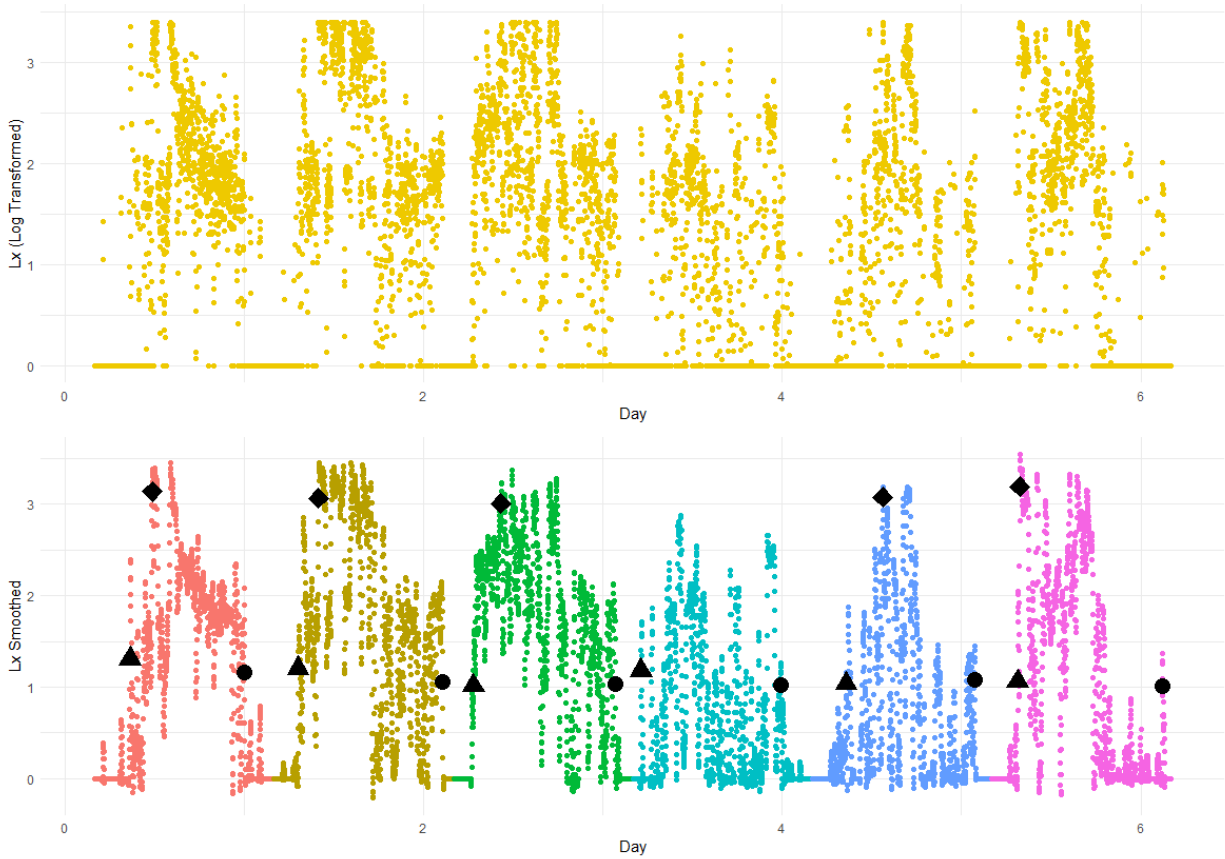
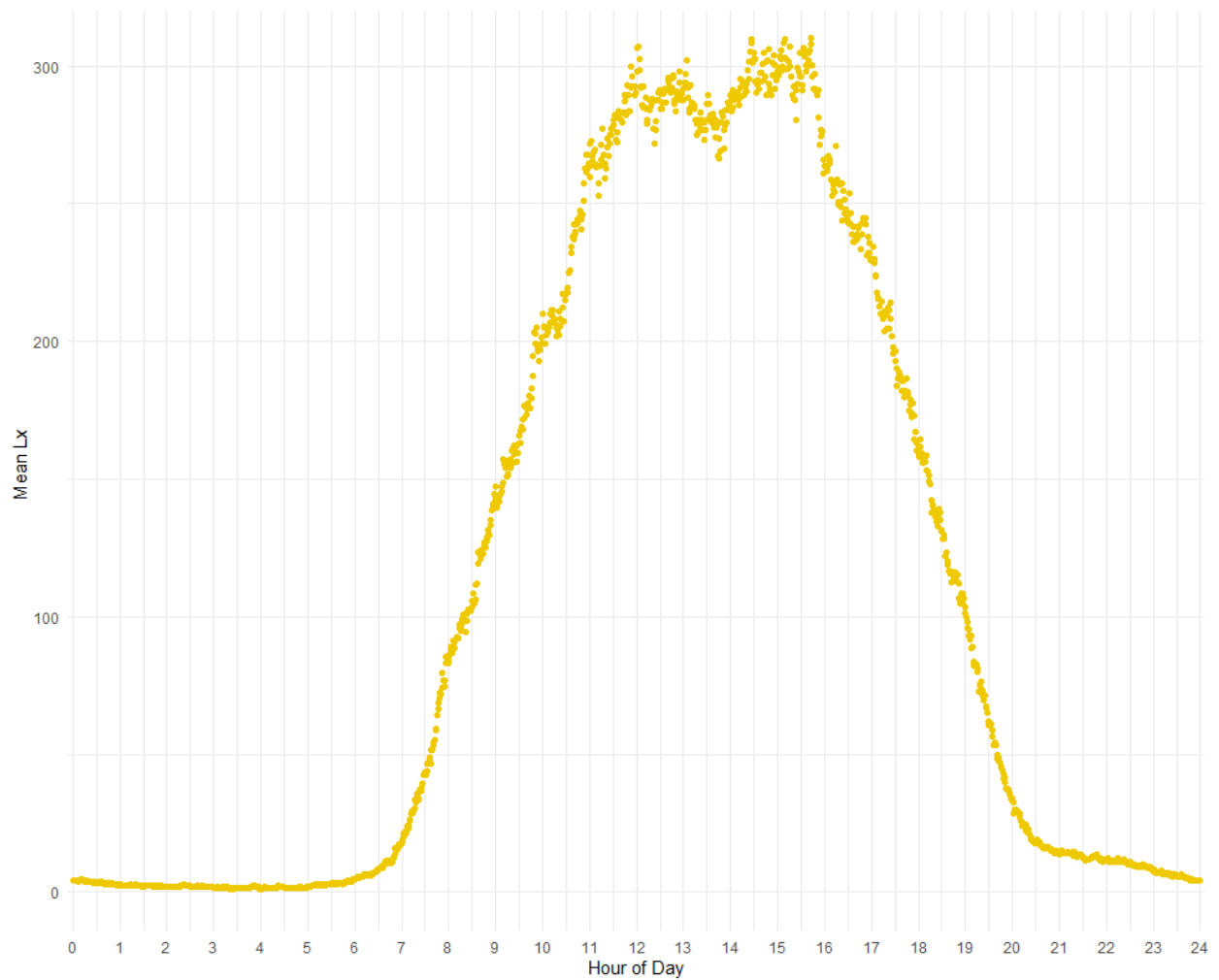


Supplementary Material

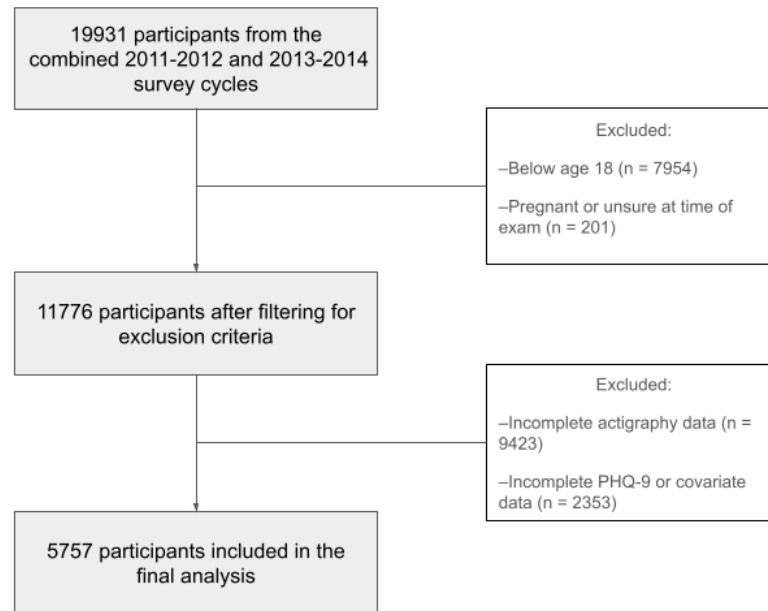


Supplementary Figure 1. Smoothing procedure using local regression (LOESS), applied over an average span of 21 minutes per day. Plot shows an example of a single time-series. Each dot represents a singular data-point for one individual. Black triangles indicate onset of exposure to 10 lux, black diamonds indicate onset of 1000 lux and black circles indicate last exposure to 10 lux.

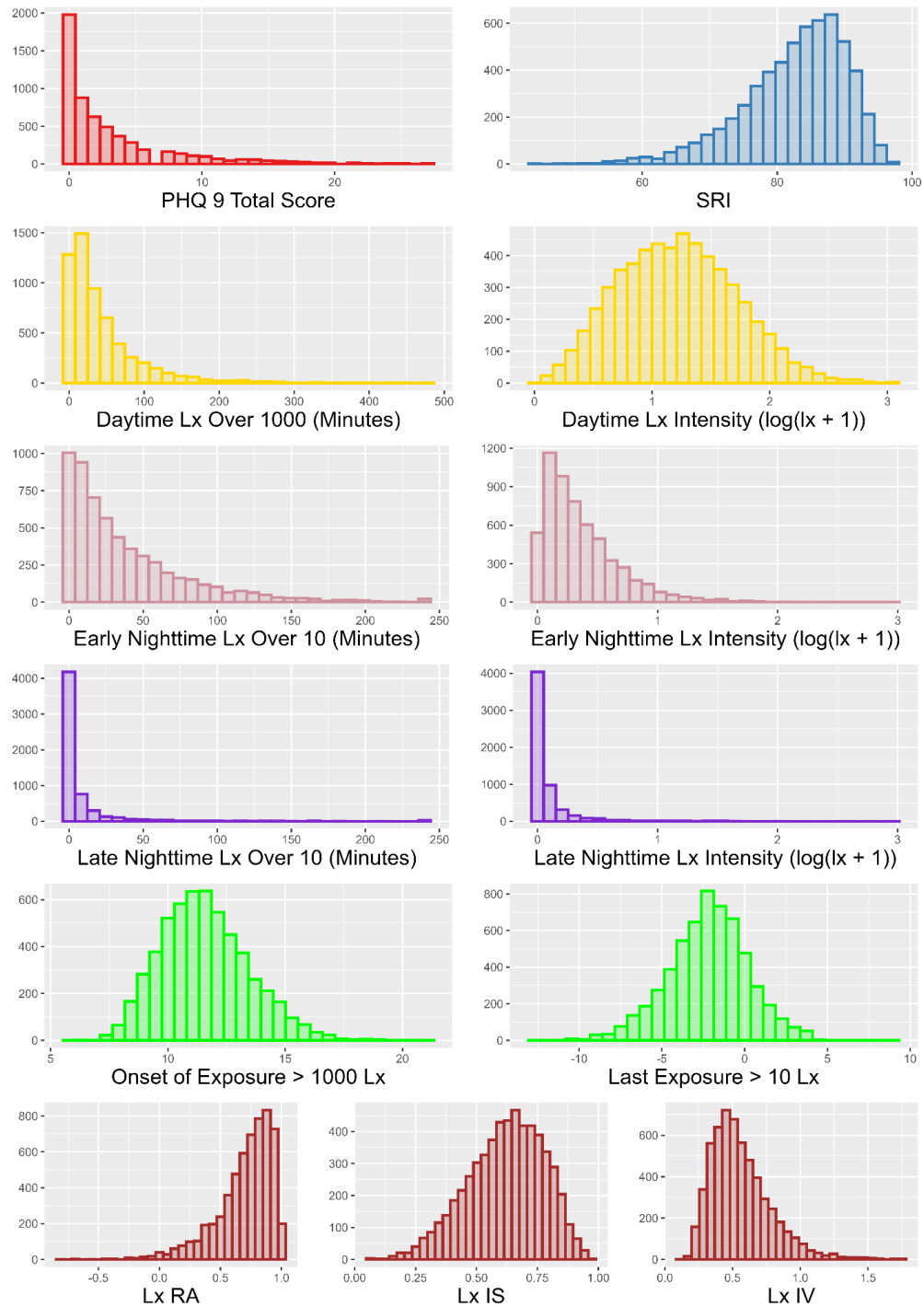


Supplementary Figure 2. Mean 24-h wave of light exposure calculated from a random sub-sample of 10% of study participants. Each dot was generated by computing the minute-by-minute average across all valid days and all participants.

Wearable-derived Dimensions of Light Exposure and Sleep Regularity Reveal Distinct Associations with Depressive Symptoms. Tonon AC, Quadri F, et al. 2026.



Supplementary Figure 3. Flowchart of sample selection.



Supplementary Figure 4. Histogram showing distributions of variables of interest. Y axes represent counts.

Supplementary Table 1. Multivariate models of light intensity, timing and rhythmicity variables on PHQ-9 scores.

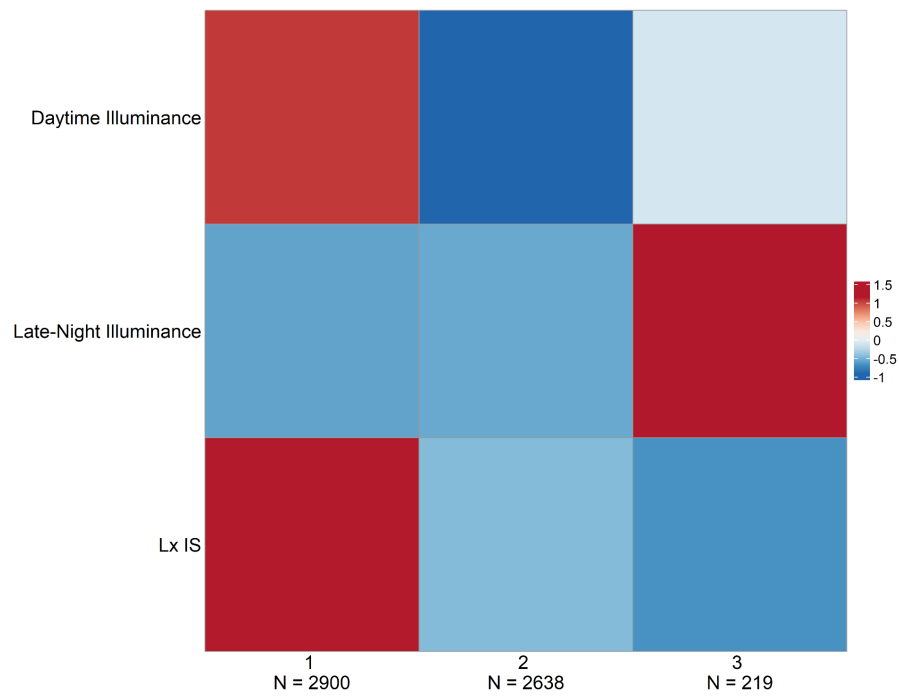
Light Variable	Model 1: Light Only (AIC = 24277)			Model 2: Light + SRI (AIC = 24166)		
	IRR	Confidence Interval	P _{adj}	IRR	Confidence Interval	P _{ad}
Daytime Illuminance	0.87	0.79, 0.95	0.01	0.87	0.79, 0.96	0.03
Early Night Illuminance	0.92	0.86, 1.00	0.09	0.95	0.88, 1.03	0.33
Late Night Illuminance	1.10	1.03, 1.17	0.03	1.05	0.99, 1.12	0.33
Onset of Exposure ≥ 1000 Lx	0.97	0.92, 1.02	0.30	0.97	0.92, 1.02	0.33
Last Exposure ≥ 10 Lx	1.01	0.94, 1.09	0.82	1.00	0.93, 1.07	0.96
Lx IS	0.98	0.91, 1.06	0.70	1.06	0.98, 1.15	0.33
Lx IV	0.96	0.90, 1.02	0.30	0.96	0.89, 1.03	0.33

P values were adjusted for the False Discovery Rate. All models are adjusted for Age, Sex, BMI, Ethnicity, Education, Employment Status, Chronotype, and Season.

Supplementary Table 2: Multivariate models of light duration, timing and rhythmicity values on PHQ-9 scores.

Light Variable	Model 1: Light Only (AIC = 24295)			Model 2: Light + SRI (AIC = 24177)		
	IRR	Confidence Interval	P _{adj}	IRR	Confidence Interval	P _{adj}
Daytime Duration ≥ 1000 Lx	0.97	0.91, 1.04	0.68	0.97	0.90, 1.04	0.94
Early Night Duration ≥ 10 Lx	0.91	0.85, 0.98	0.05	0.94	0.88, 1.01	0.53
Late Night Duration ≥ 10 Lx	1.05	0.99, 1.12	0.21	1.02	0.97, 1.09	0.94
Onset of Exposure ≥ 1000 Lx	0.99	0.94, 1.04	0.92	1.00	0.94, 1.05	0.94
Last Exposure ≥ 10 Lx	1.01	0.94, 1.09	0.92	1.00	0.93, 1.07	0.94
Lx IS	0.91	0.86, 0.97	0.01	1.00	0.94, 1.06	0.94
Lx IV	1.00	0.94, 1.06	0.94	0.99	0.93, 1.06	0.94

P values were adjusted for the False Discovery Rate. The IRR for the interaction term SRI * IS was 0.92. All models were adjusted for Age, Sex, BMI, Ethnicity, Education, Employment Status, Chronotype, and Season.



Supplementary Figure 5. Heatmap of the light variables used in k-means clustering, across the 3 clusters produced. Median values of the light variables across the clusters were scaled and z-scores plotted.

Supplementary Table 3: Post-Hoc testing of continuous variables of interest across light clusters.

Cluster Comparison	Median Difference	Adj. p-value (FDR)
Chronotype (MSFsc)		
Cluster 1 vs Cluster 2	-0.56	<0.001
Cluster 1 vs Cluster 3	-2.56	<0.001
Cluster 2 vs Cluster 3	-1.99	<0.001
PHQ9 Total Score		
Cluster 1 vs Cluster 2	-1.00	<0.001
Cluster 1 vs Cluster 3	-1.00	0.008
Cluster 2 vs Cluster 3	0.00	0.628
Sleep Regularity Index (SRI)		
Cluster 1 vs Cluster 2	4.79	<0.001
Cluster 1 vs Cluster 3	8.58	<0.001
Cluster 2 vs Cluster 3	3.78	<0.001

P values were adjusted for the False Discovery Rate.

Supplementary Table 4: Standardized Residuals of PHQ-9 ≥ 10 across light clusters

PHQ-9 ≥ 10	Cluster 1	Cluster 2	Cluster 3
Yes	-7.23	6.62	1.83

Values whose absolute value is greater than 1.96 are taken to represent statistically significant deviations from the population average, at an $\alpha = 0.05$.

