Supplementary Table 1. Duration for Days 5, 7, and 9 Coping and Nursing Behaviors Long term coping behaviors and nursing duration (seconds). Video was sampled for 20 minutes on days 5, 7, and 9 relative to farrowing. Among sows that were treated six times over days 1+4 with vibration-only (VIB, n = 16), conventional (CONV, n = 18; 3 hand slaps), or vibration and electrical Impulse (VIB+EI, n = 18) during a play back of a distress piglet call. Starting point was after 100 uL of blood was collected from sow ear vein.

	Treatment				*P*-values[1]		
	VIB	CONV	VIB+EI	SEM	TRT	Time	TRT*Time
n	16	18	18	--			
Headstill	1045.8	1007.7	1026.8	36.00	0.76	0.12	0.50
Oral behaviors[2]	154.2	192.3	173.3	36.40	0.71	0.01	0.74
NNOB[3, 4]	46.4	93.7	65.3	17.20	0.66	0.05	0.93
Floor	23.3	41.6	28.2	9.20	0.55	0.12	0.69
Stall	4.5	8.3	10.8	35.60	0.73	0.04	0.56
Feeder	7.8	28.7	7.6	8.96	0.20	0.10	0.92
Piglets	10.8	15.2	18.6	5.12	0.65	0.85	0.10
Nutritive	107.8	98.5	107.9	26.00	0.54	0.57	0.46
Eat	58.7	65.5	54.5	24.40	0.89	0.33	0.47
Drink	49.1	33.0	53.5	8.96	0.53	0.88	0.35
Upright	84.5	129.1	90.3	32.00	0.82	0.69	0.39
Sit	13.5	23.5	15.9	8.08	0.25	0.99	0.30
Stand	71.0	105.5	74.5	29.40	0.26	0.94	0.80
Lie	543.5	476.4	504.0	39.20	0.49	0.66	0.19
Sternal[4]	184.5	237.5	206.4	41.60	0.34	0.82	0.90
Lateral[4]	359.0	238.9	297.6	44.40	0.11	0.17	0.27
Nursing[5]	572.0	594.5	605.7	47.60	0.88	0.24	0.51
1 piglet	276.4	293.1	308.7	35.60	0.80	0.01	0.98
5+ piglets	295.7	301.5	297.0	34.40	0.99	0.05	0.25

[a,b]LS means differ $P < 0.05$; LS-means are in seconds, untransformed.
[1] Log-transformed *P*-values unless otherwise noted;
[2] Data fit a normal distribution and were not transformed.
[3] Non-nutritive behaviors directed at any object.
[4] Data were analyzed using the square root transformation to better fit normality.
[5] Nursing 1 piglet was scored when ≥ 1 but ≤ 4 piglets suckling. Nursing 5+ piglets was noted when the sow had ≥ 5 piglets suckling.
[5] Nursing 1 was noted when the sow was lying laterally with ≥ 1 but ≤ 4 piglets present and manipulating the udder; nursing 5+ was noted when the sow had ≥ 5 piglets present and manipulating the udder.

Supplementary Table 2. Latency for Days 5, 7, and 9 Coping and Nursing Behaviors (seconds per 20 min observation). Sow were treated with vibration-only (VIB, n = 16), conventional (CONV, n = 18; 3 hand slaps), or vibration and electrical impulse (VIB+EI, n = 18) during a play back of a distress piglet call (starting point). Starting point was after 100 uL of blood was collected from sow ear vein most sows remained in the lie-position. If the behavior was not observed, latency could not be analyzed.

	Treatment				*P*-values[1]		
	VIB	CONV	VIB+EI	SEM	TRT	Time	TRT*Time
n	16	18	18	--			
Any oral behavior	260.3	289.8	276.1	45.77	0.21	0.20	0.94
NNOB[2]	289.2	294.0	283.3	44.73	0.49	0.23	0.79
Floor	302.2	348.1	413.8	47.07	0.18	0.13	0.54
Stall	487.2	555.6	389.6	52.90	0.78	0.55	0.75
Feeder	420.4	364.7	389.3	64.80	0.86	0.12	0.68
Piglets	380.1	309.2	314.3	37.40	0.76	0.41	0.76
Any Nutritive	402.4	411.3	360.9	66.47	0.96	0.01	0.94
Eat[3]	--	510.3	397.5	90.30	0.56	0.20	0.44
Drink	450.7	415.1	372.7	66.50	0.77	0.03	0.76
Lie after sit or stand							
Sternal	281.3	280.2	332.6	66.93	0.95	0.02	0.34
Lateral	390.1	401.1	421.4	49.13	0.76	0.01	0.65
Nursing[4]	226.9	226.4	197.5	47.40	0.53	0.32	0.43
1 piglet	373.3	416.8	371.2	57.03	0.66	0.10	0.98
5+ piglets	397.3	365.0	392.7	61.90	0.95	0.01	0.92

[a,b]LS means differ $P < 0.05$; LS-means are in seconds, untransformed.
[1] Log-transformed *P*-values unless otherwise noted;
[2] Non-nutritive behaviors directed at any object.
[3]P-values derived from normally distributed data (untransformed)
[4] Nursing 1 piglet was scored when ≥ 1 but ≤ 4 piglets suckling. Nursing 5+ piglets was noted when the sow had ≥ 5 piglets suckling.

Supplementary Table 3. Automated data analyses. Before farrowing, all sows were fitted with an event sensor and logger (HOBO Pendant® Event Data Logger - UA-003-64, ONSET Computer Corp., Bourne, MA, USA) on their head or neck region by a fabric pocket fixed to the skin of the sow via 3M tape (3M, St. Paul, MN, USA). In addition, the back left leg of each sow was fitted with an accelerometer (64 k, Onset Pendant G, onset), which captured the y-axis (stand vs. lie) and the z-axis (sternal-recumbency vs. Lateral-recumbency). The head-logger was used to automate the process of capturing oral behaviors (both nutritive or non-nutritive) while the leg-logger was used to determine the lying and standing positions. The head-logger captured the occurrence of head movement within a second whereas the leg-logger provided accelerometric relative positioning within a minute. The captured data was aligned based on the treatment session timeline and aggregated to investigate effects for 20 min, 1 h, and 20 h after each session. After data were adjusted for rotation of accelerometer using python software, a generalized, linear mixed model was fitted. Fixed effects of session, treatment (VIB,CONV,VIB+EI), farrowing block (1 or 2), parity (1 – 5), and parity 1 vs. 2+ (2 - 5) are presented during the 6 sessions while considering each sow's residual effect as the model's random effect. The first 20-minutes of automated data (head-movement, lying) was compared to the available for 20m, 1h, and 20h and data were correlated.

Automated-data *P*-values, Time After Sessions						
		Treatment	Block	Parity	Parity 1 vs 2+	Transformed
Head- movement						
20 min		0.8403^{+S}	0.0003	0.6839	0.8798	Lognormal
1 h		0.8065	0.0051	0.2549	0.0906	Lognormal
20h		0.8124	0.0021	0.5290	0.1582	Lognormal
Leg-Accelerometer						
	Standing	0.1372	0.4816^{+S}	0.5474	0.4687	Lognormal
20 min	Lie Right*	0.1678	0.4972	0.5529	0.3649	Normal
	Lie Left*	0.0413^{+S}	0.2757^{+S}	0.5065	0.2454	Normal
	Standing	0.5886	0.1949	0.3781	0.6297	Lognormal
1h	Lie Right*	0.0540	0.2072	0.1377^{+S}	0.7549	Normal
	Lie Left*	0.2204	0.2642^{+S}	0.4729	0.2357	Normal
	Standing	0.5991	0.6611	0.5447	0.7388	Lognormal
20h	Lie Right	0.7587	0.3926$^{\pm S}$	0.8523^{-S}	0.3550	Normal
	Lie Left	0.8221	0.6880$^{\pm S}$	0.8356^{-S}	0.3854	Normal

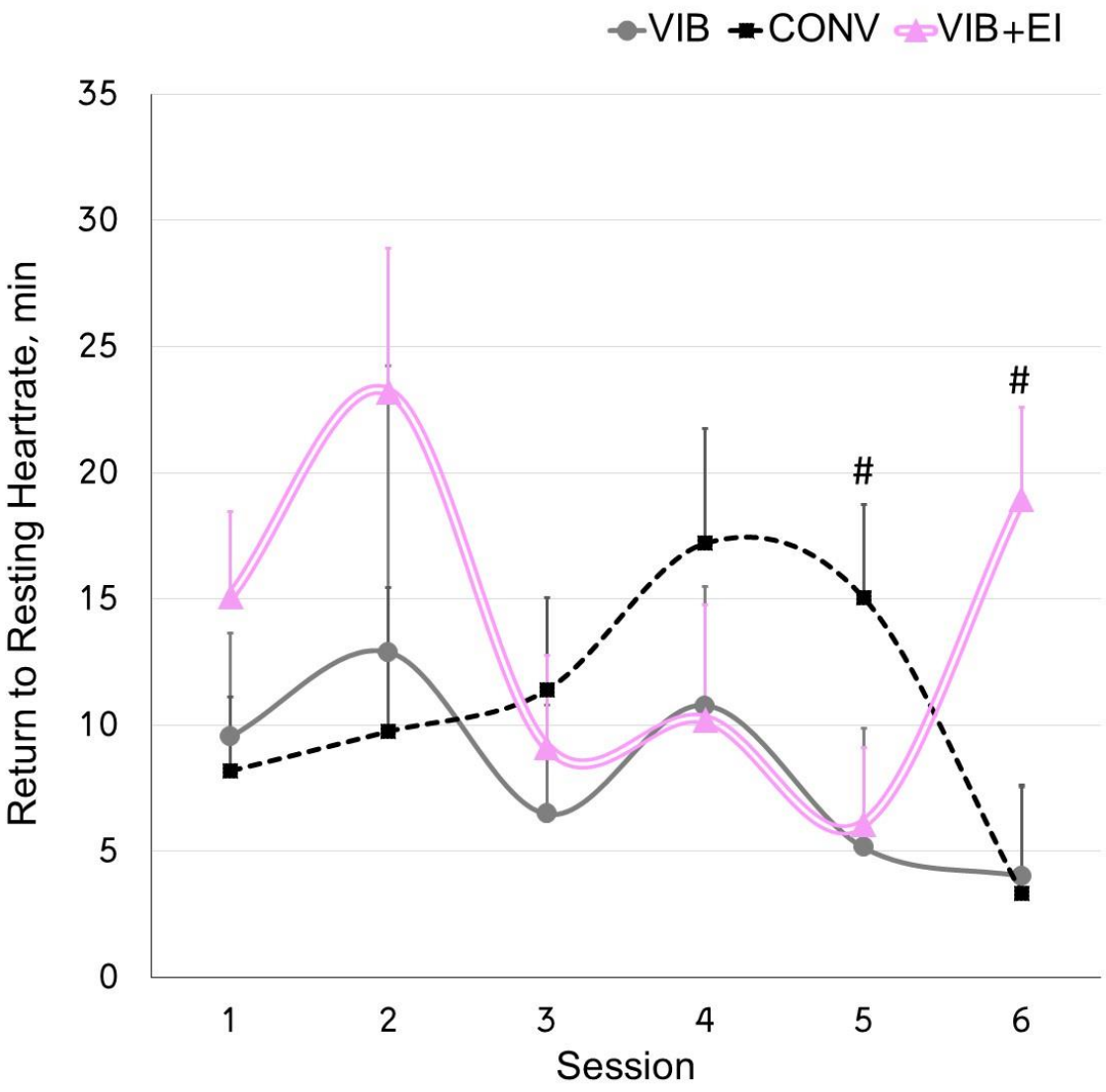
$^{+S}$ The fixed effect exhibits a significant effect in combination with session ($P < 0.05$).
$^{-S}$ Session has a significant fixed effect.
$^{\pm S}$ Both $^{+S}$ and $^{-S}$ effects are observed.
* Provided data to the model had limitation (censored and survival) for a good fit

Supplementary Table 4. Cull rate and Return to Estrus at 4 or 5 days. During play-back of a piglet distress sows were treated with vibration (VIB n = 16), conventional (CONV n = 18), vibration + Electrical Impulse (VIB+EI n = 18) over six sessions. Sows were culled at weaning (day 21). Remaining sows were placed into gestation stalls and serviced if they were in full estrus (lordosis). Sows either came into estrus 4 or 5 days after weaning. The number of observations are represented in the center, (expected), [residual].

	Culled		5 days		4 days		
VIB	**4**		**3**		**9**		
	(4.31)	[-0.21]	(4.31)	[-0.89]	(7.38)	[0.97]	
CONV	**7**		**7**		**4**		
	(4.85)	[1.42]	(4.85)	[1.42]	(8.31)	[-2.51]	
VIB+EI	**3**		**4**		**11**		$\chi2(4) = 6.6440$, N = 52, $P = 0.1559$.
	(4.85)	[-1.21]	(4.85)	[-0.56]	(8.31)	[1.57]	

Supplementary Sound byte. **Piglet_distress_call_crush.wav**. A 16-s piglet distress call was played back through speakers (one speaker behind two adjacent sows). For each group and session.

Supplementary Figure 1. Session Return-to-Resting Heartrate. After play-back of a piglet distress call, sows were treated with vibration-only (VIB, n = 16), conventional (CONV, n = 18; 3 hand slaps), and, vibration + electrical Impulse (VIB+EI, n = 18). This was conducted over 6 sessions. The time for sows to return to resting within the hour after each session was calculated. #LS-means tend (P = 0.07) to differ.



Supplementary Figure 2. Circadian Cortisol. After play-back of a piglet distress call, sows were treated with vibration-only (VIB, n = 16), conventional (CONV, n = 18; 3 hand slaps), and, vibration + electrical Impulse (VIB+EI, n = 18). The treatments were applied over 6 sessions on days 1 through 4 relative to farrowing. The mean of am and pm cortisol concentrations were evaluated for circadian cortisol on days 1, 4, 5, 7, and 9. Treatment x Time *P*-value = 0.04. Tukey's LS-mean comparison indicated that within day, no treatments were different ($P > 0.10$).