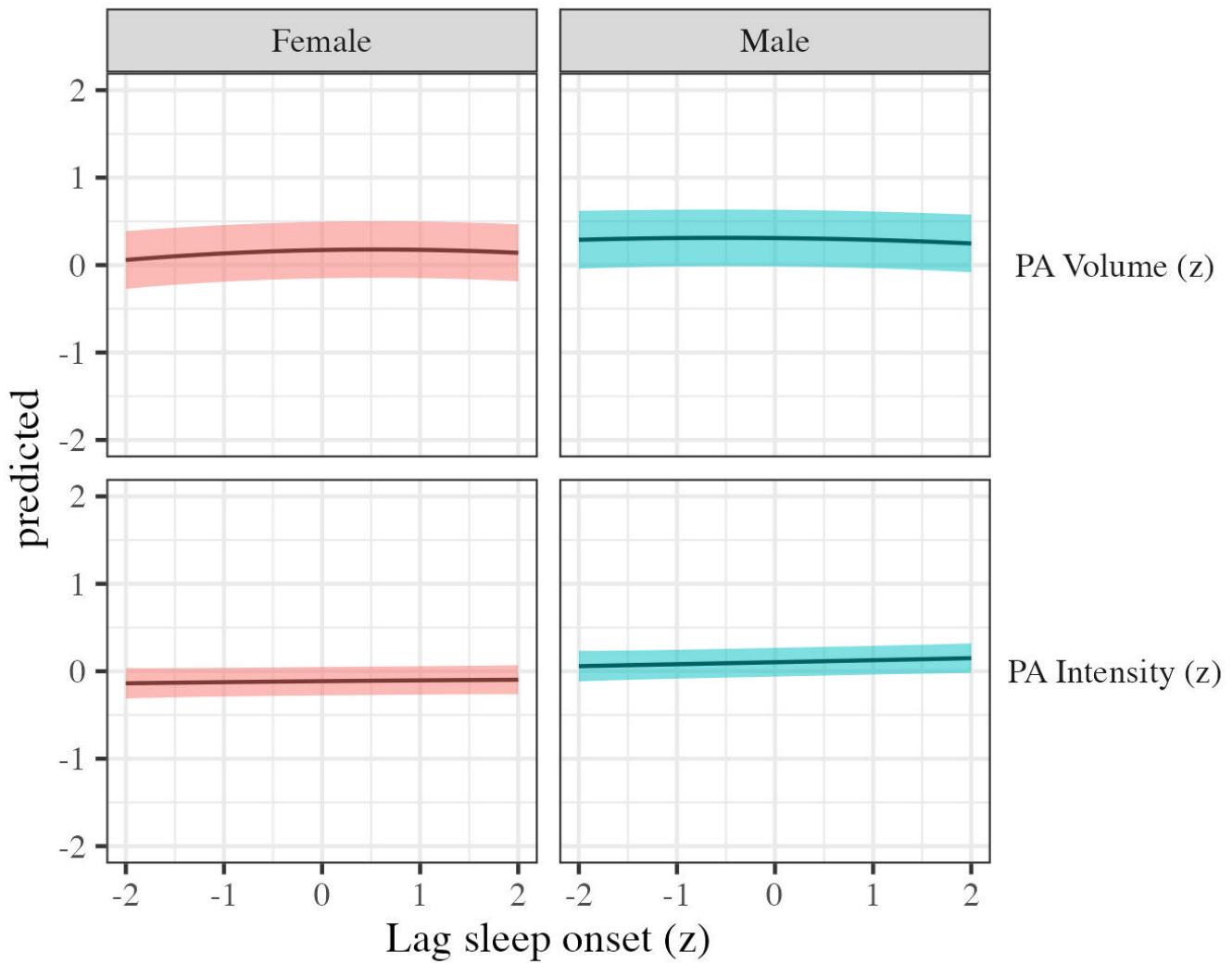


Figure 28. Physical activity by sleep onset moderated by sex

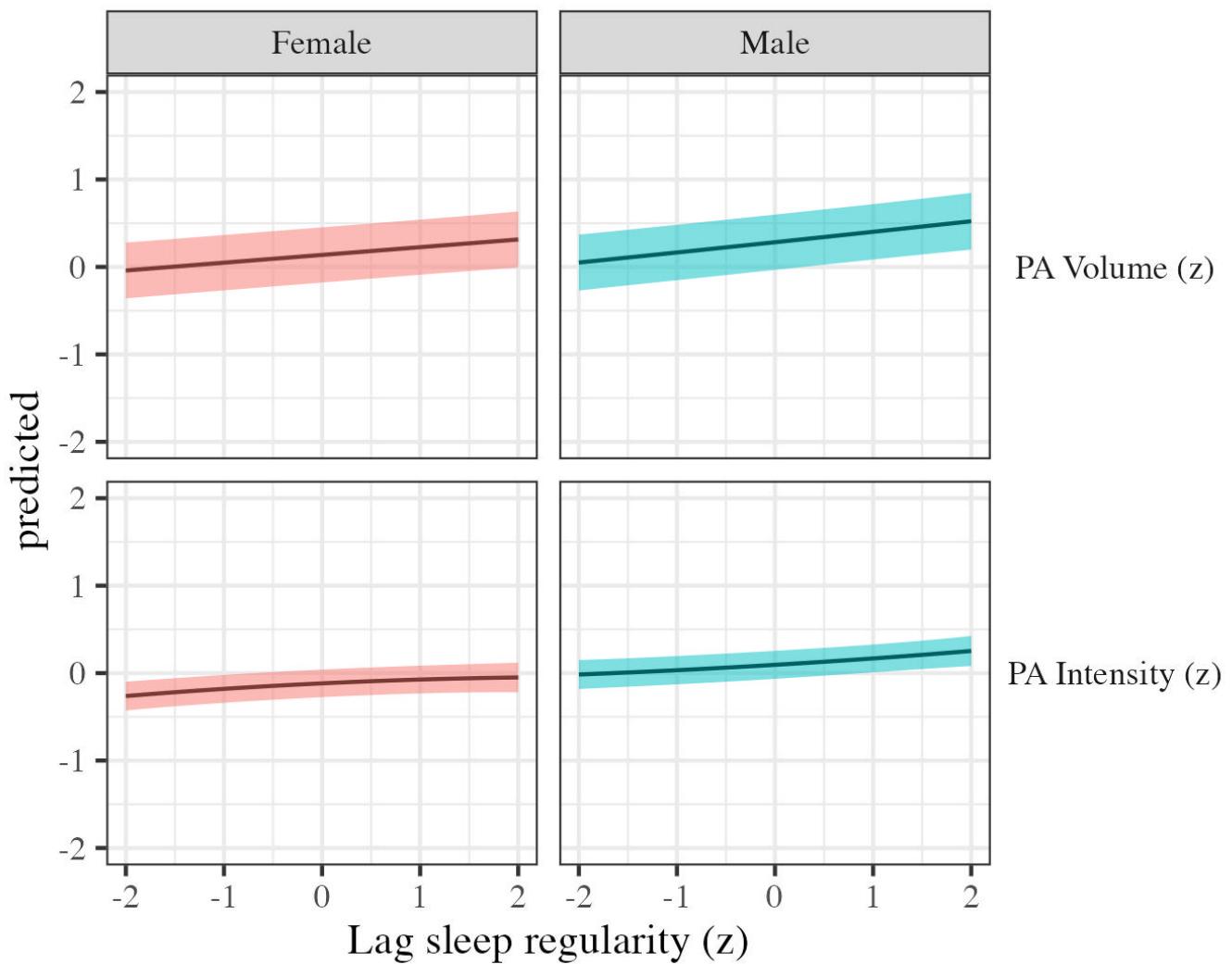


Figure 29. Physical activity by sleep regularity moderated by sex

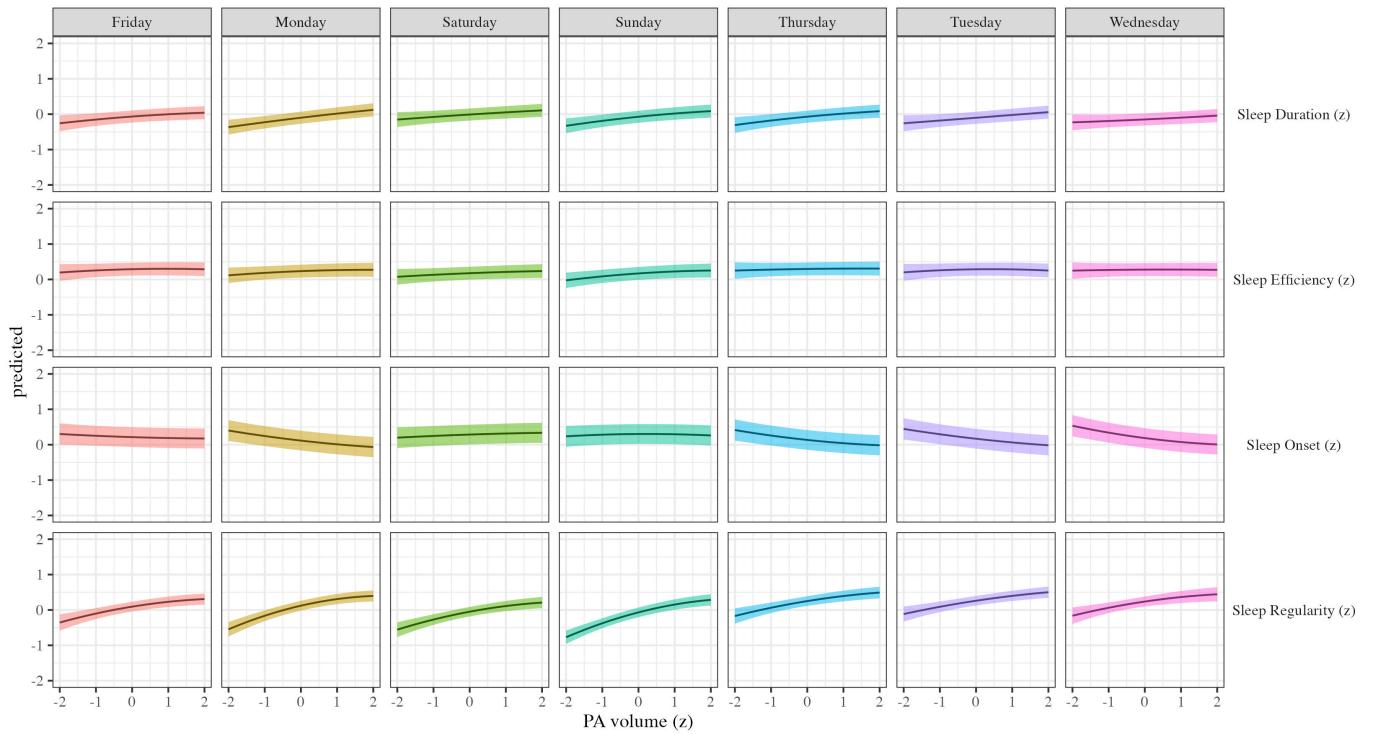


Figure 30. Sleep metrics on Physical activity volume by weekday

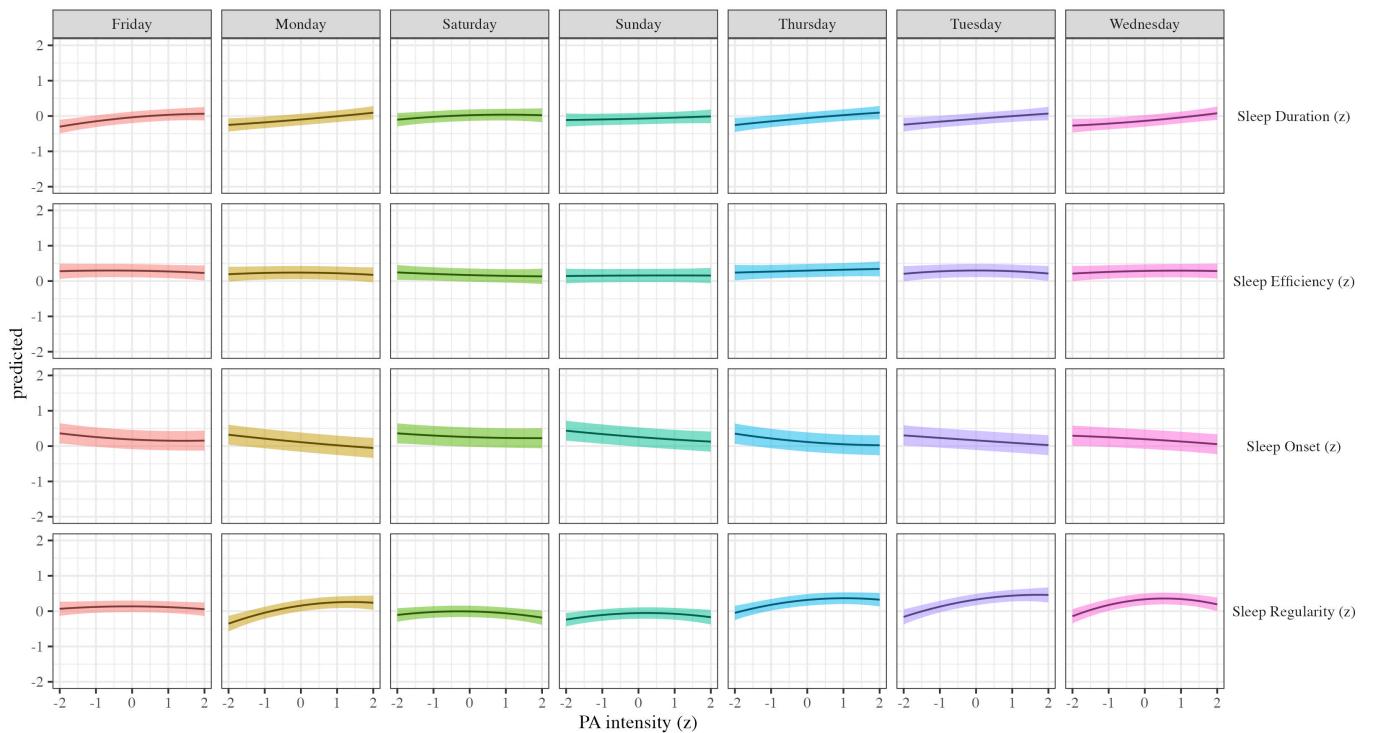


Figure 31. Sleep metrics on Physical activity intensity moderated by weekday

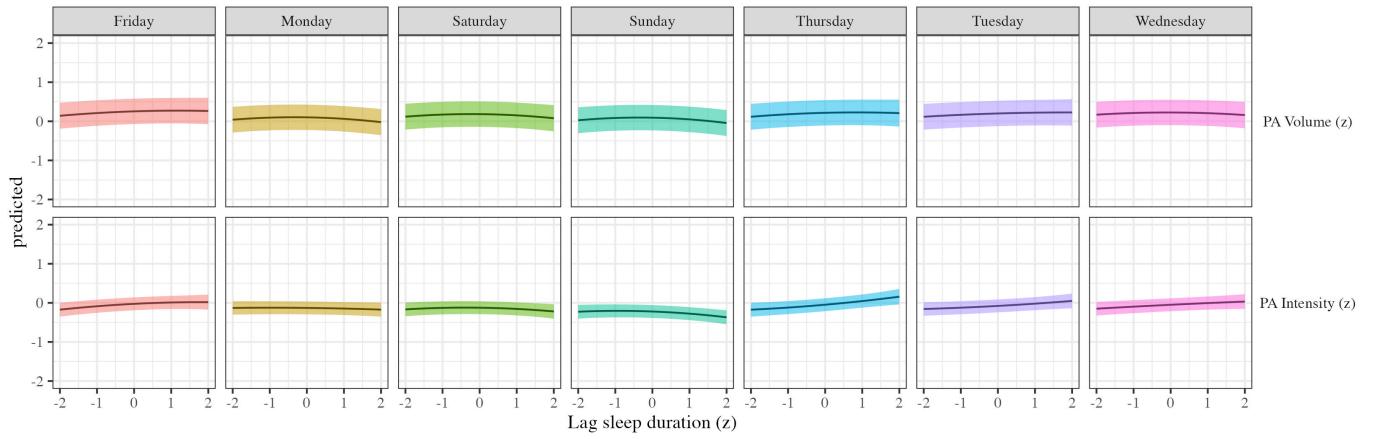


Figure 32. Physical activity by sleep duration moderated by weekday

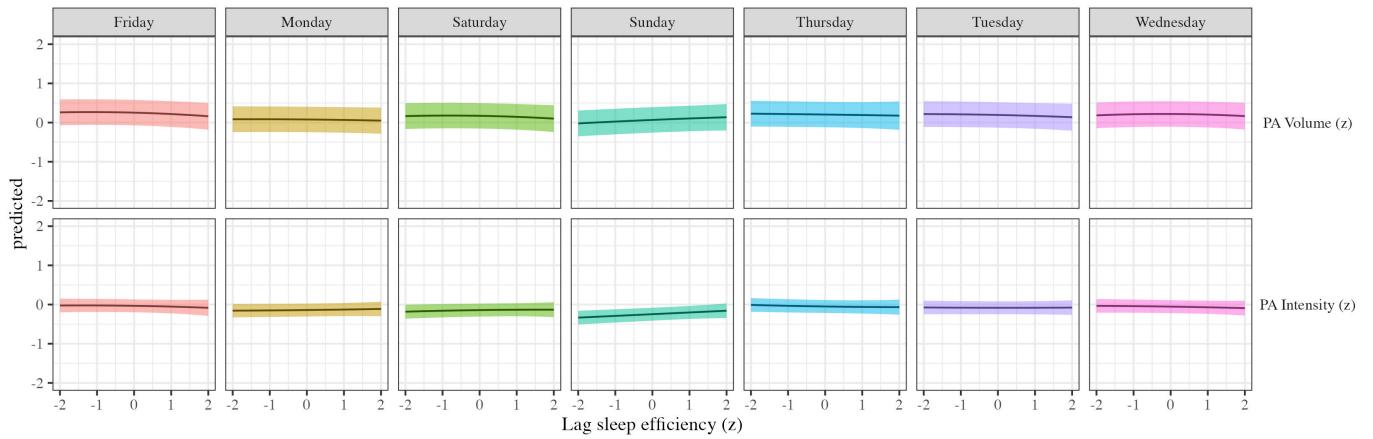


Figure 33. Physical activity by sleep efficiency moderated by weekday

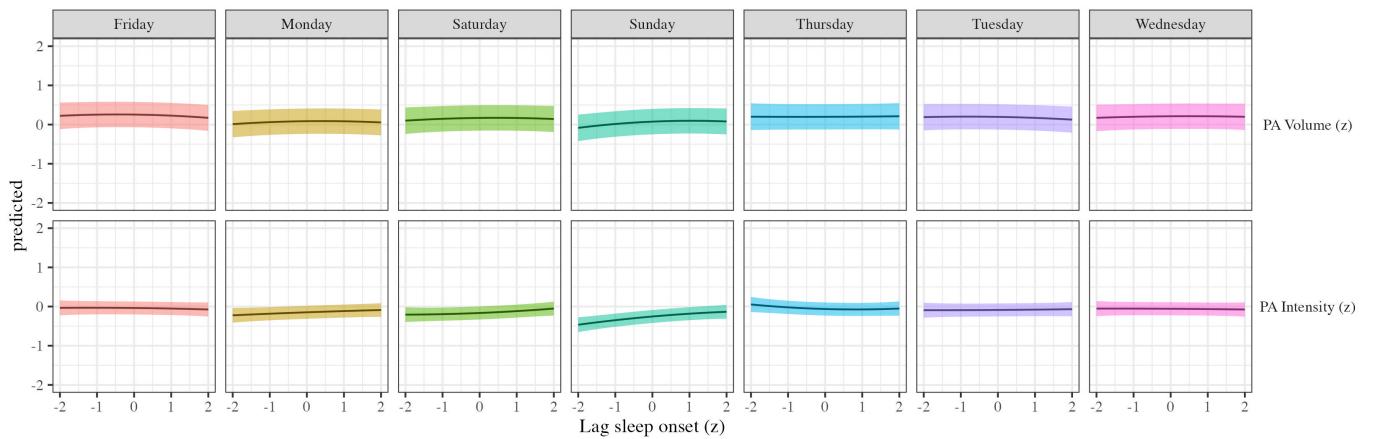


Figure 34. Physical activity by sleep onset moderated by weekday

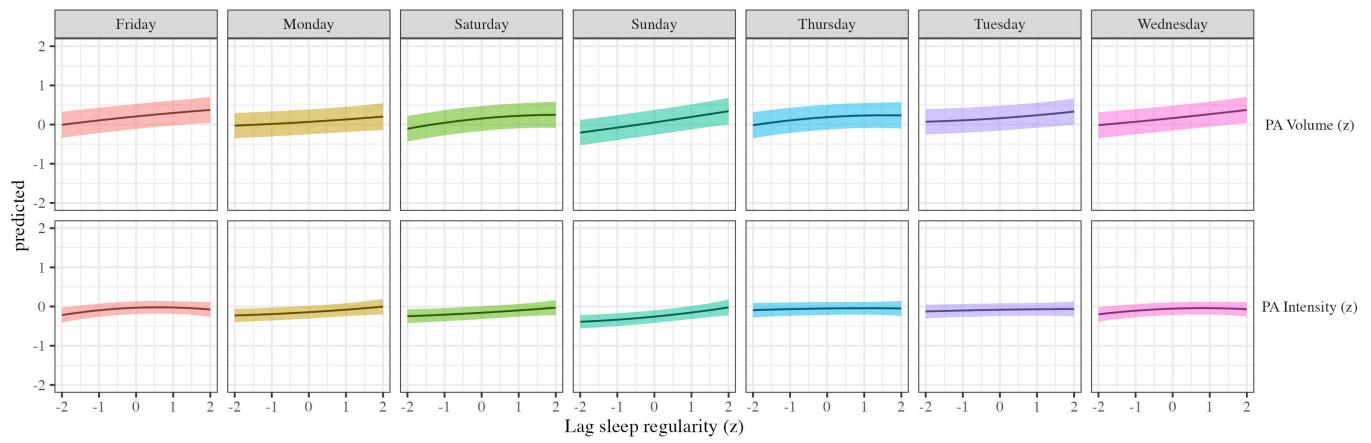


Figure 35. Physical activity by sleep regularity moderated by weekday

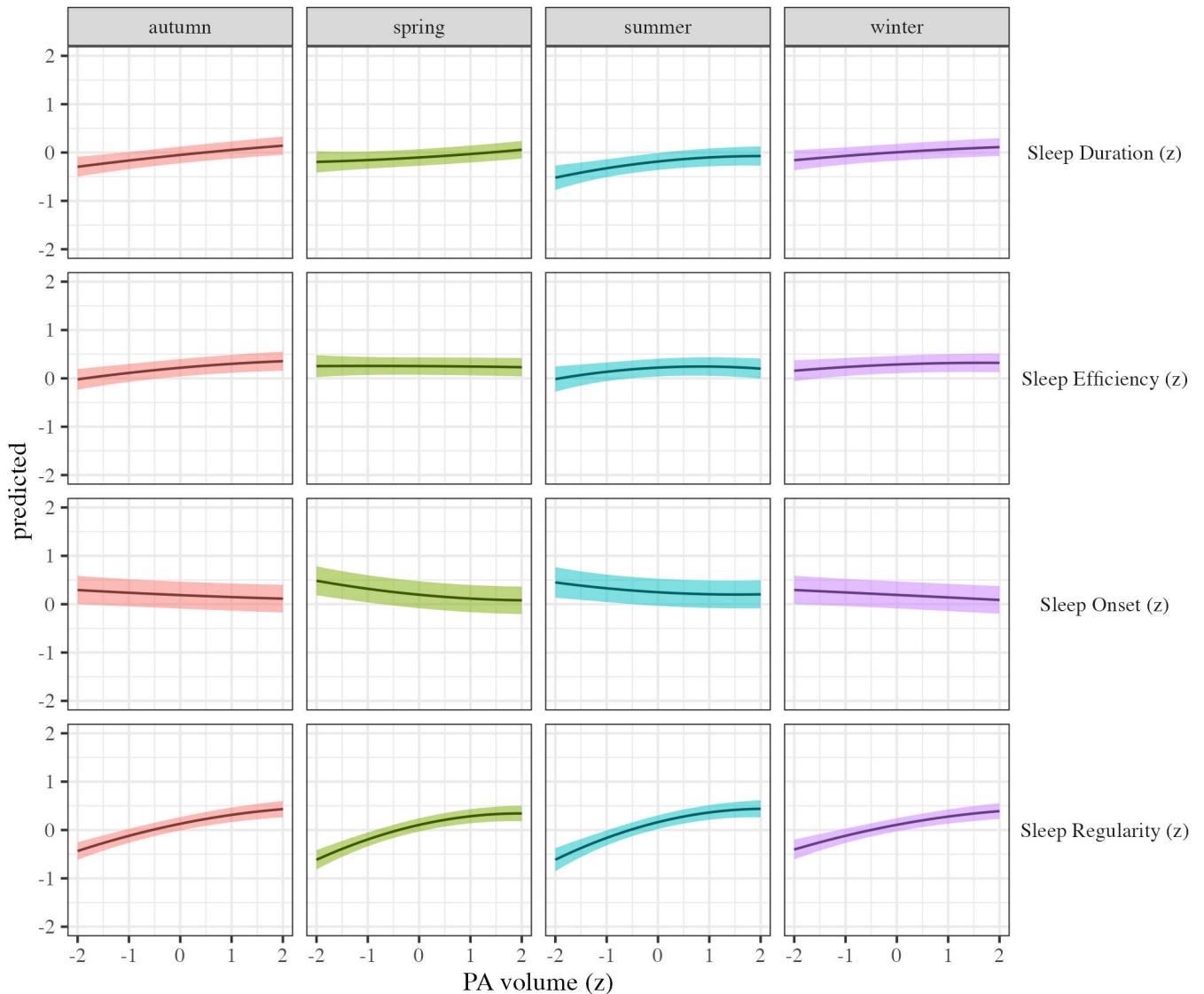


Figure 36. Sleep metrics on Physical activity volume by season

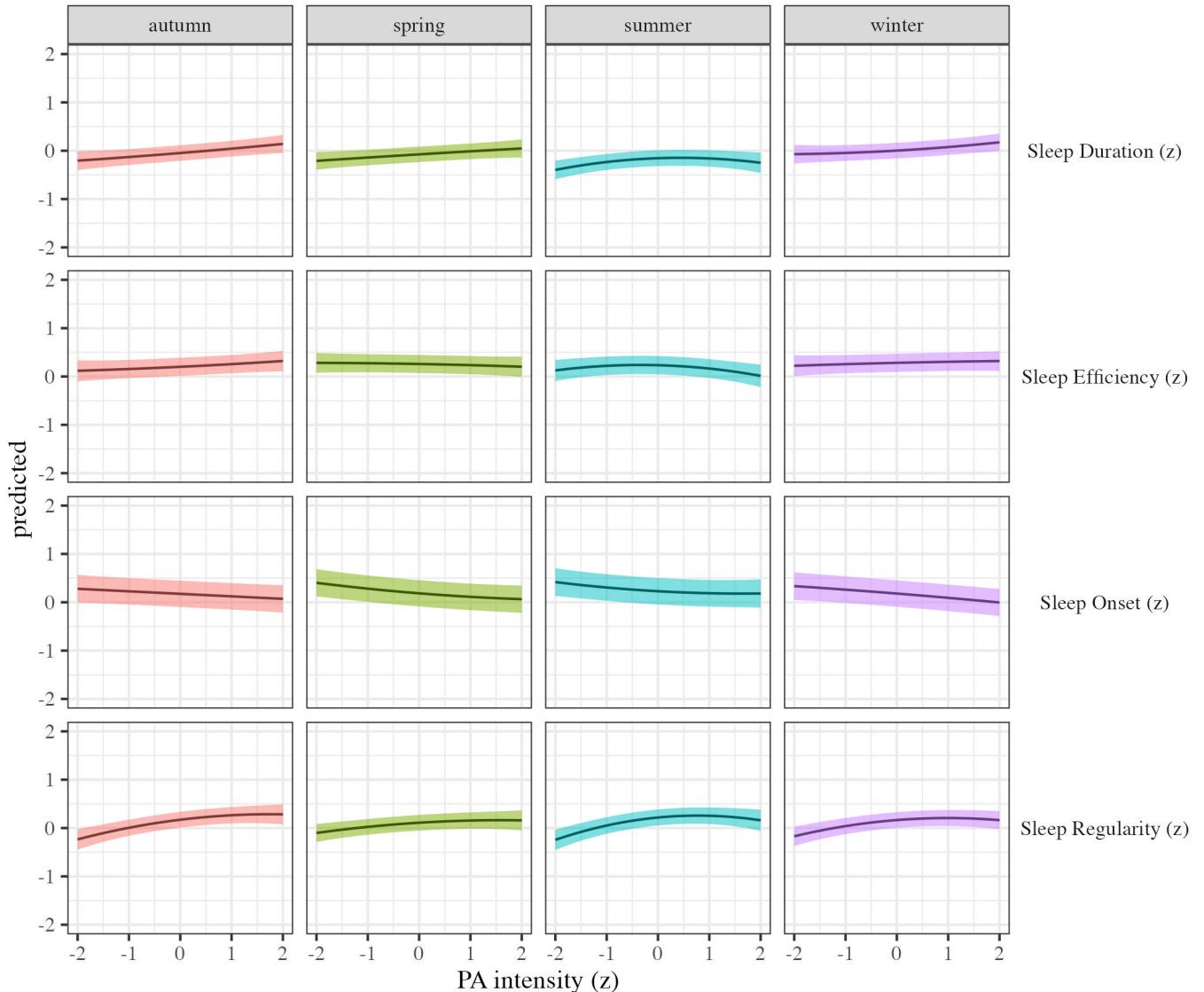


Figure 37. Sleep metrics on Physical activity intensity moderated by season

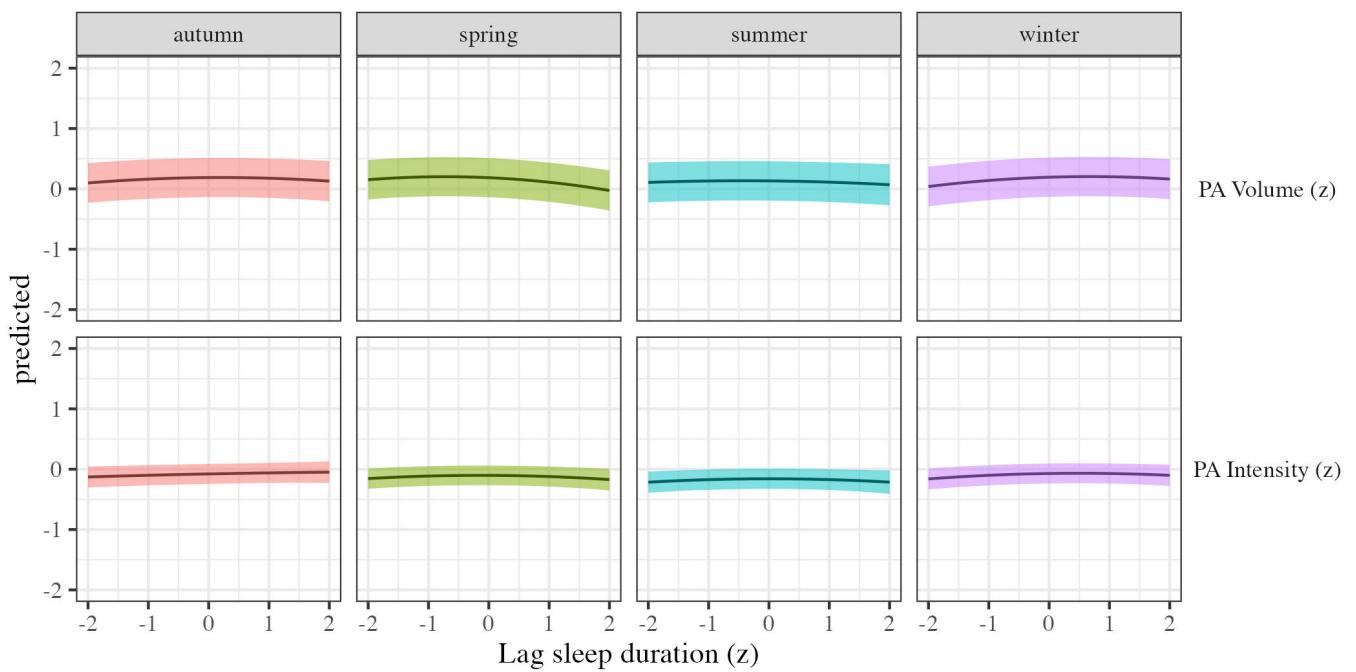


Figure 38. Physical activity by sleep duration moderated by season

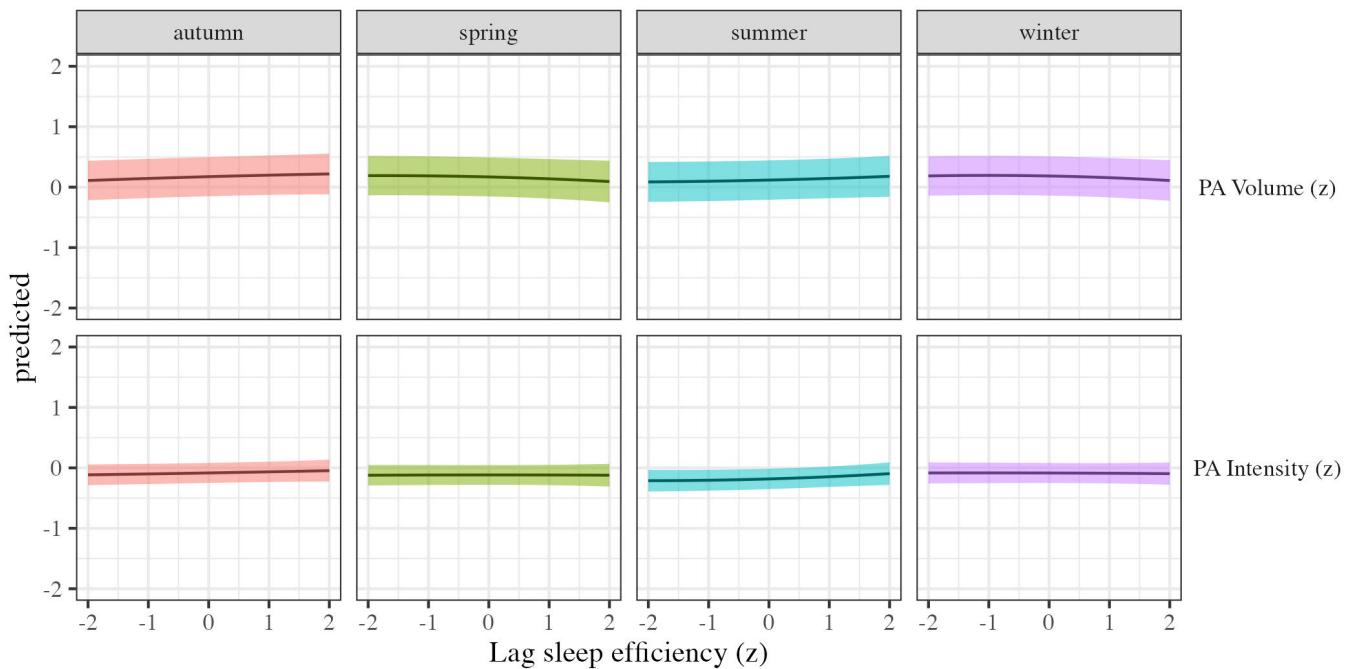


Figure 39. Physical activity by sleep efficiency moderated by season

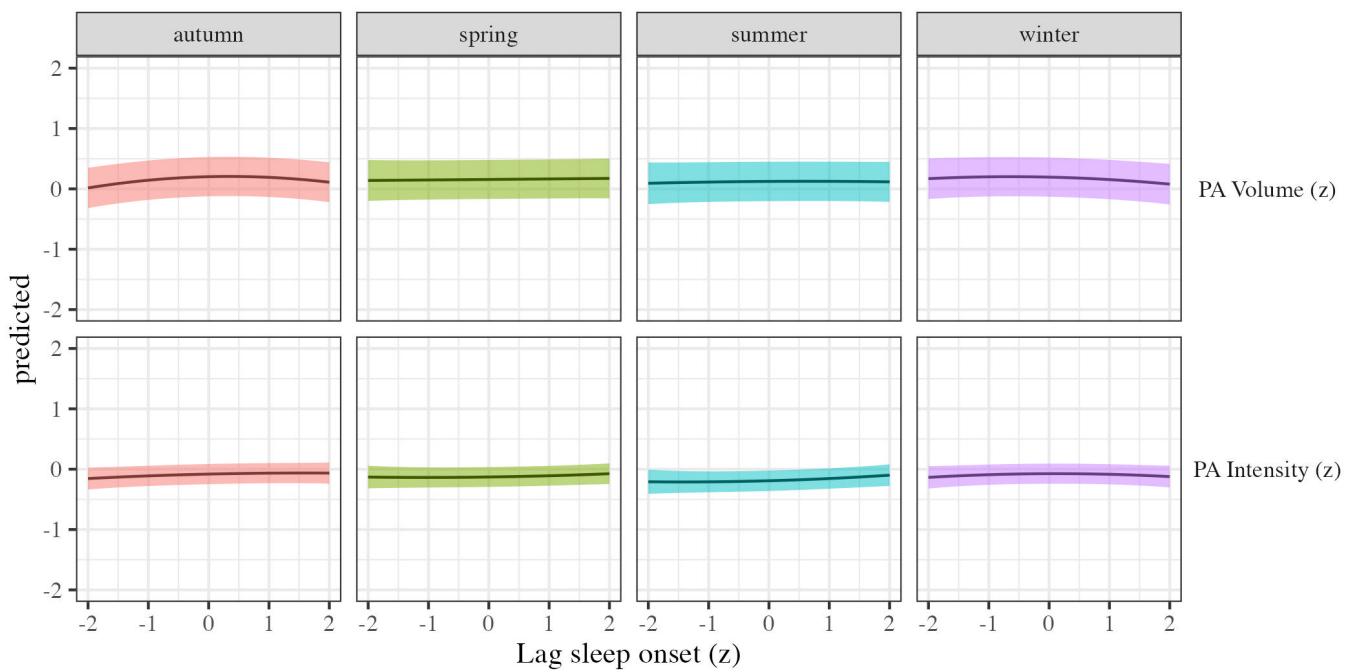


Figure 40. Physical activity by sleep onset moderated by season

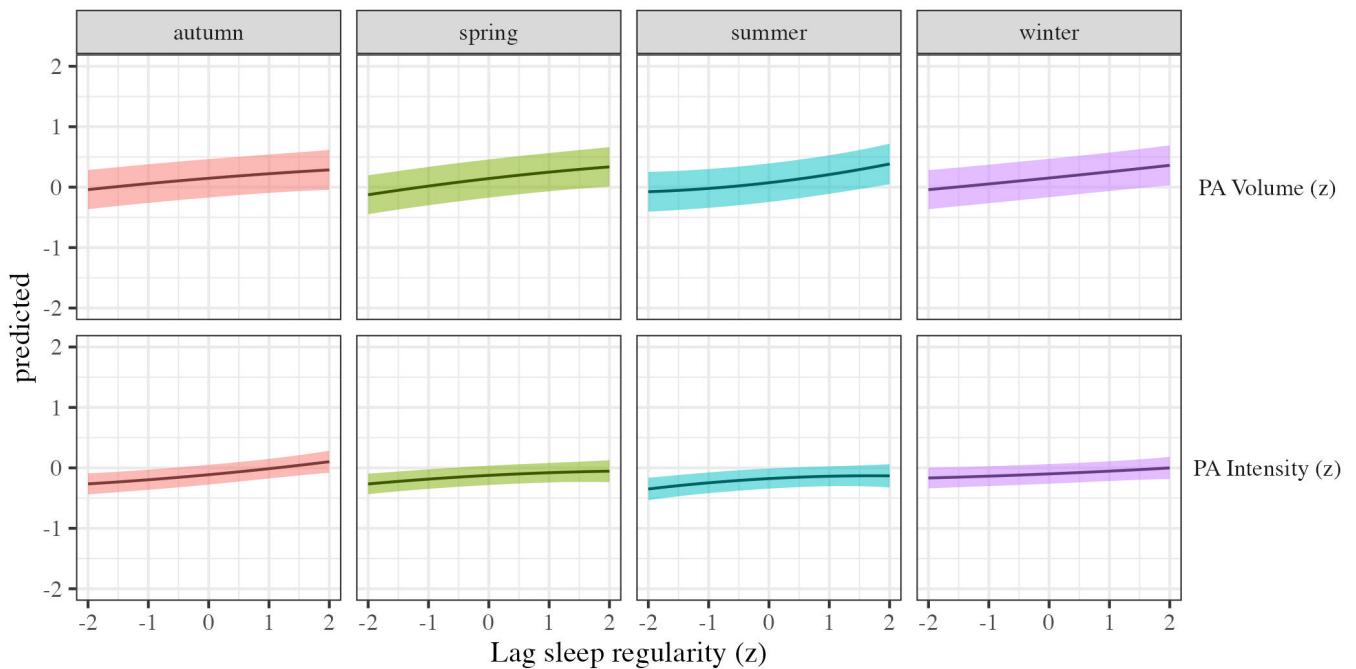


Figure 41. Physical activity by sleep regularity moderated by season

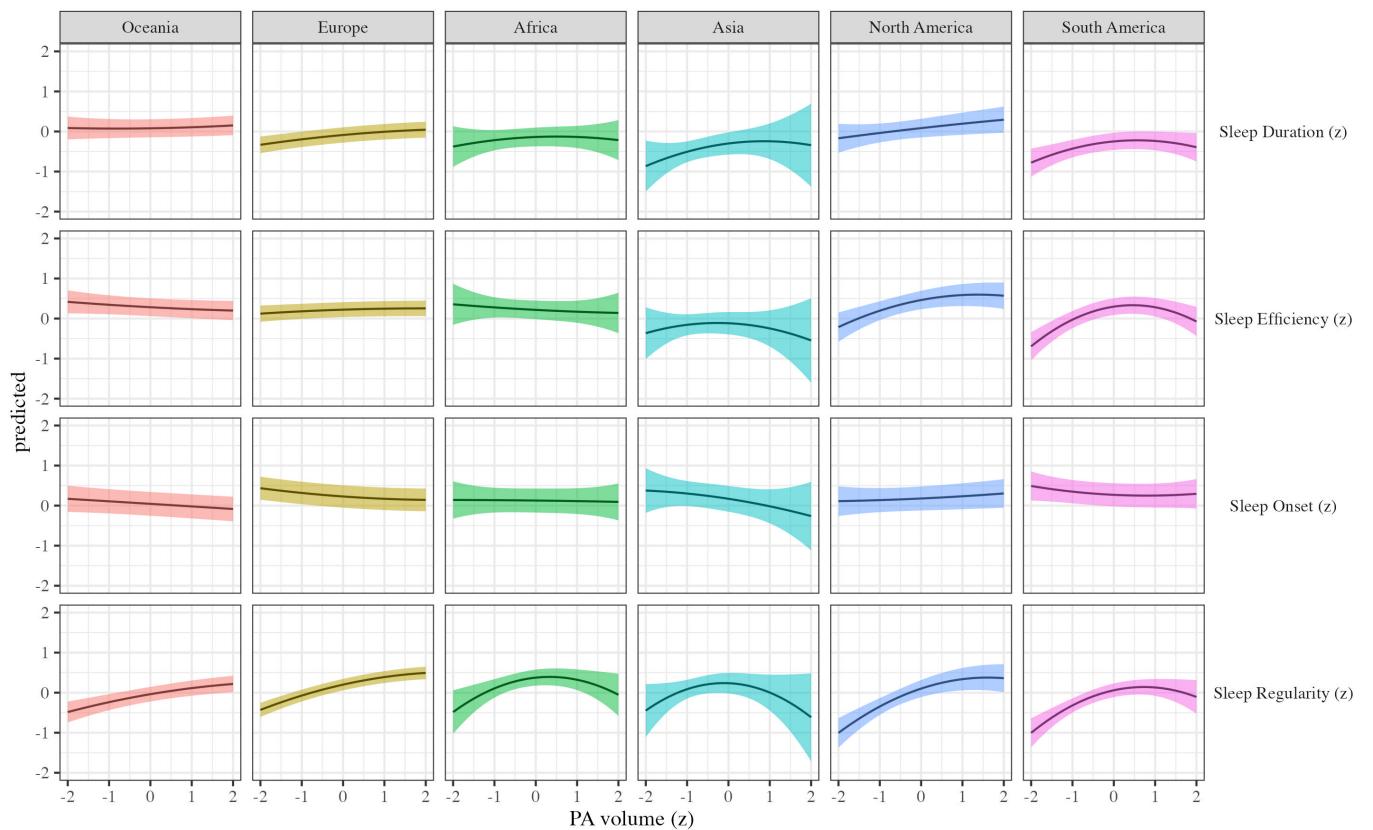


Figure 42. Sleep metrics on Physical activity volume by region

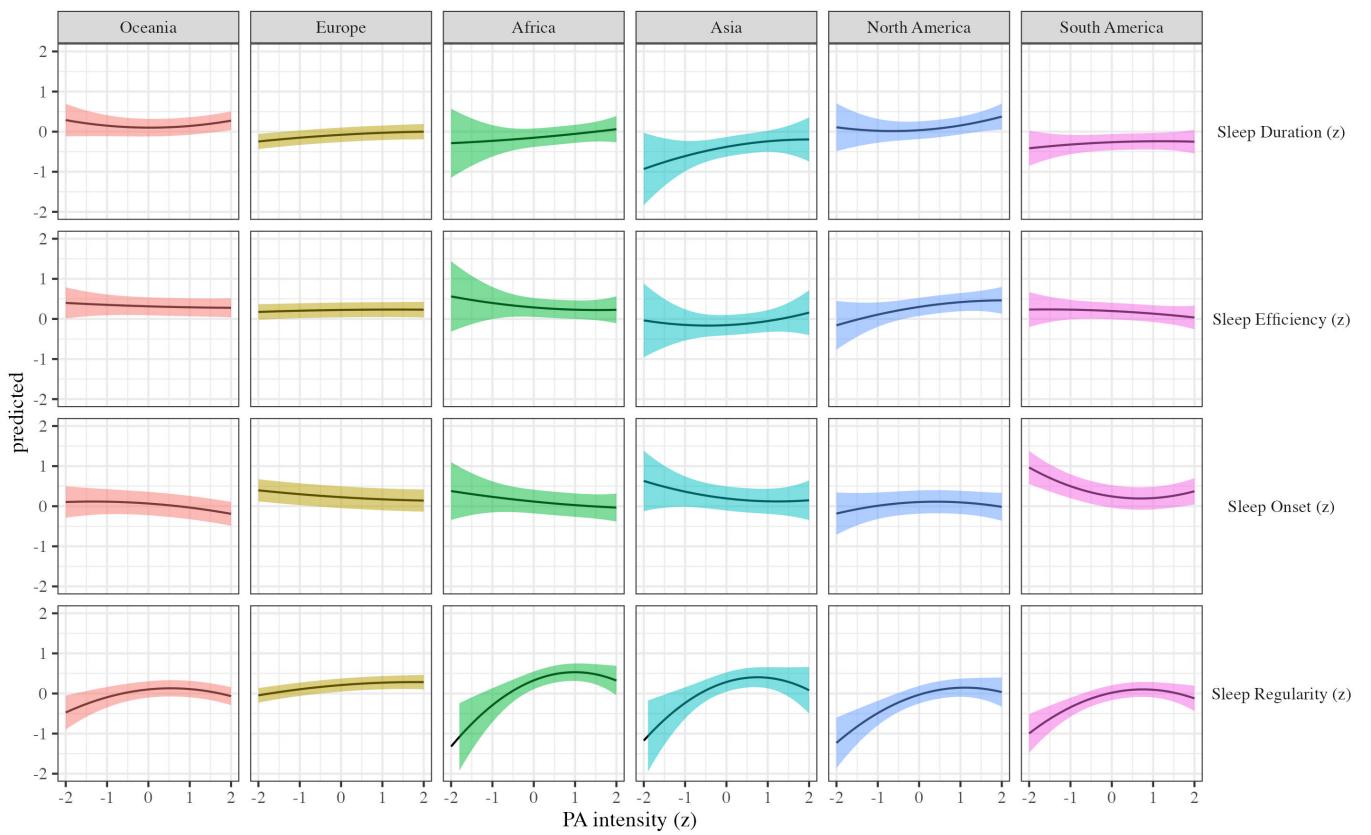


Figure 43. Sleep metrics on Physical activity intensity moderated by region

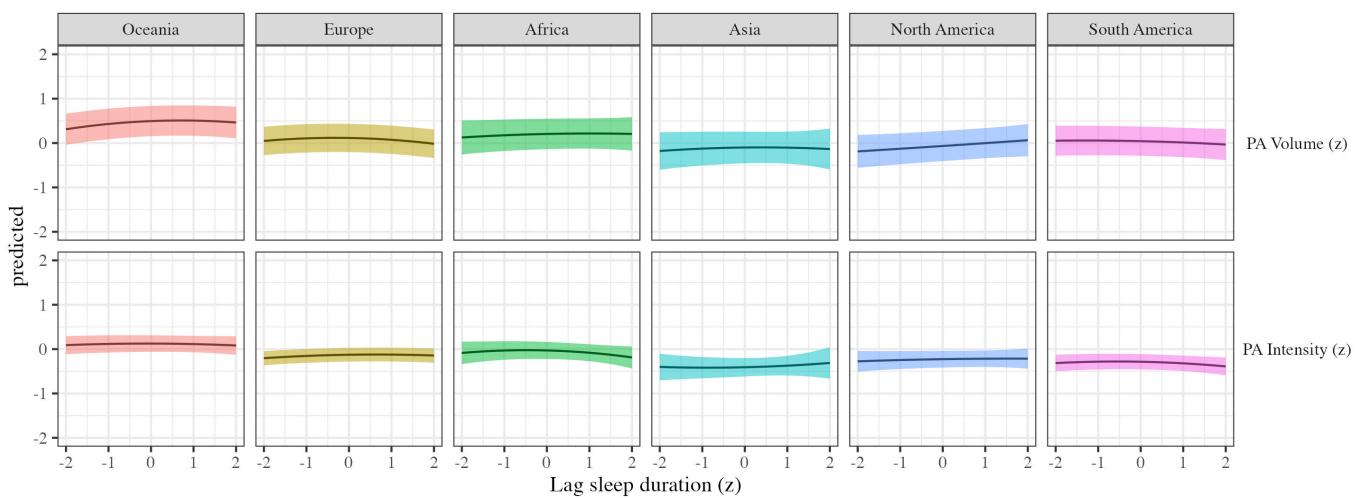


Figure 44. Physical activity by sleep duration moderated by region

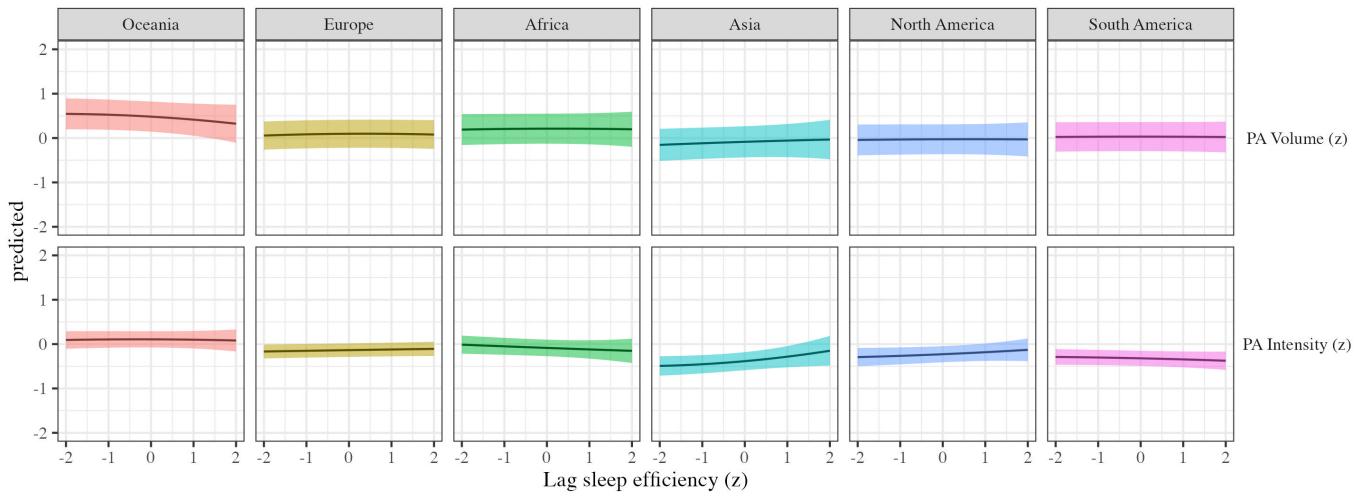


Figure 45. Physical activity by sleep efficiency moderated by region

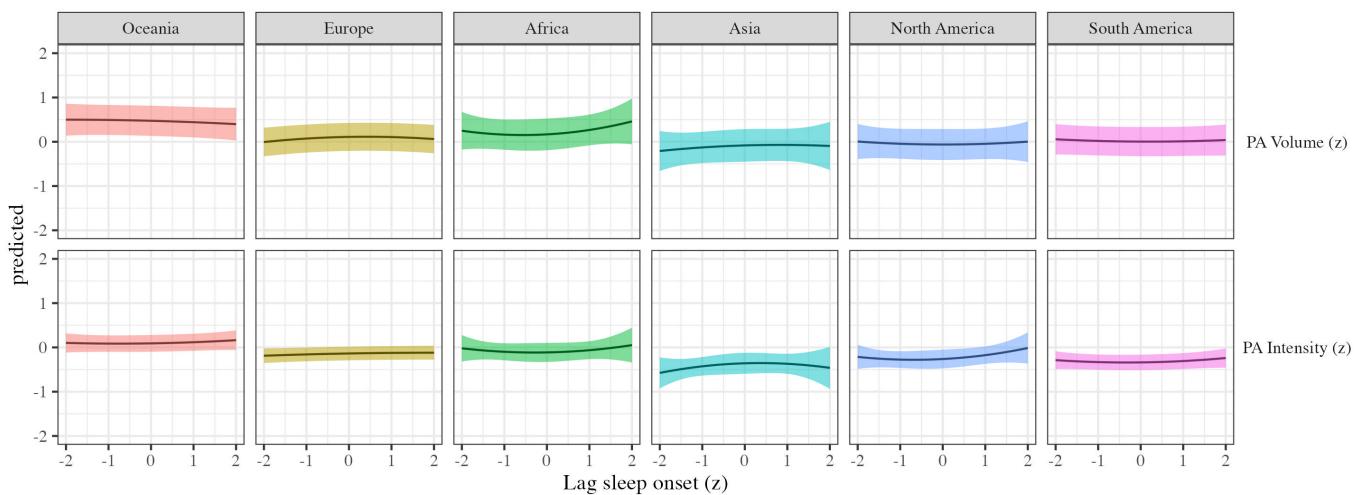


Figure 46. Physical activity by sleep onset moderated by region

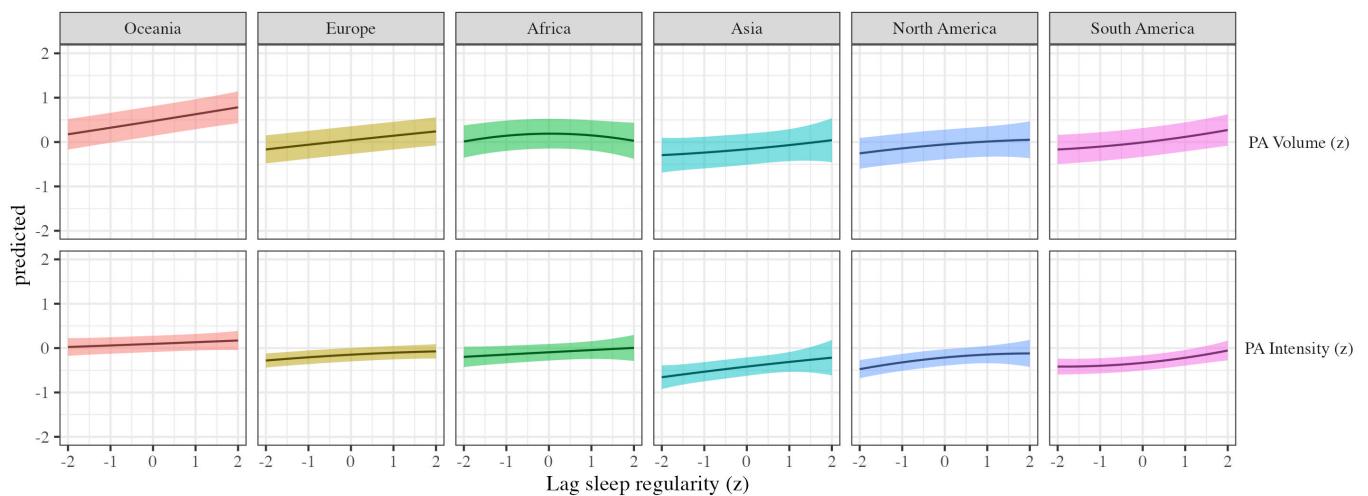


Figure 47. Physical activity by sleep regularity moderated by region

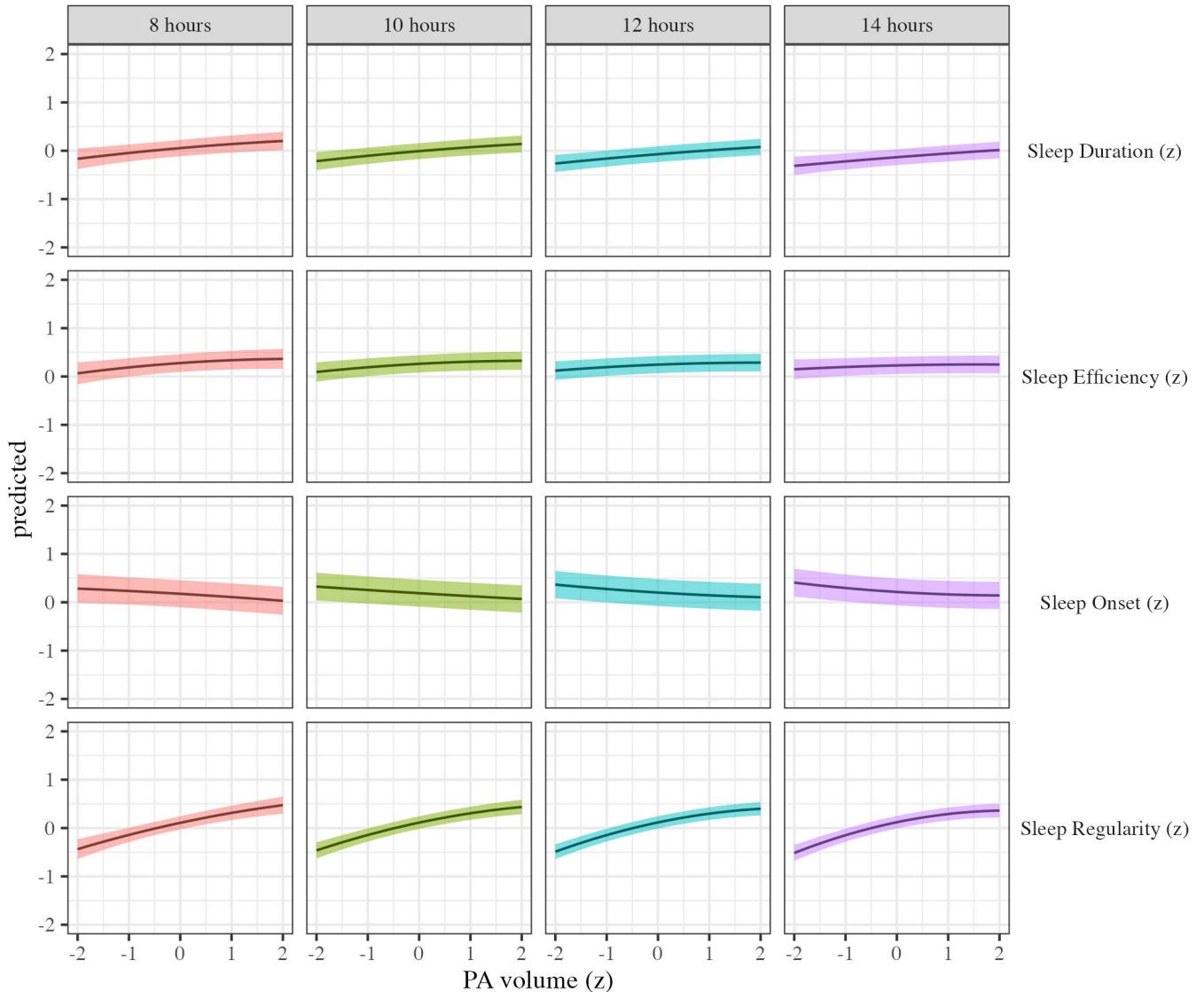


Figure 48. Sleep metrics on Physical activity volume by daylight hours

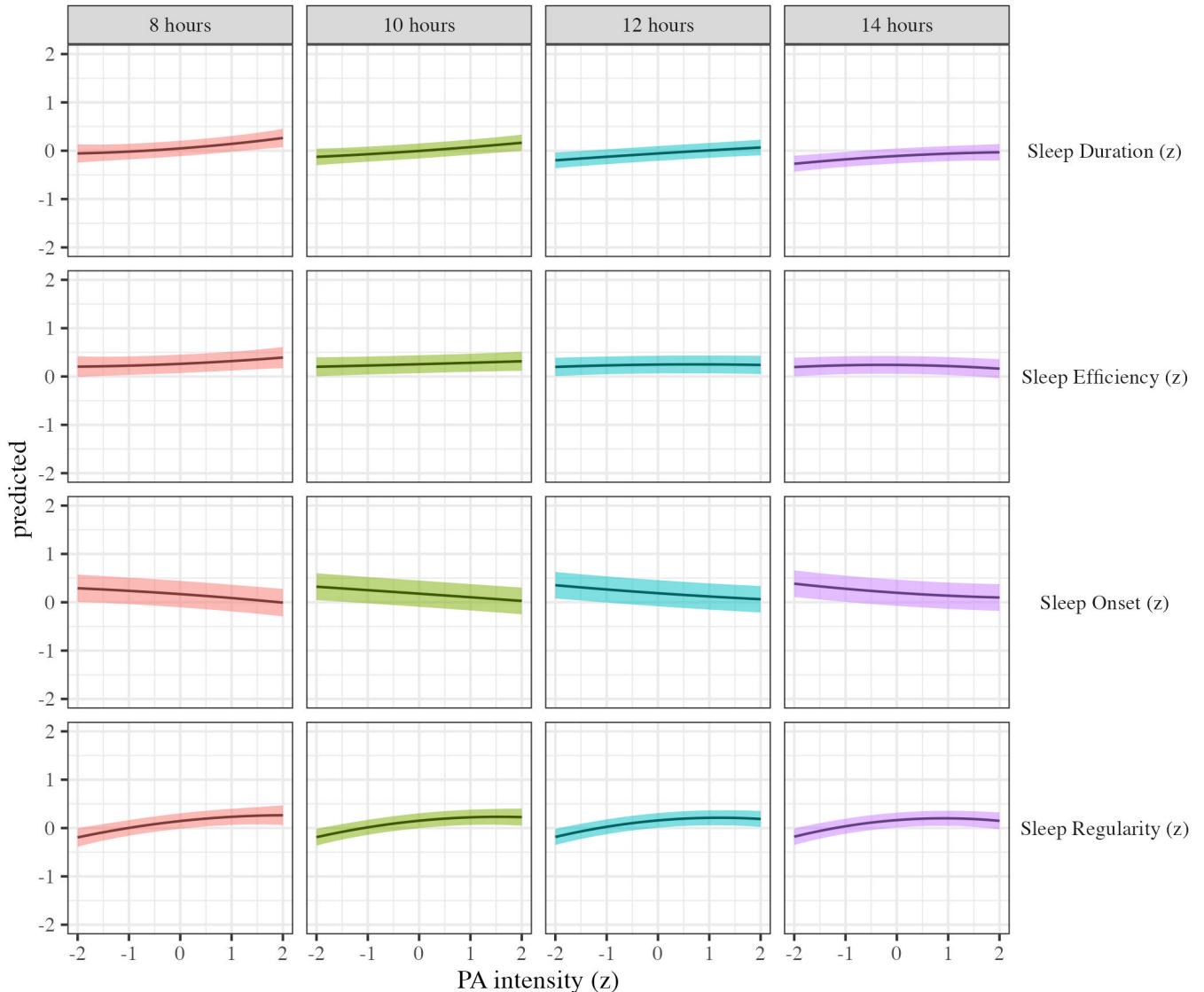


Figure 49. Sleep metrics on Physical activity intensity moderated by daylight hours

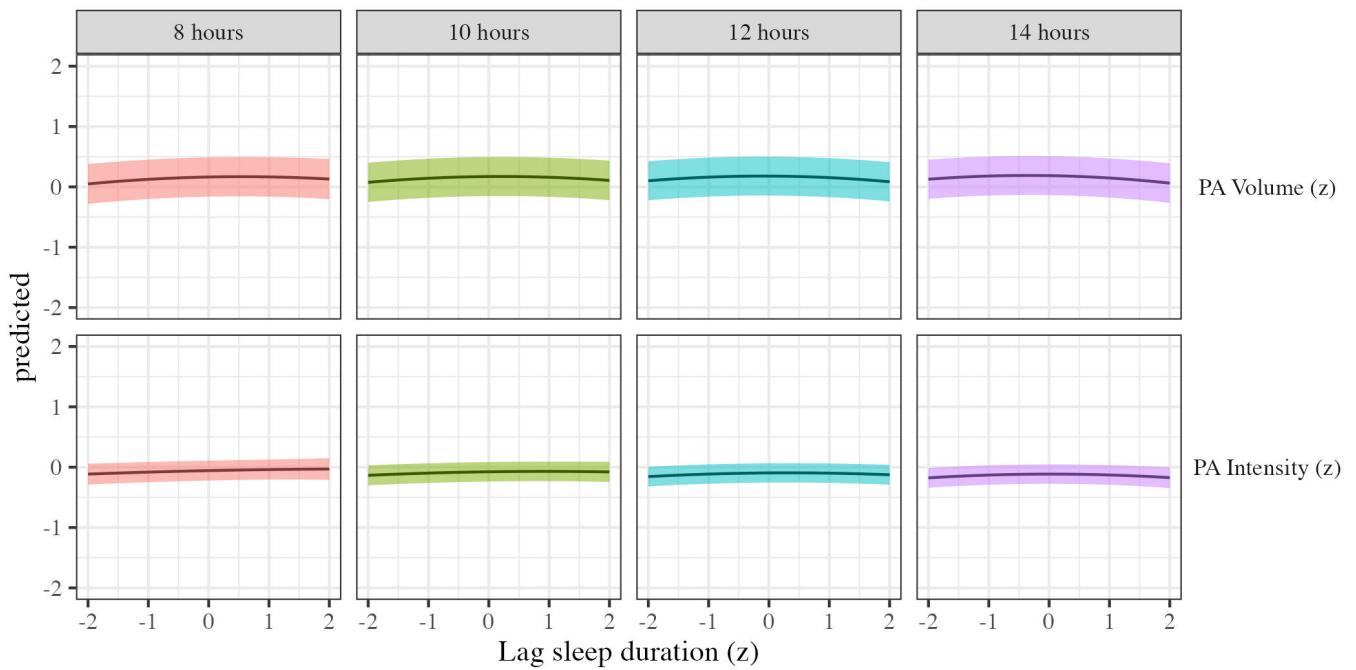


Figure 50. Physical activity by sleep duration moderated by daylight hours

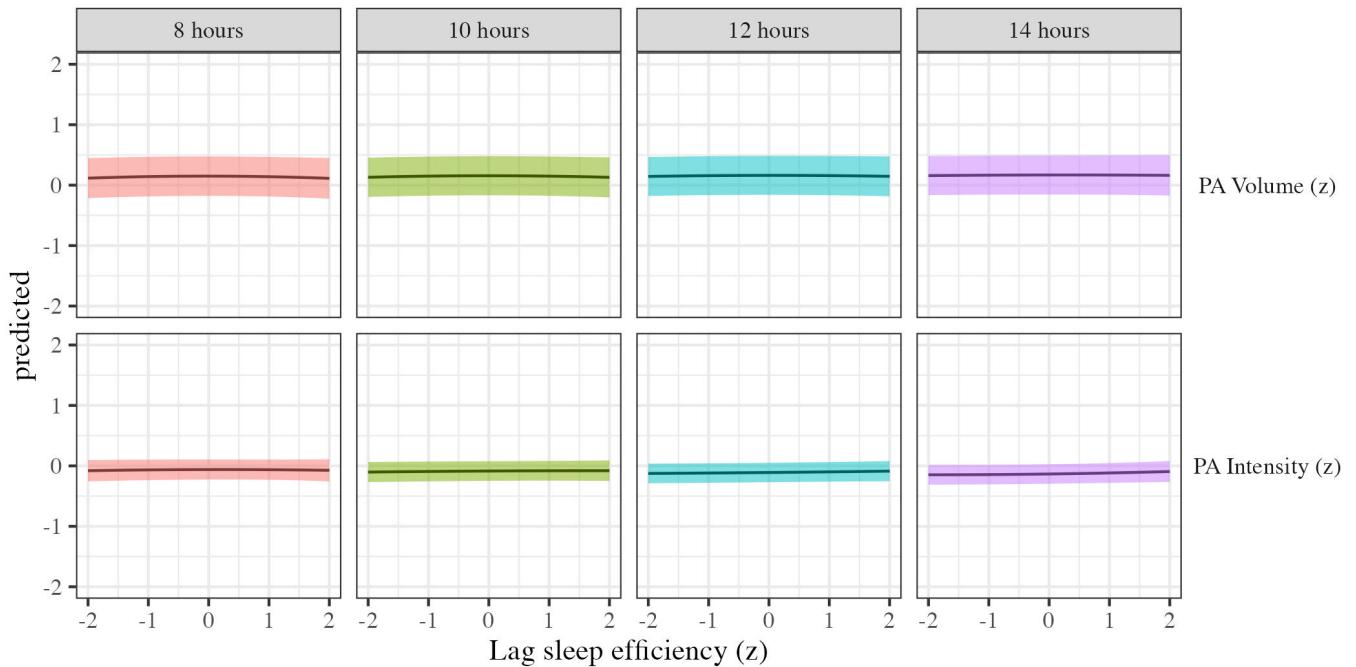


Figure 51. Physical activity by sleep efficiency moderated by daylight hours

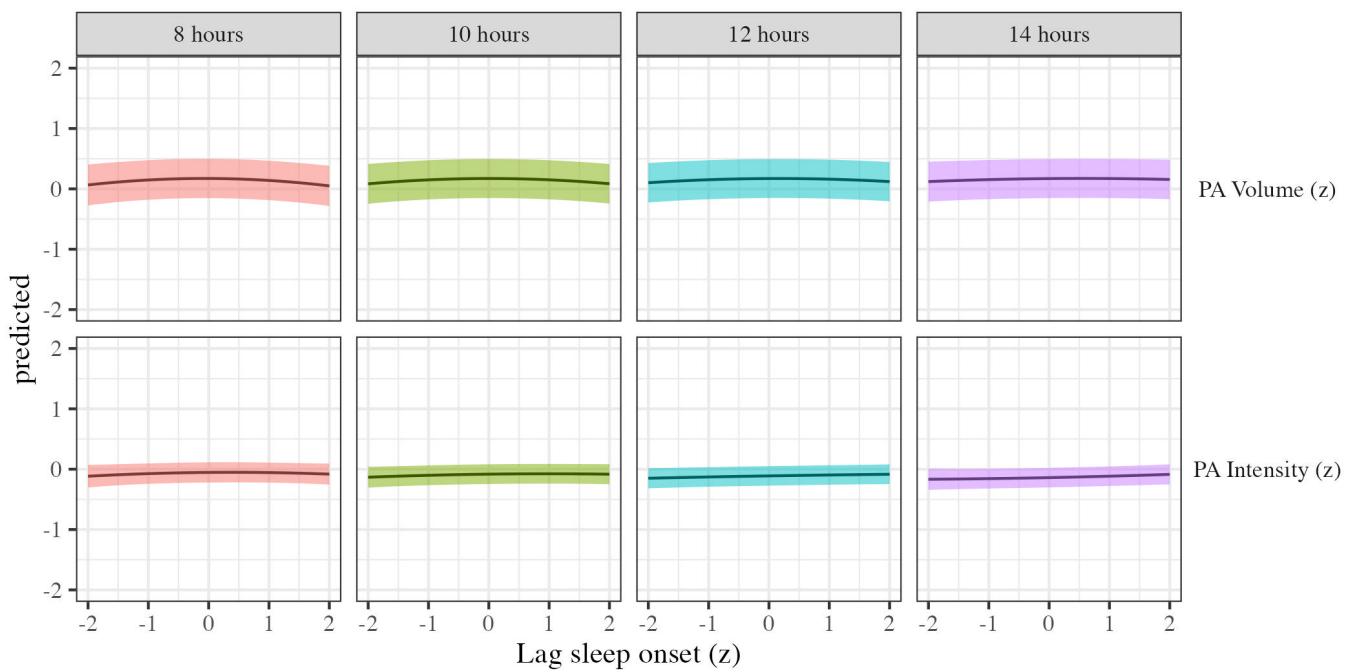


Figure 52. Physical activity by sleep onset moderated by daylight hours

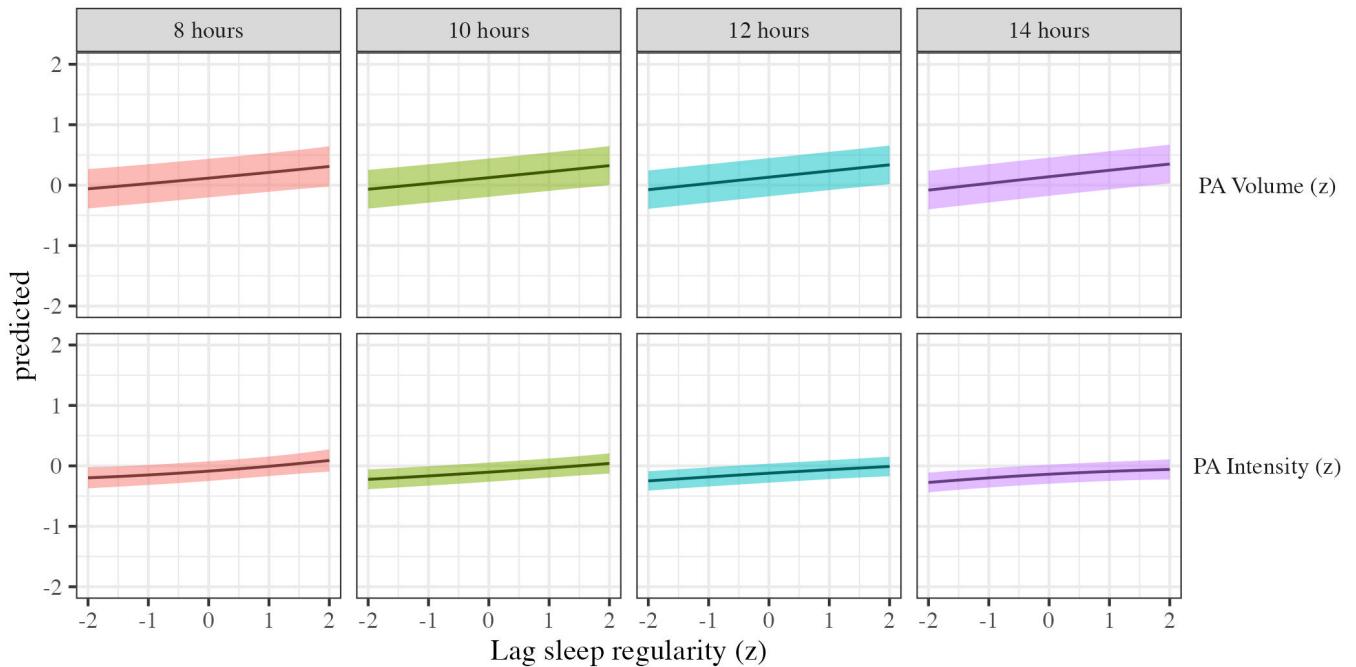


Figure 53. Physical activity by sleep regularity moderated by daylight hours

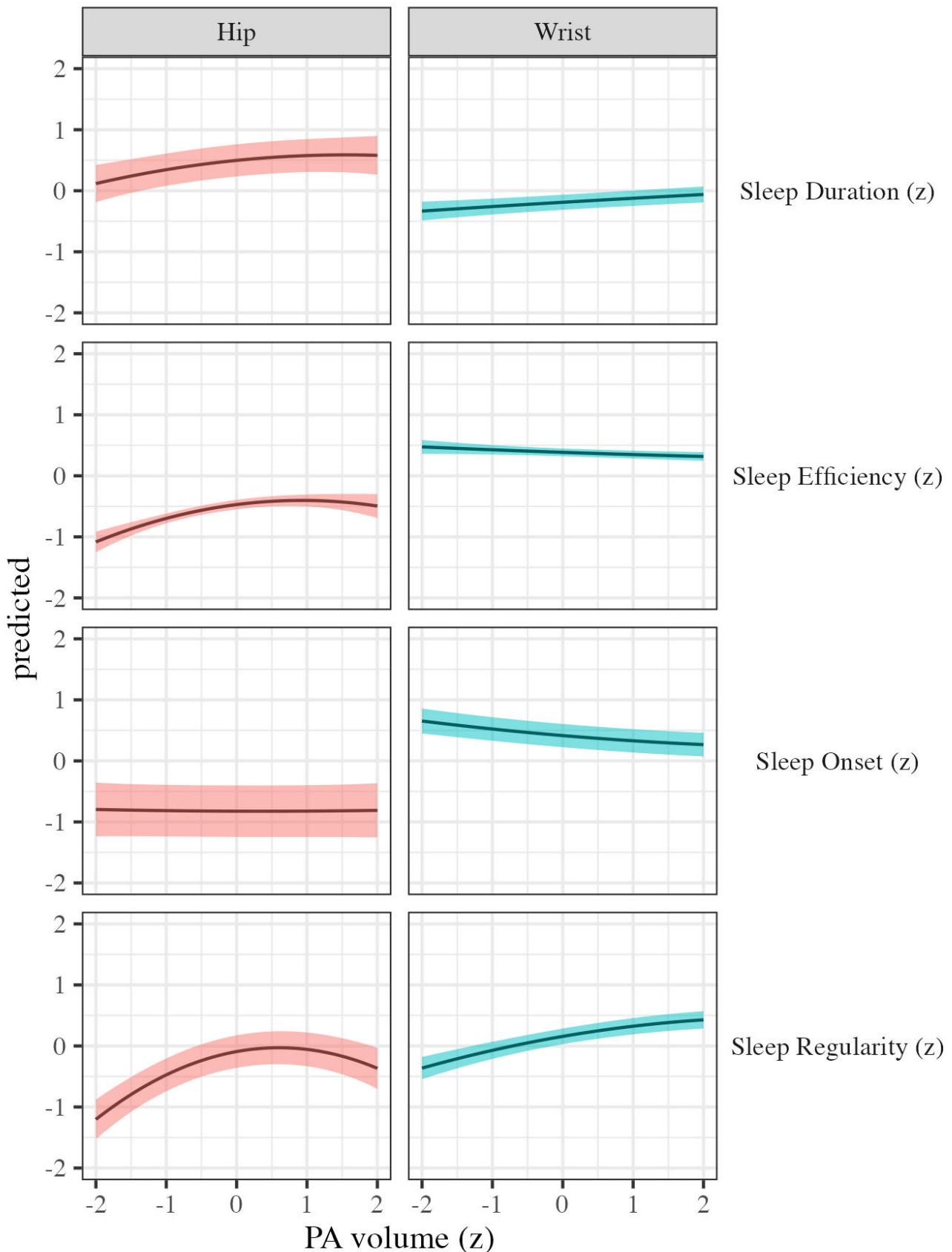


Figure 54. Sleep metrics on Physical activity volume by wear location

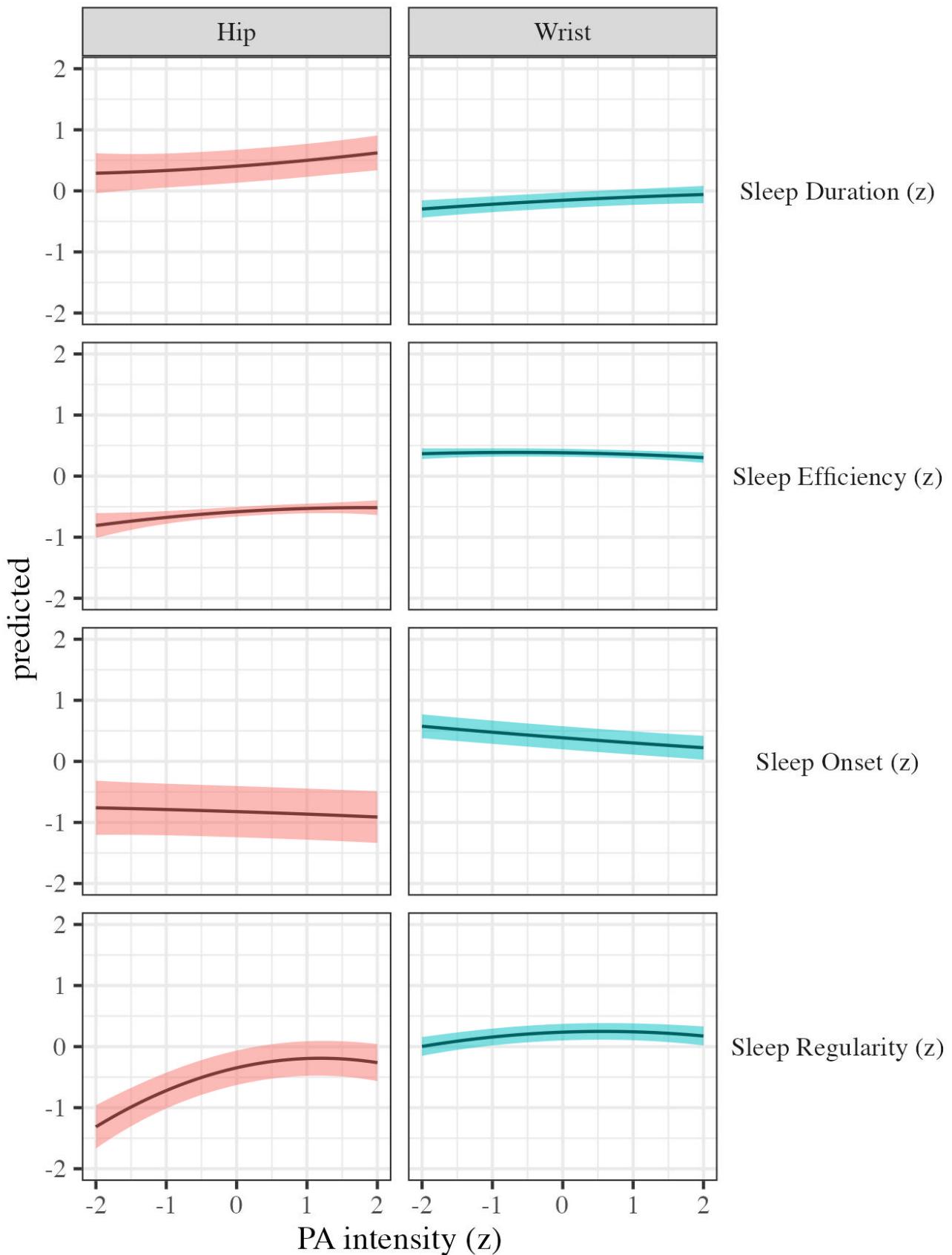


Figure 55. Sleep metrics on Physical activity intensity moderated by wear location

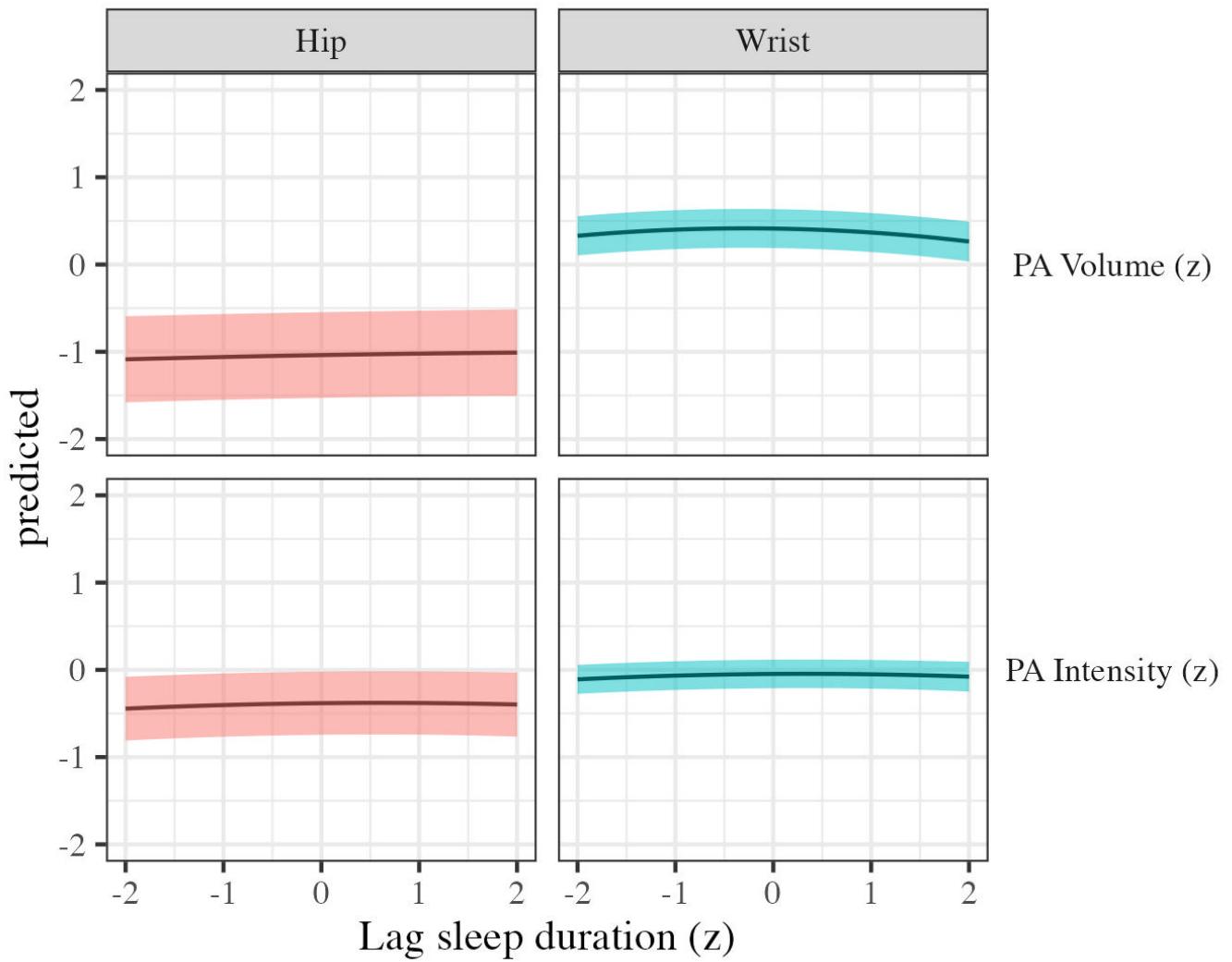


Figure 56. Physical activity by sleep duration moderated by wear location

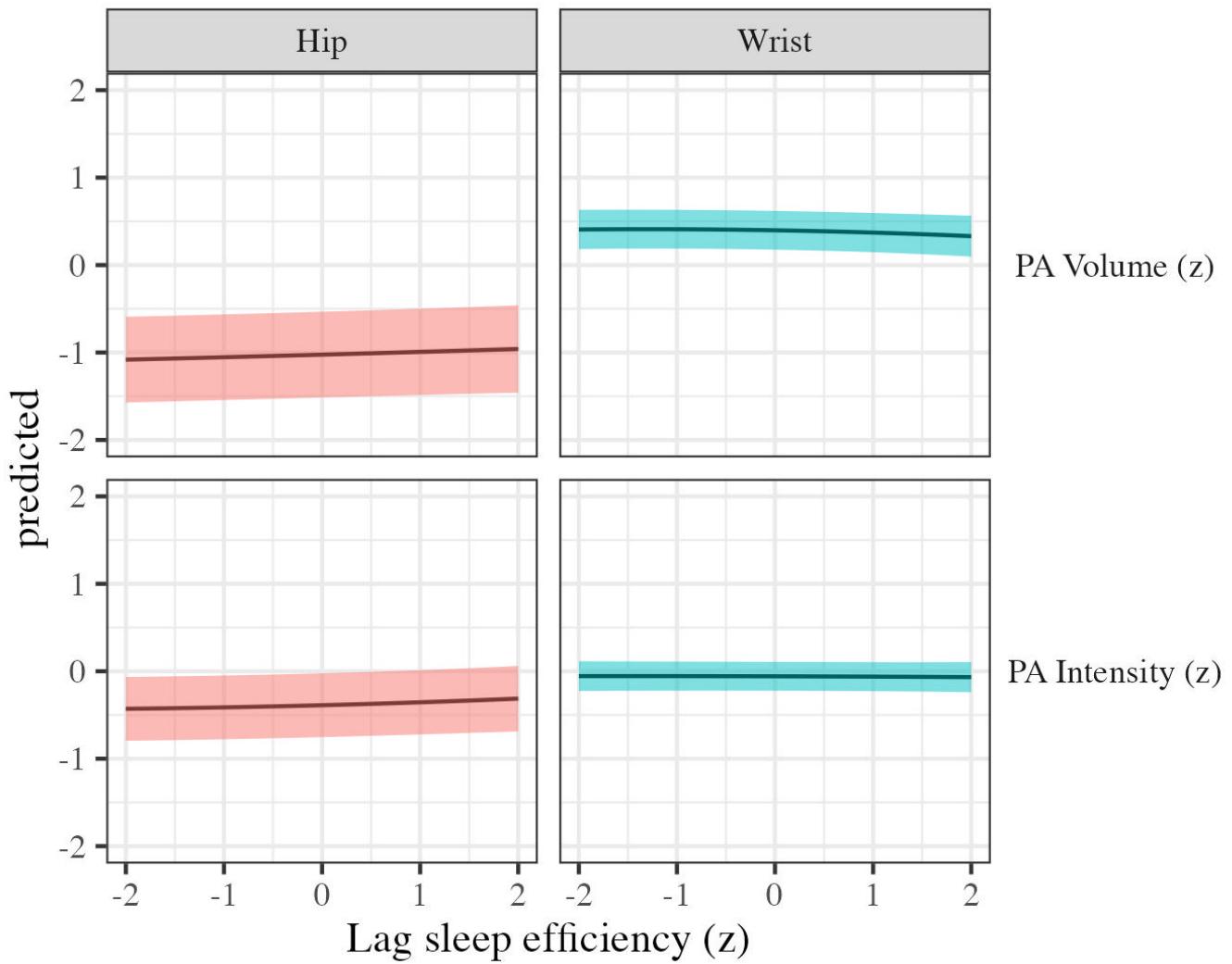


Figure 57. Physical activity by sleep efficiency moderated by wear location

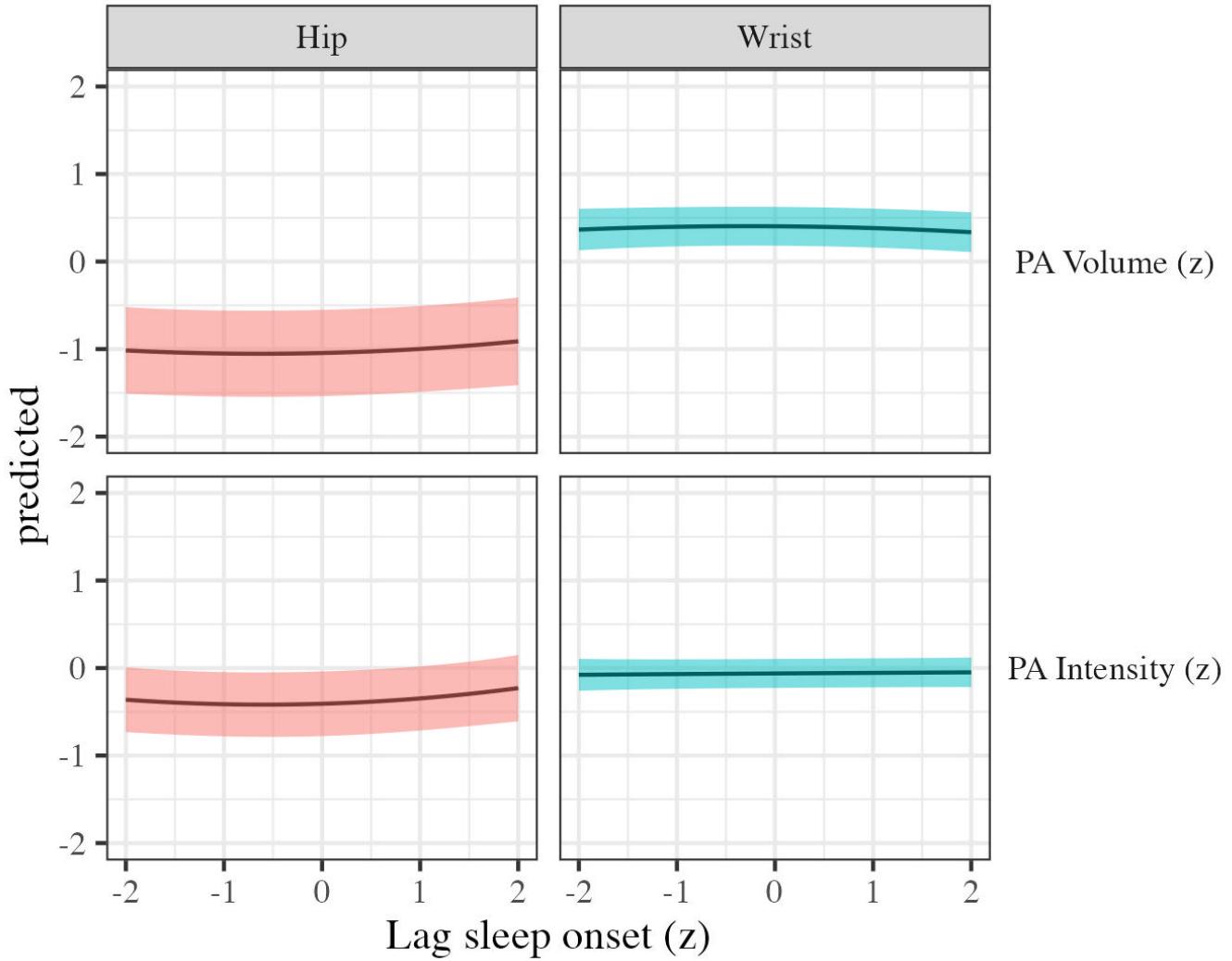


Figure 58. Physical activity by sleep onset moderated by wear location

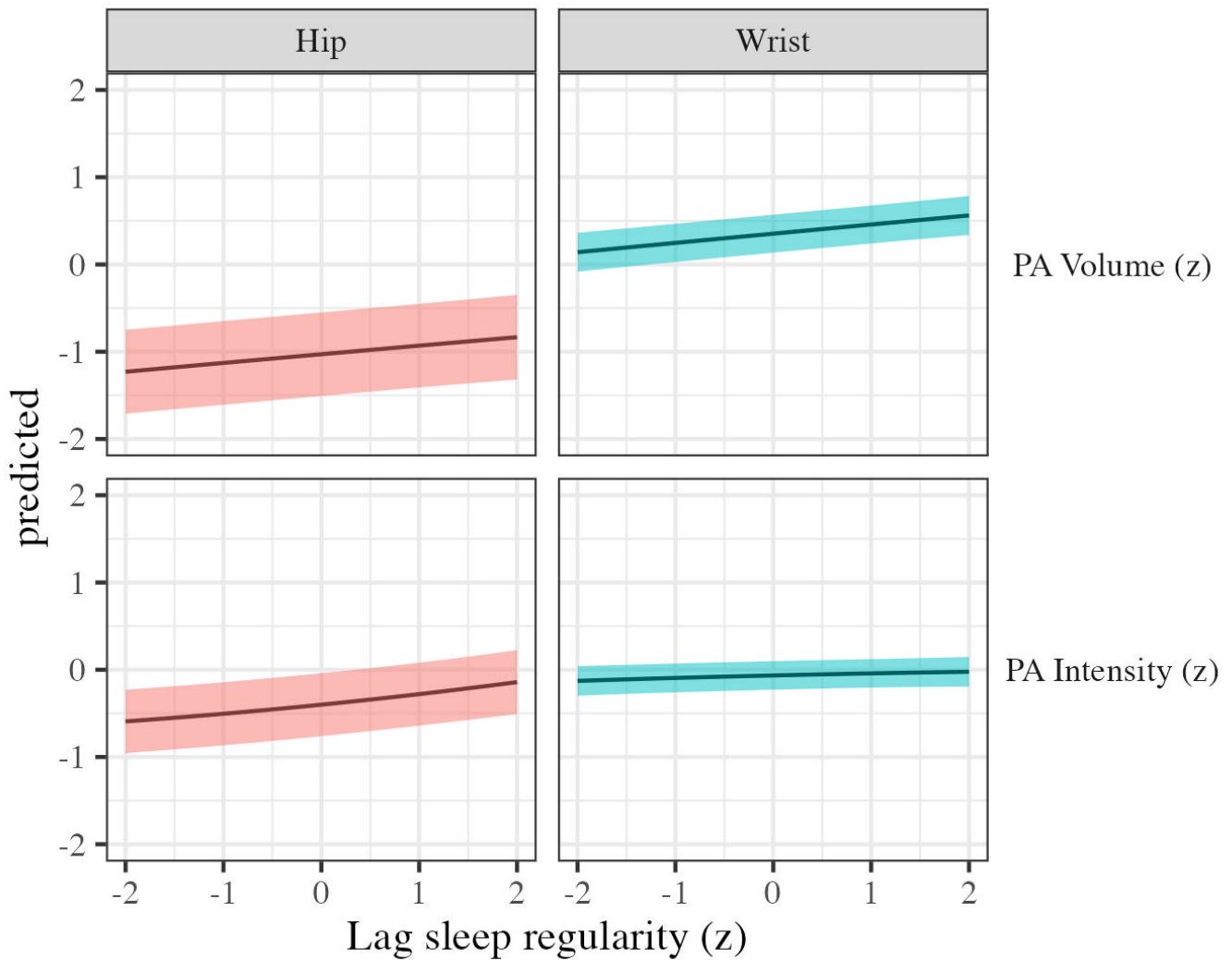


Figure 59. Physical activity by sleep regularity moderated by wear location

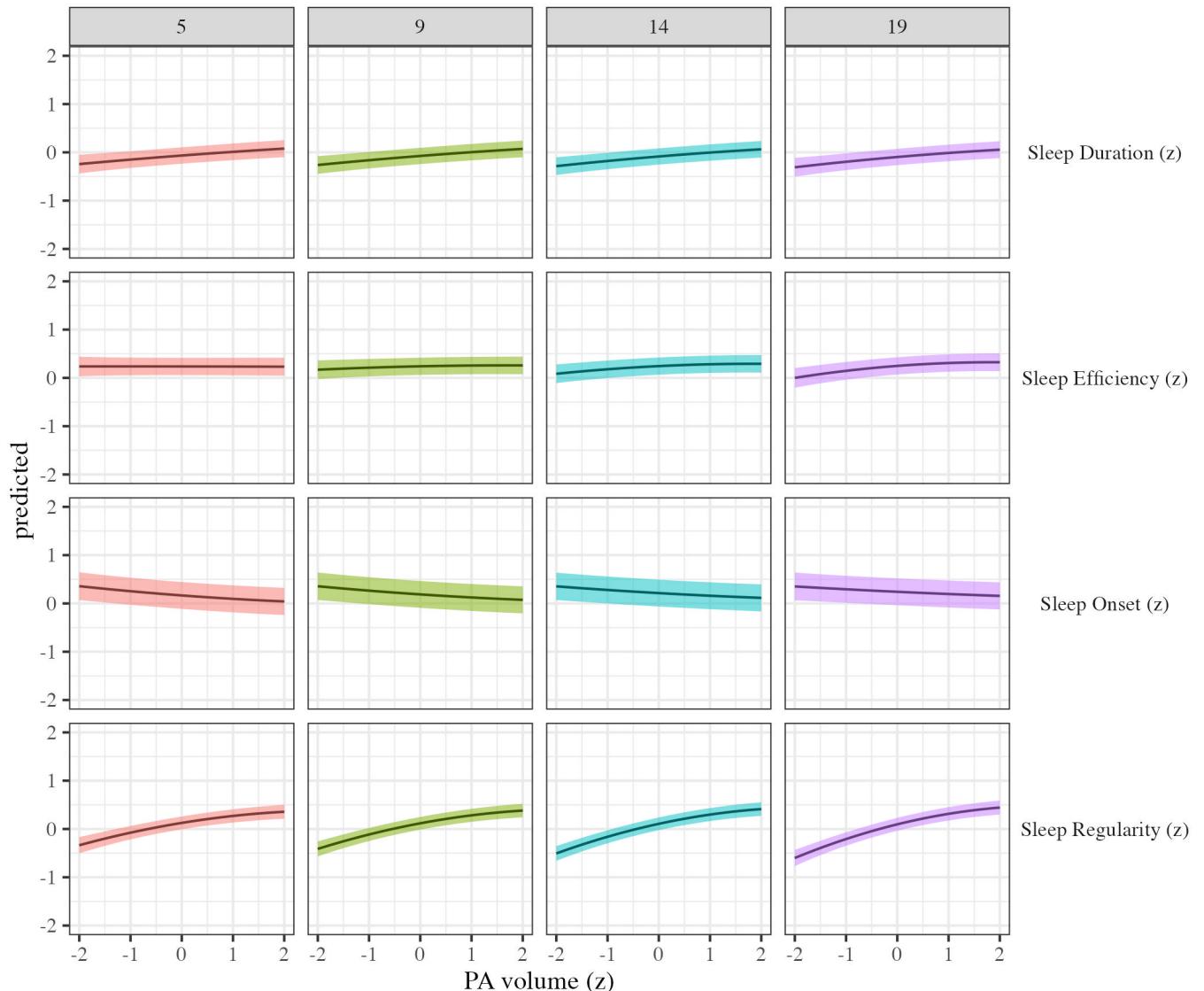


Figure 60. Sleep metrics on Physical activity volume by most active hour

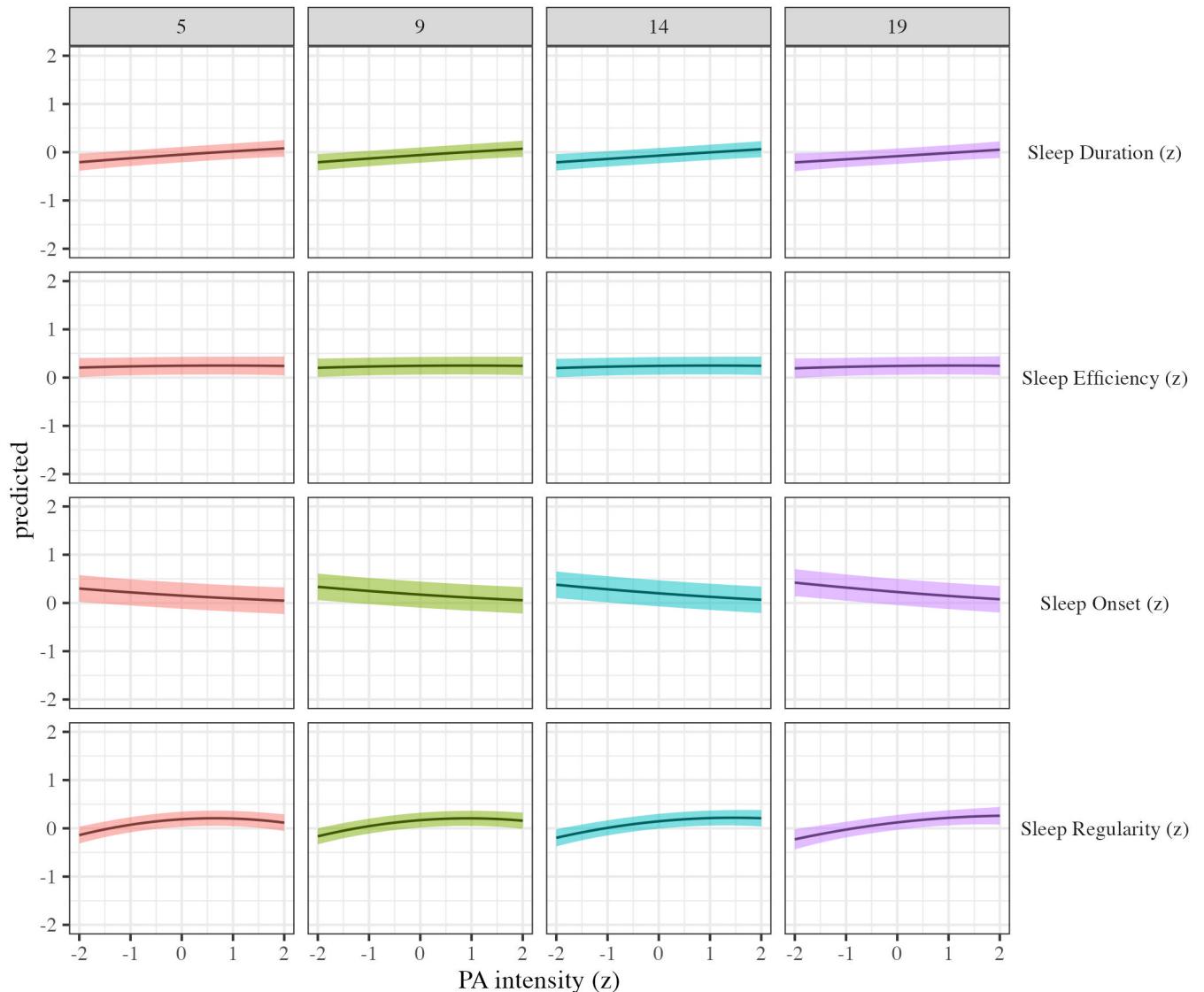


Figure 61. Sleep metrics on Physical activity intensity moderated by most active hour

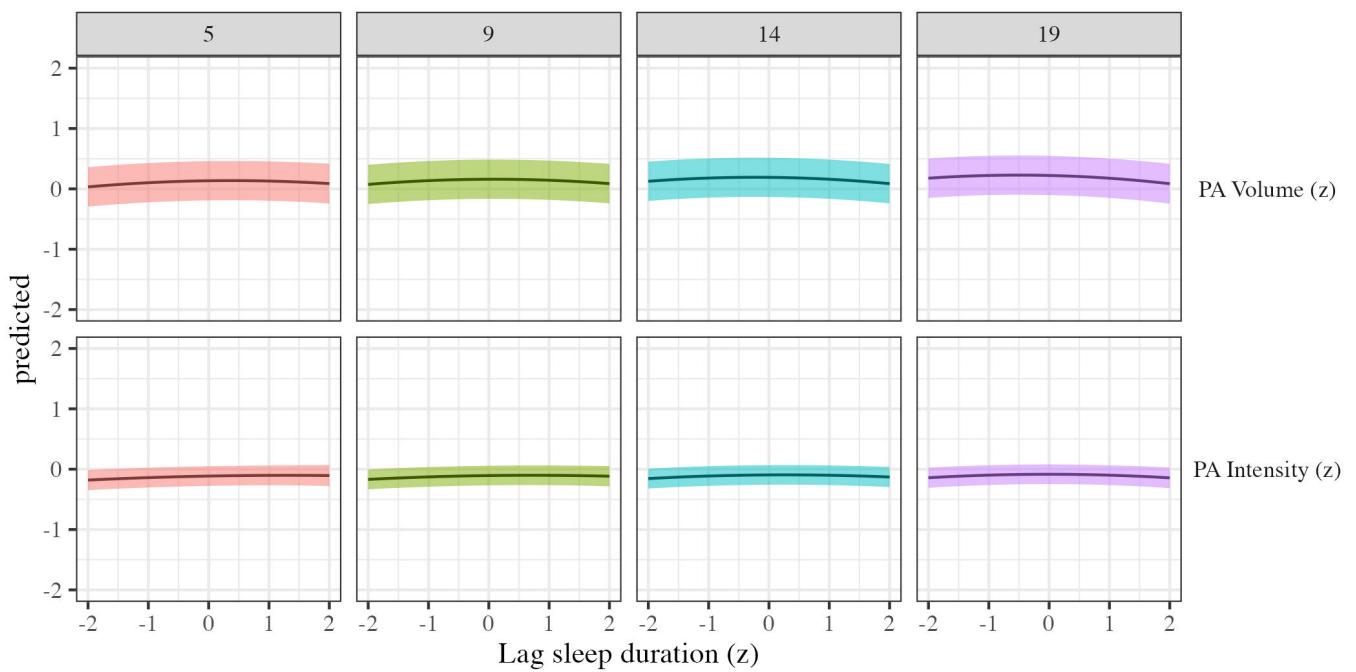


Figure 62. Physical activity by sleep duration moderated by most active hour

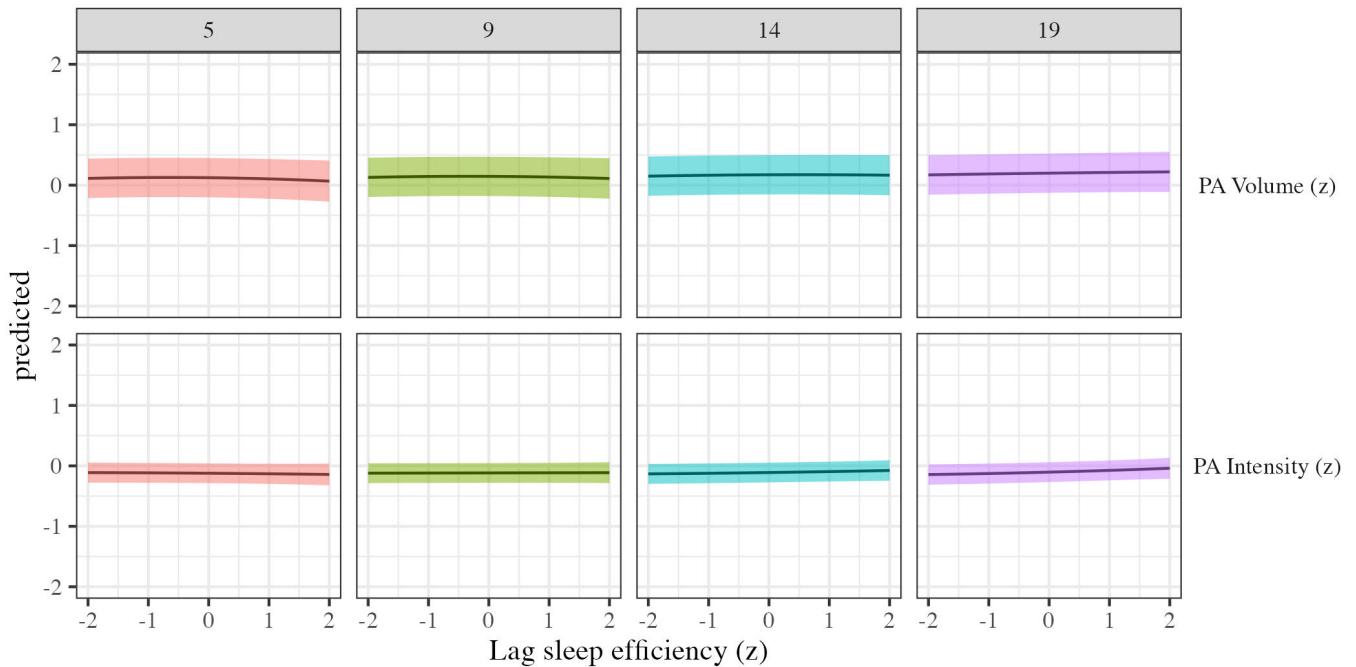


Figure 63. Physical activity by sleep efficiency moderated by most active hour

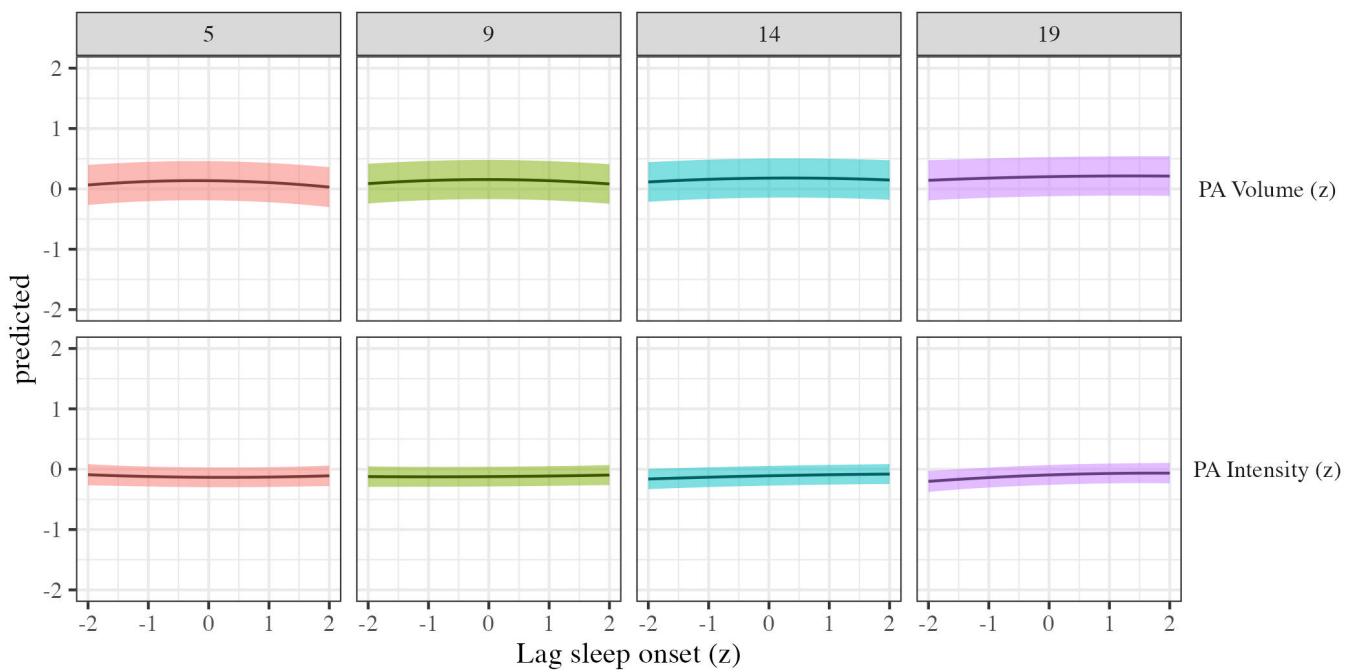


Figure 64. Physical activity by sleep onset moderated by most active hour

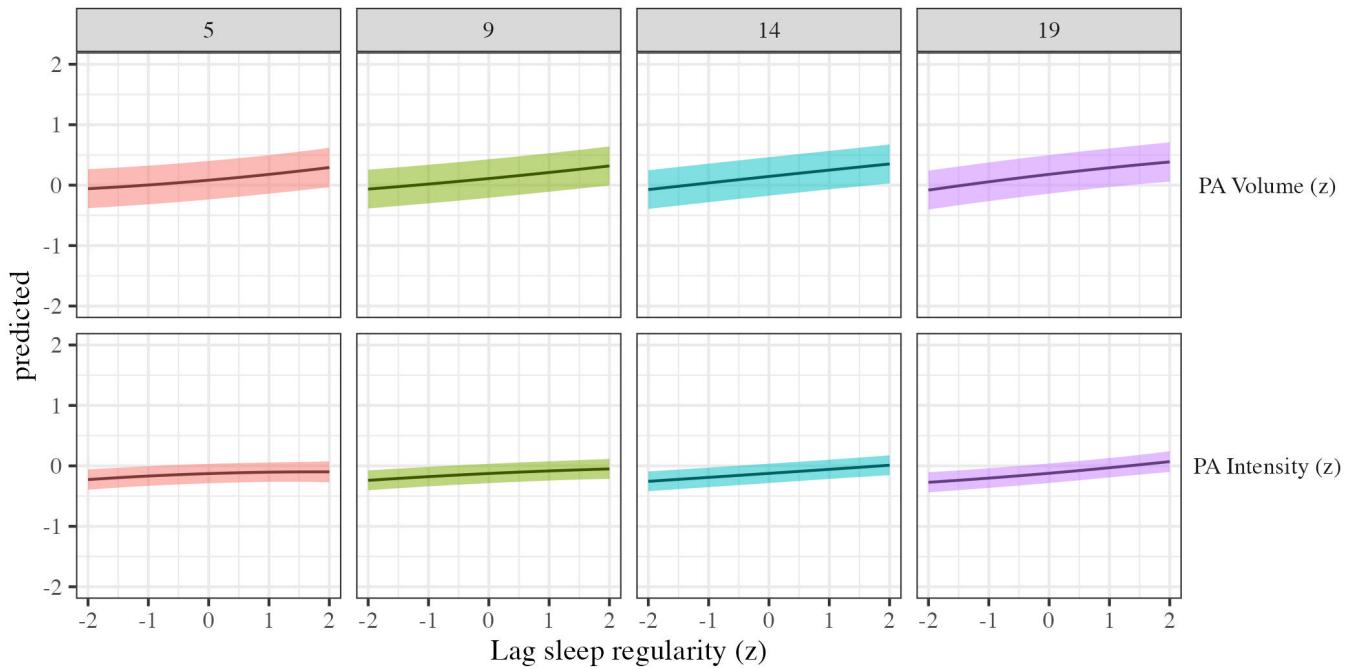


Figure 65. Physical activity by sleep regularity moderated by most active hour

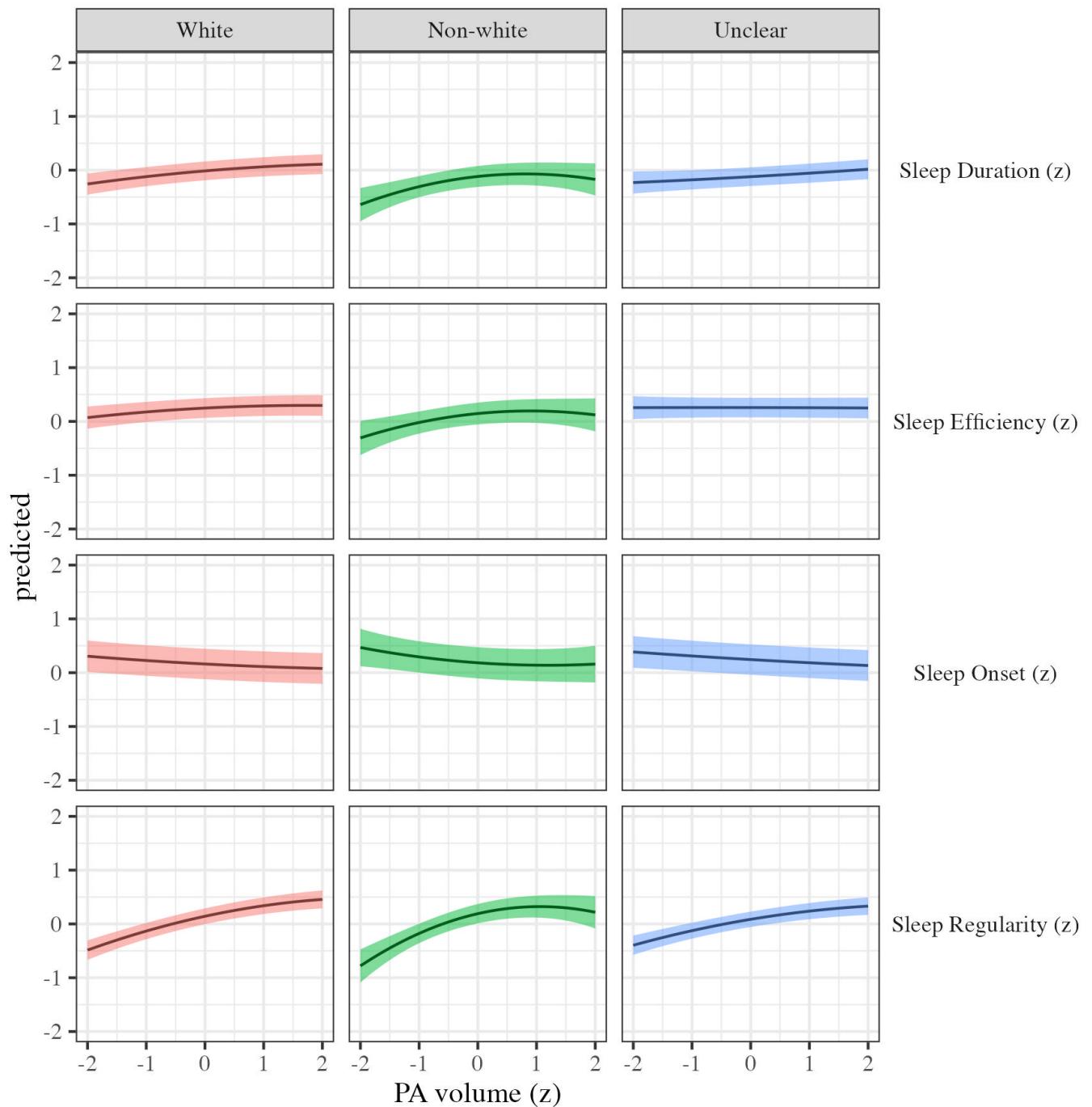


Figure 66. Sleep metrics on Physical activity volume by ethnicity

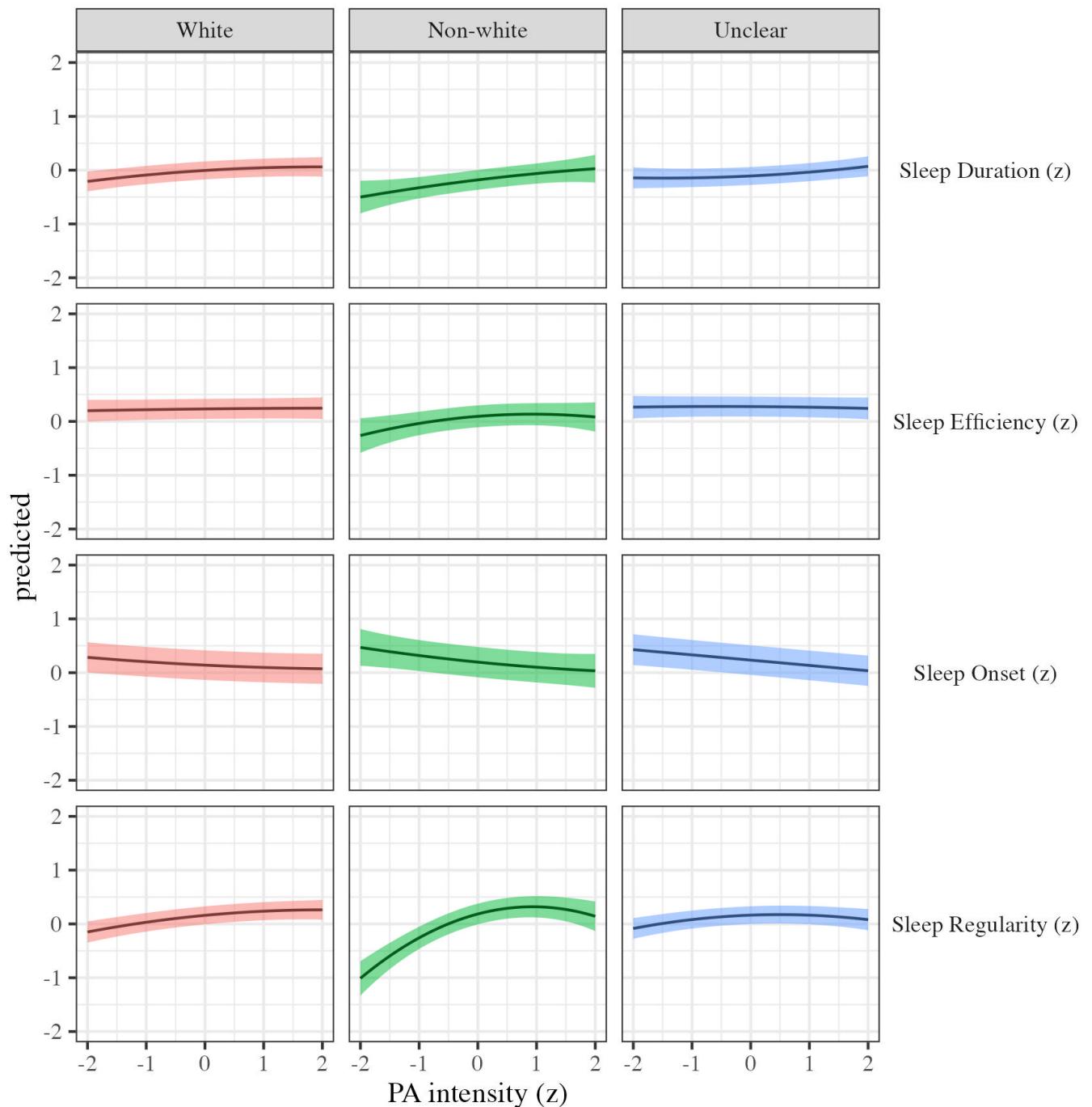


Figure 67. Sleep metrics on Physical activity intensity moderated by ethnicity

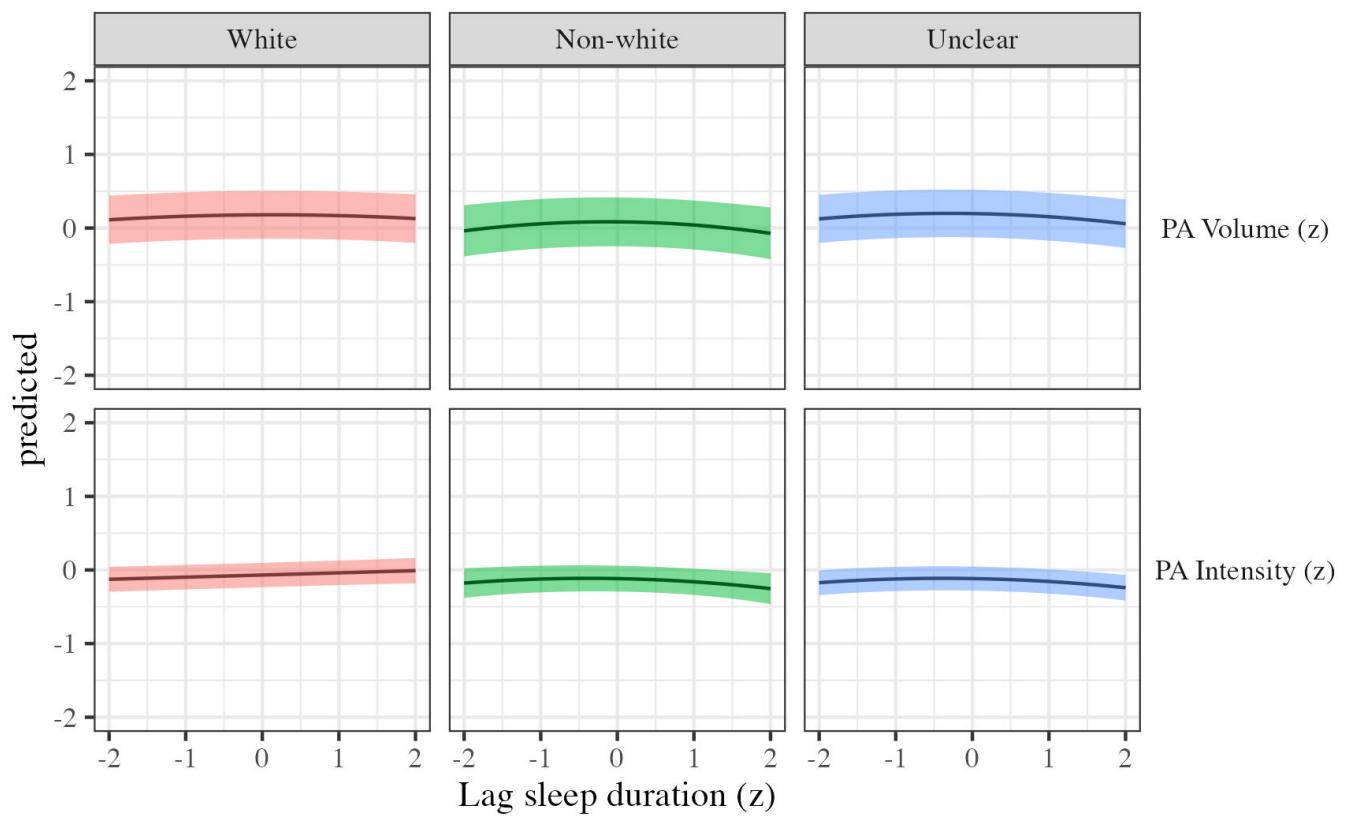


Figure 68. Physical activity by sleep duration moderated by ethnicity

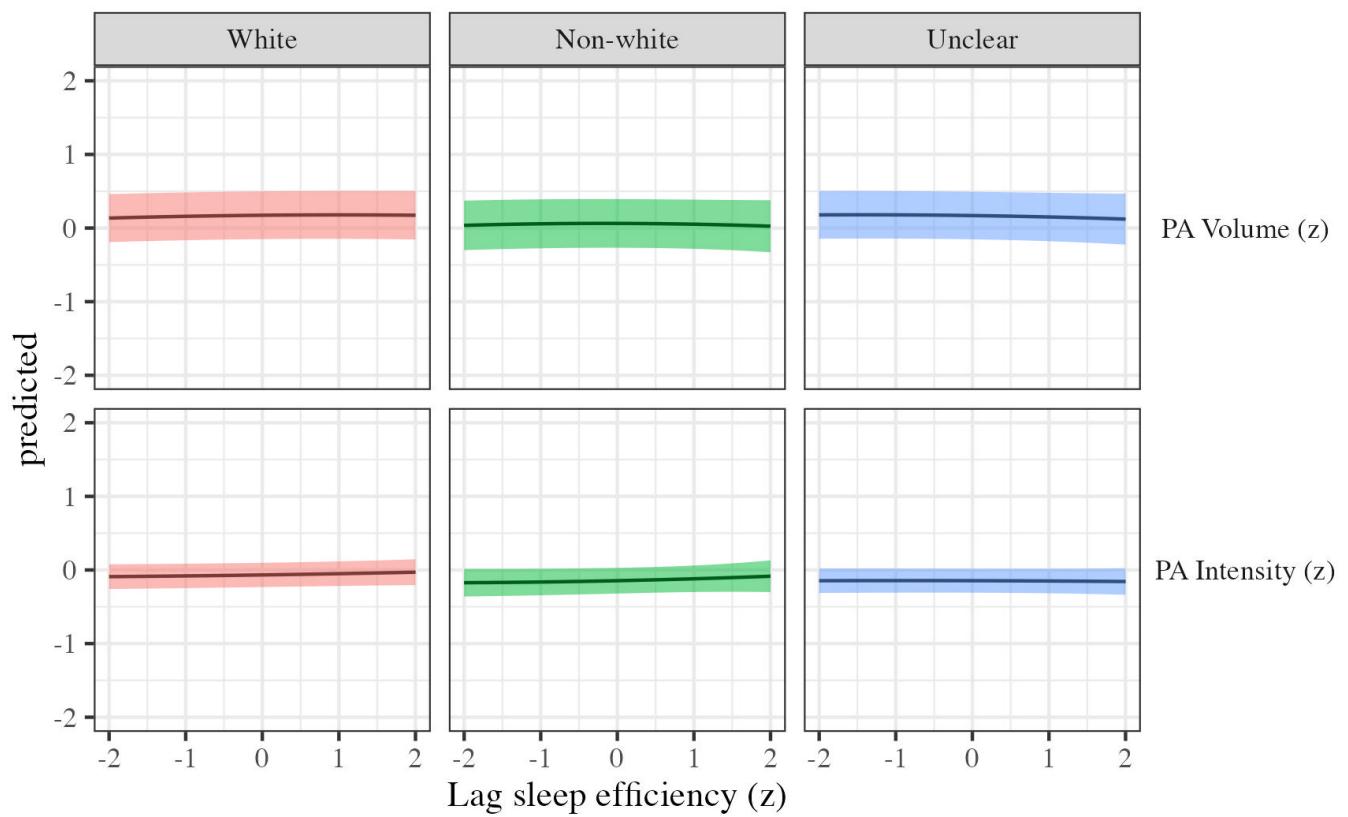


Figure 69. Physical activity by sleep efficiency moderated by ethnicity

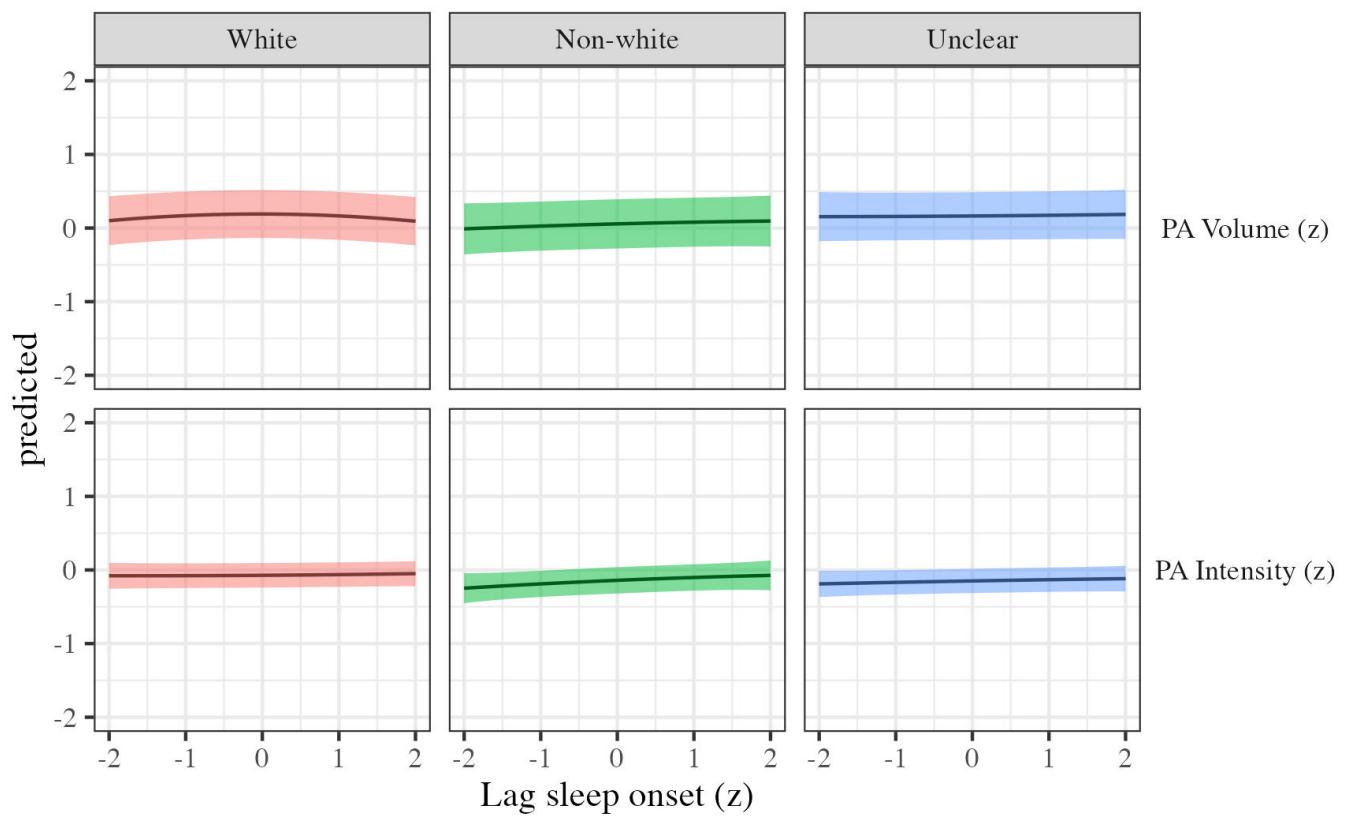


Figure 70. Physical activity by sleep onset moderated by ethnicity

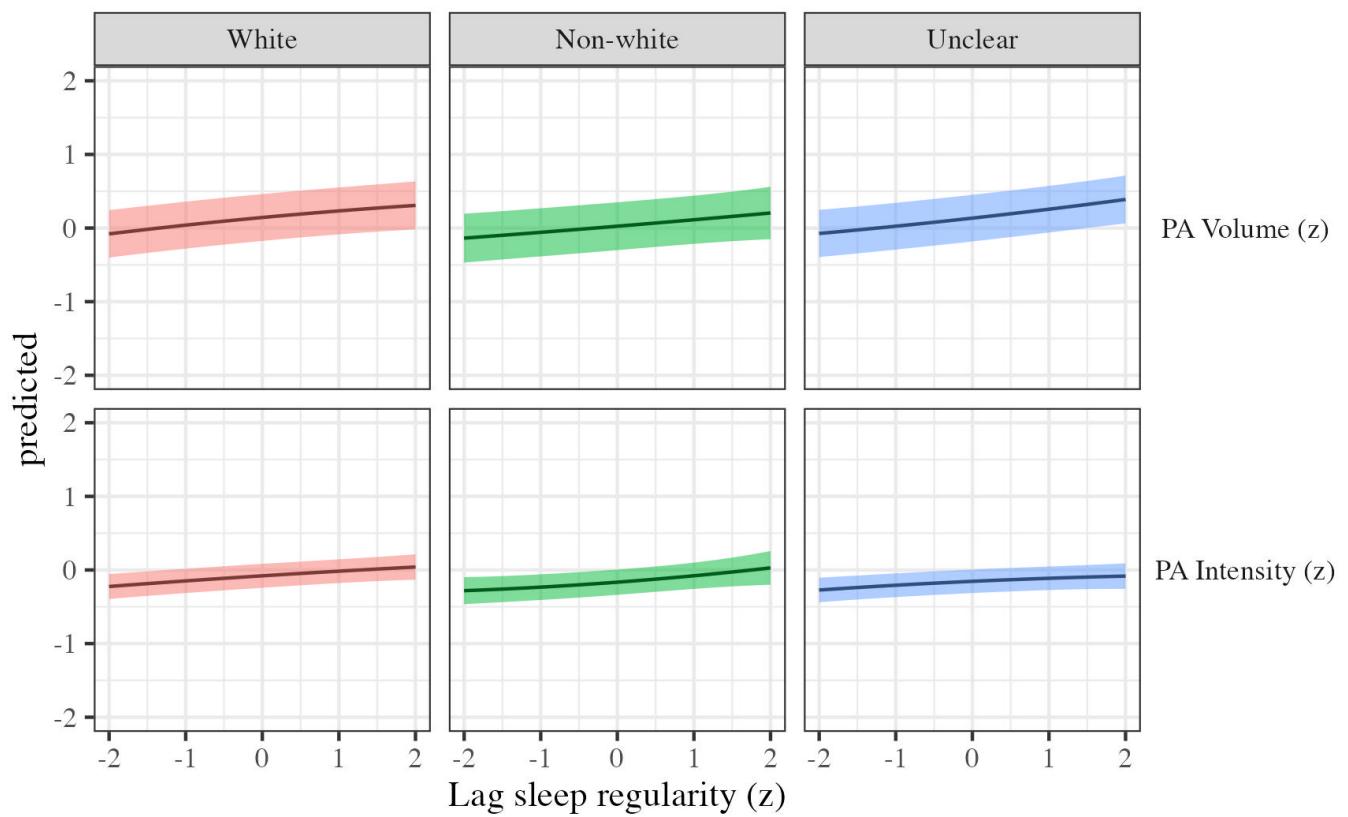


Figure 71. Physical activity by sleep regularity moderated by ethnicity