SUPPLEMENTAL MATERIAL

Supplemental Table 1. Participant characteristics (*related to Table 1*).

Participant characteristics	***n* = 72**
Educational level, *n* (%)	
College, High school	3 (4.2)
Apprenticeship	5 (6.9)
Professional school	39 (54.1)
University, University of applied science	21 (29.2)
Other	4 (5.6)
Household composition, median (IQR)	
Number of children	0 (0; 1)
Age of youngest child, years	3.5 (1.5; 7.0)
Age of oldest child, years	6.0 (3.6; 12.3)
Number of older incumbent persons	0 (0; 0)
Self-reported ethnicity, *n* (%)	
African	5 (6.9)
European	65 (90.3)
North American	2 (2.8)
South American	3 (4.2)
Other ethnicity	2 (2.8)
Clinical data	
Body mass index categories, *n* (%)	
Underweight	2 (2.7)
Normal	49 (68.1)
Overweight	16 (22.2)
Obesity	5 (7.0)
Self-reported comorbid conditions, *n* (%)	
Hypertension	1 (1.4)
Dyslipidemia	3 (4.2)
Obstructive sleep apnea	1 (1.4)
Thyroid disorder	3 (4.2)
Asthma	9 (12.5)
Cancer	2 (2.8)
Depression	3 (4.2)
Smoking status, *n* (%)	
Current	11 (15.3)
Past	11 (15.3)
Never	50 (69.4%)
Chronotype[A] (*n* = 69), *n* (%)	
Definitely morning type	0
Moderately morning type	21 (30.4)
Neutral type	43 (62.3)
Moderately evening type	5 (7.3)
Definitely evening type	0

Footnotes: [A]Assessed with the Morningness-Eveningness Questionnaire, with a total score ranging between 'definitely morning' (70–86 points), 'moderately morning' (59–69 points), 'neutral' (42–58 points), 'moderately evening' (31–41 points), and 'definitely evening' types (16–30 points) (1).

Supplemental Table 2. Work patterns, shift work systems, motivations, and workload.

Shift work schedule	***n* = 72**
Employment	
Work time, hours Weekly work duration excluding overtime Weekly overtime	 40.0 (35.5; 43.3) 1 (0; 2)
Commuting time, minutes Day shift to work Day shift from work Night shift to work Night shift from work	 20 (15; 30) 20 (15; 30) 15 (10; 30) 20 (15; 30)
Shift work system	
No. successive day shifts, days	3.0 (2.5; 4.0)
No. successive night shifts, days	3.0 (2.5; 3.5)
No. successive number of days off Maximum no. successive shifts of any kind between days off in the past month	2.0 (2.0; 2.5) 5 (4; 5)
No. weekends off per month	2 (2; 2)
No. night shifts in a year, days	55 (36; 72)
Types of night shifts (*n* = 70), *n* (%) Permanent night shift A single block of night duty per year Occasional blocks of night duty per year A block of nights per month Two blocks of nights per month One or two nights each week Other	 1 (1.4) 1 (1.4) 9 (12.7) 11 (15.5) 23 (32.4) 5 (7.0) 21 (29.6)
Impact of shift work on socio-familial life	
Main reason for working shifts, *n* (%) Part of the job The only job available More convenient for domestic responsibility Higher rates of pay Others	 70 (97.2) 2 (2.8) 4 (5.6) 4 (5.6) 8 (11.1)
Willingness to give up working shifts over day time job without shifts, *n* (%) Definitely not Probably not Maybe not Probably yes Definitely yes	 6 (8.3) 12 (16.7) 7 (9.7) 25 (34.7) 22 (30.6)
Partner's weekly paid employment (*n* = 47), hours	42 (40, 42)

Shift work schedule	***n* = 72**
Partner's usual work pattern, *n* (%)	
Daytime - no shifts	30 (63.8)
Rotating shifts with nights	10 (21.3)
Rotating shifts without nights	2 (4.3)
Permanent night shifts	2 (4.3)
Other	3 (6.4)
Partner's perception of participants' work shifts, *n* (%)	
Extremely unsupportive	2 (4.3)
Fairly unsupportive	3 (6.4)
Quite indifferent	6 (12.8)
Fairly supportive	16 (34.0)
Extremely supportive	20 (42.6)
Self-rated workload during night shifts compared to day shifts	
Physical workload, *n* (%)	
Much lighter	9 (12.5)
A bit lighter	18 (25.0)
About the same	28 (38.9)
A bit heavier	8 (11.1)
Much heavier	9 (12.5)
Mental workload, *n* (%)	
Much lighter	5 (6.9)
A bit lighter	20 (27.8)
About the same	24 (33.3)
A bit heavier	13 (18.1)
Much heavier	10 (13.9)
Time pressures, *n* (%)	
Much lighter	20 (27.8)
A bit lighter	23 (31.9)
About the same	13 (18.1)
A bit heavier	11 (15.3)
Much heavier	5 (6.9)
Emotional stress, *n* (%)	
Much lighter	6 (8.3)
A bit lighter	15 (20.8)
About the same	19 (26.4)
A bit heavier	23 (31.9)
Much heavier	9 (12.5)

Footnotes: Questions adapted from a subset of questions in the Standard Shiftwork Index (2). Data are presented as median (IQR) for continuous variables, or *n* (%) for categorical parameters.

Supplemental Table 3. Comparison of sleep and fatigue between night and day shifts (*related to Table 2*).

Sleep habits, sleep disturbances and fatigue (*n* = 72)	**Day shifts**	**Night shifts**	**p-value**
Preferred sleep duration daily irrespective of shift work, hours	7.59 (1.07)		
Time of sleep onset Time of wake-up	22:53h (22:00h; 23:00h) 06:00h (05:30h; 06:30h)	09:00h (08:30h; 09:23h) 14:30h (13:30h; 16:00h)	<0.001 <0.001
No. naps taken during shifts	0 (0; 0)	1 (0; 1)	<0.001
Self-reported sleep quality, *n* (%) Extremely badly Quite badly Moderately bad Quite well Extremely well	 0 2 (2.8) 20 (27.8) 35 (48.6) 15 (20.8)	 4 (5.6) 16 (22.2) 29 (40.3) 20 (27.80 3 (4.2)	<0.001
Perception of sleep sufficiency, *n* (%) Nowhere near enough Could do with a lot more Could do with a bit more Get the right amount Get plenty	 7 (9.7) 9 (12.5) 41 (56.9) 14 (19.4) 1 (1.4)	 14 (19.4) 26 (36.1) 21 (29.2) 11 (15.3) 0	0.001
Perceived restfulness after sleep, *n* (%) Definitely no rested Not very rested Moderately rested Quite rested Extremely rested	 4 (5.6) 16 (22.2) 29 (40.3) 20 (27.8) 3 (4.2)	 12 (16.7) 33 (45.8) 19 (26.4) 8 (11.1) 0	<0.001
Difficulty falling asleep, *n* (%) Never Rarely Sometimes Frequently	 24 (33.3) 16 (22.2) 23 (31.9) 8 (11.1)	 21 (29.2) 26 (36.1) 16 (22.2) 8 (11.1)	0.59

Sleep habits, sleep disturbances and fatigue (*n* = 72)	**Day shifts**	**Night shifts**	**p-value**
Always	1 (1.4)	1 (1.4)	
Waking earlier than intended, *n* (%)			<0.001
Never	28 (38.9)	7 (9.7)	
Rarely	21 (29.2)	7 (9.7)	
Sometimes	16 (22.2)	19 (26.4)	
Frequently	6 (8.3)	24 (33.3)	
Always	1 (1.4)	15 (20.8)	
Use of sleeping pills, *n* (%)			0.46
Never	68 (94.4)	66 (91.7)	
Rarely	2 (2.8)	1 (1.4)	
Sometimes	2 (2.8)	5 (6.9)	
Frequently	0	0	
Always	0	0	
Melatonin usage to aid sleep, *n* (%)			0.66
Never	61 (84.7)	63 (87.5)	
Rarely	2 (2.8)	4 (5.6)	
Sometimes	4 (5.6)	5 (6.9)	
Frequently	3 (4.2)	0	
Always	2 (2.8)	0	
Tiredness during shift, *n* (%)			<0.001
Never	0	0	
Rarely	10 (13.9)	0	
Sometimes	32 (44.4)	15 (20.8)	
Frequently	26 (36.1)	30 (41.7)	
Always	4 (5.6)	27 (37.5)	

Footnotes: Questions adapted from a subset of questions in the Standard Shiftwork Index (SSI) (2). Data are presented as median (IQR) for continuous variables, or *n* (%) for categorical parameters.

Supplemental Table 4. Comparison of calorie and macronutrient intake between night and day shifts (*related to Figure 1*).

Daily consumption (*n* = 66)	Reference values[A]	Day shifts	Night shifts	Difference	p-value
Calories (kcal/day)	1861 to 2147 for women 2305 to 2672 for men	1939.7 ± 468.0	1751.3 ± 547.2	-163.8 ± 529.9	0.015
Carbohydrates (g/day)	n/a	208.8 ± 63.7	201.6 ± 65.3	-3.6 ± 59.2	0.62
Protein (g/day) Relative to body weight (g/kg)	n/a 0.83 g/kg body weight	74.1 (56.9; 100.9) 1.26 (0.86; 1.58)	67.4 (53.0; 83.1) 1.05 (0.80; 1.36)	-9.6 ± 28.1 -0.15 ± 0.44	0.007 0.007
Fat (g/day)	n/a	86.0 ± 26.5	76.4 ± 31.9	-8.9 ± 29.3	0.017
Alcohol (g/day)	10 g for women 20 g for men	0.0 (0.0; 7.7)	0.0 (0.0; 0.0)	0.0 (-6.3; 0.0)	<0.001
Fiber (g/day)	30	19.1 (15.6; 23.9)	17.8 (13.9; 21.1)	-1.93 ± 6.36	0.017
Carbohydrates (%)	45 to 60	43.3 ± 8.6	47.0 ± 9.0	2.6 (-1.3; 8.6)	<0.001
Protein (%)	n/a	16.6 ± 4.0	15.8 ± 4.1	-0.6 ± 4.0	0.23
Fat (%)	20 to 35	39.7 ± 6.5	38.4 ± 7.5	-1.6 ± 7.5	0.09
Alcohol (%)	n/a	0.0 (0.0; 2.7)	0.0 (0.0; 0.0)	0.0 (-2.4; 0.0)	<0.001

Footnotes: Data are presented as mean ± SD or median (IQR), depending on the normal distribution of data. [A]Nutritional reference values for healthy adults aged between 18 and 65 in Switzerland (3).

Supplemental Table 5. Self-reported eating habits, alcohol and caffeine intake, and tobacco use between night and day shifts.

Eating habits, median (IQR)	***n***	**Day shifts**	**Night shifts**	**Difference**	**p-value**
Self-rated subjective appetite, mean ± SD	69	6.1 ± 2.0	5.5 ± 2.1	-0.7 ± 2.1	0.008
Changes in eating habits during night shifts, *n* (%) Longer eating duration Irregular meals Skipping meals Unhealthy food consumption Snacking	72		 10 (13.9) 34 (47.2) 37 (51.4) 22 (30.6) 32 (44.4)		
Number of meals in the past 24 hours	70	3 (2; 3)	2 (2; 3)	0 (-1; 0)	0.01
Main meal of the day, *n* (%) Breakfast Lunch Dinner Other	69	 6 (8.7) 31 (44.9) 30 (43.5) 2 (2.9)	 3 (4.3) 7 (10.1) 56 (81.2) 3 (4.4)		 0.004
Frequency of eating outside the usual mealtime in the past 24 hours	70	1 (0.5; 2)	2 (1; 3)	0 (-0.3; 1)	0.03
Frequency of eating in front of a screen in the past 24 hours	69	1 (0.2; 1)	1 (1; 2)	0 (0; 1.5)	0.001
Alcohol intake (units)	69	0 (0; 2)	0 (0; 0)	0 (-1; 0)	<0.001
Caffeine intake (cups) Coffee Tea Caffeinated soda/ shake drinks	56	 6 (2.75; 8) 0 (0; 3) 0 (0; 0)	 5 (2; 8) 1 (0; 2) 0 (0; 0)	 0 (-1; 1) 0 (-0.5; 1) 0 (0; 0)	 0.62 0.26 0.39
Tobacco use throughout the shift period (numbers) Cigarettes E-cigarettes Vaporizers	 11 7 8	 15 (4; 40) 0 (0; 0) 0 (0; 0)	 6 (2; 30) 0 (0; 0) 0 (0; 0)	 0 (-9; 4) 0 (0; 0) 0 (0; 0)	 0.79 0.91 0.93

Footnotes: Data are presented as mean ± SD or median (IQR), depending on the normal distribution of data.

Supplemental Table 6. Comparison of CGM metrics and Actiheart® measurements between night and day shifts (*related to Figures 2-3-4*).

	n	Day shifts	Night shifts	Difference	p-value
CGM metrics					
Mean glucose (mmol/L)	58	4.93 ± 0.67	4.78 ± 0.59	-0.19 ± 0.61	0.024
Coefficient of variation (%)	58	13.85 (11.83; 17.25)	15.47 (12.72; 18.96)	1.45 ± 4.52	0.018
Mean amplitude of glycemic variation (mmol/L)	58	1.31 (0.99; 1.65)	1.45 (1.12; 1.99)	0.21 ± 0.64	0.016
Baseline of baseline glucose cosinor model (mmol/L)	55	4.37 ± 0.70	4.11 ± 0.59	-0.29 ± 0.69	0.003
Amplitude of baseline glucose cosinor model (mmol/L)	55	0.53 (0.41; 0.68)	0.62 (0.46; 0.82)	0.08 ± 0.36	0.11
Damping coefficient	55	-0.60 (-1.02; -0.29)	-0.74 (-1.32; -0.29)	-0.31 (-0.73; 0.35)	0.10
Half-life (h)	55	1.25 (1.01; 1.55)	1.23 (1.04; 1.51)	-0.06 (-0.20; 0.25)	0.88
Mean of meal heights (mmol/L)	55	0.90 (0.70; 1.16)	1.06 (0.86; 1.37)	0.20 (0.01; 0.42)	<0.001
Actiheart® measurements					
Activity count	43	3.43 (2.94; 4.12)	3.11 (2.72; 4.00)	-0.21 (-0.66; 0.24)	0.12
Heart rate (beats/min)	43	77.54 (72.01; 82.99)	75.66 (67.39; 79.18)	-1.77 ± 4.63	0.018
Heart rate variability [log(RMSSD)]	43	3.58 ± 0.45	3.67 ± 0.42	0.07 (-0.10 to 0.23)	0.073

Footnotes: Data are presented as mean ± SD or median (IQR), depending on the data normal distribution.

Abbreviations: CGM, Continuous Glucose Monitor; RMSSD, Root Mean Square of Successive Differences.

Supplemental Figure 1.

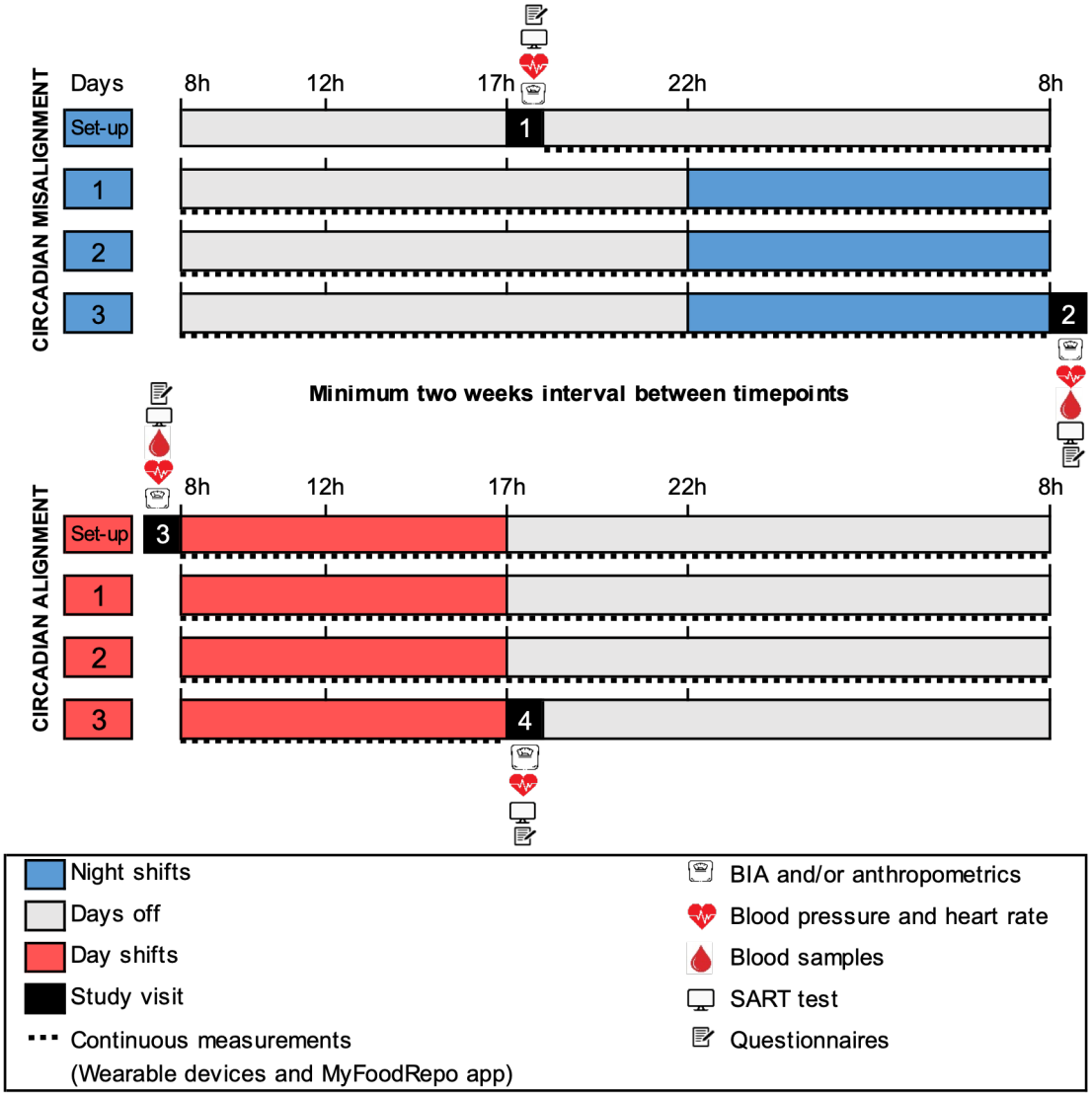

Figure S1. Study design of the OPTI-SHIFT observational study. The actual clock times of the shift start and end times could vary slightly according to the individual shift rotations. Abbreviations: BIA, Bioelectrical Impedance; SART, Sustained Attention to Response Task (4).

Supplemental Figure 2.

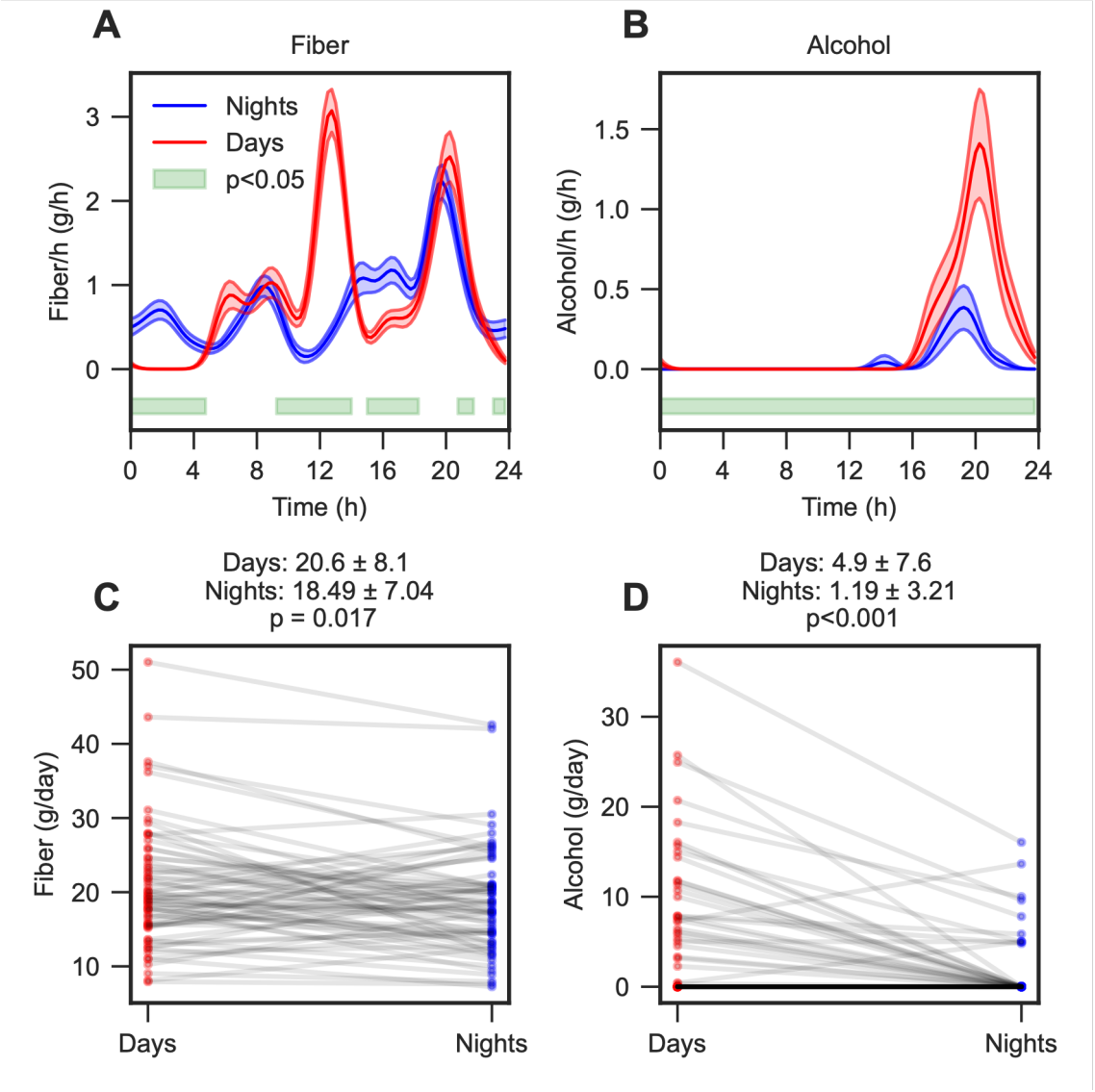

Figure S2. Temporal distribution of fiber and alcohol consumption during day and night shifts (*related to Figure 1*). (A-B) The mean consumption rate per hour for night shifts (blue) and day shifts (red) for fiber and alcohol, respectively. The shaded area represents the mean ± SEM, and the green bar represents significant group differences as assessed from p<0.05 in a Wilcoxon non-parametric test, adjusted for multiple testing with the Benjamini-Hochberg procedure. (C-D) Individual average daily intake for the day and night shift period for fiber and alcohol, respectively. Group means ± SD are indicated above each panel. *n* = 66 for all analyses.

References

1. Horne JA, Östberg O. A self-assessment questionnaire to determine morningness-eveningness in human circadian rhythms. *Int J Chronobiol*. 1976;4(2):97–110.

2. Barton J, et al. Is there an optimum number of night shifts? Relationship between sleep, health and well-being. *Work Stress*. 1995;9(2–3):109–123.

3. Federal Food Safety and Veterinary Office (FSVO). Recommendations for healthy adults aged between 18 and 65 [Internet]. 2025. https://valeursnutritives.ch/en/nutrients/. Accessed August 15, 2025.

4. Robertson IH, et al. “Oops!”: performance correlates of everyday attentional failures in traumatic brain injured and normal subjects. *Neuropsychologia*. 1997;35(6):747–758.