

Multiverse analysis

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

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Abstract

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

Keywords: keywords

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Multiverse analysis

Results

Model diagnostics

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

Multiverse

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

The effects of physical activity volume on sleep

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

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 4 and Figure 7.

The effects of physical activity intensity on sleep by BMI. We estimated how physical activity intensity affects sleep across BMI. We present the results in Table 4 and Figure 8.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by BMI. Results, controlling for sex, SES, and BMI are presented in Table 5 and Figure 9.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by BMI. Results, controlling for sex, SES, and BMI are presented in Table 5 and Figure 10.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by BMI. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 11.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by BMI. Results are presented in Table 5 and Figure 12.

SES

The effects of physical activity volume on sleep by SES. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by SES, and the results are presented in Table 6 and Figure 13.

The effects of physical activity intensity on sleep by SES. We estimated how physical activity intensity affects sleep across SES. We present the results in Table 6 and Figure 14.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by SES. Results, controlling for sex, SES, and BMI are presented in Table 7 and Figure 15.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by SES. Results, controlling for sex, SES, and BMI are presented in Table 7 and Figure 16.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by SES. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 17.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by SES. Results are presented in Table 7 and Figure 18.

sex

The effects of physical activity volume on sleep by sex. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by sex, and the results are presented in Table 8 and Figure 19.

The effects of physical activity intensity on sleep by sex. We estimated how physical activity intensity affects sleep across sex. We present the results in Table 8 and Figure 20.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by sex. Results, controlling for sex, SES, and BMI are presented in Table 9 and Figure 21.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by sex. Results, controlling for sex, SES, and BMI are presented in Table 9 and Figure 22.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by sex. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 23.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by sex. Results are presented in Table 9 and Figure 24.

weekday

The effects of physical activity volume on sleep by weekday. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by weekday, and the results are presented in Table 10 and Figure 25.

The effects of physical activity intensity on sleep by weekday. We estimated how physical activity intensity affects sleep across weekday. We present the results in Table 10 and Figure 26.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by weekday. Results, controlling for sex, SES, and BMI are presented in Table 11 and Figure 27.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by weekday. Results, controlling for sex, SES, and BMI are presented in Table 11 and Figure 28.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by weekday. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 29.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by weekday. Results are presented in Table 11 and Figure 30.

season

The effects of physical activity volume on sleep by season. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by season, and the results are presented in Table 12 and Figure 31.

The effects of physical activity intensity on sleep by season. We estimated how physical activity intensity affects sleep across season. We present the results in Table 12 and Figure 32.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by season. Results, controlling for sex, SES, and BMI are presented in Table 13 and Figure 33.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by season. Results, controlling for sex, SES, and BMI are presented in Table 13 and Figure 34.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by season. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 35.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by season. Results are presented in Table 13 and Figure 36.

region

The effects of physical activity volume on sleep by region. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by region, and the results are presented in Table 14 and Figure 37.

The effects of physical activity intensity on sleep by region. We estimated how physical activity intensity affects sleep across region. We present the results in Table 14 and Figure 38.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by region. Results, controlling for sex, SES, and BMI are presented in Table 15 and Figure 39.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by region. Results, controlling for sex, SES, and BMI are presented in Table 15 and Figure 40.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by region. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 41.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by region. Results are presented in Table 15 and Figure 42.

daylight hours

The effects of physical activity volume on sleep by daylight hours. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by daylight hours, and the results are presented in Table 16 and Figure 43.

The effects of physical activity intensity on sleep by daylight hours. We estimated how physical activity intensity affects sleep across daylight hours. We present the results in Table 16 and Figure 44.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by daylight hours. Results, controlling for sex, SES, and BMI are presented in Table 17 and Figure 45.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by daylight hours. Results, controlling for sex, SES, and BMI are presented in Table 17 and Figure 46.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by daylight hours. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 47.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by daylight hours. Results are presented in Table 17 and Figure 48.

wear location

The effects of physical activity volume on sleep by wear location. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by wear location, and the results are presented in Table 18 and Figure 49.

The effects of physical activity intensity on sleep by wear location. We estimated how physical activity intensity affects sleep across wear location. We present the results in Table 18 and Figure 50.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by wear location. Results, controlling for sex, SES, and BMI are presented in Table 19 and Figure 51.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by wear location. Results, controlling for sex, SES, and BMI are presented in Table 19 and Figure 52.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by wear location. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 53.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by wear location. Results are presented in Table 19 and Figure 54.

most active hour

The effects of physical activity volume on sleep by most active hour. We estimated the effects of physical activity on sleep (RQ1) using mixed-effects models. We estimated the effect of physical activity volume on sleep by most active hour, and the results are presented in Table 20 and Figure 55.

The effects of physical activity intensity on sleep by most active hour. We estimated how physical activity intensity affects sleep across most active hour. We present the results in Table 20 and Figure 56.

The effects of sleep duration on physical activity. We estimated the effect of sleep duration on physical activity by most active hour. Results, controlling for sex, SES, and BMI are presented in Table 21 and Figure 57.

The effects of sleep efficiency on physical activity. We estimated the effect of sleep efficiency on physical activity by most active hour. Results, controlling for sex, SES, and BMI are presented in Table 21 and Figure 58.

The effects of sleep onset on physical activity. We estimated the effect of sleep onset on physical activity by most active hour. Results, controlling for sex, SES, and BMI are presented in Table 3 and Figure 59.

The effects of sleep regularity on physical activity. We estimated the effect of sleep regularity on physical activity by most active hour. Results are presented in Table 21 and Figure 60.

Table 1

Model diagnostics

Model name	Skewness	Kurtosis	Converged (%)
Models moderated by age			
sleep duration by PA volume	0.07	-3.16	100.00%
sleep efficiency by PA volume	-0.15	-22.73	100.00%
sleep onset by PA volume	0.02	-11.17	100.00%
sleep regularity by PA volume	-0.26	-6.81	100.00%
sleep duration by PA intensity	0.07	-3.16	100.00%
sleep efficiency by PA intensity	-0.15	-22.71	100.00%
sleep onset by PA intensity	0.01	-11.17	100.00%
sleep regularity by PA intensity	-0.26	-6.85	100.00%
PA volume by sleep duration(lagged)	-0.31	-374.65	100.00%
PA intensity by sleep duration(lagged)	0.14	-2.14	100.00%
PA volume by sleep efficiency(lagged)	-0.30	-375.56	100.00%
PA intensity by sleep efficiency(lagged)	0.13	-2.14	100.00%
PA volume by sleep onset(lagged)	-0.27	-375.90	100.00%
PA intensity by sleep onset(lagged)	0.13	-2.14	100.00%
PA volume by sleep regularity(lagged)	-0.24	-375.25	100.00%
PA intensity by sleep regularity(lagged)	0.15	-2.10	100.00%
Models moderated by bmi			
sleep duration by PA volume	0.07	-3.16	100.00%
sleep efficiency by PA volume	-0.16	-22.71	100.00%
sleep onset by PA volume	0.01	-11.15	100.00%
sleep regularity by PA volume	-0.26	-6.83	100.00%
sleep duration by PA intensity	0.07	-3.16	100.00%
sleep efficiency by PA intensity	-0.16	-22.72	100.00%
sleep onset by PA intensity	0.01	-11.16	100.00%
sleep regularity by PA intensity	-0.26	-6.83	100.00%
PA volume by sleep duration(lagged)	-0.31	-374.63	100.00%
PA intensity by sleep duration(lagged)	0.14	-2.14	100.00%
PA volume by sleep efficiency(lagged)	-0.29	-375.61	100.00%
PA intensity by sleep efficiency(lagged)	0.13	-2.14	100.00%
PA volume by sleep onset(lagged)	-0.27	-375.17	100.00%
PA intensity by sleep onset(lagged)	0.14	-2.14	100.00%
PA volume by sleep regularity(lagged)	-0.22	-375.18	100.00%
PA intensity by sleep regularity(lagged)	0.15	-2.10	100.00%

Table 1 continued

Model name		Skewness	Kurtosis	Converged (%)
Models moderated by ses				
sleep duration by PA volume	0.07	-3.16	100.00%	
sleep efficiency by PA volume	-0.16	-22.68	100.00%	
sleep onset by PA volume	0.01	-11.20	100.00%	
sleep regularity by PA volume	-0.26	-6.83	100.00%	
sleep duration by PA intensity	0.07	-3.18	100.00%	
sleep efficiency by PA intensity	-0.16	-22.72	100.00%	
sleep onset by PA intensity	0.02	-11.16	100.00%	
sleep regularity by PA intensity	-0.26	-6.83	100.00%	
PA volume by sleep duration(lagged)	-0.31	-374.67	100.00%	
PA intensity by sleep duration(lagged)	0.14	-2.14	100.00%	
PA volume by sleep efficiency(lagged)	-0.31	-375.09	100.00%	
PA intensity by sleep efficiency(lagged)	0.13	-2.14	100.00%	
PA volume by sleep onset(lagged)	-0.28	-375.33	100.00%	
PA intensity by sleep onset(lagged)	0.13	-2.14	100.00%	
PA volume by sleep regularity(lagged)	-0.22	-374.36	100.00%	
PA intensity by sleep regularity(lagged)	0.15	-2.11	100.00%	
Models moderated by sex				
sleep duration by PA volume	0.07	-3.16	100.00%	
sleep efficiency by PA volume	-0.16	-22.71	100.00%	
sleep onset by PA volume	0.02	-11.19	100.00%	
sleep regularity by PA volume	-0.26	-6.84	100.00%	
sleep duration by PA intensity	0.07	-3.17	100.00%	
sleep efficiency by PA intensity	-0.16	-22.70	100.00%	
sleep onset by PA intensity	0.01	-11.14	100.00%	
sleep regularity by PA intensity	-0.26	-6.82	100.00%	
PA volume by sleep duration(lagged)	-0.30	-374.36	100.00%	
PA intensity by sleep duration(lagged)	0.14	-2.15	100.00%	
PA volume by sleep efficiency(lagged)	-0.29	-375.67	100.00%	
PA intensity by sleep efficiency(lagged)	0.13	-2.14	100.00%	
PA volume by sleep onset(lagged)	-0.25	-374.42	100.00%	
PA intensity by sleep onset(lagged)	0.13	-2.14	100.00%	
PA volume by sleep regularity(lagged)	-0.24	-375.09	100.00%	
PA intensity by sleep regularity(lagged)	0.15	-2.10	100.00%	
Models moderated by weekday				

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
sleep duration by PA volume	0.06	-3.15	100.00%
sleep efficiency by PA volume	-0.14	-22.93	100.00%
sleep onset by PA volume	-0.02	-11.39	100.00%
sleep regularity by PA volume	-0.24	-7.25	100.00%
sleep duration by PA intensity	0.06	-3.15	100.00%
sleep efficiency by PA intensity	-0.14	-22.88	100.00%
sleep onset by PA intensity	-0.02	-11.26	100.00%
sleep regularity by PA intensity	-0.24	-7.30	100.00%
PA volume by sleep duration(lagged)	-0.32	-377.05	100.00%
PA intensity by sleep duration(lagged)	0.16	-2.17	100.00%
PA volume by sleep efficiency(lagged)	-0.32	-379.48	100.00%
PA intensity by sleep efficiency(lagged)	0.16	-2.15	100.00%
PA volume by sleep onset(lagged)	-0.29	-380.58	100.00%
PA intensity by sleep onset(lagged)	0.17	-2.17	100.00%
PA volume by sleep regularity(lagged)	-0.23	-377.69	100.00%
PA intensity by sleep regularity(lagged)	0.17	-2.11	100.00%
Models moderated by season			
sleep duration by PA volume	0.07	-3.16	100.00%
sleep efficiency by PA volume	-0.16	-22.68	100.00%
sleep onset by PA volume	0.02	-11.19	100.00%
sleep regularity by PA volume	-0.25	-6.84	100.00%
sleep duration by PA intensity	0.07	-3.15	100.00%
sleep efficiency by PA intensity	-0.16	-22.70	100.00%
sleep onset by PA intensity	0.02	-11.12	100.00%
sleep regularity by PA intensity	-0.26	-6.82	100.00%
PA volume by sleep duration(lagged)	-0.32	-375.01	100.00%
PA intensity by sleep duration(lagged)	0.14	-2.14	100.00%
PA volume by sleep efficiency(lagged)	-0.32	-374.93	100.00%
PA intensity by sleep efficiency(lagged)	0.13	-2.13	100.00%
PA volume by sleep onset(lagged)	-0.27	-375.61	100.00%
PA intensity by sleep onset(lagged)	0.14	-2.14	100.00%
PA volume by sleep regularity(lagged)	-0.23	-374.82	100.00%
PA intensity by sleep regularity(lagged)	0.15	-2.10	100.00%
Models moderated by region			
sleep duration by PA volume	0.06	-3.16	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
sleep efficiency by PA volume	-0.15	-22.74	100.00%
sleep onset by PA volume	0.02	-11.17	100.00%
sleep regularity by PA volume	-0.25	-6.83	100.00%
sleep duration by PA intensity	0.06	-3.14	100.00%
sleep efficiency by PA intensity	-0.15	-22.71	100.00%
sleep onset by PA intensity	0.01	-11.15	100.00%
sleep regularity by PA intensity	-0.26	-6.82	100.00%
PA volume by sleep duration(lagged)	-0.36	-372.50	100.00%
PA intensity by sleep duration(lagged)	0.13	-2.14	100.00%
PA volume by sleep efficiency(lagged)	-0.32	-374.65	100.00%
PA intensity by sleep efficiency(lagged)	0.13	-2.14	100.00%
PA volume by sleep onset(lagged)	-0.28	-375.06	100.00%
PA intensity by sleep onset(lagged)	0.13	-2.14	100.00%
PA volume by sleep regularity(lagged)	-0.22	-372.14	100.00%
PA intensity by sleep regularity(lagged)	0.14	-2.11	100.00%
Models moderated by daylight			
sleep duration by PA volume	0.07	-3.16	100.00%
sleep efficiency by PA volume	-0.16	-22.70	100.00%
sleep onset by PA volume	0.02	-11.18	100.00%
sleep regularity by PA volume	-0.26	-6.84	100.00%
sleep duration by PA intensity	0.07	-3.16	100.00%
sleep efficiency by PA intensity	-0.16	-22.71	100.00%
sleep onset by PA intensity	0.02	-11.14	100.00%
sleep regularity by PA intensity	-0.26	-6.82	100.00%
PA volume by sleep duration(lagged)	-0.30	-374.98	100.00%
PA intensity by sleep duration(lagged)	0.14	-2.15	100.00%
PA volume by sleep efficiency(lagged)	-0.29	-375.79	100.00%
PA intensity by sleep efficiency(lagged)	0.13	-2.14	100.00%
PA volume by sleep onset(lagged)	-0.27	-375.62	100.00%
PA intensity by sleep onset(lagged)	0.13	-2.14	100.00%
PA volume by sleep regularity(lagged)	-0.23	-375.30	100.00%
PA intensity by sleep regularity(lagged)	0.15	-2.11	100.00%
Models moderated by wear location			
sleep duration by PA volume	0.07	-3.16	100.00%
sleep efficiency by PA volume	-0.15	-22.75	100.00%

Table 1 continued

Model name	Skewness	Kurtosis	Converged (%)
sleep onset by PA volume	0.01	-11.18	100.00%
sleep regularity by PA volume	-0.26	-6.84	100.00%
sleep duration by PA intensity	0.07	-3.16	100.00%
sleep efficiency by PA intensity	-0.15	-22.75	100.00%
sleep onset by PA intensity	0.01	-11.13	100.00%
sleep regularity by PA intensity	-0.26	-6.85	100.00%
PA volume by sleep duration(lagged)	-0.30	-374.73	100.00%
PA intensity by sleep duration(lagged)	0.14	-2.14	100.00%
PA volume by sleep efficiency(lagged)	-0.29	-375.82	100.00%
PA intensity by sleep efficiency(lagged)	0.13	-2.14	100.00%
PA volume by sleep onset(lagged)	-0.27	-375.71	100.00%
PA intensity by sleep onset(lagged)	0.13	-2.14	100.00%
PA volume by sleep regularity(lagged)	-0.24	-375.51	100.00%
PA intensity by sleep regularity(lagged)	0.16	-2.09	100.00%
Models moderated by pa mostactivehr			
sleep duration by PA volume	0.07	-3.15	100.00%
sleep efficiency by PA volume	-0.16	-22.68	100.00%
sleep onset by PA volume	0.01	-11.22	100.00%
sleep regularity by PA volume	-0.26	-6.84	100.00%
sleep duration by PA intensity	0.07	-3.15	100.00%
sleep efficiency by PA intensity	-0.16	-22.71	100.00%
sleep onset by PA intensity	0.01	-11.18	100.00%
sleep regularity by PA intensity	-0.26	-6.81	100.00%
PA volume by sleep duration(lagged)	-0.30	-374.99	100.00%
PA intensity by sleep duration(lagged)	0.14	-2.14	100.00%
PA volume by sleep efficiency(lagged)	-0.31	-375.72	100.00%
PA intensity by sleep efficiency(lagged)	0.13	-2.14	100.00%
PA volume by sleep onset(lagged)	-0.28	-375.48	100.00%
PA intensity by sleep onset(lagged)	0.13	-2.14	100.00%
PA volume by sleep regularity(lagged)	-0.23	-375.10	100.00%
PA intensity by sleep regularity(lagged)	0.15	-2.11	100.00%

Table 2

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

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

Table 2 continued

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

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

Table 3

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

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

Table 3 continued

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

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

Table 4

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

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.44 [0.23, 0.65]	0.11	4.10	< .001	0.41 [0.19, 0.62]	0.11	3.74	< .001
Physical activity	0.03 [-0.07, 0.13]	0.05	0.59	.594	0.04 [-0.03, 0.10]	0.03	1.16	.250
Physical activity ²	0.00 [-0.03, 0.03]	0.01	-0.01	.991	0.02 [-0.02, 0.06]	0.02	1.10	.271
Age	-0.01 [-0.01, 0.00]	0.00	-3.19	.001	-0.01 [-0.01, 0.00]	0.00	-2.96	.003
Physical activity × bmi	0.00 [0.00, 0.00]	0.00	-0.04	.968	0.00 [0.00, 0.00]	0.00	0.12	.903
Sleep efficiency								
(Intercept)	0.23 [-0.01, 0.47]	0.12	1.84	.067	0.25 [0.01, 0.49]	0.12	2.02	.044
Physical activity	0.03 [-0.07, 0.12]	0.05	0.56	.608	-0.02 [-0.08, 0.05]	0.03	-0.54	.590
Physical activity ²	-0.01 [-0.03, 0.02]	0.01	-0.41	.698	-0.01 [-0.05, 0.03]	0.02	-0.35	.730
Age	0.00 [0.00, 0.01]	0.00	1.00	.318	0.00 [0.00, 0.01]	0.00	0.90	.369
Physical activity × bmi	0.00 [0.00, 0.00]	0.00	-0.23	.831	0.00 [0.00, 0.00]	0.00	0.57	.574
Sleep onset								
(Intercept)	-0.13 [-0.45, 0.18]	0.16	-0.82	.410	-0.08 [-0.41, 0.26]	0.17	-0.45	.656
Physical activity	0.04 [-0.01, 0.09]	0.02	1.53	.168	-0.03 [-0.09, 0.02]	0.03	-1.19	.260
Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.00	.386	-0.03 [-0.06, -0.01]	0.01	-2.39	.019
Age	0.00 [0.00, 0.01]	0.00	0.96	.338	0.00 [0.00, 0.00]	0.00	0.61	.540
Physical activity × bmi	0.00 [-0.01, 0.00]	0.00	-2.16	.087	0.00 [0.00, 0.00]	0.00	-0.63	.548
Sleep regularity								
(Intercept)	0.58 [0.31, 0.84]	0.14	4.23	< .001	0.63 [0.39, 0.88]	0.12	5.06	< .001
Physical activity	0.07 [-0.01, 0.15]	0.04	1.74	.141	0.18 [0.12, 0.25]	0.03	5.45	< .001
Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.83	.426	-0.05 [-0.09, -0.01]	0.02	-2.34	.020

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Age	0.00	[0.00, 0.00]	0.00	0.07	.948	0.00	[0.00, 0.00]	0.00	0.23	.820
Physical activity × bmi	0.00	[0.00, 0.00]	0.00	0.48	.629	0.00	[-0.01, 0.00]	0.00	-3.23	.001

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

Table 5

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

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration										
(Intercept)	1.52	[1.16, 1.88]	0.18	8.29	< .001	1.40	[1.16, 1.64]	0.12	11.48	< .001
Sleep duration	0.01	[0.09, 0.11]	0.05	0.18	.872	0.01	[-0.04, 0.06]	0.02	0.39	.709
Sleep duration ²	0.00	[-0.03, 0.03]	0.02	0.00	.998	0.00	[-0.01, 0.02]	0.01	0.36	.728
Age	-0.02	[-0.03, -0.02]	0.00	-9.33	< .001	-0.03	[-0.03, -0.02]	0.00	-8.62	< .001
Sleep duration × bmi	0.00	[0.00, 0.00]	0.00	-0.21	.849	0.00	[0.00, 0.00]	0.00	0.02	.984
Sleep efficiency										
(Intercept)	1.52	[1.16, 1.88]	0.18	8.27	< .001	1.41	[1.17, 1.65]	0.12	11.51	< .001
Sleep efficiency	-0.02	[-0.09, 0.05]	0.03	-0.58	.586	0.00	[-0.03, 0.03]	0.02	0.24	.807
Sleep efficiency ²	0.00	[-0.02, 0.02]	0.01	0.15	.887	0.00	[-0.01, 0.01]	0.00	0.54	.593
Age	-0.02	[-0.03, -0.02]	0.00	-9.29	< .001	-0.03	[-0.03, -0.02]	0.00	-8.67	< .001
Sleep efficiency × bmi	0.00	[0.00, 0.00]	0.00	0.70	.506	0.00	[0.00, 0.00]	0.00	-0.17	.869
Sleep onset										
(Intercept)	1.54	[1.18, 1.91]	0.19	8.32	< .001	1.42	[1.18, 1.67]	0.12	11.45	< .001
Sleep onset	-0.02	[-0.13, 0.10]	0.06	-0.27	.805	-0.06	[-0.13, 0.01]	0.03	-1.78	.119
Sleep onset ²	-0.02	[-0.06, 0.02]	0.02	-1.16	.278	-0.01	[-0.04, 0.01]	0.01	-1.04	.301
Age	-0.02	[-0.03, -0.02]	0.00	-9.40	< .001	-0.03	[-0.03, -0.02]	0.00	-8.71	< .001
Sleep onset × bmi	0.00	[0.00, 0.00]	0.00	-0.04	.968	0.00	[0.00, 0.00]	0.00	2.05	.053
Sleep regularity										
(Intercept)	1.47	[1.12, 1.83]	0.18	8.14	< .001	1.39	[1.15, 1.63]	0.12	11.35	< .001
Sleep regularity	0.17	[0.06, 0.29]	0.06	2.92	.075	0.10	[0.07, 0.13]	0.02	6.30	< .001
Sleep regularity ²	-0.01	[-0.04, 0.01]	0.01	-1.21	.264	-0.01	[-0.03, 0.01]	0.01	-0.73	.504

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Age	-0.02	[-0.03, -0.02]	0.00	-9.32	< .001	-0.03	[-0.03, -0.02]	0.00	-8.78	< .001
Sleep regularity × bmi	0.00	[0.01, 0.00]	0.00	-2.40	.093	0.00	[0.00, 0.00]	0.00	-3.82	< .001

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

Table 6

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

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	0.58 [0.34, 0.81]	0.12	4.82	< .001	0.62 [0.37, 0.87]	0.13	4.89	< .001
Physical activity	0.12 [0.07, 0.17]	0.03	4.80	.001	0.07 [0.03, 0.11]	0.02	3.56	.001
Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-1.02	.376	-0.02 [-0.06, 0.02]	0.02	-1.00	.384
Age	0.00 [0.00, 0.00]	0.00	0.23	.821	0.00 [0.00, 0.00]	0.00	0.25	.805
Physical activity × sesmedium	-0.03 [-0.14, 0.07]	0.06	-0.62	.581	0.00 [-0.04, 0.05]	0.02	0.15	.882
Physical activity × seshigh	-0.02 [-0.11, 0.07]	0.04	-0.45	.679	0.02 [-0.04, 0.07]	0.03	0.53	.601

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

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

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.53 [1.17, 1.90]	0.19	8.27	< .001	1.41 [1.18, 1.65]	0.12	11.71	< .001
Sleep duration	0.00 [-0.03, 0.03]	0.01	-0.08	.938	0.01 [-0.01, 0.03]	0.01	0.96	.347
Sleep duration ²	-0.01 [-0.03, 0.00]	0.01	-1.46	.216	0.00 [-0.01, 0.00]	0.00	-1.10	.290
Age	-0.02 [-0.03, -0.02]	0.00	-9.38	< .001	-0.03 [-0.03, -0.02]	0.00	-8.68	< .001
Sleep duration × sesmedium	-0.01 [-0.06, 0.04]	0.03	-0.24	.815	0.00 [-0.04, 0.04]	0.02	0.04	.971
Sleep duration × seshigh	0.01 [-0.07, 0.08]	0.04	0.24	.826	-0.01 [-0.05, 0.04]	0.02	-0.31	.771
Sleep efficiency								
(Intercept)	1.53 [1.16, 1.89]	0.19	8.23	< .001	1.41 [1.18, 1.65]	0.12	11.67	< .001
Sleep efficiency	-0.02 [-0.08, 0.04]	0.03	-0.59	.593	-0.01 [-0.03, 0.02]	0.01	-0.67	.511
Sleep efficiency ²	0.00 [-0.01, 0.01]	0.00	-0.03	.977	0.00 [-0.01, 0.01]	0.00	-0.11	.919
Age	-0.02 [-0.03, -0.02]	0.00	-9.38	< .001	-0.03 [-0.03, -0.02]	0.00	-8.67	< .001
Sleep efficiency × sesmedium	0.03 [-0.04, 0.10]	0.03	0.76	.494	0.02 [-0.01, 0.06]	0.02	1.36	.198
Sleep efficiency × seshigh	0.02 [-0.05, 0.09]	0.04	0.67	.542	0.00 [-0.02, 0.03]	0.01	0.34	.736
Sleep onset								
(Intercept)	1.55 [1.19, 1.91]	0.19	8.35	< .001	1.42 [1.18, 1.65]	0.12	11.83	< .001
Sleep onset	-0.01 [-0.04, 0.02]	0.02	-0.66	.512	0.01 [-0.03, 0.04]	0.02	0.36	.728
Sleep onset ²	-0.02 [-0.05, 0.00]	0.01	-2.14	.069	0.00 [-0.02, 0.02]	0.01	0.03	.975
Age	-0.02 [-0.03, -0.02]	0.00	-9.39	< .001	-0.03 [-0.03, -0.02]	0.00	-8.80	< .001
Sleep onset × sesmedium	0.01 [-0.04, 0.05]	0.02	0.24	.813	-0.02 [-0.05, 0.02]	0.02	-0.96	.335
Sleep onset × seshigh	-0.03 [-0.08, 0.03]	0.03	-0.91	.384	-0.02 [-0.07, 0.03]	0.03	-0.90	.400
Sleep regularity								

Table 7 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
(Intercept)	1.46 [1.10, 1.82]	0.18	7.98	< .001	1.39 [1.16, 1.62]	0.12	11.88	< .001
Sleep regularity	0.07 [0.04, 0.10]	0.02	4.47	< .001	0.02 [-0.01, 0.06]	0.02	1.30	.254
Sleep regularity ²	0.00 [-0.01, 0.02]	0.01	0.54	.600	-0.01 [-0.03, 0.01]	0.01	-0.71	.530
Age	-0.02 [-0.03, -0.02]	0.00	-9.09	< .001	-0.03 [-0.03, -0.02]	0.00	-8.72	< .001
Sleep regularity × sesmedium	0.01 [-0.05, 0.07]	0.03	0.47	.660	0.02 [-0.02, 0.05]	0.02	0.92	.370
Sleep regularity × seshigh	0.00 [-0.04, 0.04]	0.02	0.09	.927	0.02 [-0.03, 0.08]	0.03	0.90	.420

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

Table 8

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

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.44 [0.23, 0.65]	0.11	4.10	< .001	0.42 [0.21, 0.63]	0.11	3.92	< .001
Physical activity	0.03 [-0.03, 0.10]	0.03	1.06	.373	0.04 [0.00, 0.07]	0.02	2.07	.063
Physical activity ²	0.00 [-0.01, 0.01]	0.01	0.19	.854	0.01 [-0.01, 0.03]	0.01	1.25	.215
Age	-0.01 [-0.01, 0.00]	0.00	-3.13	.002	-0.01 [-0.01, 0.00]	0.00	-2.96	.003
Physical activity × sexmale	0.00 [-0.06, 0.05]	0.03	-0.17	.871	0.01 [-0.04, 0.06]	0.03	0.47	.652
Sleep efficiency								
(Intercept)	0.22 [-0.01, 0.46]	0.12	1.84	.067	0.24 [0.00, 0.48]	0.12	1.95	.052
Physical activity	0.01 [-0.03, 0.05]	0.02	0.60	.567	-0.03 [-0.06, 0.01]	0.02	-1.57	.138
Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.58	.598	0.00 [-0.02, 0.01]	0.01	-0.52	.602
Age	0.00 [0.00, 0.01]	0.00	1.04	.299	0.00 [0.00, 0.01]	0.00	0.94	.348
Physical activity × sexmale	0.01 [-0.04, 0.06]	0.03	0.47	.652	0.05 [0.01, 0.10]	0.02	2.46	.024
Sleep onset								
(Intercept)	-0.15 [-0.47, 0.17]	0.16	-0.94	.347	-0.10 [-0.43, 0.22]	0.17	-0.63	.528
Physical activity	-0.02 [-0.06, 0.01]	0.02	-1.34	.250	-0.05 [-0.07, -0.03]	0.01	-4.56	< .001
Physical activity ²	0.00 [-0.01, 0.01]	0.00	-0.42	.692	-0.01 [-0.02, 0.00]	0.01	-1.48	.141
Age	0.00 [0.00, 0.01]	0.00	1.13	.257	0.00 [0.00, 0.00]	0.00	0.65	.513
Physical activity × sexmale	0.00 [-0.03, 0.03]	0.02	-0.10	.920	-0.01 [-0.04, 0.01]	0.01	-0.87	.383
Sleep regularity								
(Intercept)	0.58 [0.33, 0.83]	0.13	4.59	< .001	0.61 [0.37, 0.85]	0.12	4.91	< .001
Physical activity	0.09 [-0.03, 0.20]	0.06	1.49	.263	0.06 [0.01, 0.10]	0.02	2.55	.046
Physical activity ²	-0.01 [-0.03, 0.02]	0.01	-0.56	.622	-0.02 [-0.05, 0.01]	0.01	-1.19	.287

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Age	0.00 [0.00, 0.00]	0.00	0.13	.897	0.00 [0.00, 0.00]	0.00	0.30	.767
Physical activity \times sexmale	0.01 [-0.10, 0.11]	0.05	0.10	.926	0.04 [-0.01, 0.09]	0.03	1.46	.179

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

Table 9

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

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.53 [1.17, 1.89]	0.18	8.30	< .001	1.41 [1.17, 1.65]	0.12	11.60	< .001
Sleep duration	-0.02 [-0.05, 0.01]	0.01	-1.18	.272	0.00 [-0.02, 0.03]	0.01	0.25	.808
Sleep duration ²	-0.01 [-0.03, 0.01]	0.01	-1.25	.292	0.00 [-0.01, 0.01]	0.01	-0.64	.556
Age	-0.02 [-0.03, -0.02]	0.00	-9.33	< .001	-0.03 [-0.03, -0.02]	0.00	-8.63	< .001
Sleep duration × sexmale	0.03 [-0.01, 0.08]	0.02	1.55	.176	0.01 [-0.01, 0.04]	0.01	1.05	.306
Sleep efficiency								
(Intercept)	1.53 [1.16, 1.89]	0.19	8.25	< .001	1.41 [1.17, 1.65]	0.12	11.54	< .001
Sleep efficiency	0.00 [-0.03, 0.03]	0.01	0.25	.810	0.01 [-0.02, 0.03]	0.01	0.62	.553
Sleep efficiency ²	0.00 [-0.01, 0.01]	0.00	0.09	.926	0.00 [0.00, 0.01]	0.00	0.66	.535
Age	-0.02 [-0.03, -0.02]	0.00	-9.38	< .001	-0.03 [-0.03, -0.02]	0.00	-8.67	< .001
Sleep efficiency × sexmale	-0.01 [-0.04, 0.02]	0.01	-0.47	.642	-0.01 [-0.03, 0.01]	0.01	-0.72	.473
Sleep onset								
(Intercept)	1.54 [1.18, 1.90]	0.18	8.34	< .001	1.41 [1.17, 1.65]	0.12	11.53	< .001
Sleep onset	0.02 [-0.01, 0.06]	0.02	1.32	.203	0.00 [-0.03, 0.03]	0.01	-0.16	.879
Sleep onset ²	-0.02 [-0.04, 0.01]	0.01	-1.49	.199	0.00 [-0.02, 0.02]	0.01	0.04	.967
Age	-0.02 [-0.03, -0.02]	0.00	-9.49	< .001	-0.03 [-0.03, -0.02]	0.00	-8.72	< .001
Sleep onset × sexmale	-0.08 [-0.13, -0.03]	0.02	-3.24	.010	-0.01 [-0.04, 0.03]	0.02	-0.45	.654
Sleep regularity								
(Intercept)	1.47 [1.11, 1.83]	0.18	8.03	< .001	1.39 [1.15, 1.62]	0.12	11.63	< .001
Sleep regularity	0.07 [0.01, 0.13]	0.03	2.18	.135	0.03 [0.01, 0.05]	0.01	2.84	.021
Sleep regularity ²	0.00 [-0.01, 0.01]	0.00	-0.40	.698	0.00 [-0.01, 0.01]	0.01	-0.70	.517

Table 9 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Age	-0.02 [-0.03, -0.02]	0.00	-9.17	< .001	-0.03 [-0.03, -0.02]	0.00	-8.64	< .001
Sleep regularity \times sexmale	0.01 [-0.04, 0.07]	0.03	0.43	.689	0.01 [-0.02, 0.03]	0.01	0.62	.539

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

Table 10

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

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.41 [0.20, 0.62]	0.11	3.77	< .001	0.39 [0.19, 0.60]	0.11	3.74	< .001
Physical activity	0.03 [-0.02, 0.08]	0.03	1.11	.279	0.07 [0.03, 0.10]	0.02	3.92	< .001
Weekday xmonday	-0.04 [-0.10, 0.02]	0.03	-1.38	.193	-0.04 [-0.10, 0.02]	0.03	-1.19	.247
Weekday xsaturday	0.05 [-0.02, 0.12]	0.04	1.32	.248	0.06 [-0.01, 0.13]	0.03	1.80	.097
Weekday xsunday	0.03 [-0.03, 0.10]	0.03	1.04	.334	0.04 [-0.01, 0.10]	0.03	1.52	.132
Weekday xthursday	-0.02 [-0.07, 0.04]	0.03	-0.50	.628	-0.01 [-0.08, 0.07]	0.04	-0.23	.823
Weekday xtuesday	-0.02 [-0.09, 0.04]	0.03	-0.70	.510	-0.03 [-0.11, 0.04]	0.04	-0.82	.439
Weekday xwednesday	-0.04 [-0.10, 0.03]	0.03	-1.10	.312	-0.03 [-0.09, 0.03]	0.03	-1.02	.312
Physical activity ²	0.00 [-0.01, 0.01]	0.01	0.03	.976	0.01 [-0.02, 0.03]	0.01	0.48	.629
Age	-0.01 [-0.01, 0.00]	0.00	-3.01	.003	-0.01 [-0.01, 0.00]	0.00	-2.85	.005
Physical activity × weekday xmonday	0.02 [-0.04, 0.08]	0.03	0.55	.589	-0.02 [-0.07, 0.02]	0.02	-0.92	.361
Physical activity × weekday xsaturday	0.01 [-0.05, 0.07]	0.03	0.33	.748	-0.07 [-0.12, -0.03]	0.02	-3.02	.005
Physical activity × weekday xsunday	0.04 [-0.04, 0.12]	0.04	0.89	.415	-0.06 [-0.10, -0.01]	0.02	-2.35	.024
Physical activity × weekday xtuesday	-0.01 [-0.09, 0.07]	0.04	-0.20	.849	-0.01 [-0.05, 0.04]	0.02	-0.24	.811
Physical activity × weekday xtuesday	0.02 [-0.03, 0.08]	0.03	0.91	.361	0.00 [-0.05, 0.04]	0.02	-0.14	.891
Physical activity × weekday xwednesday	-0.02 [-0.10, 0.05]	0.04	-0.64	.547	-0.01 [-0.05, 0.03]	0.02	-0.44	.663
Weekday xmonday × Physical activity ²	0.00 [-0.01, 0.02]	0.01	0.37	.718	0.00 [-0.03, 0.03]	0.02	-0.02	.983
Weekday xsaturday × Physical activity ²	-0.01 [-0.03, 0.02]	0.01	-0.61	.567	-0.02 [-0.05, 0.01]	0.02	-1.25	.212
Weekday xsunday × Physical activity ²	-0.01 [-0.03, 0.02]	0.01	-0.39	.714	-0.02 [-0.05, 0.01]	0.02	-1.18	.238
Weekday xthursday × Physical activity ²	0.00 [-0.01, 0.02]	0.01	0.21	.837	-0.01 [-0.04, 0.03]	0.02	-0.36	.724
Weekday xtuesday × Physical activity ²	0.00 [-0.01, 0.01]	0.01	-0.06	.949	0.01 [-0.03, 0.04]	0.02	0.41	.681

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.80	.466	0.00 [-0.03, 0.04]	0.02	0.17	.869
Sleep efficency								
(Intercept)	0.23 [0.00, 0.46]	0.12	1.93	.054	0.27 [0.03, 0.50]	0.12	2.25	.024
Physical activity	0.01 [-0.04, 0.05]	0.02	0.26	.795	-0.01 [-0.05, 0.02]	0.02	-0.67	.505
Weekday xmunday	-0.01 [-0.06, 0.04]	0.02	-0.40	.687	-0.03 [-0.09, 0.02]	0.03	-1.10	.272
Weekday xsaturday	-0.08 [-0.14, -0.02]	0.03	-2.56	.027	-0.09 [-0.16, -0.01]	0.04	-2.29	.049
Weekday xsunday	-0.07 [-0.14, -0.01]	0.04	-2.12	.078	-0.11 [-0.16, -0.05]	0.03	-3.94	< .001
Weekday xthursday	0.00 [-0.05, 0.05]	0.03	0.02	.982	-0.01 [-0.06, 0.05]	0.03	-0.22	.830
Weekday xtuesday	-0.01 [-0.05, 0.04]	0.02	-0.32	.748	-0.01 [-0.07, 0.05]	0.03	-0.43	.668
Weekday xwednesday	0.01 [-0.04, 0.06]	0.02	0.49	.623	0.00 [-0.06, 0.06]	0.03	0.10	.919
Physical activity ²	0.00 [-0.01, 0.01]	0.01	0.18	.859	-0.01 [-0.04, 0.01]	0.01	-0.81	.420
Age	0.00 [0.00, 0.01]	0.00	1.14	.254	0.00 [0.00, 0.01]	0.00	0.91	.365
Physical activity \times weekday xmonday	0.02 [-0.04, 0.07]	0.03	0.58	.565	0.01 [-0.04, 0.06]	0.03	0.45	.658
Physical activity \times weekday xsaturday	0.04 [-0.02, 0.11]	0.03	1.26	.227	-0.03 [-0.08, 0.02]	0.02	-1.27	.209
Physical activity \times weekday xsunday	0.05 [-0.05, 0.15]	0.05	0.94	.404	0.00 [-0.06, 0.07]	0.03	0.13	.899
Physical activity \times weekday xtursday	0.01 [-0.07, 0.09]	0.04	0.36	.730	0.05 [0.00, 0.10]	0.03	1.89	.073
Physical activity \times weekday xtuesday	-0.01 [-0.07, 0.05]	0.03	-0.38	.703	0.00 [-0.05, 0.06]	0.03	0.17	.864
Physical activity \times weekday xwednesday	-0.01 [-0.07, 0.06]	0.03	-0.24	.815	0.01 [-0.04, 0.05]	0.02	0.28	.782
Weekday xmunday \times Physical activity ²	-0.01 [-0.03, 0.01]	0.01	-0.93	.358	0.01 [-0.02, 0.04]	0.02	0.60	.551
Weekday xsaturday \times Physical activity ²	-0.01 [-0.02, 0.01]	0.01	-0.59	.558	0.00 [-0.04, 0.04]	0.02	0.00	.998
Weekday xsunday \times Physical activity ²	-0.01 [-0.06, 0.04]	0.02	-0.50	.660	0.01 [-0.02, 0.05]	0.02	0.81	.422
Weekday xthursday \times Physical activity ²	-0.01 [-0.03, 0.02]	0.01	-0.66	.539	0.00 [-0.04, 0.03]	0.02	-0.21	.836
Weekday xtuesday \times Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.24	.811	0.00 [-0.03, 0.04]	0.02	0.15	.881

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.22	.832	0.01 [-0.03, 0.05]	0.02	0.34	.738
Sleep onset								
(Intercept)	-0.12 [-0.44, 0.20]	0.16	-0.72	.472	-0.07 [-0.39, 0.26]	0.17	-0.40	.688
Physical activity	-0.02 [-0.05, 0.01]	0.02	-1.04	.297	-0.04 [-0.06, -0.01]	0.01	-2.59	.016
Weekday xmunday	-0.06 [-0.10, -0.03]	0.02	-3.61	.001	-0.07 [-0.11, -0.03]	0.02	-3.57	.001
Weekday xsaturday	0.06 [0.03, 0.09]	0.02	4.20	< .001	0.05 [0.01, 0.09]	0.02	2.60	.012
Weekday xsunday	0.06 [0.03, 0.10]	0.02	3.44	.002	0.03 [-0.01, 0.06]	0.02	1.37	.170
Weekday xthursday	-0.07 [-0.10, -0.04]	0.02	-4.49	< .001	-0.07 [-0.12, -0.03]	0.02	-3.03	.010
Weekday xtuesday	-0.05 [-0.09, -0.01]	0.02	-2.59	.024	-0.06 [-0.11, -0.01]	0.02	-2.32	.042
Weekday xwednesday	-0.05 [-0.09, -0.01]	0.02	-2.67	.018	-0.06 [-0.10, -0.02]	0.02	-2.73	.009
Physical activity ²	0.00 [-0.01, 0.01]	0.00	0.54	.595	-0.01 [-0.03, 0.01]	0.01	-0.82	.421
Age	0.00 [0.00, 0.01]	0.00	1.06	.289	0.00 [0.00, 0.00]	0.00	0.63	.529
Physical activity \times weekday xmonday	-0.04 [-0.09, 0.00]	0.02	-2.15	.035	-0.03 [-0.06, 0.00]	0.02	-1.69	.098
Physical activity \times weekday xsaturday	0.05 [0.01, 0.09]	0.02	2.73	.007	0.01 [-0.02, 0.04]	0.01	0.59	.558
Physical activity \times weekday xsunday	0.02 [-0.04, 0.08]	0.03	0.71	.516	-0.03 [-0.06, 0.01]	0.02	-1.59	.118
Physical activity \times weekday xthursday	-0.02 [-0.07, 0.03]	0.02	-0.87	.397	-0.02 [-0.05, 0.02]	0.02	-0.91	.377
Physical activity \times weekday xtuesday	-0.04 [-0.08, 0.00]	0.02	-2.01	.045	-0.02 [-0.05, 0.01]	0.02	-1.21	.230
Physical activity \times weekday xwednesday	-0.02 [-0.05, 0.02]	0.02	-0.84	.401	-0.02 [-0.05, 0.01]	0.02	-1.16	.260
Weekday xmunday \times Physical activity ²	0.00 [-0.01, 0.01]	0.01	-0.17	.870	0.01 [-0.01, 0.03]	0.01	0.79	.429
Weekday xsaturday \times Physical activity ²	-0.01 [-0.02, 0.00]	0.01	-1.11	.269	0.00 [-0.02, 0.03]	0.01	0.28	.782
Weekday xsunday \times Physical activity ²	-0.01 [-0.04, 0.02]	0.01	-0.76	.510	0.02 [0.00, 0.04]	0.01	1.66	.105
Weekday xthursday \times Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.32	.753	0.00 [-0.03, 0.03]	0.02	0.05	.958
Weekday xtuesday \times Physical activity ²	0.00 [-0.01, 0.01]	0.01	-0.08	.938	0.01 [-0.03, 0.04]	0.02	0.32	.757

Table 10 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Physical activity ²	-0.01 [-0.01, 0.00]	0.00	-1.07	.289	0.00 [-0.02, 0.02]	0.01	0.13	.899
Sleep regularity								
(Intercept)	0.58 [0.35, 0.82]	0.12	4.83	< .001	0.63 [0.38, 0.87]	0.13	4.95	< .001
Physical activity	0.08 [0.02, 0.13]	0.03	2.79	.013	0.02 [-0.02, 0.06]	0.02	1.11	.273
Weekday xmunday	-0.01 [-0.07, 0.05]	0.03	-0.28	.782	-0.01 [-0.07, 0.05]	0.03	-0.37	.713
Weekday xsaturday	-0.12 [-0.19, -0.05]	0.04	-3.22	.024	-0.11 [-0.18, -0.04]	0.04	-3.11	.010
Weekday xsunday	-0.15 [-0.19, -0.10]	0.02	-6.37	< .001	-0.16 [-0.24, -0.08]	0.04	-3.78	.011
Weekday xthursday	0.14 [0.08, 0.19]	0.03	4.86	< .001	0.14 [0.07, 0.22]	0.04	3.79	.005
Weekday xtuesday	0.14 [0.08, 0.19]	0.03	5.13	< .001	0.14 [0.07, 0.21]	0.03	4.01	.001
Weekday xwednesday	0.13 [0.09, 0.18]	0.02	5.79	< .001	0.14 [0.09, 0.20]	0.03	5.09	< .001
Physical activity ²	0.00 [-0.01, 0.01]	0.01	-0.50	.614	-0.01 [-0.04, 0.02]	0.02	-0.54	.602
Age	0.00 [0.00, 0.00]	0.00	0.02	.986	0.00 [0.00, 0.00]	0.00	0.03	.974
Physical activity \times weekday xmonday	0.06 [-0.03, 0.15]	0.05	1.27	.259	0.09 [0.05, 0.14]	0.02	3.90	< .001
Physical activity \times weekday xsaturday	0.00 [-0.07, 0.08]	0.04	0.07	.947	-0.03 [-0.08, 0.02]	0.02	-1.28	.207
Physical activity \times weekday xsunday	0.04 [-0.05, 0.13]	0.05	0.89	.421	-0.01 [-0.06, 0.04]	0.03	-0.43	.668
Physical activity \times weekday xtursday	-0.01 [-0.09, 0.07]	0.04	-0.15	.883	0.09 [0.05, 0.14]	0.02	4.07	< .001
Physical activity \times weekday xtuesday	0.01 [-0.06, 0.08]	0.04	0.30	.770	0.08 [0.04, 0.13]	0.02	3.71	< .001
Physical activity \times weekday xwednesday	-0.01 [-0.07, 0.04]	0.03	-0.44	.662	0.06 [0.01, 0.10]	0.02	2.54	.011
Weekday xmunday \times Physical activity ²	-0.01 [-0.04, 0.02]	0.02	-0.71	.519	-0.02 [-0.06, 0.02]	0.02	-1.12	.272
Weekday xsaturday \times Physical activity ²	0.00 [-0.03, 0.02]	0.01	-0.18	.864	-0.02 [-0.05, 0.02]	0.02	-0.99	.325
Weekday xsunday \times Physical activity ²	0.00 [-0.04, 0.03]	0.02	-0.21	.850	0.00 [-0.05, 0.04]	0.02	-0.20	.847
Weekday xthursday \times Physical activity ²	0.00 [-0.02, 0.02]	0.01	-0.07	.949	-0.02 [-0.05, 0.02]	0.02	-0.79	.439
Weekday xtuesday \times Physical activity ²	0.00 [-0.02, 0.02]	0.01	-0.35	.734	-0.01 [-0.05, 0.02]	0.02	-0.67	.508

Table 10 continued

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday x wednesday \times Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.25	.800	-0.02 [-0.05, 0.02]	0.02	-1.01	.314

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

Table 11

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

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.54 [1.18, 1.90]	0.18	8.42	< .001	1.47 [1.23, 1.71]	0.12	12.02	< .001
Sleep duration	0.02 [-0.02, 0.06]	0.02	0.95	.354	0.05 [0.01, 0.08]	0.02	2.68	.024
Weekday xsunday	-0.18 [-0.23, -0.14]	0.02	-7.84	< .001	-0.07 [-0.11, -0.04]	0.02	-4.10	< .001
Weekday xsaturday	-0.08 [-0.14, -0.02]	0.03	-2.77	.015	-0.05 [-0.08, -0.02]	0.02	-2.96	.003
Weekday xsunday	-0.17 [-0.24, -0.11]	0.03	-5.33	.001	-0.14 [-0.18, -0.10]	0.02	-6.84	< .001
Weekday xsunday	-0.03 [-0.08, 0.01]	0.02	-1.33	.184	0.03 [0.00, 0.07]	0.02	1.72	.096
Weekday xtuesday	-0.08 [-0.18, 0.02]	0.05	-1.51	.226	-0.01 [-0.05, 0.03]	0.02	-0.31	.758
Weekday xwednesday	-0.06 [-0.10, -0.01]	0.02	-2.43	.016	-0.01 [-0.04, 0.03]	0.02	-0.26	.795
Sleep duration ²	-0.01 [-0.03, 0.01]	0.01	-1.10	.290	0.00 [-0.01, 0.02]	0.01	0.50	.642
Age	-0.02 [-0.03, -0.02]	0.00	-9.16	< .001	-0.03 [-0.03, -0.02]	0.00	-8.59	.001
Sleep duration × weekday xmonday	-0.02 [-0.08, 0.04]	0.03	-0.63	.545	-0.07 [-0.11, -0.03]	0.02	-3.27	.004
Sleep duration × weekday xsaturday	-0.04 [-0.10, 0.03]	0.03	-1.09	.308	-0.05 [-0.09, -0.01]	0.02	-2.62	.012
Sleep duration × weekday xsunday	-0.03 [-0.08, 0.01]	0.02	-1.34	.182	-0.06 [-0.09, -0.02]	0.02	-3.33	.001
Sleep duration × weekday xtuesday	0.00 [-0.09, 0.10]	0.05	0.02	.983	-0.02 [-0.06, 0.02]	0.02	-0.95	.357
Sleep duration × weekday xtuesday	0.00 [-0.09, 0.09]	0.04	-0.01	.994	-0.01 [-0.05, 0.03]	0.02	-0.54	.589
Sleep duration × weekday xwednesday	-0.02 [-0.07, 0.03]	0.03	-0.64	.529	-0.03 [-0.07, 0.01]	0.02	-1.44	.159
Weekday xmonday × Sleep duration ²	0.01 [-0.02, 0.04]	0.02	0.44	.681	-0.01 [-0.03, 0.01]	0.01	-1.10	.310
Weekday xsaturday × Sleep duration ²	0.00 [-0.04, 0.04]	0.02	-0.02	.982	-0.02 [-0.03, 0.00]	0.01	-2.13	.050
Weekday xsunday × Sleep duration ²	0.00 [-0.06, 0.07]	0.03	0.10	.929	-0.01 [-0.03, 0.02]	0.01	-0.58	.602
Weekday xtuesday × Sleep duration ²	0.00 [-0.03, 0.03]	0.02	-0.20	.850	-0.02 [-0.04, 0.01]	0.01	-1.39	.216
Weekday xtuesday × Sleep duration ²	0.02 [-0.08, 0.13]	0.05	0.44	.701	-0.01 [-0.03, 0.02]	0.01	-0.52	.628

Table 11 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Sleep duration ²	0.00 [-0.04, 0.03]	0.02	-0.08	.943	0.00 [-0.03, 0.03]	0.01	-0.12	.912
Sleep efficiency (Intercept)	1.55 [1.19, 1.91]	0.18	8.44	< .001	1.48 [1.24, 1.72]	0.12	12.09	< .001
Sleep efficiency	-0.01 [-0.05, 0.02]	0.02	-0.77	.443	-0.02 [-0.05, 0.01]	0.01	-1.38	.179
Weekday xmunday	-0.18 [-0.23, -0.13]	0.03	-6.64	< .001	-0.09 [-0.13, -0.06]	0.02	-4.86	< .001
Weekday xsaturday	-0.09 [-0.13, -0.04]	0.02	-3.99	< .001	-0.07 [-0.11, -0.04]	0.02	-4.66	< .001
Weekday xsunday	-0.18 [-0.23, -0.13]	0.03	-6.91	< .001	-0.15 [-0.18, -0.12]	0.02	-8.87	< .001
Weekday xthursday	-0.04 [-0.08, 0.01]	0.02	-1.57	.118	0.02 [-0.01, 0.05]	0.02	1.18	.237
Weekday xtuesday	-0.06 [-0.11, -0.01]	0.02	-2.43	.019	-0.02 [-0.05, 0.02]	0.02	-0.97	.334
Weekday xwednesday	-0.06 [-0.12, 0.00]	0.03	-2.09	.062	-0.01 [-0.04, 0.03]	0.02	-0.36	.716
Sleep efficiency ²	0.00 [-0.01, 0.00]	0.00	-0.43	.664	0.00 [-0.01, 0.01]	0.00	-0.32	.760
Age	-0.02 [-0.03, -0.02]	0.00	-9.17	< .001	-0.03 [-0.03, -0.02]	0.00	-8.82	< .001
Sleep efficiency \times weekday xmonday	0.02 [-0.04, 0.07]	0.03	0.65	.526	0.06 [0.01, 0.11]	0.03	2.23	.068
Sleep efficiency \times weekday xsaturday	0.01 [-0.04, 0.05]	0.02	0.37	.711	0.03 [0.00, 0.06]	0.02	1.75	.081
Sleep efficiency \times weekday xsunday	0.03 [-0.03, 0.08]	0.03	0.87	.399	0.06 [0.01, 0.10]	0.02	2.26	.055
Sleep efficiency \times weekday xthursday	0.01 [-0.10, 0.12]	0.06	0.22	.838	0.01 [-0.04, 0.07]	0.03	0.52	.622
Sleep efficiency \times weekday xtuesday	0.01 [-0.03, 0.06]	0.02	0.52	.603	0.00 [-0.04, 0.04]	0.02	-0.09	.932
Sleep efficiency \times weekday xwednesday	0.00 [-0.07, 0.07]	0.04	-0.03	.977	-0.01 [-0.06, 0.03]	0.02	-0.49	.635
Weekday xmunday \times Sleep efficiency ²	0.00 [-0.01, 0.02]	0.01	0.40	.702	0.01 [-0.02, 0.03]	0.01	0.57	.618
Weekday xsaturday \times Sleep efficiency ²	0.00 [-0.01, 0.01]	0.00	0.58	.565	0.00 [-0.01, 0.01]	0.00	0.54	.611
Weekday xsunday \times Sleep efficiency ²	0.01 [-0.01, 0.02]	0.01	0.96	.341	0.00 [-0.01, 0.02]	0.01	0.36	.729
Weekday xthursday \times Sleep efficiency ²	0.00 [-0.01, 0.01]	0.01	0.14	.890	0.00 [-0.01, 0.01]	0.00	-0.35	.738
Weekday xtuesday \times Sleep efficiency ²	0.00 [-0.01, 0.01]	0.00	0.36	.722	0.00 [-0.01, 0.01]	0.01	0.52	.621

Table 11 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Sleep efficiency ²	0.00 [-0.02, 0.02]	0.01	-0.10	.927	0.00 [-0.02, 0.02]	0.01	-0.19	.859
Sleep onset								
(Intercept)	1.56 [1.19, 1.92]	0.18	8.44	< .001	1.48 [1.24, 1.71]	0.12	12.12	< .001
Sleep onset	-0.04 [-0.07, 0.00]	0.02	-1.99	.048	-0.04 [-0.08, -0.01]	0.02	-2.64	.021
Weekday xmunday	-0.16 [-0.25, -0.07]	0.04	-3.60	.015	-0.07 [-0.12, -0.03]	0.02	-3.31	.002
Weekday xsaturday	-0.09 [-0.15, -0.02]	0.03	-2.48	.034	-0.07 [-0.11, -0.03]	0.02	-3.26	.003
Weekday xsunday	-0.17 [-0.23, -0.10]	0.03	-4.94	< .001	-0.14 [-0.18, -0.10]	0.02	-6.41	< .001
Weekday xthursday	-0.04 [-0.10, 0.01]	0.03	-1.58	.118	0.01 [-0.03, 0.06]	0.02	0.67	.505
Weekday xtuesday	-0.06 [-0.12, -0.01]	0.03	-2.14	.040	-0.01 [-0.06, 0.04]	0.03	-0.42	.684
Weekday xwednesday	-0.07 [-0.14, 0.00]	0.03	-2.00	.071	-0.01 [-0.05, 0.03]	0.02	-0.53	.597
Sleep onset ²	-0.02 [-0.06, 0.02]	0.02	-0.89	.432	0.00 [-0.02, 0.03]	0.01	0.09	.928
Age	-0.02 [-0.03, -0.02]	0.00	-9.12	< .001	-0.03 [-0.03, -0.02]	0.00	-8.85	< .001
Sleep onset \times weekday xmonday	0.03 [-0.03, 0.09]	0.03	0.93	.378	0.09 [0.06, 0.12]	0.02	5.19	< .001
Sleep onset \times weekday xsaturday	0.04 [-0.01, 0.09]	0.03	1.46	.162	0.06 [0.03, 0.09]	0.02	3.43	.001
Sleep onset \times weekday xsunday	0.06 [0.01, 0.10]	0.02	2.55	.012	0.10 [0.07, 0.13]	0.02	5.93	< .001
Sleep onset \times weekday xthursday	0.01 [-0.05, 0.06]	0.03	0.29	.779	0.03 [-0.02, 0.07]	0.02	1.12	.302
Sleep onset \times weekday xtuesday	0.03 [-0.01, 0.08]	0.02	1.53	.127	0.02 [-0.02, 0.05]	0.02	1.02	.307
Sleep onset \times weekday xwednesday	0.02 [-0.03, 0.07]	0.03	0.88	.384	0.02 [-0.01, 0.06]	0.02	1.46	.146
Weekday xmunday \times Sleep onset ²	-0.01 [-0.07, 0.04]	0.03	-0.50	.643	-0.01 [-0.04, 0.02]	0.02	-0.64	.544
Weekday xsaturday \times Sleep onset ²	0.00 [-0.05, 0.06]	0.03	0.13	.906	0.00 [-0.03, 0.03]	0.01	-0.01	.991
Weekday xsunday \times Sleep onset ²	0.00 [-0.05, 0.04]	0.02	-0.20	.844	-0.01 [-0.04, 0.02]	0.02	-0.96	.364
Weekday xthursday \times Sleep onset ²	0.01 [-0.04, 0.06]	0.03	0.40	.704	0.00 [-0.03, 0.04]	0.02	0.23	.827
Weekday xtuesday \times Sleep onset ²	0.01 [-0.04, 0.06]	0.02	0.34	.747	0.00 [-0.04, 0.04]	0.02	-0.15	.888

Table 11 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday xwednesday \times Sleep onset ²	0.01 [-0.03, 0.04]	0.02	0.44	.663	0.00 [-0.02, 0.03]	0.01	0.20	.845
Sleep regularity								
(Intercept)	1.49 [1.14, 1.84]	0.18	8.24	< .001	1.46 [1.22, 1.70]	0.12	12.03	< .001
Sleep regularity	0.08 [0.03, 0.12]	0.02	3.26	.012	0.02 [-0.01, 0.06]	0.02	1.52	.156
Weekday xmunday	-0.16 [-0.24, -0.09]	0.04	-4.56	.003	-0.08 [-0.12, -0.04]	0.02	-4.27	< .001
Weekday xsaturday	-0.06 [-0.11, -0.02]	0.02	-2.59	.010	-0.05 [-0.09, -0.02]	0.02	-2.79	.006
Weekday xsunday	-0.15 [-0.21, -0.08]	0.03	-4.35	.002	-0.13 [-0.17, -0.09]	0.02	-6.82	< .001
Weekday xthursday	-0.02 [-0.07, 0.02]	0.02	-1.00	.319	0.02 [-0.01, 0.06]	0.02	1.36	.175
Weekday xtuesday	-0.05 [-0.12, 0.02]	0.04	-1.53	.168	-0.01 [-0.05, 0.03]	0.02	-0.39	.700
Weekday xwednesday	-0.06 [-0.13, 0.00]	0.03	-1.90	.094	-0.01 [-0.05, 0.03]	0.02	-0.42	.674
Sleep regularity ²	0.00 [-0.03, 0.02]	0.01	-0.18	.864	0.00 [-0.02, 0.01]	0.01	-0.36	.728
Age	-0.02 [-0.03, -0.02]	0.00	-8.81	< .001	-0.03 [-0.03, -0.02]	0.00	-8.71	< .001
Sleep regularity \times weekday xmonday	-0.02 [-0.07, 0.03]	0.03	-0.76	.457	0.01 [-0.02, 0.04]	0.02	0.63	.528
Sleep regularity \times weekday xsaturday	-0.01 [-0.06, 0.04]	0.03	-0.34	.737	0.01 [-0.03, 0.05]	0.02	0.72	.485
Sleep regularity \times weekday xsunday	0.00 [-0.07, 0.06]	0.03	-0.04	.972	0.02 [-0.02, 0.05]	0.02	1.04	.297
Sleep regularity \times weekday xthursday	0.00 [-0.10, 0.10]	0.05	0.05	.965	0.00 [-0.04, 0.03]	0.02	-0.22	.831
Sleep regularity \times weekday xtuesday	0.00 [-0.06, 0.06]	0.03	-0.03	.975	0.00 [-0.05, 0.05]	0.03	0.10	.923
Sleep regularity \times weekday xwednesday	-0.04 [-0.08, 0.01]	0.02	-1.45	.151	-0.02 [-0.06, 0.01]	0.02	-1.36	.175
Weekday xmunday \times Sleep regularity ²	0.00 [-0.03, 0.04]	0.02	0.13	.900	0.00 [-0.01, 0.02]	0.01	0.27	.786
Weekday xsaturday \times Sleep regularity ²	-0.01 [-0.04, 0.02]	0.01	-0.82	.413	-0.02 [-0.04, 0.00]	0.01	-1.67	.109
Weekday xsunday \times Sleep regularity ²	-0.01 [-0.05, 0.03]	0.02	-0.48	.660	-0.01 [-0.03, 0.01]	0.01	-0.88	.384
Weekday xthursday \times Sleep regularity ²	-0.01 [-0.04, 0.02]	0.02	-0.63	.547	-0.01 [-0.02, 0.01]	0.01	-0.71	.481
Weekday xtuesday \times Sleep regularity ²	0.01 [-0.04, 0.05]	0.02	0.26	.807	0.00 [-0.03, 0.02]	0.01	-0.20	.849

Table 11 continued

TITLE

44

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Weekday x wednesday \times Sleep regularity ²	0.01 [-0.02, 0.04]	0.02	0.48	.642	0.00 [-0.02, 0.02]	0.01	0.31	.760

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

Table 12

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

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.41 [0.20, 0.62]	0.11	3.83	< .001	0.40 [0.20, 0.61]	0.10	3.87	< .001
Physical activity	0.05 [-0.05, 0.15]	0.05	0.99	.411	0.06 [0.02, 0.10]	0.02	3.16	.003
Seasonspring	-0.04 [-0.12, 0.04]	0.04	-0.97	.340	-0.05 [-0.12, 0.03]	0.04	-1.25	.210
Seasonsummer	-0.10 [-0.20, -0.01]	0.05	-2.10	.060	-0.11 [-0.19, -0.03]	0.04	-2.75	.007
Seasonwinter	0.06 [-0.03, 0.14]	0.04	1.29	.221	0.04 [-0.05, 0.13]	0.05	0.91	.378
Physical activity ²	0.00 [-0.02, 0.02]	0.01	-0.20	.857	-0.02 [-0.04, 0.01]	0.01	-1.23	.222
Age	-0.01 [-0.01, 0.00]	0.00	-2.84	.005	-0.01 [-0.01, 0.00]	0.00	-2.70	.007
Physical activity × seasonspring	-0.03 [-0.11, 0.04]	0.04	-0.82	.451	-0.03 [-0.08, 0.02]	0.02	-1.15	.251
Physical activity × seasonsummer	0.00 [-0.12, 0.12]	0.06	-0.04	.967	-0.03 [-0.08, 0.02]	0.03	-1.04	.299
Physical activity × seasonwinter	-0.03 [-0.11, 0.04]	0.04	-0.82	.455	-0.02 [-0.08, 0.04]	0.03	-0.53	.603
Seasonspring × Physical activity ²	0.01 [-0.01, 0.03]	0.01	0.57	.595	0.02 [-0.01, 0.05]	0.02	1.10	.272
Seasonsummer × Physical activity ²	0.01 [-0.03, 0.04]	0.02	0.38	.721	0.02 [-0.01, 0.06]	0.02	1.26	.210
Seasonwinter × Physical activity ²	0.00 [-0.01, 0.02]	0.01	0.40	.712	0.02 [-0.02, 0.06]	0.02	1.07	.314
Sleep efficiency								
(Intercept)	0.16 [-0.07, 0.38]	0.12	1.33	.184	0.19 [-0.05, 0.42]	0.12	1.57	.117
Physical activity	0.04 [-0.03, 0.12]	0.04	1.06	.368	0.04 [0.00, 0.08]	0.02	2.17	.034
Seasonspring	0.06 [-0.01, 0.12]	0.04	1.58	.115	0.05 [-0.02, 0.13]	0.04	1.35	.178
Seasonsummer	0.03 [-0.05, 0.11]	0.04	0.70	.487	-0.01 [-0.09, 0.07]	0.04	-0.16	.874
Seasonwinter	0.08 [0.01, 0.14]	0.03	2.28	.022	0.09 [0.01, 0.16]	0.04	2.32	.021
Physical activity ²	0.00 [-0.02, 0.02]	0.01	-0.46	.681	-0.01 [-0.04, 0.01]	0.01	-0.98	.327
Age	0.00 [0.00, 0.01]	0.00	1.23	.219	0.00 [0.00, 0.01]	0.00	0.98	.325

Table 12 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity \times seasonspring	-0.04 [-0.14, 0.06]	0.05	-0.76	.496	-0.06 [-0.11, -0.01]	0.03	-2.37	.019
Physical activity \times seasonsummer	0.05 [-0.07, 0.17]	0.06	0.83	.453	-0.06 [-0.12, 0.00]	0.03	-1.87	.070
Physical activity \times seasonwinter	-0.03 [-0.11, 0.04]	0.04	-0.84	.448	-0.05 [-0.11, 0.01]	0.03	-1.61	.127
Seasonspring \times Physical activity ²	0.00 [-0.02, 0.03]	0.01	0.23	.830	0.01 [-0.02, 0.04]	0.02	0.47	.642
Seasonsummer \times Physical activity ²	-0.02 [-0.06, 0.02]	0.02	-0.89	.429	0.02 [-0.02, 0.06]	0.02	1.15	.252
Seasonwinter \times Physical activity ²	0.00 [-0.02, 0.02]	0.01	0.30	.780	0.00 [-0.03, 0.03]	0.02	0.03	.976
Sleep onset								
(Intercept)	-0.13 [-0.46, 0.19]	0.17	-0.80	.423	-0.09 [-0.41, 0.24]	0.17	-0.54	.592
Physical activity	-0.02 [-0.07, 0.02]	0.02	-1.03	.374	-0.04 [-0.07, -0.01]	0.02	-2.55	.024
Seasonspring	0.01 [-0.05, 0.06]	0.03	0.20	.842	0.00 [-0.06, 0.06]	0.03	0.09	.926
Seasonsummer	0.06 [0.01, 0.12]	0.03	2.24	.025	0.06 [0.00, 0.12]	0.03	1.93	.054
Seasonwinter	0.01 [-0.05, 0.06]	0.03	0.18	.857	0.01 [-0.05, 0.07]	0.03	0.48	.635
Physical activity ²	0.00 [-0.01, 0.01]	0.00	-0.01	.995	0.00 [-0.02, 0.02]	0.01	0.17	.864
Age	0.00 [0.00, 0.01]	0.00	0.96	.337	0.00 [0.00, 0.00]	0.00	0.47	.638
Physical activity \times seasonspring	-0.01 [-0.07, 0.04]	0.03	-0.51	.630	-0.02 [-0.06, 0.02]	0.02	-0.96	.349
Physical activity \times seasonsummer	0.02 [-0.03, 0.07]	0.02	0.87	.387	-0.01 [-0.05, 0.03]	0.02	-0.57	.567
Physical activity \times seasonwinter	0.01 [-0.05, 0.06]	0.03	0.24	.821	-0.03 [-0.08, 0.02]	0.03	-1.04	.335
Seasonspring \times Physical activity ²	0.00 [-0.01, 0.01]	0.01	0.07	.943	0.00 [-0.02, 0.03]	0.01	0.05	.962
Seasonsummer \times Physical activity ²	-0.01 [-0.03, 0.00]	0.01	-1.47	.173	-0.01 [-0.04, 0.02]	0.01	-0.57	.572
Seasonwinter \times Physical activity ²	0.00 [-0.01, 0.01]	0.01	-0.22	.837	-0.01 [-0.03, 0.01]	0.01	-0.98	.328
Sleep regularity								
(Intercept)	0.60 [0.35, 0.86]	0.13	4.64	< .001	0.65 [0.40, 0.91]	0.13	5.04	< .001
Physical activity	0.07 [-0.05, 0.20]	0.07	1.14	.362	0.08 [0.02, 0.13]	0.03	2.70	.035

Table 12 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Seasonspring	-0.09 [-0.24, 0.06]	0.08	-1.22	.298	-0.12 [-0.23, -0.01]	0.06	-2.15	.065
Seasonsummer	-0.02 [-0.16, 0.12]	0.07	-0.28	.796	-0.06 [-0.19, 0.07]	0.06	-0.92	.391
Seasonwinter	-0.03 [-0.14, 0.09]	0.06	-0.49	.647	-0.03 [-0.13, 0.06]	0.05	-0.67	.511
Physical activity ²	-0.01 [-0.03, 0.02]	0.01	-0.51	.656	-0.03 [-0.06, 0.00]	0.01	-2.11	.044
Age	0.00 [0.00, 0.00]	0.00	0.35	.727	0.00 [0.00, 0.01]	0.00	0.42	.672
Physical activity × seasonspring	0.05 [-0.16, 0.26]	0.11	0.49	.668	-0.01 [-0.07, 0.05]	0.03	-0.24	.812
Physical activity × seasonsummer	0.11 [-0.09, 0.31]	0.10	1.06	.382	0.02 [-0.05, 0.09]	0.03	0.49	.630
Physical activity × seasonwinter	0.01 [-0.10, 0.11]	0.05	0.12	.909	0.01 [-0.06, 0.08]	0.04	0.24	.818
Seasonspring × Physical activity ²	0.00 [-0.05, 0.04]	0.02	-0.10	.925	0.03 [-0.01, 0.06]	0.02	1.63	.103
Seasonsummer × Physical activity ²	-0.02 [-0.09, 0.04]	0.03	-0.71	.535	0.02 [-0.03, 0.07]	0.03	0.89	.395
Seasonwinter × Physical activity ²	0.00 [-0.02, 0.03]	0.01	0.39	.723	0.01 [-0.03, 0.05]	0.02	0.57	.574

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

Table 13

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

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.49 [1.13, 1.85]	0.19	8.04	< .001	1.46 [1.22, 1.70]	0.12	11.98	< .001
Sleep duration	0.01 [-0.06, 0.08]	0.04	0.16	.887	0.02 [0.00, 0.04]	0.01	1.88	.062
Seasonspring	-0.04 [-0.10, 0.02]	0.03	-1.20	.230	-0.05 [-0.11, 0.01]	0.03	-1.67	.098
Seasonsummer	-0.02 [-0.10, 0.06]	0.04	-0.51	.616	-0.05 [-0.10, 0.01]	0.03	-1.54	.124
Seasonwinter	-0.05 [-0.12, 0.02]	0.04	-1.39	.176	-0.06 [-0.11, 0.00]	0.03	-2.00	.046
Sleep duration ²	-0.01 [-0.02, 0.01]	0.01	-1.04	.300	0.00 [-0.01, 0.02]	0.01	0.34	.751
Age	-0.02 [-0.03, -0.02]	0.00	-9.11	< .001	-0.03 [-0.03, -0.02]	0.00	-8.57	.001
Sleep duration × seasonspring	-0.02 [-0.07, 0.04]	0.03	-0.55	.604	-0.02 [-0.05, 0.02]	0.02	-0.92	.371
Sleep duration × seasonsummer	-0.03 [-0.10, 0.05]	0.04	-0.67	.536	-0.02 [-0.06, 0.02]	0.02	-0.95	.351
Sleep duration × seasonwinter	0.02 [-0.06, 0.09]	0.04	0.46	.669	-0.01 [-0.06, 0.04]	0.02	-0.51	.630
Seasonspring × Sleep duration ²	0.00 [-0.02, 0.02]	0.01	0.15	.885	-0.01 [-0.02, 0.00]	0.01	-1.43	.176
Seasonsummer × Sleep duration ²	-0.01 [-0.03, 0.01]	0.01	-0.77	.440	-0.01 [-0.03, 0.02]	0.01	-0.73	.505
Seasonwinter × Sleep duration ²	0.00 [-0.04, 0.03]	0.02	-0.25	.818	-0.01 [-0.02, 0.01]	0.01	-1.08	.294
Sleep efficiency								
(Intercept)	1.49 [1.13, 1.86]	0.18	8.07	< .001	1.48 [1.23, 1.72]	0.13	11.75	< .001
Sleep efficiency	0.01 [-0.01, 0.04]	0.01	1.03	.302	0.00 [-0.03, 0.03]	0.01	-0.06	.951
Seasonspring	-0.04 [-0.10, 0.03]	0.03	-1.16	.248	-0.06 [-0.12, -0.01]	0.03	-2.24	.026
Seasonsummer	-0.02 [-0.11, 0.06]	0.04	-0.59	.564	-0.06 [-0.12, 0.00]	0.03	-2.00	.045
Seasonwinter	-0.06 [-0.12, 0.01]	0.03	-1.71	.088	-0.07 [-0.13, -0.01]	0.03	-2.29	.030
Sleep efficiency ²	0.00 [0.00, 0.01]	0.00	0.34	.741	0.00 [-0.01, 0.00]	0.00	-0.35	.737
Age	-0.02 [-0.03, -0.02]	0.00	-9.11	< .001	-0.03 [-0.03, -0.02]	0.00	-8.65	< .001

Table 13 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep efficiency \times seasonspring	-0.02 [-0.05, 0.02]	0.02	-0.93	.354	0.00 [-0.04, 0.05]	0.02	0.22	.831
Sleep efficiency \times seasonsummer	0.00 [-0.05, 0.05]	0.02	-0.02	.985	0.01 [-0.04, 0.06]	0.03	0.33	.754
Sleep efficiency \times seasonwinter	-0.04 [-0.15, 0.08]	0.06	-0.65	.568	0.01 [-0.03, 0.04]	0.02	0.37	.714
Seasonspring \times Sleep efficiency ²	0.00 [-0.01, 0.00]	0.00	-0.26	.794	0.00 [-0.01, 0.01]	0.00	0.30	.778
Seasonsummer \times Sleep efficiency ²	0.00 [-0.01, 0.01]	0.01	-0.35	.727	0.00 [-0.01, 0.01]	0.01	0.17	.869
Seasonwinter \times Sleep efficiency ²	0.00 [-0.02, 0.01]	0.01	-0.43	.684	0.00 [-0.01, 0.01]	0.01	0.74	.488
Sleep onset								
(Intercept)	1.50 [1.14, 1.86]	0.18	8.14	< .001	1.47 [1.23, 1.71]	0.12	11.99	< .001
Sleep onset	0.00 [-0.05, 0.04]	0.02	-0.14	.887	0.00 [-0.04, 0.03]	0.02	-0.12	.902
Seasonspring	-0.03 [-0.11, 0.04]	0.04	-0.89	.380	-0.04 [-0.10, 0.02]	0.03	-1.39	.164
Seasonsummer	-0.03 [-0.11, 0.04]	0.04	-0.93	.355	-0.05 [-0.11, 0.01]	0.03	-1.55	.123
Seasonwinter	-0.06 [-0.13, 0.00]	0.04	-1.84	.067	-0.07 [-0.13, -0.01]	0.03	-2.16	.033
Sleep onset ²	-0.02 [-0.04, 0.00]	0.01	-1.59	.127	0.01 [-0.01, 0.03]	0.01	0.64	.541
Age	-0.02 [-0.03, -0.02]	0.00	-9.23	< .001	-0.03 [-0.03, -0.02]	0.00	-8.73	< .001
Sleep onset \times seasonspring	-0.01 [-0.07, 0.04]	0.03	-0.50	.626	0.00 [-0.04, 0.04]	0.02	0.12	.907
Sleep onset \times seasonsummer	0.01 [-0.04, 0.07]	0.03	0.47	.640	0.01 [-0.04, 0.06]	0.02	0.34	.736
Sleep onset \times seasonwinter	-0.04 [-0.11, 0.03]	0.04	-1.07	.328	-0.01 [-0.05, 0.03]	0.02	-0.63	.528
Seasonspring \times Sleep onset ²	-0.01 [-0.04, 0.03]	0.02	-0.33	.745	-0.02 [-0.04, 0.00]	0.01	-1.93	.055
Seasonsummer \times Sleep onset ²	0.00 [-0.04, 0.04]	0.02	0.15	.884	-0.01 [-0.04, 0.02]	0.02	-0.51	.616
Seasonwinter \times Sleep onset ²	0.00 [-0.03, 0.03]	0.01	0.22	.828	0.00 [-0.02, 0.02]	0.01	-0.21	.834
Sleep regularity								
(Intercept)	1.44 [1.08, 1.80]	0.18	7.94	< .001	1.45 [1.21, 1.69]	0.12	11.91	< .001
Sleep regularity	0.06 [-0.03, 0.16]	0.05	1.24	.322	0.02 [0.00, 0.05]	0.01	1.98	.054

Table 13 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Seasonspring	-0.04 [-0.11, 0.03]	0.04	-1.09	.278	-0.06 [-0.12, 0.00]	0.03	-2.03	.045
Seasonsummer	-0.03 [-0.11, 0.05]	0.04	-0.73	.471	-0.05 [-0.11, 0.01]	0.03	-1.59	.113
Seasonwinter	-0.06 [-0.14, 0.01]	0.04	-1.59	.129	-0.07 [-0.12, -0.01]	0.03	-2.24	.028
Sleep regularity ²	-0.01 [-0.04, 0.02]	0.01	-0.79	.469	-0.01 [-0.02, 0.01]	0.01	-0.91	.371
Age	-0.02 [-0.03, -0.02]	0.00	-8.76	< .001	-0.03 [-0.03, -0.02]	0.00	-8.59	.001
Sleep regularity \times seasonspring	0.02 [-0.05, 0.10]	0.04	0.57	.602	0.02 [-0.01, 0.05]	0.02	1.15	.251
Sleep regularity \times seasonsummer	0.00 [-0.09, 0.09]	0.05	0.06	.957	0.00 [-0.05, 0.05]	0.02	-0.07	.943
Sleep regularity \times seasonwinter	0.03 [-0.05, 0.11]	0.04	0.68	.541	0.02 [-0.01, 0.05]	0.02	1.25	.213
Seasonspring \times Sleep regularity ²	0.01 [-0.02, 0.04]	0.01	0.59	.575	0.00 [-0.01, 0.02]	0.01	0.30	.770
Seasonsummer \times Sleep regularity ²	0.01 [-0.01, 0.04]	0.01	0.82	.416	0.00 [-0.02, 0.02]	0.01	-0.33	.747
Seasonwinter \times Sleep regularity ²	0.01 [-0.04, 0.06]	0.02	0.44	.694	0.00 [-0.02, 0.02]	0.01	0.17	.873

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

Table 14

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

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.41 [0.17, 0.66]	0.13	3.29	.001	0.41 [0.15, 0.67]	0.13	3.13	.003
Physical activity	0.01 [-0.04, 0.06]	0.02	0.42	.701	-0.01 [-0.11, 0.08]	0.05	-0.30	.772
Regioneurope	-0.21 [-0.39, -0.02]	0.09	-2.21	.028	-0.20 [-0.40, -0.01]	0.10	-2.03	.045
Regionafrica	-0.20 [-0.42, 0.02]	0.11	-1.81	.072	-0.26 [-0.48, -0.04]	0.11	-2.27	.025
Regionasia	-0.42 [-0.67, -0.17]	0.13	-3.29	.002	-0.50 [-0.74, -0.26]	0.12	-4.10	< .001
Regionnorth america	-0.05 [-0.28, 0.18]	0.12	-0.44	.659	-0.09 [-0.33, 0.15]	0.12	-0.71	.480
Regionsouth america	-0.38 [-0.58, -0.19]	0.10	-3.81	< .001	-0.40 [-0.60, -0.19]	0.11	-3.75	< .001
Physical activity ²	0.00 [0.00, 0.01]	0.00	0.77	.475	0.04 [-0.01, 0.08]	0.02	1.51	.154
Age	-0.01 [-0.01, 0.00]	0.00	-3.25	.001	-0.01 [-0.01, 0.00]	0.00	-3.07	.002
Physical activity × regioneurope	0.03 [-0.03, 0.09]	0.03	0.98	.370	0.06 [-0.05, 0.16]	0.05	1.08	.300
Physical activity × regionafrica	0.07 [-0.06, 0.21]	0.07	1.05	.310	0.16 [0.00, 0.31]	0.08	1.98	.051
Physical activity × regionasia	0.12 [-0.06, 0.30]	0.09	1.30	.220	0.09 [-0.06, 0.24]	0.08	1.15	.250
Physical activity × regionnorth america	0.04 [-0.06, 0.14]	0.05	0.76	.448	0.03 [-0.20, 0.26]	0.12	0.25	.809
Physical activity × regionsouth america	0.04 [-0.04, 0.11]	0.04	0.97	.338	0.03 [-0.11, 0.16]	0.07	0.39	.709
Regioneurope × Physical activity ²	0.00 [-0.01, 0.01]	0.01	0.21	.839	-0.04 [-0.09, 0.01]	0.03	-1.65	.123
Regionafrica × Physical activity ²	0.00 [-0.09, 0.09]	0.05	0.01	.994	-0.06 [-0.20, 0.08]	0.07	-0.85	.435
Regionasia × Physical activity ²	-0.05 [-0.17, 0.06]	0.06	-0.97	.335	-0.07 [-0.20, 0.06]	0.07	-1.08	.282
Regionnorth america × Physical activity ²	-0.01 [-0.04, 0.02]	0.02	-0.62	.534	0.02 [-0.11, 0.15]	0.07	0.24	.815
Regionsouth america × Physical activity ²	-0.01 [-0.03, 0.02]	0.01	-0.66	.522	-0.01 [-0.10, 0.08]	0.05	-0.27	.793
Sleep efficiency								
(Intercept)	0.27 [0.02, 0.52]	0.13	2.13	.036	0.28 [0.04, 0.53]	0.12	2.29	.023

Table 14 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity	-0.01 [-0.04, 0.02]	0.02	-0.60	.559	0.04 [-0.08, 0.17]	0.07	0.68	.528
Regioneurope	-0.11 [-0.33, 0.12]	0.12	-0.91	.379	-0.10 [-0.33, 0.13]	0.12	-0.86	.403
Regionafrica	-0.03 [-0.26, 0.20]	0.12	-0.25	.800	-0.06 [-0.28, 0.16]	0.11	-0.58	.565
Regionasia	-0.12 [-0.38, 0.13]	0.13	-0.95	.345	-0.33 [-0.57, -0.09]	0.12	-2.73	.008
Regionnorth america	-0.01 [-0.27, 0.24]	0.13	-0.08	.934	-0.05 [-0.28, 0.18]	0.12	-0.43	.667
Regionsouth america	-0.31 [-0.61, -0.02]	0.15	-2.09	.084	-0.38 [-0.60, -0.16]	0.11	-3.33	.002
Physical activity ²	0.00 [-0.01, 0.00]	0.00	-0.42	.682	-0.03 [-0.08, 0.02]	0.03	-1.17	.272
Age	0.00 [0.00, 0.01]	0.00	0.75	.453	0.00 [0.00, 0.01]	0.00	0.66	.513
Physical activity × regioneurope	0.02 [-0.02, 0.06]	0.02	1.09	.275	-0.05 [-0.17, 0.07]	0.06	-0.79	.456
Physical activity × regionafrica	0.03 [-0.13, 0.18]	0.08	0.36	.724	-0.02 [-0.17, 0.13]	0.08	-0.31	.759
Physical activity × regionasia	0.21 [0.03, 0.40]	0.10	2.25	.046	-0.01 [-0.18, 0.15]	0.09	-0.17	.868
Physical activity × regionnorth america	0.07 [-0.06, 0.20]	0.07	1.05	.310	-0.03 [-0.28, 0.22]	0.13	-0.25	.814
Physical activity × regionsouth america	0.15 [0.01, 0.30]	0.07	2.12	.117	-0.09 [-0.25, 0.07]	0.08	-1.10	.315
Regioneurope × Physical activity ²	0.00 [-0.02, 0.01]	0.01	-0.28	.789	0.02 [-0.04, 0.08]	0.03	0.77	.470
Regionafrica × Physical activity ²	-0.01 [-0.11, 0.09]	0.05	-0.23	.817	0.05 [-0.05, 0.14]	0.05	1.00	.321
Regionasia × Physical activity ²	-0.15 [-0.49, 0.19]	0.17	-0.86	.464	0.03 [-0.13, 0.20]	0.09	0.40	.694
Regionnorth america × Physical activity ²	0.00 [-0.04, 0.04]	0.02	0.13	.897	0.05 [-0.06, 0.17]	0.06	0.94	.357
Regionsouth america × Physical activity ²	-0.01 [-0.07, 0.04]	0.03	-0.54	.630	0.05 [-0.02, 0.12]	0.04	1.48	.144
Sleep onset								
(Intercept)	-0.13 [-0.45, 0.19]	0.16	-0.78	.437	-0.09 [-0.41, 0.22]	0.16	-0.58	.564
Physical activity	-0.01 [-0.04, 0.01]	0.01	-0.86	.421	-0.04 [-0.12, 0.04]	0.04	-0.89	.402
Regioneurope	0.17 [0.01, 0.33]	0.08	2.12	.034	0.16 [0.00, 0.32]	0.08	1.92	.056
Regionafrica	0.11 [-0.07, 0.28]	0.09	1.21	.226	0.09 [-0.09, 0.27]	0.09	1.01	.313

Table 14 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Regionasia	0.29 [0.07, 0.51]	0.11	2.55	.018	0.20 [0.00, 0.40]	0.10	1.99	.050
Regionnorth america	0.07 [-0.16, 0.31]	0.12	0.62	.551	0.05 [-0.14, 0.24]	0.10	0.53	.594
Regionsouth america	0.09 [-0.08, 0.27]	0.09	1.07	.285	0.06 [-0.12, 0.23]	0.09	0.63	.527
Physical activity ²	0.00 [-0.01, 0.00]	0.00	-0.60	.578	-0.03 [-0.08, 0.01]	0.02	-1.59	.171
Age	0.00 [0.00, 0.01]	0.00	0.95	.343	0.00 [0.00, 0.01]	0.00	0.70	.485
Physical activity × regioneurope	-0.05 [-0.09, 0.00]	0.02	-2.05	.097	-0.01 [-0.10, 0.07]	0.04	-0.33	.749
Physical activity × regionafrica	-0.01 [-0.11, 0.09]	0.05	-0.25	.808	-0.05 [-0.24, 0.15]	0.10	-0.47	.665
Physical activity × regionasia	0.03 [-0.08, 0.14]	0.06	0.47	.641	0.03 [-0.09, 0.15]	0.06	0.48	.632
Physical activity × regionnorth america	0.02 [-0.14, 0.18]	0.08	0.26	.813	0.02 [-0.10, 0.14]	0.06	0.32	.754
Physical activity × regionsouth america	0.04 [-0.01, 0.09]	0.02	1.70	.090	-0.02 [-0.10, 0.06]	0.04	-0.50	.621
Regioneurope × Physical activity ²	0.00 [0.00, 0.01]	0.00	0.87	.387	0.04 [0.00, 0.08]	0.02	1.83	.114
Regionafrica × Physical activity ²	-0.01 [-0.08, 0.06]	0.04	-0.38	.713	0.05 [-0.06, 0.15]	0.05	0.87	.428
Regionasia × Physical activity ²	-0.05 [-0.17, 0.07]	0.06	-0.78	.469	0.03 [-0.08, 0.13]	0.05	0.49	.628
Regionnorth america × Physical activity ²	0.01 [-0.05, 0.06]	0.03	0.28	.796	0.00 [-0.09, 0.08]	0.04	-0.09	.931
Regionsouth america × Physical activity ²	0.00 [-0.01, 0.02]	0.01	0.31	.757	0.02 [-0.05, 0.09]	0.04	0.65	.546
Sleep regularity								
(Intercept)	0.10 [-0.13, 0.33]	0.12	0.87	.384	0.16 [-0.07, 0.40]	0.12	1.37	.171
Physical activity	0.05 [-0.01, 0.11]	0.03	1.61	.207	0.15 [0.04, 0.27]	0.06	2.58	.036
Regioneurope	0.23 [0.04, 0.43]	0.10	2.33	.021	0.20 [0.00, 0.39]	0.10	1.97	.049
Regionafrica	0.32 [0.08, 0.56]	0.12	2.57	.013	0.27 [0.04, 0.51]	0.12	2.25	.025
Regionasia	0.29 [0.03, 0.55]	0.13	2.15	.036	0.15 [-0.09, 0.38]	0.12	1.21	.226
Regionnorth america	0.04 [-0.22, 0.30]	0.13	0.27	.789	0.03 [-0.25, 0.31]	0.14	0.21	.835
Regionsouth america	-0.11 [-0.32, 0.10]	0.11	-1.01	.314	-0.17 [-0.38, 0.04]	0.11	-1.58	.114

Table 14 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity ²	0.00 [-0.01, 0.01]	0.00	0.18	.866	-0.07 [-0.14, 0.00]	0.03	-2.08	.100
Age	0.00 [-0.01, 0.00]	0.00	-1.00	.329	0.00 [-0.01, 0.00]	0.00	-1.28	.205
Physical activity × regioneurope	0.11 [-0.01, 0.23]	0.06	1.79	.188	-0.09 [-0.22, 0.05]	0.07	-1.28	.254
Physical activity × regionafrica	0.01 [-0.14, 0.16]	0.08	0.11	.917	0.07 [-0.09, 0.22]	0.08	0.85	.395
Physical activity × regionasia	0.10 [-0.12, 0.32]	0.11	0.86	.421	0.04 [-0.15, 0.22]	0.10	0.40	.693
Physical activity × regionnorth america	0.06 [-0.19, 0.32]	0.13	0.49	.661	-0.02 [-0.32, 0.27]	0.15	-0.16	.880
Physical activity × regionsouth america	0.12 [0.03, 0.22]	0.05	2.57	.032	0.01 [-0.15, 0.17]	0.08	0.14	.891
Regioneurope × Physical activity ²	-0.03 [-0.05, 0.00]	0.01	-1.97	.145	0.06 [0.00, 0.13]	0.04	1.82	.134
Regionafrica × Physical activity ²	-0.05 [-0.19, 0.08]	0.07	-0.76	.485	-0.02 [-0.11, 0.07]	0.05	-0.37	.714
Regionasia × Physical activity ²	-0.12 [-0.38, 0.14]	0.13	-0.89	.439	0.05 [-0.13, 0.22]	0.09	0.52	.615
Regionnorth america × Physical activity ²	-0.01 [-0.08, 0.06]	0.04	-0.32	.770	0.00 [-0.23, 0.23]	0.12	0.00	.997
Regionsouth america × Physical activity ²	-0.01 [-0.06, 0.03]	0.02	-0.55	.623	0.01 [-0.08, 0.11]	0.05	0.27	.796

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

Table 15

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

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.18 [0.82, 1.54]	0.18	6.44	< .001	1.10 [0.87, 1.33]	0.12	9.54	< .001
Sleep duration	0.06 [-0.01, 0.13]	0.04	1.57	.195	0.02 [-0.04, 0.08]	0.03	0.61	.580
Regioneurope	-0.13 [-0.35, 0.10]	0.11	-1.12	.276	-0.12 [-0.28, 0.04]	0.08	-1.51	.132
Regionafrica	-0.11 [-0.33, 0.11]	0.11	-0.94	.350	-0.04 [-0.21, 0.14]	0.09	-0.41	.683
Regionasia	-0.39 [-0.62, -0.15]	0.12	-3.24	.002	-0.37 [-0.57, -0.18]	0.10	-3.76	< .001
Regionnorth america	-0.23 [-0.44, -0.01]	0.11	-2.09	.037	-0.16 [-0.36, 0.04]	0.10	-1.56	.125
Regionsouth america	-0.29 [-0.49, -0.09]	0.10	-2.82	.005	-0.26 [-0.42, -0.11]	0.08	-3.26	.001
Sleep duration ²	0.01 [-0.07, 0.08]	0.04	0.18	.875	0.00 [-0.01, 0.01]	0.01	-0.24	.808
Age	-0.02 [-0.03, -0.02]	0.00	-9.89	< .001	-0.03 [-0.03, -0.02]	0.00	-9.50	< .001
Sleep duration × regioneurope	-0.07 [-0.14, 0.00]	0.04	-1.92	.116	0.00 [-0.07, 0.07]	0.04	0.01	.991
Sleep duration × regionafrica	-0.06 [-0.15, 0.04]	0.05	-1.18	.253	-0.04 [-0.10, 0.03]	0.03	-1.15	.255
Sleep duration × regionasia	-0.03 [-0.18, 0.11]	0.08	-0.44	.679	0.01 [-0.07, 0.08]	0.04	0.19	.851
Sleep duration × regionnorth america	-0.05 [-0.14, 0.03]	0.04	-1.28	.208	-0.04 [-0.10, 0.02]	0.03	-1.23	.221
Sleep duration × regionsouth america	-0.06 [-0.11, -0.01]	0.03	-2.27	.023	-0.03 [-0.08, 0.01]	0.02	-1.37	.194
Regioneurope × Sleep duration ²	-0.02 [-0.09, 0.05]	0.03	-0.56	.628	-0.01 [-0.02, 0.01]	0.01	-0.88	.384
Regionafrica × Sleep duration ²	-0.01 [-0.07, 0.05]	0.03	-0.26	.814	0.00 [-0.03, 0.02]	0.01	-0.27	.788
Regionasia × Sleep duration ²	0.02 [-0.05, 0.08]	0.03	0.55	.607	0.00 [-0.03, 0.03]	0.02	-0.16	.870
Regionnorth america × Sleep duration ²	-0.02 [-0.10, 0.05]	0.04	-0.65	.571	-0.01 [-0.04, 0.02]	0.02	-0.79	.460
Regionsouth america × Sleep duration ²	-0.01 [-0.08, 0.06]	0.04	-0.24	.829	0.00 [-0.02, 0.01]	0.01	-0.67	.509
Sleep efficiency								
(Intercept)	1.23 [0.89, 1.57]	0.17	7.05	< .001	1.11 [0.90, 1.32]	0.11	10.20	< .001

Table 15 continued

TITLE

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep efficiency	-0.07 [-0.15, 0.01]	0.04	-1.63	.177	0.01 [-0.03, 0.05]	0.02	0.50	.620
Regioneurope	-0.20 [-0.39, -0.01]	0.10	-2.06	.040	-0.13 [-0.29, 0.02]	0.08	-1.67	.095
Regionafrica	-0.15 [-0.36, 0.05]	0.11	-1.45	.151	-0.06 [-0.23, 0.11]	0.09	-0.73	.467
Regionasia	-0.40 [-0.64, -0.16]	0.12	-3.27	.003	-0.35 [-0.56, -0.15]	0.10	-3.42	.002
Regionnorth america	-0.29 [-0.52, -0.07]	0.12	-2.53	.015	-0.20 [-0.39, 0.00]	0.10	-1.99	.054
Regionsouth america	-0.34 [-0.53, -0.15]	0.10	-3.52	< .001	-0.28 [-0.45, -0.12]	0.08	-3.42	.001
Sleep efficiency ²	-0.01 [-0.04, 0.01]	0.01	-0.88	.445	0.00 [-0.01, 0.02]	0.01	0.23	.828
Age	-0.02 [-0.03, -0.02]	0.00	-9.80	< .001	-0.03 [-0.03, -0.02]	0.00	-9.58	< .001
Sleep efficiency × regioneurope	0.08 [-0.01, 0.17]	0.05	1.74	.152	0.00 [-0.04, 0.03]	0.02	-0.20	.845
Sleep efficiency × regionafrica	0.06 [-0.03, 0.15]	0.05	1.38	.189	-0.02 [-0.09, 0.04]	0.03	-0.74	.470
Sleep efficiency × regionasia	0.12 [0.02, 0.21]	0.05	2.49	.021	0.00 [-0.11, 0.11]	0.05	0.02	.986
Sleep efficiency × regionnorth america	0.06 [-0.06, 0.18]	0.06	1.00	.347	-0.03 [-0.10, 0.03]	0.03	-1.01	.315
Sleep efficiency × regionsouth america	0.05 [-0.05, 0.14]	0.05	0.96	.379	-0.01 [-0.06, 0.04]	0.03	-0.40	.691
Regioneurope × Sleep efficiency ²	0.01 [-0.01, 0.04]	0.01	0.96	.405	0.00 [-0.02, 0.01]	0.01	-0.23	.828
Regionafrica × Sleep efficiency ²	0.01 [-0.01, 0.04]	0.01	0.90	.416	0.00 [-0.02, 0.02]	0.01	-0.22	.840
Regionasia × Sleep efficiency ²	0.02 [-0.01, 0.06]	0.02	1.33	.244	-0.01 [-0.03, 0.01]	0.01	-1.08	.293
Regionnorth america × Sleep efficiency ²	0.01 [-0.03, 0.04]	0.02	0.29	.782	0.00 [-0.03, 0.02]	0.01	-0.32	.759
Regionsouth america × Sleep efficiency ²	0.01 [-0.01, 0.03]	0.01	0.68	.528	0.00 [-0.02, 0.02]	0.01	-0.12	.907
Sleep onset								
(Intercept)	1.22 [0.85, 1.59]	0.19	6.50	< .001	1.10 [0.87, 1.34]	0.12	9.37	< .001
Sleep onset	-0.07 [-0.18, 0.05]	0.06	-1.12	.330	-0.04 [-0.10, 0.02]	0.03	-1.35	.207
Regioneurope	-0.18 [-0.41, 0.06]	0.12	-1.45	.165	-0.12 [-0.29, 0.05]	0.09	-1.42	.159
Regionafrica	-0.08 [-0.34, 0.18]	0.13	-0.59	.559	-0.07 [-0.30, 0.15]	0.11	-0.62	.540

Table 15 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Regionasia	-0.39 [-0.66, -0.13]	0.14	-2.90	.005	-0.35 [-0.55, -0.14]	0.10	-3.30	.001
Regionnorth america	-0.23 [-0.48, 0.03]	0.13	-1.76	.079	-0.20 [-0.47, 0.08]	0.14	-1.42	.187
Regionsouth america	-0.30 [-0.53, -0.07]	0.12	-2.61	.011	-0.28 [-0.45, -0.11]	0.09	-3.15	.002
Sleep onset ²	-0.03 [-0.10, 0.03]	0.03	-1.07	.364	-0.02 [-0.05, 0.01]	0.02	-1.12	.305
Age	-0.02 [-0.03, -0.02]	0.00	-9.72	< .001	-0.03 [-0.03, -0.02]	0.00	-9.77	< .001
Sleep onset × regioneurope	0.05 [-0.07, 0.18]	0.06	0.81	.467	0.04 [-0.03, 0.12]	0.04	1.13	.299
Sleep onset × regionafrica	0.13 [-0.11, 0.36]	0.12	1.06	.299	0.01 [-0.16, 0.19]	0.09	0.16	.873
Sleep onset × regionasia	0.03 [-0.22, 0.28]	0.13	0.22	.826	0.09 [-0.10, 0.28]	0.10	0.97	.333
Sleep onset × regionnorth america	0.10 [-0.19, 0.39]	0.15	0.66	.546	0.02 [-0.11, 0.16]	0.07	0.32	.753
Sleep onset × regionsouth america	0.05 [-0.07, 0.17]	0.06	0.79	.445	0.03 [-0.05, 0.11]	0.04	0.73	.471
Regioneurope × Sleep onset ²	0.02 [-0.04, 0.08]	0.03	0.60	.588	0.02 [-0.01, 0.05]	0.02	1.08	.313
Regionafrica × Sleep onset ²	0.04 [-0.09, 0.16]	0.07	0.55	.584	0.01 [-0.12, 0.15]	0.07	0.21	.839
Regionasia × Sleep onset ²	0.01 [-0.16, 0.17]	0.08	0.09	.926	0.05 [-0.06, 0.15]	0.05	0.84	.404
Regionnorth america × Sleep onset ²	0.02 [-0.12, 0.16]	0.07	0.26	.808	0.01 [-0.06, 0.09]	0.04	0.32	.752
Regionsouth america × Sleep onset ²	0.01 [-0.07, 0.08]	0.04	0.14	.895	0.02 [-0.03, 0.06]	0.02	0.73	.487
Sleep regularity								
(Intercept)	1.24 [0.91, 1.58]	0.17	7.26	< .001	1.12 [0.90, 1.33]	0.11	10.13	< .001
Sleep regularity	0.15 [0.01, 0.29]	0.07	2.10	.151	0.04 [0.01, 0.07]	0.02	2.47	.014
Regioneurope	-0.26 [-0.46, -0.07]	0.10	-2.67	.009	-0.15 [-0.31, 0.00]	0.08	-1.90	.058
Regionafrica	-0.20 [-0.40, 0.00]	0.10	-1.92	.055	-0.10 [-0.27, 0.07]	0.09	-1.15	.252
Regionasia	-0.47 [-0.69, -0.25]	0.11	-4.16	< .001	-0.38 [-0.57, -0.19]	0.10	-3.92	< .001
Regionnorth america	-0.35 [-0.56, -0.14]	0.11	-3.30	.001	-0.19 [-0.39, 0.01]	0.10	-1.90	.066
Regionsouth america	-0.39 [-0.58, -0.20]	0.10	-3.98	< .001	-0.29 [-0.44, -0.13]	0.08	-3.55	< .001

Table 15 continued

TITLE

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep regularity ²	-0.02 [-0.05, 0.02]	0.02	-1.01	.370	-0.01 [-0.02, 0.00]	0.01	-1.51	.131
Age	-0.02 [-0.03, -0.02]	0.00	-9.06	< .001	-0.03 [-0.03, -0.02]	0.00	-9.48	< .001
Sleep regularity × regioneurope	-0.08 [-0.21, 0.04]	0.06	-1.34	.284	-0.01 [-0.05, 0.02]	0.02	-0.64	.523
Sleep regularity × regionafrica	-0.10 [-0.25, 0.06]	0.08	-1.20	.299	0.03 [-0.04, 0.11]	0.04	0.90	.376
Sleep regularity × regionasia	-0.08 [-0.23, 0.06]	0.07	-1.15	.304	0.00 [-0.08, 0.08]	0.04	0.02	.987
Sleep regularity × regionnorth america	-0.11 [-0.23, 0.01]	0.06	-1.79	.121	0.01 [-0.08, 0.11]	0.05	0.25	.811
Sleep regularity × regionsouth america	-0.06 [-0.13, 0.01]	0.04	-1.66	.115	0.02 [-0.03, 0.07]	0.03	0.79	.438
Regioneurope × Sleep regularity ²	0.01 [-0.02, 0.05]	0.02	0.76	.496	0.00 [-0.02, 0.03]	0.01	0.39	.710
Regionafrica × Sleep regularity ²	-0.01 [-0.07, 0.04]	0.03	-0.49	.630	0.03 [-0.03, 0.09]	0.03	1.02	.355
Regionasia × Sleep regularity ²	0.01 [-0.04, 0.07]	0.03	0.45	.657	0.00 [-0.04, 0.03]	0.02	-0.20	.843
Regionnorth america × Sleep regularity ²	0.00 [-0.04, 0.05]	0.02	0.11	.915	-0.01 [-0.07, 0.05]	0.03	-0.20	.852
Regionsouth america × Sleep regularity ²	0.03 [-0.04, 0.10]	0.03	0.90	.439	0.02 [-0.01, 0.04]	0.01	1.17	.263

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

Table 16

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

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.74 [0.47, 1.01]	0.14	5.44	< .001	0.73 [0.45, 1.01]	0.14	5.07	< .001
Physical activity	0.05 [-0.15, 0.26]	0.10	0.51	.645	0.13 [0.02, 0.24]	0.06	2.39	.024
Daylight hours	-0.03 [-0.05, -0.01]	0.01	-3.23	.017	-0.03 [-0.05, -0.01]	0.01	-3.39	.007
Physical activity ²	0.00 [-0.04, 0.04]	0.02	-0.04	.969	0.01 [-0.06, 0.08]	0.03	0.31	.756
Age	-0.01 [-0.01, 0.00]	0.00	-2.75	.006	0.00 [-0.01, 0.00]	0.00	-2.59	.010
Physical activity × daylight hours	0.00 [-0.02, 0.01]	0.01	-0.23	.826	-0.01 [-0.02, 0.00]	0.00	-1.61	.122
Daylight hours × Physical activity ²	0.00 [0.00, 0.00]	0.00	0.09	.929	0.00 [-0.01, 0.00]	0.00	-0.30	.764
Sleep efficiency								
(Intercept)	0.23 [-0.04, 0.50]	0.14	1.65	.099	0.25 [-0.02, 0.52]	0.14	1.79	.073
Physical activity	0.03 [-0.12, 0.18]	0.08	0.38	.714	0.05 [-0.05, 0.14]	0.05	0.97	.334
Daylight hours	0.00 [-0.01, 0.01]	0.01	-0.39	.697	0.00 [-0.02, 0.01]	0.01	-0.39	.696
Physical activity ²	-0.01 [-0.04, 0.03]	0.02	-0.42	.682	0.00 [-0.07, 0.06]	0.03	-0.12	.906
Age	0.00 [0.00, 0.01]	0.00	1.16	.247	0.00 [0.00, 0.01]	0.00	1.02	.308
Physical activity × daylight hours	0.00 [-0.01, 0.01]	0.01	-0.15	.883	0.00 [-0.01, 0.00]	0.00	-0.97	.332
Daylight hours × Physical activity ²	0.00 [0.00, 0.00]	0.00	0.35	.729	0.00 [-0.01, 0.01]	0.00	-0.02	.984
Sleep onset								
(Intercept)	-0.26 [-0.60, 0.08]	0.17	-1.52	.130	-0.21 [-0.56, 0.14]	0.18	-1.17	.247
Physical activity	-0.02 [-0.13, 0.09]	0.05	-0.37	.722	-0.05 [-0.14, 0.03]	0.04	-1.20	.252
Daylight hours	0.01 [0.00, 0.02]	0.00	2.53	.012	0.01 [0.00, 0.02]	0.01	2.19	.030
Physical activity ²	0.00 [-0.02, 0.02]	0.01	0.00	.997	-0.01 [-0.05, 0.04]	0.02	-0.34	.735
Age	0.00 [0.00, 0.01]	0.00	0.80	.425	0.00 [0.00, 0.00]	0.00	0.34	.734

Table 16 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Physical activity \times daylight hours	0.00 [-0.01, 0.01]	0.00	-0.06	.954	0.00 [-0.01, 0.01]	0.00	-0.05	.960
Daylight hours \times Physical activity ²	0.00 [0.00, 0.00]	0.00	-0.11	.912	0.00 [0.00, 0.00]	0.00	0.20	.842
Sleep regularity								
(Intercept)	0.60 [0.28, 0.91]	0.16	3.69	.001	0.67 [0.35, 0.98]	0.16	4.17	< .001
Physical activity	-0.02 [-0.29, 0.26]	0.14	-0.11	.918	0.10 [0.00, 0.20]	0.05	1.94	.052
Daylight hours	0.00 [-0.02, 0.01]	0.01	-0.16	.875	-0.01 [-0.02, 0.01]	0.01	-0.64	.528
Physical activity ²	0.01 [-0.06, 0.08]	0.03	0.33	.765	-0.04 [-0.13, 0.04]	0.04	-1.02	.333
Age	0.00 [0.00, 0.00]	0.00	0.18	.859	0.00 [0.00, 0.00]	0.00	0.32	.748
Physical activity \times daylight hours	0.01 [-0.01, 0.03]	0.01	0.86	.453	0.00 [-0.01, 0.01]	0.00	-0.37	.711
Daylight hours \times Physical activity ²	0.00 [-0.01, 0.00]	0.00	-0.44	.691	0.00 [0.00, 0.01]	0.00	0.72	.486

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

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

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.36 [0.98, 1.74]	0.19	7.10	< .001	1.44 [1.18, 1.69]	0.13	11.12	< .001
Sleep duration	0.07 [-0.02, 0.16]	0.05	1.55	.133	0.05 [-0.02, 0.11]	0.03	1.43	.154
Daylight hours	0.01 [0.00, 0.02]	0.01	1.47	.150	0.00 [-0.01, 0.01]	0.01	-0.08	.936
Sleep duration ²	0.00 [-0.04, 0.05]	0.02	0.06	.957	0.01 [-0.02, 0.03]	0.01	0.64	.532
Age	-0.02 [-0.03, -0.02]	0.00	-9.06	< .001	-0.03 [-0.03, -0.02]	0.00	-8.68	< .001
Sleep duration × daylight hours	-0.01 [-0.01, 0.00]	0.00	-1.66	.100	0.00 [-0.01, 0.00]	0.00	-1.23	.220
Daylight hours × Sleep duration ²	0.00 [0.00, 0.00]	0.00	-0.40	.700	0.00 [0.00, 0.00]	0.00	-1.00	.323
Sleep efficiency								
(Intercept)	1.37 [0.99, 1.74]	0.19	7.12	< .001	1.45 [1.19, 1.71]	0.13	11.01	< .001
Sleep efficiency	-0.01 [-0.10, 0.08]	0.05	-0.21	.837	-0.04 [-0.14, 0.06]	0.05	-0.82	.445
Daylight hours	0.01 [0.00, 0.02]	0.01	1.51	.133	0.00 [-0.01, 0.01]	0.00	-0.32	.752
Sleep efficiency ²	0.00 [-0.02, 0.02]	0.01	-0.14	.897	0.00 [-0.01, 0.02]	0.01	0.51	.628
Age	-0.02 [-0.03, -0.02]	0.00	-9.09	< .001	-0.03 [-0.03, -0.02]	0.00	-8.75	< .001
Sleep efficiency × daylight hours	0.00 [-0.01, 0.01]	0.00	0.23	.818	0.00 [0.00, 0.01]	0.00	0.92	.392
Daylight hours × Sleep efficiency ²	0.00 [0.00, 0.00]	0.00	0.15	.889	0.00 [0.00, 0.00]	0.00	-0.43	.686
Sleep onset								
(Intercept)	1.37 [0.99, 1.75]	0.19	7.06	< .001	1.42 [1.17, 1.67]	0.13	11.25	< .001
Sleep onset	-0.05 [-0.14, 0.05]	0.05	-0.94	.347	-0.04 [-0.12, 0.04]	0.04	-0.95	.345
Daylight hours	0.01 [0.00, 0.02]	0.01	1.36	.183	0.00 [-0.01, 0.01]	0.01	0.17	.863
Sleep onset ²	-0.01 [-0.09, 0.07]	0.04	-0.25	.812	0.03 [-0.02, 0.09]	0.03	1.18	.279
Age	-0.02 [-0.03, -0.02]	0.00	-9.12	< .001	-0.03 [-0.03, -0.02]	0.00	-8.75	< .001

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep onset × daylight hours	0.00 [-0.01, 0.01]	0.00	0.60	.546	0.00 [0.00, 0.01]	0.00	0.88	.381
Daylight hours × Sleep onset ²	0.00 [-0.01, 0.01]	0.00	-0.19	.853	0.00 [-0.01, 0.00]	0.00	-1.27	.242
Sleep regularity								
(Intercept)	1.31 [0.92, 1.69]	0.20	6.66	< .001	1.43 [1.16, 1.71]	0.14	10.37	< .001
Sleep regularity	0.09 [-0.02, 0.20]	0.06	1.65	.138	0.06 [-0.01, 0.13]	0.04	1.64	.112
Daylight hours	0.01 [0.00, 0.02]	0.01	1.59	.114	0.00 [-0.01, 0.01]	0.01	-0.35	.732
Sleep regularity ²	0.00 [-0.08, 0.07]	0.04	-0.10	.929	-0.02 [-0.08, 0.05]	0.03	-0.49	.659
Age	-0.02 [-0.03, -0.02]	0.00	-8.80	< .001	-0.03 [-0.03, -0.02]	0.00	-8.72	< .001
Sleep regularity × daylight hours	0.00 [-0.01, 0.01]	0.00	-0.40	.690	0.00 [-0.01, 0.00]	0.00	-0.58	.574
Daylight hours × Sleep regularity ²	0.00 [-0.01, 0.01]	0.00	0.03	.981	0.00 [0.00, 0.01]	0.00	0.36	.746

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

Table 18

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

Term	Physical Activity Volume			Physical Activity Intensity				
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.78 [0.53, 1.03]	0.13	6.05	< .001	0.72 [0.47, 0.97]	0.13	5.65	< .001
Physical activity	0.07 [0.02, 0.11]	0.02	2.99	.007	0.05 [0.01, 0.09]	0.02	2.44	.015
Wrist	-0.48 [-0.75, -0.22]	0.14	-3.54	< .001	-0.43 [-0.70, -0.17]	0.13	-3.25	.001
Physical activity ²	-0.01 [-0.03, 0.02]	0.01	-0.41	.703	0.01 [-0.02, 0.04]	0.02	0.48	.636
Age	-0.01 [-0.01, 0.00]	0.00	-3.05	.002	0.00 [-0.01, 0.00]	0.00	-2.82	.005
Physical activity × wrist	-0.05 [-0.10, 0.00]	0.03	-1.85	.078	-0.01 [-0.06, 0.04]	0.02	-0.45	.656
Wrist × Physical activity ²	0.01 [-0.02, 0.04]	0.01	0.57	.602	-0.01 [-0.04, 0.03]	0.02	-0.43	.673
Sleep efficiency								
(Intercept)	-0.39 [-0.53, -0.26]	0.07	-5.75	< .001	-0.44 [-0.57, -0.31]	0.07	-6.70	< .001
Physical activity	0.13 [0.08, 0.19]	0.03	4.64	.002	0.03 [-0.02, 0.08]	0.02	1.16	.257
Wrist	0.75 [0.63, 0.88]	0.07	11.56	< .001	0.82 [0.70, 0.94]	0.06	13.36	< .001
Physical activity ²	-0.01 [-0.04, 0.02]	0.02	-0.42	.702	0.00 [-0.03, 0.03]	0.01	-0.14	.890
Age	0.00 [0.00, 0.00]	0.00	0.82	.412	0.00 [0.00, 0.00]	0.00	0.74	.460
Physical activity × wrist	-0.14 [-0.20, -0.09]	0.03	-5.12	< .001	-0.04 [-0.10, 0.01]	0.03	-1.51	.148
Wrist × Physical activity ²	0.01 [-0.02, 0.04]	0.02	0.42	.698	-0.01 [-0.04, 0.02]	0.02	-0.50	.620
Sleep onset								
(Intercept)	-1.05 [-1.46, -0.64]	0.21	-4.99	< .001	-1.02 [-1.42, -0.61]	0.21	-4.87	< .001
Physical activity	0.02 [-0.01, 0.05]	0.01	1.21	.231	-0.02 [-0.06, 0.01]	0.02	-1.35	.195
Wrist	1.14 [0.70, 1.59]	0.23	5.02	< .001	1.16 [0.72, 1.59]	0.22	5.17	< .001
Physical activity ²	0.00 [-0.01, 0.01]	0.01	-0.33	.739	-0.01 [-0.05, 0.02]	0.02	-0.87	.425
Age	0.00 [0.00, 0.01]	0.00	0.94	.347	0.00 [0.00, 0.00]	0.00	0.39	.699

Table 18 continued

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Physical activity \times wrist	-0.05	[-0.09, -0.01]	0.02	-2.20	.066	-0.05	[-0.08, -0.01]	0.02	-2.61	.010
Wrist \times Physical activity ²	0.00	[0.01, 0.01]	0.01	0.24	.814	0.01	[0.03, 0.05]	0.02	0.50	.642
Sleep regularity										
(Intercept)	0.24	[0.03, 0.52]	0.14	1.74	.082	0.16	[0.12, 0.45]	0.14	1.14	.255
Physical activity	0.14	[0.10, 0.19]	0.03	5.78	< .001	0.18	[0.14, 0.23]	0.02	7.93	< .001
Wrist	0.48	[0.18, 0.77]	0.15	3.16	.002	0.61	[0.32, 0.91]	0.15	4.06	< .001
Physical activity ²	-0.02	[-0.06, 0.03]	0.02	-0.70	.542	-0.06	[-0.11, -0.02]	0.02	-2.83	.031
Age	0.00	[0.00, 0.00]	0.00	-0.43	.670	0.00	[0.00, 0.00]	0.00	-0.55	.585
Physical activity \times wrist	-0.08	[-0.14, -0.01]	0.03	-2.38	.044	-0.14	[-0.19, -0.09]	0.02	-5.61	< .001
Wrist \times Physical activity ²	0.02	[-0.03, 0.06]	0.02	0.70	.539	0.05	[0.01, 0.09]	0.02	2.58	.018

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

Table 19

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

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	0.34 [-0.13, 0.81]	0.24	1.43	.152	1.08 [0.71, 1.45]	0.19	5.70	< .001
Sleep duration	0.01 [-0.03, 0.04]	0.02	0.32	.760	0.01 [-0.03, 0.05]	0.02	0.32	.774
Wrist	1.38 [0.87, 1.90]	0.26	5.26	< .001	0.46 [0.05, 0.86]	0.21	2.21	.027
Sleep duration ²	0.00 [-0.02, 0.02]	0.01	-0.11	.920	0.00 [-0.01, 0.00]	0.00	-0.66	.529
Age	-0.02 [-0.03, -0.02]	0.00	-9.68	< .001	-0.03 [-0.03, -0.02]	0.00	-9.10	< .001
Sleep duration × wrist	-0.01 [-0.04, 0.02]	0.02	-0.39	.694	0.00 [-0.04, 0.05]	0.02	0.21	.849
Wrist × Sleep duration ²	-0.01 [-0.05, 0.03]	0.02	-0.48	.671	-0.01 [-0.02, 0.01]	0.01	-0.90	.411
Sleep efficiency								
(Intercept)	0.35 [-0.12, 0.82]	0.24	1.46	.145	1.08 [0.70, 1.45]	0.19	5.64	< .001
Sleep efficiency	0.01 [-0.02, 0.03]	0.01	0.44	.677	0.00 [-0.01, 0.02]	0.01	0.22	.832
Wrist	1.38 [0.86, 1.89]	0.26	5.26	< .001	0.45 [0.04, 0.87]	0.21	2.16	.031
Sleep efficiency ²	0.00 [0.00, 0.00]	0.00	0.47	.649	0.00 [0.00, 0.00]	0.00	0.50	.640
Age	-0.02 [-0.03, -0.02]	0.00	-9.80	< .001	-0.03 [-0.03, -0.02]	0.00	-9.15	< .001
Sleep efficiency × wrist	-0.02 [-0.05, 0.01]	0.02	-1.09	.278	0.00 [-0.02, 0.03]	0.01	0.20	.843
Wrist × Sleep efficiency ²	0.00 [-0.01, 0.01]	0.00	0.02	.987	0.00 [-0.01, 0.00]	0.00	-0.47	.653
Sleep onset								
(Intercept)	0.35 [-0.12, 0.82]	0.24	1.45	.146	1.06 [0.69, 1.43]	0.19	5.59	< .001
Sleep onset	0.01 [-0.06, 0.08]	0.04	0.25	.806	-0.02 [-0.09, 0.05]	0.04	-0.66	.530
Wrist	1.39 [0.87, 1.90]	0.26	5.29	< .001	0.47 [0.05, 0.89]	0.21	2.21	.028
Sleep onset ²	0.00 [-0.04, 0.04]	0.02	0.10	.922	-0.01 [-0.03, 0.02]	0.01	-0.42	.673
Age	-0.02 [-0.03, -0.02]	0.00	-9.87	< .001	-0.03 [-0.03, -0.02]	0.00	-9.21	< .001

Table 19 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep onset × wrist	-0.03 [-0.10, 0.05]	0.04	-0.66	.510	0.02 [-0.04, 0.08]	0.03	0.61	.549
Wrist × Sleep onset ²	-0.02 [-0.06, 0.02]	0.02	-0.98	.340	0.01 [-0.02, 0.03]	0.01	0.36	.723
Sleep regularity								
(Intercept)	0.33 [-0.13, 0.80]	0.24	1.42	.156	1.09 [0.71, 1.46]	0.19	5.71	< .001
Sleep regularity	0.08 [0.04, 0.13]	0.02	3.65	.014	0.07 [0.05, 0.10]	0.01	6.93	< .001
Wrist	1.33 [0.82, 1.83]	0.26	5.14	< .001	0.43 [0.02, 0.83]	0.21	2.06	.039
Sleep regularity ²	0.00 [-0.02, 0.01]	0.01	-0.55	.591	-0.01 [-0.02, 0.00]	0.01	-1.21	.237
Age	-0.02 [-0.03, -0.02]	0.00	-9.58	< .001	-0.03 [-0.03, -0.02]	0.00	-9.19	< .001
Sleep regularity × wrist	-0.01 [-0.05, 0.02]	0.02	-0.77	.448	-0.06 [-0.09, -0.03]	0.02	-3.99	.001
Wrist × Sleep regularity ²	0.00 [-0.02, 0.02]	0.01	0.40	.698	0.00 [-0.01, 0.02]	0.01	0.62	.548

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

Table 20

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

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Sleep duration										
(Intercept)	0.47	[0.27, 0.68]	0.11	4.49	< .001	0.45	[0.25, 0.66]	0.11	4.33	< .001
Physical activity	0.03	[-0.03, 0.09]	0.03	1.09	.328	0.03	[-0.01, 0.07]	0.02	1.64	.101
Pa mostactivehr	-0.01	[-0.01, 0.00]	0.00	-2.83	.023	0.00	[-0.01, 0.00]	0.00	-2.34	.031
Physical activity ²	0.00	[-0.01, 0.01]	0.00	-0.19	.853	0.01	[-0.01, 0.04]	0.01	0.81	.420
Age	-0.01	[-0.01, 0.00]	0.00	-3.10	.002	-0.01	[-0.01, 0.00]	0.00	-2.97	.003
Physical activity × pa mostactivehr	0.00	[0.00, 0.00]	0.00	0.16	.876	0.00	[0.00, 0.00]	0.00	0.88	.378
Pa mostactivehr × Physical activity ²	0.00	[0.00, 0.00]	0.00	0.63	.529	0.00	[0.00, 0.00]	0.00	-0.74	.465
Sleep efficiency										
(Intercept)	0.24	[0.01, 0.47]	0.12	2.02	.044	0.25	[0.02, 0.49]	0.12	2.10	.036
Physical activity	0.00	[-0.06, 0.05]	0.03	-0.11	.914	0.00	[-0.04, 0.05]	0.02	0.23	.817
Pa mostactivehr	0.00	[-0.01, 0.00]	0.00	-2.14	.038	0.00	[-0.01, 0.00]	0.00	-1.01	.343
Physical activity ²	0.00	[-0.01, 0.01]	0.01	-0.15	.889	0.00	[-0.03, 0.03]	0.02	0.19	.854
Age	0.00	[0.00, 0.01]	0.00	1.11	.268	0.00	[0.00, 0.01]	0.00	0.96	.335
Physical activity × pa mostactivehr	0.00	[0.00, 0.01]	0.00	1.08	.315	0.00	[0.00, 0.00]	0.00	-0.19	.854
Pa mostactivehr × Physical activity ²	0.00	[0.00, 0.00]	0.00	-0.11	.919	0.00	[0.00, 0.00]	0.00	-0.47	.645
Sleep onset										
(Intercept)	-0.18	[-0.50, 0.14]	0.16	-1.10	.272	-0.15	[-0.47, 0.17]	0.16	-0.93	.355
Physical activity	-0.05	[-0.09, 0.00]	0.02	-1.87	.143	-0.04	[-0.08, -0.01]	0.02	-2.36	.047
Pa mostactivehr	0.00	[0.00, 0.01]	0.00	4.93	< .001	0.01	[0.00, 0.01]	0.00	4.59	< .001
Physical activity ²	0.01	[-0.01, 0.02]	0.01	0.96	.402	0.01	[-0.01, 0.02]	0.01	0.83	.409
Age	0.00	[0.00, 0.01]	0.00	0.99	.322	0.00	[0.00, 0.00]	0.00	0.62	.534

Table 20 continued

Term	Physical Activity Volume				Physical Activity Intensity					
	β	[95% CI]	SE	t	p	β	[95% CI]	SE	t	p
Physical activity × pa mostactivehr	0.00	[0.00, 0.00]	0.00	0.94	.394	0.00	[0.00, 0.00]	0.00	-0.85	.419
Pa mostactivehr × Physical activity ²	0.00	[0.00, 0.00]	0.00	-1.22	.298	0.00	[0.00, 0.00]	0.00	-1.32	.191
Sleep regularity										
(Intercept)	0.60	[0.37, 0.83]	0.12	5.10	< .001	0.64	[0.38, 0.89]	0.13	4.97	< .001
Physical activity	0.08	[0.04, 0.12]	0.02	3.73	.001	0.05	[0.01, 0.09]	0.02	2.62	.009
Pa mostactivehr	0.00	[0.00, 0.00]	0.00	-0.96	.342	0.00	[-0.01, 0.00]	0.00	-0.87	.418
Physical activity ²	-0.01	[-0.02, 0.01]	0.01	-0.66	.553	-0.02	[-0.08, 0.03]	0.03	-0.94	.412
Age	0.00	[0.00, 0.00]	0.00	0.14	.892	0.00	[0.00, 0.00]	0.00	0.23	.821
Physical activity × pa mostactivehr	0.00	[0.00, 0.00]	0.00	0.79	.446	0.00	[0.00, 0.01]	0.00	1.57	.124
Pa mostactivehr × Physical activity ²	0.00	[0.00, 0.00]	0.00	0.50	.647	0.00	[0.00, 0.00]	0.00	0.48	.650

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

Table 21

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

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep duration								
(Intercept)	1.44 [1.08, 1.80]	0.18	7.89	< .001	1.41 [1.17, 1.65]	0.12	11.71	< .001
Sleep duration	0.02 [-0.03, 0.07]	0.03	0.69	.524	0.03 [0.01, 0.06]	0.01	2.70	.008
Pa mostactivehr	0.00 [0.00, 0.01]	0.00	0.76	.466	0.00 [0.00, 0.00]	0.00	1.36	.182
Sleep duration ²	0.00 [-0.02, 0.01]	0.01	-0.59	.562	0.00 [-0.01, 0.02]	0.01	0.50	.641
Age	-0.02 [-0.03, -0.02]	0.00	-9.01	< .001	-0.03 [-0.03, -0.02]	0.00	-8.75	< .001
Sleep duration × pa mostactivehr	0.00 [-0.01, 0.00]	0.00	-0.75	.493	0.00 [0.00, 0.00]	0.00	-2.16	.032
Pa mostactivehr × Sleep duration ²	0.00 [0.00, 0.00]	0.00	-0.39	.706	0.00 [0.00, 0.00]	0.00	-1.22	.274
Sleep efficiency								
(Intercept)	1.45 [1.09, 1.80]	0.18	7.90	< .001	1.42 [1.19, 1.66]	0.12	11.83	< .001
Sleep efficiency	-0.02 [-0.08, 0.04]	0.03	-0.59	.594	0.00 [-0.03, 0.03]	0.02	-0.17	.871
Pa mostactivehr	0.00 [0.00, 0.00]	0.00	0.73	.487	0.00 [0.00, 0.00]	0.00	0.84	.403
Sleep efficiency ²	0.00 [-0.01, 0.01]	0.01	0.31	.776	0.00 [-0.01, 0.01]	0.00	-0.06	.956
Age	-0.02 [-0.03, -0.02]	0.00	-9.08	< .001	-0.03 [-0.03, -0.02]	0.00	-8.78	< .001
Sleep efficiency × pa mostactivehr	0.00 [0.00, 0.01]	0.00	0.83	.450	0.00 [0.00, 0.00]	0.00	0.43	.673
Pa mostactivehr × Sleep efficiency ²	0.00 [0.00, 0.00]	0.00	-0.23	.830	0.00 [0.00, 0.00]	0.00	0.27	.805
Sleep onset								
(Intercept)	1.45 [1.09, 1.81]	0.18	7.89	< .001	1.42 [1.18, 1.65]	0.12	11.66	< .001
Sleep onset	-0.05 [-0.09, 0.00]	0.02	-1.89	.086	-0.02 [-0.06, 0.01]	0.02	-1.40	.178
Pa mostactivehr	0.00 [0.00, 0.01]	0.00	0.77	.454	0.00 [0.00, 0.00]	0.00	1.12	.266
Sleep onset ²	-0.02 [-0.05, 0.01]	0.01	-1.51	.143	0.00 [-0.02, 0.02]	0.01	0.14	.887
Age	-0.02 [-0.03, -0.02]	0.00	-9.14	< .001	-0.03 [-0.03, -0.02]	0.00	-8.84	< .001

Table 21 continued

Term	Physical Activity Volume				Physical Activity Intensity			
	β [95% CI]	SE	t	p	β [95% CI]	SE	t	p
Sleep onset × pa mostactivehr	0.00 [0.00, 0.01]	0.00	1.24	.266	0.00 [0.00, 0.00]	0.00	1.62	.105
Pa mostactivehr × Sleep onset ²	0.00 [0.00, 0.00]	0.00	0.28	.781	0.00 [0.00, 0.00]	0.00	-0.22	.826
Sleep regularity								
(Intercept)	1.39 [1.04, 1.75]	0.18	7.74	< .001	1.40 [1.17, 1.63]	0.12	11.99	< .001
Sleep regularity	0.07 [0.03, 0.10]	0.02	3.95	< .001	0.01 [-0.01, 0.04]	0.01	0.87	.390
Pa mostactivehr	0.00 [0.00, 0.00]	0.00	0.52	.615	0.00 [0.00, 0.00]	0.00	0.63	.538
Sleep regularity ²	-0.01 [-0.04, 0.02]	0.02	-0.49	.657	-0.01 [-0.04, 0.02]	0.01	-0.59	.597
Age	-0.02 [-0.03, -0.02]	0.00	-8.72	< .001	-0.03 [-0.03, -0.02]	0.00	-8.68	< .001
Sleep regularity × pa mostactivehr	0.00 [0.00, 0.01]	0.00	0.24	.827	0.00 [0.00, 0.00]	0.00	2.20	.029
Pa mostactivehr × Sleep regularity ²	0.00 [0.00, 0.00]	0.00	0.37	.732	0.00 [0.00, 0.00]	0.00	0.27	.803

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

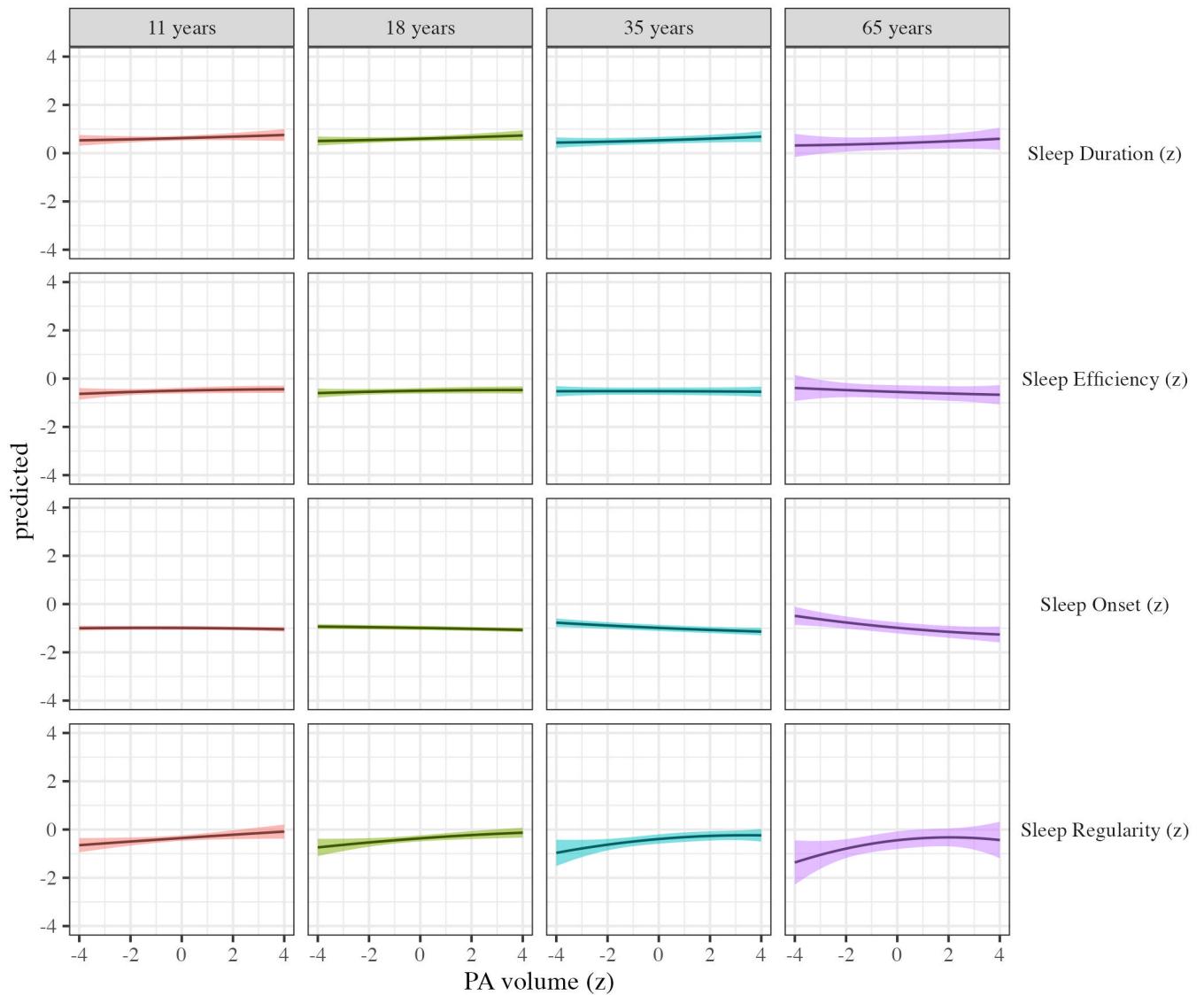


Figure 1. Sleep metrics on Physical activity volume

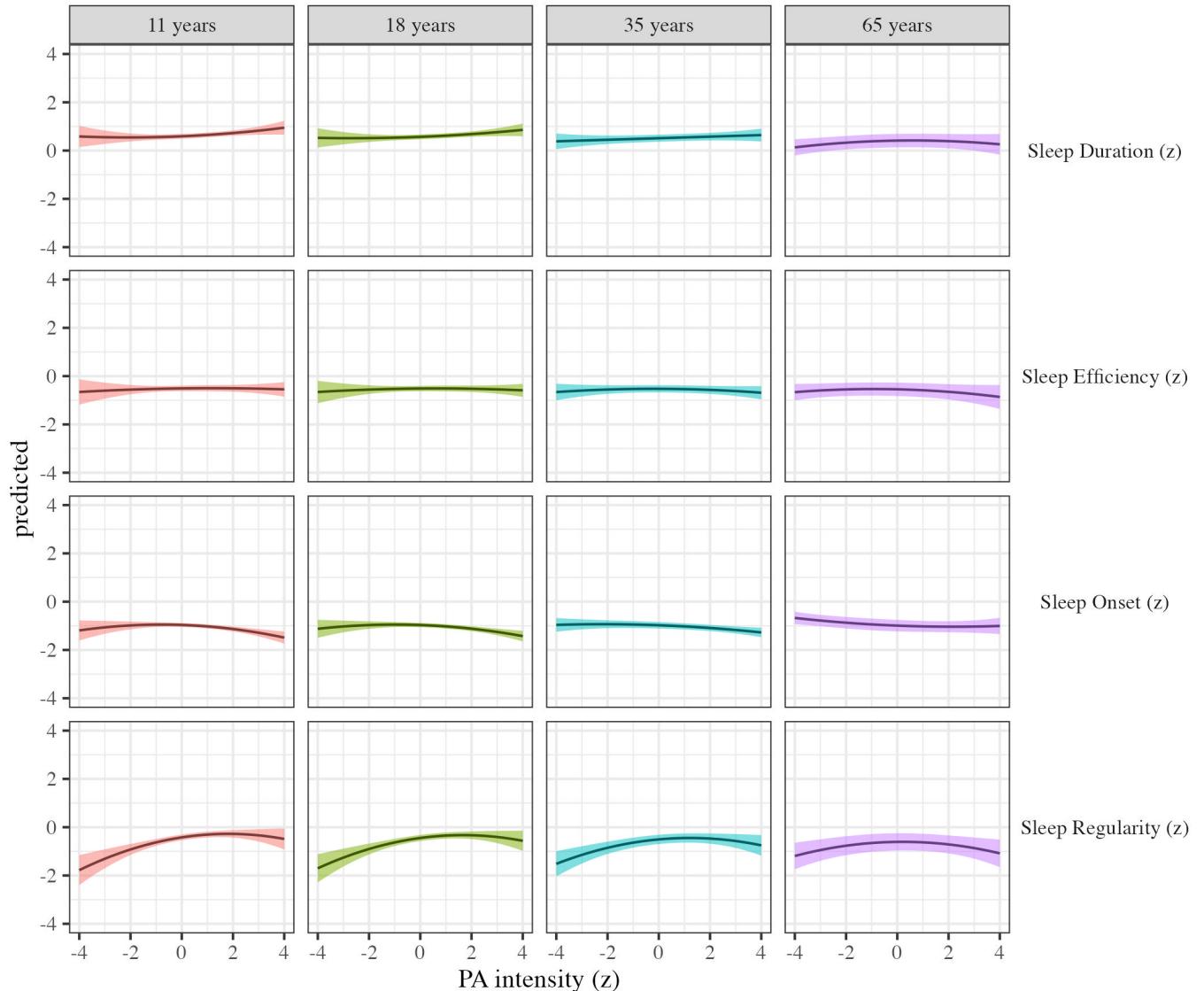


Figure 2. Sleep metrics on Physical activity intensity

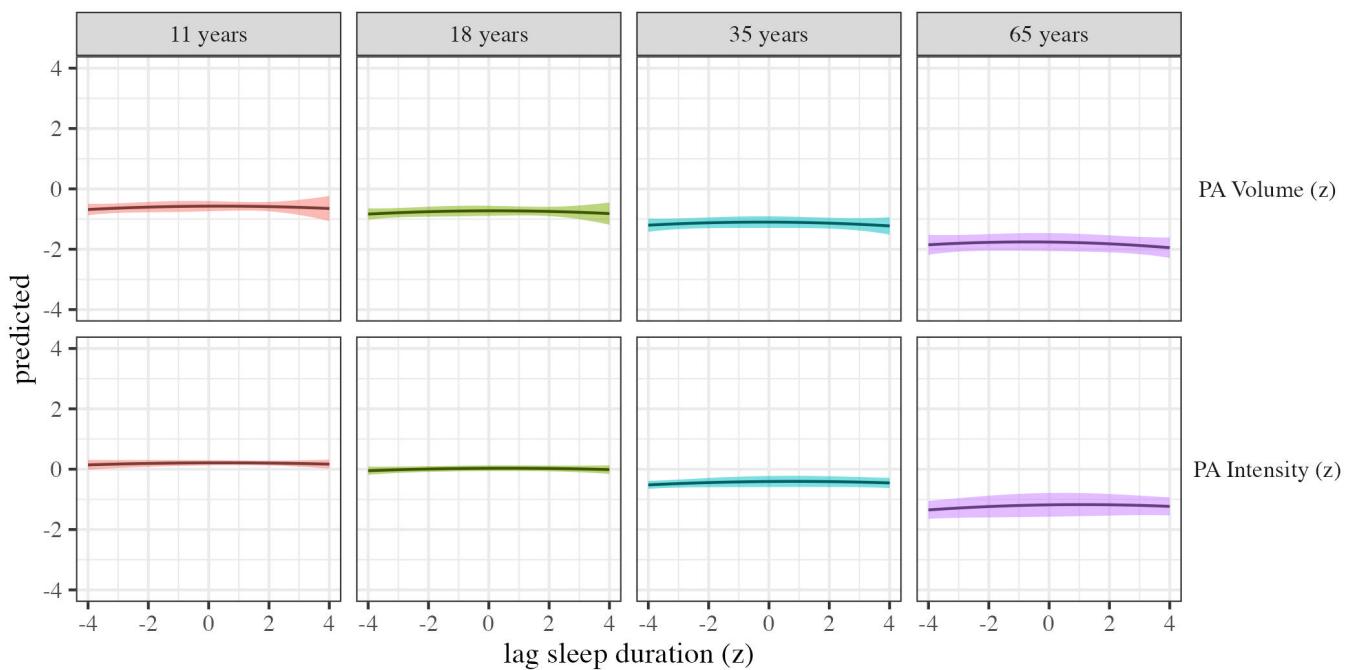


Figure 3. Physical activity by sleep duration

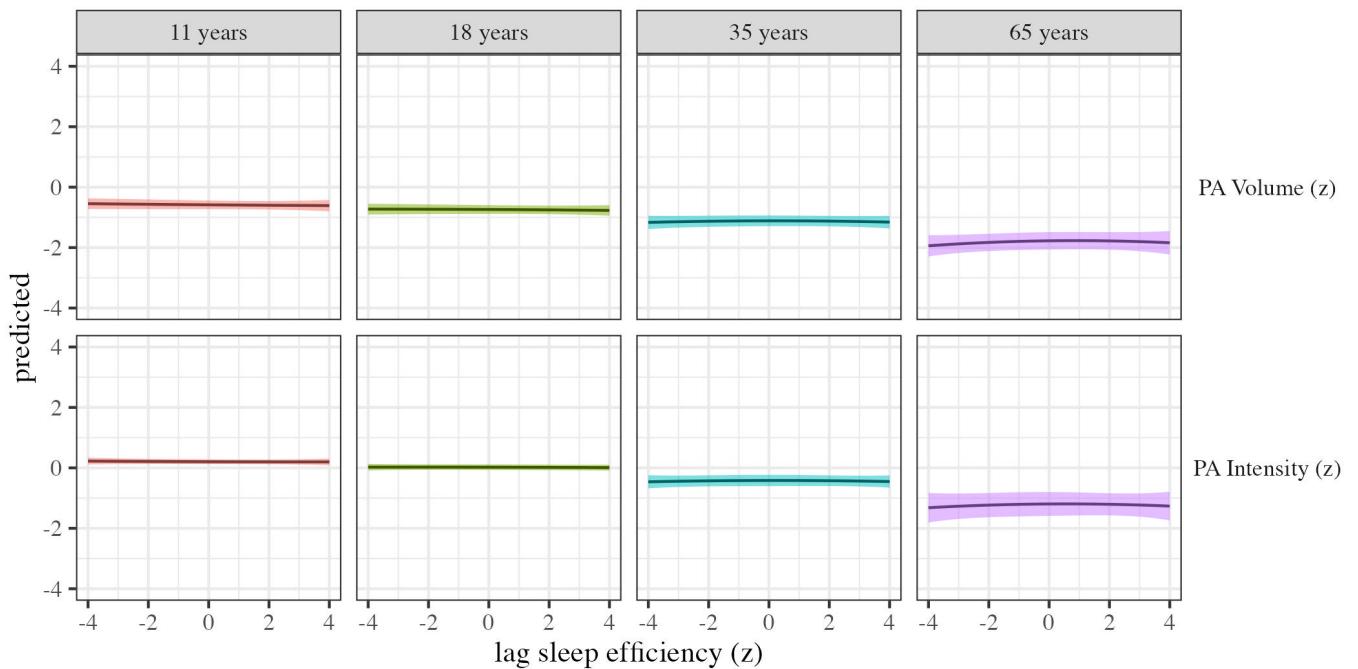


Figure 4. Physical activity by sleep efficiency

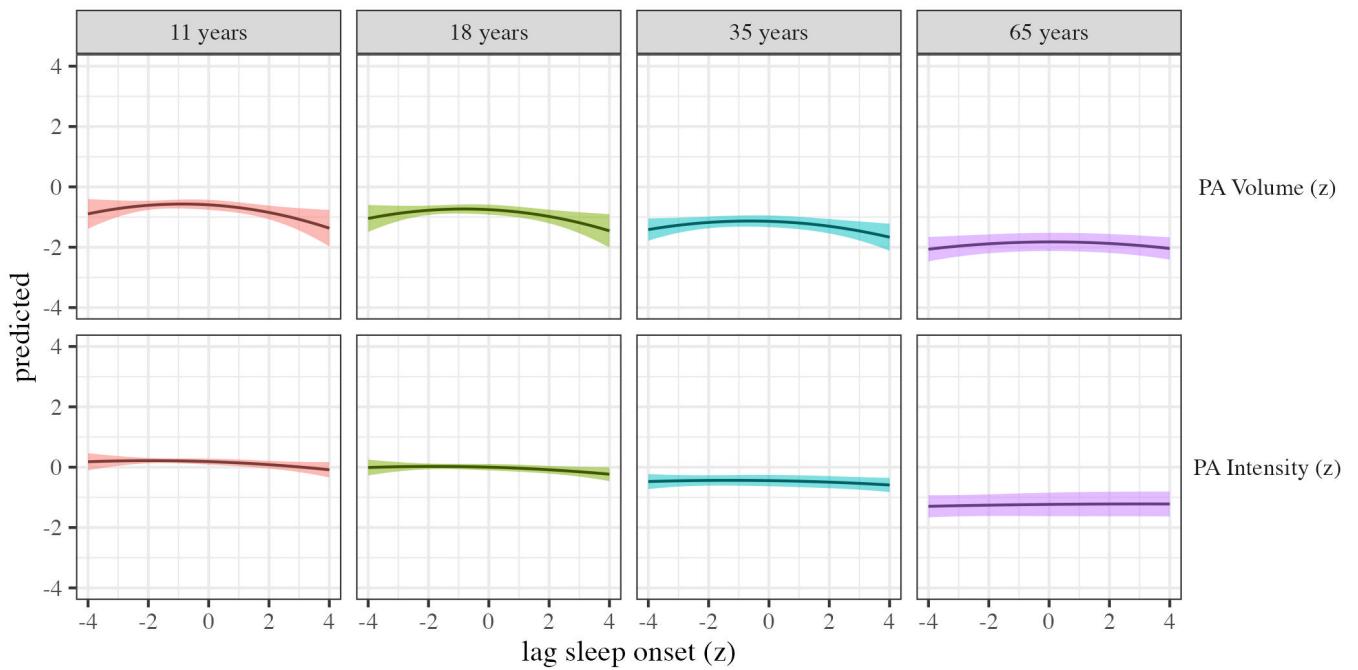


Figure 5. Physical activity by sleep onset

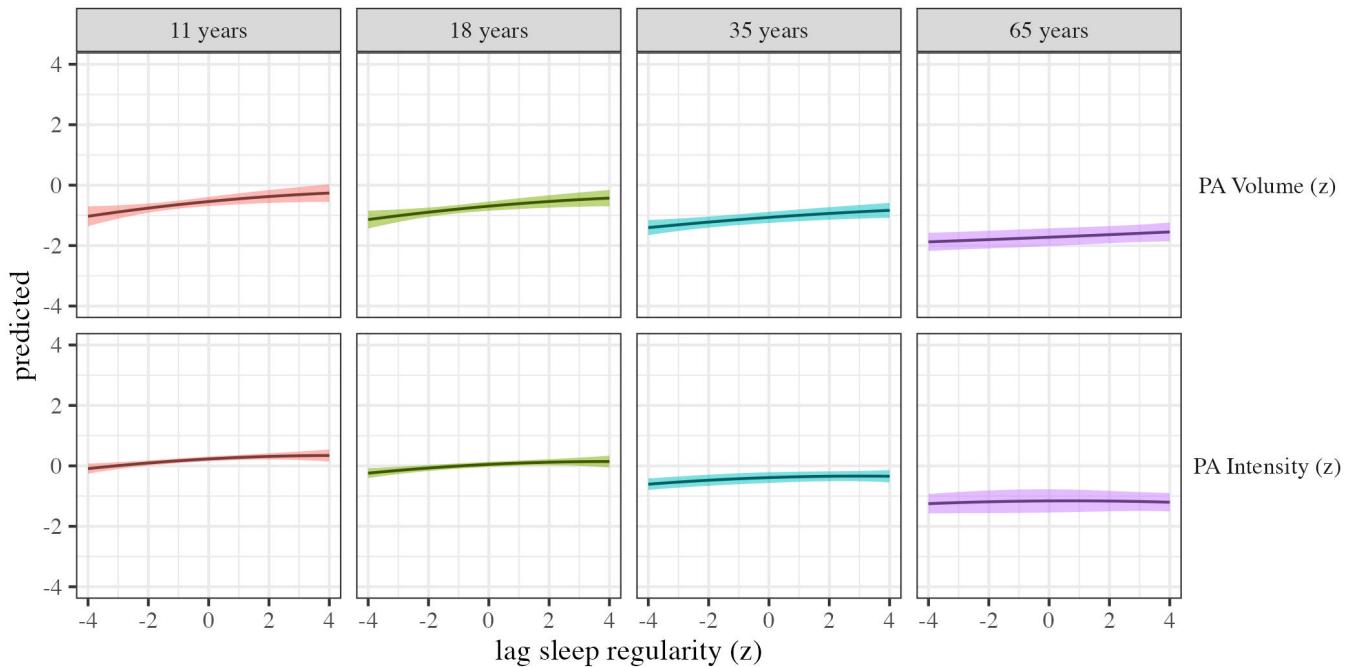


Figure 6. Physical activity by sleep regularity

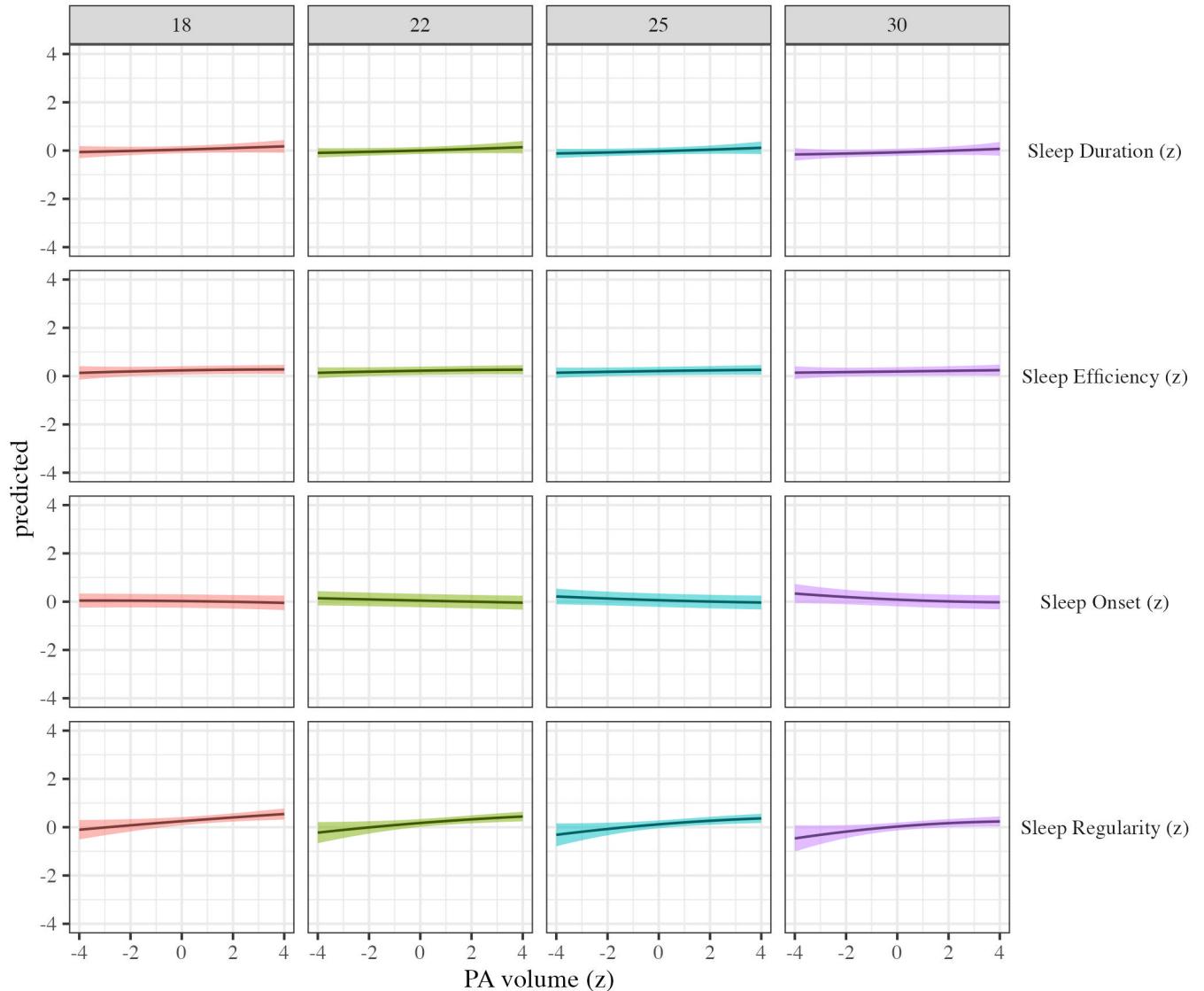


Figure 7. Sleep metrics on Physical activity volume by BMI

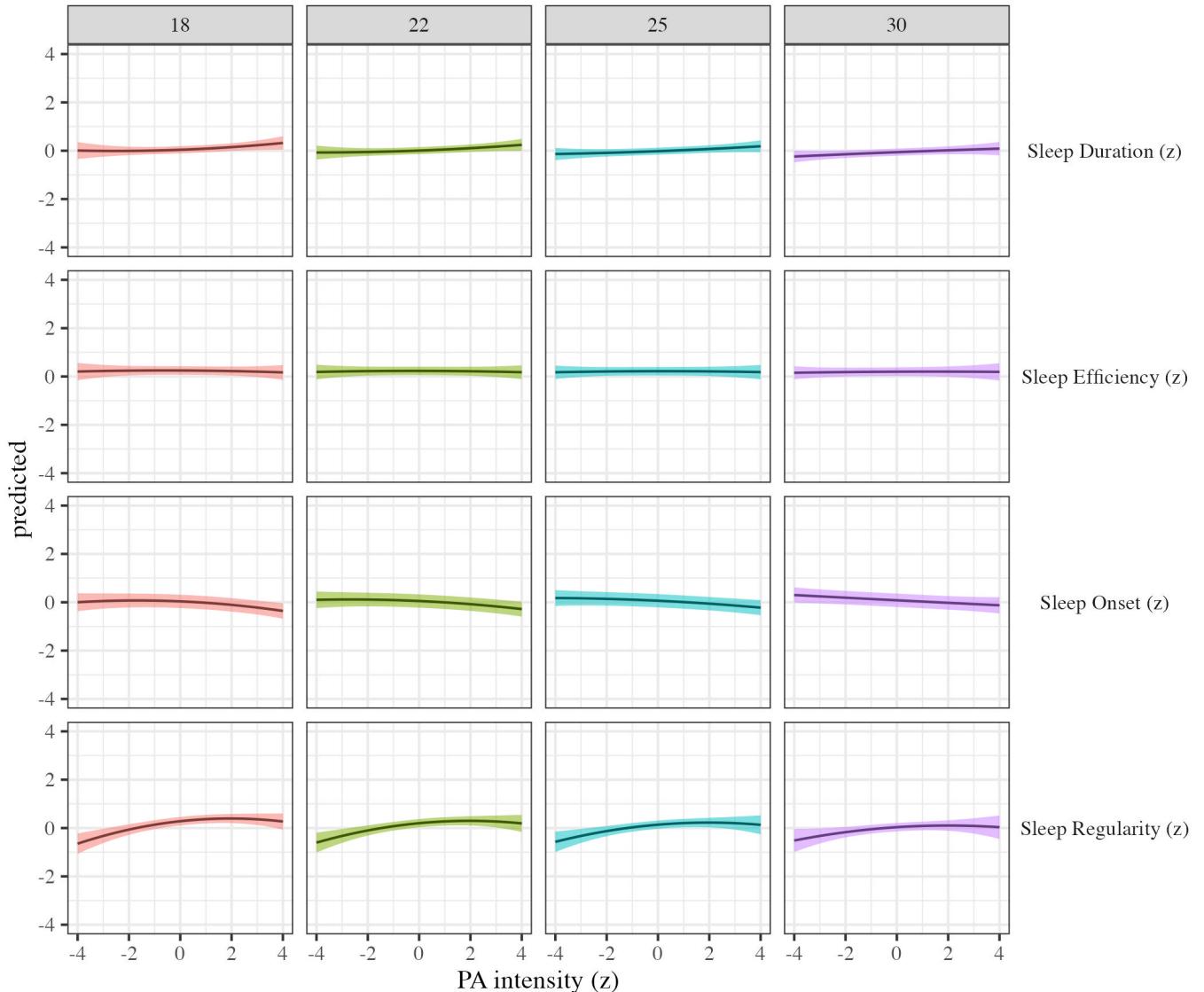


Figure 8. Sleep metrics on Physical activity intensity moderated by BMI

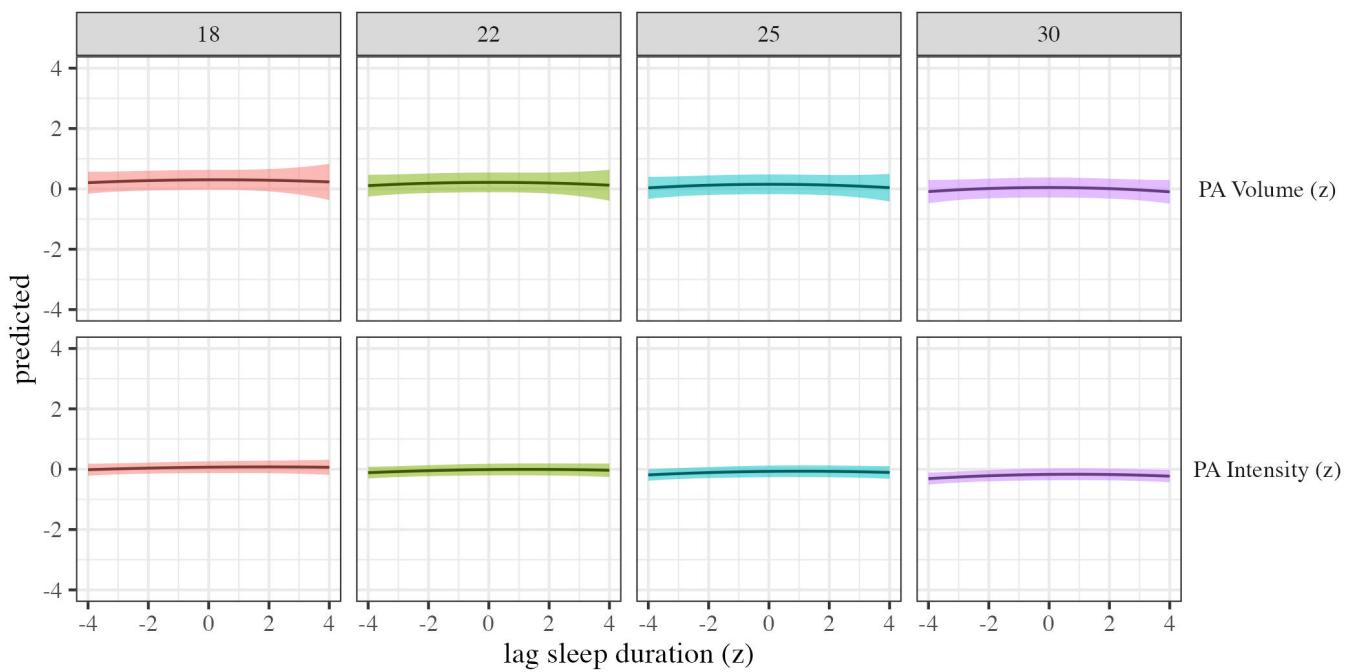


Figure 9. Physical activity by sleep duration moderated by BMI

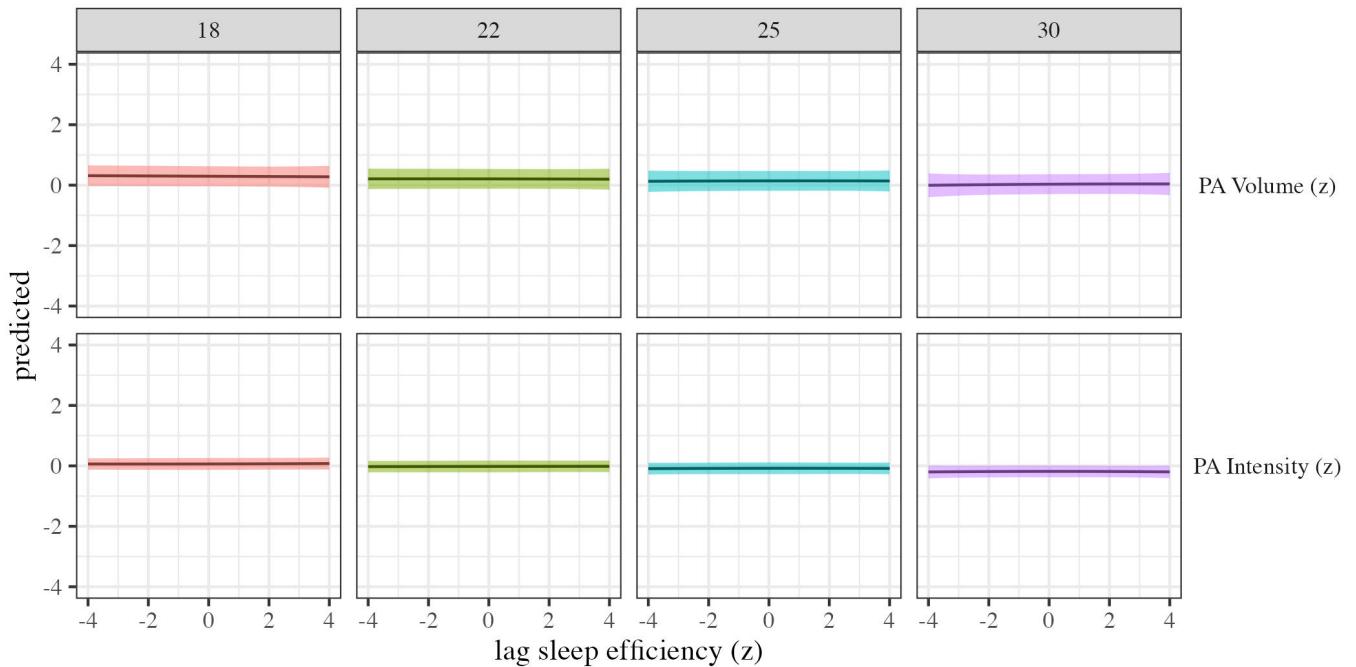


Figure 10. Physical activity by sleep efficiency moderated by BMI

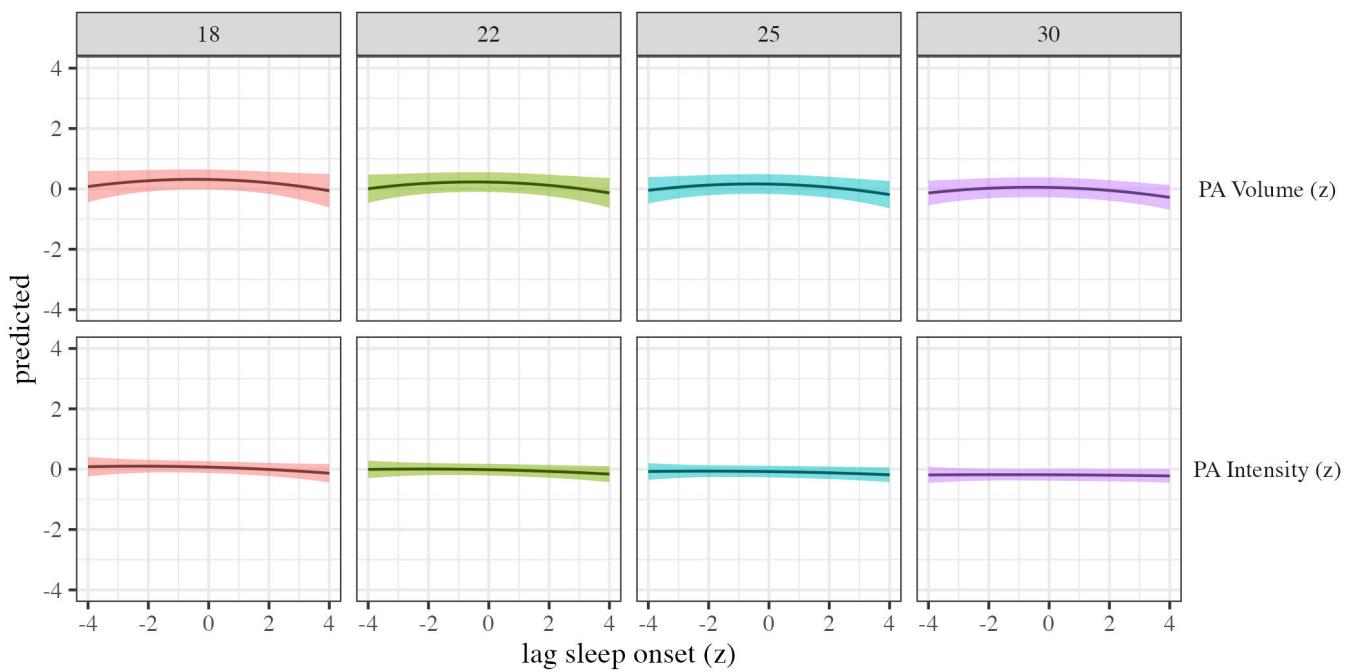


Figure 11. Physical activity by sleep onset moderated by BMI

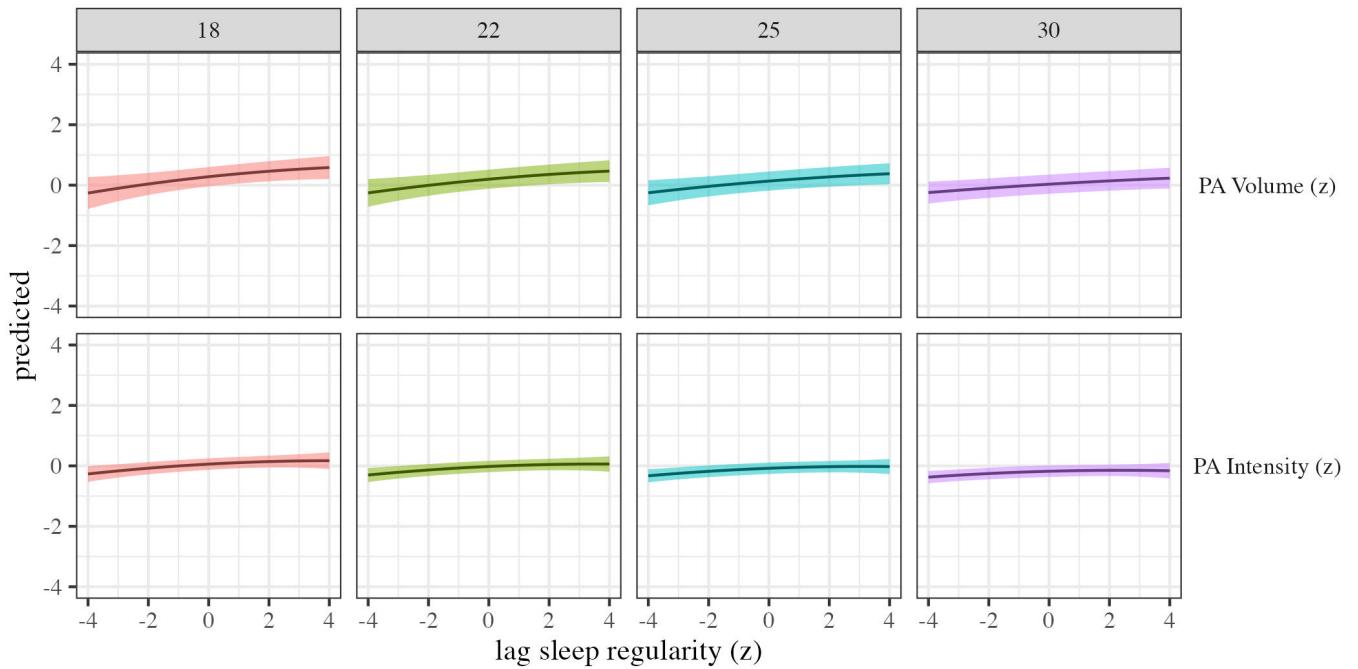


Figure 12. Physical activity by sleep regularity moderated by BMI

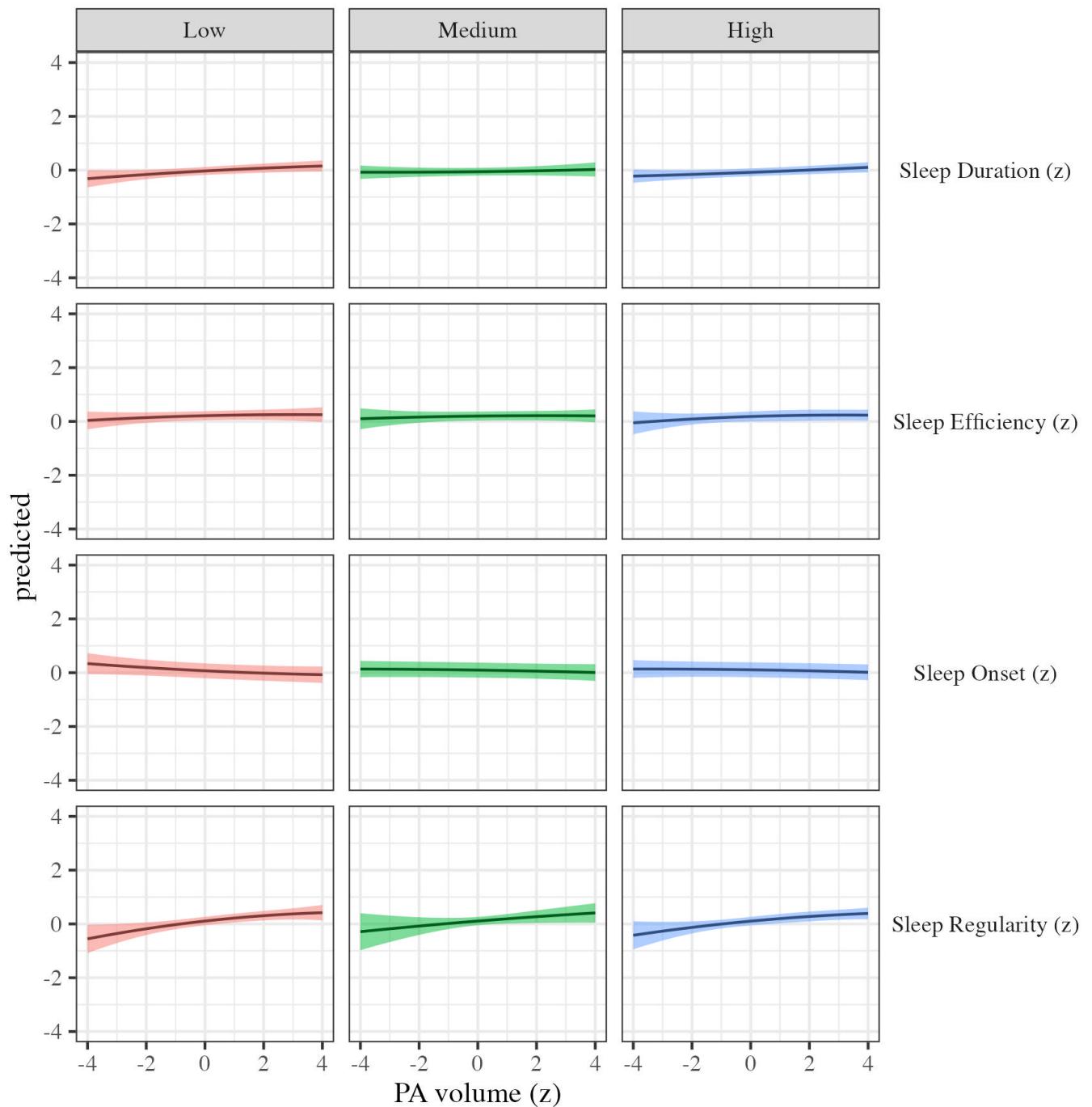


Figure 13. Sleep metrics on Physical activity volume by SES

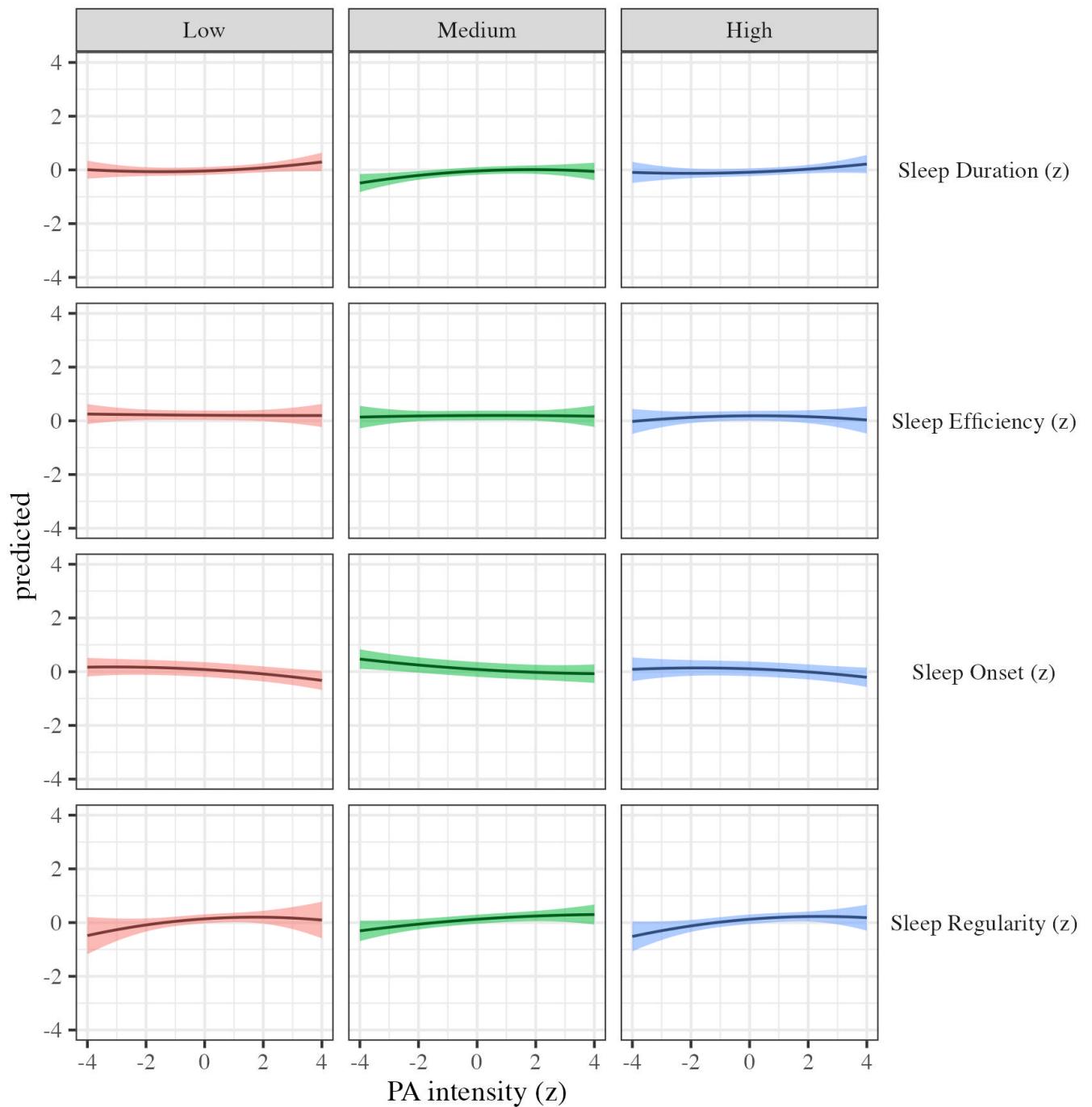


Figure 14. Sleep metrics on Physical activity intensity moderated by SES

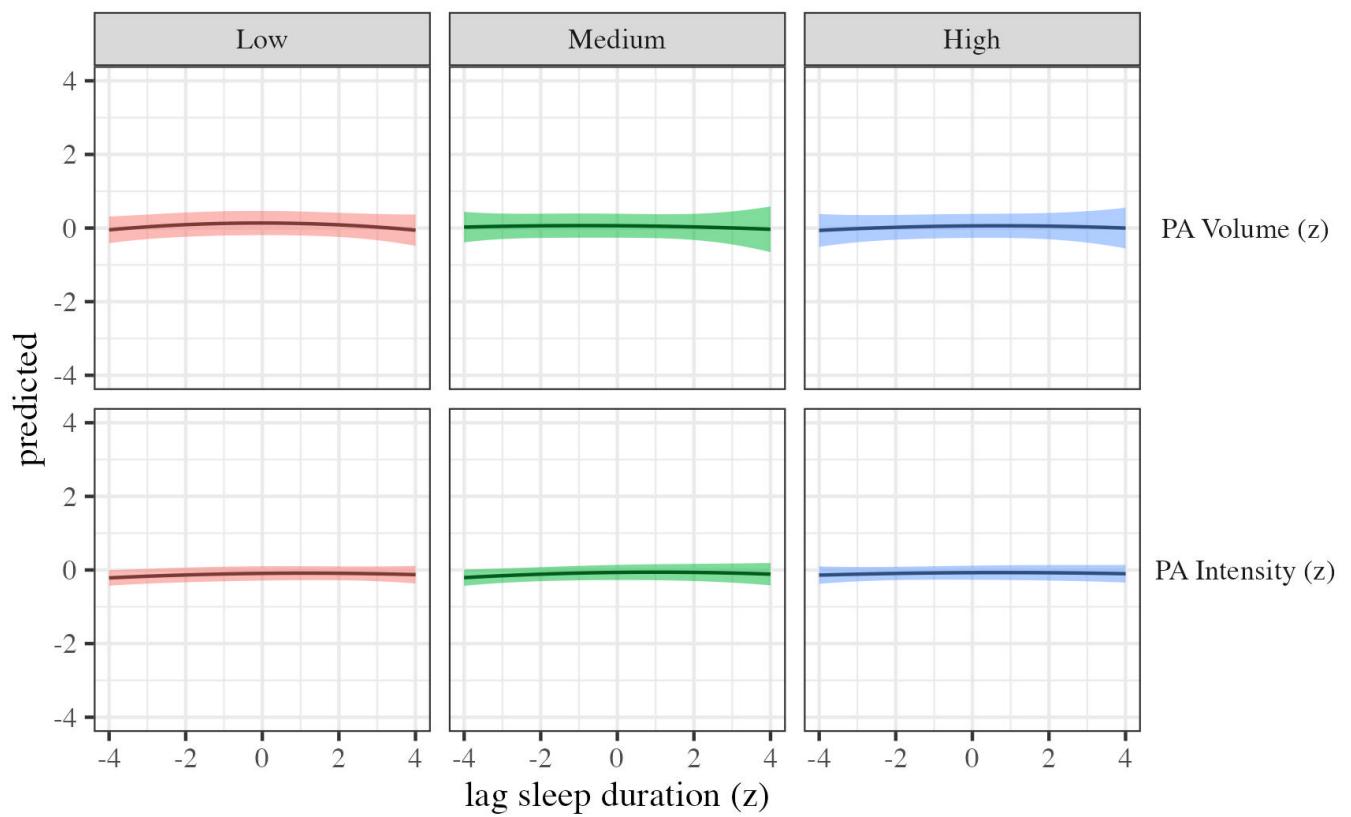


Figure 15. Physical activity by sleep duration moderated by SES

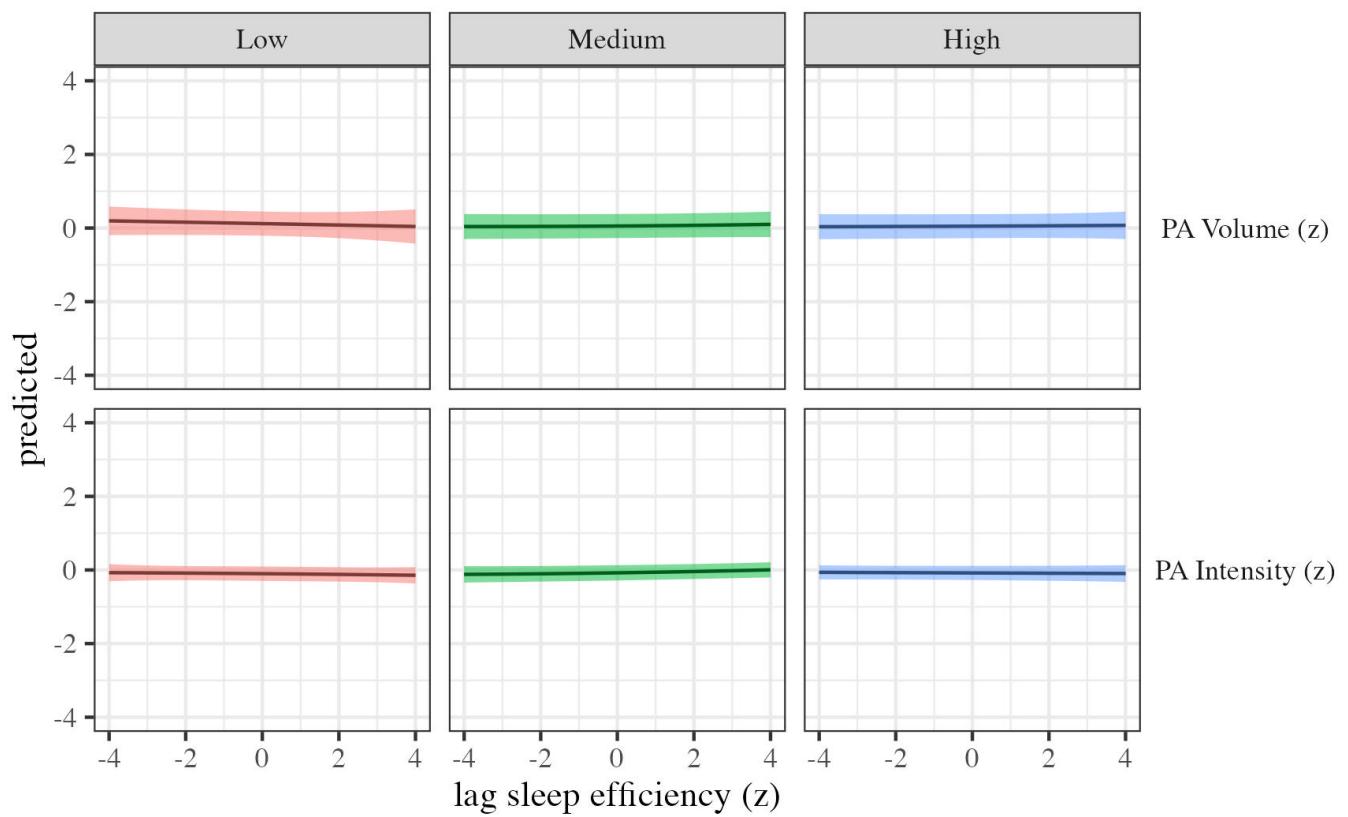


Figure 16. Physical activity by sleep efficiency moderated by SES

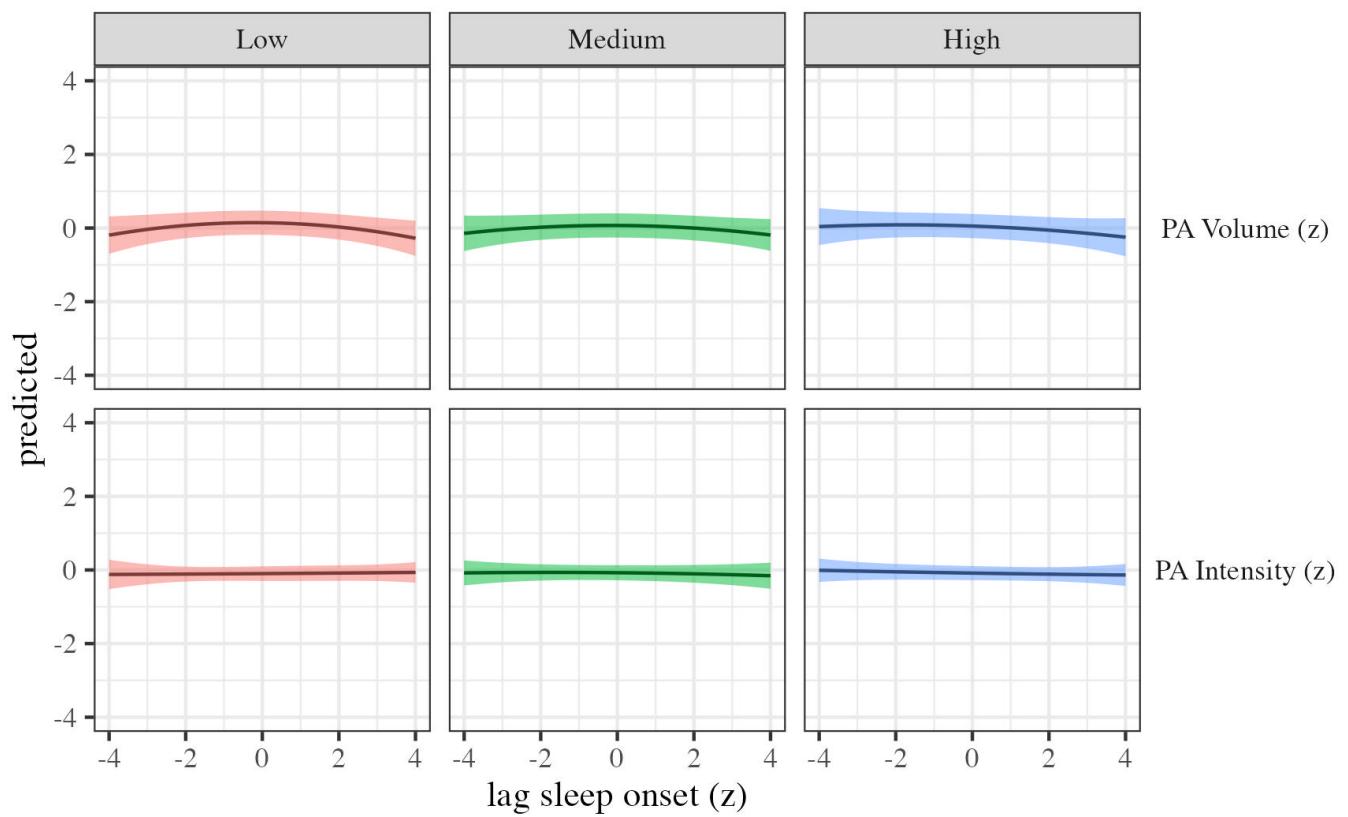


Figure 17. Physical activity by sleep onset moderated by SES

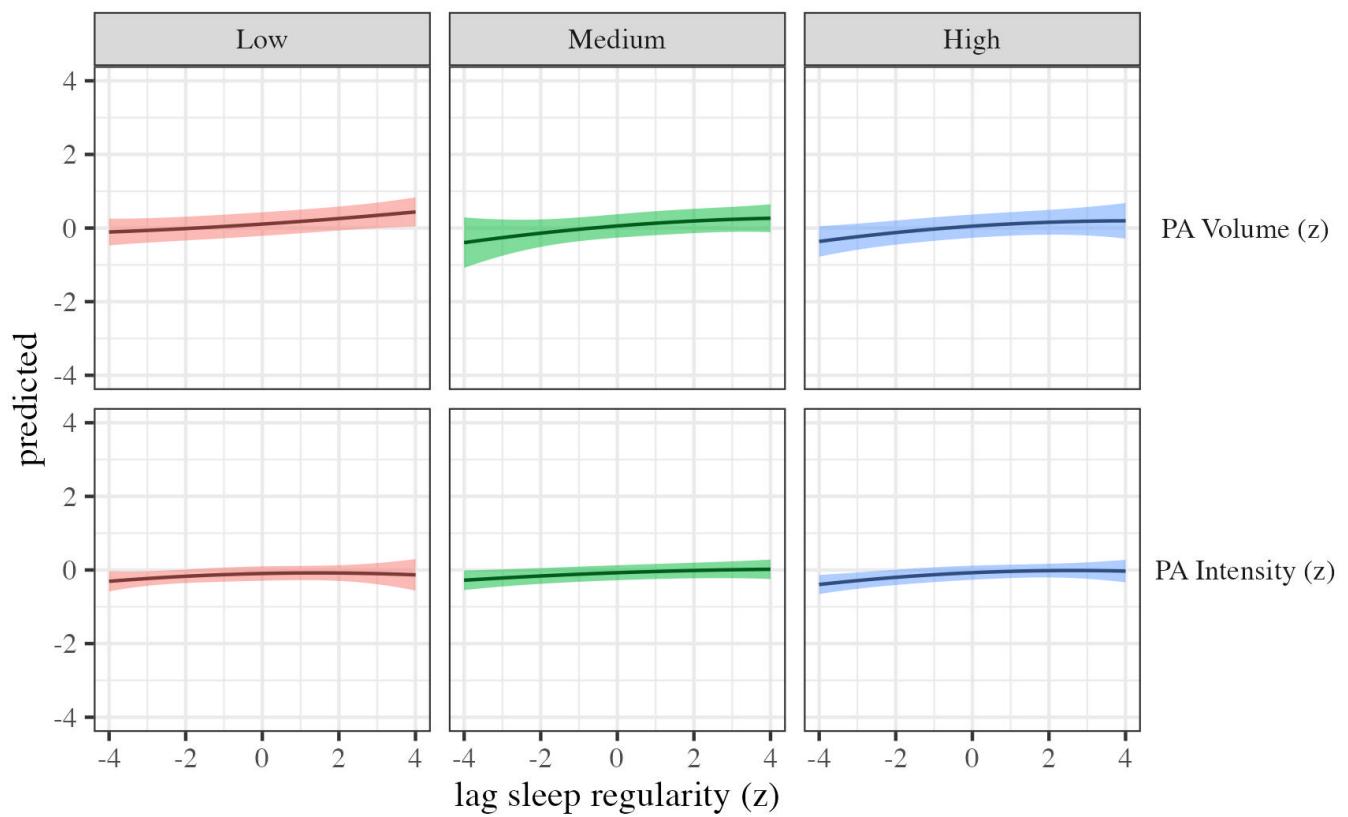


Figure 18. Physical activity by sleep regularity moderated by SES

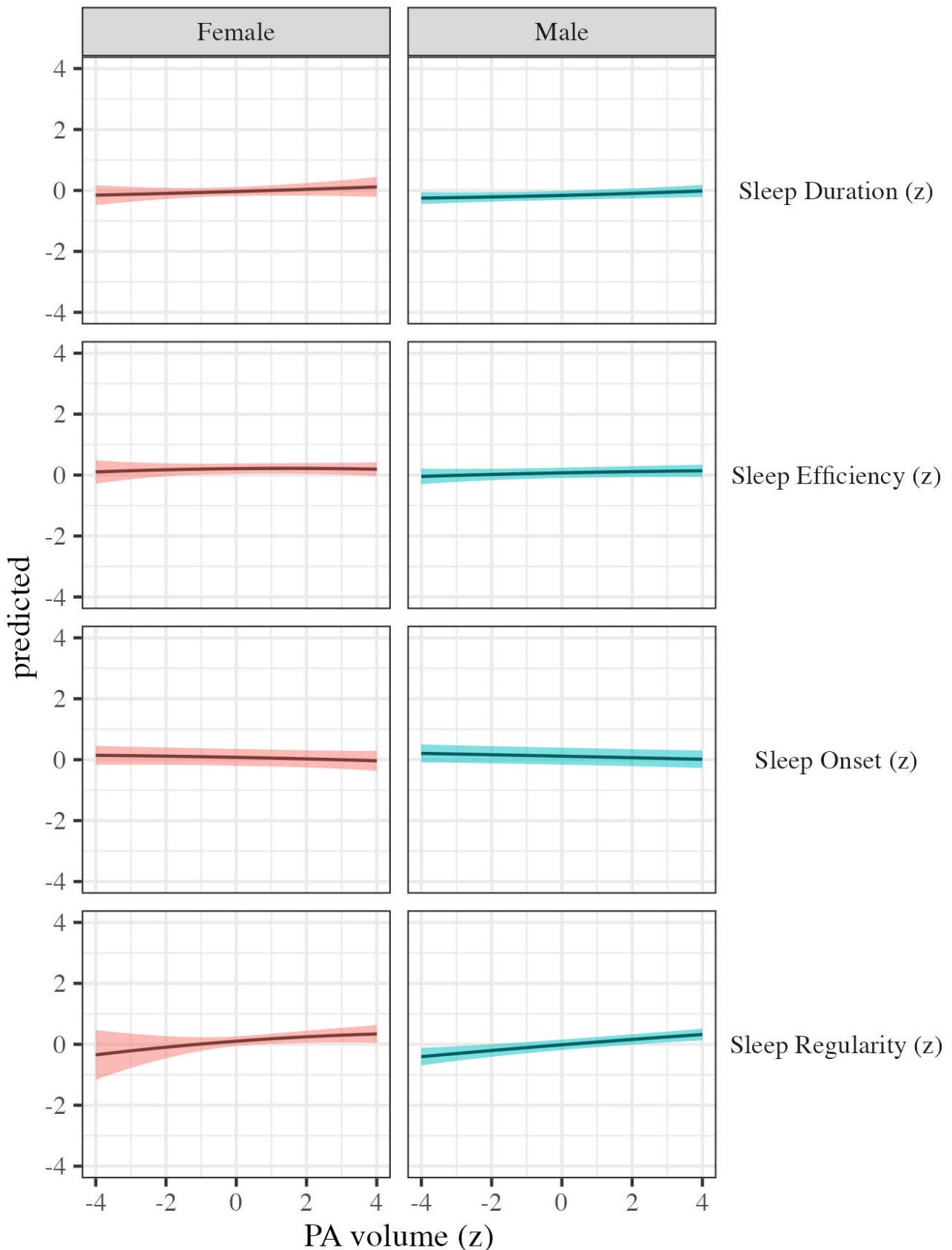


Figure 19. Sleep metrics on Physical activity volume by sex

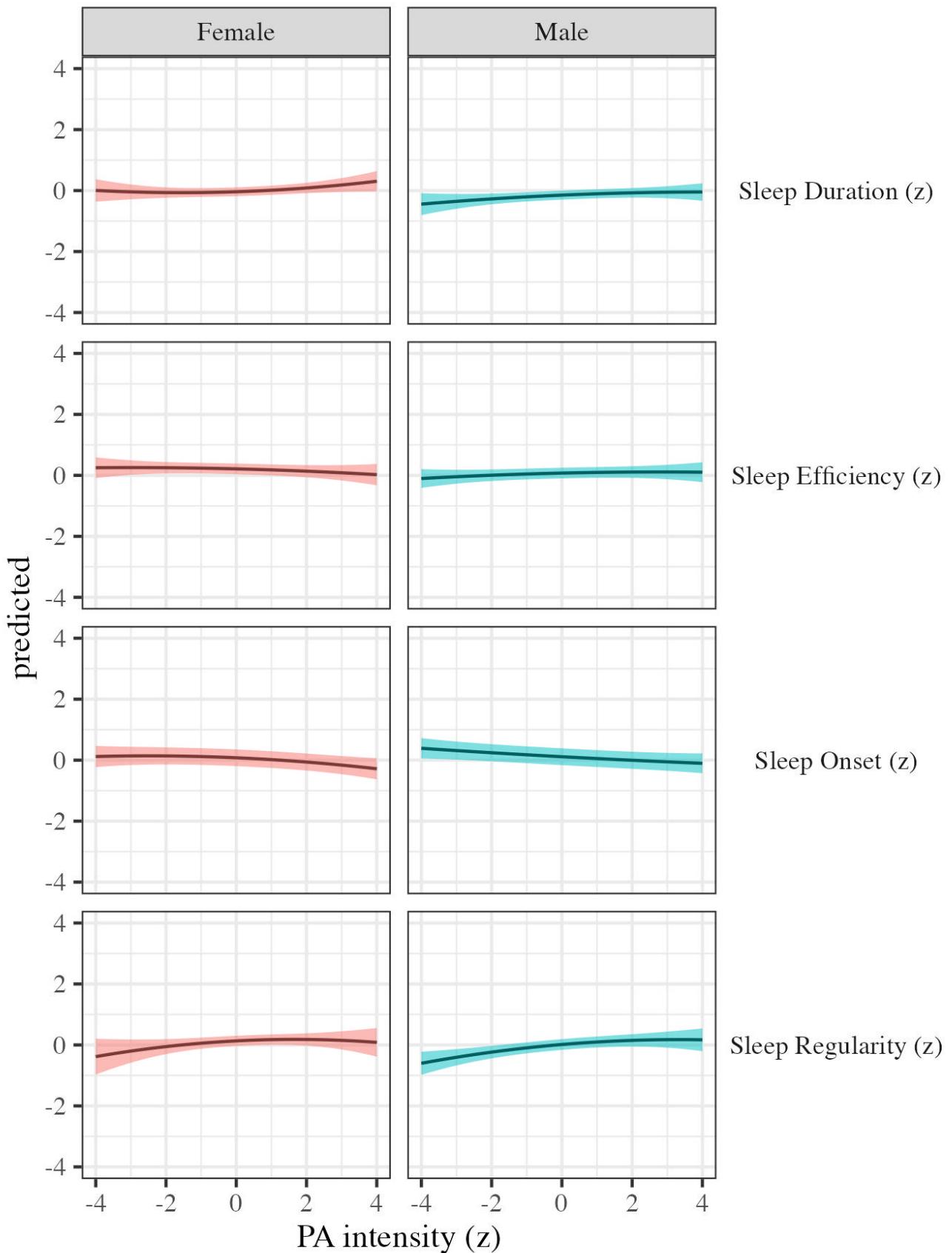


Figure 20. Sleep metrics on Physical activity intensity moderated by sex

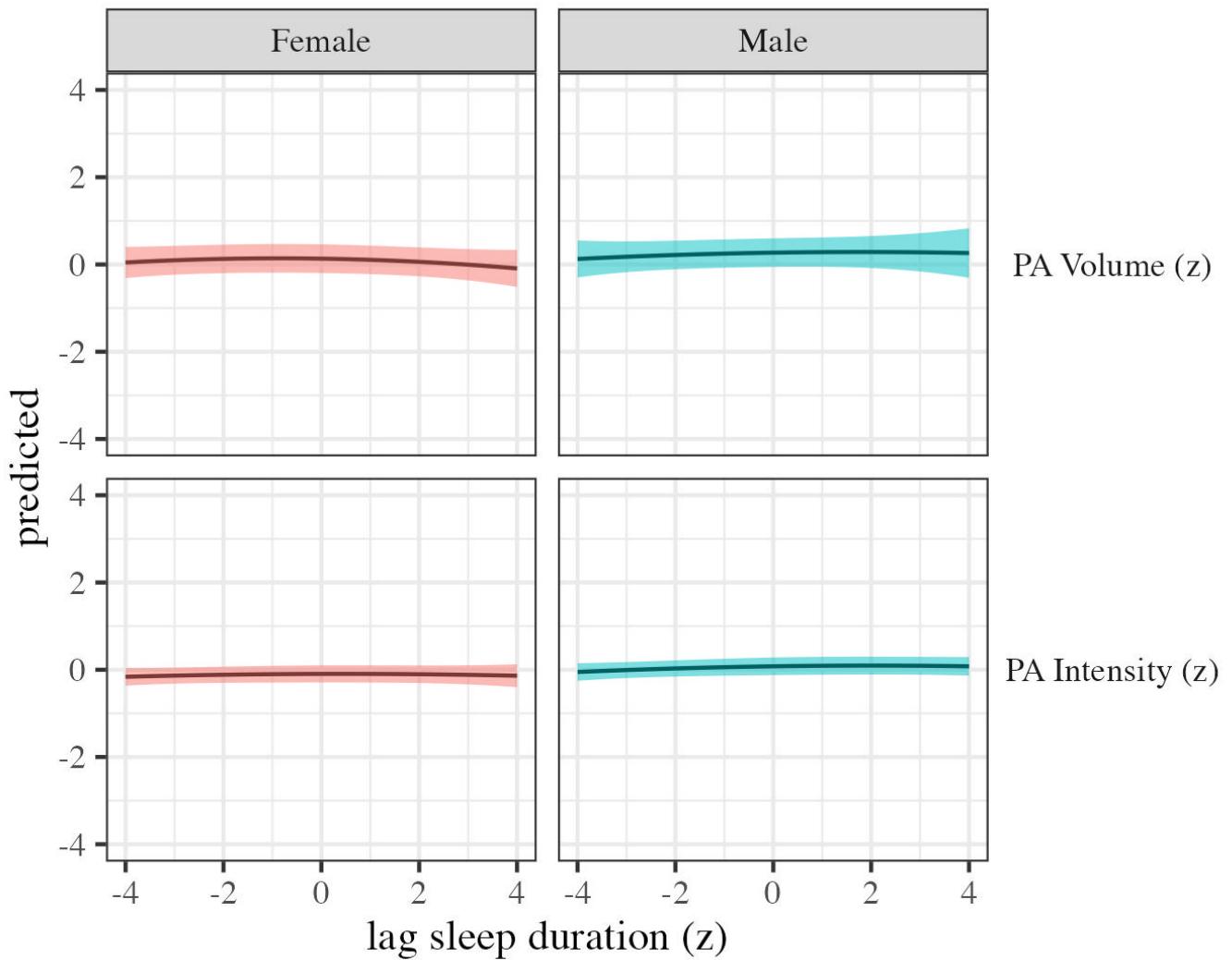


Figure 21. Physical activity by sleep duration moderated by sex

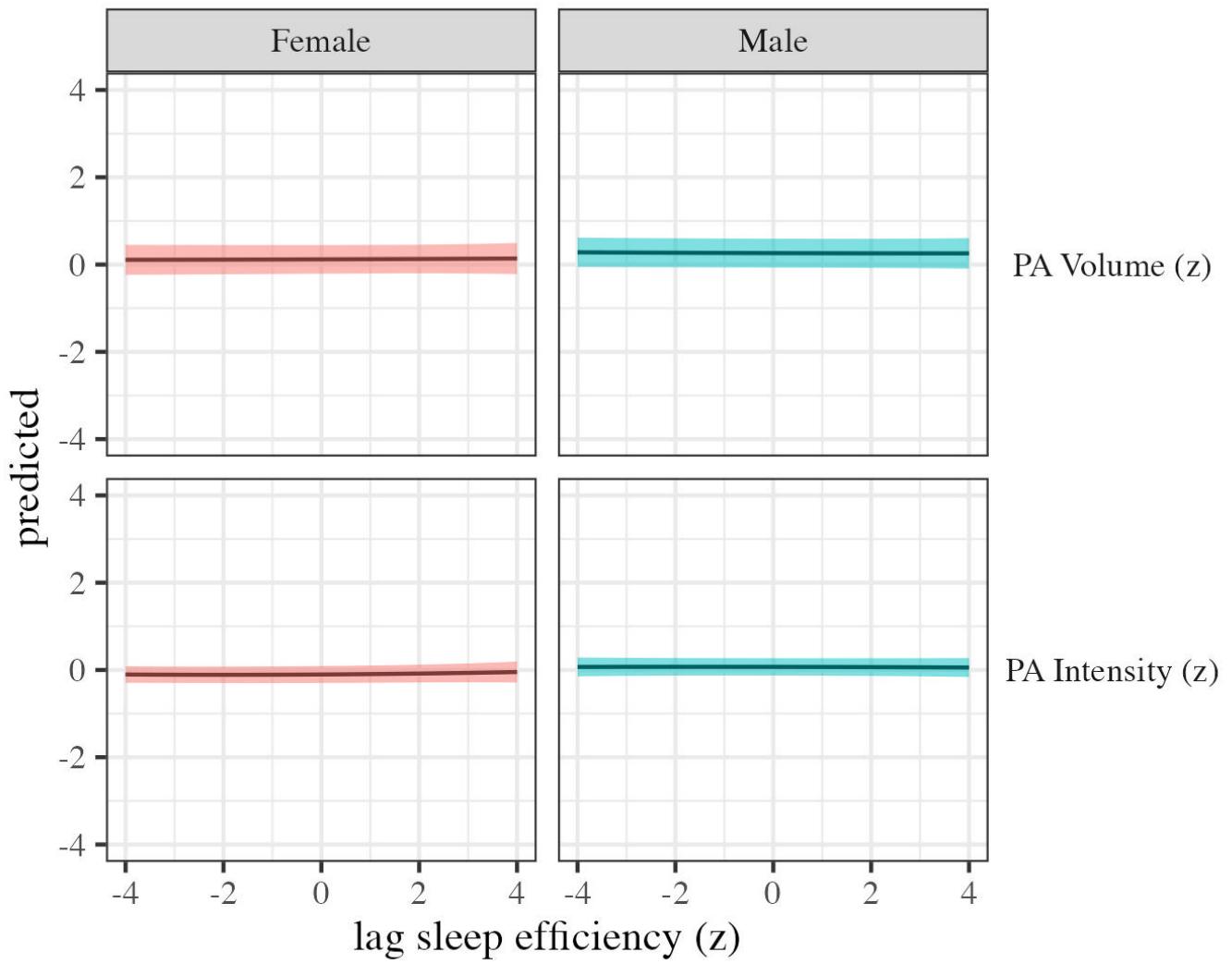


Figure 22. Physical activity by sleep efficiency moderated by sex

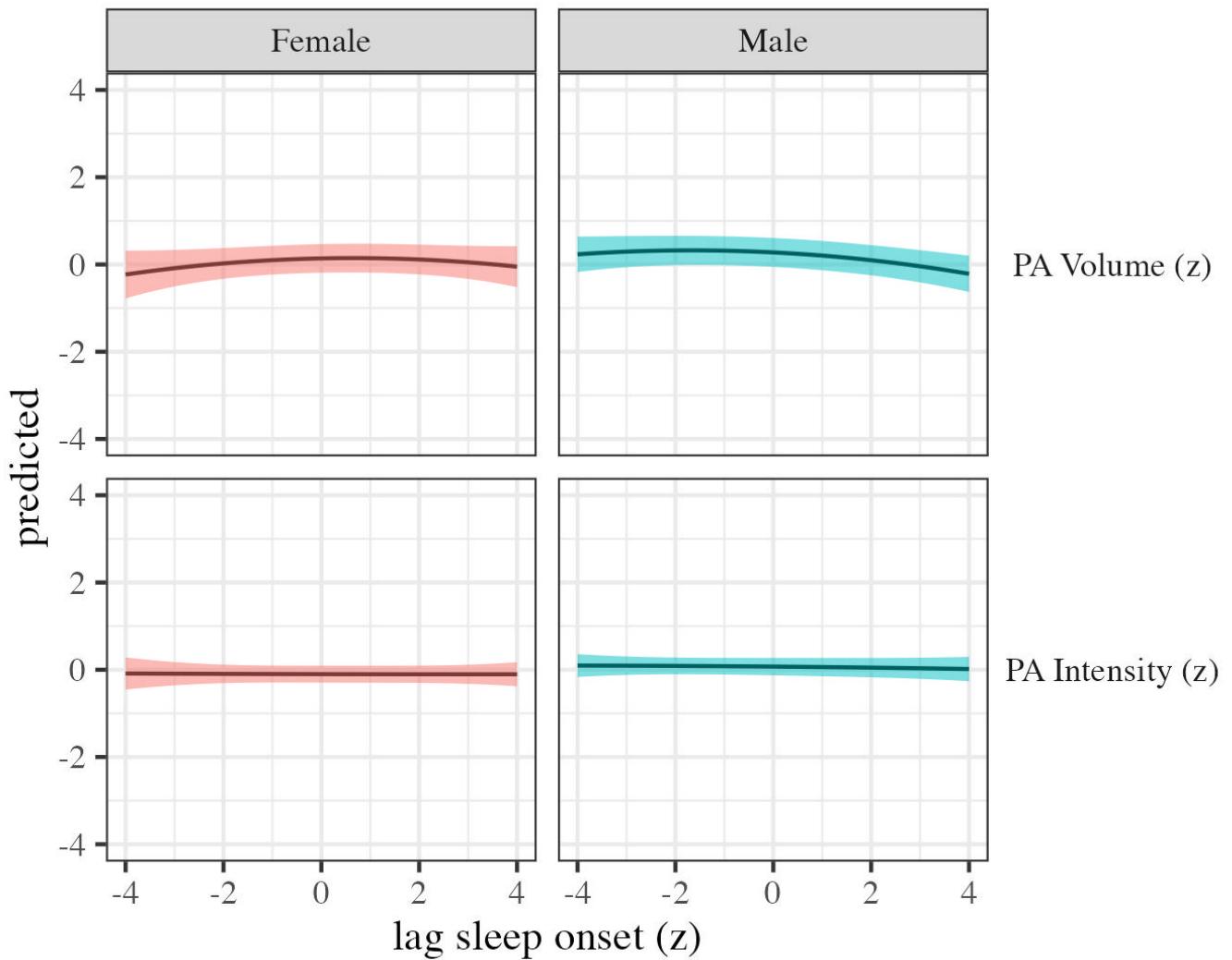


Figure 23. Physical activity by sleep onset moderated by sex

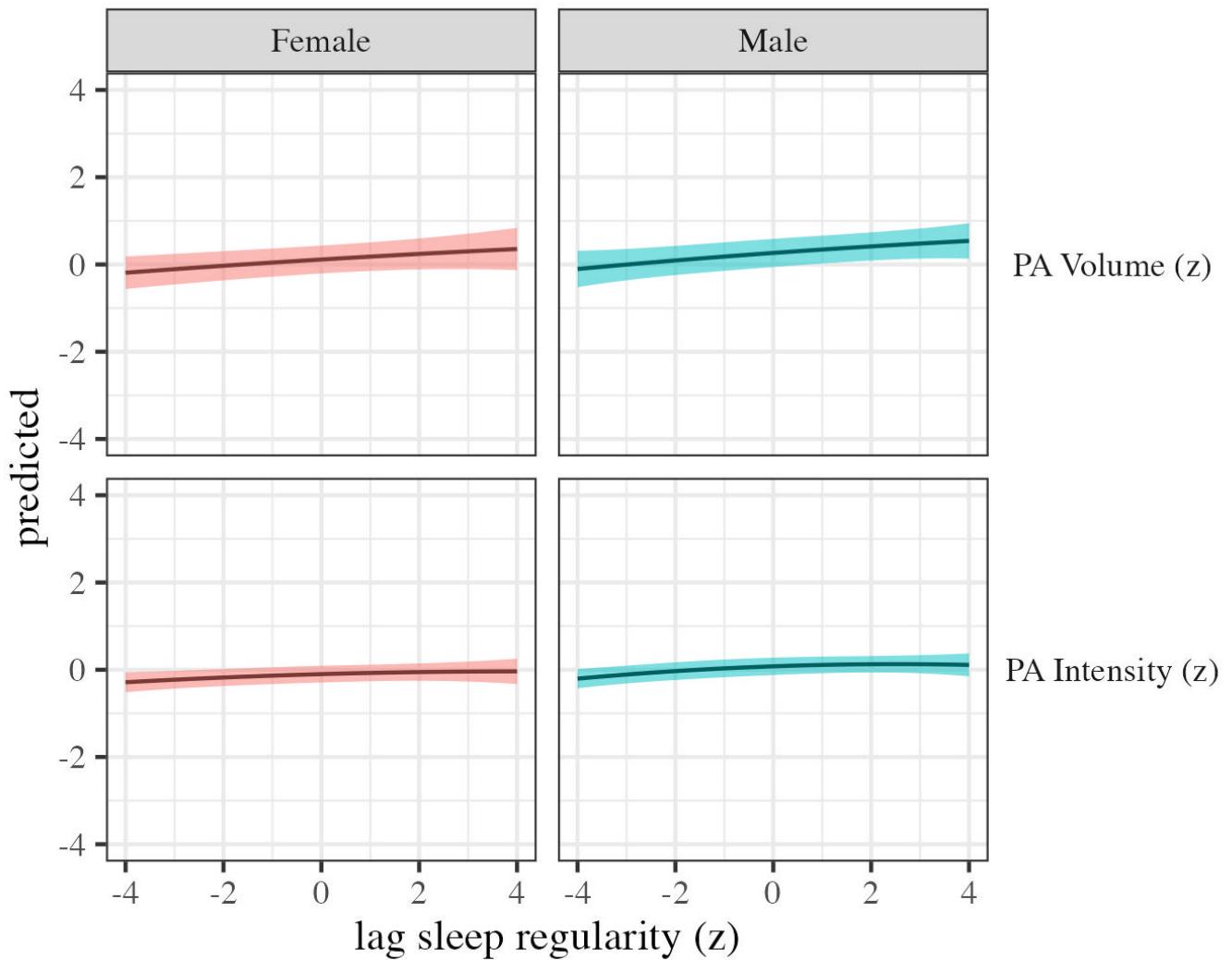


Figure 24. Physical activity by sleep regularity moderated by sex

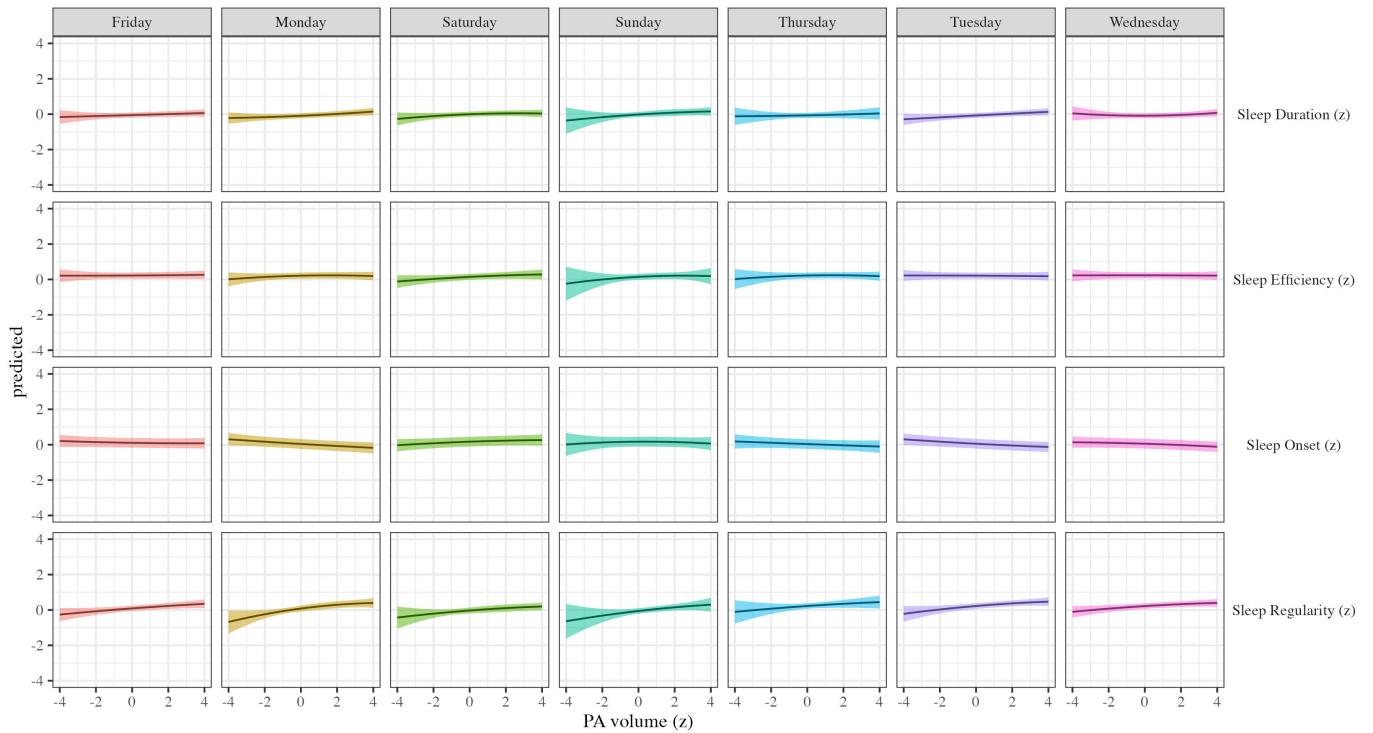


Figure 25. Sleep metrics on Physical activity volume by weekday

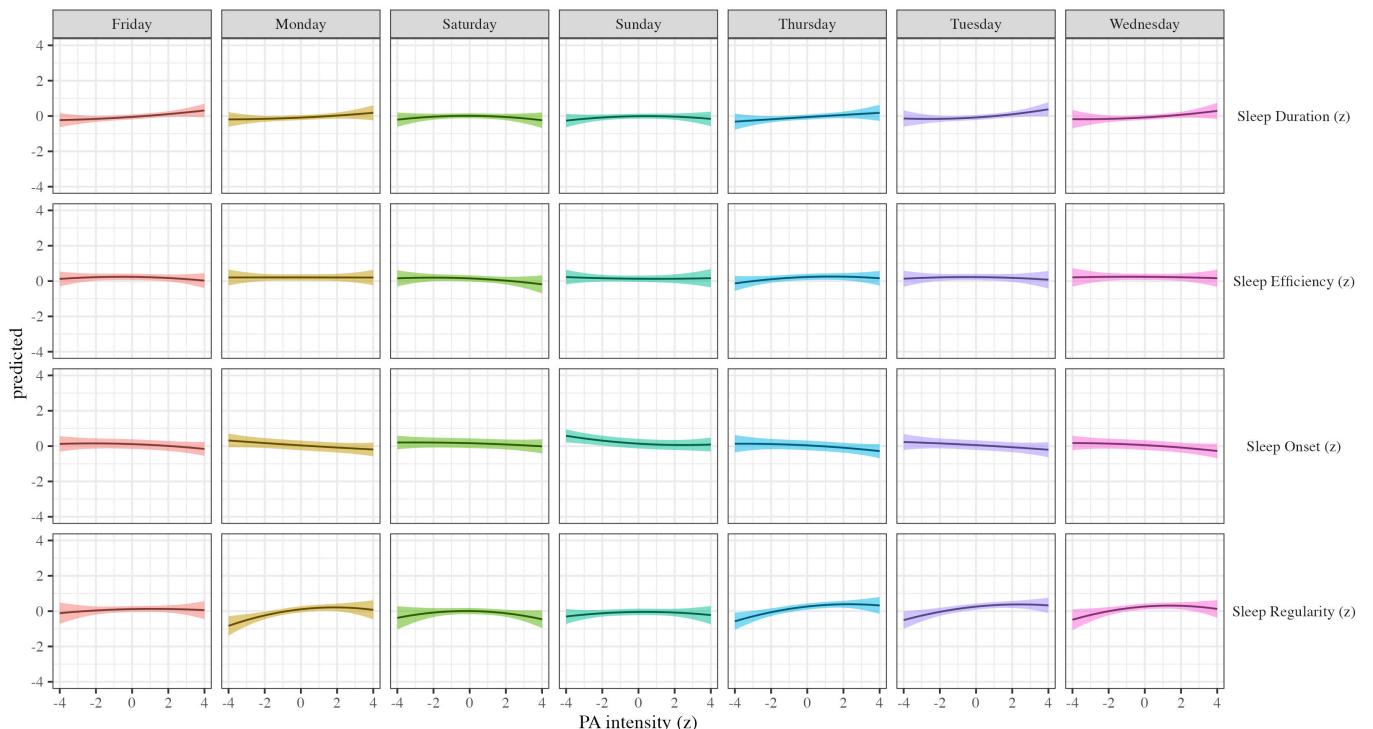


Figure 26. Sleep metrics on Physical activity intensity moderated by weekday

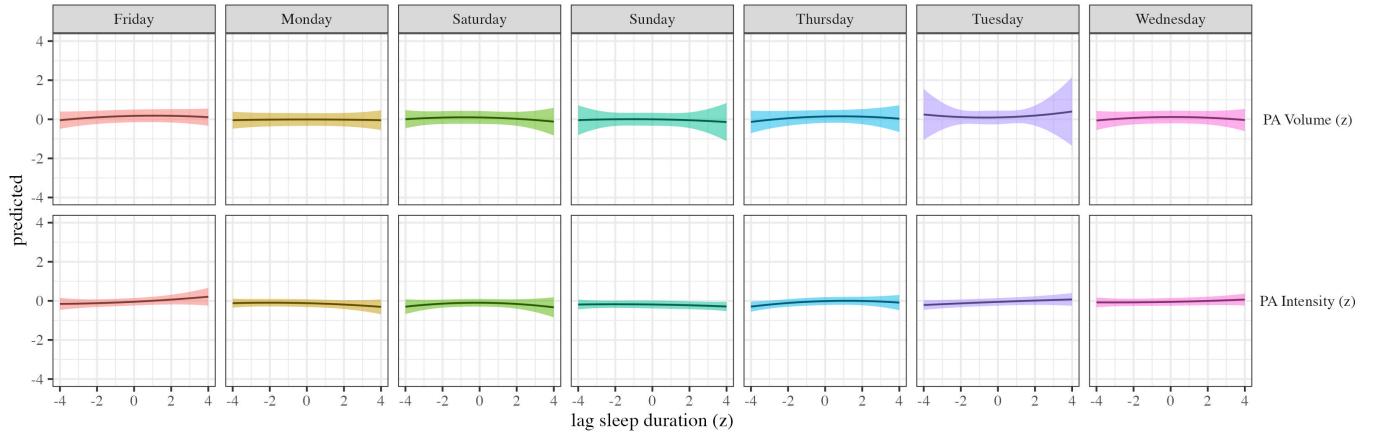


Figure 27. Physical activity by sleep duration moderated by weekday

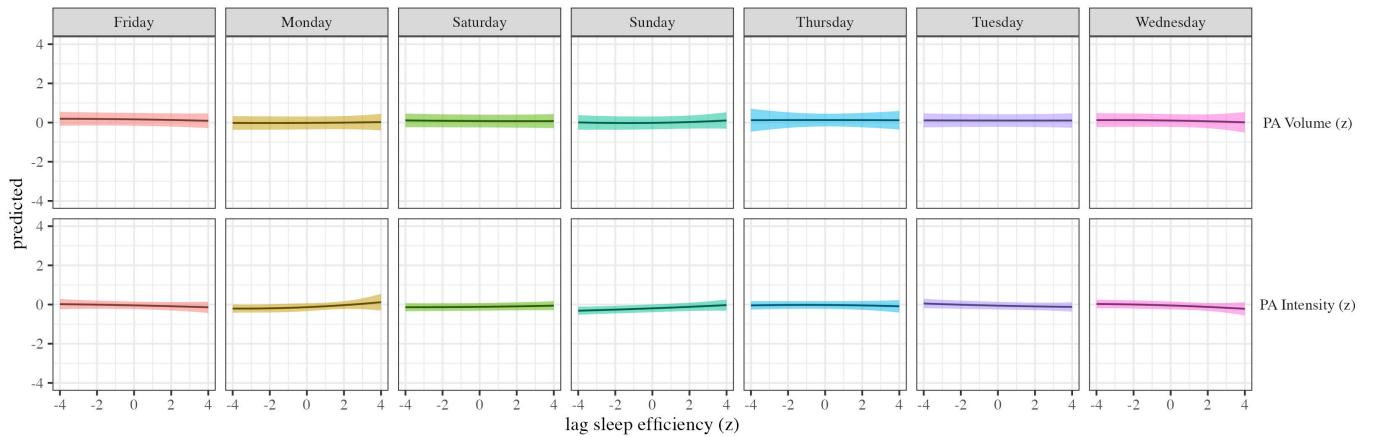


Figure 28. Physical activity by sleep efficiency moderated by weekday

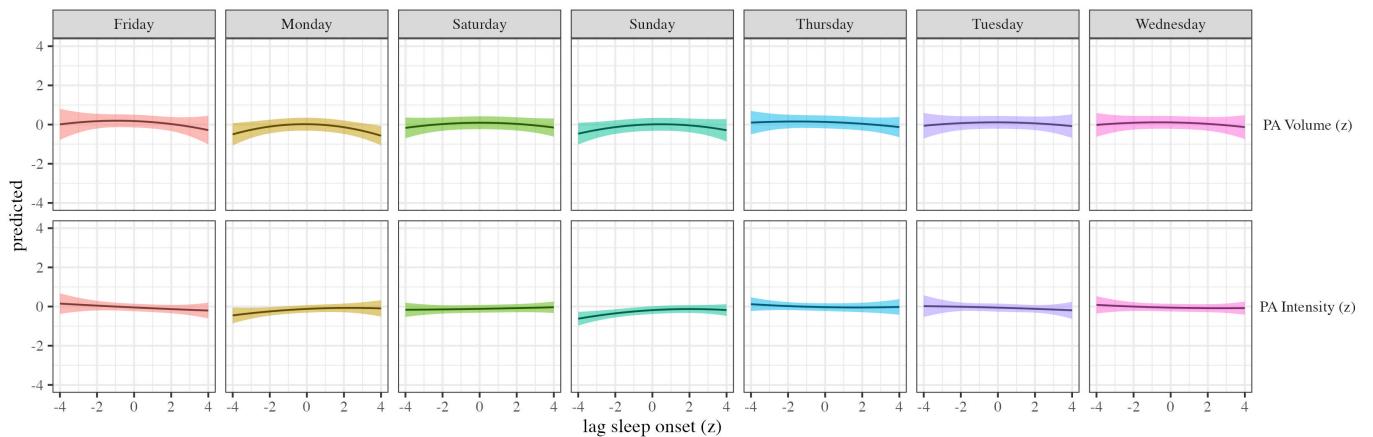


Figure 29. Physical activity by sleep onset moderated by weekday

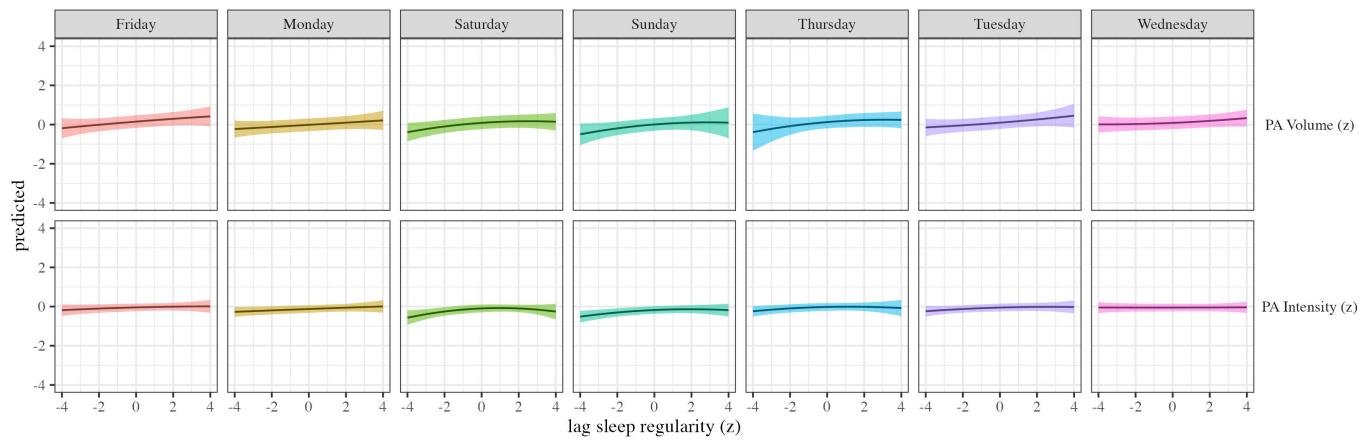


Figure 30. Physical activity by sleep regularity moderated by weekday

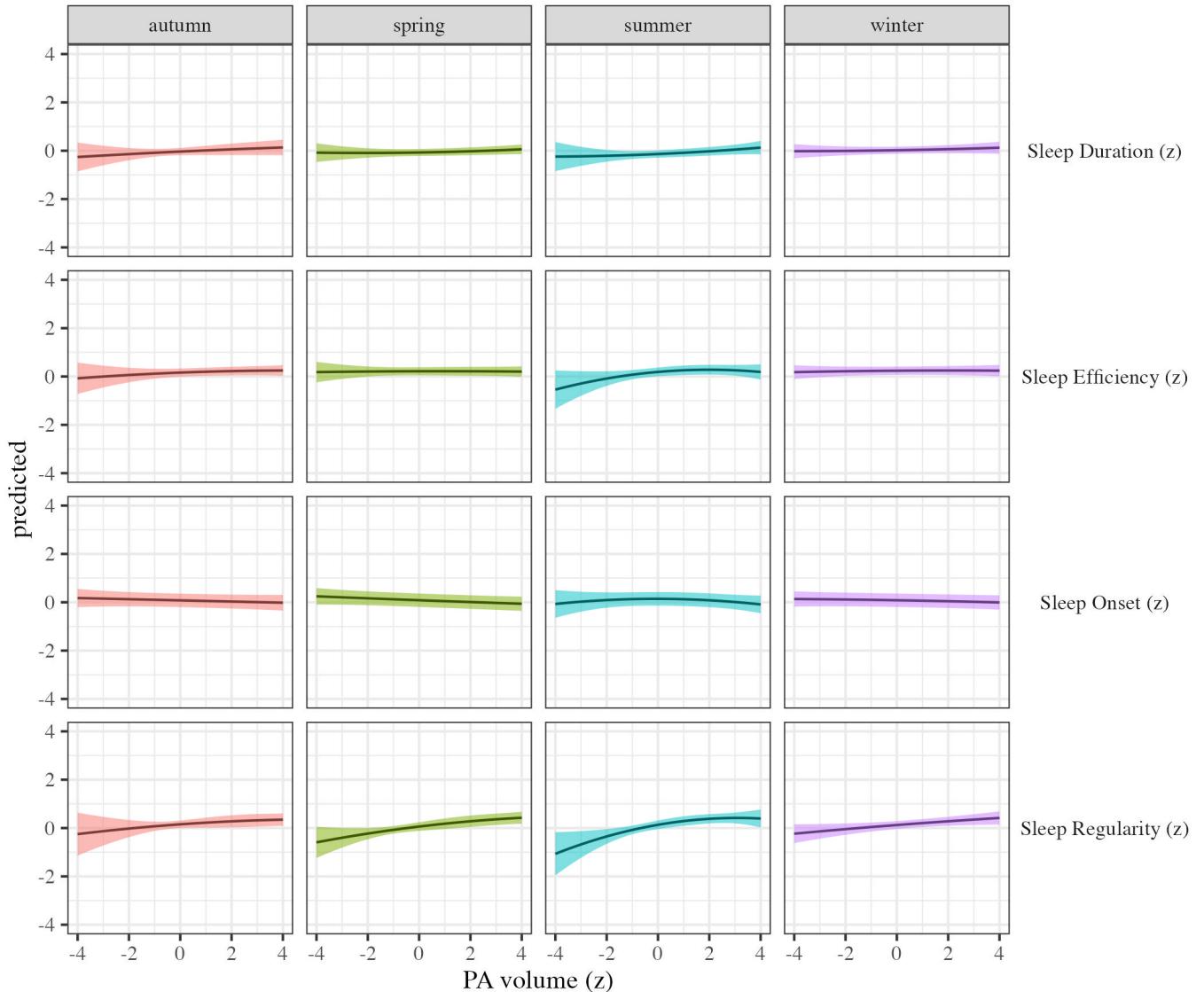


Figure 31. Sleep metrics on Physical activity volume by season

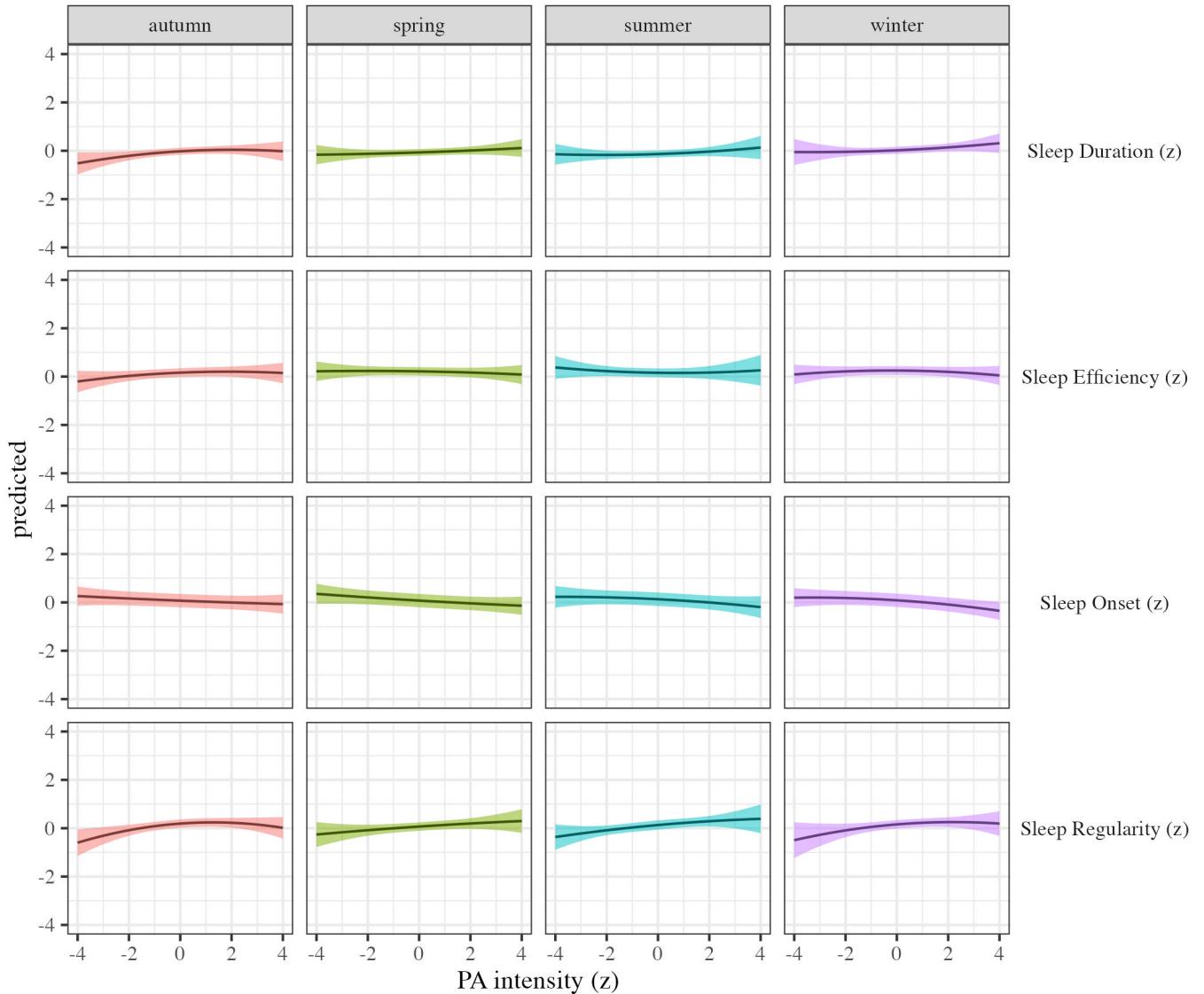


Figure 32. Sleep metrics on Physical activity intensity moderated by season

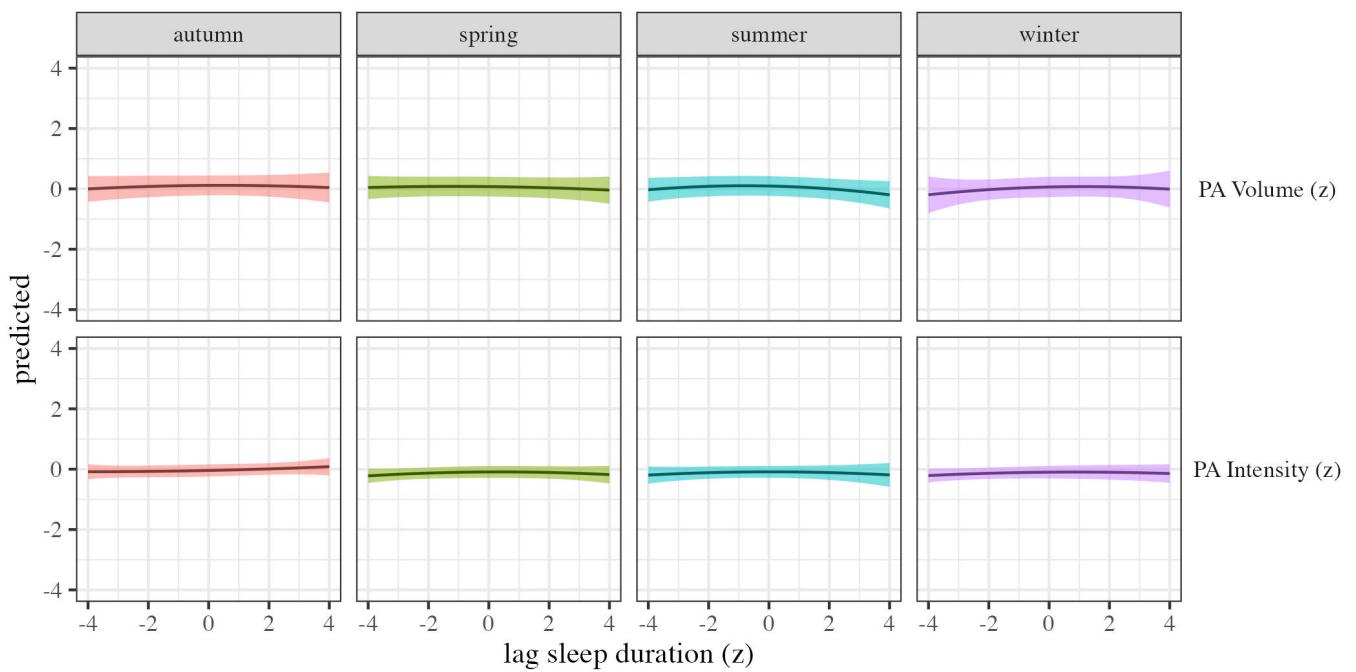


Figure 33. Physical activity by sleep duration moderated by season

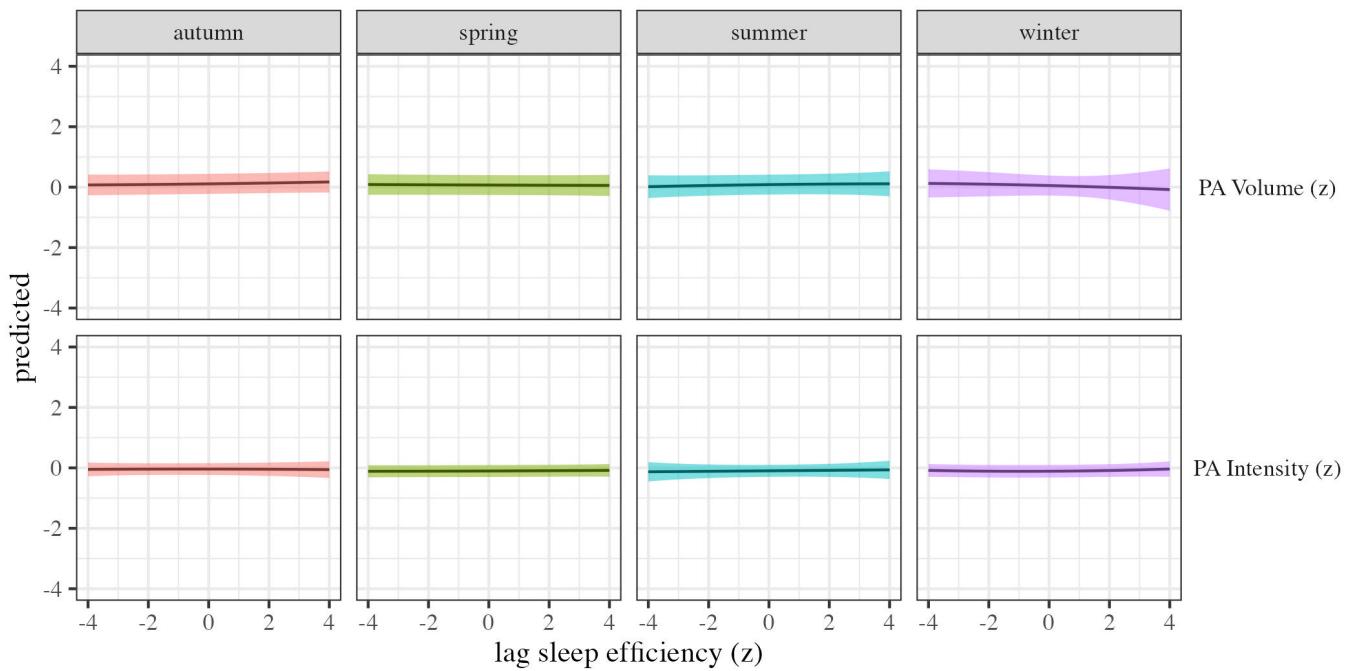


Figure 34. Physical activity by sleep efficiency moderated by season

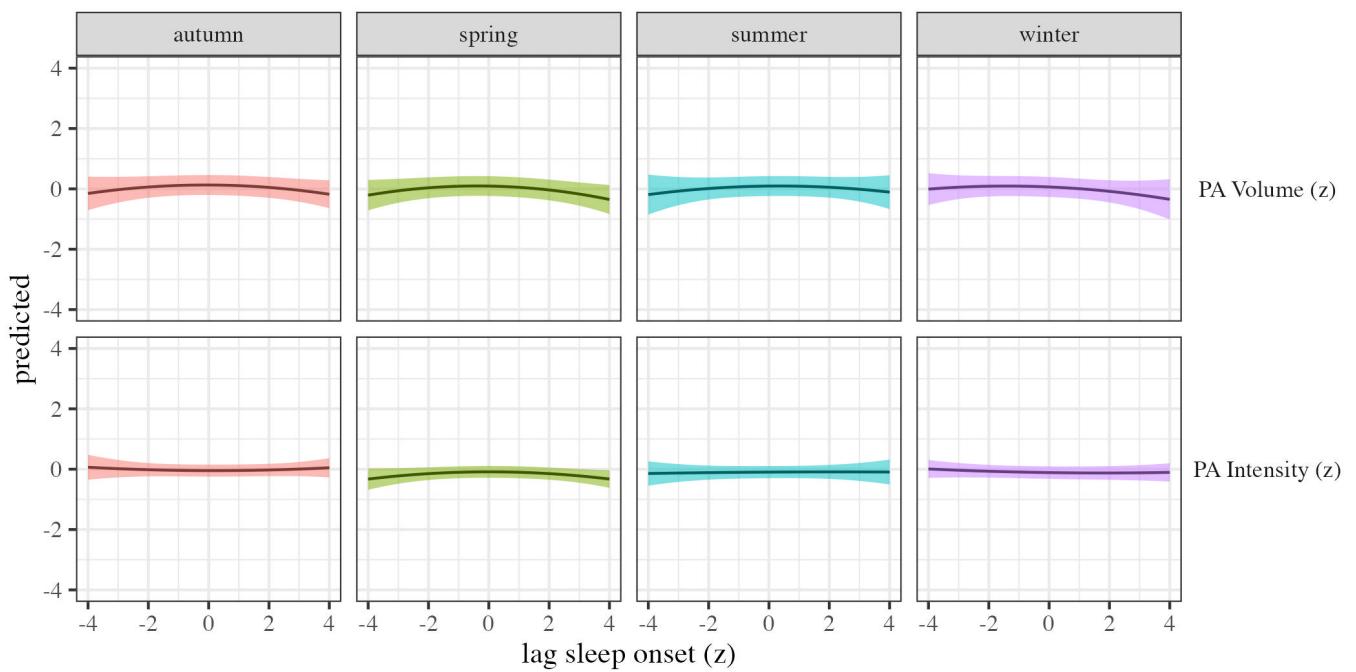


Figure 35. Physical activity by sleep onset moderated by season

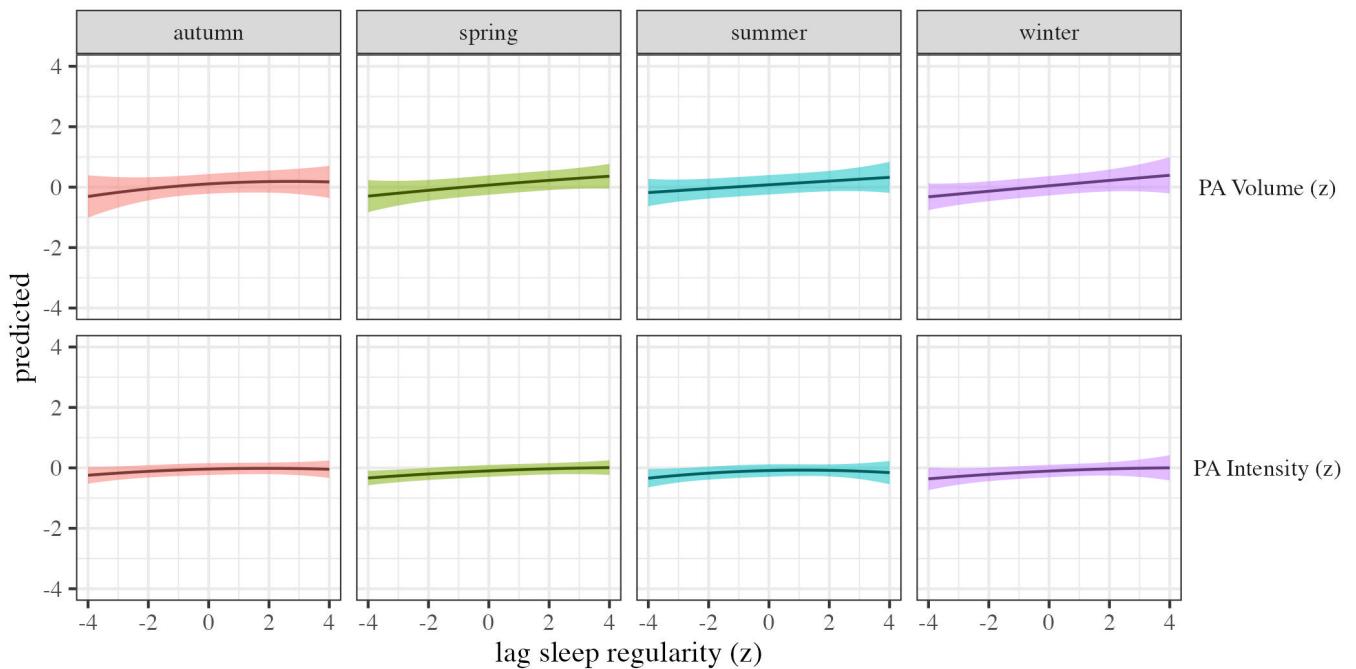


Figure 36. Physical activity by sleep regularity moderated by season

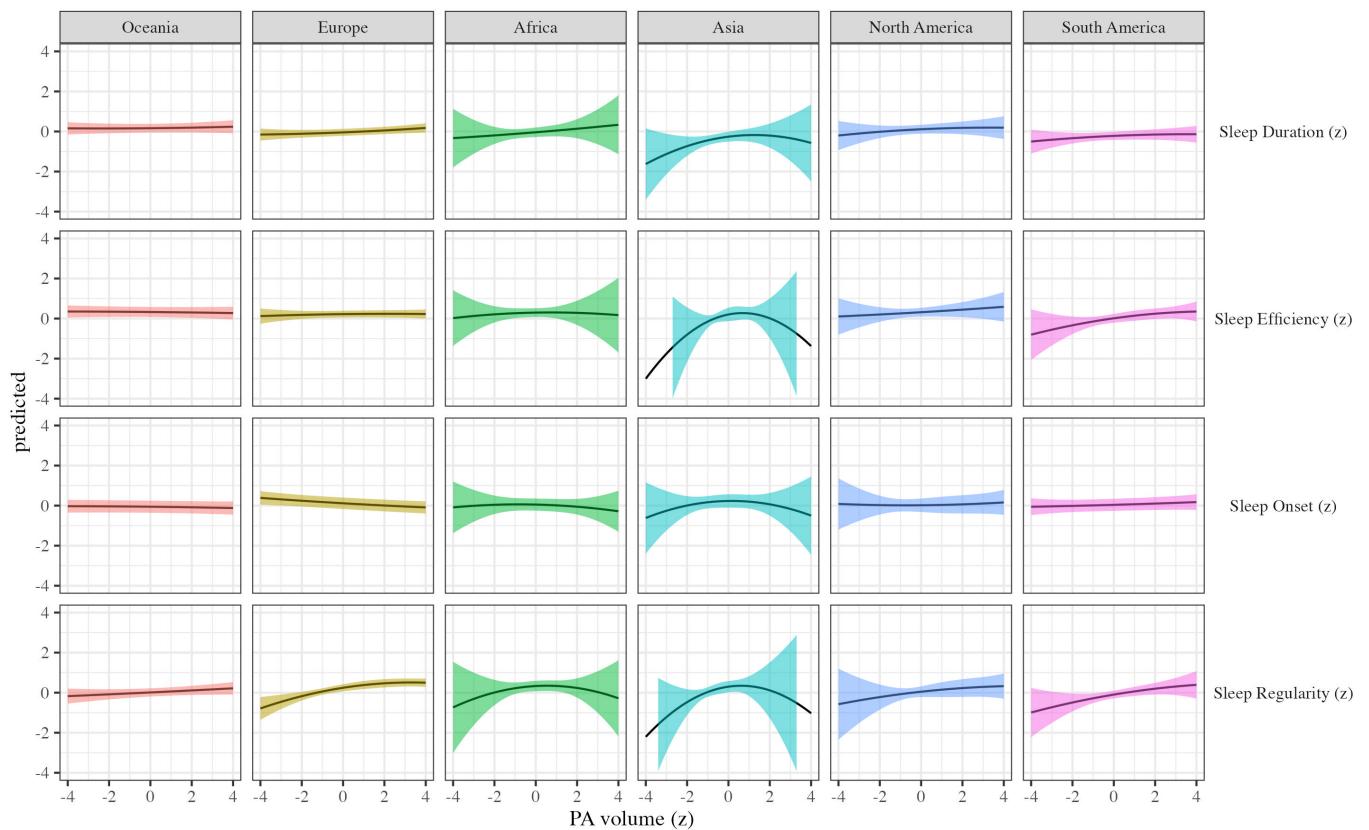


Figure 37. Sleep metrics on Physical activity volume by region

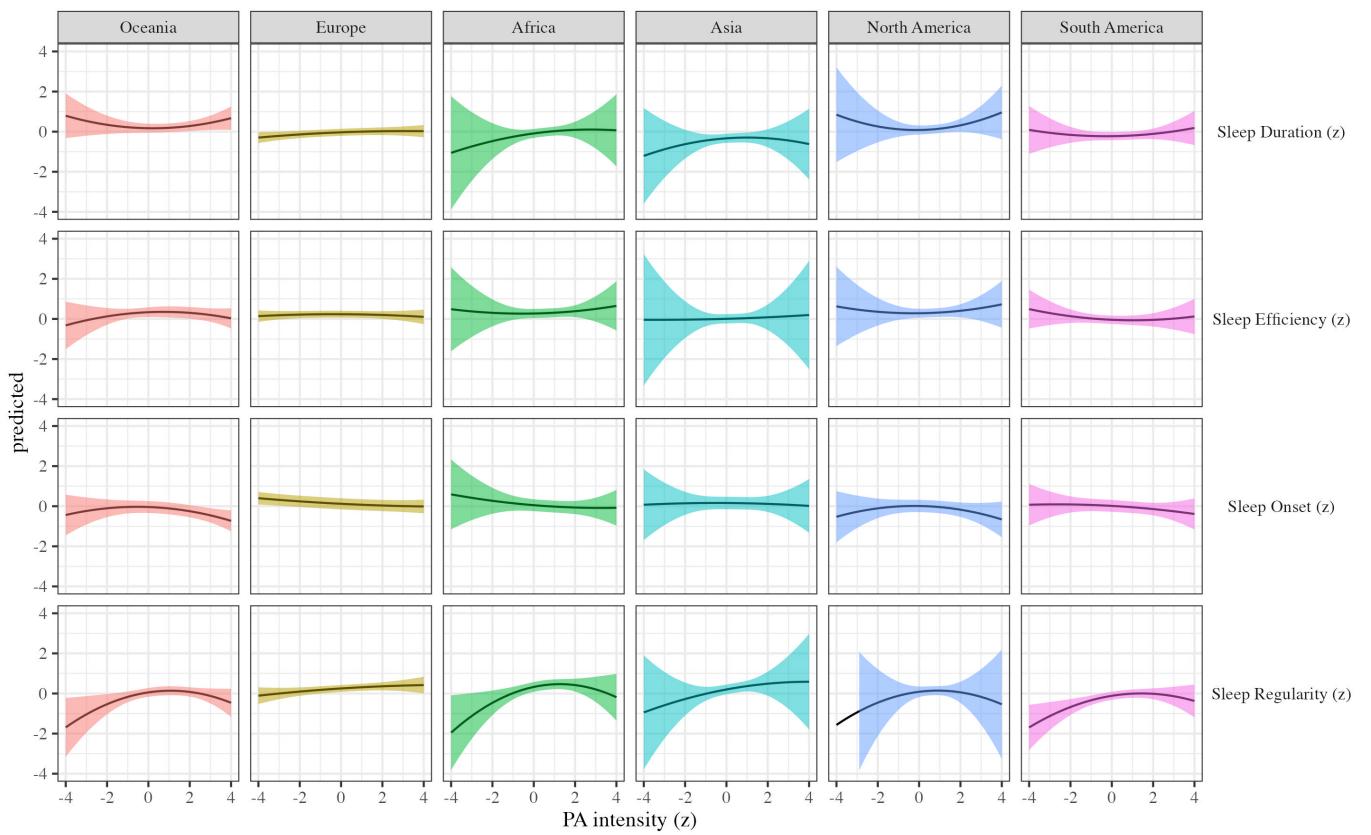


Figure 38. Sleep metrics on Physical activity intensity moderated by region

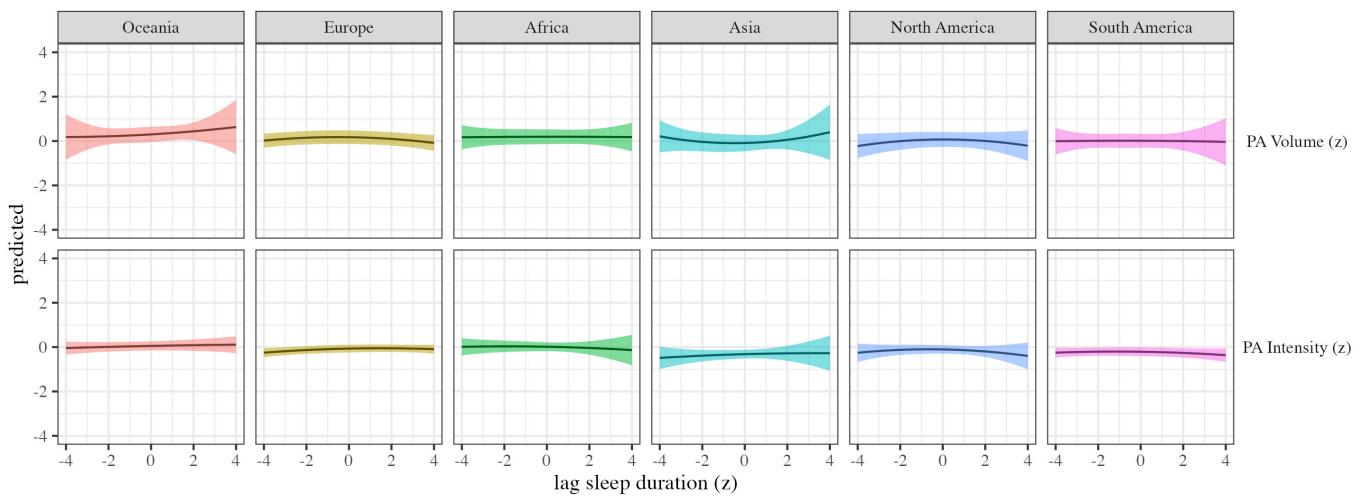


Figure 39. Physical activity by sleep duration moderated by region

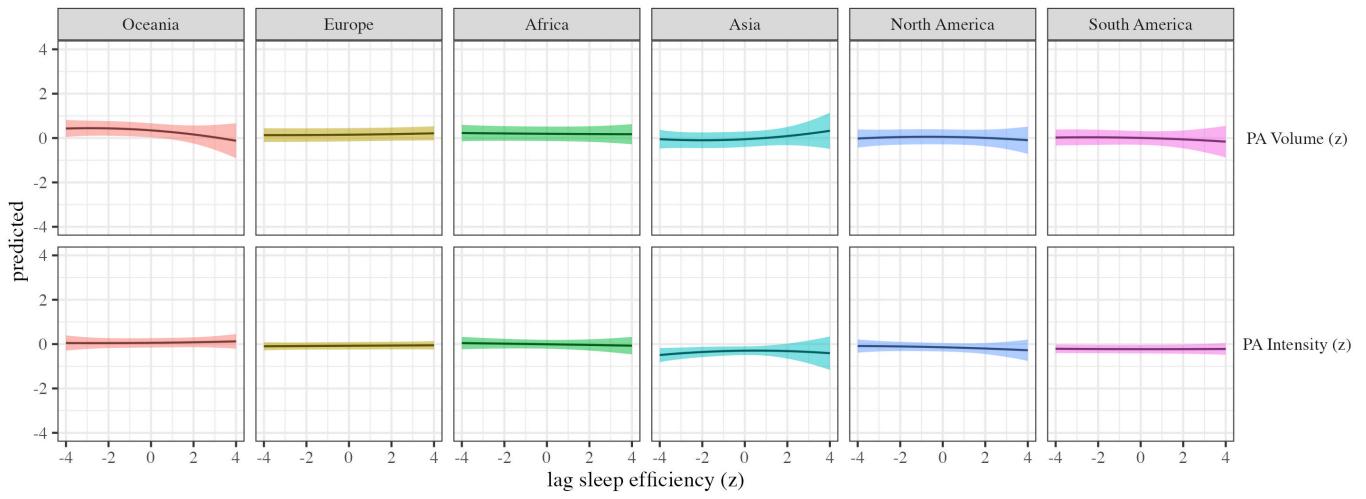


Figure 40. Physical activity by sleep efficiency moderated by region

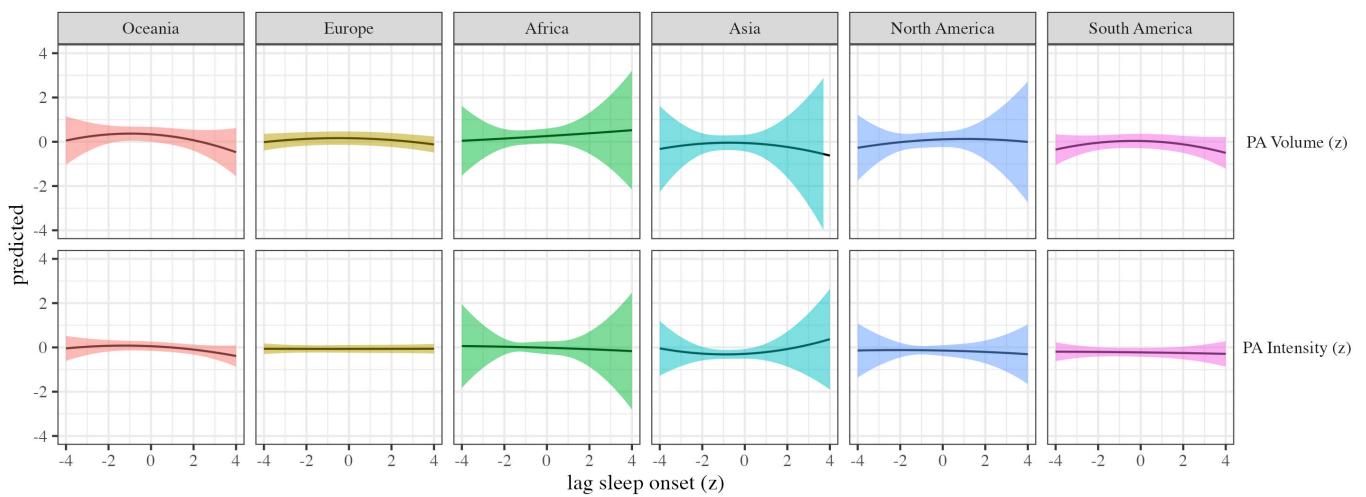


Figure 41. Physical activity by sleep onset moderated by region

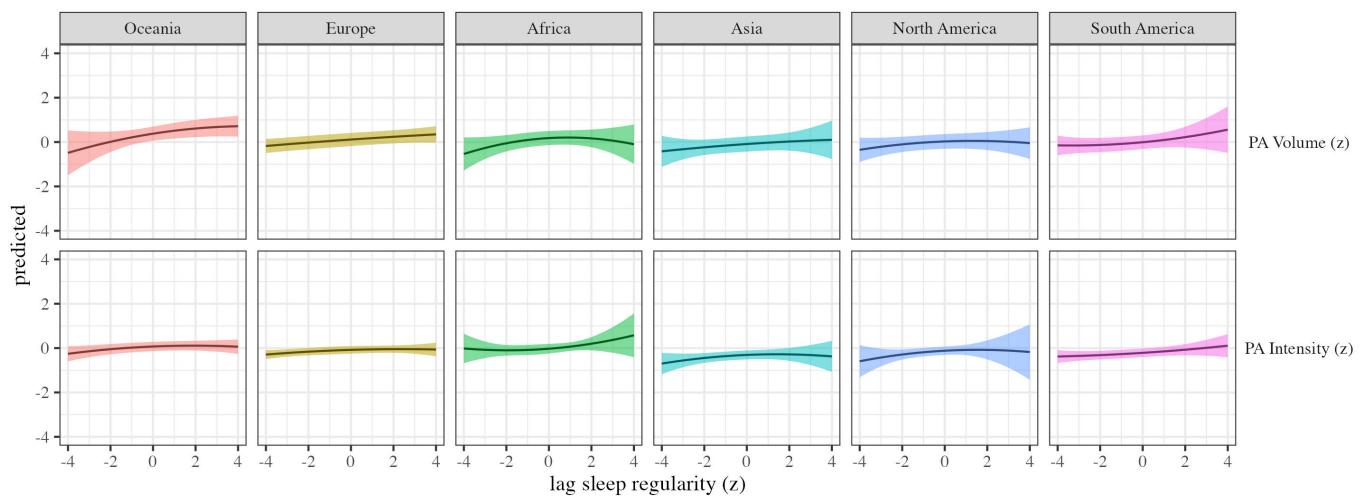


Figure 42. Physical activity by sleep regularity moderated by region

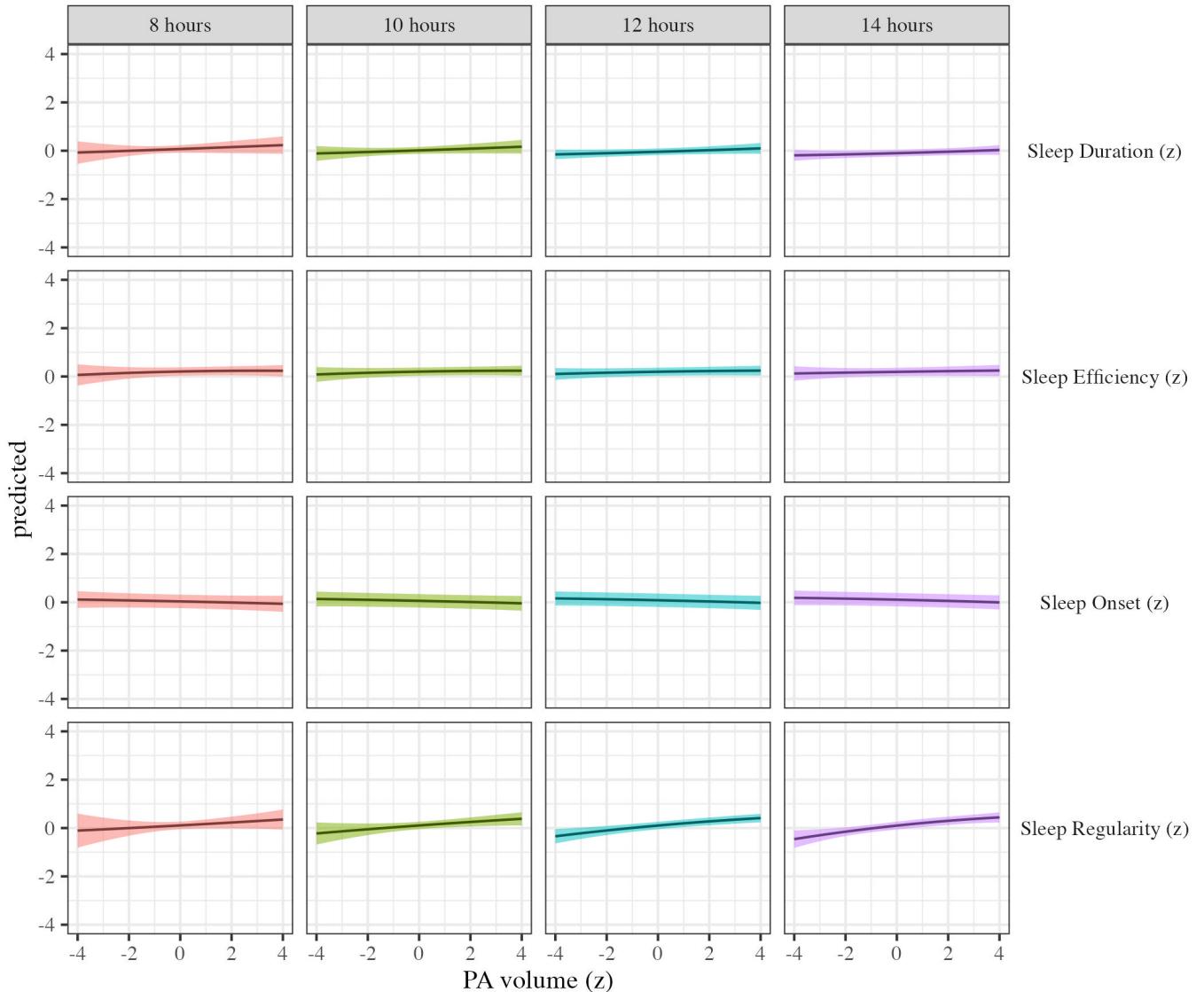


Figure 43. Sleep metrics on Physical activity volume by daylight hours

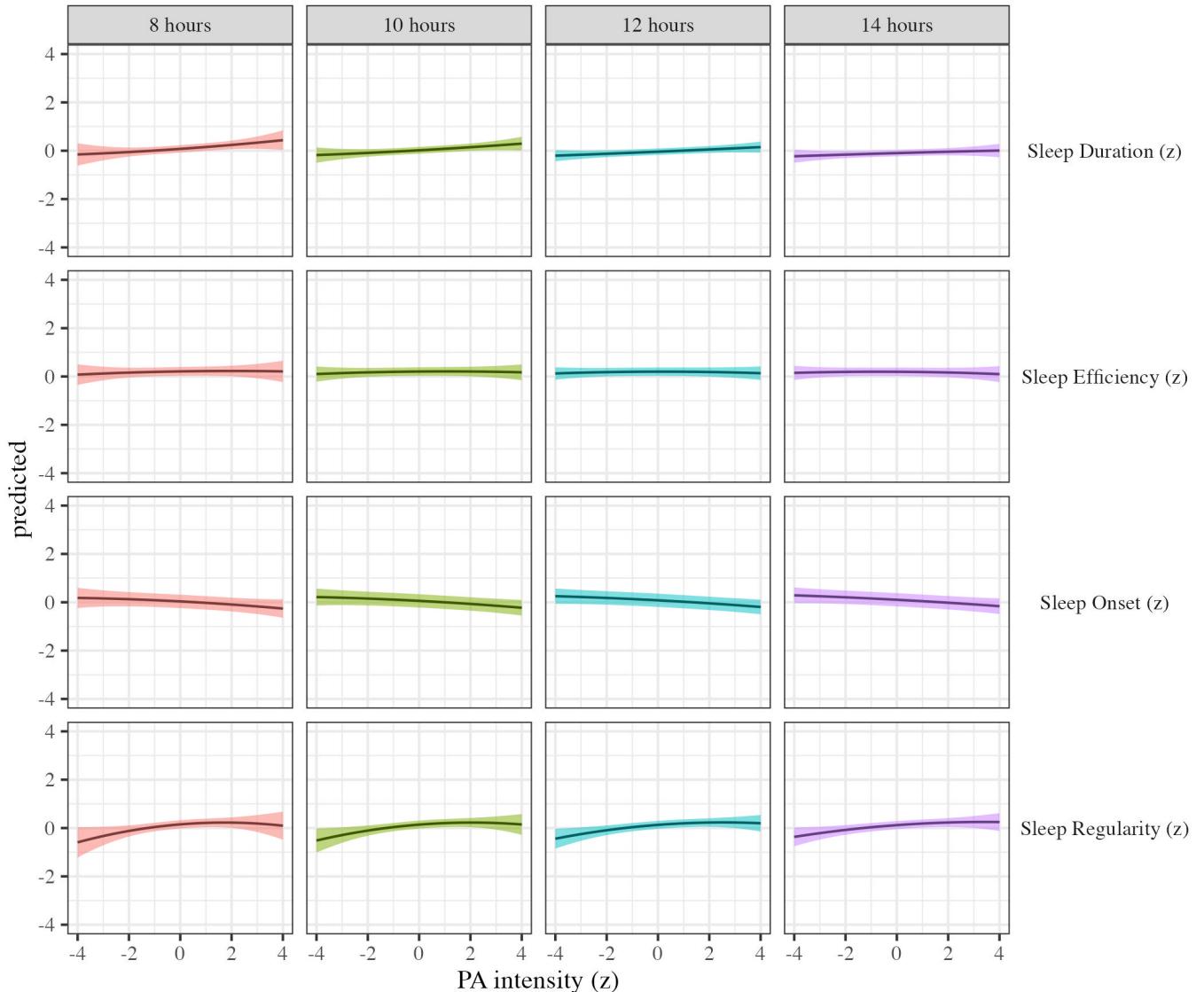


Figure 44. Sleep metrics on Physical activity intensity moderated by daylight hours

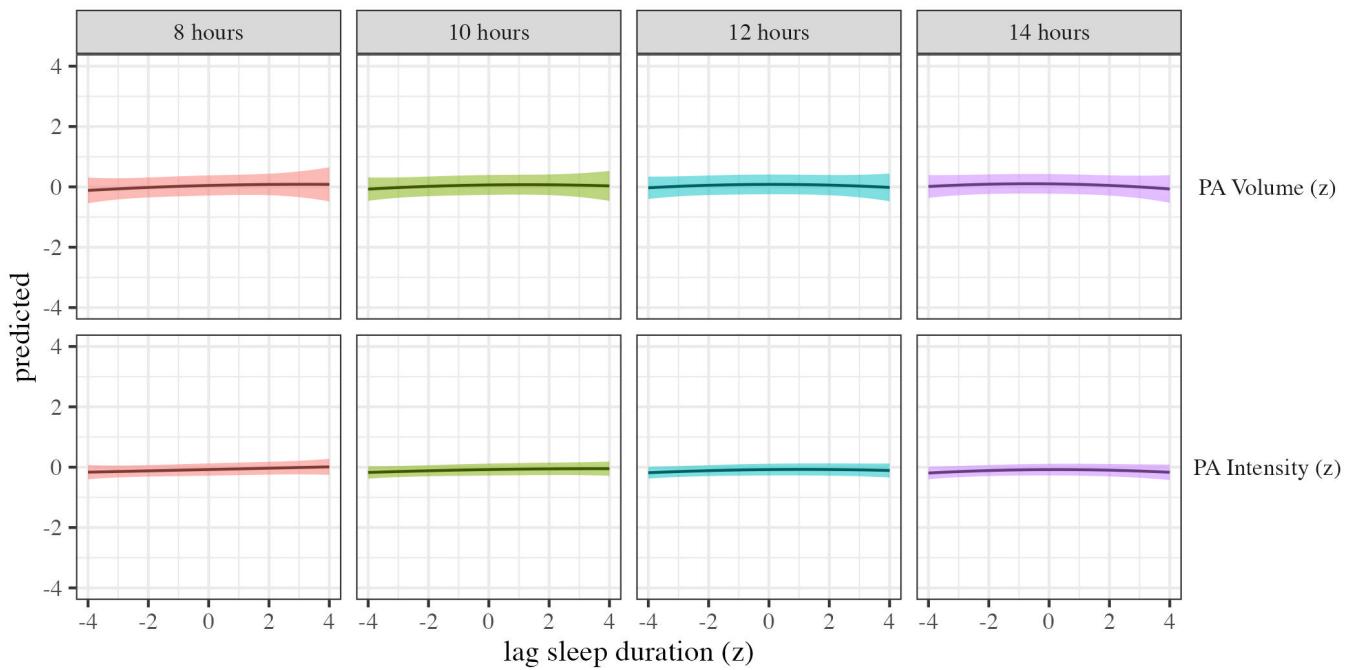


Figure 45. Physical activity by sleep duration moderated by daylight hours

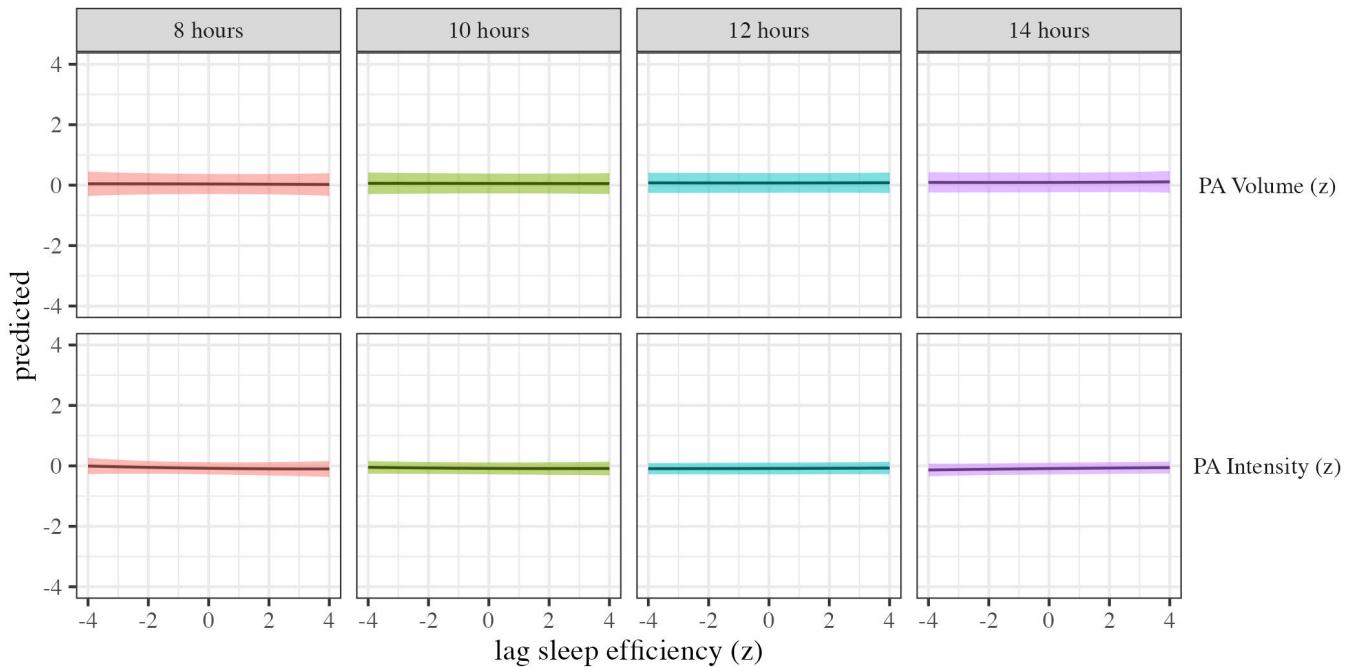


Figure 46. Physical activity by sleep efficiency moderated by daylight hours

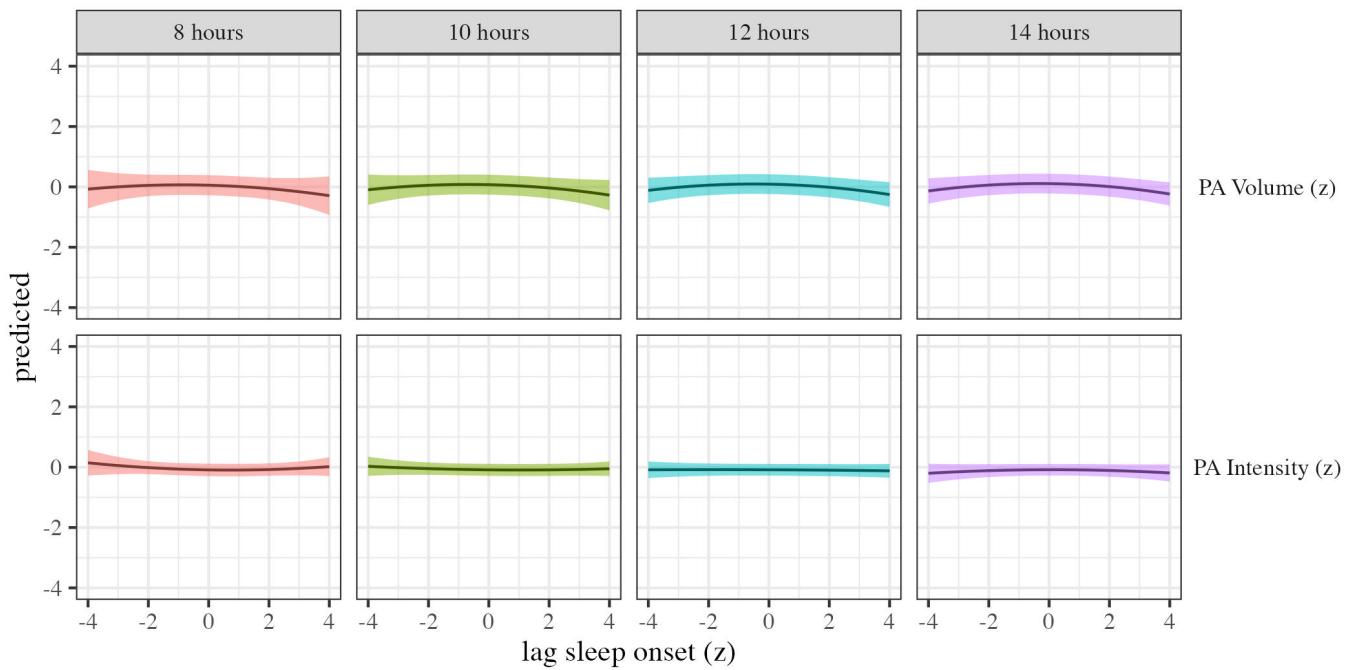


Figure 47. Physical activity by sleep onset moderated by daylight hours

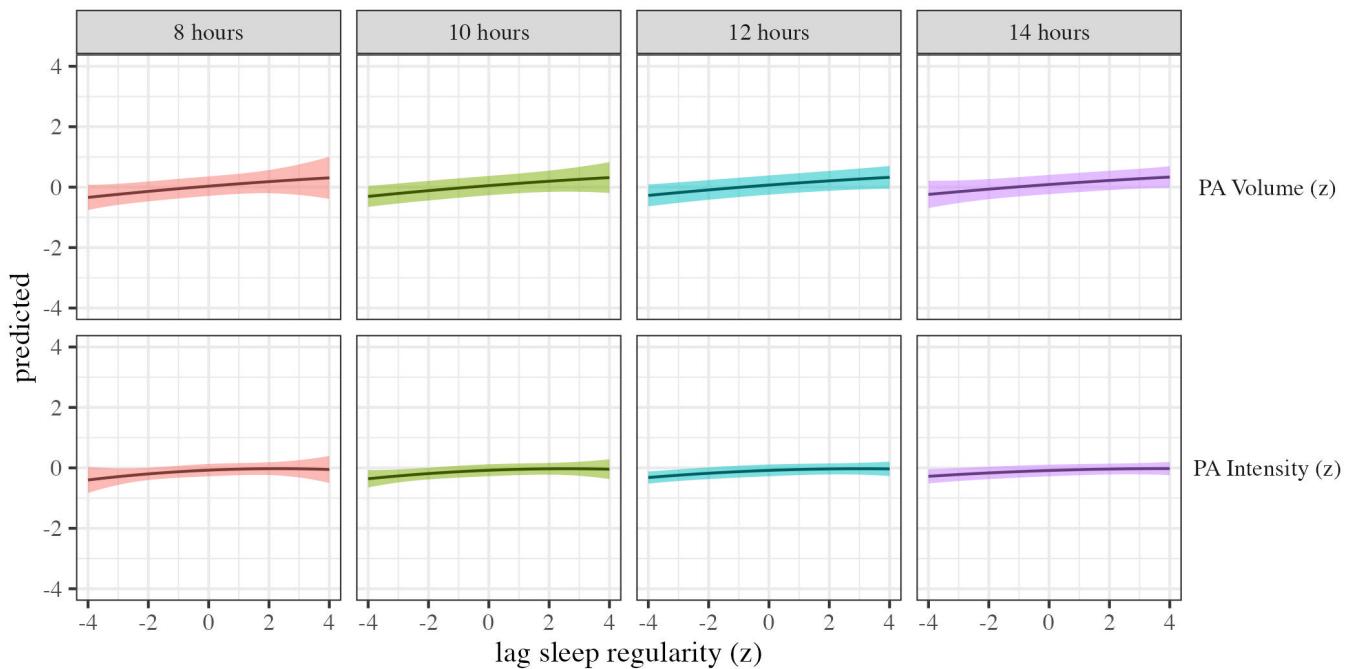


Figure 48. Physical activity by sleep regularity moderated by daylight hours

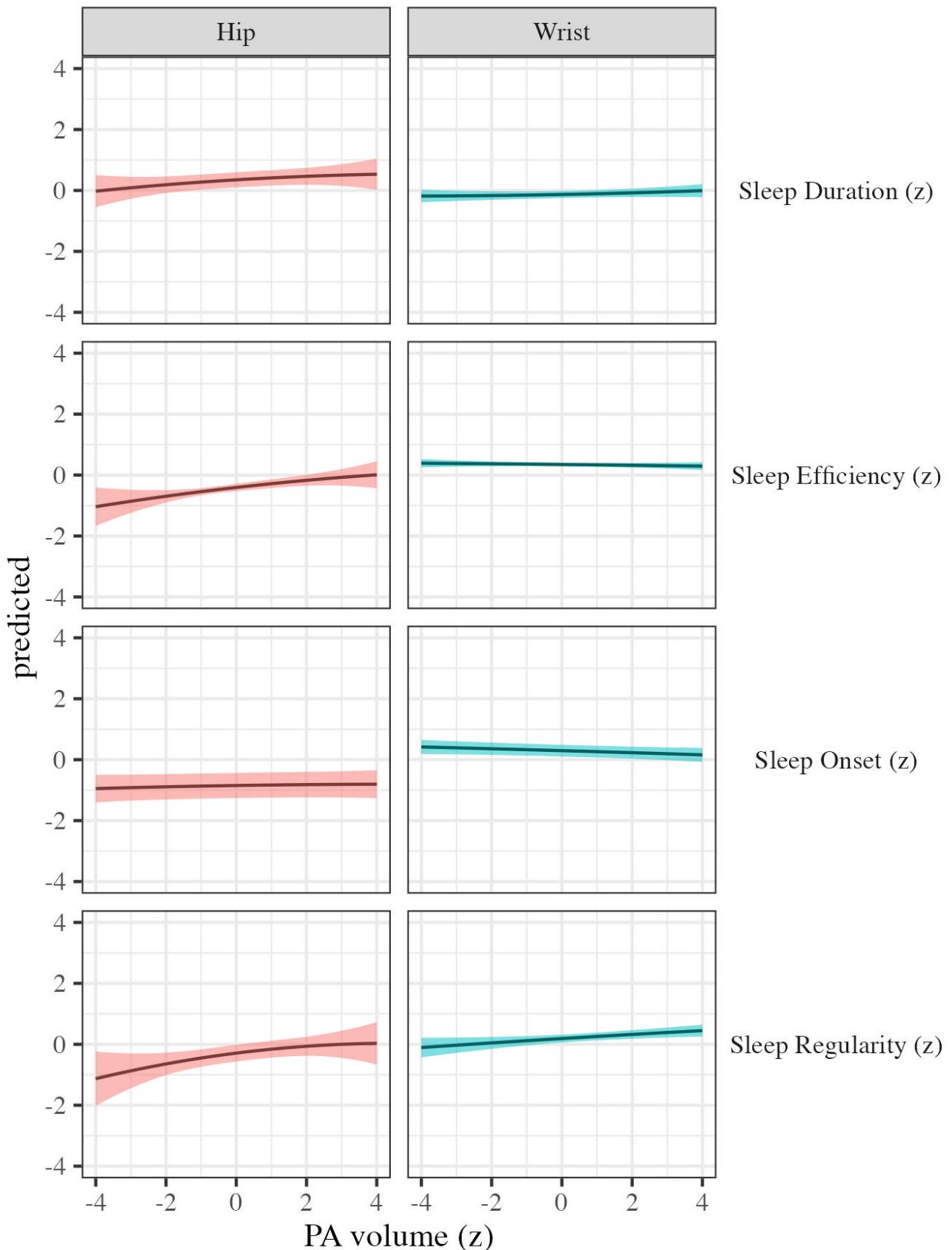


Figure 49. Sleep metrics on Physical activity volume by wear location

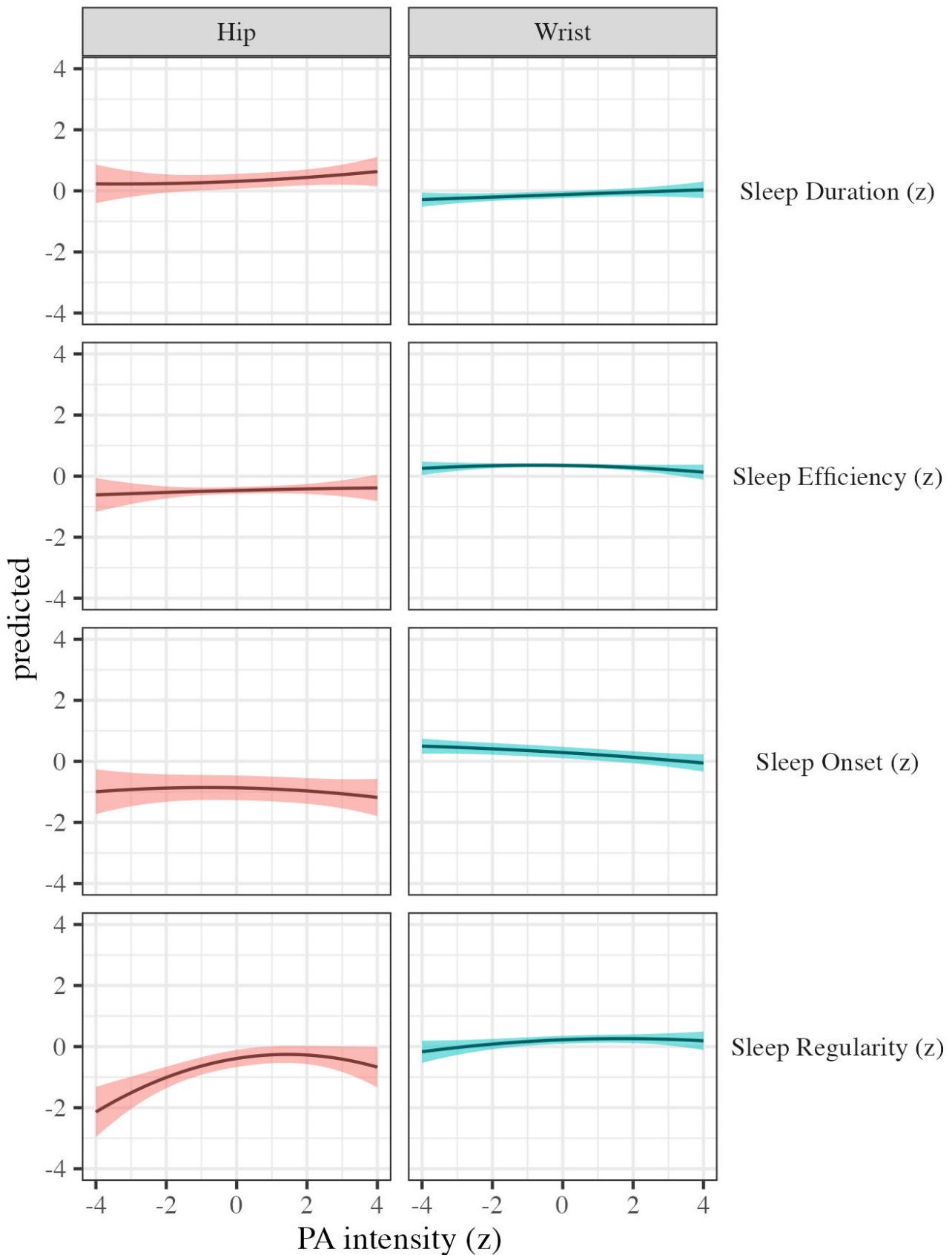


Figure 50. Sleep metrics on Physical activity intensity moderated by wear location

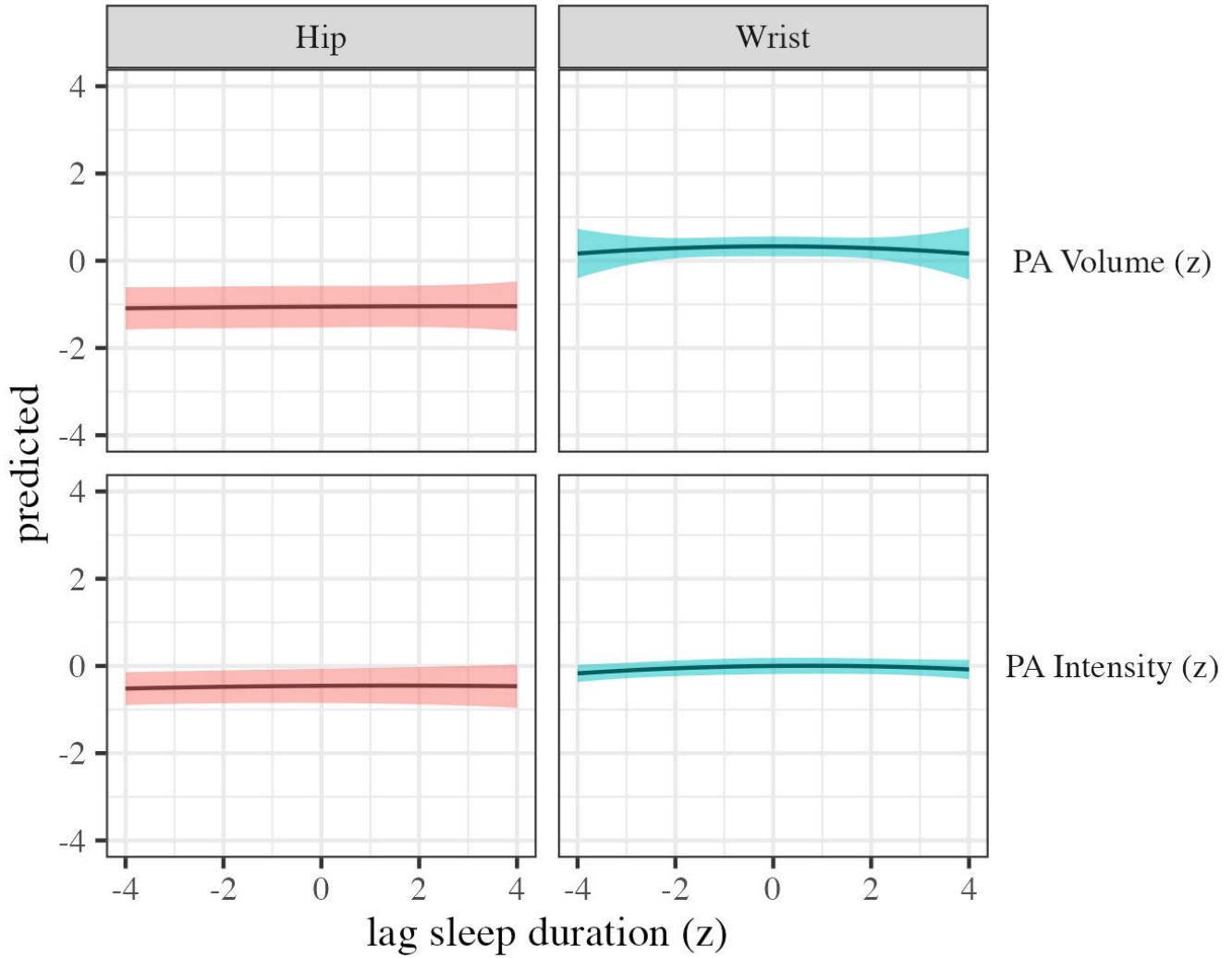


Figure 51. Physical activity by sleep duration moderated by wear location

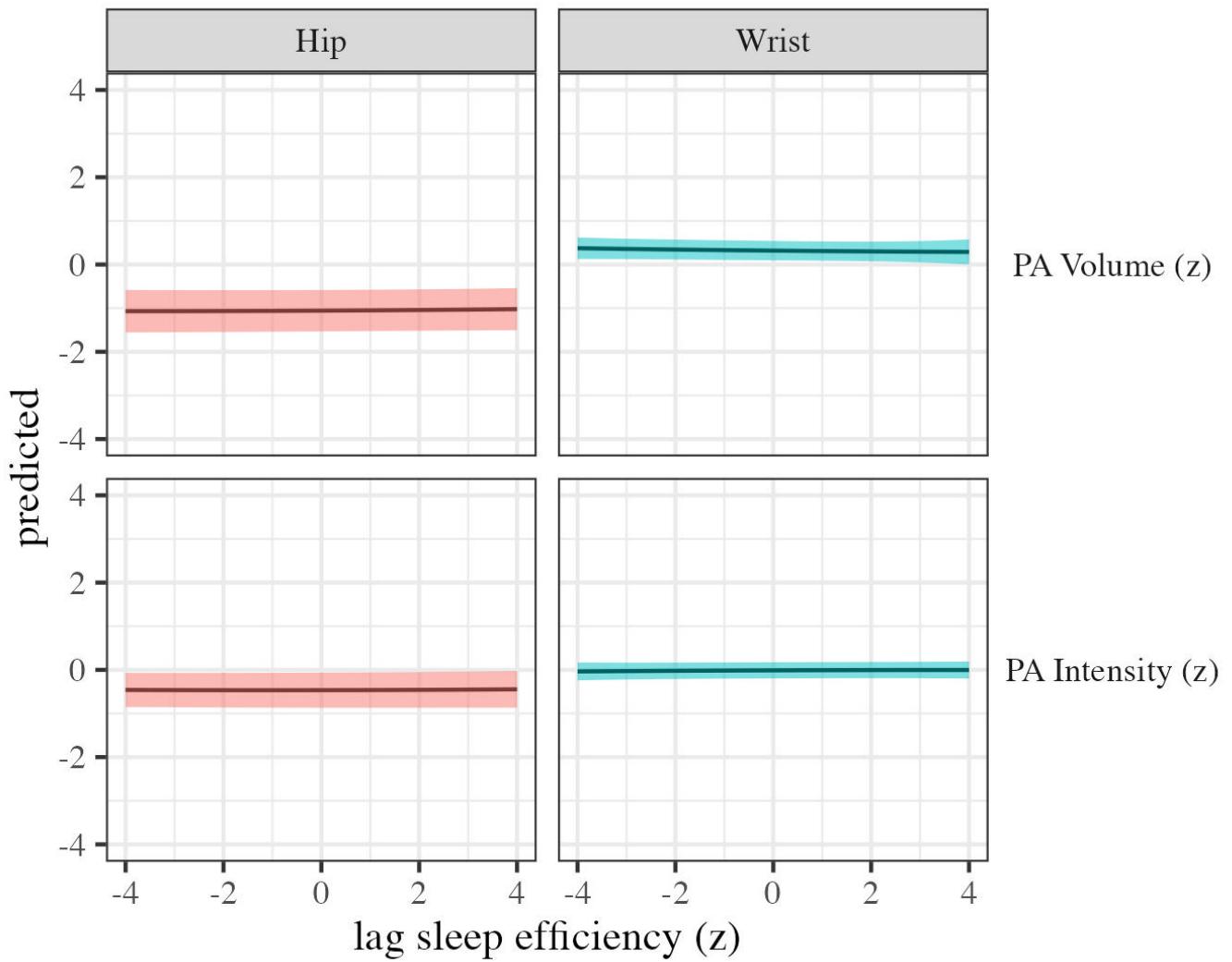


Figure 52. Physical activity by sleep efficiency moderated by wear location

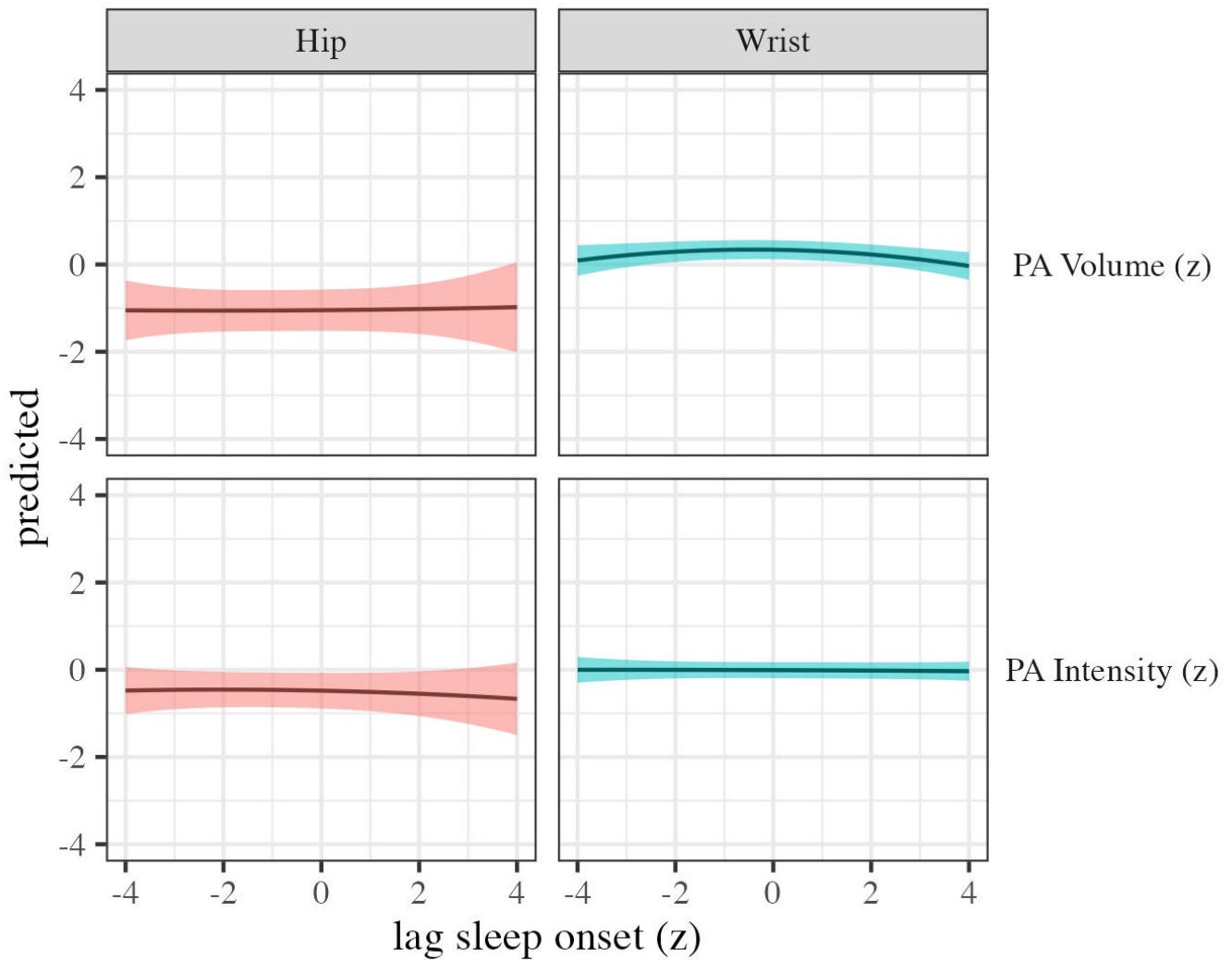


Figure 53. Physical activity by sleep onset moderated by wear location

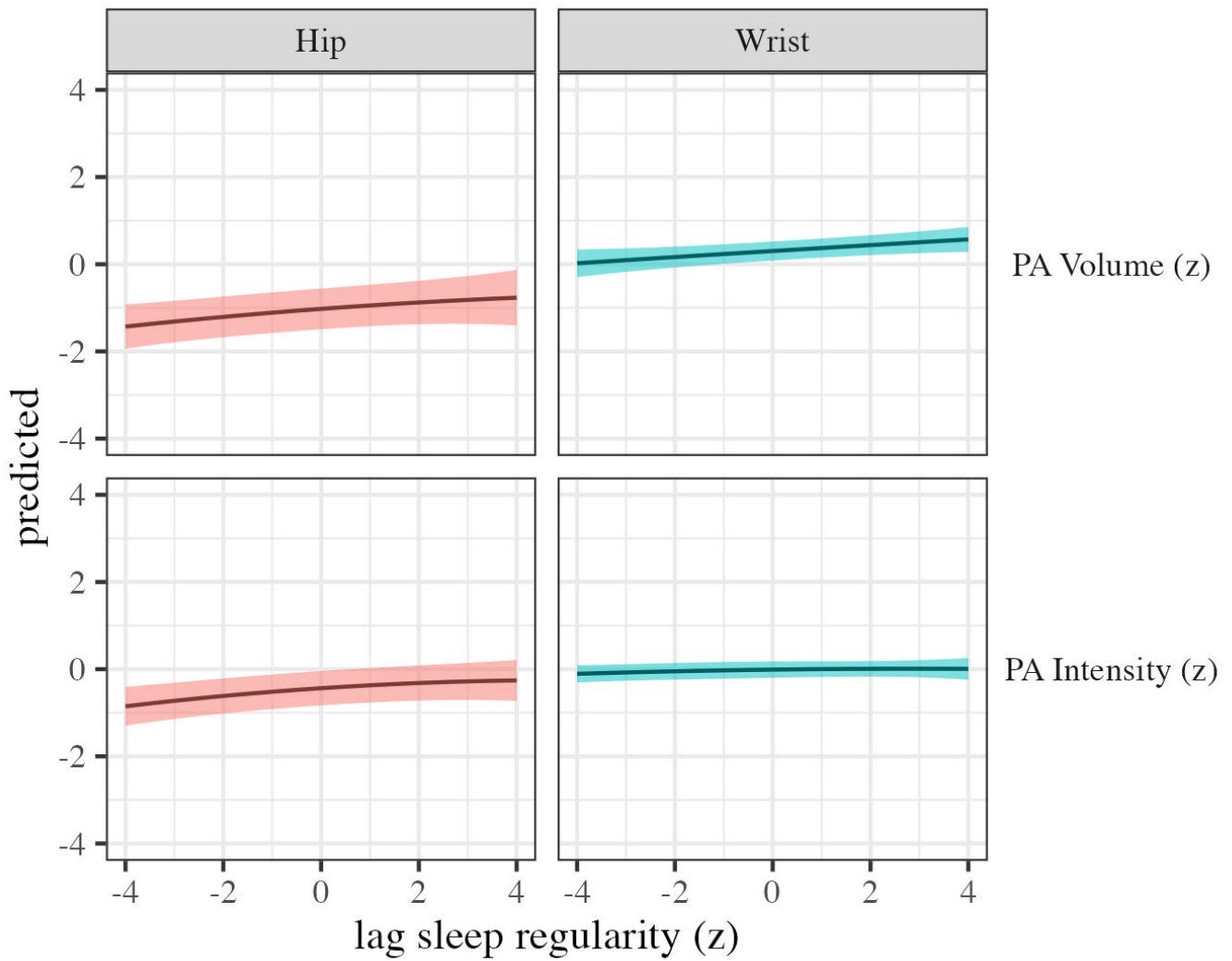


Figure 54. Physical activity by sleep regularity moderated by wear location

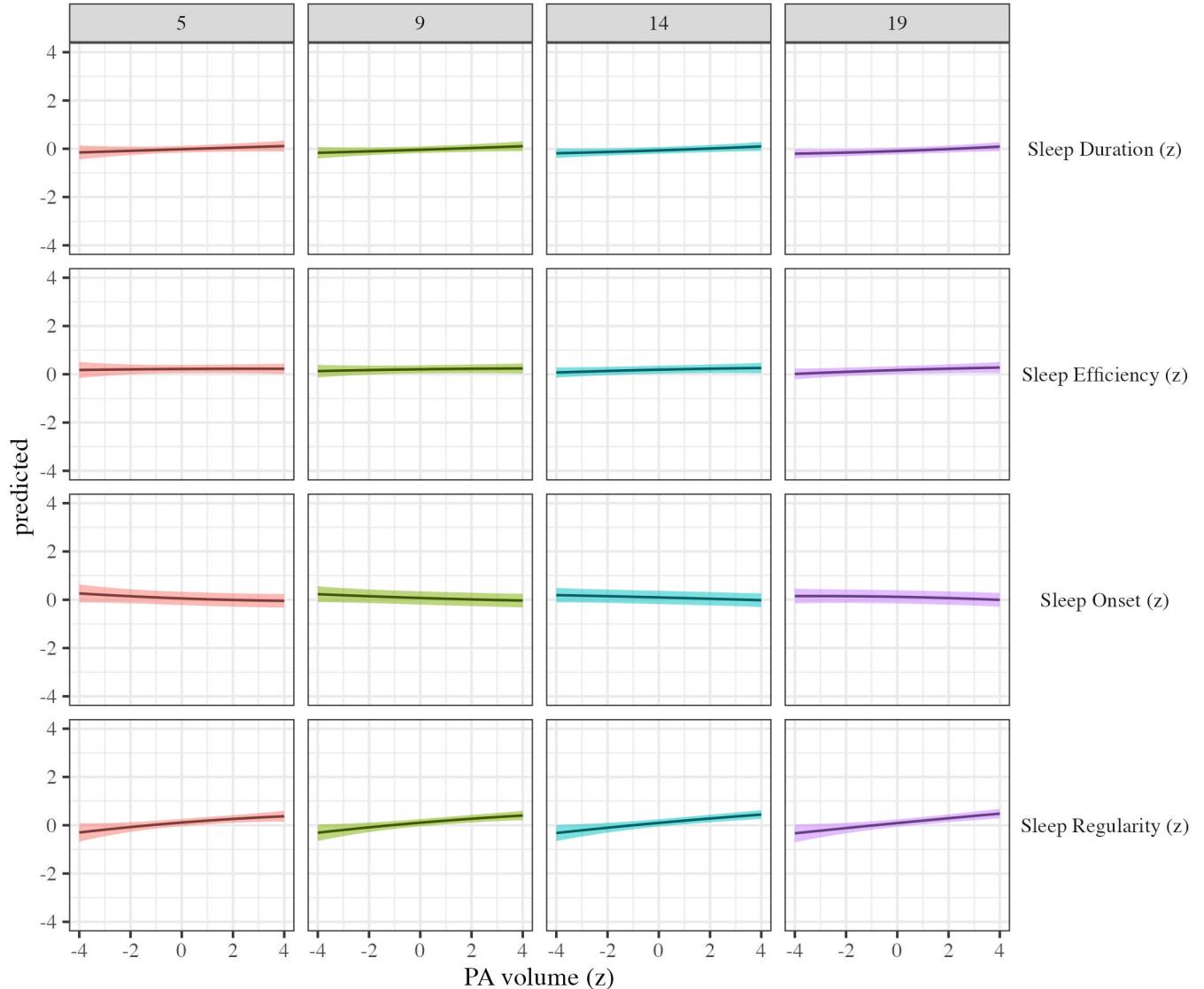


Figure 55. Sleep metrics on Physical activity volume by most active hour

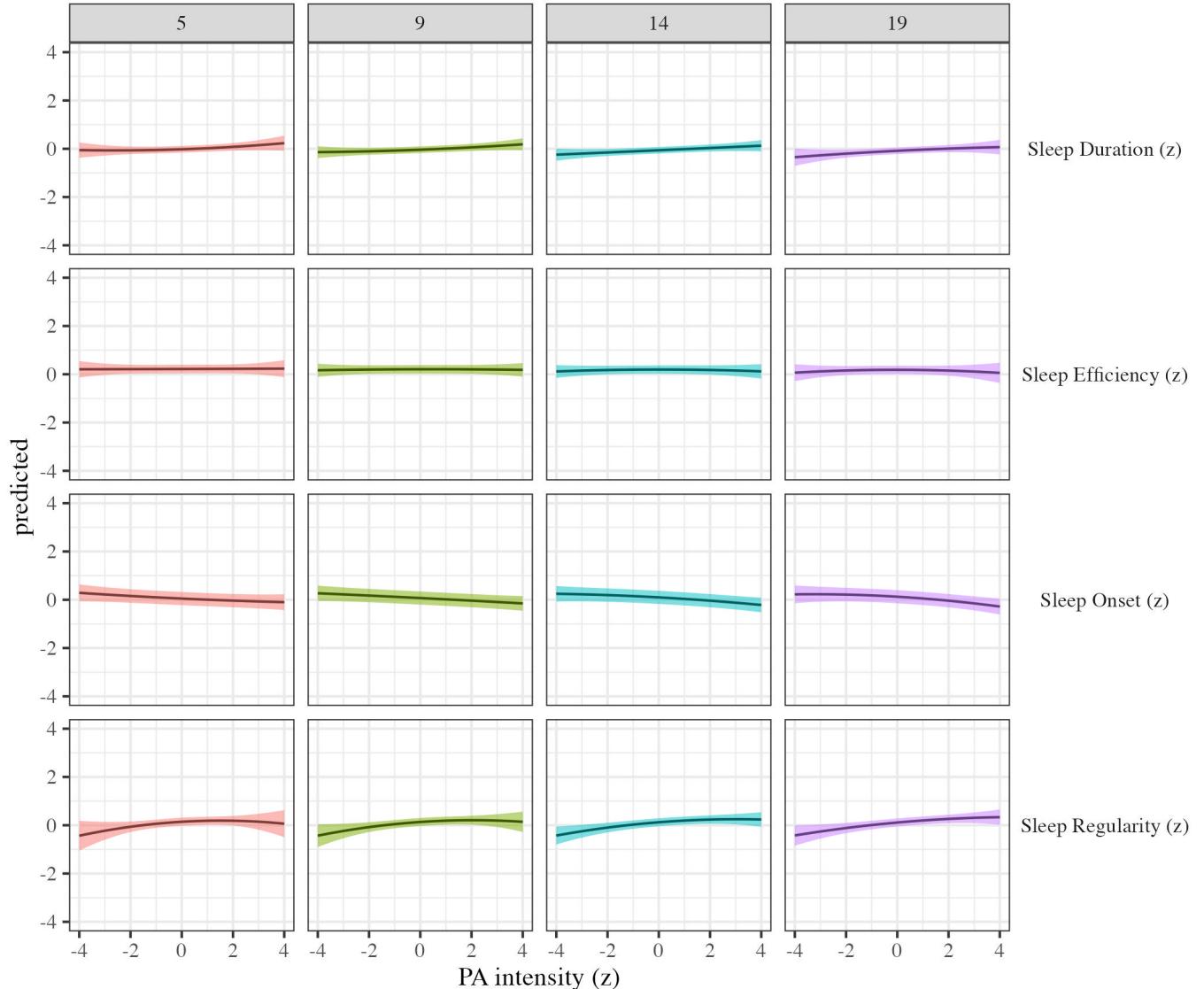


Figure 56. Sleep metrics on Physical activity intensity moderated by most active hour

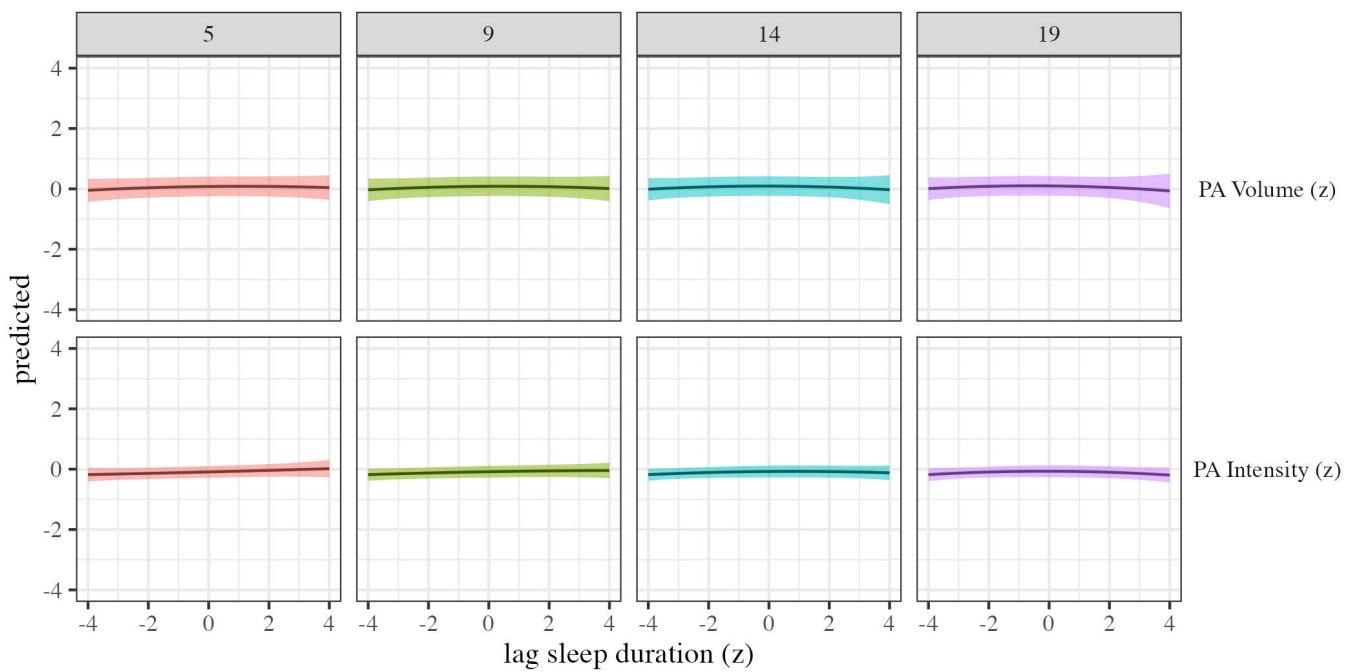


Figure 57. Physical activity by sleep duration moderated by most active hour

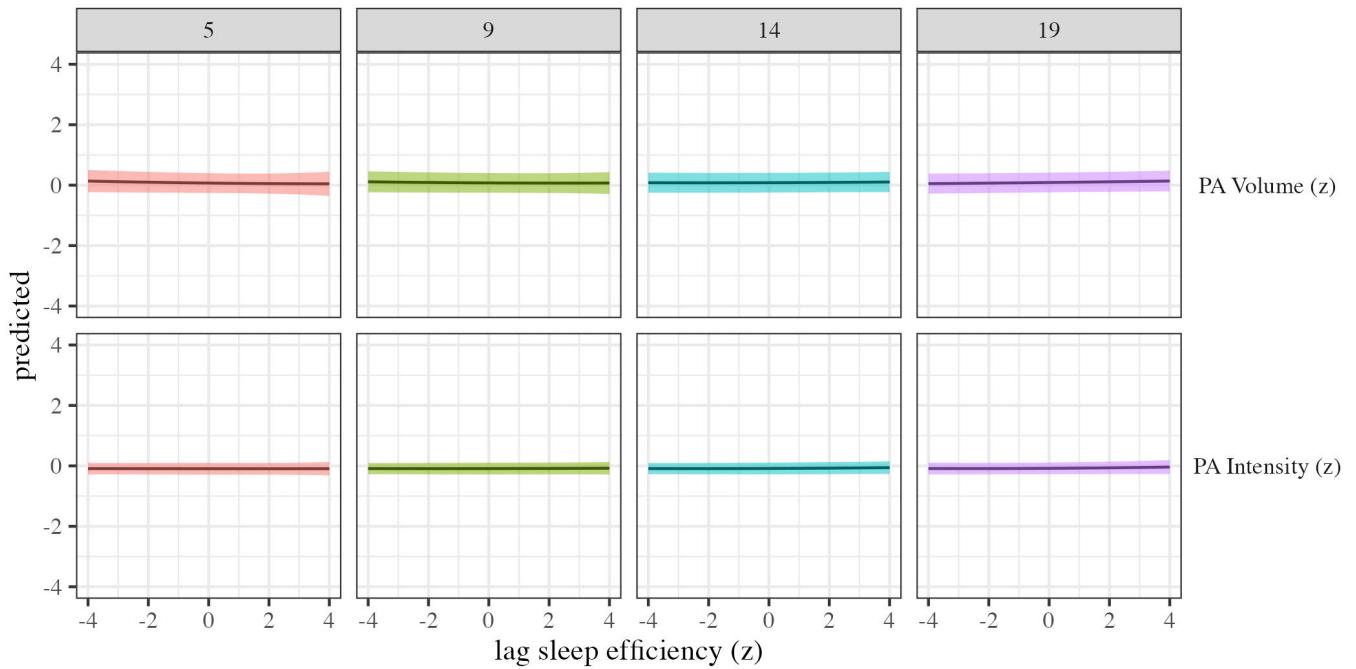


Figure 58. Physical activity by sleep efficiency moderated by most active hour

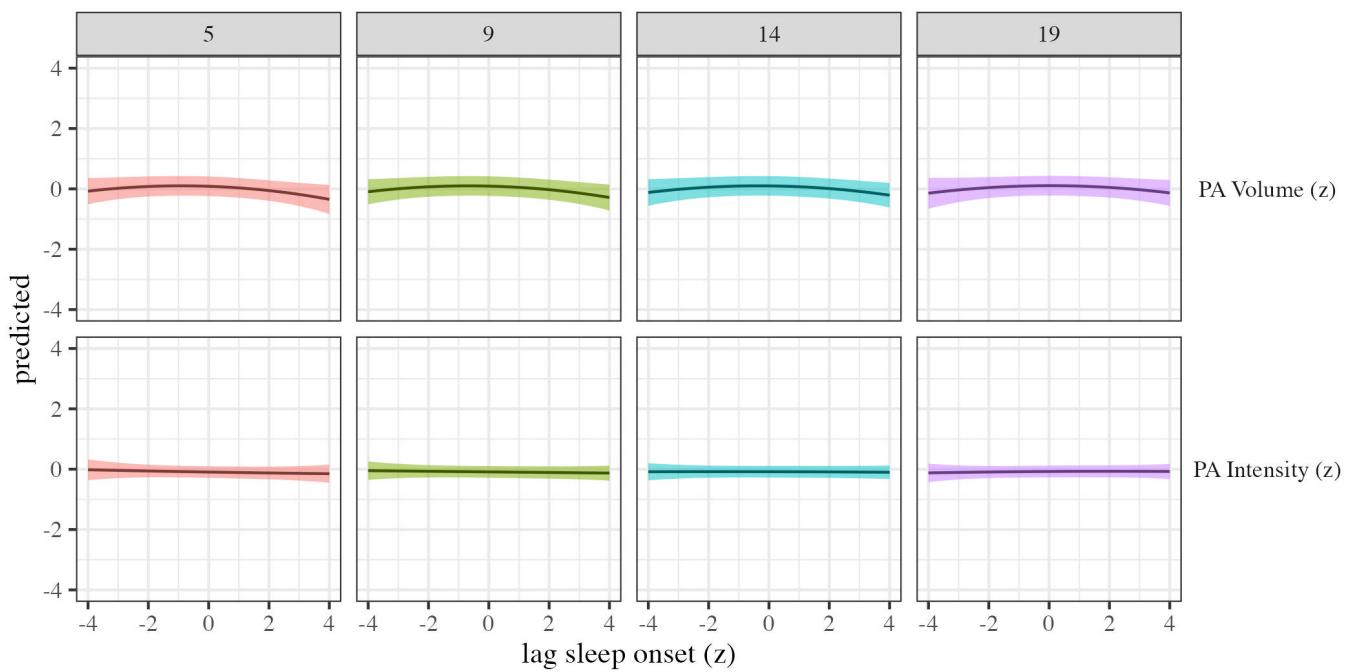


Figure 59. Physical activity by sleep onset moderated by most active hour

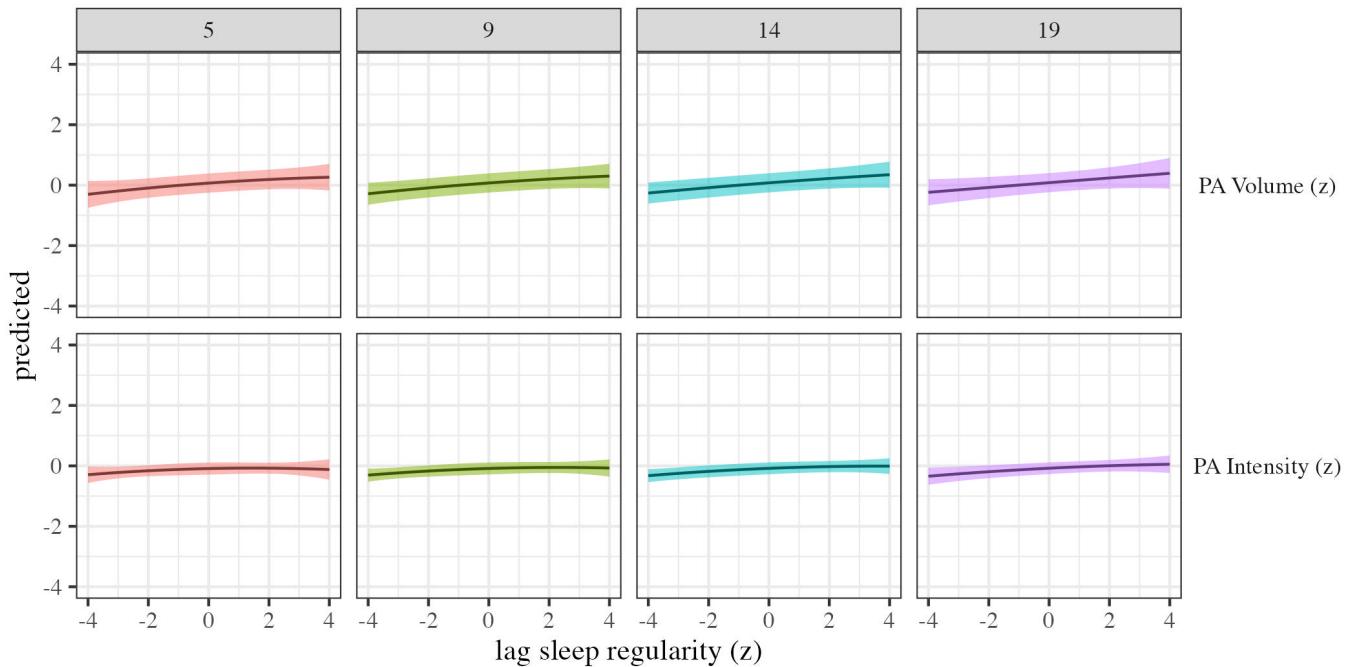


Figure 60. Physical activity by sleep regularity moderated by most active hour