

UCLA

UCLA Previously Published Works

Title

KINDNESS TO OTHERS OR TO ONESELF: AN ONLINE PILOT RANDOMIZED CONTROLLED TRIAL TO ENHANCE WELL-BEING IN BREAST CANCER SURVIVORS

Permalink

<https://escholarship.org/uc/item/4tt9t86h>

Journal

PSYCHOSOMATIC MEDICINE, 81(4)

ISSN

0033-3174

Authors

Haydon, Marcie D
Walsh, Lisa C
Fritz, Megan M
[et al.](#)

Publication Date

2019

Peer reviewed



The Journal of Positive Psychology

Dedicated to furthering research and promoting good practice

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/rpos20>

Kindness interventions for early-stage breast cancer survivors: An online, pilot randomized controlled trial

Marcie D. Haydon, Lisa C. Walsh, Megan M. Fritz, Danny Rahal, Sonja Lyubomirsky & Julienne E. Bower

To cite this article: Marcie D. Haydon, Lisa C. Walsh, Megan M. Fritz, Danny Rahal, Sonja Lyubomirsky & Julienne E. Bower (2023) Kindness interventions for early-stage breast cancer survivors: An online, pilot randomized controlled trial, *The Journal of Positive Psychology*, 18:5, 743-754, DOI: [10.1080/17439760.2022.2093786](https://doi.org/10.1080/17439760.2022.2093786)

To link to this article: <https://doi.org/10.1080/17439760.2022.2093786>



Published online: 05 Jul 2022.



Submit your article to this journal [↗](#)



Article views: 304



View related articles [↗](#)







View Crossmark data [↗](#)



This article has been awarded the Centre for Open Science 'Preregistered' badge.



Kindness interventions for early-stage breast cancer survivors: An online, pilot randomized controlled trial

Marcie D. Haydon ^a, Lisa C. Walsh ^b, Megan M. Fritz^b, Danny Rahal ^a, Sonja Lyubomirsky ^b
and Julienne E. Bower^{a,c,d,e}

^aDepartment of Psychology, University of California, Los Angeles (UCLA), USA; ^bDepartment of Psychology, University of California, Riverside, USA; ^cDepartment of Psychiatry and Biobehavioral Sciences, UCLA, USA; ^dJonsson Comprehensive Cancer Center, UCLA, USA; ^eCousins Center for Psychoneuroimmunology, UCLA, USA

ABSTRACT

Online interventions that elicit kindness may enhance well-being. We tested the efficacy of three kindness interventions among breast cancer survivors. Participants ($N = 137$, $M_{age} = 62.65$ years) were randomized to perform acts of kindness for others, acts of kindness for self, self-kindness meditation, or a daily-activities-writing control and completed three activities each week for 4 weeks. Primary (well-being, depressive symptoms) and secondary outcomes (social support, self-kindness) were assessed pre- and post-intervention. No differences emerged in the primary outcomes. However, relative to controls, participants in the acts of kindness to others condition reported greater increases in social support, and participants in the self-kindness meditation condition reported greater decreases in self-kindness. Among breast cancer survivors, performing prosocial acts may enhance feelings of social support. The two self-kindness conditions yielded either null or detrimental effects, suggesting that further research is needed on best practices for conducting self-focused kindness interventions.

ARTICLE HISTORY

Received 1 December 2021
Accepted 15 May 2022

KEYWORDS

Early-stage breast cancer; randomized controlled trial; prosocial behavior; acts of kindness; self-kindness; self-kindness meditation

Diagnosis and treatment for breast cancer are disruptive and can catalyze feelings of distress and debilitating physical symptoms that may persist for years following treatment (Bower et al., 2006; Lam et al., 2012; Otte et al., 2010; Peuckmann et al., 2009). Understandably, many existing psychosocial interventions are designed to help breast cancer survivors cope with adverse cancer-related sequelae (Matthews et al., 2017), consistent with the broader literature on psychosocial interventions for cancer patients and survivors (Kalter et al., 2018; Sanjida et al., 2018; Stanton, 2006). Less attention has been paid to enhancing well-being in this population, despite evidence linking well-being to better health-related outcomes (Chida & Steptoe, 2008; Hernandez et al., 2018; Moreno et al., 2018). Indeed, enhancement of positive psychological processes may be equally, if not more important, for health than reducing distress (e.g., Chida & Steptoe, 2008; Craske et al., 2019; Moreno et al., 2018). To date, there is a lack of understanding about the factors that promote well-being among breast cancer survivors, and, within this population, few interventions have been designed to target these processes. The current trial tested the efficacy of three online kindness interventions designed to enhance well-being among

early-stage breast cancer survivors – acts of kindness to others, acts of kindness to self, and self-kindness meditation.

A number of short interventions have been developed to harness positive psychological processes and promote well-being (Bolier et al., 2013; Sin & Lyubomirsky, 2009). These interventions have mainly been conducted among healthy individuals, though several have been developed for patients with chronic illness, such as HIV (Moskowitz et al., 2017) and cardiovascular disease (Huffman et al., 2011; Peterson et al., 2012). Interest in enhancing *prosocial behavior* has grown in recent years, and evidence suggests that doing kind things for others can influence both well-being and physical health (Nelson et al., 2016; Nelson-Coffey et al., 2017). Importantly, prosocial behavior can be reliably manipulated within a short, online intervention. Nelson et al. (2016), for example, conducted a 4-week online intervention with healthy adults to examine the effects of engaging in acts of kindness. Participants randomized to perform acts of kindness for others (e.g., writing a note to a coworker) demonstrated greater increases in well-being than those assigned to write factual details about their day. Similar studies

reported increases in life satisfaction (Buchanan & Bardi, 2010), happiness (Alden & Trew, 2013; Otake et al., 2006; Rowland & Curry, 2019), social connection (Layous et al., 2012), and reduced inflammatory potential of immune cells (Nelson-Coffey et al., 2017) among individuals randomized to perform acts of kindness for others.

Performing kind acts for and cultivating compassionate feelings towards *oneself* may also be beneficial. Taking time to do kind things for oneself may include engaging in health-promoting behaviors, such as exercise or healthy sleep, or doing activities that promote restoration and relaxation, such as eating a pleasurable meal or spending time on a hobby. These self-focused activities are recognized as important contributors to health and well-being (e.g., Fancourt & Steptoe, 2018; Lee et al., 2012; Luyster et al., 2012). However, intervention studies designed to elicit acts of self-kindness have yielded mixed results, with one showing no effects on well-being (Nelson et al., 2016) and two reporting beneficial effects on happiness (O'Connell et al., 2016; Rowland & Curry, 2019). Mindfulness meditation utilizes a different approach to improve well-being, through the enhancement of *internal*, or dispositional, self-kindness (Hölzel et al., 2011; Neff & Dahm, 2015). Dispositional self-kindness refers to the practice of being kind to oneself in the face of pain, stress, or failure (Neff, 2003). In kindness-based meditations, practitioners are guided through exercises designed to enhance kind and loving thoughts towards themselves and others. These practices have been shown to increase self-compassion (Neff & Germer, 2013), positive emotions (Fredrickson et al., 2008), and reduce stress-induced immune reactivity (Pace et al., 2009) in healthy adults.

Despite growing evidence that kindness-focused interventions may be beneficial, few have been conducted among individuals with a history of cancer. To date, several studies have examined the effectiveness of peer helping or providing assistance and support to other cancer patients and/or survivors undergoing the same type of treatment (Rini et al., 2014) or diagnosed with the same disease (Lepore et al., 2014; Pinto et al., 2015). However, results are inconsistent, suggesting that this kind of *targeted* helping may not be optimal. Rather, a *non-targeted* approach – similar to methods used in previous positive activity interventions (e.g., Nelson et al., 2016) – is a promising alternative, as participants can choose the recipient of their kind act and receive immediate social feedback. Notably, no studies, to date, have examined the effectiveness of engaging in acts of self-focused kindness (e.g., taking a walk, eating a favorite meal) among women with a history of breast cancer. This research is warranted, given that breast cancer survivors may find it difficult to prioritize their

care and recovery over other care-taking responsibilities (Sulik, 2007). Only a few studies have examined the effects of meditative practices on enhancing self-kindness among cancer patients and survivors. In a recent trial with younger breast cancer survivors, increases in self-kindness following a 6-week mindfulness intervention emerged as an important emotion-regulation strategy associated with reductions in depressive symptoms (Boyle et al., 2017). Improvements in self-compassion have also been reported in one trial using Cognitively-Based Compassion Training, an intervention that incorporates mindfulness meditation practices (Gonzalez-Hernandez et al., 2018), and in a small study where breast cancer patients were randomized to perform loving-kindness meditation during breast biopsy and in the months leading up to breast cancer surgery (Wren et al., 2019).

To test the efficacy of kindness-focused practices among early-stage breast cancer survivors, women with a history of breast cancer were randomized to one of four conditions. Three of these conditions – kindness to others, kindness to self, and daily-activities-writing control – were based on a previous study conducted by Nelson et al. (2016). A fourth condition – self-kindness meditation – was added based on work showing that kindness-focused meditative practices increase self-kindness (Gonzalez-Hernandez et al., 2018; Wren et al., 2019) and improve other outcomes in women with a history of breast cancer (Boyle et al., 2017). Activities were performed three times each week for 4 weeks, and participants completed online assessments before and after the intervention. Primary outcomes were well-being and depressive symptoms and secondary outcomes included social support and self-kindness. We hypothesized that participants in each of the three kindness conditions would demonstrate beneficial effects, from pre- to post-intervention, relative to those in the control condition. Because each kindness condition represents a distinct means of improving well-being, we did not have hypotheses regarding the differences *between* these conditions. Subsequently, analyses were conducted testing each kindness condition versus the control condition.

Methods

Participants and Procedure

Participants were recruited through the University of California, Los Angeles (UCLA) Cancer Registry, a database of cancer patients seen, treated, or diagnosed at a UCLA medical facility. Inclusion criteria were (1) diagnosis of early-stage breast cancer (stage

0, I, II, or IIIA), (2) completion of primary treatment (surgery, chemotherapy, and/or radiation therapy), (3) no history of cancer recurrence, (4) proficient in

online informed consent was obtained. The ClinicalTrials.gov identifier for this trial is NCT00331934.

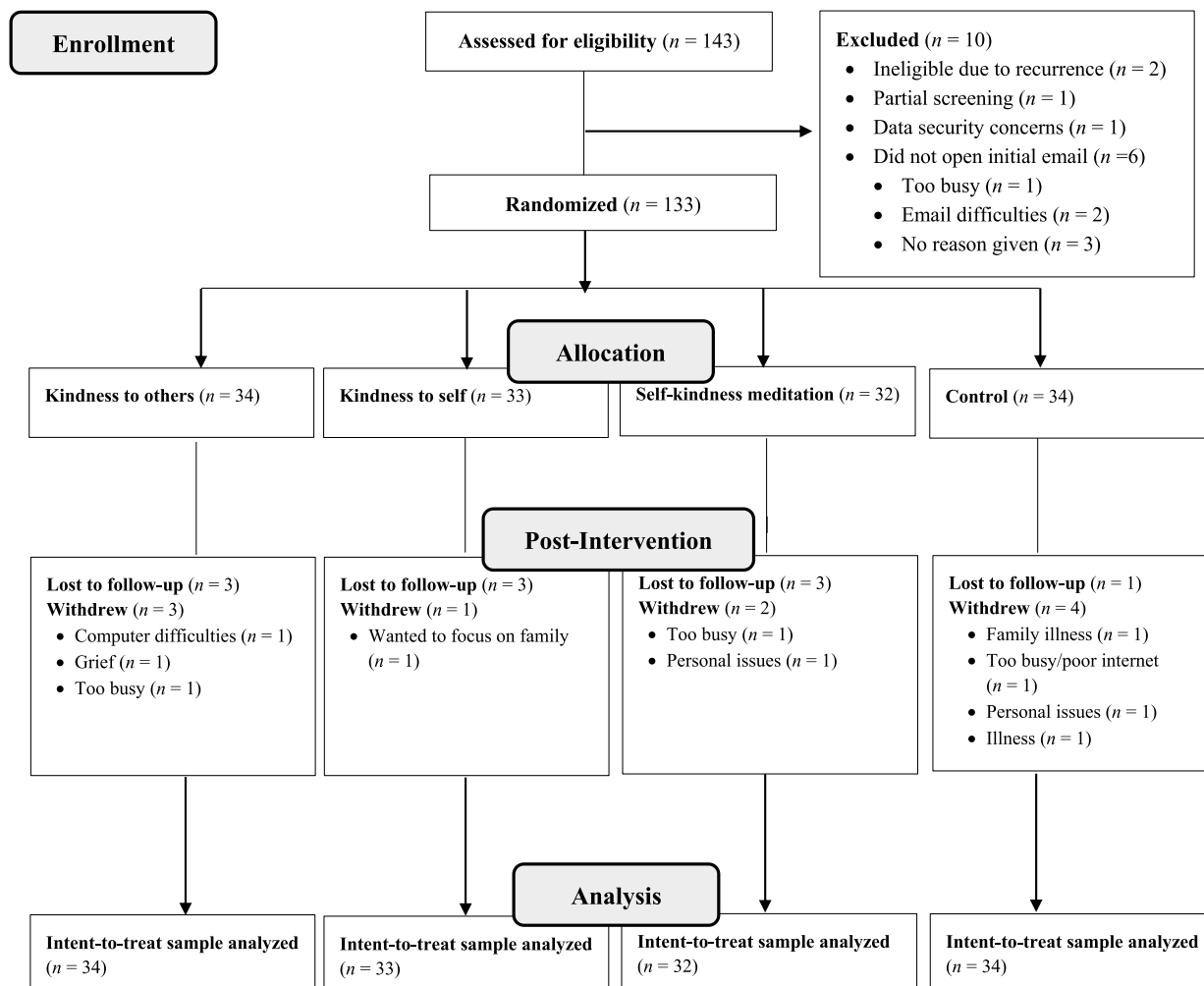


Figure 1. Consort diagram showing number of women screened, enrolled, and randomly assigned to conditions and completion of study assessments.

English, and (5) access to the Internet and email. To avoid overlap with an existing study, we restricted recruitment to women 50 years of age or older at diagnosis. Recruitment letters were mailed to 1,733 women identified through the registry (see Figure 1); letters included study information and a phone number to contact for determination of eligibility. Three additional individuals contacted the study – one after seeing the study on ClinicalTrials.gov and two after receiving a referral from a friend. In total, 163 women called, 143 were screened, and 133 were eligible and interested. The UCLA Institutional Review Board approved all study procedures, and

Following the phone screening, participants were randomized to one of the four study conditions (see Interventions below) using a fixed ratio (1:1:1:1) and received an email with instructions for completing the online informed consent, baseline questionnaire, and weekly activities – all housed on Qualtrics. Online questionnaires were administered at baseline and post-intervention. Instructions for completing the weekly activities, which varied by condition assignment (see Interventions below), were provided following completion of the baseline questionnaire and weekly throughout the intervention. Participants were instructed to plan for the week's activities in advance and to record what

they had done at the end of the week. In total, each participant was assigned four weeks of activities. After completing the final assessment, participants received a \$25 gift card as a thank you for participating.

Interventions

Participants in each condition were instructed to perform particular activities three times per week, each on a separate day. Instructions for activities in the kindness to others, kindness to self, and control conditions were modeled after a previous study (Nelson et al., 2016). Instructions for the self-kindness meditation condition were modeled after those used in a previous mindfulness trial with breast cancer survivors (Bower et al., 2015).

Acts of kindness to others

Participants in this condition were instructed to perform kind, generous, or thoughtful acts directed towards others, such as paying for someone's coffee, writing a note of appreciation, or making a cup of tea for a spouse. Instructions noted that these acts should be something out of the ordinary that required a little extra effort.

Acts of kindness to self

Participants in this condition were instructed to perform kind acts directed towards themselves, such as taking a mid-day walk or preparing a favorite meal. As in the previous condition, participants were instructed to do something out of the ordinary that required a little extra effort.

Self-kindness meditation

Participants in this condition were instructed to listen to a 5-minute guided meditation each week. The meditations were hosted on Blogger, an online blog-publishing platform, accessible via an emailed hyperlink. All meditations were pre-recorded by an experienced mindfulness instructor and were based on traditional loving-kindness exercises. Before the first session, participants were provided with a 2-minute description of loving-kindness meditation and instructed on how to deal with negative emotions that may arise. During each meditation, participants were instructed to send kindness to themselves and repeat phrases, such as 'may I be peaceful,' 'may I be healthy and strong,' and 'may I be safe.' A 5-minute meditation was chosen to approximate

the time spent on activities in the other three conditions and because this is a typical length assigned to novice meditation practitioners.

Daily-activity-writing control

Participants in this condition were instructed to write about their daily activities (e.g., went to work, had lunch with a friend) as a way to organize their time. This condition controlled for time and attention spent completing weekly activities, including planning and reporting.

Measures

Demographic, medical, and treatment-related characteristics

Demographic variables – age, ethnicity, marital status, income, education, and employment – were assessed at baseline via self-report. Medical and treatment-related variables (i.e., stage at diagnosis, type of primary treatment, and years since diagnosis) were also assessed at baseline via self-report.

Primary outcomes

Psychological well-being and depressive symptoms were assessed at baseline and post-intervention.

Psychological well-being. Well-being was measured using the 14-item Mental Health Continuum- Short Form (MHC-SF; Keyes, 2002). The MHC-SF assesses two components of well-being, hedonic and eudaimonic well-being. The 3-item hedonic well-being scale relates to feelings of happiness and satisfaction in life. The 11-item eudaimonic well-being scale relates to feelings of social connectedness, belonging, self-acceptance, and purpose in life. Items are scored on a 5-point Likert scale (0 = *never*, 4 = *every day*). This measure has high reliability and validity (Lamers et al., 2011) and has been used previously among breast cancer survivors (Boyle et al., 2019).

Depressive symptoms. Depressive symptoms were measured using the 20-item Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). Participants rated the frequency of experiencing a range of feelings and thoughts within the past week. Items are scored on a 4-point Likert scale (0 = *rarely or some of the time*, 3 = *most or all of the time*). The CES-D has been shown to be both reliable and valid as a measure of depressive symptomatology in women with a history of breast cancer (Hann et al., 1999).

Secondary outcomes. Social support and self-kindness were assessed at baseline and post-intervention.

Social support. Social support was measured using the 21-item 2-way Social Support Scale (2-Way SSS; Shakespeare-Finch & Obst, 2011). The 2-Way SSS assesses four dimensions of social support: receiving emotional support (e.g., 'I feel that I have a circle of people who value me'), giving emotional support (e.g., 'I am there to listen to others' problems'), receiving instrumental support (e.g., 'If stranded somewhere there is someone who would get me'), and giving instrumental support (e.g., 'I am a person others turn to for help with tasks'). Statements are rated on a 6-point Likert scale (0 = *not at all*, 5 = *always*), with higher scores indicating greater perceptions of giving and receiving social support. This measure has high validity (Shakespeare-Finch & Obst, 2011), but, to our knowledge, has yet to be used among breast cancer survivors.

Self-kindness. Self-kindness was measured using the 5-item self-kindness subscale of the Self-Compassion Scale (Neff, 2003). Participants rated their level of agreement with items, such as 'I try to be loving towards myself when I'm feeling emotional pain' and 'I'm tolerant of my own flaws and inadequacies.' Statements were rated on 5-point Likert scale (1 = *almost never*, 5 = *almost always*). This subscale has high reliability and construct validity (Neff, 2003) and has been used in previous studies with breast cancer survivors (Boyle et al., 2017).

Analytic Strategy

Baseline differences in demographic, cancer, and treatment-related variables between groups were tested using χ^2 , Fisher's exact, and one-way ANOVAs. This trial was designed to compare each kindness condition to the control condition, and we did not have hypotheses regarding differences *between* the kindness conditions. Thus, three analyses were conducted for each outcome, with each kindness condition – kindness to others, kindness to self, and self-kindness meditation – compared to the control condition separately. Intent-to-treat analyses using mixed models were conducted to allow for inclusion of all participants, irrespective of final compliance. Differences in the primary (well-being, depressive symptoms) and secondary outcomes (social support, self-kindness) were assessed using two-level mixed models with timepoints nested within individuals. To determine whether changes in outcomes were dependent upon condition assignment (i.e., active group versus control group), differences in change in the primary and secondary outcomes from pre- to post-intervention were assessed via the time-by-condition interaction terms. Significant interactions indicate that the difference between the

corresponding active condition (i.e., acts of kindness to others, acts of kindness to self, self-kindness meditation) and the control condition significantly differed from baseline to post-intervention. Effect sizes were estimated using the process described in Selya et al. (2012). If an interaction term was significant, we then computed simple contrasts by testing the effect of time for each condition. Analyses were conducted using the Stata 15 software package.

Results

Participants

Characteristics of the 133 study participants are reported in Table 1. On average, women were 62.65 years of age and 3.25 years post breast cancer diagnosis (range: 1–8 years). Groups did not differ on demographics, medical, or treatment-related characteristics at baseline ($ps \geq .09$). Similarly, groups did not differ on measures of the primary and secondary outcomes at baseline ($ps \geq .37$). The baseline assessment was completed by 132 women and 113 completed the post-intervention assessment, yielding an 85.60% retention rate.

Adherence was high; across conditions, participants completed, on average, 2.67 activities each week or 89% of those assigned. Notably, those in the kindness to others condition completed more activities ($M = 3.00$, $SD = 0.80$), on average, than those in the self-kindness meditation ($M = 2.44$, $SD = 1.03$, $p = .011$) and control conditions ($M = 2.50$, $SD = 0.74$, $p = .019$), but not those in the kindness to self condition ($M = 2.77$, $SD = 0.77$, $p = .29$), $F(3, 122) = 2.94$, $p = .04$.

Primary Outcomes

Means and standard deviations are presented in Table 2. Coefficients, standard errors, p -values, 95% confidence intervals (CIs), and effect sizes for the time-by-condition interactions are presented in Table 3. When comparing each kindness condition to control, no significant time-by-condition interactions emerged for total well-being ($ps \geq .59$), hedonic well-being ($ps \geq .41$), or eudaimonic well-being ($ps \geq .61$). Similarly, there were no significant time-by-condition interactions for depressive symptoms ($ps \geq .18$).

Secondary Outcomes

Means and standard deviations are presented in Table 2. Coefficients, standard errors, p -values, 95% CIs, and effect sizes for the time-by-condition interactions are presented in Table 3.

Table 1. Demographic, medical, and treatment-related characteristics of the sample.

	All (n = 133)	Acts of kindness for others (n = 34)	Acts of kindness for self (n = 33)	Self-kindness meditation (n = 32)	Control (n = 34)
Age: mean (SD), range	62.65 (6.39), 36–75	63.09 (7.98), 36–73	62.52 (5.68), 52–73	62.59 (5.38), 54–73	62.41 (6.39), 53–75
Ethnicity, %					
Black	1.5	2.9	–	–	3.0
Asian	7.7	8.8	9.4	9.4	3.0
White	86.2	79.4	90.6	83.9	90.9
Other	4.6	8.8	–	6.5	3.0
Latina (Yes), %	9	–	9.1	15.6	11.8
Education, %					
< College	19.5	8.8	15.2	34.4	20.6
College graduate	33.1	50.0	30.3	25.0	26.5
> College	46.6	41.2	51.5	40.6	52.9
Employed (full- or part-time), %	51.1	47.1	48.5	62.5	47.1
Income >\$100,000, %	54.9	52.9	54.5	56.3	55.9
Married/partnered, %	72.2	67.6	75.8	71.9	73.5
Cancer Stage, %					
0	17.4	14.7	21.2	18.8	14.7
1	43.2	47.1	36.4	46.9	41.2
IIA or IIB	28.0	23.5	30.3	28.1	29.4
IIIA	3.0	2.9	3.0	–	5.9
Other	3.8	5.9	6.1	–	2.9
Do Not Recall	4.5	5.9	3.0	6.3	2.9
Type of Treatment, %					
Surgery	92.5	88.2	97	96.9	88.2
Chemotherapy	44.4	50	45.5	43.8	38.2
Radiation	66.9	52.9	63.6	78.1	73.5
Herceptin	21.8	26.5	27.3	21.9	11.8
Years Since Diagnosis: mean (SD)	3.25 (1.56)	3.06 (1.72)	3.38 (1.62)	3.09 (1.39)	3.48 (1.53)

Note. SD = standard deviation.

Social support

When comparing each kindness condition to the control condition, those in the acts of kindness to others condition reported greater increases in total social support, $b = 3.83$, $SE = 1.85$, $p = .038$, 95% CI [0.20, 7.45]. Assignment to the acts of kindness to others condition accounted for 7% of the variance in total social support. Simple contrasts revealed that those in the acts of kindness to others condition reported a significant increase in social support from baseline to post-intervention ($b = 3.00$, $SE = 1.32$, $p = .023$, 95% CI [0.42, 5.59]), and those in the control condition reported a non-significant decrease ($b = -0.82$, $SE = 1.29$, $p = .53$, 95% CI [-3.36,

1.72]). No significant time-by-condition interactions emerged when comparing the acts of kindness to self or self-kindness meditation conditions to controls ($ps \geq .39$).

Exploratory analyses of the four dimensions of social support revealed that the time-by-condition interaction was driven by an increase in ratings of instrumental support received; those in the acts of kindness to others condition reported significantly greater increases in receiving instrumental support relative to those in the control condition, $b = 1.81$, $SE = 0.58$, $p = .002$, 95% CI [0.67, 2.95], $f^2 = 0.16$. Assignment to the acts of kindness to others condition accounted for 16% of the variance in instrumental support received. Simple contrasts

Table 2. Means and standard deviations for primary and secondary outcomes.

	Baseline (n = 132)				Post-Intervention (n = 113)			
	AOKO	AOKS	SKM	Control	AOKO	AOKS	SKM	Control
Well-Being ^a								
Total	2.69 (0.70)	2.90 (0.47)	2.71 (0.65)	2.67 (0.69)	2.67 (0.87)	2.85 (0.65)	2.73 (0.75)	2.52 (0.80)
Hedonic	2.96 (0.77)	3.27 (0.61)	3.07 (0.79)	3.04 (0.75)	2.96 (0.86)	3.08 (0.77)	3.08 (0.94)	2.90 (0.91)
Eudaimonic	2.62 (0.72)	2.80 (0.48)	2.61 (0.64)	2.57 (0.75)	2.59 (0.90)	2.79(0.63)	2.63 (0.74)	2.40 (0.82)
Depressive Symptoms ^b	12.91 (10.81)	8.97 (7.00)	11.44 (10.16)	11.85 (8.92)	10.82 (11.30)	9.07 (7.47)	9.00 (9.32)	11.48 (9.24)
Social Support Total ^c	89.45 (12.08)	92.64 (11.97)	89.25 (11.01)	90.94 (13.22)	92.29 (11.44)	90.83 (13.48)	91.07 (13.21)	89.97 (14.50)
Self-Kindness ^d	17.85 (5.55)	19.00 (4.10)	17.75 (4.52)	17.00 (5.18)	19.00 (4.54)	18.93 (4.07)	16.93 (4.65)	17.52 (5.46)

Notes. AOKO = acts of kindness for others. AOKS = acts of kindness for self. SKM = self-kindness meditation. ^aMental Health Continuum-Short Form. ^bCenter for Epidemiologic Studies Depression Scale. ^c2-way Social Support Scale. ^dself-kindness subscale of the Self-Compassion Scale

Table 3. Time-by-condition interaction coefficients for the primary and secondary outcomes.

		Baseline to Post-Intervention				
		<i>b</i>	<i>SE</i>	<i>p</i>	95% CI	<i>r</i> ²
Primary Outcomes						
Well-Being ^a						
Total	AOKO vs. Control	0.74	2.17	.73	-3.50, 4.99	.001
	AOKS vs. Control	-0.48	1.81	.79	-4.02, 3.07	.000
	SKM vs. Control	1.11	2.07	.59	-2.96, 5.18	.003
Hedonic						
	AOKO vs. Control	0.21	0.50	.67	-0.77, 1.20	.002
	AOKS vs. Control	-0.42	0.50	.41	-1.41, 0.57	.012
	SKM vs. Control	0.16	0.46	.73	-0.75, 1.07	.001
Eudaimonic						
	AOKO vs. Control	0.24	0.91	.80	-1.55, 2.02	-.001
	AOKS vs. Control	-0.04	0.73	.96	-1.47, 1.39	.000
	SKM vs. Control	0.45	0.88	.61	-1.26, 2.17	.002
Depressive Symptoms ^b						
	AOKO vs. Control	-1.27	2.51	.61	-6.18, 3.64	.003
	AOKS vs. Control	1.98	1.48	.18	-0.91, 4.87	.035
	SKM vs. Control	-0.94	1.47	.52	-3.83, 1.94	.004
Secondary Outcomes						
Social Support Total ^c						
	AOKO vs. Control	3.83	1.85	.038*	0.20, 7.45	.073
	AOKS vs. Control	-1.34	1.91	.48	-5.09, 2.41	.008
	SKM vs. Control	1.63	1.91	.39	-2.11, 5.37	.012
Self-Kindness ^d						
	AOKO vs. Control	0.15	0.95	.87	-1.72, 2.02	-.000
	AOKS vs. Control	-1.00	0.91	.27	-2.79, 0.79	.023
	SKM vs. Control	-2.17	1.01	.031*	-4.15, -0.20	.091

Note. *SE* = standard error. *CI* = confidence interval. AOKO = acts of kindness for others. AOKS = acts of kindness for self. SKM = self-kindness meditation. Time was coded as 0 (baseline) and 1 (post-intervention). Condition was coded as 0 (control) and 1 (experimental condition) for each analysis.

^aMental Health Continuum-Short Form. ^bCenter for Epidemiologic Studies Depression Scale. ^c2-way Social Support Scale. ^dSelf-kindness subscale of the Self-Compassion Scale.

* $p < .05$.

revealed that those in the acts of kindness to others condition reported a significant increase in receiving instrumental support from baseline to post-intervention, ($b = 1.29$, $SE = 0.42$, $p = .002$, 95% CI [0.48, 2.11]), and those in the control condition reported a non-significant decrease ($b = -0.51$, $SE = 0.41$, $p = .21$, 95% CI [-1.31, 0.29]). No significant time-by-condition interaction terms emerged when analyzing the other three dimensions of social support: emotional support received ($b = 0.95$, $SE = 1.00$, $p = .35$, 95% CI [-1.02, 2.91]), emotional support given ($b = 0.52$, $SE = 0.53$, $p = .32$, 95% CI [-0.51, 1.56]), and instrumental support given ($b = 0.57$, $SE = 0.64$, $p = .37$, 95% CI [-0.68, 1.81]).

Self-kindness

For self-kindness, no significant time-by-condition interactions emerged when comparing the acts of kindness to others and acts of kindness to self conditions to the control condition ($ps \geq .27$). Those in the self-kindness meditation condition differed significantly from controls, $b = -2.17$, $SE = 1.01$, $p = .031$, 95% CI [-4.15, -0.20], reporting a greater decrease in feelings of self-kindness across the intervention. Assignment to the self-kindness meditation

condition accounted for 9% of the variance in self-kindness. Simple slopes analyses revealed that those in the self-kindness meditation condition showed a marginally significant decrease in self-kindness, $b = -1.43$, $SE = 0.73$, $p = .050$, 95% CI [-2.85, -0.002], and those in the control condition reported a non-significant increase, $b = 0.75$, $SE = 0.70$, $p = .29$, 95% CI [-0.63, 2.12].

Discussion

This trial tested the efficacy of three online kindness interventions – acts of kindness to others, acts of kindness to self, and self-kindness meditation – for use with early-stage breast cancer survivors. Contrary to expectations and despite strong adherence, none of these interventions led to changes in well-being or depressive symptoms (primary outcomes) relative to the daily-activity-writing control. However, performing acts of kindness for others did lead to increases in social support – particularly perceptions of instrumental support received – and self-kindness meditation unexpectedly led to decreases in self-kindness. These findings contribute to a growing literature on kindness-related

interventions and suggest that effects in clinical populations may be more nuanced than those observed in healthy individuals.

Of the three interventions included in this trial, acts of kindness to others is perhaps the most commonly studied. In general, evidence suggests that performing kind acts for others enhances well-being, at least in the short term (Curry et al., 2018), and feelings of social connection (Layous et al., 2012; O'Connell et al., 2016). However, prosocial interventions conducted among cancer survivors have yielded more mixed results, with some studies reporting null effects on well-being (Rini et al., 2014) and even *increases* in psychological distress (Lepore et al., 2014). Our findings suggest that engaging in other-focused kindness may enhance perceptions of social support among breast cancer survivors. Prosocial giving may promote positive appraisals of one's connections, enhance the quality of existing relationships (O'Connell et al., 2016), and increase one's social network (Layous et al., 2012). Notably, among those in the acts of kindness to others condition, increases in social support were primarily driven by increases in perceptions of *receiving* instrumental support, measured here as the availability of someone to assist when one is unwell, stranded, or unable to fulfill their responsibilities. It is likely that doing kind acts for others fosters a stronger sense of social connection, promoting feelings of interdependence or shared humanity (Fritz et al., 2020). These feelings may, in turn, alter perceptions regarding the amount of available support one has. Indeed, previous work with breast cancer survivors suggests that perceived social support depends, in part, on social network size (Bloom et al., 2001). Surprisingly, women in the kindness to others condition did not report increases in giving social support across the intervention, relative to controls. Although the social support measure used here – the 2-way SSS – allowed for interrogation of different domains of social support, a more comprehensive assessment of social connection (e.g., social network size, relationship satisfaction) is warranted.

Although self-care is emphasized as an important contributor to well-being in clinical care, this is the first study to experimentally manipulate acts of self-kindness among breast cancer survivors. We found no evidence that engaging in self-focused kind acts had beneficial (or harmful) effects in breast cancer survivors. This finding is consistent with a previous intervention study that found null effects (Nelson et al., 2016), and contrary to two others that found beneficial effects (O'Connell et al., 2016; Rowland & Curry, 2019), all conducted among healthy adults. Notably, the two studies reporting beneficial effects were conducted over the course of one week (O'Connell et al., 2016; Rowland & Curry, 2019),

suggesting that acts of self-kindness may offer benefits in the short term. Although caring for oneself is vital to health and well-being, engaging in self-focused kind acts is often challenging and may elicit negative emotions. Indeed, in follow-up interviews, participants reported feeling guilty taking time for themselves. Though an emphasis on prioritizing self-care has emerged in popular culture over the last decade, research on these practices remains scarce. Understanding what types of self-care work best – and for whom – is particularly important in populations with long-term healthcare needs, such as breast cancer survivors, who may find it difficult to prioritize their ongoing care and recovery while managing other care-taking responsibilities (Sulik, 2007).

Self-kindness meditation takes a different approach to cultivating kindness that does not involve performing explicit acts of kindness. Although few studies have examined the effectiveness of kindness-based meditative practices among breast cancer survivors, previous trials among healthy adults report enhancements in well-being and reductions in depressive symptoms (Galante et al., 2014). In addition, Boyle et al. (2017) previously reported increases in self-kindness following a mindfulness meditation intervention – which included loving-kindness meditation – among breast cancer survivors. Here, we found a paradoxical *decrease* in self-kindness among participants in the self-kindness meditation condition, relative to controls. Notably, women in the current study were instructed to send kind and loving thoughts primarily towards themselves, in contrast to traditional kindness-based meditations that focus on cultivating both self- and other-oriented kindness. Though this decision was intentional – as we were primarily interested in the efficacy of cultivating self-directed kindness – it is possible that both components, cultivating *self-* and *other-*oriented kindness, are necessary to produce beneficial effects. Further, an introduction to the theoretical foundations of mindfulness, group discussion, and access to an instructor – components commonly provided in kindness-based meditation interventions (Zeng et al., 2015) – were not provided and likely limited women's ability to contextualize, discuss, or process their experiences. Given that negative emotions related to one's self-concept, such as guilt, may arise during kindness-based meditative practices (Boellinghaus et al., 2013), this processing may be vital to mitigate adverse effects (e.g., declines in dispositional self-kindness).

Several limitations are worthy of note. A lack of a post-intervention follow-up assessment may have limited our ability to detect lasting effects of the intervention or delayed effects. Further, fine-grained analysis of the

types of kind acts performed and under what social context was beyond the scope of the current study. Acts reported in both the kindness to others and kindness to self conditions ranged from small in scale (e.g., made a cup of tea, let someone cut in line at the store) to more elaborate, indulgent, and/or costly (e.g., got a massage, bought and distributed \$10 gift cards to those in need). Targets of the kind acts also spanned a wide range of social relationships, from weak social ties (e.g., strangers, acquaintances) to strong ones (e.g., husband, good friend). Examining these characteristics may help to contextualize our findings and provide insight into the types of acts that elicit positive versus negative emotions (e.g., delight versus guilt after treating oneself). Although this trial lacked power to examine moderators of treatment effects, previous studies have reported moderated effects for both other-focused kindness (Mongrain et al., 2011; Rini et al., 2014; Tashjian et al., 2021) and mindfulness-based (Lengacher et al., 2016) interventions. Finally, the structure of the meditations provided and lack of didactic component may limit comparison with other kindness-based meditation interventions. The addition of a traditional loving-kindness or an *other*-focused kindness meditation group may elucidate reasons for the adverse effects observed here. Future research should carefully consider best practices for implementing online kindness-based meditations among breast cancer survivors.

Our findings suggest that engaging in acts of kindness for others, at least for some breast cancer survivors, enhances perceptions of social support. Notably, these effects were elicited through a short, online intervention that was both feasible to conduct and easy-to-disseminate, with the potential to be self-administered. Developing interventions that target positive psychological and social processes is vitally important to enhancing quality of life among breast cancer survivors, and our results underscore the importance of future research on both prosocial behavior and social connectedness among women with a history for breast cancer.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This project was supported by the University of California Intercampus Consortium on Health Psychology, University of California Office of the President grant MR-15-328794 (PIs: Lyubomirsky and Bower).

ORCID

Marcie D. Haydon  <http://orcid.org/0000-0001-5266-6945>
 Lisa C. Walsh  <http://orcid.org/0000-0002-9689-4824>
 Danny Rahal  <http://orcid.org/0000-0001-9302-4295>
 Sonja Lyubomirsky  <http://orcid.org/0000-0003-0727-5595>

Data availability statement

The data described in this article are openly available in the Open Science Framework at https://osf.io/cqvxt/?view_only=872a3fe01ba54c32950e7c8da4439b12

Open scholarship



This article has earned the Center for Open Science badge for Preregistered. The materials are openly accessible at https://osf.io/yc4eg/?view_only=866f73554bc64504be85ce9fee9f671b

References

- Alden, L. E., & Trew, J. L. (2013). If it makes you happy: Engaging in kind acts increases positive affect in socially anxious individuals. *Emotion, 13*(1), 64–75. <https://doi.org/10.1037/a0027761>
- Bloom, J. R., Stewart, S. L., Johnston, M., Banks, P., & Fobair, P. (2001). Sources of support and the physical and mental well-being of young women with breast cancer. *Social Science & Medicine, 53*(11), 1513–1524. [https://doi.org/10.1016/S0277-9536\(00\)00440-8](https://doi.org/10.1016/S0277-9536(00)00440-8)
- Boellinghaus, I., Jones, F. W., & Hutton, J. (2013). Cultivating self-care and compassion in psychological therapists in training: The experience of practicing loving-kindness meditation. *Training and Education in Professional Psychology, 7*(4), 267–277. <https://doi.org/10.1037/a0033092>
- Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health, 13*(1), 119. <https://doi.org/10.1186/1471-2458-13-119>
- Bower, J. E., Ganz, P. A., Desmond, K. A., Bernards, C., Rowland, J. H., Meyerowitz, B. E., & Belin, T. R. (2006). Fatigue in long-term breast carcinoma survivors: A longitudinal investigation. *Cancer, 106*(4), 751–758. <https://doi.org/10.1002/cncr.21671>
- Bower, J. E., Crosswell, A. D., Stanton, A. L., Crespi, C. M., Winston, D., Arevalo, J., Ma, J., Cole, S. W., & Ganz, P. A. (2015). Mindfulness meditation for younger breast cancer survivors: A randomized controlled trial. *Cancer, 121*(8), 1231–1240. <https://doi.org/10.1002/cncr.29194>
- Boyle, C. C., Stanton, A. L., Ganz, P. A., Crespi, C. M., & Bower, J. E. (2017). Improvements in emotion regulation following mindfulness meditation: Effects on depressive symptoms and perceived stress in younger breast cancer survivors. *Journal of Consulting and Clinical Psychology, 85*(4), 397–402. <https://doi.org/10.1037/ccp0000186>

- Boyle, C. C., Cole, S. W., Dutcher, J. M., Eisenberger, N. I., & Bower, J. E. (2019). Changes in eudaimonic well-being and the conserved transcriptional response to adversity in younger breast cancer survivors. *Psychoneuroendocrinology*, *103*(September 2018), 173–179. <https://doi.org/10.1016/j.psyneuen.2019.01.024>
- Buchanan, K. E., & Bardi, A. (2010). Acts of kindness and acts of novelty affect life satisfaction. *The Journal of Social Psychology*, *150*(3), 235–237. <https://doi.org/10.1080/00224540903365554>
- Chida, Y., & Steptoe, A. (2008). Positive psychological well-being and mortality: A quantitative review of prospective observational studies. *Psychosomatic Medicine*, *70*(7), 741–756. <https://doi.org/10.1097/PSY.0b013e31818105ba>
- Craske, M. G., Meuret, A. E., Ritz, T., Treanor, M., Dour, H., & Rosenfield, D. (2019). Positive affect treatment for depression and anxiety: A randomized clinical trial for a core feature of anhedonia. *Journal of Consulting and Clinical Psychology*, *87*(5), 457–471. <https://doi.org/10.1037/ccp0000396>
- Curry, O. S., Rowland, L. A., Van Lissa, C. J., Zlotowitz, S., McAlaney, J., & Whitehouse, H. (2018). Happy to help? A systematic review and meta-analysis of the effects of performing acts of kindness on the well-being of the actor. *Journal of Experimental Social Psychology*, *76*(May 2017), 320–329. <https://doi.org/10.1016/j.jesp.2018.02.014>
- Fancourt, D., & Steptoe, A. (2018). Cultural engagement predicts changes in cognitive function in older adults over a 10 year period: Findings from the English Longitudinal Study of Ageing. *Scientific Reports*, *8*(1), 10226. <https://doi.org/10.1038/s41598-018-28591-8>
- Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality and Social Psychology*, *95*(5), 1045–1062. <https://doi.org/10.1037/a0013262>
- Fritz, M., Margolis, S., Revord, J., Kellerman, G., Nieminen, L., Reece, A., & Lyubomirsky, S. (2020). Examining the social in the prosocial: Episode-level features of social interactions and kind acts predict social connection and well-being. Department of Psychology, University of California, Riverside, United States.
- Galante, J., Galante, I., Bekkers, M.-J., & Gallacher, J. (2014). Effect of kindness-based meditation on health and well-being: A systematic review and meta-analysis. *Journal of Consulting and Clinical Psychology*, *82*(6), 1101–1114. <https://doi.org/10.1037/a0037249>
- Gonzalez-Hernandez, E., Romero, R., Campos, D., Burychka, D., Diego-Pedro, R., Baños, R., & Cebolla, A. (2018). Cognitively-based compassion training (CBCT®) in breast cancer survivors: A randomized clinical trial study. *Integrative Cancer Therapies*, *17*(3), 684–696. <https://doi.org/10.1177/1534735418772095>
- Hann, D., Winter, K., & Jacobsen, P. (1999). Measurement of depressive symptoms in cancer patients. *Journal of Psychosomatic Research*, *46*(5), 437–443. [https://doi.org/10.1016/S0022-3999\(99\)00004-5](https://doi.org/10.1016/S0022-3999(99)00004-5)
- Hernandez, R., Bassett, S. M., Boughton, S. W., Schuette, S. A., Shiu, E. W., & Moskowitz, J. T. (2018). Psychological well-being and physical health: Associations, mechanisms, and future directions. *Emotion Review*, *10*(1), 18–29. <https://doi.org/10.1177/1754073917697824>
- Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science*, *6*(6), 537–559. <https://doi.org/10.1177/1745691611419671>
- Huffman, J. C., Mastromauro, C. A., Boehm, J. K., Seabrook, R., Fricchione, G. L., Denninger, J. W., & Lyubomirsky, S. (2011). Development of a positive psychology intervention for patients with acute cardiovascular disease. *Heart International*, *6*(2), 47–54. <https://doi.org/10.4081/hi.2011.e14>
- Kalter, J., Verdonck-de Leeuw, I. M., Sweegers, M. G., Aaronson, N. K., Jacobsen, P. B., Newton, R. U., Courneya, K. S., Aitken, J. F., Armes, J., Arving, C., Boersma, L. J., Braamse, A. M. J., Brandberg, Y., Chambers, S. K., Dekker, J., Ell, K., Ferguson, R. J., Gielissen, M. F. M., Glimelius, B., & Buffart, L. M. (2018). Effects and moderators of psychosocial interventions on quality of life, and emotional and social function in patients with cancer: An individual patient data meta-analysis of 22 RCTs. *Psycho-Oncology*, *27*(4), 1150–1161. <https://doi.org/10.1002/pon.4648>
- Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing. *Journal of Health and Social Behavior*, *43*(2), 207–222. <https://doi.org/10.2307/3090197>
- Lam, W. W. T., Shing, Y. T., Bonanno, G. A., Mancini, A. D., & Fielding, R. (2012). Distress trajectories at the first year diagnosis of breast cancer in relation to 6 years survivorship. *Psycho-Oncology*, *21*(1), 90–99. <https://doi.org/10.1002/pon.1876>
- Lamers, S. M. A., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. M. (2011). Evaluating the psychometric properties of the mental health Continuum-Short Form (MHC-SF). *Journal of Clinical Psychology*, *67*(1), 99–110. <https://doi.org/10.1002/jclp.20741>
- Layous, K., Nelson, S. K., Oberle, E., Schonert-Reichl, K. A., & Lyubomirsky, S. (2012). Kindness Counts: Prompting Prosocial Behavior in Preadolescents Boosts Peer Acceptance and Well-Being. *PLoS ONE*, *7*(12), e51380. <https://doi.org/10.1371/journal.pone.0051380>
- Lee, I.-M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., & Katzmarzyk, P. T. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *The Lancet*, *380*(9838), 219–229. [https://doi.org/10.1016/S0140-6736\(12\)61031-9](https://doi.org/10.1016/S0140-6736(12)61031-9)
- Lengacher, C. A., Reich, R. R., Paterson, C. L., Ramesar, S., Park, J. Y., Alinat, C., Johnson-Mallard, V., Moscoso, M., Budhrani-Shani, P., Miladinovic, B., Jacobsen, P. B., Cox, C. E., Goodman, M., & Kip, K. E. (2016). Examination of broad symptom improvement resulting from mindfulness-based stress reduction in breast cancer survivors: A randomized controlled trial. *Journal of Clinical Oncology*, *34*(24), 2827–2834. <https://doi.org/10.1200/JCO.2015.65.7874>
- Lepore, S. J., Buzaglo, J. S., Lieberman, M. A., Golant, M., Greener, J. R., & Davey, A. (2014). Comparing standard versus prosocial internet support groups for patients with breast cancer: A randomized controlled trial of the helper therapy principle. *Journal of Clinical Oncology*, *32*(36), 4081–4086. <https://doi.org/10.1200/JCO.2014.57.0093>
- Luyster, F. S., Strollo, P. J., Zee, P. C., & Walsh, J. K. (2012). Sleep: A health imperative. *Sleep*, *35*(6), 727–734. <https://doi.org/10.5665/sleep.1846>

- Matthews, H., Grunfeld, E. A., & Turner, A. (2017). The efficacy of interventions to improve psychosocial outcomes following surgical treatment for breast cancer: A systematic review and meta-analysis. *Psycho-Oncology*, 26(5), 593–607. <https://doi.org/10.1002/pon.4199>
- Mongrain, M., Chin, J. M., & Shapira, L. B. (2011). Practicing compassion increases happiness and self-esteem. *Journal of Happiness Studies*, 12(6), 963–981. <https://doi.org/10.1007/s10902-010-9239-1>
- Moreno, P. I., Dooley, L. N., & Bower, J. E. (2018). Unique associations of eudaimonic and hedonic wellbeing with psychosocial adjustment in breast cancer survivors. *Journal of Psychosocial Oncology*, 36(5), 649–657. <https://doi.org/10.1080/07347332.2018.1471564>
- Moskowitz, J. T., Carrico, A. W., Duncan, L. G., Cohn, M. A., Cheung, E. O., Batchelder, A., Martinez, L., Segawa, E., Acree, M., & Folkman, S. (2017). Randomized controlled trial of a positive affect intervention for people newly diagnosed with HIV. *Journal of Consulting and Clinical Psychology*, 85(5), 409–423. <https://doi.org/10.1037/ccp0000188>
- Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity*, 2(3), 223–250. <https://doi.org/10.1080/15298860309027>
- Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology*, 69(1), 28–44. <https://doi.org/10.1002/jclp.21923>
- Neff, K. D., & Dahm, K. A. (2015). Self-Compassion: What it is, what it does, and how it relates to mindfulness. In B. D. Ostafin, M. D. Robinson, & B. P. Meier (Eds.), *Handbook of Mindfulness and Self-Regulation* (pp. 121–137). Springer.
- Nelson, S. K., Layous, K., Cole, S. W., & Lyubomirsky, S. (2016). Do unto others or treat yourself? The effects of prosocial and self-focused behavior on psychological flourishing. *Emotion*, 16(6), 850–861. <https://doi.org/10.1037/emo0000178>
- Nelson-Coffey, S. K., Fritz, M. M., Lyubomirsky, S., & Cole, S. W. (2017). Kindness in the blood: A randomized controlled trial of the gene regulatory impact of prosocial behavior. *Psychoneuroendocrinology*, 81(2), 8–13. <https://doi.org/10.1016/j.psyneuen.2017.03.025>
- O’Connell, B. H., O’Shea, D., & Gallagher, S. (2016). Enhancing social relationships through positive psychology activities: A randomised controlled trial. *The Journal of Positive Psychology*, 11(2), 149–162. <https://doi.org/10.1080/17439760.2015.1037860>
- Otake, K., Shimai, S., Tanaka-Matsumi, J., Otsui, K., & Fredrickson, B. L. (2006). Happy people become happier through kindness: A counting kindnesses intervention. *Journal of Happiness Studies*, 7(3), 361–375. <https://doi.org/10.1007/s10902-005-3650-z>
- Otte, J. L., Carpenter, J. S., Russell, K. M., Bigatti, S., & Champion, V. L. (2010). Prevalence, severity, and correlates of sleep-wake disturbances in long-term breast cancer survivors. *Journal of Pain and Symptom Management*, 39(3), 535–547. doi:10.1016/j.jpainsymman.2009.07.004.
- Pace, T. W. W., Negi, L. T., Adame, D. D., Cole, S. P., Sivilli, T. I., Brown, T. D., Issa, M. J., & Raison, C. L. (2009). Effect of compassion meditation on neuroendocrine, innate immune and behavioral responses to psychosocial stress. *Psychoneuroendocrinology*, 34(1), 87–98. <https://doi.org/10.1016/j.psyneuen.2008.08.011>
- Peterson, J. C., Charlson, M. E., Hoffman, Z., Wells, M. T., Wong, S. C., Hollenberg, J. P., Jobe, J. B., Boschert, K. A., Isen, A. M., & Allegrante, J. P. (2012). A randomized controlled trial of positive-affect induction to promote physical activity after percutaneous coronary intervention. *Archives of Internal Medicine*, 172(4), 329–336. <https://doi.org/10.1001/archinternmed.2011.1311>
- Peuckmann, V., Ekholm, O., Rasmussen, N. K., Groenvold, M., Christiansen, P., Møller, S., Eriksen, J., & Sjøgren, P. (2009). Chronic pain and other sequelae in long-term breast cancer survivors: Nationwide survey in Denmark. *European Journal of Pain*, 13(5), 478–485. <https://doi.org/10.1016/j.ejpain.2008.05.015>
- Pinto, B. M., Stein, K., & Dunsiger, S. (2015). Peers promoting physical activity among breast cancer survivors: A randomized controlled trial. *Health Psychology*, 34(5), 463–472. <https://doi.org/10.1037/hea0000120>
- Radloff, L. S. (1977). The CES-D Scale: A self report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385–401. <https://doi.org/10.1177/014662167700100306>
- Rini, C., Austin, J., Wu, L. M., Winkel, G., Valdimarsdottir, H., Stanton, A. L., Isola, L., Rowley, S., & Redd, W. H. (2014). Harnessing benefits of helping others: A randomized controlled trial testing expressive helping to address survivorship problems after hematopoietic stem cell transplant. *Health Psychology*, 33(12), 1541–1551. <https://doi.org/10.1037/hea0000024>
- Rowland, L., & Curry, O. S. (2019). A range of kindness activities boost happiness. *The Journal of Social Psychology*, 159(3), 340–343. <https://doi.org/10.1080/00224545.2018.1469461>
- Sanjida, S., McPhail, S. M., Shaw, J., Couper, J., Kissane, D., Price, M. A., & Janda, M. (2018). Are psychological interventions effective on anxiety in cancer patients? A systematic review and meta-analyses. *Psycho-Oncology*, 27(9), 2063–2076. <https://doi.org/10.1002/pon.4794>
- Selya, A. S., Rose, J. S., Dierker, L. C., Hedeker, D., & Mermelstein, R. J. (2012). A practical guide to calculating Cohen’s f^2 , a measure of local effect size, from PROC MIXED. *Frontiers in Psychology*, 3(APR), 1–6. <https://doi.org/10.3389/fpsyg.2012.00111>
- Shakespeare-Finch, J., & Obst, P. L. (2011). The development of the 2-Way Social Support Scale: A measure of giving and receiving emotional and instrumental support. *Journal of Personality Assessment*, 93(5), 483–490. <https://doi.org/10.1080/00223891.2011.594124>
- Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, 65(5), 467–487. <https://doi.org/10.1002/jclp.20593>
- Stanton, A. L. (2006). Psychosocial Concerns and Interventions for Cancer Survivors. *Journal of Clinical Oncology*, 24(32), 5132–5137. <https://doi.org/10.1200/JCO.2006.06.8775>
- Sulik, G. A. (2007). The balancing act: Care work for the self and coping with breast cancer. *Gender & Society*, 21(6), 857–877. <https://doi.org/10.1177/0891243207309898>

- Tashjian, S. M., Rahal, D., Karan, M., Eisenberger, N., Galván, A., Cole, S. W., & Fuligni, A. J. (2021). Evidence from a randomized controlled trial that altruism moderates the effect of prosocial acts on adolescent well-being. *Journal of Youth and Adolescence*, *50*(1), 29–43. <https://doi.org/10.1007/s10964-020-01362-3>
- Wren, A. A., Shelby, R. A., Soo, M. S., Huysmans, Z., Jarosz, J. A., & Keefe, F. J. (2019). Preliminary efficacy of a lovingkindness meditation intervention for patients undergoing biopsy and breast cancer surgery: A randomized controlled pilot study. *Supportive Care in Cancer*, *27*(9), 3583–3592. <https://doi.org/10.1007/s00520-019-4657-z>
- Zeng, X., Chiu, C. P. K., Wang, R., Oei, T. P. S., & Leung, F. Y. K. (2015). The effect of loving-kindness meditation on positive emotions: A meta-analytic review. *Frontiers in Psychology*, *6*(NOV), 1–14. <https://doi.org/10.3389/fpsyg.2015.01693>