

Supplemental Materials

Negative Affect

Negative affect was measured at all five time points with the negative affect subscale of the Affect-Adjective Scale (Diener and Emmons, 1985). Participants rated the extent to which they experienced five negative emotions (i.e., worried/anxious, angry/hostile, frustrated, depressed/blue, unhappy) in the past week on a scale ranging from 0 (*not at all*) to 6 (*extremely much*). Cronbach's α s ranged from .82 to .87 across time points.

Analyses revealed a non-significant trend toward greater reductions in negative affect in the *kindness-to-others* condition relative to the *control* condition. See Table 3 and Figure 2.

Connectedness

Connectedness was assessed at all five study time points with the connectedness subscale of the Balanced Measure of Psychological Needs (Sheldon and Hilpert, 2012). Participants rated their agreement on six statements (e.g., "I felt close and connected with other people who are important to me") on a scale ranging from 1 (*no agreement*) to 5 (*much agreement*). Cronbach's α s ranged from .78 to .86 across time points.

Analyses revealed a non-significant trend toward greater increases in connectedness in the *kindness-to-others* condition relative to the *control* condition. See Table 3 and Figure 3.

Table 1

Parameter estimates for mixed model analysis of change over time in CTRA gene expression

	Parameter estimate ¹	Standard error	<i>t</i> (126)	<i>p</i>	95% CI
A. Difference from control					
Control	(Reference)	-	-	-	-
Kindness-to-World	-0.004	0.037	-0.12	0.9052	[-0.077, 0.068]
Kindness-to-Others	-0.098	0.040	-2.44	0.0162	[-0.177, -0.018]
Kindness-to-Self	0.028	0.037	0.76	0.4505	[-0.045, 0.101]
B. Absolute change (within group)					
Control	0.013	0.028	0.46	0.6486	[-0.042, 0.068]
Kindness-to-World	0.008	0.024	0.35	0.7276	[-0.039, 0.056]
Kindness-to-Others	-0.085	0.029	-2.94	0.0039	[-0.142, -0.028]
Kindness-to-Self	0.041	0.024	1.69	0.0927	[-0.007, 0.088]

1. Change from baseline to follow-up in average value of CTRA contrast score (z-score standardized RNA units)

Table 2

CONSORT 2010 Checklist of Information to Include When Reporting a Randomized Trial

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomised trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	3-5
	2b	Specific objectives or hypotheses	5-6
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	6-7
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	N/A
Participants	4a	Eligibility criteria for participants	6
	4b	Settings and locations where the data were collected	6-7
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	7, Supplement
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	7-8, Supplement
	6b	Any changes to trial outcomes after the trial commenced, with reasons	N/A
Sample size	7a	How sample size was determined	6
	7b	When applicable, explanation of any interim analyses and stopping guidelines	N/A
Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	7
	8b	Type of randomisation; details of any restriction (such as blocking and block	7

Allocation concealment mechanism	9	size) Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	7
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	7
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	7
	11b	If relevant, description of the similarity of interventions	7, Supplement
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	8-10
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	8-10, Supplement
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	6,10, 21
	13b	For each group, losses and exclusions after randomisation, together with reasons	6, 10, 21
Recruitment	14a	Dates defining the periods of recruitment and follow-up	6
	14b	Why the trial ended or was stopped	6
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	20
Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	21
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	Supplement
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	N/A
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	11, Supplement
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	N/A

Discussion

Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	13-14
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	11-12
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	11-14

Other information

Registration	23	Registration number and name of trial registry	N/A
Protocol	24	Where the full trial protocol can be accessed, if available	
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	

Table 3

Instructions for Kindness-to-Others, Kindness-to-World, Kindness-to-Self, and Control Conditions

Condition	Instructions
Kindness to Others	In our daily lives, we all perform acts of kindness, generosity, and thoughtfulness—both large and small—for others. Examples include cooking dinner for friends or family, doing a chore for a family member, paying for someone’s coffee in line behind you, visiting an elderly relative, or writing a thank you letter. <i>Tomorrow</i> , you are to perform <i>three</i> nice things for others, all three in one day. These acts of kindness do not need to be for the same person, the person may or may not be aware of the act, and the act may or may not be similar to the acts listed above. Next week, you will report what nice things you chose to perform. Please do not perform any kind acts that may place yourself or others in danger.
Kindness to World	In our daily lives, we all perform acts of kindness—both large and small—to make the world a better place. Examples include recycling, picking up roadside litter, donating to charity, or volunteering for a local organization. <i>Tomorrow</i> , you are to perform <i>three</i> nice things to improve the world, all three in one day. These acts of kindness do not necessarily need to involve other people, but they should be efforts to contribute to the world or humanity at large. In addition, the act may or may not be similar to the acts listed above. Next week, you will report what nice things you chose to perform. Please do not perform any kind acts that may place yourself or others in danger.
Kindness to Self	In our daily lives, we all perform acts of kindness for others, but we often neglect to do nice things for ourselves. <i>Tomorrow</i> , you are to perform <i>three</i> acts of kindness <i>for yourself</i> , all three in one day. These nice things that you do for yourself could be large (e.g., enjoying a day trip to your favorite hiking spot or a day at the spa) or they could be small (e.g., taking a 5-minute break when feeling stressed), but they should be something out of the ordinary that you do for yourself with a little extra effort. Examples include having your favorite meal, treating yourself to a massage, or spending time on your favorite hobby. These nice things for yourself do not need to be the same as the examples listed above, and although they may involve other people, they should be things that you do explicitly for yourself, not others.
Control	<i>Tomorrow</i> , as you go about your day, please keep track of your activities. You do not need to remember who you are with or how you are feeling during that time. Instead, just try to remember factual information about what you are doing. Do not alter your routine in any way; simply keep track of what you do. When you log back in to the study, you will be asked to write an outline of what you did. For example: Morning: Ate breakfast, went to work, ate lunch with coworkers. Afternoon: Started a new project, held a meeting, went to the gym. Evening: Ate dinner, watched TV, went to bed. Only the facts are important.

Table 4

Example Responses by Condition

Condition	Instructions
Kindness to Others	<p>“Gave some berry cobbler to a neighbor”</p> <p>“Washed dishes for mom”</p> <p>“Made my significant other their favorite meal”</p>
Kindness to World	<p>“Donated money to Plant Discovery Day”</p> <p>“Volunteered to clean up after a philosophy department event”</p> <p>“Gave things to Good Will”</p>
Kindness to Self	<p>“Splurged on a Thai coffee in the middle of the day”</p> <p>“Went to the beach”</p> <p>“Left work early”</p>
Control	<p>“Worked each day from 7:30am - 4:30pm. Walked this week either on my breaks or lunch. Had several meetings and completed my work via computer, in person, mail. At home, I spent a great deal of time with my family, cleaned my house, cooked and watched tv. also went shopping in the local mall, grocery store, major warehouse store. I also spent time alone reading and listening to music.”</p>

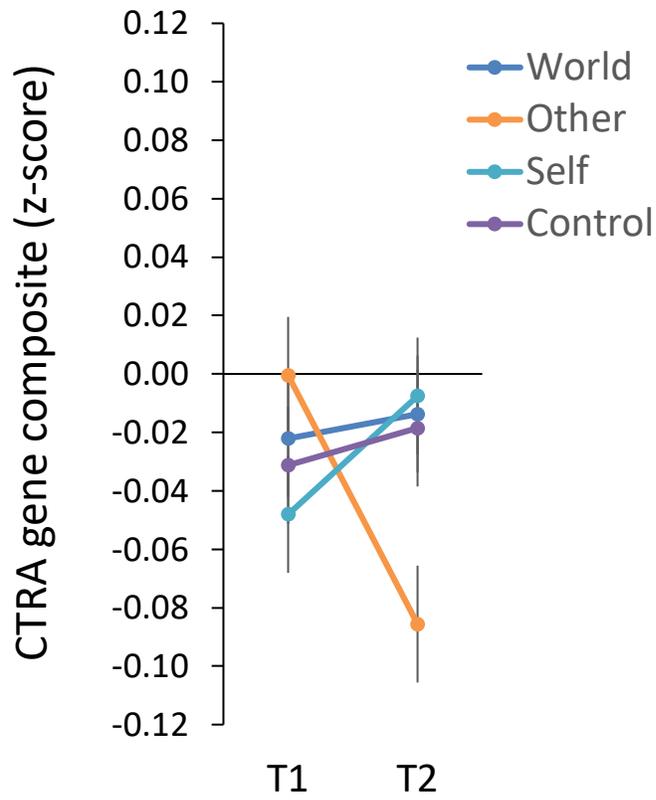
Table 5

Model Parameters (Standard Errors) and Goodness-of-Fit for Linear Changes in Negative Affect (Model 1) and Connectedness (Model 2) by Kindness-to-Others, Kindness-to-World, and Kindness-to-Self Relative to Control.

			<i>Model 1:</i>	<i>Model 2:</i>
	<i>Effect</i>	<i>Parameter</i>	<i>Linear Change in Negative Affect by Condition</i>	<i>Linear Change in Connectedness by Condition</i>
<i>Fixed Effects</i>				
Status at Baseline, π_{oi}	Intercept	γ_{00}	2.92*** (0.17)	3.72*** (0.13)
	Other-Kindness	γ_{01}	-0.28 (0.24)	0.23 (0.18)
	World-Kindness	γ_{02}	-0.13 (0.22)	-0.01 (0.16)
	Self-Kindness	γ_{03}	-0.34 (0.23)	0.06 (0.17)
Linear Rate of Change, π_{li}	Time	γ_{10}	-0.07 (0.04)	0.04 (0.03)
	Other-Kindness	γ_{11}	-0.01 (0.06)	-0.01 (0.05)
	World-Kindness	γ_{12}	-0.07 (0.06)	0.05 (0.05)
	Self-Kindness	γ_{13}	-0.04 (0.06)	0.05 (0.05)
<i>Random Effects</i>				
Variance Components				
	Level 1	σ_{ε}^2	0.48*	0.26*
	Level 2	σ_0^2	0.69*	0.38*
		σ_1^2	0.02*	0.01*
<i>Goodness-of-fit</i>				
	Deviance		1924.07	1453.66

Figure 1

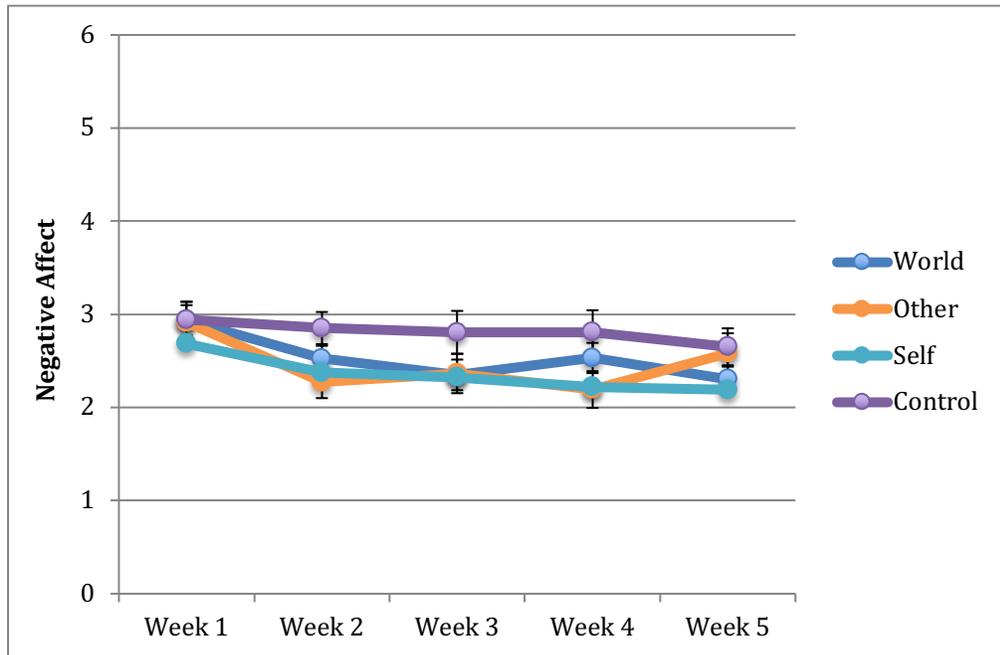
CTRA gene expression composite scores at baseline (T1) and Week 5 follow-up (T2).



Values represent the mean \pm standard error at each time point.

Figure 2

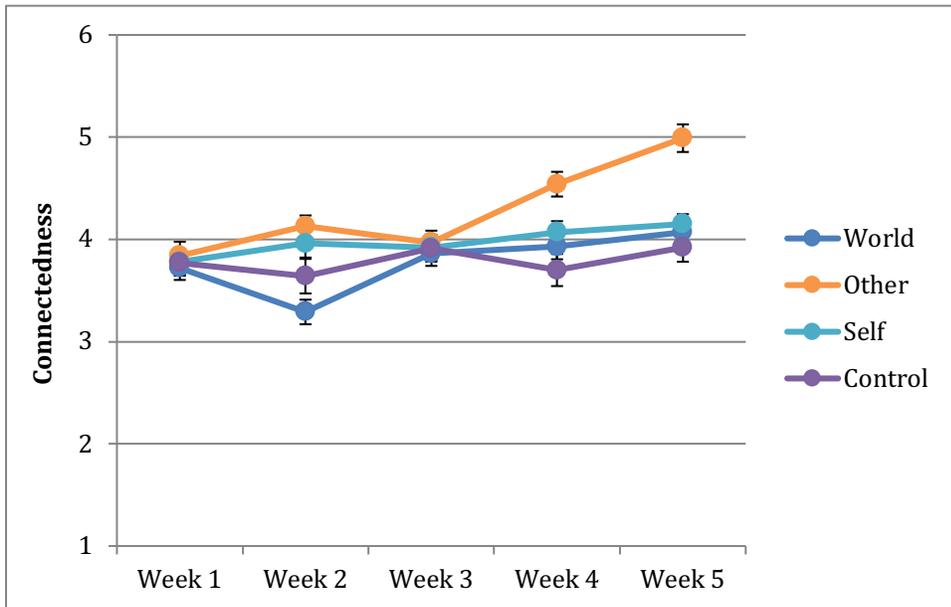
Weekly negative affect by condition.



Values represent the mean \pm standard error at each time point.

Figure 3

Weekly connectedness by condition.



Values represent the mean \pm standard error at each time point.