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Special Issue Paper

A mindfulness intervention promoting work–life balance: How segmentation preference affects changes in detachment, well-being, and work–life balance

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This study evaluates a three-week online self-training intervention teaching mindfulness as a cognitive–emotional segmentation strategy. Daily effects on psychological detachment, affective well-being, psychological and strain-based work–family conflict, and satisfaction with work–life balance were assessed, with a particular focus on whether segmentation preferences moderate training responsiveness. A randomized wait-list control group design was used for administering daily questionnaires to 190 participants. Psychological detachment, affective well-being, and work–life interface measures were assessed daily. As expected, growth curve analyses revealed positive effects on psychological detachment, psychological work–family conflict, and work–life balance satisfaction. No effects were found for strain-based work–family conflict. Additionally, segmentation preferences moderated the intervention effect on psychological detachment, such that participants with low segmentation preference reported stronger intervention effects. Unexpectedly, affective well-being increased in both groups.

Practitioner points

- Practicing mindfulness as a cognitive–emotional segmentation strategy enables detachment from work.
- Mindfulness training reduces psychological work–life conflict and enhances work–life balance satisfaction, irrespective of preferences for segmentation or integration.
- Mindfulness training increases detachment from work most successfully for integrators.
- Organizational practices and policies are advised to include brief mindfulness interventions in work–life balance programmes.

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For years, scientists and practitioners have shown that employees must balance between work and home demands. Now that information and communications technology allow employees to choose their working schedules and locations, flexible working designs increasingly blur the work–home boundaries, making it difficult for employees to switch off from work. As flexible working designs have ambiguous impacts on employees (Demerouti, Derks, ten Brummelhuis, & Bakker, 2014), employees must find new ways to balance life domains, through segmentation or integration (Ashforth, Kreiner, & Fugate, 2000; Kreiner, Hollensbe, & Sheep, 2009).

However, tactics that focus on spatial, temporal, or behavioural strategies for separating life domains (Kreiner et al., 2009) may be insufficient for creating boundaries, for integrating work and private domains, or for mental distancing from work-related thoughts and emotions. Mindfulness-based interventions (MBI), which cultivate mindfulness practice to enhance state mindfulness (Jamieson & Tuckey, 2017), have been shown to help workers detach, to cognitively and emotionally separate life domains, and to thus improve work–life balance (Hülshager et al., 2014; Michel, Bosch, & Rexroth, 2014). We tested an online self-training MBI developed by Michel et al. (2014) to help workers better achieve work–life balance and improve well-being. The MBI teaches mindfulness as a cognitive–emotional segmentation strategy for detaching from work. We build on research showing that the MBI is effective for encouraging work–life balance (Michel et al., 2014) and improve well-being (Rexroth, Michel, & Bosch, 2017). However, we extend that research by investigating how intervention effects unfold over time and whether segmentation preferences moderate the effects.

First, we combine a randomized controlled design with daily measurements to study how variables change throughout the intervention, as was done in previous studies comparing changes in recovery and well-being variables (Hülshager, Alberts, Feinholdt, & Lang, 2013; Hülshager, Feinholdt, & Nübold, 2015; Smit & Barber, 2016). This design has a major advantage over pre- and post-intervention measurement designs in indicating how outcome variables change over time.

Second, rather than focus only on the effectiveness of the MBI, we investigate whether different segmentation preferences will alter the trajectories of changes. The positive-activity model proposes that individual features should influence how extensively positive activities improve well-being (Lyubomirsky & Layous, 2013). By studying segmentation preference as a moderator, we extend previous research on individual moderators for MBI effectiveness (Hülshager et al., 2015).

Our study makes several contributions to the literature. We extend research on the use of mindfulness as a cognitive–emotional boundary management strategy, the effectiveness of MBIs over time, and boundary conditions. Our daily measurement design answers calls for analysing how and why MBIs work (Good et al., 2016) by showing how outcomes change over time, when changes occur, and which training aspects are most beneficial.

To integrate the positive-activity model with boundary frameworks (Lyubomirsky & Layous, 2013), we test whether segmentation preferences determine the effectiveness of cognitive–emotional boundary management interventions. By deepening understanding about segmentation preferences as moderators, we contribute to boundary theory (Kreiner, 2006) and answer calls for intervention-based research that reveals who benefits most from mindfulness training (Allen et al., 2015; Eby et al., 2019; Michel et al., 2014).

Last, our controlled intervention design with daily measurements answers calls for more rigorous designs and high-quality randomized controlled trials in work-specific health interventions (O’Shea, O’Connell, & Gallagher, 2016) and MBI research (Good et al., 2016; Lomas, Medina, Ivztan, Rupperecht, & Eiroa-Orosa, 2019; Lomas et al., 2017).

By designing an evidence-based MBI, we fulfil calls for better resource-oriented intervention designs (Briner & Walshe, 2015; Michel, O'Shea, & Hoppe, 2015). Moreover, by investigating work–life balance and well-being indicators for mindfulness as a boundary management strategy, we answer calls to focus on positive non-clinical outcomes when studying MBIs created for the workplace (Lomas et al., 2017, 2019).

Boundary theory and boundary management skills

Boundary theory (Ashforth et al., 2000) explains that individuals create and maintain boundaries separating life domains, such as work and home. However, some individuals may prefer *segmentation* in which life domains are highly differentiated, while others favour *integration*, in which domains overlap. Boundary theory's person–environment fit perspective (Kreiner et al., 2009) explains that incongruence between segmentation preference and possibilities to segment or integrate leads to conflicts between life domains. Individuals then use behavioural, temporal, physical, or communicative strategies to manage boundaries (Kreiner et al., 2009), which can be malleable (Rexroth, Feldmann, Peters, & Sonntag, 2016). However, cognitive–emotional boundary work might be necessary to detach mentally from work (Michel et al., 2014; Rexroth et al., 2017).

Mindfulness and mindfulness-based interventions

The two-component model of mindfulness (Bishop et al., 2004) explains that mindfulness requires (1) self-regulation of attention, awareness, and presence in moment-to-moment observations of immediate thoughts, feelings, and sensations and (2) curiosity, openness, and acceptance of momentary experiences without elaboration or rumination about thoughts, feelings, and sensations. Mindfulness practice enhances state mindfulness, that is, the extent to which individuals regulate their attention as described, and subsequently increases trait mindfulness (Bishop et al., 2004; Jamieson & Tuckey, 2017). Positive psychology interventions are 'treatment methods or intentional activities that aim to cultivate positive feelings, behaviours, or cognitions' (Sin & Lyubomirsky, 2009, p. 468). MBIs align with those principles by cultivating mindfulness practice (Jamieson & Tuckey, 2017) to improve mental and physical health, enhance cognition and affect (Creswell, 2017), and ensure positive well-being, relationships, and work performance (Good et al., 2016). Several meta-analyses (Bartlett et al., 2019; Lomas et al., 2019; Virgili, 2015) and reviews (Allen et al., 2015; Eby et al., 2019; Lomas et al., 2017) have shown that MBIs specifically designed for workplaces reduce employee stress and improve well-being and mental health, which accounts for growing interest in MBIs for workers (Eby et al., 2019).

Mindfulness as a cognitive–emotional segmentation strategy

Mindfulness practice is used to show employees how to set cognitive–emotional boundaries (Michel et al., 2014; Rexroth et al., 2017), first by bringing their awareness back to the present when their attention turns to work-related worries (Bishop et al., 2004), for example by using breathing techniques to stay anchored in the moment. Second, they learn to notice when they begin elaborating on work events and then to disengage from work-related thoughts (Bishop et al., 2004). Indeed, mindfulness a cognitive–emotional segmentation strategy has been shown to increase detachment and satisfaction with work–life balance, and reduce work–family conflict (WFC) (Michel et al., 2014). Our MBI was designed to encourage detachment, reduce WFC, increase

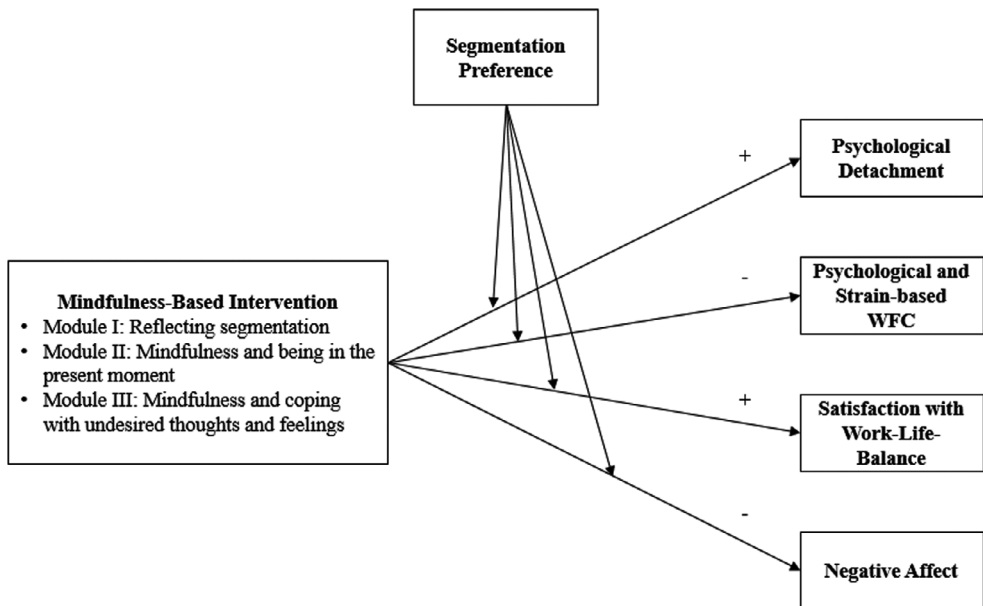


Figure 1. Hypothesized model of intervention effects.

satisfaction with work–life balance, and enhance affective well-being, with segmentation preference as a moderator (Figure 1).

Intervention effects on psychological detachment

MBI participation is expected to increase psychological detachment, that is, the ‘sense of being away from the work situation’ (Etzion, Eden, & Lapidot, 1998, p. 579). Mental disengagement goes beyond physical absence and is essential for recovery from work and stressors (Sonnetag & Fritz, 2007). State mindfulness can attenuate the impact of job stressors on psychological detachment (Sonnetag & Fritz, 2015).

Being present is the first component of the two-component model of mindfulness (Bishop et al., 2004). That is, when employees focus on the present after work, they can avoid thinking about past or future-related work issues. The second component is noticing but not ruminating about thoughts and feelings (Bishop et al., 2004). Mindfulness practitioners learn to notice and then detach from their work-related thoughts. Supporting diary studies have indicated that attention redirection prevents workload concerns from negatively affecting detachment (Smit & Barber, 2016) and that state mindfulness facilitates psychological detachment (Haun, Nübold, & Bauer, 2018; Hülshager et al., 2014), which leads to our first hypothesis.

Hypothesis 1. Psychological detachment will increase over time among the MBI group compared to the control group.

Intervention effects on work–life balance

To conceptualize different aspects of the work–life interface (Casper, Vaziri, Wayne, DeHauw, & Greenhaus, 2018; Wayne, Butts, Casper, & Allen, 2017), we evaluate how well

the intervention reduces the spillover between work and private roles and whether it positively affects satisfaction with work–life balance.

Employees undergo *psychological conflict* when they are ‘mentally distracted or pre-occupied with one role while physically present in another role’ (van Steenbergen, Ellemers, & Mooijaart, 2007, p. 280). When employees ruminate about work at home, they experience psychological WFC (Carlson & Frone, 2003). To reiterate, mindfulness implies self-regulation of attention for maintaining presence in the moment and non-elaborative experience of thoughts and feelings (Bishop et al., 2004). Mindfulness practitioners should be less pre-occupied with work roles because they can focus on present roles and disengage from rumination after work. Consequently, mindfulness training should reduce psychological WFC.

When ‘strain experienced in one role intrudes into and interferes with participation in another role’ (Carlson, Kacmar, & Williams, 2000, p. 250), the result is *strain-based conflict*. Thus, when work roles cause stress and emotional depletion that then interferes with family life, employees experience strain-based WFC. Mindfulness practitioners learn to fundamentally shift their perspectives, a process called *reperceiving* (Shapiro, Carlson, Astin, & Freedman, 2006) or *decentred perspective* (Bishop et al., 2004), which allows them to change subjective meanings about unpleasant thoughts and emotions and instead perceive thoughts and emotions as being transient (Bishop et al., 2004). By shifting perspectives, they objectively witness thoughts and emotions (Shapiro et al., 2006). Emotional distress then becomes less unpleasant (Bishop et al., 2004). Moreover, mindfulness practice energizes (Allen & Kiburz, 2012; Brown & Ryan, 2003) and renews energies needed to fulfil family roles. Consequently, mindfulness training should reduce strain-based WFC, as shown in studies indicating that MBIs alleviate WFC (Kiburz, Allen, & French, 2017).

Hypothesis 2. Psychological and strain-based WFC will decrease over time among the MBI group compared to the control group.

If employees feel that they meet the multiple demands of work and family roles, they have *satisfaction with work–life balance* (Valcour, 2007). Mindfulness practitioners learn to be present in the moment (Bishop et al., 2004). Thus, they should be fully present in family life without being distracted by work. An accepting orientation – the second component of mindfulness (Bishop et al., 2004) – should further enhance refrainment from work-related distress and engagement in family roles. Consequently, they will positively evaluate their ability to combine work and family roles and will feel satisfied with their work–life balance, as supported in studies showing that trait mindfulness is positively connected to work–family balance (Allen & Kiburz, 2012).

Hypothesis 3. Satisfaction with work–life balance will increase over time among the MBI group compared to the control group.

Intervention effects on affective well-being

To study affective well-being, we observe *negative affect*, a state of ‘subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states’ (Watson, Clark, & Tellegen, 1988, p. 1063). Negative affect has been shown to have stronger

impacts than positive affect (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), especially in spilling over from work to home (Montgomery, Panagopoulou, Peeters, & Schaufeli, 2005; Williams & Alliger, 1994). Mindfulness practitioners learn to shift perspectives to reduce negative thinking (Good et al., 2016) and thus decrease emotional distress (Bishop et al., 2004; Shapiro et al., 2006). Hence, practicing mindfulness should reduce negative affect. Moreover, mindfulness training has been shown empirically to enhance well-being in work contexts (Bartlett et al., 2019; Lomas et al., 2019), decrease perceived stress and negative affect when used daily (Lacaille et al., 2018), and increase segmentation of life domains (Rexroth et al., 2017) which is associated with well-being (Rexroth, Sonntag, & Michel, 2014).

Hypothesis 4. Negative affect will decrease over time among the MBI group compared to the control group.

Segmentation preference as a moderator

The positive-activity model (Lyubomirsky & Layous, 2013) proposes that certain person features may influence intervention effectiveness. We integrate this proposition into the boundary framework to assume that segmentation preferences as a person feature are likely to moderate how much MBI participants profit from employing mindfulness as a cognitive–emotional segmentation strategy and, thus, from the MBI. According to boundary theory, people vary in preferences for segmenting or integrating aspects of work and home and will employ boundary tactics accordingly (Ashforth et al., 2000; Kreiner, 2006). In the work–family context, segmenters prefer to separate work from family and vice versa; integrators prefer to combine work and family roles.

To achieve their preferences, people with high segmentation preference employ boundary work tactics to separate life domains (Kreiner et al., 2009). For example, they avoid work-related technology at home, which in turn improves psychological detachment and reduces WFC (Park, Fritz, & Jex, 2011; Yang, Zhang, Shen, Liu, & Zhang, 2019). Other studies confirmed that high segmentation preference is associated with psychological detachment (Hahn & Dormann, 2013) and also with less emotional exhaustion (Foucreault, Ollier-Malaterre, & Ménard, 2018). While segmentation preferences have to be distinguished from segmentation behaviours (Foucreault et al., 2018), Powell and Greenhaus (2010) showed that high segmentation preferences are positively related to actual segmentation of life domains, and actual segmentation is negatively related to WFC. Moreover, integration increases blurring of boundaries between life domains and thus the chance of spillover between life domains (Ashforth et al., 2000). Although spillover can be positive, for example when positive work experiences enrich employees' home lives, negative spillover can lead to more experienced WFC (Powell & Greenhaus, 2010).

Boundary theory's person–environment fit perspective (Kreiner, 2006; Kreiner et al., 2009) proposes that employees can establish and manage boundaries in congruence with their preferences when they perceive that given segmentation possibilities match their preferences. The congruence between segmentation preferences and the environment positively affects WFC, stress, and job satisfaction (Kossek & Lautsch, 2012; Kreiner, 2006). As the MBI facilitates separation of life domains, segmenters might benefit more from the MBI because segmentation matches their preferences. Moreover, the MBI might even negatively affect integrators, as it would encourage boundary tactics that are incongruent with their preferences.

However, in line with boundary theory, both segmenters and integrators may benefit from the MBI because it enforces segmentation of life domains. Moreover, MBI participants learn to appropriately strengthen and control their cognitive–emotional boundaries between life domains, and feelings of being in control are very important (Kossek, Ruderman, Braddy, & Hannum, 2012). Still, segmentation preference might moderate MBI effectiveness. As stated above, segmentation can reduce WFC. People with low segmentation preferences generally employ less tactics to segment life domains (Kreiner et al., 2009). Yet, they might wish to segment life domains and avoid experiencing WFC in certain situations, for instance, when they spend time with their family and want to focus on the moment. Hence, they might profit from the MBI, as they are likely to learn a new segmentation strategy. Segmenters, on the contrary, might profit less from the MBI because they are more likely to employ boundary work tactics to segment life domains (Kreiner et al., 2009) and thus might already practice cognitive–emotional segmentation.

Given the contradicting assumptions derived from boundary theory and the person–environment fit perspective, we cannot deduce a clear expectation how segmentation preferences will affect MBI effectiveness. We, thus, pose the following research question.

Research Question 1: Will MBI participants with low or high segmentation preference show stronger and more accelerated changes in (1) psychological detachment, (2) strain-based and psychological WFC, (3) satisfaction with work–life balance, and (4) negative affect?

Method

Study design and participants

For our experimental diary study, we compared an experimental group with a waitlist control group. First, we performed a pre-intervention assessment followed with daily intervention assessments. Participants were aware that they were randomly assigned to one of the two groups and that each group would receive questionnaires and self-training instructions in different orders. Self-reported data were collected at Time 1, directly before the experimental group took part in the intervention. Participants of both groups were instructed to fill out a daily survey each day over three weeks (Monday to Friday, 15 working days). Subsequently, the control group received the intervention. We considered the wait-list control group to be active because they filled in daily questionnaires and would be subject to the behaviour changes that accompany self-monitoring (Michie, Johnston, Francis, Hardeman, & Eccles, 2008; Michie et al., 2013).

In fall 2013, we advertised the study via flyers, professional e-mail list servers, and a snowball sampling approach (Vine, 2011) through our professional and social contacts. The study was promoted as a scientific project offering a free three-week online self-training intervention for using mindfulness as a strategy for detaching from work and enhancing work–life balance. The internet signup yielded 379 participants who were randomly assigned to either the intervention group ($n = 192$) or the control group ($n = 187$). The time 1 questionnaire was completed by 164 participants of the intervention group and 168 participants of the control group. Four from the control group created the same personal code, which prevented us from assigning daily questionnaires correctly, and thus, they were excluded. A total of 72 did not complete any daily questionnaires: 45 (27.44%) in the intervention group and 27 (16.46%) in the control group, $\chi^2(1, 328) = 5.14, p < .05$. Analyses revealed that dropouts (those who did not fill

in the daily questionnaires) were younger than those who filled in at least one diary, $t(116.21) = -3.46, p < .01, d = -0.46, 95\% \text{ CI} [-0.72, -0.19]$. There were no differences regarding gender, $\chi^2(1, 328) = 0, p = 1$, or segmentation preferences, $t(115.37) = -0.02, p = .98, d = -0.00, 95\% \text{ CI} [-0.27, 0.26]$.

Of the remaining 256, we excluded 66 who completed fewer than three daily questionnaires: 39 (23.78%) in the intervention group and 27 (16.46%) in the control group, $\chi^2(1, 256) = 5.02, p < .05$. Analyses revealed no differences between participants in the final sample and participants who only completed one or two daily questionnaires (i.e., who were not retained in the final sample) regarding segmentation preferences, $t(107.72) = -0.58, p = .57, d = -0.08, 95\% \text{ CI} [-0.37, 0.20]$, and demographic variables, gender: $\chi^2(1, 256) = 0.24, p = .63$; age: $t(131.96) = -0.32, p = .75, d = -0.04, 95\% \text{ CI} [-0.32, 0.24]$.

The final sample comprised 190 participants, 80 in the intervention group and 110 in the control group; mean age 42.23 ($SD = 10.72$), mostly women (75.3%), mostly fulltime workers (71.6%), with university degrees (74.2%), and living with partners (76.8%). Almost one third had children living in their household (30.0%). Our recruiting strategy drew participants from various occupations such as health and social services, processing and manufacturing, finance and insurance, and science and education. Groups indicated similar segmentation preferences, $t(177.25) = -0.63, p = .53, d = -0.09, 95\% \text{ CI} [-0.38, 0.20]$, and demographic variables, gender: $\chi^2(1, 190) = 0.06, p = .81$; age: $t(173.55) = -0.28, p = .78, d = -0.04, 95\% \text{ CI} [-0.33, 0.25]$, at Time 1. Participants completed questionnaires for an average of 9.46 days ($SD = 3.88$).

Mindfulness-based intervention to promote work–life balance

Our intervention is an adapted version of the effective training developed by Michel et al. (2014). Building on boundary theory (Ashforth et al., 2000) and the two-component model of mindfulness (Bishop et al., 2004), the three-week training teaches mindfulness practice as a cognitive–emotional segmentation strategy (Michel et al., 2014). The intervention builds on exercises related to mindfulness-based cognitive therapy (MBCT, Segal, Williams, & Teasdale, 2002), mindfulness-based stress reduction (MBSR, Kabat-Zinn, 1982, 2006), and self-education mindfulness guidebooks (Siegel, 2010; Weiss, Harrer, & Dietz, 2010). Although originally employed in therapeutic contexts, guided mindfulness meditation and daily exercise training programmes can increase mindfulness in the work context and are easily integrated into daily life (e.g., Hülshager et al., 2013, 2015; Michel et al., 2014; Rexroth et al., 2017).

Altogether, the intervention included three online modules, each emphasizing strategies for detaching from work. Each module had a daily task, while Parts A and B were completed during the weekend. In Part A, participants received basic information combined with practical exercises that took approximately 20 min. Part B was a practical exercise taking approximately 3–5 min. The daily task was similar to Part B and conducted for the following five working days. Michel et al. (2014) provide a detailed description of all modules. Participants received information and instructions in a written, downloadable format. They could access audio files for the mindfulness exercises on the project homepage. To remind all participants to fill out daily questionnaires and to remind the intervention group to carry out daily tasks, we sent up to three text messages on Mondays, Wednesdays, and/or Fridays. Additionally, we sent reminder e-mails at the beginning of each week.

Measures

We collected data through a general questionnaire and brief daily surveys. The general questionnaire assessed demographic information and segmentation preferences. The daily surveys, answered for 15 working days, assessed mindfulness, detachment, work–life balance, and affective well-being. All questionnaires were in German. A translation/back-translation procedure was used for items unavailable in German (Brislin, 1980; Graham & Naglieri, 2003). Unless indicated otherwise, participants responded on a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*). For the between-person construct (segmentation preference), we computed McDonald's omegas; to estimate within-person reliability, we applied the method proposed by Geldhof, Preacher, and Zyphur (2014) (Table 1).

Segmentation preference was assessed with three items from Kreiner (2006). For example, 'I don't like to have to think about work while I'm at home'.

Mindfulness was assessed with three items adapted from the German version (Michalak, Heidenreich, Ströhle, & Nachtigall, 2008) of the mindfulness attention awareness scale (MAAS; Brown & Ryan, 2003). Participants rated all items on a 5-point frequency scale (1 = *rarely*; 5 = *almost always*). For example, 'Today, I find myself doing things without paying attention'.

Psychological detachment from work during time off was assessed with three items adapted from the respective subscale of the recovery experience questionnaire (Sonnentag & Fritz, 2007). For example, 'Today, after workhours I distanced myself from my work'.

Psychological WFC was assessed with three items adapted from van Steenbergen et al. (2007). For example, 'Today, when I was at home, I thought about work-related problems'.

Strain-based WFC was measured with the 3-item subscale for strain-based WFC from the WFC scale (Carlson et al., 2000), adapted to daily measurement and focused on private rather than family life. For example, 'Due to all the pressures at work, I was too stressed to do the things I enjoy when I came home today'.

Satisfaction with work–life balance was measured with three items from the satisfaction with work–family balance scale (Valcour, 2007), adapted to focus on private life, rated on a 5-point Likert scale (1 = *very dissatisfied*; 5 = *very satisfied*). For example, 'How satisfied are you today with your ability to balance the needs of your job with those of your personal or family life?'

Negative affect was assessed with three items adapted from the German version of the negative affect scale (Krohne, Egloff, Kohlmann, & Tausch, 1996) taken from the positive and negative affect scale (PANAS; Watson et al., 1988) for measuring negative affect such as nervous, irritated, or depressed.

Data analysis

Data were longitudinally nested with measurement occasions (Level 1) within individuals (Level 2). For data analyses, we applied the R package lme4 (Bates, Mächler, Bolker, & Walker, 2015). Level 1 data consisted of 3–15 measurement points ($M = 9.46$, $SD = 3.88$; overall response rate 63%). The Level 2 variable, segmentation preference, was measured only once at baseline.

In a first step, we analysed state mindfulness changes across intervention and control groups as a manipulation check. Being unable to track whether participants actually completed their weekly modules and daily exercises, we used changes in mindfulness

Table 1. Means and variances, bivariate correlations, intraclass correlation coefficients, and reliability estimates of study measures at the within-person and between-person level

	1	2	3	4	5	6	7	ω	ρ
1 Mindfulness									.39
2 Detachment	.36							.66	.33
3 Psychological Work-Family Conflict	-.41	-.92						.92	.36
4 Strain-based Work-Family Conflict	-.59	-.53	.57					.84	.37
5 Satisfaction with Work-Life Balance	.52	.58	-.40	.49				.88	.38
6 Negative Affect	-.68	-.47	.32	-.23	-.02			.62	.44
7 Segmentation Preference	-.10	.25	-.25	-.01	-.05	.05		—	—
M	3.43	3.42	2.20	2.02	3.32	1.92	3.42		
Var	0.88	1.48	1.22	1.10	1.16	0.92	0.79		
ω	.86	.99	.95	.98	.99	.90	.88		

Note. Between-person ($N = 190$) statistics below the diagonal, within-person ($N = 1,798$) statistics above the diagonal.

levels as a manipulation check, expecting that intervention group participants would perform the intervention and be more likely to show stronger increased mindfulness than control group participants.

To test the hypotheses, we computed a series of growth curve models to analyse patterns of change over time and to observe how change trajectories differed between groups. To investigate which model would best fit the data for each outcome, we first compared the fits of a linear or a quadratic change trajectory, using the simple number of daily measurement occasions for the linear trajectory and the squared number of diary entries for the quadratic trajectory. Models assuming a linear versus a quadratic trajectory are nested. To compare them, the deviance test can be applied as a log-likelihood-based goodness-of-fit statistic. In addition, we tested a log-linear change trajectory as proposed by the dose-effect model in psychotherapy research (e.g., Falkenström, Josefsson, Berggren, & Holmqvist, 2016). The log-linear model is based on the natural log of number of diary entries and is not nested within models assuming a linear or a quadratic trajectory. To evaluate which model fits best, we compared the log-linear model with either the linear model or the quadratic model (depending on which one fit better), using the Akaike information criterion (AIC) and the Bayesian information criterion (BIC).

After identifying the most fitting model, we looked at (1) main effects of time indicating that the relevant outcome changed during the intervention and (2) interaction effects of time and group variables indicating that changes in outcome depended on group membership. Hence, the interaction term provides the most relevant information for testing the intervention effectiveness, aligned with our objective to find a stronger reduction of negative outcomes and a stronger increase in positive outcomes in the intervention rather than in the control group. For the moderation research question, we used the grand-mean centred segmentation preference scale assessed at baseline to compute cross-level interactions. Moderation effects would be supported if group membership had a significant three-way interaction with time and segmentation preference.

Results

Table 1 shows means, variances, zero-order correlations, and consistencies at both between-person and within-person levels.

Manipulation check

In a first step, we examined whether state mindfulness trajectories differed across groups, a particularly important concern because our active control group completed diaries as often as the intervention group. When participants rated items on daily mindfulness and detachment, the repetition could increase self-awareness and induce intervention effects. The intervention group showed significantly stronger increased mindfulness than the control group (group \times time interaction: $b = 0.02$, $t = 2.10$, 95% CI [0.00, 0.04]),¹ although time had a main effect as well ($b = 0.01$, $t = 2.34$, 95% CI [0.00, 0.02]). The significant positive interaction between time and group indicated that the two groups showed significantly differing change patterns in mindfulness. Although the results

¹ As long as the lower bound and upper bound of the confidence interval have the same sign, null is not included in the reported confidence intervals. In these confidence intervals, numbers not equal to null would appear if more decimal places were reported.

indicate that both groups experienced increased mindfulness, the intervention group showed a stronger increase. Hence, our intervention effectively influenced daily mindfulness levels.

Psychological detachment

Hypothesis 1 predicted that intervention participants would become more competent in detaching from work. First, we compared the linear with the quadratic trajectory and found a better fit for the quadratic model than for the linear model ($\Delta\chi^2 = 9.85$, $df = 2$, $p = .007$). Second, we compared the quadratic with the log-linear model. AIC and BIC criteria indicated that the log-linear model fit best (log-linear: AIC 5379.9, BIC 5412.9; quadratic: AIC 5381.3, BIC 5425.3). The model indicated that the intervention group showed a steeper positive change trajectory in psychological detachment than the control group, $b = 0.25$, $t = 3.82$, 95% CI [0.12; 0.38], supporting hypothesis 1 (Table 2 summarizes all coefficients for the models in hypotheses 1–4).

Table 2. Results of the Multilevel Models for all outcomes

Outcome Predictor	B	SE B	t	95% CI
PD				
Intercept	3.25	.10	32.77	[3.05; 3.44]
Group	−0.39	.16	−2.49	[−0.70; −0.08]
Log(Day)	0.07	.04	1.91	[−0.00; 0.15]
Group x Log(Day)	0.25	.07	3.82	[0.12; 0.38]
PWFC				
Intercept	2.44	.09	26.59	[2.26; 2.61]
Group	0.21	.15	1.43	[−0.08; 0.49]
Log(Day)	−0.11	.03	−3.31	[−0.18; −0.05]
Group x Log(Day)	−0.12	.06	−2.03	[−0.23; −0.00]
SBWFC				
Intercept	2.10	.09	24.06	[1.93; 2.27]
Group	0.19	.14	1.36	[−0.08; 0.46]
Log(Day)	−0.05	.03	−1.49	[−0.11; 0.02]
Group x Log(Day)	−0.04	.06	−0.77	[−0.15; 0.07]
SWLB				
Intercept	3.23	.09	36.42	[3.05; 3.40]
Group	−0.25	.14	−1.75	[−0.52; 0.03]
Log(Day)	0.04	.03	1.30	[−0.02; 0.11]
Group x Log(Day)	0.13	.06	2.38	[0.02; 0.24]
NA				
Intercept	2.06	.08	25.53	[1.90; 2.21]
Group	0.17	.13	1.30	[−0.08; 0.42]
Log(Day)	−0.08	.03	−2.86	[−0.14; −0.03]
Group x Log(Day)	−0.06	.05	−1.30	[−0.16; 0.03]

Notes. NA = negative affect; PD = psychological detachment; PWFC = psychological work–family conflict; SBWFC = strain-based work–family conflict; SWLB = satisfaction with work–life balance. $N = 1798$. All predictors are centred around the person mean.

Psychological and strain-based WFC

In hypothesis 2, we expected that mindfulness training would decrease psychological and strain-based WFC. Again, we first compared the linear with the quadratic trajectory. For psychological WFC, adding the quadratic predictor to the model did not improve model fit, $\Delta\chi^2 = 5.65$, $df = 2$, $p = .06$. Comparing the linear with the log-linear trajectory, the log-linear trajectory corresponded with data better than the linear trajectory (log-linear: AIC 4992.7, BIC 5025.7; linear: AIC 4999.4, BIC 5032.3). The log-linear model revealed that psychological conflict had a significant negative trajectory over time for both groups, but again, the intervention group showed the steeper trajectory ($b = -0.12$, $t = -2.03$, 95% CI [-0.23; -0.00]), indicating that the intervention group had stronger reduced psychological conflict over time. Similarly, for strain-based WFC, adding the quadratic predictor to the model did not improve model fit ($\Delta\chi^2 = 1.23$, $df = 2$, $p = .54$), and the log-linear model fit data better than the linear trajectory, but with very small differences (log-linear: AIC 4801.3, BIC 4834.3; linear: AIC 4802.0, BIC 4834.9). However, evidence failed to indicate that the intervention affected strain-based WFC. Therefore, hypothesis 2 was supported only partially.

Satisfaction with work–life balance

Hypothesis 3 predicted that intervention participants would report increased satisfaction with work–life balance. Again, we first computed a linear and a quadratic trajectory and compared models with the deviance test. Adding the quadratic predictor to the model did not improve model fit ($\Delta\chi^2 = 3.14$, $df = 2$, $p = .21$). Then comparing the linear with the quadratic trajectory, information criteria indicated that the log-linear model was a slightly better fit than the linear model (log-linear: AIC 4820.3, BIC 4853.3; linear: AIC 4822.5, BIC 4855.5). Again, the differences were small, but both models are equally parsimonious and yield similar results, so we report the slightly more adequate log-linear model, showing a steeper positive trajectory in improved satisfaction with work–life balance over time for the intervention group than for the control group ($b = 0.13$, $t = 2.38$, 95% CI [0.02; 0.24]), supporting hypothesis 3.

Negative affect

To test the hypothesis regarding changes in negative affect, we conducted the same comparisons. When we compared the linear and quadratic models, adding the quadratic predictor to the model did not improve model fit ($\Delta\chi^2 = 5.54$, $df = 2$, $p = .06$). When we compared the linear and log-linear models, the log-linear model yielded the best results (log-linear: AIC 4297.4, BIC 4330.4; linear: AIC 4303.2, BIC 4336.2). Unlike predicted, we found no evidence for different trajectories of negative affect over time between groups. Rather, both groups reported significantly decreased negative affect ($b = -0.08$, $t = -2.86$, 95% CI [-0.14; -0.03]) as indicated by the estimated coefficient for log of time.

Moderation analyses

We asked how segmentation preference would moderate MBI effects on psychological detachment, work–life balance, and affective well-being. Moderation effects would be supported if group membership had a significant three-way interaction with time and segmentation preference. The log-linear trajectory fit best in all models, so we used them to examine whether segmentation preference (Level 2 variable) would modulate responsiveness to mindfulness training. Table 3 displays coefficients for the models.

Table 3. Results of the moderation analyses

Outcome Predictor	B	SE B	t	95% CI
PD				
Intercept	3.25	.10	33.24	[3.06; 3.44]
Group	−0.39	.16	−2.53	[−0.70; −0.09]
Log(Day)	0.07	.04	1.76	[−0.01; 0.14]
SP	−0.04	.11	−0.40	[−0.26; 0.17]
Group × Log(Day)	0.26	.07	3.90	[0.13; 0.38]
Group × SP	0.35	.17	2.05	[0.02; 0.68]
Log(Day) × SP	0.11	.04	2.48	[0.02; 0.19]
Group × Log(Day) × SP	−0.14	.07	−1.96	[−0.27; −0.00]
PWFC				
Intercept	2.43	.09	26.98	[2.26, 2.61]
Group	0.20	.14	1.42	[−0.08, 0.48]
Log(Day)	−0.11	.03	−3.24	[−0.18, −0.04]
SP	−0.02	.10	−0.24	[−0.22, 0.17]
Group × Log(Day)	−0.12	.06	−2.05	[−0.24, −0.01]
Group × SP	−0.27	.16	−1.75	[−0.58, 0.03]
Log(Day) × SP	−0.05	.04	−1.32	[−0.13, 0.02]
Group × Log(Day) × SP	0.06	.06	0.92	[−0.06, 0.18]
SBWFC				
Intercept	2.09	.09	24.20	[1.92, 2.26]
Group	0.19	.14	1.42	[−0.07, 0.46]
Log(Day)	−0.05	.03	−1.39	[−0.11, 0.02]
SP	0.23	.10	2.41	[0.04, 0.42]
Group × Log(Day)	−0.05	.06	−0.82	[−0.15, 0.06]
Group × SP	−0.38	.15	−2.56	[−0.68, −0.09]
Log(Day) × SP	−0.05	.04	−1.49	[−0.12, 0.02]
Group × Log(Day) × SP	0.02	.06	0.31	[−0.10, 0.13]
SWLB				
Intercept	3.24	.09	36.97	[3.07, 3.41]
Group	−0.25	.14	−1.83	[−0.53, 0.02]
Log(Day)	0.04	.03	1.13	[−0.03, 0.10]
SP	−0.27	.10	−2.75	[−0.46, −0.08]
Group × Log(Day)	0.14	.06	2.45	[0.03, 0.25]
Group × SP	0.34	.15	2.22	[0.04, 0.63]
Log(Day) × SP	0.09	.04	2.62	[0.02, 0.17]
Group × Log(Day) × SP	0.00	.06	0.05	[−0.11, 0.12]
NA				
Intercept	2.05	.08	25.52	[1.89, 2.20]
Group	0.17	.13	1.36	[−0.08, 0.42]
Log(Day)	−0.08	.03	−2.75	[−0.13, −0.02]
SP	0.23	.09	2.51	[0.05, 0.40]
Group × Log(Day)	−0.07	.05	−1.37	[−0.16, 0.03]
Group × SP	−0.40	.14	−2.88	[−0.67, −0.13]
Log(Day) × SP	−0.05	.03	−1.56	[−0.11, 0.01]
Group × Log(Day) × SP	0.09	.05	1.74	[−0.01, 0.19]

Notes. $N_{\text{Level}2} = 190$, $N_{\text{Level}1} = 1798$. All predictors are centred around the person mean.

NA = negative affect; PD = psychological detachment; PWFC = psychological work–family conflict; SBWFC = strain-based work–family conflict; SP = segmentation preference; SWLB = satisfaction with work–life balance.

Psychological detachment

Research question 1a asked how segmentation preference would moderate the trajectory of psychological detachment. Again, the intervention strongly affected psychological detachment. When we included segmentation preference as a moderator, a significant three-way interaction was found; thus, segmentation preference determined the increase of psychological detachment over time in both groups ($b = -0.14$, $t = -1.96$, 95% CI $[-0.27; -0.00]$, Figure 2). In addition, all two-way interactions yielded significant results (group \times log of time, log of time \times segmentation preference, group \times segmentation preference). The group \times log of time interaction indicated that intervention and control group participants reported different trajectories, as proposed in hypothesis 1. The log of time \times segmentation preference interaction indicated that segmentation preference affected detachment trajectories. The group \times segmentation preference interaction implied that segmentation preferences affected detachment trajectories more strongly in the intervention group, such that intervention effects on psychological detachment were stronger when participants had low segmentation preference.

Psychological and strain-based WFC

Research question 1b asked how segmentation preference would moderate the trajectory of WFC. Although hypothesis 2 indicated that group and log of time would have a significant two-way interaction, the two other two-way interactions (log of time \times segmentation preference, group \times segmentation preference) and the three-way interaction yielded non-significant results for psychological WFC. A non-significant three-way interaction was also found for strain-based WFC. Of the two-way interactions, only the group \times segmentation preference interaction was significant. To summarize, we found no support indicating that segmentation preference modulates responsiveness to the intervention in terms of pronounced changes in psychological or strain-based WFC.

Satisfaction with work–life balance

Research question 1c asked how segmentation preference would moderate the trajectory of satisfaction with work–life balance. However, all two-way interactions yielded

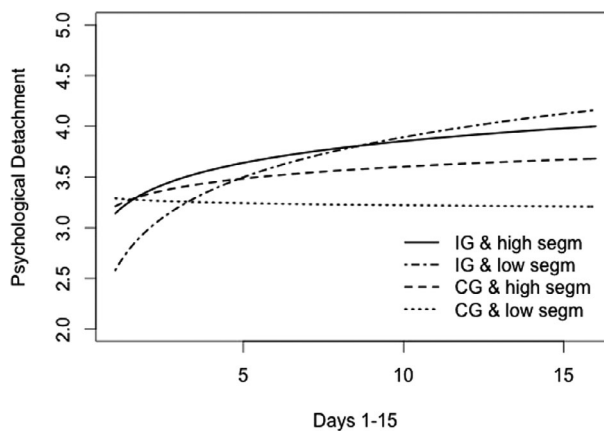


Figure 2. Growth trajectories of psychological detachment over the course of the study. CG = control group; IG = intervention group; high segm = high segmentation preference; low segm = low segmentation preference.

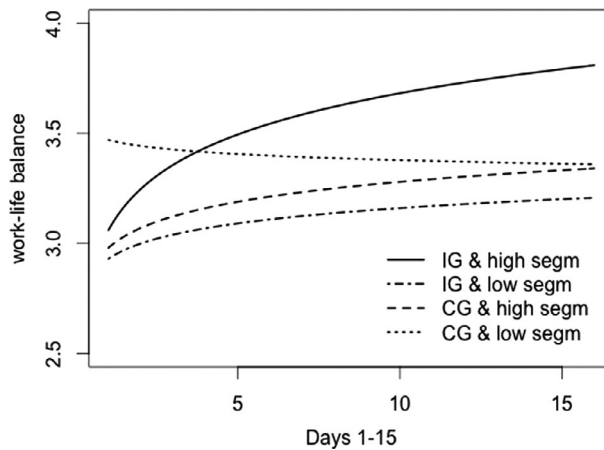


Figure 3. Growth trajectories of satisfaction with work–life balance over the course of the study. CG = control group; IG = intervention group; high segm = high segmentation preference; low segm = low segmentation preference.

significant results (group \times log of time, log of time \times segmentation preference, group \times segmentation preference). Similar to research question 1a, in the group \times log of time interaction, the groups reported different trajectories, indicating an effective intervention, as in hypothesis 3. In the log of time \times segmentation preference interaction, segmentation preferences caused the groups to show different trajectories for work–life balance. In the group \times segmentation preference interaction, segmentation preference had a stronger effect for work–life balance among the intervention group. However, the three-way interaction was non-significant, so segmentation preferences had the same effects on work–life balance in both groups (Figure 3).

Negative affect

Research question 1d asked how segmentation preference would moderate the trajectory of negative affect. Again, we failed to find that the intervention specifically impacted negative affect (group \times log of time), but both groups experienced significantly reduced negative affect (log of time). Moreover, the group \times segmentation preference interaction was significant. The log of time \times segmentation preference interaction and the three-way interaction yielded non-significant results. Over the period of our study, segmenters reported lower levels of negative affect (segmentation preference). When the study ended, intervention group segmenters reported the lowest levels of negative affect (Figure 4).

Discussion

Given the importance of individual segmentation skills in increasingly flexible workplaces, we tested an online self-training MBI for its effects on daily levels of detachment, work–life balance, and affective well-being over 3 weeks. Integrating boundary theory and the positive-activity model, we compared an intervention group practicing mindfulness with a non-practicing control group to test whether segmentation

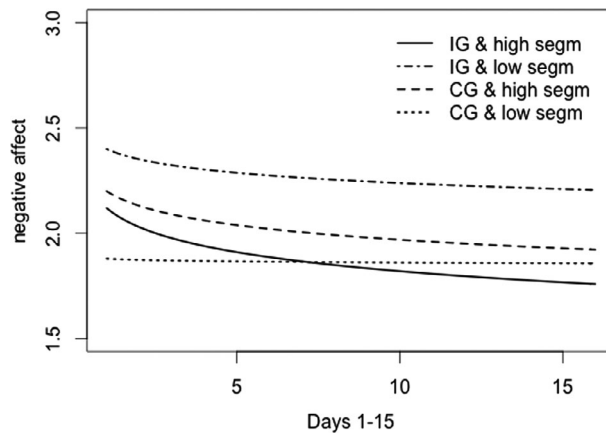


Figure 4. Growth trajectories of negative affect over the course of the study. CG = control group; IG = intervention group; high segm = high segmentation preference; low segm = low segmentation preference.

preferences would affect responses to training. Findings were mixed, supporting some but not all hypotheses.

Intervention effectiveness and change trajectories

In line with our hypotheses, mindfulness training significantly enhanced detachment from work, increased satisfaction with work–life balance, and decreased psychological conflict over time. However, it failed to significantly affect strain-based WFC or negative affect.

Growth curve analyses revealed a log-linear trajectory, indicating that the intervention affected detachment, work–life balance, and negative affect immediately after the intervention started, then affecting the outcomes slowly but steadily. Such trajectories are more common for clinical interventions (cf. the dose-effect model in psychotherapy; e.g., Falkenström et al., 2016). Occupational health research has provided few studies for comparing our results, but our analyses differed from Hülshager et al. (2015) in showing a different development for detachment, perhaps because the interventions were designed differently. We find that the MBI conveys immediate benefits rather than having continuous effects over time, an encouraging indication that MBI participants enjoy quick wins. However, we cannot determine whether the particular content of the first module caused the strong acceleration, or whether other interventions, whatever their content, would show the same general effect. Future research could randomly assign topics to modules and compare change trajectories. Also, future research should identify the most effective durations for MBI practice (Eby et al., 2019). Would a micro-intervention with one module have the same effects as the three-week intervention? Are other modules necessary to stabilize the effects?

Our results indicate that MBI enhances work–life balance. Our findings regarding detachment and psychological conflict concur with research showing that mindfulness training enhances abilities to refrain from work-related worries (Haun et al., 2018; Hülshager et al., 2014; Michel et al., 2014; Querstret, Cropley, & Fife-Schaw, 2017) and that being present in the moment enhances satisfaction with work–life balance (Michel

et al., 2014). Surprisingly, we diverged from Michel et al. (2014) when we failed to find effects on strain-based WFC, perhaps because we observed daily changes rather than comparing pre- and post-data.

Also surprising was that we found no intervention effect on affective well-being. Participants of both groups reported less negative affect over time, which conflicts with findings from a similar three-week mindfulness segmentation training (Rexroth et al., 2017) and with general evidence showing MBIs to positively affect well-being (Bartlett et al., 2019; Lomas et al., 2017). One explanation might be that our training was designed specifically to promote work–life balance. Another explanation is that study participation had a positive effect by itself because our control group was active; all participants regularly answered questionnaires. Well-being may have been improved simply by thinking about work–life balance, mindfulness, and well-being, as was shown in a study in which participants showed improved mental health and well-being by using a reflection-focussed self-monitoring mental health app and completing daily mood surveys (Bakker & Rickard, 2018). Further research should investigate more closely whether diaries alone might improve well-being, and whether self-awareness or other mechanisms would mediate the effect.

Another open research question arises from the strong effects found within the first week of training and the positive effects on well-being in the control group. The intervention's first module required reflection about detachment and segmentation. Mindfulness practice was introduced later. In completing the daily surveys, the active control group had to reflect on the questions. Hence, reflection and mental engagement with work–life and well-being issues may be central mechanisms for training effectiveness. Future research should therefore investigate whether mindfulness practice is the critical ingredient by exploring specific mechanisms in detail (Allen et al., 2015; Virgili, 2015).

Segmentation preference effects on training responsiveness and change trajectories

Segmentation preference moderated the trajectory of psychological detachment in the intervention group. Integrators derived the strongest benefits for psychological detachment, but both integrators and segmenters benefitted equally in psychological WFC and satisfaction with work–life balance. In summary, segmentation skills enhance work–life balance for both segmenters and integrators (Rexroth et al., 2014).

Segmenters appeared to benefit from study participation regarding psychological detachment and satisfaction with work–life balance, whether they received training or just filled out diaries. A tentative interpretation is that segmenters are particularly responsive to any engagement with work–life balance and well-being. Again, simple reflection about work–life balance and affective well-being might have positive effects, especially for segmenters. Regarding affective well-being, segmenters who received training received the most benefits in reducing negative affect, a promising indication that similar interventions would be equally beneficial.

Our findings show promise for integrating the positive-activity model with boundary theory. Segmentation preference appears to affect how cognitive–emotional boundary management interventions will encourage detachment. Moreover, segmentation preference determines whether engagement in training or in reflection only will influence detachment and satisfaction with work–life balance. Although our study supports boundary theory's proposition that individuals differ in segmentation preferences, it contradicts earlier findings showing that integrators enjoy spillover between life domains

and experience less WFC. For instance, one study showed that integrators who frequently used smartphones for work after work hours indicated reduced work–family conflict and better family role fulfilment (Derks, Bakker, Peters, & van Wingerden, 2016). Hence, more research is needed to examine whether segmentation preference alone can alleviate work–life conflicts, and how important segmentation skills are.

Moreover, segmentation preference seems to moderate how strongly MBIs will increase detachment but not to moderate how strongly MBIs will affect work–life balance constructs and affective well-being. Hence, future boundary research and resource-oriented intervention research should include segmentation preference as a person feature that affects training effectiveness. Moreover, further research should draw on the positive-activity model to investigate which person features serve as individual boundary conditions of interventions.

Limitations and implications for future research

As with every empirical study, our study has limitations. First, we experienced a high dropout rate. About 51% in the intervention group and 33% in the control group completed fewer than three diary questionnaires. However, dropout rates of 50% and higher are expected in web-based interventions (Bausch, Michel, & Sonntag, 2014; Nistor & Neubauer, 2010), in MBIs for employees (Hülshager et al., 2013; Michel et al., 2014; Rexroth et al., 2017) and in organizational survey research (Anseel, Lievens, Schollaert, & Choragwicka, 2010). Participants may drop out for various individual or environmental reasons. In addition, many may have disliked having to answer several questionnaires and perform daily tasks for three weeks. Of course, some may have continued practicing mindfulness but stopped filling out questionnaires.

Another limitation is that participants were self-selected. However, self-selectors are likely to be highly motivated and have high outcome expectancy, ensuring that they will benefit from interventions (Sin & Lyubomirsky, 2009). Self-selection may also explain why three quarters of our participants were women, and aligns with the positive-activity model in that women are more likely to choose interventions with specific features such as meditation (Lyubomirsky & Layous, 2013; Michel et al., 2014). Our use of self-report measures raises concerns about common method bias. We believe that self-reports were reasonable considering our interest in internal states and perceptions of mindfulness, detachment, work–life balance, and well-being (Spector, 2006). Our data were from 2013. We believe that the underlying processes should remain stable, but recent accelerations of technological change may have intensified spillovers from work to life domains.

When recruiting participants, we told them that the web-based intervention was designed to support better work–life balance and that it would teach them how to use mindfulness as a strategy for detachment and recovery after work. Their expectations might have worked as a demand characteristic, evoking responses that confirmed the hypotheses (Nichols & Maner, 2008). However, the intervention group went beyond demand-induced responses in showing effects on detachment, satisfaction with work–life balance, and psychological conflict over time. Nevertheless, future research should consider further reducing possible demand effects.

Our objective was to evaluate change trajectories over the course of an intervention rather than long-term outcomes. To extend our findings, future research should evaluate long-term MBI effectiveness by conducting follow-up measurements after several weeks and months, including third-party ratings and further outcomes as those discussed below. Moreover, future research should use high-quality randomized controlled designs (Lomas

et al., 2019) to investigate whether people benefit more from mindfulness training than from being in active control groups. For example, mindfulness training teaching cognitive–emotional segmentation strategies could be compared with behavioural boundary management skill training. Boundary management skills, such as boundary creation and segmentation competency, should be directly measured as in previous boundary management interventions (Rexroth et al., 2016). Differential effects of behavioural and cognitive–emotional boundary tactics on behaviour-based or time-based WFC (Greenhaus & Beutell, 1985) could be evaluated.

A major limitation is the underlying assumption that individuals can regulate their boundaries according to their preference. However, organizations provide supplies and cultural norms that determine how extensively employees can manage their boundaries. For instance, Adkins and Premeaux (2014) showed that role integration preference and being required to be connected after hours were associated with the use of technology for after-hours work-related connectivity. Foucreault et al. (2018) showed that when segmenters perceived that their organizational culture strongly supported integration, they were less able to detach after work. Park et al. (2011) showed that high organizational norms for segmentation ensured that employees segmented their use of technology. Yang et al. (2019) showed that group norms moderated the relationship between segmentation preferences and work-related technology use at home. In another study, integrators who had low perceptions of organizational integration norms were able to use work-related PC/laptops at home without feeling time-based or strain-based WFC (Gadeyne, Verbruggen, Delanoëje, & De Cooman, 2018). Rexroth et al. (2014) showed that both segmenters and integrators who were not given the possibility to segment were emotionally exhausted and dissatisfied with work–life balance. Brauner et al. (Brauner, Wöhrmann, & Michel, 2020) showed that employees working in jobs that allow segmentation of life domains were more satisfied with their work–life balance. Thus, having the possibility to segment work and home may be as important as matching preferences and supplies for reducing WFC (Kreiner, 2006). Future research should therefore consider segmentation supplies or cultural norms and evaluate interactions with personal boundary management strategies to better account for such contextual influences. Moreover, future research should conduct multilevel interventions that are aimed at building resources at multiple levels (individual, group, leader, or organizational level) (Nielsen et al., 2017). A further limitation is that we used reduced WFC and increased satisfaction with work–life balance to evaluate effects on the work–life interface. To better capture effects, future research should include work–family enrichment processes, their interaction with conflict and satisfaction, and further facets of work–life balance, such as balance effectiveness or involvement (Casper et al., 2018; Wayne et al., 2017).

We did not differentiate between preference for segmentation at work or at home, although researchers are showing that preferences differ for segmenting work from the family domain versus family from the work domain, with domain-specific effects on boundary creation (Methot & LePine, 2016; Park & Jex, 2011). Future research should consider whether the bidirectional nature of segmentation preferences shapes responsiveness to MBIs. Moreover, future research might evaluate whether mindfulness practiced at work also alleviates family–work conflict through domain-specific mindfulness measures, aligned with research showing the need to consider domain-specific state mindfulness (Haun et al., 2018).

Furthermore, more research is needed to better understand boundary conditions, underlying processes, and factors that influence the success of mindfulness practice. Future research could examine the positive-activity model in more detail (Lyubomirsky &

Layouts, 2013), including how person features affect well-being and activity characteristics (e.g., dosage, variety, or social support) or workplace characteristics as potential boundary conditions (Jamieson & Tuckey, 2017).

A further limitation is that we focused on affective well-being. Subjective well-being includes numerous components (Diener, Emmons, Larsen, & Griffin, 1985; Diener, Suh, Lucas, & Smith, 1999), so we propose that future research should examine effects on cognitive well-being indicators such as daily life satisfaction. Moreover, we focused on negative affect as an indicator for affective well-being. Future research could expand this by including asset-based well-being measures such as positive affect.

We used the state version of the MAAS (Brown & Ryan, 2003), a mindfulness scale explicitly designed to assess state or trait mindfulness in a general adult population with no experience with mindfulness training. The scale is well-established for intervention studies in the work context (Hülshager et al., 2013, 2015; Kiburz et al., 2017) and recommended as a manipulation check in intervention studies (Jamieson & Tuckey, 2017), but it is increasingly criticized for measuring only present-centred attention awareness (e.g., Grossman, 2011). According to the two-component model of mindfulness (Bishop et al., 2004), mindfulness is a multifaceted construct that includes accepting and non-judgemental attitudes that are not measured with the MAAS. Future research could include potentially different operationalizations of mindfulness in work contexts. Moreover, we assessed only state mindfulness, although participants may have varied in trait mindfulness. Thus, future research should observe trait and state mindfulness to address the potential limitation.

Last, organizations share responsibilities for well-being and work–life balance. They should provide employees with the opportunity to separate work and private life, for example by establishing suitable human resource practices and policies or facilitating supervisor behaviours and a workplace climate that encourage segmentation of life domains (Kreiner, 2006).

Conclusion

By showing that a brief mindfulness-based self-training intervention can foster detachment, reduce psychological work–life conflict, and improve satisfaction with work–life balance, our study advances the literatures of boundary theory, mindfulness, and positive psychology. We show how the positive effects unfold over time and that MBI intervention research should include personal characteristics. Although interventions can help all participants derive work–life balance benefits, segmentation preferences determine effects on psychological detachment. As a practical implication, boundary management interventions should include emotional–cognitive segmentation strategies. Moreover, organizations should tailor interventions to both integrators and segmenters because both can gain from interventions. Last, organizations should offer segmentation possibilities.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Sarah Elena Althammer (Writing – original draft; Writing – review and editing; Formal analysis). Dorota Reis (Formal analysis; Writing – original draft; Writing – review and editing). Sophie van der Beek (Investigation; Writing – original draft) Laura Beck (Investigation; Writing – original draft). Alexandra Michel (Conceptualization; Methodology; Project administration; Supervision; Writing – original draft; Writing – review and editing).

Data Availability Statement

The corresponding author will provide supporting data on request.

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