A multimodal analysis of physical activity, sleep, and work shift in nurses with wearable sensor data (Supplementary)

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Table 1: Results of the three-way ANOVA tests on the rest-activity ratio. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

	Rest-Activity Ratio			
	Workday		**Off-day**	
	F statistics	**p-value**	**F statistics**	**p-value**
Age	3.73	0.056	5.06	0.027^{*}
Gender	0.05	0.826	0.02	0.903
Shift	9.77	0.002^{**}	7.36	0.008^{**}
DOF	101		91	

Table 2: Results of the three-way ANOVA tests on the walk activity. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

	Walk-Activity Ratio			
	Workday		**Off-day**	
	F statistics	**p-value**	**F statistics**	**p-value**
Age	3.34	0.071	0.16	0.689
Gender	8.71	0.004^{**}	7.50	0.007^{**}
Shift	4.93	0.028^{*}	5.16	0.025^{*}
DOF	101		91	

Table 3: Results of the three-way ANOVA tests on the vigorous activity. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

	Vigorous-Activity Duration			
	Workday		**Off-day**	
	F statistics	**p-value**	**F statistics**	**p-value**
Age	11.54	0.001^{**}	9.76	0.002^{**}
Gender	1.53	0.219	0.46	0.498
Shift	2.02	0.159	4.50	0.037^{*}
DOF	101		91	

Table 4: Results of the three-way ANOVA tests on the sleep duration. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

| | Sleep Duration | | | |
| | Workday | | Off-day | |
	F statistics	p-value	F statistics	p-value
Age	0.67	0.415	7.45	0.008**
Gender	4.79	0.031*	1.39	0.241
Shift	65.55	<0.01 **	2.65	0.107
DOF	90		90	

Table 5: Results of the three-way ANOVA tests on the sleep efficiency. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

| | Sleep Efficiency | | | |
| | Workday | | Off-day | |
	F statistics	p-value	F statistics	p-value
Age	0.14	0.715	0.15	0.703
Gender	0.07	0.796	0.20	0.656
Shift	2.68	0.105	3.10	0.082
DOF	90		90	

Table 6: Results of the three-way ANOVA tests on the sleep efficiency. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

| | Social Jet Lag (MS) | |
	F statistics	p-value
Age	0.01	0.960
Gender	0.55	0.462
Shift	274.11	<0.01 **
DOF	85	

Table 7: Results from the linear regression models to predict self-report variables using the rest activity ratio on workdays. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

	SWLS std β	STAI std. β	PSQI std. β	PA std. β	NA std. β
Intercept	−0.54 *	0.15	0.27	0.40	0.57*
Age [< 40 Years]	0.28	−0.15	−0.30	0.24	−0.24
Gender [Female]	0.37	−0.05	0.23	−0.36	−0.43 *
Shift [Day shift]	0.38	−0.16	−0.53 *	−0.27	−0.29
Rest Activity Ratio(Workday)	−0.11	0.35	0.06	−0.51 *	0.03
Shift [Day shift]×Rest-activity Ratio(Workday)	0.36	−0.25	−0.02	0.48	0.01
Number of Observations	104	105	104	105	105
Adjust R^2	0.083*	0.019	0.076*	0.047	0.032

Table 8: Results from the linear regression models to predict self-report variables using the walk-activity ratio on workdays. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

	SWLS std β	STAI std. β	PSQI std. β	PA std. β	NA std. β
Intercept	-0.54 *	0.31	0.33	0.08	0.62**
Age [< 40 Years]	0.22	-0.29	-0.39	0.45*	-0.26
Gender [Female]	0.37	-0.16	0.12	-0.13	-0.44
Shift [Day shift]	0.35	-0.18	-0.47 *	-0.24	-0.32
Walk Activity Ratio(Workday)	0.12	-0.34	-0.20	0.28	0.11
Shift [Day shift]×Walk-activity Ratio(Workday)	-0.21	0.22	0.03	0.06	-0.18
Number of Observations	104	105	104	105	105
Adjust R^2	0.043	0.032	0.102**	0.101**	0.038

Table 9: Results from the linear regression models to predict self-report variables using the sleep duration on workdays. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

	SWLS std β	STAI std. β	PSQI std. β	PA std. β	NA std. β
Intercept	-0.75 *	0.72*	0.66*	-0.26	0.72*
Age [< 40 Years]	0.25	-0.31	-0.42 *	0.42*	-0.24
Gender [Female]	0.31	-0.10	0.27	-0.26	-0.51 *
Shift [Day shift]	0.65*	-0.75 **	-0.94 **	0.33	-0.37
Sleep Duration(Workday)	-0.15	0.48*	0.32	-0.47 *	0.13
Shift [Day shift] × Sleep Duration (Workday)	0.08	-0.24	-0.41	0.31	-0.05
Number of Observations	94	94	93	94	94
Adjust R^2	0.061	0.078*	0.191**	0.095*	0.027

Table 10: Results from the linear regression models to predict self-report variables using the sleep efficiency on workdays. Statistical significance is denoted with $^{**}p < 0.01$, $^{*}p < 0.05$.

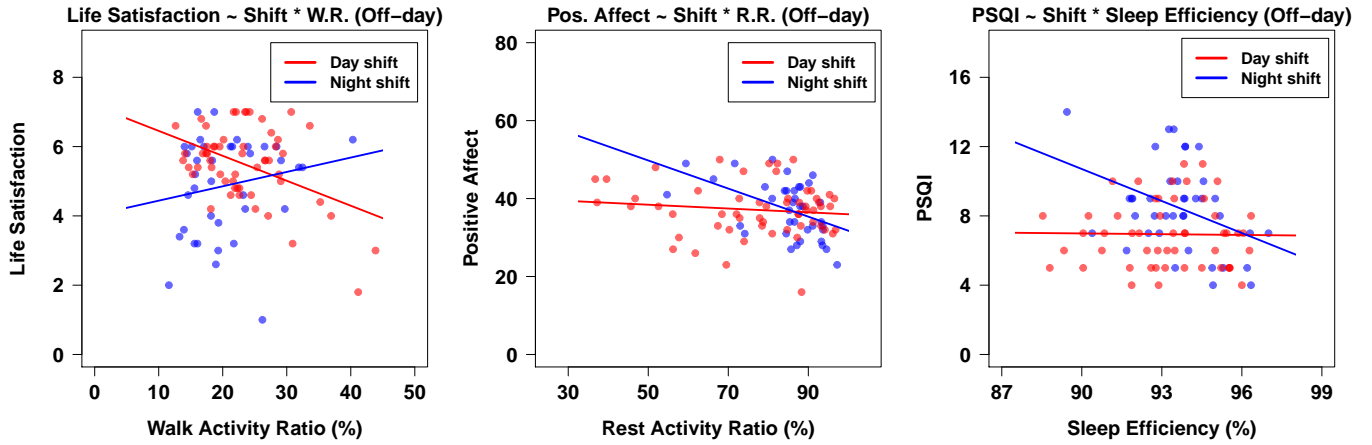|	SWLS std β	STAI std. β	PSQI std. β	PA std. β	NA std. β
Intercept	-0.62 *	0.23	0.53*	0.17	0.62*
Age [< 40 Years]	0.26	-0.34	-0.40 *	0.43*	-0.25
Gender [Female]	0.27	-0.01	0.33	-0.36	-0.47
Shift [Day shift]	0.52*	-0.21	-0.93 **	-0.10	-0.26
Sleep Efficiency(Workday)	0.08	0.27	-0.85 *	0.02	-0.12
Shift [Day shift]×Sleep Efficiency(Workday)	-0.08	-0.39	0.77	0.00	0.09
Number of Observations	94	94	93	94	94
Adjust R^2	0.053	0.012	0.207**	0.026	0.022

Figure 1: Interaction plot between self-report behavioral variables and sensor data in different shift schedules. R.R represents the rest activity ratio, and W.R is the walk activity ratio.