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### An initial examination of state and longitudinal effects of loving-kindness practice on affective and motivational states at work

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# An Initial Examination of State and Longitudinal Effects of Loving-Kindness Practice on Affective and Motivational States at Work

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## Abstract

**Objectives** Drawing on practices and concepts from Buddhist ethics, we developed a loving-kindness training. We investigated the state and longitudinal effects of this training on employees' affective and motivational states at work in two studies.

**Methods** Study 1 tested this training program in a randomized controlled trial, comparing the effects of loving-kindness practice on employee affect and motivation with an active (mindfulness) and a passive (waitlist) control condition. Analyses focused on both longitudinal effects (increases in affect and motivation over the training period) and state effects (effects of practice on daily affect and motivation). Study 2 conducted a 1-week study to further probe the state effects of loving-kindness and the effectiveness of formal vs. informal practice.

**Results** Results indicated mixed support for longitudinal effects, with individuals in the loving-kindness condition showing increases in work motivation, affective valence, and activation over time but the majority of these increases not being statistically different from trends in the two control conditions. Analysis of state (day-level) effects found consistent support for a beneficial effect of loving-kindness practice on daily affective valence and motivation. Analyses from study 2 replicated these day-level effects and provided evidence for the efficacy of both formal and informal practice-based training programs.

**Conclusions** This research provides initial support for the potential benefits of loving-kindness practice in a workplace context. We discuss theoretical and practical implications including the future of loving-kindness practice as a workplace training intervention.

**Keywords** Loving-kindness · Workplace flourishing · Core affect · Experience sampling method · Mindfulness · Motivation

People who adopt the virtuous principles of universal love, kindness, and care are typically held in high esteem by their peers and society more generally—but is loving-kindness a help or a hindrance in the competitive world of business? The western term “loving-kindness” is derived from Buddhist teachings on ethics and is translated from the Pali term *mēṭṭā* (Keown, 2016). Through practicing loving-kindness, individuals generate positive feelings of love and kindness towards themselves, loved ones, and even enemies (Feldman et al., 2010; Kang et al., 2015; Salzberg, 2011). In Buddhist teachings, individuals are encouraged to cultivate loving-kindness in order to develop virtuous moral principles and thus incorporate an attitude of loving-kindness into

their daily interactions with others, the self, and the natural world around them (Hanh, 2002). Importantly, the ethical principles espoused in Buddhism bear notable similarities with western philosophical teachings on ethics and morality, particularly the Socratic concept of virtue ethics, in which individuals aim to adopt moral and ethical virtues in their interactions with others, themselves, and the natural world (Hursthouse, 1999). However, a critical distinction is that in Buddhism, these virtuous principles are cultivated through formal practice, namely loving-kindness meditation.

Eastern contemplative traditions have long held that individuals can cultivate virtuous principles through loving-kindness meditation (Salzberg, 2011). This perspective has been increasingly ratified by psychological research. For example, research has found that loving-kindness meditation can reduce intergroup bias (Kang et al., 2014) and increase altruistic behavior towards others (Weng et al., 2013), punishment of moral transgressors (Weng et al., 2015), and empathic concern (Singer & Klimecki, 2014), all of which

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can be viewed as demonstrating strong virtuous principles. However, there is very limited research on loving-kindness practice as an organizational intervention and most of this research has used the workplace or employee participants as a research backdrop only without studying specific workplace variables. For example, Fredrickson et al. (2008, 2017) conducted loving-kindness interventions using employee samples and found they led to more positive emotion states in their life generally, though not specifically at work.

The consideration of loving-kindness practice in the workplace as a tool for cultivating a virtuous ethical stance has clear parallels with the voluminous research on the benefits of mindfulness at work (Reb et al., 2020; Reb & Atkins, 2015). Secular mindfulness and loving-kindness have similar roots in Buddhist teachings and both are mental states that are cultivated through contemplative practice. However, the two are critically different in terms of their intention (Salzberg, 2011). In contrast to loving-kindness, mindfulness practice cultivates a state of moment-to-moment awareness and acceptance of one's experience (Kabat-Zinn, 1994). Therefore, in the secular context, mindfulness as a practice is distinctly non-ethical (which does not mean that it cannot have downstream effects on ethical behavior, Ruedy & Schweitzer, 2010) and focuses more on how individuals relate to their own experiences as opposed to their attitude and conduct towards others (Thupten, 2019). Alternatively, loving-kindness practice is focused on cultivating virtue ethics (Salzberg, 2011). As such, it can be seen as a promising way to integrate the virtue component of contemplative traditions with organizational research and practice (Purser, 2019).

Loving-kindness practice could thus impact employees through two (beneficial) mechanisms. First, loving-kindness could affect employee affective states at work. Affect is a core psychological process (Barrett, 1998) and a key driver of downstream workplace outcomes such as job performance and job satisfaction (Cropanzano, 1998). Affect regulation is also an important variable in loving-kindness research and contemplative science more broadly (Hill & Updegraff, 2012; Zeng et al., 2015; for a discussion of its role in the workplace see Reb & Masters-Waage, 2020). The widely researched core affect model characterizes affective states on two continuous dimensions: valence and activation (see Barrett, 1998, 2006; Barrett & Russell, 1999). *Valence* refers to the pleasantness (positive or negative) of an affective state, and *activation* to the level of physiological activity or arousal. Past research has found that loving-kindness practice can increase positive valence (Fredrickson et al., 2008; Zeng et al., 2015), which is consistent with its historical role in Buddhism given that feelings of love, gratitude, and caring can all be viewed as positively valenced and are cultivated through loving-kindness meditation. However, less is known about the relationship between loving-kindness meditation and practitioners' activation states, although practice

in the lab has been linked with increased cardiovascular responses suggesting physiological systems are elevated by the practice (Cwir et al., 2011; Ong & Allaire, 2005).

Second, loving-kindness could affect employee motivational states at work. Work motivation is a key job attitude in the organizational literature and is an important antecedent to employee performance (Schaufeli et al., 2006; Van Knippenberg, 2000). Looking at contemplative practices more broadly, past research has reported mixed findings for work motivation. Specifically, research on mindfulness practice has found conflicting results, with some studies suggesting that mindfulness increases or has no effect on motivation (Allen et al., 2015) and others suggesting that mindfulness decreases motivation (Hafenbrack & Vohs, 2018). However, it should be noted that very few studies have examined effects on work motivation and thus there are not yet clear conclusions from this body of research. Also, the seemingly conflicting results could be due to the manner in which mindfulness is sometimes adapted in organizational settings, sometimes criticized for being devoid of its ethical components and unaffectionately termed "McMindfulness" (Hyland, 2015). In contrast, loving-kindness meditation is distinctly ethical in nature and thus is intended to actively promote positive action from individuals within their communities (Hanh, 2002; Keown, 2016). In other words, the active nature of loving-kindness practice—encouraging individuals to generate feelings of universal love and kindness towards others and self, along with bringing these feelings into daily interactions—could potentially increase individuals' motivation to take action at work, as they feel more positively about themselves (Kang et al., 2015) and more socially connected to others (Hutcherson et al., 2008). In sum, compared to other contemplative practices (e.g., mindfulness), loving-kindness may be better suited for facilitating workplace motivation.

Beyond the theoretical link between loving-kindness and affective and motivational states at work, there is also a practical question concerning how the potential benefits of loving-kindness manifest themselves (i.e., longitudinal vs. short-term effects) and how they are best elicited (i.e., formal vs. informal practices). Past research on contemplative practices in the workplace has focused on the longitudinal effects of training programs (Allen et al., 2015; Eby et al., 2019). However, there are equally important day-level (i.e., state) effects that researchers should consider, especially given that practitioners are unlikely to practice consistently every day. Further, training programs typically distinguish between formal practices (e.g., sitting meditation of breath awareness) and informal practices (e.g., eating or communicating mindfully). Unfortunately, limited research has been conducted on their differential effects (Birtwell et al., 2019) and the existing research has only examined mindfulness but not loving-kindness practice. This raises the interesting

question of whether any longitudinal and/or state effects of loving-kindness are attributable to (a) meditating on loving-kindness towards others and the self (formal practice) or (b) bringing an attitude of loving-kindness into daily interactions with colleagues and family members (informal practice). The general—if often implicit—assumption in the literature is that formal meditation practice is the primary driver of the effects. This is evidenced, for example, by the vast majority of laboratory studies employing formal practice inductions (Creswell, 2017), as well as the rise of online mindfulness apps that solely focus on formal practices (Mani et al., 2015). However, it is plausible and consistent with work on informal mindfulness practice (Birtwell et al., 2019), that practicing loving-kindness during employees' interactions with others is an important driver of the practice's salubrious effects.

To address the above questions, we examined the effects of loving-kindness practice on affective and motivational states, from both a longitudinal (i.e., trend over the training period) and a state (i.e., day-level effects) perspective, and considered both formal and informal practice. In study 1, a randomized field intervention study was conducted within a large Japanese e-commerce company, with participants randomly assigned to either a six-week loving-kindness training condition, an active (mindfulness) control, or a passive (waitlist) control condition. Analyses investigated the effects of practice using an experience sampling method (ESM), in which participants reported their affect and motivation using daily surveys over the six-week period of the training program. This allowed for the examination of changes over time (i.e., longitudinal effects), as well as day-level effects of formal and informal practice (i.e., state effects). Study 2 further probed the state effects in a one-week intervention study with students. Based on the reasoning discussed above, it is hypothesized that loving-kindness practice increases positive valence (Hypothesis 1), activation (Hypothesis 2), and motivational states (Hypothesis 3). Finally, exploratory analyses will investigate the relative effects of formal and informal practice.

## Study 1

### Method

#### Participants

Participants for this study were recruited from a major Japanese e-commerce company through an email sent by the company's mindfulness network to all employees in the company and several public announcements in the company headquarters in Tokyo. After registering interest, employees were sent information about the program and

invited to attend an information session. To sign up for the training, individuals had to complete a pre-survey in which demographic and work-related information was obtained. After completing the pre-survey, participants were randomly assigned to one of three conditions: loving-kindness practice, active (mindfulness) control, or passive (waitlist) control. In the waitlist control group, participants continued their work as usual with the only addition being the completion of the daily surveys.

A total of 150 employees completed the pre-survey and enrolled in the training program. All eligible participants were admitted to the program, however, for analyses we excluded individuals with prior experience with meditation ( $N = 15$ ) and those who did not complete at least one daily survey ( $N = 4$ ). This resulted in a final sample for analysis of 131 participants. This sample was 45% female ( $N = 58$ ), median age range of 30–34 years, and 50% Japanese ( $N = 63$ ) with the rest of the sample coming from a diverse number of countries. Due to the exclusions, there were slightly uneven group sizes in each condition and thus number of observations: loving-kindness ( $N = 38$ , observations = 454), mindfulness ( $N = 47$ ; observations = 570), and waitlist control ( $N = 46$ ; observations = 767). Overall, the sample of 131 participants completed a total of 1791 daily surveys (46% completion rate).

### Procedures

The loving-kindness and mindfulness practice interventions (see Table 1) were adapted specifically for this program from existing mindfulness-based interventions (MBIs) such as mindfulness-based stress reduction (MBSR, Kabat-Zinn, 2003). The adaptations were made with the purpose of this research in mind. Thus, the interventions (1) focused on personal practices only (removing other aspects of MBIs such as inquiry), (2) ensured that the loving-kindness and mindfulness practices were comparable on all dimensions (e.g., mode of instruction and length of practice), and (3) avoided potential confounds (e.g., by not including yoga or gratitude practices).

Participants were invited to attend weekly sessions that always followed the same structure: (1) they would watch a video-recorded lesson introducing and describing this week's practices, (2) complete this week's practice, and (3) be invited to ask the facilitator (who was experienced in both loving-kindness and mindfulness practice) any questions they had. Participants did not have to attend the weekly sessions and the materials (the lesson, practice instructions, and audio-guided practices) were made available online after each session. In between the weekly sessions, participants were asked to complete the assigned practices, and audio versions of these practices were provided in English and Japanese along with written transcripts.

**Table 1** Program structure for the mindfulness and loving-kindness training interventions

	Content	Formal practice	Informal practice
Week 1			
Mindfulness	Mindfulness of breathing	8 min	Noticing breathing at work
Loving-kindness	L.K. towards loved ones	8 min	Bringing L.K. when interacting with loved ones
Week 2			
Mindfulness	Mindfulness of breathing (counting)	10 min	Counting breathing at work
Loving-kindness	L.K. towards liked colleague	10 min	Bringing L.K. when interacting with liked colleagues
Week 3			
Mindfulness	Mindfulness of body	12 min	Noticing body at work
Loving-kindness	L.K. towards self	12 min	Bringing L.K. towards self
Week 4			
Mindfulness	Mindfulness of sounds	15 min	Noticing sounds at work
Loving-kindness	L.K. towards neutral colleague	15 min	Bringing L.K. when interacting with neutral colleagues
Week 5			
Mindfulness	Mindfulness of thoughts	18 min	Noticing thoughts at work
Loving-kindness	L.K. towards difficult colleague	18 min	Bringing L.K. when interacting with difficult colleagues
Week 6			
Mindfulness	No addition	18 min	No addition
Loving-kindness	No addition	18 min	No addition

*Note.* L.K., loving-kindness. The formal practice column indicates the length of the audio-guided formal practice that participants were asked to engage in at least 6 times per week

Each week, participants were introduced to new content (see Table 1). The content was described in the weekly videos, then applied through formal practice. For example, if the content was “loving-kindness for co-workers,” participants would learn about what it means to direct loving-kindness towards their co-workers (e.g., showing love and compassion outside of romantic love) after which, the practice would include a loving-kindness practice focused on their co-workers thereby encouraging participants to bring loving-kindness into their day-to-day interaction with their co-workers. Each week, participants were provided both a *formal* guided audio practice to be completed with eyes closed, and an *informal* practice in which participants incorporated loving-kindness (or mindfulness) into their workday (see Table 1). This allocation of both practices is common in established mindfulness programs (Kabat-Zinn, 2003).

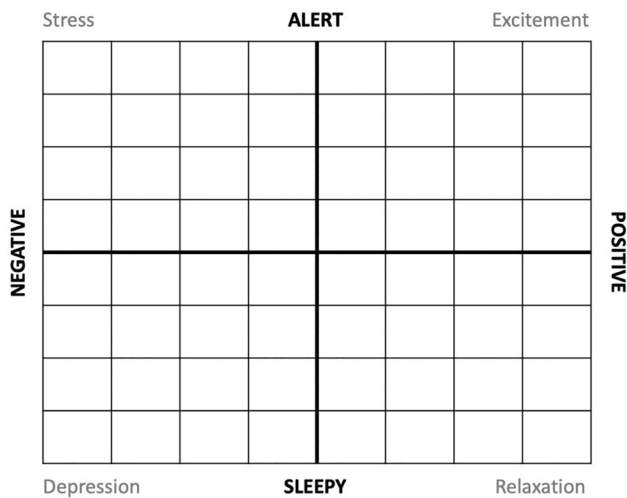
Participants in all conditions were asked to complete a short daily survey (~2 min) on each working day (Monday to Friday). This survey link was sent via email at 5pm, towards the formal end of the workday at the company. The surveys recorded whether employees completed their formal and informal practices and their affective and motivational states at work that day. A total of 30 surveys were sent out on working days over the 40-day period, which included 6 working weeks (Monday to Friday) and 5 weekends (Saturday and Sunday). Note we did not include the final weekend after participants completed the program and thus the last survey to participants was sent 40 days after the first survey.

## Measures

Given the length of the study and the relatively extensive time requirement of the practices, we decided to minimize the daily survey length. Thus, consistent with past research, we used single-item measures to increase response rates and reduce participant fatigue (Russell et al., 1989; Smith et al., 2017; Van Hooff et al., 2007; Verhagen et al., 2016)

**Affective Valence and Activation** In order to measure both core dimensions of affect simultaneously, we presented participants with an 8x8 affect grid (Russell et al., 1989), ranging from “Negative” to “Positive” on the *x*-axis (measuring valence) and “Alert” to “Sleepy” on the *y*-axis (measuring activation) (see Figure 1). Employees were asked to: “Select the square on the grid that most represents your overall emotional state at work today.” Responses were recorded as two distinct measures of activation (1–8) and valence (1–8), respectively.

**Motivation** Participants responded to the question “How motivated did you feel at work today?” on a 7-point Likert scale ranging from “Very Unmotivated” to “Very Motivated,” adapted from the single-item measure for work engagement developed by Kulikowski (2019). Past research has shown single-item measures to have sufficient predictive validity in workplace and clinical settings (Gogol et al., 2014; Kulikowski, 2019; Smith et al., 2017).



**Fig. 1** Affect grid used in daily surveys. *Note.* Participants could select one square based on how they felt at work “today”.

**Formal and Informal Practice** Each survey also recorded whether participants in the training condition had engaged in informal practice that day (yes = 1; no = 0) and the number of informal practices they engaged in (0 to 8+).

**Data Analyses**

Data were analyzed using generalized estimating equations (GEE) to account for clustering of daily survey responses nested within participants. Because daily observations within participants tended to be correlated from one day to the next, an autoregressive (AR1) structure was specified for the working correlation matrix (for a similar application in a longitudinal clinical trial, see Vens & Ziegler, 2012). We also attempted to fit multilevel models to the data but were unable to estimate random effects for the slopes in some models. GEE models adjust for clustering without modeling

random effects and allow for valid inferences regarding the population-average effect of predictors on the dependent variable (McNeish et al., 2017).

To examine changes in affective and motivational states over the six-week intervention period, we estimated growth curves. Consequently, time was coded as the number of days from the start of the intervention, ranging from 0 (first day) to 39.

**Results**

Descriptive statistics are presented in Table 2. This table also includes a correlation matrix for all study variables.

**Valence**

Analyses first regressed valence on time for the loving-kindness condition. As expected, the effect of time was significantly positive indicating that over the course of the loving-kindness training, positive valence increased ( $b = .027, SE = .010, p = .008$ ; see Figure 2 and Table 3). Next, analyses examined the effect of time in the other conditions and also found an increase over time in both the mindfulness ( $b = .019, SE = .009, p = .041$ ) and passive control conditions ( $b = .013, SE = .006, p = .036$ ; see Table 3). Thus, while the increase of positive valence in the loving-kindness condition is consistent with Hypothesis 1, a significant increase in the control conditions implies that seasonal or other factors cannot be ruled out as explanation.

To explore this further, analyses tested whether the growth curves differed between the loving-kindness and the control groups. Time, condition, and their interactions were entered into a single model. Groups did not differ at the start of the intervention. Moreover, the loving-kindness growth curve did not differ from either the mindfulness ( $b = -.008, SE = .014, p = .569$ ) or passive control condition ( $b = -.014, SE = .012, p = .256$ ). Therefore, while

**Table 2** Descriptive statistics and intercorrelations among study 1 variables

	Mean	SD <sub>bp</sub> /SD <sub>wp</sub>	1	2	3	4	5
1. Valence <sup>a</sup>	5.20	1.33/1.33	-	.11***	.55***	.04	.08*
2. Activation	5.09	1.20/1.46	.15	-	.34***	.07*	.06*
3. Motivation <sup>b</sup>	4.71	0.97/1.03	.69***	.40**	-	.08*	.12**
4. Formal practice <sup>c</sup>	0.79	0.78/0.33	.05	.12	.04	-	.12*
5. Informal practice <sup>c</sup>	4.08	2.53/0.87	.31	.08	.35**	.27*	-

*Note.*  $N = 131$  participants (1791 daily responses; all three conditions).  $SD_{bp}$  refers to the between-person standard deviation and  $SD_{wp}$  refers to the within-person standard deviation. Correlations below the diagonal are on average participant values, reflecting between-person results. Correlations above the diagonal are on person-centered variables, reflecting within-person results

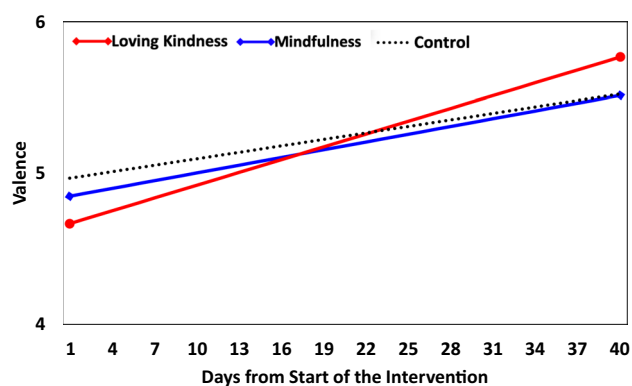
<sup>a</sup>Based on 1789 daily responses and 131 participants

<sup>b</sup>Based on 1789 daily responses and 129 participants

<sup>c</sup>Based on 1023 daily responses and 85 participants

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





**Fig. 2** Longitudinal trends for valence by condition, study 1. *Note.* This graph represents the longitudinal trends for the loving-kindness (red), mindfulness (blue), and passive control (dotted black) conditions. Note, between “4” and “5” on valence represents the mid-point of the valence scale (1–8).

loving-kindness did lead to a significant increase in positive valence over the training, this increase was indistinguishable from the comparison conditions.

Analyses next tested whether daily loving-kindness practice predicted daily affective valence. Because participants could engage in both formal and informal practice in the same day, both were entered as predictors. In addition, analyses controlled for participants’ mean level of formal and informal practice over the intervention period and the total number of daily surveys they completed in order to take into account potential individual differences in motivation to practice and/or complete the surveys. When regressing daily valence on both formal and informal practice, a significant positive effect of daily formal practice ( $b = .369$ ,  $SE = .142$ ,  $p = .010$ ), and a non-significant effect of informal practice was found (Table 4). These results provide qualified evidence in support of Hypothesis 1. Although participants in the mindfulness condition also engaged in formal and informal practices, effects were not significant at the .05

alpha level (Table 4). We also tested whether the effects of daily formal and informal practice differed between loving-kindness and mindfulness conditions. Type of intervention did not moderate the effects of practice on valence, activation, or motivation (all  $p$ ’s  $> .16$ ).

## Activation

Analyses first regressed activation on time for the loving-kindness condition. Consistent with Hypothesis 2, activation increased over time ( $b = .024$ ,  $SE = .011$ ,  $p = .023$ ; see Table 3 and Figure 3). Next, analyses examined the effect of time in the other conditions and found no effect over time in both the mindfulness and passive control condition (Table 3). As above, to probe this relationship further, analyses tested whether the growth curves differed between the loving-kindness and the control conditions. Results indicate that the growth curve for the loving-kindness training was significantly higher than for the mindfulness condition ( $b = -.031$ ,  $SE = .013$ ,  $p = .015$ ) but not the passive control condition ( $b = -.014$ ,  $SE = .013$ ,  $p = .269$ ). However, results also indicate that the loving-kindness group began the intervention with lower levels of arousal relative to the mindfulness ( $b = 1.26$ ,  $SE = .276$ ,  $p < .001$ ) and control groups ( $b = .682$ ,  $SE = .291$ ,  $p = .019$ ; see Figure 3). This pre-score variation is somewhat surprising given the random allocation of participants to conditions. Nevertheless, in these analyses it is important to note that the primary outcome variable is the gradient of the growth curves instead of their pre or post levels.

Analyses next tested whether daily loving-kindness practice predicted daily affective activation. As above, participants’ mean level of formal and informal practice over the intervention period and the total number of daily surveys they completed were entered as controls. When regressing daily activation on both formal and informal practice, no effect was found (Table 4).

**Table 3** Growth curves in valence, activation, and motivation over time by condition, study 1

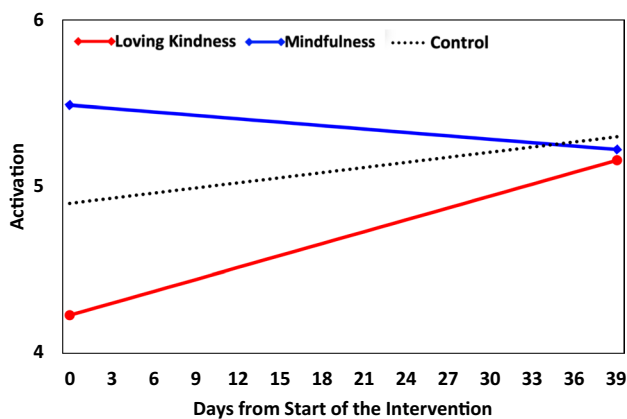
Effect	Loving-kindness			Mindfulness			Control		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Outcome: valence									
Intercept	4.698	.206	--	4.739	.280	--	4.987	.186	--
Day	.027	.010	.008	.019	.009	.041	.013	.006	.036
Outcome: activation									
Intercept	4.226	.218	--	5.490	.167	--	4.901	.194	--
Day	.024	.011	.023	-.007	.007	.328	.010	.007	.163
Outcome: motivation									
Intercept	4.197	.155	--	4.735	.179	--	4.609	.143	--
Day	.016	.006	.008	.007	.006	.217	.004	.005	.494

*Note.* Day of the intervention was coded from 0 (first day of study) to 39 (last day of assessment). Unstandardized beta coefficients are reported

**Table 4** Effects of daily loving-kindness and mindfulness practice on daily valence, activation, and motivation, study 1

Predictor	Loving-kindness			Mindfulness		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Outcome: valence						
Intercept	3.602	.788	--	4.178	.747	--
Time	0.028	.010	.007	0.016	.009	.073
Formal practice	0.369	.142	.010	0.158	.165	.338
Informal practice	0.098	.068	.148	0.163	.085	.056
Formal Avg	1.244	.857	.147	-1.326	.649	.041
Informal Avg	-0.161	.217	.460	0.358	.227	.115
Number of surveys	0.002	.021	.942	0.009	.023	.686
Outcome: activation						
Intercept	3.458	.606	--	5.494	.666	--
Time	0.018	.010	.077	-0.009	.007	.208
Formal practice	0.376	.296	.205	0.158	.226	.485
Informal practice	0.006	.098	.950	0.114	.077	.140
Formal Avg	0.707	.547	.196	-1.098	.654	.093
Informal Avg	-0.286	.187	.127	0.113	.169	.504
Number of surveys	0.044	.017	.012	0.009	.018	.605
Outcome: motivation						
Intercept	3.455	.626	--	4.279	.420	--
Time	0.018	.006	.002	0.001	.005	.831
Formal practice	0.416	.236	.078	0.009	.114	.936
Informal practice	0.153	.054	.005	0.109	.061	.076
Formal Avg	0.822	.544	.131	-1.073	.381	.005
Informal Avg	-0.215	.191	.260	0.253	.138	.067
Number of surveys	-0.005	.020	.817	0.026	.016	.102

*Note.* Formal practice (daily), whether a participant did formal practice (yes/no) on a particular day; formal practice (avg), proportion of days during the intervention on which a participant carried out a formal practice; informal practice (daily), number of informal practices performed on a particular day; informal practice (avg), average number of informal practices per day during the intervention. Unstandardized beta coefficients are reported

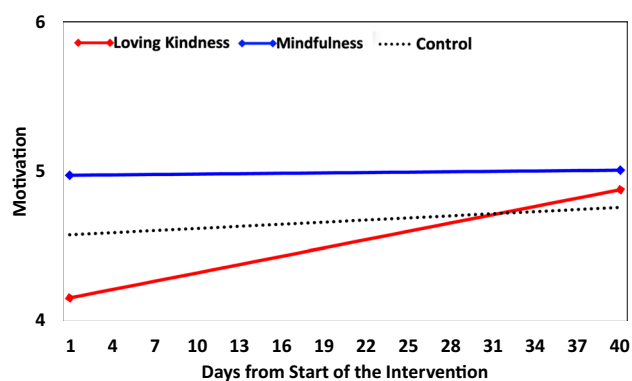


**Fig. 3** Longitudinal trends for activation by condition, study 1. *Note.* This graph represents the longitudinal trends for the loving-kindness (red), mindfulness (blue), and passive control (dotted black) conditions. Note, between “4” and “5” on activation represents the midpoint of the activation scale (1–8).

## Motivation

Finally, analyses regressed motivation on time for the loving-kindness condition. Consistent with Hypothesis 3, the effect of time was significantly positive, indicating that over the training, motivation increased ( $b = .016$ ,  $SE = .006$ ,  $p = .008$ ; see Table 3 and Figure 4). Next, analyses examined the effect of time in the other conditions and found no effect over time in both the mindfulness and passive control condition (Table 3). To probe this relationship further, analyses tested whether the growth curves differed between conditions. The loving-kindness condition reported lower levels of motivation at the start of the intervention than the mindfulness ( $b = .554$ ,  $SE = .238$ ,  $p = .020$ ) and passive control condition ( $b = .415$ ,  $SE = .211$ ,  $p = .049$ ; see Figure 4). However, the loving-kindness growth curve did not differ significantly from either the mindfulness ( $b = -.009$ ,  $SE = .008$ ,  $p = .294$ ) or control conditions ( $b = -.012$ ,  $SE = .008$ ,  $p = .127$ ). Therefore, while only loving-kindness practice led to a significant increase in motivation over the course of





**Fig. 4** Longitudinal trends for motivation by condition, study 1. *Note.* This graph represents the longitudinal trends for the loving-kindness (red), mindfulness (blue), and passive control (dotted black) conditions. Note, “4” on motivation represents the mid-point of the scale (“Neither Motivated not Unmotivated”); scale ranged from 1 to 7.

the training program, this increase was statistically indistinguishable from the control conditions.

Analyses then regressed daily motivation on both formal and informal practice. We found a significant effect of informal practice ( $b = .153, SE = .054, p = .005$ ) and the effect of daily formal practice on motivation was close to significance ( $b = .416, SE = .236, p = .078$ ) (Table 4).

### Minimum exposure to the intervention

The previous analyses included all participants, irrespective of their adherence to the intervention. To examine participants who completed at least a minimum dose of the intervention, we restricted the sample to those who reported a formal practice in at least three or more weeks. We reasoned that these participants were likely to have a greater breadth of exposure to the 6-week intervention. In total, 26 of 38 loving-kindness participants (68.4%) and 33 of 47 mindfulness participants (70.2%) met this criterion. For loving-kindness participants, the growth curve of valence remained positive but was just not significant ( $b = .020, SE = .010, p = .052$ ). Second, formal loving-kindness practice ( $b = .553, SE = .255, p = .030$ ) and informal mindfulness practice were associated with greater motivation ( $b = .121, SE = .061, p = .046$ ). All other previously reported results were unchanged.

### Qualitative results

As part of the study, we also asked participants for their feedback after the study. We briefly summarize the qualitative responses from participants ( $N = 21$ ; others did not give responses) in the loving-kindness condition. When asked about training benefits, 24 benefits were mentioned (more than 1 mention possible per participant): 11 reported they experienced greater positive emotions

and thoughts (e.g., gratitude, appreciation, caring), 4 reported improved emotional awareness and regulation, 4 greater general awareness and attention, 3 being able to slow down and relax, and 2 more positive interactions with others; only 2 explicitly indicated not receiving any benefits. When asked about challenges and suggestions for improvement, 7 participants reported difficulty finding time to practice and 7 found the later, longer practices too long; 4 felt the practices had too little variation / were bored, 4 Japanese participants would have liked all materials (including the surveys) in Japanese; 2 generally found it challenging to concentrate on the practice and 1 fell asleep while practicing; 2 were unclear about the purpose of the training and 1 suggested more dialogue sessions in addition to the practice; 2 participants reported sometimes experiencing strong negative emotions such as sadness. Overall, these qualitative findings provide some insights into the benefits and challenges participants experienced and the frequent mentioning of positive emotions is consistent with the quantitative findings.

### Discussion

The results of study 1 provide mixed support for the hypotheses. In the loving-kindness condition, participants showed increased valence, activation, and motivation over the course of the six-week intervention. However, while this is consistent with the hypotheses, these increases were largely statistically indistinguishable from changes in the two control conditions, despite all differences being in directions consistent with the hypotheses. Thus, the findings should not be taken as full support for the hypotheses. This highlights the importance of the methodological rigor in field experiments. Notably, if analyses had applied single-group pre-post comparisons, as is common in the mindfulness literature (Creswell, 2017; Kay et al., 2019), there would have been full support for the hypotheses. Instead, by employing an experimental approach, the results provide tempered but hopefully more empirically sound evidence. Explanations for finding mixed support for these hypotheses and future directions are highlighted in the discussion.

The analyses of daily practice provide more consistent support for the hypotheses. First of all, results found effects of daily loving-kindness practice on valence and motivation. These findings suggest potential benefits of loving-kindness in the workplace. However, a limitation of the study was that participants engaged in both formal and informal practices, thus limiting the ability to attribute the observed benefits to each practice specifically. Therefore, to test the robustness of our results (including the lack of an effect on activation) and explore in more depth the roles of formal versus informal practice, we conducted study 2.

## Study 2

### Method

#### Participants

A total of 71 students at a major South-East Asian business school were recruited for this study. The sample included 38 female participants (26 male; 7 did not answer), with a median age of 21.67 years ( $SD = 1.72$ ). Participants were recruited through the subject pool system and offered course credit in return for participation. After registering, participants were invited to attend an information session. In order to sign up for the study individuals had to complete a pre-survey in which demographic information was obtained. After completing the pre-survey, participants were randomly assigned to one of the two study conditions. Due to no shows to the information session, there were slightly uneven group sizes in each condition and thus number of observations: loving-kindness-formal ( $N = 37$ ; observations = 223; 86% completion rate) and loving-kindness-informal ( $N = 34$ ; observations = 196; 82% completion rate).

#### Procedures

Participants were randomly assigned to one of two conditions, (i) loving-kindness formal practice or (ii) loving-kindness informal practice. This design allowed for an examination of the distinct roles of formal and informal practice in the loving-kindness training. The study ran over a one-week period with individuals receiving an introduction to the practices in an information session. This information session provided individuals with a description of the practice and a chance to practice along with an instructor and ask any questions. After the information session, participants were asked to complete these practices over the next seven days. A link to the practice was sent at 8am each day. In the formal condition this was an audio file, in the informal condition it was a reminder sheet about how to conduct informal practice (the same practices on all seven days). Participants were sent a survey link via email at 5pm with the measures.

#### Measures

Participants in both conditions were asked to complete a short daily survey (~2 min) on each day (i.e., Monday to Sunday). The surveys recorded whether participants completed their practices and their affective and motivational states that day. All measures were the same as in study 1. However, the items were adapted to refer to “university”

instead of “work.” For example, participants rated their “overall emotional state at university today.”

#### Data Analyses

In study 2, participants were randomly assigned to either formal or informal practices. Although we compared overall outcomes in these two groups, individuals within groups could also vary in terms of how often they practiced formally or informally. Therefore, we also examined the effects of practice separately within each condition. For example, for participants assigned to the *formal* loving-kindness group, we predicted daily outcomes based on whether or not they engaged in *formal* practices on a particular day. We then conducted a similar analysis for the frequency of practice in the informal loving-kindness condition. As in study 1, we controlled for average level of practice and number of surveys completed by each respondent.

### Results

Descriptive statistics and correlations are presented in Table 5.

#### Valence

Analyses examined the effects of loving-kindness practice on affective valence for both the formal and informal practice conditions (see Table 6). Contrary to study 1, formal practice was not a significant predictor of daily affective valence, although the results were in the expected direction ( $b = .380$ ,  $SE = .30$ ,  $p = .212$ ). However, practice in the informal condition was a significant predictor of daily affective valence ( $b = .604$ ,  $SE = .15$ ,  $p < .001$ ). While these results are different from study 1 in that in study 2 it was informal (and not formal) practice that was associated with increases in valence, they nonetheless provide consistent

**Table 5** Descriptive statistics and intercorrelations among study 2 variables

	Mean	$SD_{bp}/SD_{wp}$	1	2	3
1. Valence	4.83	1.27/1.26	-	.12*	.44***
2. Activation	4.95	1.15/1.29	.22	-	.38***
3. Motivation	4.47	0.92/1.16	.54***	.25*	-

*Note.*  $N = 71$  participants,  $\bar{n} = 419$  responses.  $SD_{bp}$  refers to the between-person standard deviation and  $SD_{wp}$  refers to the within-person standard deviation. Correlations *below* the diagonal are on average participant values, reflecting between-person results. Correlations *above* the diagonal are on person-centered variables, reflecting within-person results

\*  $p < .05$ ; \*\*\*  $p < .001$

**Table 6** Effects of daily loving-kindness practice on daily valence, activation, and motivation, study 2

Predictor	Formal practice			Informal practice		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Outcome: valence						
Intercept	1.046	1.084	--	4.371	.641	--
Day	-.038	.053	.471	.011	.070	.870
Practice (daily)	.380	.304	.212	.604	.153	.000
Practice (Avg)	.726	.652	.266	-.629	.290	.030
Number of surveys	.532	.170	.002	.072	.155	.641
Outcome: activation						
Intercept	5.193	1.200	--	3.597	.717	--
Day	.025	.048	.600	.051	.059	.387
Practice (daily)	.729	.373	.051	.006	.168	.970
Practice (Avg)	-.268	.761	.725	-.101	.289	.726
Number of surveys	-.073	.168	.664	.236	.141	.095
Outcome: motivation						
Intercept	2.086	1.012	--	3.359	.692	--
Day	.098	.040	.014	.077	.066	.241
Practice (daily)	.775	.290	.007	.206	.112	.067
Practice (Avg)	.110	.521	.832	-.100	.251	.691
Number of surveys	.247	.137	.072	.098	.141	.487

*Note.* Day was coded from 0 (first day of study) to 6 (last day of study). Practice (daily) represents whether (formal practice) or how often (informal practice) participants practiced loving-kindness on a particular day. Practice (Avg) represents participants' average level of practice across the 7-day intervention. Unstandardized beta coefficients are reported

support of an overall effect of loving-kindness practice on affective valence.

### Activation

Next, analyses examined the effects of loving-kindness practice on activation for both the formal and informal practice conditions (see Table 6). Consistent with study 1, neither formal practice ( $b = .729$ ,  $SE = .37$ ,  $p = .051$ ) nor informal practice ( $b = .006$ ,  $SE = .17$ ,  $p = .970$ ) was significantly related to activation. While the effect of formal practice was close to significant, given that no effect was found in study 1, we approach this result with caution.

### Motivation

Finally, analyses examined the effect of loving-kindness practice on motivation (see Table 6). Formal loving-kindness was associated with greater motivation ( $b = .775$ ,  $SE = .290$ ,  $p = .007$ ) and informal practice was non-significantly associated with greater motivation, but the relation was close to significance ( $b = .206$ ,  $SE = .112$ ,  $p = .067$ ). Recall that in study 1 there was a significant effect of informal practice and the effect of formal practice was close to significant, whereas in study 2, this pattern was reversed. Although caution is necessary when drawing conclusions from "close to significant" effects, these results are noteworthy given their

similarity across the different demographics and cultural background of respondents as well as the research design employed in both studies.

### Formal vs. informal practice

We compared the overall effects of formal and informal practice by entering a dummy variable (0 = formal practice group, 1 = informal practice group) as a predictor of affect and motivation in a series of GEE models. All models controlled for the number of surveys each participant completed and the day of the study (0 to 6). Valence, activation, and motivation did not differ between the formal practice and informal practice groups (all  $p$ 's  $\geq .374$ ).

### Discussion

The results of study 2 provide further support for the benefits of loving-kindness practice. First, consistent with study 1, daily loving-kindness practice was positively related to both valence and motivation at work, but not activation. The replication of these findings across two heterogeneous samples and settings suggests some robustness of the results. Second, these positive effects appear to be due at least in some part to both formal and informal practice. Third, consistent with study 1, this study demonstrates the strongest link between daily loving-kindness practice and motivation, with both

**Table 7** Summary overview of results (*p*-values) from studies 1 and 2

	Study 1			Study 2		
	Valence	Activation	Motivation	Valence	Activation	Motivation
Longitudinal effects						
Positive growth curve LK	.008	.023	.008	--	--	--
Positive growth curve C	.036	.163	.494	--	--	--
Positive growth curve M	.041	.328	.217	--	--	--
State effects						
Daily practice (formal)	.010	.205	.078	.212	.051	.007
Daily practice (informal)	.148	.950	.005	.001	.970	.067

*Note.* LK, loving-kindness; C, passive control; M, mindfulness. *p*-values are reported for each significance test. No growth curve analyses conducted in study 2

formal and informal practice being related to increases in motivation across both studies (for a summary of results across both studies, see Table 7).

## General Discussion

Results from two field interventions provided evidence from both longitudinal trends and daily practice effects. Consistent with the hypotheses, loving-kindness training led to a longitudinal increase in valence, activation, and motivation over the course of the training. However, these effects were statistically indistinguishable from the effects in the two control conditions, tempering the strength of this evidence and suggesting potential methodological limitations related to statistical power and between-group differences. Nevertheless, it is worth noting that there was certainly no evidence that loving-kindness was a “hindrance” to employees and that, while mostly not significant, the interaction patterns between the loving-kindness and the control conditions were all in a consistent direction and only the loving-kindness group showed significantly positive growth curves for both activation and motivation. Further, within-person analyses of the daily practice effects provided greater support for loving-kindness being of “help” to employees. Replicated results across two studies found that on days in which individuals practiced loving-kindness they also experienced greater work motivation and positive valence (but not activation). These encouraging findings are mirrored by the qualitative responses from participants in the loving-kindness training condition (see study 1 “Results” section). Combining these lines of evidence to answer the motivating question: there was no evidence that loving-kindness is a hindrance in the workplace in terms of motivational and affective states. Instead, considerable (although by no means conclusive) support was found for the salubrious effects of loving-kindness in the workplace. In sum, this paper provides initial evidence for the potential benefits of loving-kindness at work.

Despite these findings, it is important to note that loving-kindness research, especially at the workplace, is at

a nascent stage of development (Jazaieri & Rock, 2021; Reizer, 2019). Thus, this discussion highlights contributions along with important future directions. By investigating loving-kindness as a secular workplace practice, this paper advances contemplative research in organizations. Previously this field had focused primarily on mindfulness (Good et al., 2016; Reb & Atkins, 2015), with research even somewhat erroneously equating practices of loving-kindness and mindfulness under the umbrella term of mindfulness (for a critique see Van Dam et al., 2018). However, loving-kindness is inherently an ethical practice, whereas mindfulness is considered a non-ethical practice (Thupten, 2019). Therefore, by focusing on loving-kindness, this paper helps reintroduce the ethical component of contemplative practice and specifically Buddhist ethics in the organizational literature (Hyland, 2015), opening the door to further exploration of loving-kindness in the interpersonal domain where this practice could be even more influential, for example, shaping leader-follower and team relationships.

This research also advances theory on the effects of contemplative practices on workplace motivational states. Whereas previous research has found mindfulness did not impact (see Allen et al., 2015) or even decreased motivation (Hafenbrack & Vohs, 2018), we found that loving-kindness led to an increase in work motivation. Therefore, this research suggests the possibility—to be confirmed in future research—that loving-kindness practice might be more impactful for increasing motivation than mindfulness practice.

An additional contribution of this paper is in understanding the daily level effects of formal and informal practice. Previously, the contemplative science literature has stayed relatively quiet on the role of these two forms of practice (cf. Birtwell et al., 2019; Hindman et al., 2015). However, evident from experimental and applied work, the primary focus has been on formal practice (Creswell, 2017; Mani et al., 2015). On the basis of the present findings, it is not possible to conclude that formal practice is more effective. Instead, the preliminary conclusion most consistent with the evidence is that both formal practice and informal practice are

helpful. Further, the replication of these findings across two heterogeneous samples and settings suggests some generalizability of these results. Thus, these findings challenge the existing emphasis on formal practice. In addition, the qualitative reports suggested that “finding time to practice” and “completing longer formal practices” were two of the most common challenges in the program for employees. Thus, there is a practical case for the use of informal practice, which is less time-consuming and easier to integrate with a busy schedule. Considering that many organizations offer contemplative trainings, the results of this study emphasize the value of using not only formal, but also informal practice in these programs.

### Limitations and Future Directions

The present findings need to be viewed in light of the limitations of this research. This paper adopted an experimental approach of manipulating one aspect, while keeping everything else equal. Therefore, the training intervention only included the actual practices of loving-kindness and no other aspects common in mindfulness training programs (e.g., MBSR) such as inquiry or group discussion. While this stripped-down, analytical approach provides greater confidence that the observed effects are the sole results of the practices, they also likely reduced participant engagement and support (evident from the somewhat low response rates and the qualitative responses from participants about the practices having “too little variation” and the training not having enough “dialogue with other practitioners”).

These factors, along with baseline differences between the conditions, may have contributed to the lack of evidence for significant differences between the loving-kindness and the control conditions. Nevertheless, it is worth noting that had this paper employed a pre-post design—as is common in research on mindfulness (Allen et al., 2015; Creswell, 2017)—results would have provided significant support for the benefit of loving-kindness with significantly increasing growth curves across all study variables. Therefore, while the study’s results are not conclusive on the longitudinal benefits of loving-kindness, they encourage future research to develop and validate a rigorous and more complex workplace loving-kindness training. Further, the qualitative challenges listed above by participants provide starting points for future researchers.

There are also limitations in the methodological approach of this paper that could be addressed in future research. First, the measurement point used in this study always occurred at the end of the workday, whereas the practices were completed during the workday at an unspecified point. This created a source of random error in the time lag between daily practice and measurement. Future research could address this by controlling for this

variability in their model or by defining a specific practice time for participants. Second, the inclusion of an informal practice condition in study 2 also raises concerns about the ability of novice meditators to engage in a purely self-guided practice. While it is promising that this condition still showed benefits from the practice on affective valence, it would again reduce the random error in participants’ experience of the practice if more instructions were provided for the informal practice. Hopefully, the positive effects of informal practice in this paper can encourage scholars to develop such instructions. Finally, we only examined the effect of practice on individuals and not the organization as a whole. It would be intriguing to find that communal loving-kindness practice within an organization leads to changes in company culture or climate; we encourage future multilevel research in this direction.

While we uncovered several noteworthy effects of loving-kindness practice on affective and motivational states at work, this research only stands at the very beginning of the systematic study of the role of loving-kindness in the workplace, hopefully encouraging future research. For example, it would be important to learn about which individual and situational factors moderate the extent to which employees are attracted to, and benefit from, workplace loving-kindness trainings. Also, it would be important for future research to examine additional outcomes beyond affect and motivation, with more interpersonal and ethics outcomes being closely linked with loving-kindness and thus a logical next step, along with objective measures of performance that could be impacted by loving-kindness.

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**Author Contribution** TCMW: designed and executed the studies, assisted with the data analyses, and wrote the manuscript. JR: designed and executed the studies and wrote the manuscript. WT: analyzed the data, wrote part of the results, and helped with editing of the manuscript. UB: designed and executed the study and helped with editing of the manuscript.

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**Data Availability** All data are available at the Open Science Framework (<https://osf.io/cm7w/>).

### Declarations

**Ethics Statement** All materials for this study were approved by Singapore Management University’s Institutional Review Board.

**Informed Consent Statement** This research involves only human participants, all of whom provided informed consent before the study.



**Conflict of Interest** This study was supported by a research grant from Rakuten Inc. which was also the organization where study 1 was conducted. One member of the authorship team (Udana Bandara) is employed by Rakuten Inc. but was not involved in decisions regarding data analysis and interpretation of the results (see “Author Contribution” statement). Therefore, the authorship team declares no conflict of interest for this research.

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