Supplemental Tables

for

Cultivating Concern for Others:

Meditation Training and Motivated Engagement with Human Suffering

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Table S1

Correlations Among Self-report Characteristics at Baseline

Self-report measure	1	2	3	4	5	6	7	8
Dispositional empathy								
1. Empathic concern	—	.002	.000	.203	.000	.247	.038	.000
2. Personal distress	-.39†	—	.000	.132	.023	.108	.864	.022
3. Perspective taking	.52†	-.45†	—	.058	.002	.007	.011	.018
Positive emotionality								
4. Amusement	.17	-.20	.25	—	.193	.040	.000	.015
5. Compassion	.75†	-.29†	.38†	.17	—	.058	.056	.000
6. Contentment	.15	-.21	.34†	.27	.25	—	.000	.005
7. Joy	.27	-.02	.33†	.50†	.25	.53†	—	.005
8. Love	.46†	-.29†	.30†	.31†	.47†	.36†	.36†	—

Note. Correlation coefficients are shown below the diagonal and observed *p* values above the diagonal for the combined participant sample ($N = 60$). *P* values less than .001 are indicated as .000.

† Significant discovery based on false discovery rate control for 28 tests (adjusted α = .030).

Table S2

Means and Standard Deviations for Self-report Outcomes by Group and Assessment

	Control group				Training group			
	Preassessment		Postassessment		Preassessment		Postassessment	
Self-report measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Dispositional empathy								
Empathic concern	5.48	0.60	5.49	0.56	5.71	0.88	6.00	0.85
Personal distress	2.77	0.93	2.73	0.95	2.85	1.18	2.33	0.93
Perspective taking	5.35	0.80	5.42	0.79	5.44	0.98	5.65	0.97
Positive emotionality								
Amusement	5.01	1.14	4.94	1.04	5.11	1.06	5.57	1.13
Compassion	5.57	0.88	5.61	0.67	5.81	0.74	6.10	0.66
Contentment	5.19	1.07	5.19	1.06	5.58	0.74	6.16	0.71
Joy	5.11	0.85	5.04	0.88	5.25	0.95	5.68	0.95
Love	5.07	0.87	5.13	0.87	5.33	0.95	5.92	0.74

Note. Scale scores have a possible range of 1 to 7.

Table S3

Correlations Between Changes in Self-report Outcomes and Heart Rate Orienting to Suffering in Training Participants

Measure	Orienting index		Δ Dispositional empathy			Δ Positive emotionality				
	1	2	3	4	5	6	7	8	9	10
Orienting index										
1. Preassessment	—	.548	.138	.587	.744	.734	.023	.553	.360	.468
2. Postassessment	.11	—	.016	.048	.858	.007	.046	.154	.132	.077
Change in self-report (Δ)										
3. Empathic concern	.28	.44†	—	.008	.055	.186	.003	.057	.162	.003
4. Personal distress	-.11	-.37	-.49†	—	.491	.415	.165	.042	.901	.336
5. Perspective taking	-.06	.03	.37	-.14	—	.272	.054	.152	.000	.003
6. Amusement	-.07	.49†	.26	-.16	.21	—	.034	.010	.000	.027
7. Compassion	.42	.37	.54†	-.27	.37	.40	—	.002	.005	.000
8. Contentment	.11	.27	.36	-.39	.28	.48†	.55†	—	.001	.009
9. Joy	-.18	.29	.27	-.02	.62†	.70†	.52†	.60†	—	.001
10. Love	.14	.33	.54†	-.19	.55†	.42	.64†	.49†	.59†	—

Note. Correlation coefficients are shown below the diagonal and observed *p* values above the diagonal. Larger values of the orienting index indicate enhanced orienting to suffering, relative to threat. For self-report measures, the coefficients are partial correlations of observed change scores (Δ = postassessment – preassessment), controlling for preassessment levels. *P* values less than .001 are indicated as .000.
† Significant discovery based on false discovery rate control for 45 tests (adjusted α = .017).

Table S4

Parameter Estimates for Growth Curve Model of Blood Volume Amplitude in Training Participants

Parameter	Threat Estimate	*SE*	Suffering Estimate	*SE*
	Fixed effects			
Intercept	-105.3	(60.1)	-107.0*	(43.5)
Linear slope (0 = 6 sec)	-30.9***	(6.5)	-34.3***	(6.0)
Quadratic slope	-2.2***	(0.4)	[=]	[=]
Assessment (0 = pre)[a]	7.3	(46.6)	100.8*	(42.1)
× Linear slope[a]	3.3	(4.3)	14.1***	(3.0)
	Variance components			
Intercept variance	95095.0***	(26235.5)	49417.5***	(13665.7)
Linear slope variance	426.9**	(146.1)	363.9***	(111.2)
Intercept–Slope cov.	5065.5**	(1744.6)	4121.6***	(1195.4)
Assessment variance	42034.6***	(11456.8)	[=]	[=]
Residual variance	39327.5***	(2872.3)	19027.6***	(1344.3)

Note. For each picture category, the intercept is the expected mean level of blood volume amplitude (in arbitrary units) at 6 seconds post-picture onset at preassessment (pre). The number of data points modeled was 1,440. [=] indicates that a parameter was held constant across levels of picture category; cov. = covariance.

[a] These parameters differ significantly as a function of picture content category (*p*s < .037).

* *p* < .05. ** *p* < .01. *** *p* < .001.

Table S5

Parameter Estimates for Growth Curve Model of Pulse Transit Time in Training Participants

Parameter	Threat Estimate	Threat SE	Suffering Estimate	Suffering SE
Fixed effects				
Intercept	-0.244	(0.274)	-0.256	(0.269)
Linear slope (0 = 3 sec)[a]	-0.053	(0.100)	0.189**	(0.066)
Quadratic slope	0.015	(0.014)	0.016	(0.009)
Cubic slope	0.001	(0.004)	-0.006*	(0.003)
Assessment (0 = pre)[a]	-0.820*	(0.371)	0.899**	(0.309)
× Linear slope[a]	0.347**	(0.133)	-0.031	(0.091)
× Quadratic slope[a]	0.047*	(0.019)	-0.028*	(0.013)
× Cubic slope[a]	-0.013*	(0.006)	0.005	(0.004)
Variance components				
Intercept variance	1.065**	(0.359)	1.623***	(0.468)
Linear slope variance	0.031*	(0.014)	0.008*	(0.005)
Intercept–Slope cov.	-0.052	(0.051)	-0.008	(0.033)
Assessment variance	1.757***	(0.545)	[=]	[=]
Residual variance	6.036***	(0.378)	2.802***	(0.184)

Note. For each picture category, the intercept is the expected mean level of pulse transit time (in msec) at 3 seconds post-picture onset at preassessment (pre). The number of data points modeled was 1,440. [=] indicates that a parameter was held constant across levels of picture category; cov. = covariance.

[a] These parameters differ significantly as a function of picture content category ($ps < .043$).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table S6

Correlations of Finger Pulse Activity After Training With the Orienting Indexes and Self-report Outcomes of Study 1

| Measure | Blood volume amplitude | | | | Pulse transit time | | | |
| | Threat | | Suffering | | Threat | | Suffering | |
	r	p	r	p	r	p	r	p
Orienting index								
Preassessment	.14	.468	.23	.215	.05	.777	.22	.243
Postassessment	.20	.280	.69†	< .001	.37	.043	-.07	.700
Change in self-report (Δ)								
Empathic concern	.03	.867	.63†	< .001	-.18	.361	-.07	.725
Personal distress	-.10	.595	-.37	.047	.29	.123	-.07	.712
Perspective taking	-.57†	.001	.18	.361	-.29	.127	.05	.798
Amusement	-.10	.620	.52†	.004	.06	.772	.28	.144
Compassion	.01	.968	.61†	< .001	-.09	.632	.03	.891
Contentment	.05	.782	.20	.292	-.23	.224	.12	.527
Joy	-.31	.105	.28	.148	.01	.941	.08	.698
Love	-.24	.212	.50†	.006	-.05	.813	.18	.356

Note. Zero-order correlations are shown for orienting indexes. Partial correlations are shown for changes in self-report measures across training (controlling for pre-training values). Larger values of the orienting index indicate enhanced orienting to suffering, relative to threat.
† Significant discovery based on false discovery rate control for 40 tests (adjusted α = .008).

Table S7

Parameter Estimates for Heart Rate Responses at Encoding: Trial-based Recognition Confidence

Parameter	Pleasant		Threat		Suffering	
	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
		Fixed effects				
Intercept	-0.978	(0.870)	-2.006	(1.018)	-1.521	(1.032)
Linear slope (0 = 5 sec)	-0.065	(0.086)	0.094	(0.121)	0.221*	(0.099)
Quadratic slope[a]	0.002$_a$	(0.009)	0.051$_b$***	(0.009)	0.037$_b$***	(0.009)
Confidence[a]	-0.538$_a$	(0.471)	-0.491$_a$	(0.495)	1.515$_b$**	(0.501)
× Linear slope[a]	-0.045$_a$	(0.033)	-0.066$_a$	(0.040)	0.168$_b$***	(0.038)
Encoding (0 = pre)	-1.074	(0.748)	-1.057	(0.775)	-1.177	(0.749)
× Linear slope[a]	-0.157$_a$**	(0.056)	0.060$_b$	(0.059)	-0.153$_a$**	(0.057)
Confidence × Encoding[a]	-0.121$_a$	(0.296)	0.986$_b$**	(0.371)	-3.107$_c$***	(0.368)
× Linear slope[a]	0.048$_a$	(0.049)	0.073$_a$	(0.056)	-0.349$_b$***	(0.056)
		Variance components				
Random effects for subjects						
Intercept variance	4.840*	(2.405)	10.402**	(3.956)	11.084**	(4.450)
Linear slope variance	0.031	(0.020)	0.161*	(0.070)	0.078*	(0.040)
Intercept–Slope cov.	0.375	(0.205)	1.237*	(0.503)	0.842*	(0.385)
Random effects for stimuli						
Intercept variance	6.129***	(1.533)	[=]	[=]	[=]	[=]
Encoding variance	7.365***	(1.810)	[=]	[=]	[=]	[=]
Confidence variance	2.700***	(0.699)	[=]	[=]	[=]	[=]
Intercept–Encoding cov.	-5.649***	(1.550)	[=]	[=]	[=]	[=]
Intercept–Confidence cov.	-0.631	(0.731)	[=]	[=]	[=]	[=]
Encoding–Confidence cov.	0.820	(0.915)	[=]	[=]	[=]	[=]
Residual variance	11.704***	(0.269)	[=]	[=]	[=]	[=]

Table S7 (continued)

Note. Maximum likelihood estimates are reported for trials with correct memory judgments. For each picture category, the intercept is the expected mean heart rate (in beats per minute) at participants' mean level of memory confidence for pre-training (pre) images. The number of data points modeled was 4,104. [=] indicates that a variance component was held constant across picture categories; cov. = covariance.

[a] These parameters differ significantly as a function of picture content category ($ps < .010$ for interaction terms). For these effects, estimates that do not share subscript letters differ significantly from one another within rows.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table S8

Parameter Estimates for Blood Volume Amplitude to
Images of Suffering by Subsequent Trial Memory

Parameter	Estimate	SE
Fixed effects		
Intercept	-19.2	(64.5)
Linear slope (0 = 6 sec)	-2.7	(5.8)
Memory (0 = forgotten)	-146.9**	(53.9)
× Linear slope	-22.4**	(7.8)
Encoding (0 = pre)	-32.6	(59.5)
× Linear slope	-2.3	(6.4)
Memory × Encoding	346.6***	(71.8)
× Linear slope	42.5***	(10.8)
Variance components		
Random effects for subjects		
Intercept variance	52784.0**	(18187.0)
Linear slope variance	265.3*	(128.1)
Intercept–Slope cov.	3635.5*	(1446.8)
Random effects for stimuli		
Intercept variance	11985.0*	(5314.8)
Encoding variance	28028.0**	(11952.0)
Intercept–Encoding cov.	-10526.0	(6550.5)
Residual variance	290425.0***	(6841.2)

Note. The intercept is the expected mean level of blood
volume amplitude (in arbitrary units) at 6 seconds post-picture
onset for forgotten images of suffering from the pre-training
assessment (pre). The number of data points modeled was
3,680; cov. = covariance.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table S9

Parameter Estimates for Pulse Transit Time to Images of Suffering by Subsequent Trial Memory

Parameter	Estimate	SE
Fixed effects		
Intercept	0.231	(0.629)
Linear slope (0 = 3 sec)	0.116***	(0.031)
Memory (0 = forgotten)	-0.816*	(0.365)
Encoding (0 = pre)	-0.435	(0.711)
Memory × Encoding	2.371***	(0.477)
Variance components		
Random subject intercept	2.594**	(0.894)
Random effects for stimuli		
Intercept variance	3.701**	(1.453)
Encoding variance	6.824**	(2.721)
Intercept–Encoding cov.	-3.942*	(1.780)
Residual variance	43.467***	(1.017)

Note. The intercept is the expected mean level of pulse transit time (in msec) at 6 seconds post-picture onset for forgotten images of suffering from the pre-training assessment (pre). The number of data points modeled was 3,704; cov. = covariance.

* $p < .05$. ** $p < .01$. *** $p < .001$.