



**Table S2.** Changes in pain scores for breastmilk-odor (Condition 2), and breastmilk-odor+ breastmilk-taste (Condition 3) by GEE multiple linear regression with Condition 1 as reference (N = 120)

Variable	B	SE	Wald $\chi^2$	P	95% CI	
					Lower	Upper
<b>Condition effects</b>						
Condition <sub>3</sub> vs. Condition <sub>1</sub>	-0.15	0.12	1.72	0.190	-0.38	0.08
Condition <sub>2</sub> vs. Condition <sub>1</sub>	-0.23	0.12	3.77	0.052	-0.46	0.00
<b>Phase effects</b>						
Phase <sub>11</sub> vs. Phase <sub>1</sub>	1.25	0.36	11.94	0.001	0.54	1.96
Phase <sub>10</sub> vs. Phase <sub>1</sub>	1.65	0.36	21.14	<0.001	0.95	2.35
Phase <sub>9</sub> vs. Phase <sub>1</sub>	2.00	0.35	32.07	<0.001	1.31	2.69
Phase <sub>8</sub> vs. Phase <sub>1</sub>	2.70	0.39	47.56	<0.001	1.93	3.46
Phase <sub>7</sub> vs. Phase <sub>1</sub>	3.32	0.41	65.07	<0.001	2.52	4.13
Phase <sub>6</sub> vs. Phase <sub>1</sub>	6.00	0.24	636.29	<0.001	5.53	6.46
Phase <sub>5</sub> vs. Phase <sub>1</sub>	6.17	0.21	867.63	<0.001	5.76	6.58
Phase <sub>4</sub> vs. Phase <sub>1</sub>	6.25	0.20	946.22	<0.001	5.85	6.65
Phase <sub>3</sub> vs. Phase <sub>1</sub>	6.27	0.21	919.26	<0.001	5.87	6.68
Phase <sub>2</sub> vs. Phase <sub>1</sub>	6.05	0.22	728.17	<0.001	5.61	6.49
<b>Interaction effects</b>						
<b>Condition 3</b>						
Condition <sub>3</sub> × Phase <sub>11</sub>	-1.51	0.38	15.60	<0.001	-2.26	-0.76
Condition <sub>3</sub> × Phase <sub>10</sub>	-1.74	0.38	20.76	<0.001	-2.48	-0.99
Condition <sub>3</sub> × Phase <sub>9</sub>	-2.19	0.37	35.20	<0.001	-2.91	-1.46
Condition <sub>3</sub> × Phase <sub>8</sub>	-2.74	0.41	44.36	<0.001	-3.54	-1.93
Condition <sub>3</sub> × Phase <sub>7</sub>	-3.29	0.42	59.85	<0.001	-4.12	-2.55
Condition <sub>3</sub> × Phase <sub>6</sub>	-4.36	0.45	93.95	<0.001	-5.24	-3.48
Condition <sub>3</sub> × Phase <sub>5</sub>	-4.21	0.43	94.38	<0.001	-5.06	-3.36
Condition <sub>3</sub> × Phase <sub>4</sub>	-3.56	0.41	75.80	<0.001	-4.36	-2.76
Condition <sub>3</sub> × Phase <sub>3</sub>	-3.51	0.39	79.74	<0.001	-4.28	-2.74
Condition <sub>3</sub> × Phase <sub>2</sub>	-3.21	0.39	68.20	<0.001	-3.97	-2.45
<b>Condition 2</b>						
Condition <sub>2</sub> × Phase <sub>11</sub>	-1.11	0.38	8.59	0.003	-1.85	-0.37
Condition <sub>2</sub> × Phase <sub>10</sub>	-1.59	0.37	18.00	<0.001	-2.32	-0.85
Condition <sub>2</sub> × Phase <sub>9</sub>	-1.96	0.39	25.69	<0.001	-2.27	-1.20
Condition <sub>2</sub> × Phase <sub>8</sub>	-2.71	0.41	44.78	<0.001	-3.51	-1.92
Condition <sub>2</sub> × Phase <sub>7</sub>	-2.46	0.48	26.32	<0.001	-3.40	-1.52
Condition <sub>2</sub> × Phase <sub>6</sub>	-1.91	0.50	14.36	<0.001	-2.90	-0.92
Condition <sub>2</sub> × Phase <sub>5</sub>	-1.46	0.46	9.95	0.002	-2.37	-0.55
Condition <sub>2</sub> × Phase <sub>4</sub>	-1.21	0.45	7.30	0.007	-2.09	-0.33
Condition <sub>2</sub> × Phase <sub>3</sub>	-1.16	0.43	7.38	0.007	-2.00	-0.32
Condition <sub>2</sub> × Phase <sub>2</sub>	-1.19	0.39	9.45	0.002	-1.95	-0.43
<b>Baseline pain score</b>	0.54	0.10	30.66	<0.001	0.35	0.73

Notes: SE: standard error; CI: confidence interval; Condition<sub>1</sub>: gentle touch+ verbal comfort (routine care); Condition<sub>2</sub>: breastmilk-odor + gentle touch+ verbal comfort; Condition<sub>3</sub>: breastmilk-odor + breastmilk-taste + gentle touch+ verbal comfort; Phase<sub>1</sub>: baseline (no stimulation); Phase<sub>2</sub>: 1<sup>st</sup> minute during heel stick; Phase<sub>3</sub>: 2<sup>nd</sup> minute during heel stick; Phase<sub>4</sub>: 3<sup>rd</sup> minute during heel stick; Phase<sub>5</sub>: 4<sup>th</sup> minute during heel stick; Phase<sub>6</sub>: 5<sup>th</sup> minute during heel stick; Phase<sub>7</sub>: 1<sup>st</sup> minute after heel stick; Phase<sub>8</sub>: 2<sup>nd</sup> minute after heel stick; Phase<sub>9</sub>: 3<sup>rd</sup> minute after heel stick; Phase<sub>10</sub>: 4<sup>th</sup> minute after heel stick; Phase<sub>11</sub>: 5<sup>th</sup> minute after heel stick; Condition effects: comparison of the mean NIPS scores at phase<sub>1</sub> (Condition<sub>2</sub> versus Condition<sub>1</sub>, Condition<sub>3</sub> versus Condition<sub>1</sub>); phase effects: the changes (from phase<sub>1</sub>) of the mean NIPS scores across the phases in the Condition<sub>1</sub> (phase<sub>2</sub>, 3, 4, 5, 6, 7, 8, 9, 10, 11, respectively, versus phase<sub>1</sub>); Interaction effects: comparisons of differences in the changes

11  
12

13  
14  
15  
16  
17  
18  
19  
20  
21  
22

(from phase<sub>1</sub>) of the mean NIPS scores between Condition<sub>3</sub> (or Condition<sub>2</sub>) and Condition<sub>1</sub> across the phases.

**Table S3.** Changes in pain scores for Condition 1 (routine care), and Condition 3 (breastmilk-odor+ breastmilk-taste) by GEE multiple linear regression with Condition 2 (breastmilk-odor) as reference (N = 120)

Variable	B	SE	Wald $\chi^2$	P	95% CI	
					Lower	Upper
<b>Condition effects</b>						
Condition <sub>3</sub> vs. Condition <sub>2</sub>	0.08	.093	0.71	0.398	-0.10	0.26
Condition <sub>1</sub> vs. Condition <sub>2</sub>	0.23	.119	3.77	0.052	-0.00	0.46
<b>Phase effects</b>						
Phase <sub>11</sub> vs. Phase <sub>1</sub>	0.14	0.11	1.50	0.220	-0.08	0.35
Phase <sub>10</sub> vs. Phase <sub>1</sub>	0.06	0.11	0.31	0.578	-0.15	0.27
Phase <sub>9</sub> vs. Phase <sub>1</sub>	0.04	0.16	0.05	0.827	-0.28	0.35
Phase <sub>8</sub> vs. Phase <sub>1</sub>	-0.02	0.11	0.02	0.888	0.22	0.19
Phase <sub>7</sub> vs. Phase <sub>1</sub>	0.86	0.25	12.18	<0.001	0.38	1.34
Phase <sub>6</sub> vs. Phase <sub>1</sub>	4.09	0.45	84.22	<0.001	3.21	4.96
Phase <sub>5</sub> vs. Phase <sub>1</sub>	4.71	0.41	129.66	<0.001	3.90	5.52
Phase <sub>4</sub> vs. Phase <sub>1</sub>	5.04	0.40	158.40	<0.001	4.25	5.82
Phase <sub>3</sub> vs. Phase <sub>1</sub>	5.11	0.37	185.99	<0.001	4.38	5.84
Phase <sub>2</sub> vs. Phase <sub>1</sub>	4.86	0.31	238.68	<0.001	4.24	5.48
<b>Interaction effects</b>						
<b>Condition 3</b>						
Condition <sub>3</sub> × Phase <sub>11</sub>	-0.40	0.17	5.69	0.017	-0.73	-0.07
Condition <sub>3</sub> × Phase <sub>10</sub>	-0.15	0.17	0.79	0.374	-0.48	0.18
Condition <sub>3</sub> × Phase <sub>9</sub>	-0.22	0.19	1.36	0.243	-0.60	0.15
Condition <sub>3</sub> × Phase <sub>8</sub>	-0.02	0.16	0.02	0.883	-0.35	0.30
Condition <sub>3</sub> × Phase <sub>7</sub>	-0.82	0.27	9.55	0.002	-1.35	-0.30
Condition <sub>3</sub> × Phase <sub>6</sub>	-2.45	0.59	17.42	<0.001	-3.60	-1.30
Condition <sub>3</sub> × Phase <sub>5</sub>	-2.75	0.56	23.96	<0.001	-3.85	-1.65
Condition <sub>3</sub> × Phase <sub>4</sub>	-2.35	0.54	19.26	<0.001	-3.40	-1.30
Condition <sub>3</sub> × Phase <sub>3</sub>	-2.35	0.50	21.86	<0.001	-3.33	-1.36
Condition <sub>3</sub> × Phase <sub>2</sub>	-2.02	0.45	20.48	<0.001	-2.90	-1.15
<b>Condition 1</b>						
Condition <sub>1</sub> × Phase <sub>11</sub>	1.11	0.38	8.69	0.003	0.37	1.85
Condition <sub>1</sub> × Phase <sub>10</sub>	1.59	0.37	18.00	<0.001	0.85	2.32
Condition <sub>1</sub> × Phase <sub>9</sub>	1.96	0.39	25.69	<0.001	1.20	2.72
Condition <sub>1</sub> × Phase <sub>8</sub>	2.71	0.41	44.78	<0.001	1.92	3.51
Condition <sub>1</sub> × Phase <sub>7</sub>	2.46	0.48	26.32	<0.001	1.52	3.40
Condition <sub>1</sub> × Phase <sub>6</sub>	1.91	0.50	14.36	<0.001	0.92	2.90
Condition <sub>1</sub> × Phase <sub>5</sub>	1.46	0.46	9.95	0.002	0.55	2.37
Condition <sub>1</sub> × Phase <sub>4</sub>	1.21	0.45	7.30	0.007	0.33	2.09
Condition <sub>1</sub> × Phase <sub>3</sub>	1.16	0.43	7.38	0.007	0.32	2.00
Condition <sub>1</sub> × Phase <sub>2</sub>	1.19	0.39	9.45	0.002	0.43	1.95
<b>Baseline pain score</b>	0.54	0.10	30.66	<0.001	0.35	0.73

Notes: SE: standard error; CI: confidence interval; Condition<sub>1</sub>: gentle touch+ verbal comfort (routine care); Condition<sub>2</sub>: breastmilk-odor + gentle touch+ verbal comfort; Condition<sub>3</sub>: breastmilk-odor + breastmilk-taste + gentle touch+ verbal comfort; Phase<sub>1</sub>: baseline (no stimulation); Phase<sub>2</sub>: 1<sup>st</sup> minute during heel stick; Phase<sub>3</sub>: 2<sup>nd</sup> minute during heel stick; Phase<sub>4</sub>: 3<sup>rd</sup> minute during heel stick; Phase<sub>5</sub>: 4<sup>th</sup> minute during heel stick; Phase<sub>6</sub>: 5<sup>th</sup> minute during heel stick; Phase<sub>7</sub>: 6<sup>th</sup> minute during heel stick; Phase<sub>8</sub>: 7<sup>th</sup> minute during heel stick; Phase<sub>9</sub>: 8<sup>th</sup> minute during heel stick; Phase<sub>10</sub>: 9<sup>th</sup> minute during heel stick; Phase<sub>11</sub>: 10<sup>th</sup> minute during heel stick.

---

4<sup>th</sup> minute during heel stick; Phase<sub>6</sub>: 5<sup>th</sup> minute during heel stick; Phase<sub>7</sub>: 1<sup>st</sup> minute after heel stick; 33  
Phase<sub>8</sub>: 2<sup>nd</sup> minute after heel stick; Phase<sub>9</sub>: 3<sup>rd</sup> minute after heel stick; Phase<sub>10</sub>: 4<sup>th</sup> minute after heel 34  
stick; Phase<sub>11</sub>: 5<sup>th</sup> minute after heel stick; Condition effects: comparison of the mean NIPS scores at 35  
phase<sub>1</sub> (Condition<sub>3</sub> versus Condition<sub>2</sub>, Condition<sub>1</sub> versus Condition<sub>2</sub>); phase effects: the changes 36  
(from phase<sub>1</sub>) of the mean NIPS scores across the phases in the Condition<sub>2</sub> (phase<sub>2</sub>, 3, 4, 5, 6, 7, 8, 9, 37  
10, 11, respectively, versus phase<sub>1</sub>); Interaction effects: comparisons of differences in the changes 38  
(from phase<sub>1</sub>) of the mean NIPS scores between Condition<sub>3</sub> (or Condition<sub>1</sub>) and Condition<sub>2</sub> across 39  
the phases. 40  
41