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Supporting Information for

The circadian molecular clock in the suprachiasmatic nucleus is necessary but not sufficient for fear entrainment

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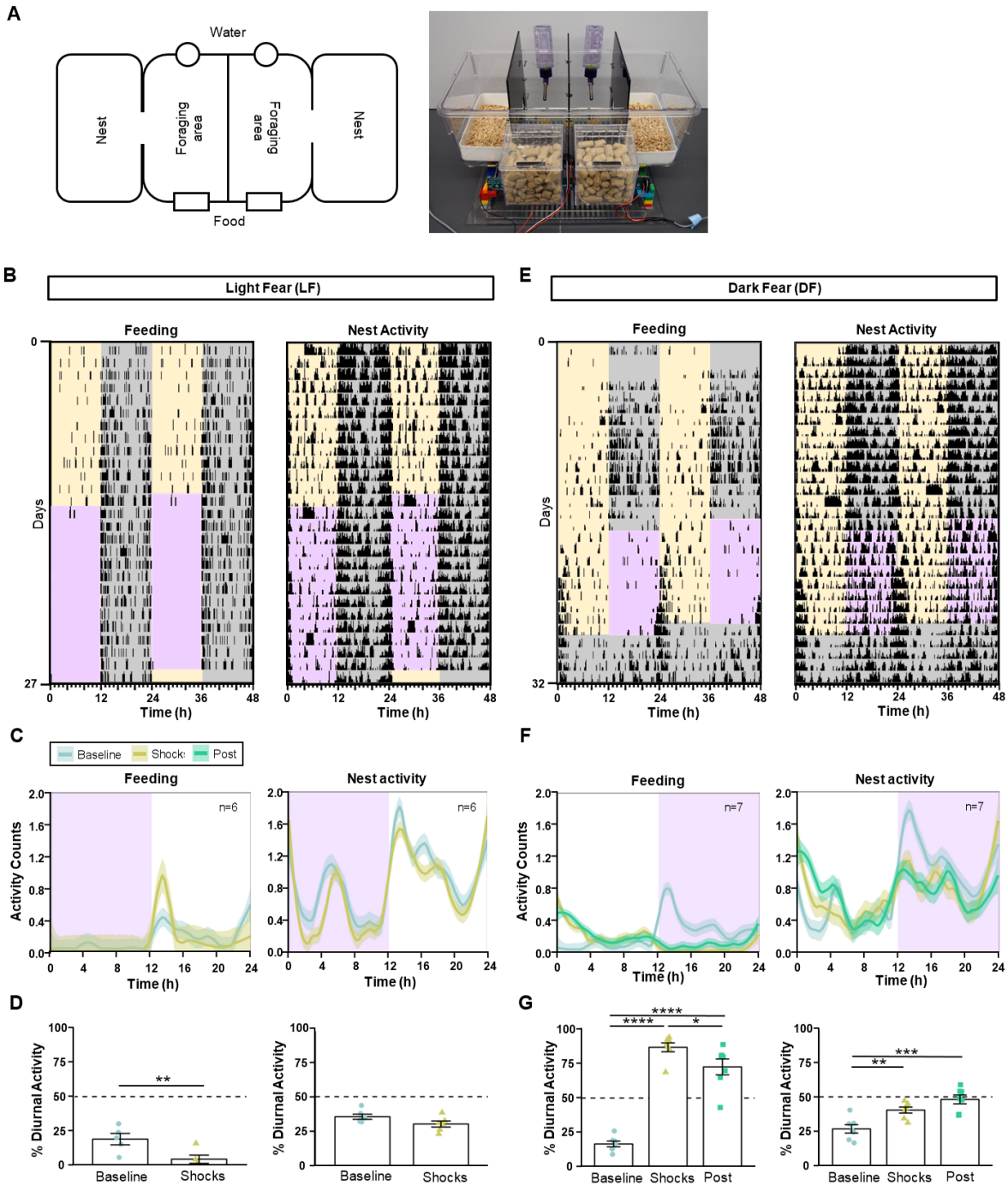

Figure S1. Cyclic fear entrains a circadian oscillator under a light-dark cycle. (A) Custom-build cages to study fear entrainment. Top: Schematic of a cage where two mice are individually housed. Each mouse has access to a safe nest cage and needs to get all the food and water from a foraging area. The floor of the foraging area can deliver footshocks with any temporal pattern. The shocking grid is shared by the two mice but each mouse's setup is separated by an opaque divider. Bottom: Photograph of the fear-entrainment setup. A nose poke detector continuously records feeding from each feeder. Individual IR sensors on the cage lid (not displayed) monitor the activity of each mouse independently in the nest and foraging areas. **(B)** Representative feeding and nest activity actograms from mice in LD subjected to LF (left) or DF (right). Yellow and grey shading respectively represents the light and dark phases of a 12:12 LD cycle. Purple shading represents the 12-h window of time at which 3 footshocks/hour randomly distributed over time were presented. **(C)** Average feeding and nest activity patterns from mice under an LD cycle subjected LF (left, n=6) or DF (right, n=7). **(D)** Percent of activity that took place during the daytime or extrapolated daytime across the different experimental stages from the same mice shown in B. Bars represent mean ± SEM. *P < 0.05, **P < 0.01, ***P < 0.001. Symbols as in Fig. 1.

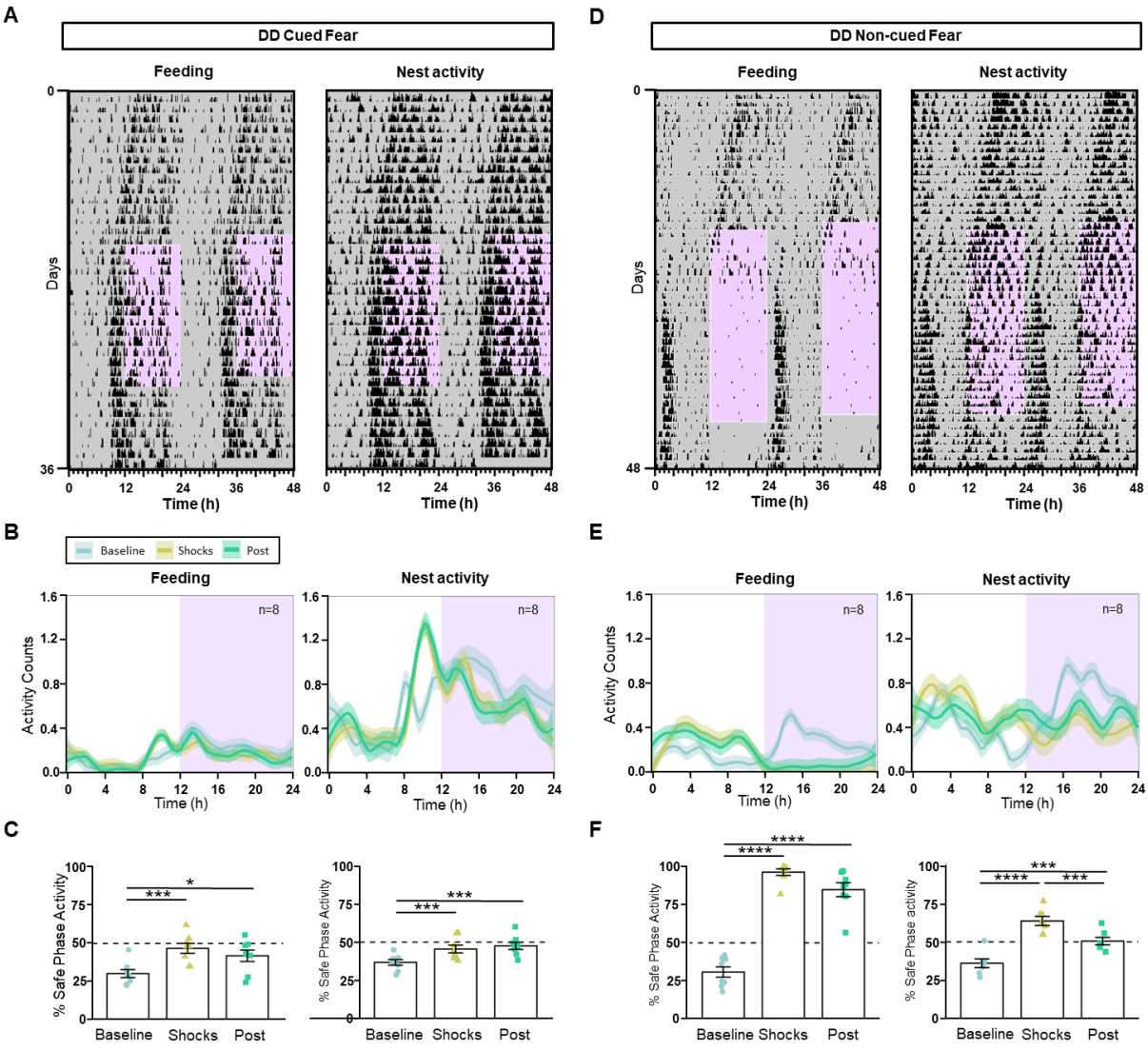

Figure S2. Cyclic fear entrains a circadian oscillator under constant darkness. (A, D) Representative feeding and nest activity actograms from mice in DD subjected to either cued (A) or non-cued (D) cyclic fear. Purple shading represents the 12-h window of time at which 3 footshocks/hour randomly distributed over time were presented either preceded by an auditory signal (A, cued) or not (D, non-cued). **(B, E)** Average feeding and nest activity patterns from mice in DD subjected to cued (B, n=8) or non-cued fear (F, n=8). **(C, F)** Percent of activity that took place during the safe phase (window of time without shocks) or extrapolated safe phase across the different experimental stages from the same mice shown in B, F. *P < 0.05, ***P < 0.001. Symbols as in Fig. 1.

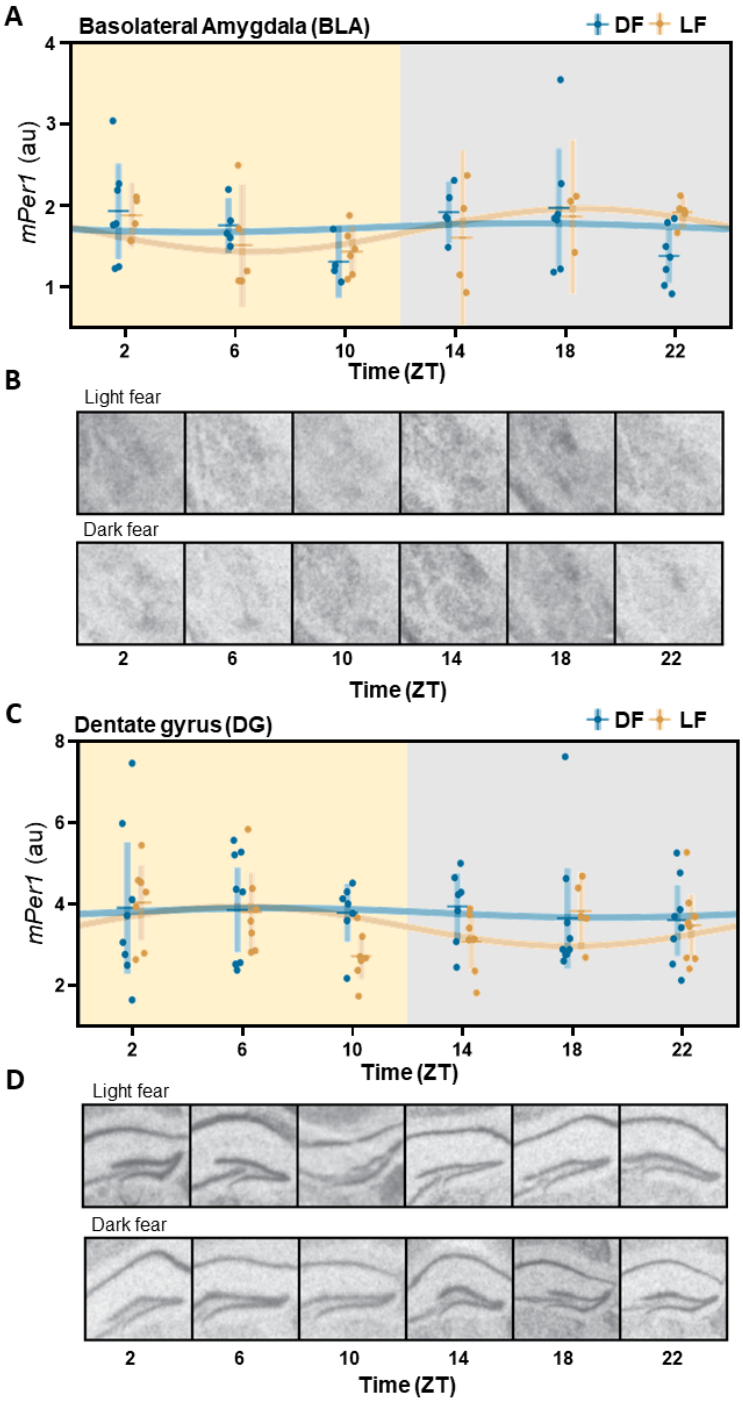

Figure S3. m***Per1*** **expression in in the basolateral amygdala and dentate gyrus**. (A, C) Daily pattern of *mPer1* mRNA expression in mice housed under a 12:12 LD cycle and subjected to LF or DF. Each dot represents an individual mouse, horizontal and vertical lines respectively represent the mean and SEM. Cosinor analysis failed to detect any oscillation in any of the regions or groups. (B, D) Representative autoradiographs of coronal brain sections at the level of the basolateral amygdala (B) and the dentate gyrus of the hypocampus (D), hybridized with a radioactive probe for *mPer1* mRNA detection.

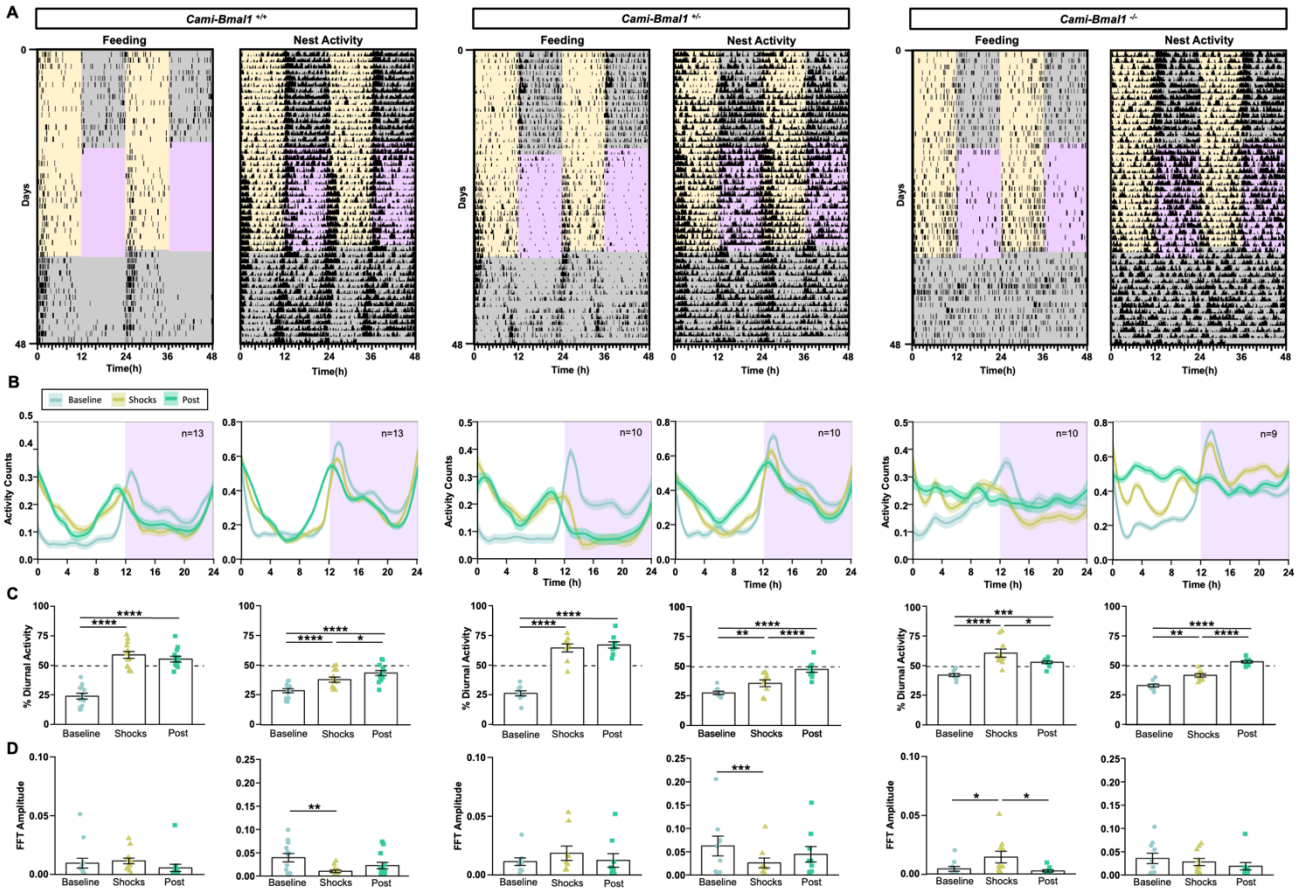

Figure S4. The expression of the clock gene *Bmal1* in the forebrain is necessary for fear entrainment. (A) Representative feeding and nest activity actograms from Cami-Bmal1$^{+/+}$, Cami-Bmal1$^{+/-}$ and Cami-Bmal1$^{-/-}$ mice subjected to DF. (B) Average activity patterns from Cami-Bmal1$^{+/+}$ (left, n=13), Cami-Bmal1$^{+/-}$ (center, n=9) and Cami-Bmal1$^{-/-}$ mice (right, n=10) subjected to DF. (C) Percentage of activity during the daytime or extrapolated daytime across the different experimental stages from the same mice shown in B. (D) Fast-Fourier transform (FFT) Amplitude across the successive stages from the same mice shown in B. *P < 0.05, **P < 0.01, ***P < 0.001. Symbols as in Fig. 1.

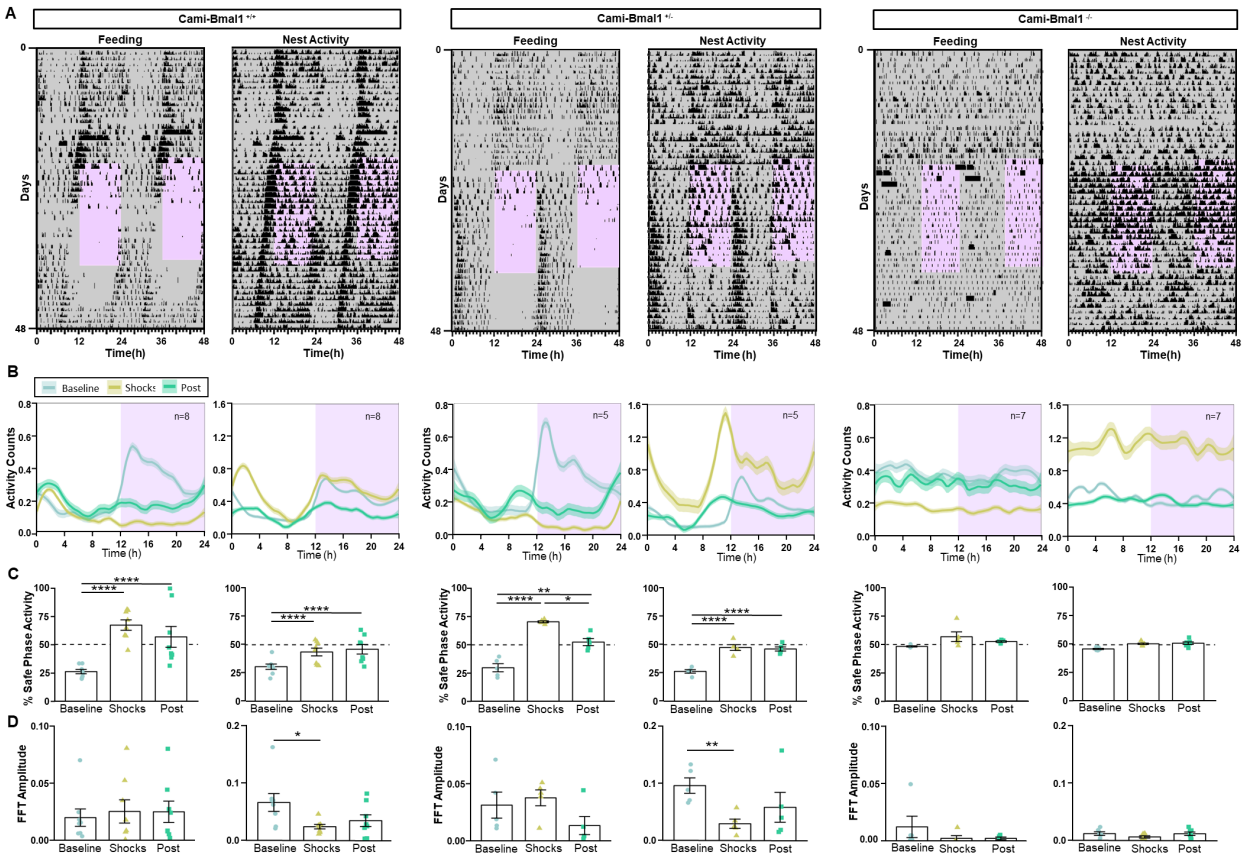

Figure S5. The expression of the clock gene *Bmal1* in the forebrain is necessary for fear entrainment. (A) Representative feeding and nest activity actograms from Cami-Bmal1$^{+/+}$, Cami-Bmal1$^{+/-}$ and Cami-Bmal1$^{-/-}$ mice subjected to a non-cued fear protocol in DD. **(B)** Average activity patterns from Cami-Bmal1$^{+/+}$ (left, n=8), Cami-Bmal1$^{+/-}$ (center, n=5) and Cami-Bmal1$^{-/-}$ mice (right, n=7) subjected to a non-cued fear protocol in DD. **(C)** Percent of activity that took place during the safe phase (window of time without shocks) or extrapolated safe phase across the different experimental stages from the same mice shown in F. **(D)** FFT amplitude across the successive stages from the same mice shown in C. *P < 0.05, **P < 0.01, ***P < 0.001. Symbols as in Fig. 1.

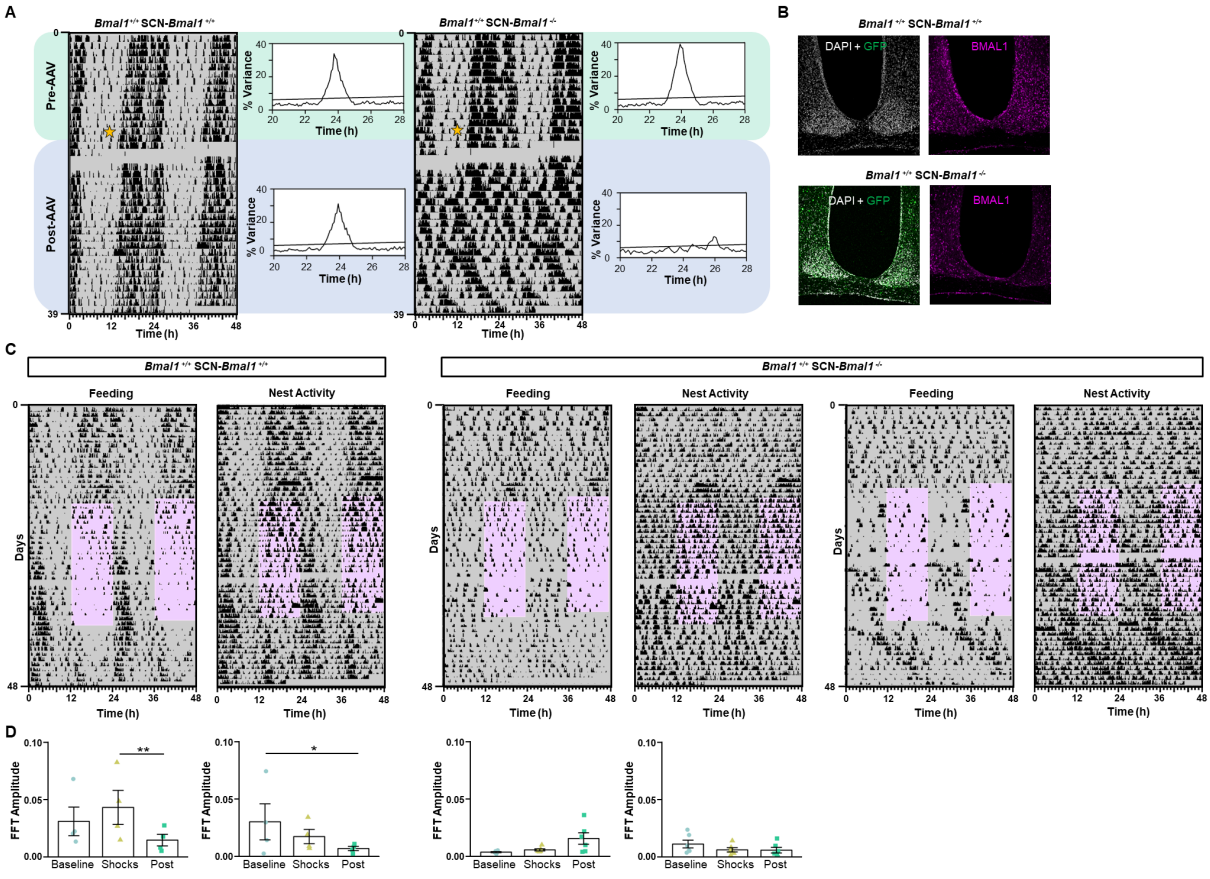

Figure S6. The circadian canonical clock within the SCN is necessary for fear entrainment. (A) Actograms and periodograms of cage locomotor activity of two representative mice before and after they received an injection of a Cre-expressing AAV outside (left, SCN-*Bmal1*$^{+/+}$) or within (right, SCN-*Bma1l*$^{-/-}$) the SCN. **(B)** Coronal sections at the level of the SCN from two representative mice displaying fluorescence for GFP (expressed by the Cre-expressing AAV) and immunostained for BMAL1. **(C)** Representative feeding and nest activity actograms from a SCN-*Bmal1*$^{+/+}$ control mouse (left) and two SCN-*Bmal1*$^{-/-}$ mice (center and right) subjected to non-cued fear in DD (same individuals shown in fig. 4B). **(D)** FFT Amplitude across the successive experimental stages from SCN- *Bmal*$^{+/+}$ mice (left, n=4) and SCN-*Bmal1*$^{-/-}$ mice (right, n=6). *P < 0.05, **P < 0.01. Symbols as in Fig. 1.

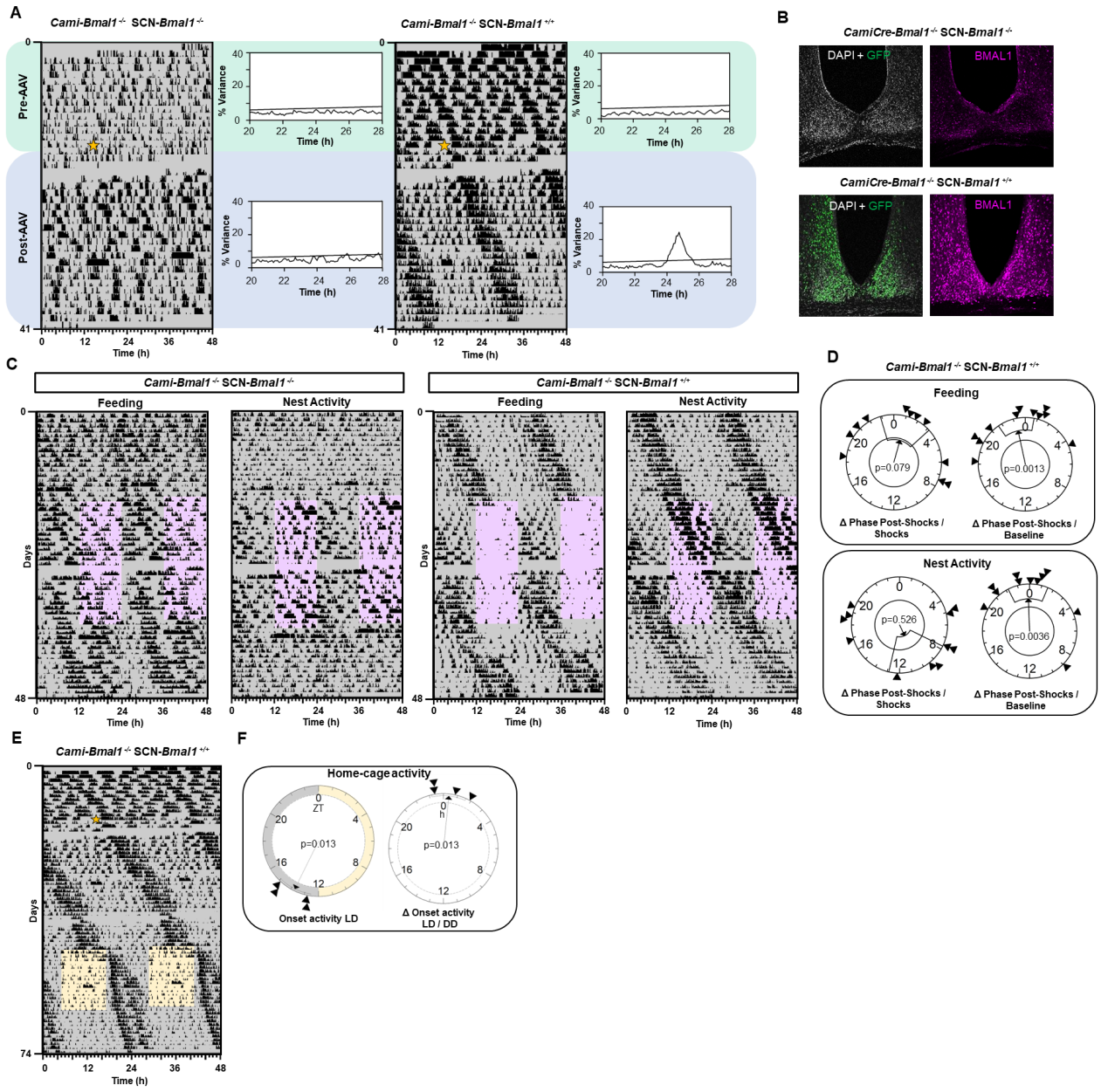

Figure S7. The circadian canonical clock within the SCN is not sufficient for fear entrainment. (A) Actograms and periodograms of home-cage locomotor activity of two representative mice before and after they received an injection of a *Bmal1*-expressing AAV outside (left, Cami-Bmal1$^{-/-}$ SCN-Bmal1$^{-/-}$) or within (right, Cami-Bmal1$^{-/-}$ SCN-Bmal1$^{+/+}$) the SCN. **(B)** Coronal sections at the level of the SCN of two representative mice displaying fluorescence for GFP (expressed by the *Bmal1*-expressing AAV) and immunostained for BMAL1. **(C)** Representative feeding and nest activity actograms from *Cami-Bmal1*$^{-/-}$-SCN-*Bmal1*$^{-/-}$ mouse (left) and *Cami-Bmal1*$^{-/-}$-SCN-*Bmal1*$^{+/+}$ mouse (right) subjected to non-cued fear protocol in DD (same individuals shown in fig. 4E). **(D)** Rayleigh plots representing the phase of the feeding and nest activity onset in the post-shock phase of *Cami-Bmal1*$^{-/-}$-SCN-*Bmal1*$^{+/+}$ mice relative to the shock phase (left) or to the baseline phase (right). **(E)** Actogram of home-cage locomotor of a *Cami-Bmal1*$^{-/-}$ *SCN-Bmal1*$^{+/+}$ mouse, showing the pattern of activity in DD before and after the viral injection to rescue *Bmal1* expression (marked by the yellow star). After this, the mouse was subjected to a 12:12 LD cycle (yellow represents light phase) and then released into DD. **(F)** Rayleigh plots representing the onset of activity of four *Cami-Bmal1*$^{-/-}$ *SCN-Bmal1*$^{+/+}$ mice subjected to a 12:12 LD cycle (left) and after release into DD with the phase relative to the previous onset of activity under LD conditions (i.e., 0 = no change in the phase angle of entrainment; right). Symbols as in Fig. 1.

Table S1. Results for the linear models with mixed effects of the percent of diurnal or safe time activity in mice entrained to fear under LD or DD conditions. Statistics correspond to Figs. 1C, G and Figs S1D, G and Fig. S2C, F.

Experiment	Behavior	n	Stage	Mean % of diurnal or safe-time activity	SEM	95% CI			Tukey	LMM-AOV
LF	Feeding	6	Baseline	19.3	4.1	7.9	-	30.7	a	**0.0079**
			Shocks	4.8	3	-3.4	-	13	b	
	Foraging	6	Baseline	21.4	3.3	12.9	-	29.9	a	**0.0006**
			Shocks	5.4	1.5	1.4	-	9.3	b	
	Nest activity	6	Baseline	35.6	1.9	30.8	-	40.3	a	0.0999
			Shocks	30.3	2.2	24.7	-	35.9	a	
DF	Feeding	7	Baseline	17.1	2.1	12	-	22.1	a	**9.78E-09**
			Shocks	86.4	3.2	78.6	-	94.1	b	
			Post	72.3	5.7	58.5	-	86.2	c	
	Foraging	7	Baseline	23.3	3.7	14.3	-	32.2	a	**1.23E-08**
			Shocks	80.5	3.3	72.4	-	88.6	b	
			Post	68.1	4.7	56.7	-	79.5	b	
	Nest activity	7	Baseline	27.1	3	19.9	-	34.4	a	**0.0003**
			Shocks	40.6	2.1	35.3	-	45.8	b	
			Post	48.2	3.1	40.5	-	55.8	b	
Cued Fear	Feeding	8	Baseline	30.2	2.7	23.8	-	36.5	a	**0.0007**
			Shocks	46.8	3.3	39	-	54.5	b	
			Post	41.9	3.8	32.9	-	50.8	b	
	Foraging	8	Baseline	33.2	2.8	26.7	-	39.8	a	**0.0011**
			Shocks	43.4	3	36.2	-	50.6	b	
			Post	41.2	2.8	34.6	-	47.9	b	
	Nest activity	8	Baseline	36.9	1.8	32.5	-	41.3	a	**0.0001**
			Shocks	45.6	2.5	39.6	-	51.5	b	
			Post	47.6	2.3	42.2	-	53	b	
Non-cued Fear	Feeding	8	Baseline	30.9	3.4	22.9	-	38.8	a	**2.01E-11**
			Shocks	96.4	2.2	91.3	-	101.6	b	
			Post	84.9	4.6	74.1	-	95.7	b	
	Foraging	8	Baseline	30.5	2.2	25.2	-	35.8	a	**3.75E-11**
			Shocks	94.6	3.1	87.3	-	101.9	b	
			Post	78.7	3.7	69.9	-	87.5	c	
	Nest activity	8	Baseline	36.2	2.8	29.3	-	43.2	a	**5.33E-07**
			Shocks	63.5	2.9	56.3	-	70.7	b	
			Post	50.5	2.4	44.7	-	56.3	c	

Table S2. Results for Rayleigh statistics on the phase of mice entrained to fear under LD or DD conditions. Statistics correspond to Figs. 1D, H.

				Rayleigh statistics				
Condition	**Treatment**	**Stage**	**n**	**r**	**p**	**Phase (h)**	**Fiduciary Limits**	**SEM**
LD	LF	Baseline	6	0.99	0.0003	12.0	11.93 - 12.15	0.05
		Shocks	6	0.99	0.0003	12.1	12.04 - 12.18	0.03
		-	-	-	-	-	-	-
	DF	Baseline	7	0.99	0.0001	11.9	11.66 - 12.18	0.13
		Shocks	7	0.92	0.0006	0.4	23.36 - 1.53	0.55
		Post	7	0.99	0.0001	23.0	22.55 - 23.42	0.22
DD	Cued Fear	Baseline	8	0.87	0.0007	10.1	8.83 - 11.40	0.68
		Shocks	8	0.87	0.0008	9.5	8.16 - 10.81	0.70
		Post	8	0.86	0.0009	9.4	7.99 - 10.71	0.71
	Non-cued Fear	Baseline	8	0.97	<0.0001	14.2	13.54 - 14.81	0.33
		Shocks	8	0.85	0.001	2.1	0.77 - 3.52	0.72
		Post	8	0.82	0.002	2.0	0.47 - 3.54	0.81

Table S3. Cosinor analysis for w4-h clock gene expression in the SCN, dentate gyrus (DG) and basolateral amygdala (BLA)

	DF				**LF**				**Wald tests**	
SCN *mPer1*	**Estimate**	**CI 95%**			**Estimate**	**CI 95%**			**Mean Difference**	**p-value**
Mean (au)	3.42	3.11	-	3.73	3.59	3.31	-	4.21	-	-
Amplitude (au)	1.67	1.22	-	2.13	1.86	1.42	-	2.3	0.19	0.5609
Acrophase (ZT)	1.24	1	-	1.49	1.2	0.96	-	1.45	-0.04	0.8166
SCN *mBmal1*										
Mean (au)	1.89	1.82	-	1.97	1.93	1.86	-	2.07	-	-
Amplitude (au)	0.18	0.08	-	0.29	0.23	0.12	-	0.34	0.05	0.5112
Phase (ZT)	12.67	12.11	-	13.22	12.78	12.35	-	13.21	0.12	0.7466
DG *mPer1*										
Mean (au)	3.78	3.46	-	4.1	3.45	2.97	-	3.92	-	-
Amplitude (au)	0.12	-0.33	-	0.56	0.48	0	-	0.96	0.37	0.2725
Acrophase (ZT)	-1.03	-5.02	-	2.97	0.16	-0.88	-	1.21	1.19	0.5724
BLA *mPer1*										
Mean (au)	2.06	1.92	-	2.21	2.04	1.82	-	2.25	-	-
Amplitude (au)	0.05	-0.15	-	0.25	0.23	0.01	-	0.45	0.18	0.2347
Phase (ZT)	13.3	8.77	-	17.82	11.39	10.3	-	12.47	-1.91	0.4208

Table S4. Results for the linear models with mixed effects of the percent of diurnal activity in mice lacking expression of *Bmal1* in the forebrain, and their genetic controls, subjected to DF. Statistics correspond to Figs. 3C and Figs S4C.

Behavior	Genotype	n	Stage	Mean % of diurnal activity	SEM	CI 95%			Tukey	LMEM-AOV	
Feeding	*Cami-Bmal* +/+	13	Baseline	24.2	2.5	18.8	-	29.6	a		
			Shocks	59.2	2.9	52.9	-	65.5	b		
			Post	55.7	2.4	50.5	-	60.9	b		
	Cami-Bmal $^{+/-}$	9	Baseline	26.7	2.1	21.9	-	31.5	a	Stage:	**2.20E-16**
			Shocks	64.9	3.3	57.1	-	72.6	b	Gen:	**0.0362**
			Post	67.4	2.6	61.3	-	73.5	b	Stage*Gen:	**2.42E-08**
	Cami-Bmal $^{-/-}$	10	Baseline	42.7	1.2	40	-	45.5	a		
			Shocks	61.5	3.5	53.7	-	69.3	b		
			Post	53.7	1.1	51.2	-	56.2	c		
Foraging	*Cami-Bmal* $^{+/+}$	13	Baseline	20.5	1.7	16.9	-	24.2	a		
			Shocks	53.5	4.2	44.5	-	62.6	b		
			Post	54.6	3.4	47.3	-	61.9	b		
	Cami-Bmal $^{+/-}$	9	Baseline	19.6	2.2	14.5	-	24.7	a	Stage:	**2.00E-16**
			Shocks	56.6	5.9	43	-	70.1	b	Gen:	0.3236
			Post	67.2	3.6	58.8	-	75.6	c	Stage*Gen:	**3.15E-02**
	Cami-Bmal $^{-/-}$	10	Baseline	26.6	1.3	23.5	-	29.6	a		
			Shocks	56.2	3.4	48.5	-	63.9	b		
			Post	54.7	0.5	53.6	-	55.9	b		
Nest activity	*Cami-Bmal* $^{+/+}$	13	Baseline	28.8	1.7	25	-	32.5	a		
			Shocks	38.2	2.2	33.4	-	42.9	b		
			Post	43.7	2.1	39.2	-	48.3	c		
	Cami-Bmal $^{+/-}$	9	Baseline	27.9	1.4	24.7	-	31.2	a	Stage:	**2.00E-16**
			Shocks	36.1	2.9	29.4	-	42.8	b	Gen:	**0.0162**
			Post	47.7	2.4	42.2	-	53.2	c	Stage*Gen:	0.2123
	Cami-Bmal $^{-/-}$	9	Baseline	33.5	1.3	30.6	-	36.4	a		
			Shocks	42	1.4	38.7	-	45.2	b		
			Post	53.4	0.9	51.3	-	55.5	c		

Table S5. Results for the linear models with mixed effects of the amplitude of the fast-Fourier transform (FFT) in mice lacking expression of *Bmal1* in the forebrain, and their genetic controls, subjected to DF. Statistics correspond to Figs. 3D and Figs S4D.

Behavior	Genotype	n	Stage	Mean FFT amplitude	SEM	CI 95%			Tukey	LMEM-AOV	
Feeding	*Cami-Bmal* $^{+/+}$	13	Baseline	0.0096	0.0042	0.0006	-	0.0187	a		
			Shocks	0.0116	0.0024	0.0064	-	0.0168	a		
			Post	0.0056	0.0031	-0.0011	-	0.0123	a		
	Cami-Bmal $^{+/-}$	9	Baseline	0.0112	0.0032	0.0038	-	0.0185	a	Stage:	**0.0021**
			Shocks	0.0182	0.0061	0.0042	-	0.0322	a	Gen:	0.3426
			Post	0.0122	0.0057	-0.001	-	0.0254	a	Stage*Gen:	0.5382
	Cami-Bmal $^{-/-}$	10	Baseline	0.0044	0.002	-0.0002	-	0.009	a		
			Shocks	0.0144	0.005	0.0032	-	0.0257	b		
			Post	0.0027	0.0009	0.0006	-	0.0048	a		
Foraging	*Cami-Bmal* $^{+/+}$	13	Baseline	0.034	0.0079	0.0168	-	0.0512	a		
			Shocks	0.026	0.005	0.0152	-	0.0368	a		
			Post	0.0158	0.004	0.0071	-	0.0245	a		
	Cami-Bmal $^{+/-}$	9	Baseline	0.0697	0.0223	0.0183	-	0.121	a	Stage:	**0.001**
			Shocks	0.0341	0.0089	0.0135	-	0.0546	b	Gen:	0.0907
			Post	0.0353	0.0169	-0.0037	-	0.0742	b	Stage*Gen:	0.2316
	Cami-Bmal $^{-/-}$	10	Baseline	0.0287	0.0101	0.0059	-	0.0516	a		
			Shocks	0.0294	0.0096	0.0077	-	0.051	a		
			Post	0.0053	0.0011	0.0027	-	0.0079	a		
Nest activity	*Cami-Bmal* $^{+/+}$	13	Baseline	0.04	0.0088	0.0207	-	0.0592	a		
			Shocks	0.0114	0.0027	0.0055	-	0.0173	b		
			Post	0.0234	0.0068	0.0086	-	0.0381	a,b		
	Cami-Bmal $^{+/-}$	9	Baseline	0.0622	0.0211	0.0134	-	0.1109	a	Stage:	**3.69E-05**
			Shocks	0.026	0.0105	0.0018	-	0.0502	b	Gen:	0.3173
			Post	0.0444	0.0165	0.0065	-	0.0824	a,b	Stage*Gen:	0.1487
	Cami-Bmal $^{-/-}$	10	Baseline	0.0357	0.011	0.0108	-	0.0607	a		
			Shocks	0.028	0.0077	0.0107	-	0.0453	a		
			Post	0.019	0.0078	0.0013	-	0.0367	a		

Table S6. Results for the linear models with mixed effects of the percent of activity during the safe phase in mice lacking expression of *Bmal1* in the forebrain, and their genetic controls, subjected to non-cued fear under DD. Statistics correspond to Figs. 3G and Figs S5C.

Behavior	Genotype	n	Stage	Mean % of safe-time activity	SEM	CI 95%			Tukey	LMEM-AOV	
Feeding	*Cami-Bmal* $^{+/+}$	8	Baseline	26.4	1.9	22	-	30.8	a		
			Shocks	66.8	4.5	56.1	-	77.5	b		
			Post	56.6	9	35.2	-	77.9	b		
	Cami-Bmal $^{+/-}$	5	Baseline	29.9	3.5	20.1	-	39.8	a	Stage:	**1.56E-08**
			Shocks	70.3	0.8	68	-	72.6	b	Gen:	0.8596
			Post	52.5	3.1	43.8	-	61.1	c	Stage*Gen:	**0.0052**
	Cami-Bmal $^{-/-}$	5	Baseline	48.4	0.5	46.9	-	49.8	a		
			Shocks	57	4.3	45.1	-	68.9	a		
			Post	52.7	0.7	50.9	-	54.5	a		
Foraging	*Cami-Bmal* $^{+/+}$	8	Baseline	23.2	1.5	19.7	-	26.6	a		
			Shocks	71.8	3.4	63.8	-	79.9	b		
			Post	63.5	7.3	46.2	-	80.8	b		
	Cami-Bmal $^{+/-}$	5	Baseline	25	2	19.5	-	30.5	a	Stage:	**4.82E-14**
			Shocks	69.9	3.2	60.9	-	78.8	b	Gen:	0.66
			Post	55.9	2.8	48	-	63.7	c	Stage*Gen:	**8.50E-08**
	Cami-Bmal $^{-/-}$	7	Baseline	46.8	0.7	45.1	-	48.5	a		
			Shocks	52	1.6	48	-	56	a		
			Post	51.3	0.8	49.4	-	53.2	a		
Nest activity	*Cami-Bmal* $^{+/+}$	8	Baseline	30.9	2.4	25.3	-	36.5	a		
			Shocks	43.7	3.4	35.7	-	51.7	b		
			Post	46.1	4.2	36.3	-	56	b		
	Cami-Bmal $^{+/-}$	5	Baseline	26.9	1.5	22.7	-	31	a	Stage:	**2.10E-11**
			Shocks	47.6	2.5	40.7	-	54.5	b	Gen:	**0.0082**
			Post	46.3	1.8	41.4	-	51.2	b	Stage*Gen:	**0.0006**
	Cami-Bmal $^{-/-}$	7	Baseline	46.3	0.5	45.1	-	47.6	a		
			Shocks	50.9	0.6	49.4	-	52.4	a		
			Post	51.4	1.1	48.7	-	54.1	a		

Table S7. Results for the linear models with mixed effects of the amplitude of the fast-Fourier transform (FFT) in mice lacking expression of *Bmal1* in the forebrain, and their genetic controls, subjected to non-cued fear in DD. Statistics correspond to Figs. 3H and Figs S5D.

Behavior	Genotype	n	Stage	Mean FFT amplitude	SEM	CI 95%			Tukey	LMEM-AOV	
Feeding	*Cami-Bmal* $^{+/+}$	8	Baseline	0.0203	0.0077	0.0021	-	0.0384	a		
			Shocks	0.0257	0.0103	0.0014	-	0.05	a		
			Post	0.0254	0.0094	0.0031	-	0.0477	a		
	Cami-Bmal $^{+/-}$	5	Baseline	0.0321	0.0116	0	-	0.0642	a	Stage:	0.3582
			Shocks	0.0385	0.0071	0.0189	-	0.0581	a	Gen:	0.0801
			Post	0.0139	0.0081	-0.0085	-	0.0363	a	Stage*Gen:	0.3425
	Cami-Bmal $^{-/-}$	5	Baseline	0.0127	0.0092	-0.0129	-	0.0383	a		
			Shocks	0.0028	0.0024	-0.0037	-	0.0093	a		
			Post	0.0028	0.0011	-0.0003	-	0.0059	a		
Foraging	*Cami-Bmal* $^{+/+}$	8	Baseline	0.0639	0.0124	0.0345	-	0.0932	a		
			Shocks	0.0906	0.0205	0.0423	-	0.139	a		
			Post	0.0712	0.019	0.0263	-	0.1162	a		
	Cami-Bmal $^{+/-}$	5	Baseline	0.0778	0.0204	0.0212	-	0.1344	a	Stage:	0.0996
			Shocks	0.0782	0.0085	0.0547	-	0.1017	a	Gen:	**0.0003**
			Post	0.0325	0.009	0.0074	-	0.0576	b	Stage*Gen:	0.1088
	Cami-Bmal $^{-/-}$	7	Baseline	0.0066	0.002	0.0017	-	0.0116	a		
			Shocks	0.0039	0.0009	0.0018	-	0.006	a		
			Post	0.0076	0.0025	0.0016	-	0.0136	a		
Nest activity	*Cami-Bmal* $^{+/+}$	8	Baseline	0.0675	0.0157	0.0304	-	0.1045	a		
			Shocks	0.025	0.0039	0.0158	-	0.0342	b		
			Post	0.0356	0.0102	0.0114	-	0.0598	a,b		
	Cami-Bmal $^{+/-}$	5	Baseline	0.0985	0.0136	0.0607	-	0.1363	a	Stage:	**0.0004**
			Shocks	0.0311	0.0082	0.0083	-	0.0539	b	Gen:	**3.84E-06**
			Post	0.0601	0.0264	-0.0131	-	0.1333	a,b	Stage*Gen:	0.113
	Cami-Bmal $^{-/-}$	7	Baseline	0.0128	0.0032	0.0051	-	0.0206	a		
			Shocks	0.007	0.002	0.002	-	0.012	a		
			Post	0.0126	0.0031	0.0051	-	0.0201	a		

Table S8. Results for the linear models with mixed effects of the amplitude of the fast-Fourier transform (FFT) in mice with targeted deletion of *Bmal1* to the SCN, and their controls, subjected to non-cued fear in DD. Statistics correspond to Figs. 4C and Figs S6D.

Behavior	Genotype	n	Stage	Mean FFT amplitude	SEM	CI 95%	Tukey	LMM-AOV	
Feeding	*SCN-Bmal1* $^{-/-}$	6	Baseline	0.0043	0.0005	0.0030 - 0.0055	a	Stage:	0.100676
			Shocks	0.0062	0.0009	0.0039 - 0.0086	a		
			Post	0.0160	0.0049	0.0034 - 0.0286	a	Gen:	**0.039836**
	SCN-Bmal1 $^{+/+}$	4	Baseline	0.0308	0.0122	-0.0081 - 0.0697	a,b		
			Shocks	0.0427	0.0145	-0.0035 - 0.0890	a	Stage*Gen:	**0.000897**
			Post	0.0148	0.0049	-0.0009 - 0.0305	b		
Foraging	*SCN-Bmal1* $^{-/-}$	6	Baseline	0.0068	0.0026	0.0001 - 0.0135	a	Stage:	0.053748
			Shocks	0.0112	0.0049	-0.0014 - 0.0238	a		
			Post	0.0154	0.0071	-0.0027 - 0.0336	a	Gen:	**0.005911**
	SCN-Bmal1 $^{+/+}$	4	Baseline	0.0510	0.0127	0.0104 - 0.0916	a		
			Shocks	0.0595	0.0151	0.0115 - 0.1075	a	Stage*Gen:	**0.007886**
			Post	0.0221	0.0064	0.0017 - 0.0425	b		
Nest activity	*SCN-Bmal1* $^{-/-}$	6	Baseline	0.0115	0.0033	0.0029 - 0.0201	a	Stage:	0.05212
			Shocks	0.0066	0.0018	0.0019 - 0.0112	a		
			Post	0.0063	0.0024	0.0001 - 0.0125	a	Gen:	0.10213
	SCN-Bmal1 $^{+/+}$	4	Baseline	0.0306	0.0157	-0.0194 - 0.0807	a		
			Shocks	0.0178	0.0062	-0.0021 - 0.0376	a,b	Stage*Gen:	0.27096
			Post	0.0073	0.0018	0.0015 - 0.0131	b		

Table S9. Results for Raleigh statistics on the phase of mice with restricted expression of *Bmal1* to the SCN (*Cami-Bmal1* $^{-/-}$ *- SCN-Bmal1* $^{+/+}$*)* subjected to non-cued fear under DD, and to a 12:12 LD cycle followed by DD. Statistics correspond to Fig. 4F and S7 D. and F.

			Rayleigh statistics				
Behavior	**Stage**	**n**	**r**	**p**	**Phase (h)**	**Fiduciary Limits**	**SEM**
Feeding	Post/ Baseline	11	0.73	0.0013	0.80	21.68 - 0.72	0.84
	Post/Shocks	11	0.48	0.079	1.02	25.11 - 3.16	1.18
Foraging	Post/ Baseline	11	0.69	0.0029	0.60	22.98 - 2.23	0.89
	Post/Shocks	11	0.03	0.988	18.3	15.4 - 21.2	1.60
Nest activity	Post/ Baseline	11	0.68	0.0036	0.15	22.2 - 1.51	0.91
	Post/Shocks	11	0.24	0.526	10.29	7.73 - 12.86	1.41
Home-cage activity	LD	4	0.96	0.0128	10.24	-11.45 - (-9.04)	0.51
Home-cage activity	Δ Onset LD - DD	4	0.96	0.129	0.39	-0.83 - 1.62	0.52