Residual, differential neurobehavioral deficits linger after multiple recovery nights following chronic sleep restriction or acute total sleep deprivation

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Table S1. Bonferroni-adjusted pairwise comparisons for both conditions combined for measures without a significant time by condition interaction.

Measure	Time Points in Analysis	Study Day	Study Day	Mean Difference	SE	*p*	CI Lower-bound	CI Upper-bound
10 min PVT Lapses	All	B2	Sleep Loss*	-7.56	0.79	0.000	-9.94	-5.18
			R1*	-0.61	0.16	0.003	-1.08	-0.14
			R2*	-0.82	0.21	0.003	-1.46	-0.19
			R3*	-0.73	0.16	0.000	-1.22	-0.23
			R4*	-1.08	0.31	0.011	-2.01	-0.15
		Sleep Loss	R1*	6.95	0.73	0.000	4.74	9.16
			R2*	6.74	0.72	0.000	4.57	8.89
			R3*	6.83	0.70	0.000	4.71	8.96
			R4*	6.48	0.67	0.000	4.46	8.50
		R1	R2	-0.22	0.15	1.000	-0.67	0.24
			R3	-0.12	0.14	1.000	-0.54	0.31
			R4	-0.47	0.27	1.000	-1.28	0.35
		R2	R3	0.10	0.14	1.000	-0.32	0.52
			R4	-0.25	0.23	1.000	-0.94	0.43
		R3	R4	-0.35	0.23	1.000	-1.06	0.36
	Recovery	R1	R2	-0.22	0.15	0.928	-0.62	0.19
			R3	-0.12	0.14	1.000	-0.50	0.26
			R4	-0.47	0.27	0.520	-1.20	0.26
		R2	R3	0.10	0.14	1.000	-0.28	0.48
			R4	-0.25	0.23	1.000	-0.87	0.36
		R3	R4	-0.35	0.23	0.827	-0.98	0.28
10 min PVT 1/RT	Recovery	R1	R2	0.01	0.02	1.000	-0.04	0.06
			R3	0.02	0.02	1.000	-0.04	0.07
			R4	0.06	0.03	0.153	-0.01	0.13
		R2	R3	0.01	0.02	1.000	-0.03	0.05
			R4	0.05	0.02	0.074	0.00	0.11
		R3	R4*	0.04	0.01	0.016	0.01	0.08
DSST Number Correct	Recovery	R1	R2*	-1.33	0.32	0.001	-2.20	-0.46
			R3*	-1.66	0.40	0.000	-2.72	-0.59
			R4*	-1.87	0.44	0.000	-3.07	-0.67
		R2	R3	-0.33	0.27	1.000	-1.06	0.41
			R4	-0.54	0.32	0.553	-1.40	0.32
		R3	R4	-0.22	0.38	1.000	-1.24	0.81
KSS Score	Recovery	R1	R2	-0.04	0.12	1.000	-0.37	0.28
			R3	-0.08	0.13	1.000	-0.42	0.27
			R4	0.07	0.12	1.000	-0.26	0.41
		R2	R3	-0.03	0.07	1.000	-0.23	0.17
			R4	0.12	0.09	1.000	-0.12	0.36

		R3	R4	0.15	0.07	0.252	-0.05	0.35
POMS Fatigue Score	**All**	**B2**	Sleep Loss*	-4.83	0.51	0.000	-6.38	-3.28
			R1	-0.56	0.19	0.063	-1.13	0.02
			R2	-0.47	0.22	0.464	-1.12	0.18
			R3	-0.53	0.21	0.220	-1.17	0.11
			R4	-0.23	0.21	1.000	-0.85	0.40
		Sleep Loss	R1*	4.27	0.50	0.000	2.76	5.79
			R2*	4.35	0.53	0.000	2.74	5.97
			R3*	4.30	0.54	0.000	2.65	5.95
			R4*	4.60	0.55	0.000	2.94	6.26
		R1	R2	0.08	0.17	1.000	-0.42	0.58
			R3	0.03	0.17	1.000	-0.49	0.54
			R4	0.33	0.20	1.000	-0.26	0.92
		R2	R3	-0.05	0.08	1.000	-0.30	0.19
			R4	0.25	0.16	1.000	-0.22	0.72
		R3	R4	0.30	0.12	0.184	-0.05	0.66
	Recovery	**R1**	R2	0.08	0.17	1.000	-0.36	0.53
			R3	0.03	0.17	1.000	-0.43	0.49
			R4	0.33	0.20	0.581	-0.20	0.86
		R2	R3	-0.05	0.08	1.000	-0.28	0.17
			R4	0.25	0.16	0.683	-0.17	0.67
		R3	R4	0.30	0.12	0.074	-0.02	0.62
POMS Vigor Score	**All**	**B2**	Sleep Loss*	4.13	0.41	0.000	2.88	5.37
			R1*	1.21	0.33	0.007	0.20	2.22
			R2*	1.40	0.37	0.004	0.28	2.52
			R3*	1.70	0.35	0.000	0.64	2.76
			R4*	2.23	0.40	0.000	1.02	3.43
		Sleep Loss	R1*	-2.91	0.40	0.000	-4.12	-1.71
			R2*	-2.73	0.39	0.000	-3.92	-1.54
			R3*	-2.43	0.41	0.000	-3.65	-1.20
			R4*	-1.90	0.43	0.000	-3.19	-0.61
		R1	R2	0.19	0.29	1.000	-0.69	1.07
			R3	0.49	0.28	1.000	-0.35	1.33
			R4	1.01	0.34	0.056	-0.01	2.04
		R2	R3	0.30	0.22	1.000	-0.37	0.97
			R4*	0.83	0.26	0.035	0.03	1.62
		R3	R4	0.53	0.21	0.197	-0.10	1.15
	Recovery	**R1**	R2	0.19	0.29	1.000	-0.60	0.97
			R3	0.49	0.28	0.497	-0.26	1.24
			R4*	1.01	0.34	0.022	0.10	1.93
		R2	R3	0.30	0.22	1.000	-0.30	0.90
			R4*	0.83	0.26	0.014	0.12	1.54
		R3	R4	0.53	0.21	0.079	-0.04	1.09
MWT Sleep Latency	**Recovery**	**R1**	R3	-1.62	0.91	0.239	-3.84	0.61
			R4	-1.56	1.08	0.456	-4.20	1.08
		R3	R4	0.06	0.62	1.000	-1.46	1.57

SE=standard error; CI=confidence interval; B2=baseline day; R1-R4=recovery days; PVT=Psychomotor Vigilance Test; 1/RT=Response Speed; DSST=Digit Symbol Substitution Task; KSS=Karolinska Sleepiness Scale; POMS=Profile of Mood States; MWT=Maintenance of Wakefulness Test. *$p<0.05$. Results are only presented for measures that did not demonstrate a significant interaction in between-group RMANOVAs using all time points and/or recovery only (between-group RMANOVA results are presented in Table 2).

Table S2. Bonferroni-adjusted pairwise comparison results, presented by condition, for variables that demonstrated a significant time by condition interaction.

Measure	Condition	Study Day	Study Day	Mean Difference	SE	*p*	CI-Lower bound	CI-Upper bound
10 min PVT 1/RT	SR	B2	Sleep Loss*	0.67	0.07	0.000	0.46	0.88
			R1*	0.31	0.05	0.000	0.15	0.46
			R2*	0.32	0.06	0.000	0.14	0.49
			R3*	0.35	0.05	0.000	0.19	0.51
			R4*	0.37	0.06	0.000	0.19	0.55
		Sleep Loss	R1*	-0.36	0.04	0.000	-0.50	-0.23
			R2*	-0.35	0.05	0.000	-0.50	-0.20
			R3*	-0.32	0.04	0.000	-0.46	-0.18
			R4*	-0.30	0.05	0.000	-0.45	-0.15
		R1	R2	0.01	0.03	1.000	-0.08	0.10
			R3	0.04	0.03	1.000	-0.06	0.14
			R4	0.06	0.04	1.000	-0.07	0.19
		R2	R3	0.03	0.03	1.000	-0.06	0.12
			R4	0.05	0.03	1.000	-0.05	0.15
		R3	R4	0.02	0.02	1.000	-0.04	0.08
	TSD	B2	Sleep Loss*	0.64	0.07	0.000	0.43	0.84
			R1	0.02	0.02	1.000	-0.05	0.09
			R2	0.03	0.03	1.000	-0.06	0.12
			R3	0.02	0.03	1.000	-0.08	0.12
			R4	0.08	0.04	0.610	-0.04	0.20
		Sleep Loss	R1*	-0.61	0.06	0.000	-0.80	-0.42
			R2*	-0.61	0.06	0.000	-0.78	-0.43
			R3*	-0.62	0.06	0.000	-0.80	-0.44
			R4*	-0.55	0.06	0.000	-0.74	-0.37
		R1	R2	0.01	0.02	1.000	-0.07	0.08
			R3	-0.01	0.03	1.000	-0.09	0.08
			R4	0.06	0.03	1.000	-0.05	0.16
		R2	R3	-0.01	0.02	1.000	-0.06	0.04
			R4	0.05	0.02	0.390	-0.02	0.12
		R3	R4*	0.07	0.02	0.013	0.01	0.12
DSST Number Correct	SR	B2	Sleep Loss	1.73	1.15	1.000	-1.85	5.31
			R1*	-2.91	0.90	0.039	-5.73	-0.08
			R2*	-4.20	0.82	0.000	-6.76	-1.65
			R3*	-4.33	0.92	0.000	-7.19	-1.46
			R4*	-4.34	0.85	0.000	-6.99	-1.68
		Sleep Loss	R1*	-4.63	0.73	0.000	-6.91	-2.36
			R2*	-5.93	0.86	0.000	-8.62	-3.25
			R3*	-6.06	0.97	0.000	-9.09	-3.02
			R4*	-6.07	1.12	0.000	-9.55	-2.58
		R1	R2	-1.30	0.55	0.328	-3.00	0.40

			R3	-1.42	0.62	0.400	-3.35	0.51
			R4	-1.43	0.67	0.586	-3.53	0.66
		R2	R3	-0.12	0.40	1.000	-1.36	1.12
			R4	-0.14	0.51	1.000	-1.73	1.46
		R3	R4	-0.01	0.59	1.000	-1.84	1.81
	TSD	**B2**	Sleep Loss*	6.25	1.10	0.000	2.84	9.66
			R1*	-2.14	0.56	0.006	-3.87	-0.41
			R2*	-3.50	0.66	0.000	-5.55	-1.46
			R3*	-4.03	0.68	0.000	-6.14	-1.93
			R4*	-4.45	0.81	0.000	-6.96	-1.94
		Sleep Loss	R1*	-8.39	0.88	0.000	-11.12	-5.66
			R2*	-9.75	0.88	0.000	-12.48	-7.02
			R3*	-10.28	0.94	0.000	-13.21	-7.35
			R4*	-10.70	0.96	0.000	-13.68	-7.72
		R1	R2*	-1.36	0.35	0.006	-2.46	-0.27
			R3*	-1.89	0.49	0.006	-3.43	-0.36
			R4*	-2.31	0.58	0.004	-4.13	-0.50
		R2	R3	-0.53	0.37	1.000	-1.68	0.62
			R4	-0.95	0.38	0.256	-2.14	0.24
		R3	R4	-0.42	0.48	1.000	-1.92	1.08
KSS Score	**SR**	**B2**	Sleep Loss*	-2.56	0.33	0.000	-3.60	-1.52
			R1	-0.25	0.18	1.000	-0.80	0.31
			R2	-0.33	0.15	0.575	-0.81	0.15
			R3	-0.29	0.16	1.000	-0.78	0.21
			R4	-0.20	0.18	1.000	-0.75	0.35
		Sleep Loss	R1*	2.31	0.31	0.000	1.36	3.26
			R2*	2.23	0.28	0.000	1.36	3.11
			R3*	2.28	0.30	0.000	1.33	3.22
			R4*	2.36	0.30	0.000	1.43	3.29
		R1	R2	-0.08	0.20	1.000	-0.71	0.55
			R3	-0.04	0.20	1.000	-0.64	0.57
			R4	0.05	0.21	1.000	-0.61	0.71
		R2	R3	0.04	0.12	1.000	-0.32	0.41
			R4	0.13	0.15	1.000	-0.34	0.60
		R3	R4	0.08	0.11	1.000	-0.24	0.41
	TSD	**B2**	Sleep Loss*	-3.81	0.32	0.000	-4.81	-2.81
			R1	-0.24	0.11	0.558	-0.59	0.11
			R2	-0.25	0.15	1.000	-0.71	0.22
			R3	-0.36	0.16	0.406	-0.84	0.13
			R4	-0.14	0.13	1.000	-0.56	0.27
		Sleep Loss	R1*	3.57	0.32	0.000	2.57	4.56
			R2*	3.56	0.29	0.000	2.65	4.48
			R3*	3.45	0.30	0.000	2.51	4.39
			R4*	3.67	0.30	0.000	2.73	4.60
		R1	R2	-0.01	0.13	1.000	-0.41	0.40
			R3	-0.12	0.16	1.000	-0.62	0.39

					SE		CI lower	CI upper
			R4	-0.10	0.14	1.000	-0.32	0.52
		R2	R3	-0.11	0.09	1.000	-0.39	0.17
			R4	-0.10	0.10	1.000	-0.20	0.40
		R3	R4	0.21	0.10	0.547	-0.10	0.52
MWT Sleep Latency	**SR**	**B2**	Sleep Loss*	9.87	1.48	0.000	5.49	14.26
			R1	2.72	1.66	1.000	-2.22	7.66
			R3	0.69	0.98	1.000	-2.23	3.61
			R4	0.70	1.32	1.000	-3.21	4.62
		Sleep Loss	R1*	-7.15	1.56	0.000	-11.77	-2.53
			R3*	-9.18	1.35	0.000	-13.20	-5.16
			R4*	-9.17	1.56	0.000	-13.79	-4.55
		R1	R3	-2.03	1.56	1.000	-6.66	2.60
			R4	-2.02	1.82	1.000	-7.42	3.38
		R3	R4	0.01	1.10	1.000	-3.26	3.29
	TSD	**B2**	Sleep Loss*	14.22	1.45	0.000	9.92	18.52
			R1	0.12	1.04	1.000	-2.96	3.20
			R3	-1.08	0.83	1.000	-3.54	1.38
			R4	-0.98	1.04	1.000	-4.06	2.10
		Sleep Loss	R1*	-14.10	1.41	0.000	-18.29	-9.91
			R3*	-15.30	1.47	0.000	-19.65	-10.94
			R4*	-15.20	1.54	0.000	-19.76	-10.63
		R1	R3	-1.20	0.96	1.000	-4.04	1.64
			R4	-1.10	1.18	1.000	-4.60	2.40
		R3	R4	0.10	0.59	1.000	-1.64	1.85

SE=standard error; CI=confidence interval; SR=sleep restriction; TSD=total sleep deprivation; B2=baseline day; R1-R4=recovery days; PVT=Psychomotor Vigilance Test; 1/RT=Response Speed; DSST=Digit Symbol Substitution Task; KSS=Karolinska Sleepiness Scale; MWT=Maintenance of Wakefulness Test. *$p<0.05$.