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A Mind Full of Happiness: How Mindfulness Shapes Affect Dynamics in Daily Life

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Mindfulness plays an important role in moderating affect dynamics. To date, associations between mindfulness and affect dynamics have mostly been examined with mindfulness as a trait-like characteristic. However, examining associations between momentary mindfulness and affect dynamics could reveal important within-person processes underlying mindfulness and wellbeing. The present study first examined dispositional mindfulness as a 1-dimensional as well as a multifaceted construct in relation to affect dynamics (instability, inertia, and valence switch). We further investigated how momentary mindfulness predicts affect dynamics, and how training momentary mindfulness with a mindfulness training influences affect dynamics in daily life. A final sample of 125 undergraduate students took part in a 6-week randomized controlled trial, either engaging in a low-intensity mindfulness training ($n = 61$) or being part of a wait-list control condition ($n = 64$). We assessed participants' low and high arousal positive (PA) and negative affect (NA) and their momentary mindfulness 6 times a day for 40 consecutive days by implementing an ambulatory assessment (AA) protocol during either the mindfulness training or waiting period, respectively. We found that the dispositional mindfulness facet present-awareness was negatively associated with low arousal NA inertia and a lower switching propensity. However, we found momentary mindfulness to be positively associated with low arousal PA inertia, a lower switching propensity to NA and less instability. Furthermore, participants who practiced mindfulness experienced reduced low arousal NA inertia. These findings demonstrate that momentary mindfulness may be helpful in promoting adaptive affect experiences and maintaining PA, which could ultimately foster affective well-being.

Keywords: affective well-being, affect dynamics, momentary mindfulness, mindfulness training, ambulatory assessment

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Mindfulness refers to an individual's ability to consciously focus on the sensations of the present moment with an open and accepting stance (Bishop et al., 2004), and can be defined as either a one dimensional or a multifaceted construct (Baer, Smith, & Allen, 2004; Brown & Ryan, 2003). In addition to mindfulness as disposition, *momentary mindfulness* refers to a state of mind that fluctuates within individuals, independent of how mindful they generally tend to be (Brown & Ryan, 2003). Dispositional mindfulness is considered to have a positive impact on affective well-being by means of improving acceptance and the release of negative emotions and cognitions (Bishop et al., 2004). Numerous studies have found supporting evidence for this view: Individuals high in dispositional mindfulness have reported less negative affect (Baer et al., 2004; Brown & Ryan, 2003), lower levels of ruminative thinking (Raes & Williams, 2010), more functional emotion regulation (Chambers, Gullone, & Allen, 2009), and increased well-being (Brown & Ryan, 2003). Further support was drawn from intervention research, whereby mindfulness-based training programs have been found to be effective in promoting affective well-being across a range of applications and health conditions (e.g., Barnhofer et al., 2009; Hayes, Strosahl, & Wilson, 2012; Kabat-Zinn et al., 1992; Linehan, 1993; Ostafin et al., 2006; Segal, Williams, & Teasdale, 2002; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). Training momentary mindfulness also increases dispositional mindfulness over time, which may ultimately improve an individual's affective well-being (e.g., dispositional distress; Kiken, Garland, Bluth, Palsson, & Gaylord, 2015).

Most research to date on the affective correlates of dispositional mindfulness has been largely limited to the study of average levels of affect (Keng & Tong, 2016) in single observational studies or pre- and postcomparisons in intervention research. As such, the affective correlates of dispositional mindfulness have frequently been treated as static, trait-like dispositions, neglecting within-person mechanisms underlying affective well-being. Affective ex-

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periences, however, are anything but stable. They are dynamic and complex processes, which reflect individuals' responses to daily life's internal and external regulatory demands (Kashdan & Rottenberg, 2010; Kuppens, Oravecz, & Tuerlinckx, 2010). These affect dynamics play a crucial role in general well-being and psychological functioning (Houben, Van Den Noortgate, & Kuppens, 2015; Trull, Lane, Koval, & Ebner-Priemer, 2015). A recent study by Keng and Tong (2016) used an ambulatory assessment (AA; Kubiak & Stone, 2012; Shiffman, Stone, & Hufford, 2008) approach using electronic diaries to investigate the dynamic nature of affect and its relationship to dispositional mindfulness in daily life (Keng & Tong, 2016). This "real-life" approach leads to data of high ecological validity and offers opportunities to study underlying processes in the context of everyday life (Shiffman et al., 2008). In Keng and Tong's (2016) study, more mindful people reported less maladaptive affective patterns in daily life, as evidenced by less persistent and less intense fluctuations in negative affect experiences compared with individuals low in dispositional mindfulness.

When it comes to investigating associations with affect dynamics, focusing solely on trait-like dispositional mindfulness falls short of offering a complete picture of these processes. Specifically, it remains unclear how within-person processes of momentary mindfulness relate to affect dynamics. It is well known that momentary mindfulness substantially varies within individuals according to fluctuating internal and external circumstances (Brown & Ryan, 2003; Nezlek, Holas, Rusanowska, & Krejtz, 2016). Moreover, Brown and Ryan (2003) have argued that momentary and dispositional mindfulness are statistically and conceptually independent. Not surprisingly, momentary mindfulness has shown stronger positive effects on momentary emotional well-being than has dispositional mindfulness. Furthermore, the within-person association between momentary mindfulness and emotional well-being was found to be independent from dispositional mindfulness (Brown & Ryan, 2003). These findings underscore the importance of considering dynamic within-person processes of momentary mindfulness when examining the potential impact of mindfulness on affective experiences.

In summary, mindfulness has consistently been shown to be associated with affective well-being. There is, however, only scarce evidence regarding the basic processes underlying mindfulness that may influence affective experiences and, ultimately, well-being. In the present study, we conducted a randomized controlled trial combined with an AA approach to examine within-person processes of momentary mindfulness on affect dynamics in the course of mindfulness training. In this way, we aimed to reveal a more nuanced picture of how mindfulness may ultimately improve affective well-being. In this section, we describe recent findings on affect dynamics related to mindfulness, and provide a rationale for studying basic within-person processes of momentary mindfulness in the context of a mindfulness training.

Affect Dynamics and Dispositional Mindfulness

Affect dynamics capture the time-dynamic nature of affect in daily life in describing how affect changes or fluctuates across time (Kuppens, 2015; Trull et al., 2015). These affective patterns are proposed to be the result of multiple factors, such as changes in internal or external situational circumstances (Barrett, 2014), social interactions (Mesquita & Boiger, 2014), or appraisals (Moors, 2014). Affect dynamics contain crucial information about adaptive or maladaptive affective responses and well-being, which would be lost in using averaged or single measurements of affect (Keng & Tong, 2016; Trull et al., 2015). As such, affect dynamics constitute an important mental health factor (Kuppens, 2015): Affect dynamics are a key facet of well-being and psychopathology (Houben et al., 2015; Trull et al., 2015), and may contribute to better understanding mental health, as they describe basic microlevel processes that, over time, may put individuals at risk for developing psychopathologies (Wichers, Wigman, & Myin-Germeys, 2015). A recent meta-analysis showed that extreme moment-to-moment changes of affect, described as affective instability, as well as carrying over affect from moment-to-moment, described as affective inertia, were both consistently associated with several psychopathological disorders, as well as with lower overall well-being (Houben et al., 2015).

A recent study took a more nuanced focus on different aspects of adaptive and maladaptive affect dynamics in daily life and their associations with an important facet of *dispositional mindfulness*: the tendency to be aware of the present moment (Keng & Tong, 2016). Following an AA approach, Keng and Tong (2016) conducted a 2-day electronic diary study in a student sample, assessing positive affect (PA) and negative affect (NA) 18 times a day. The findings support the assumption that mindfulness positively influences adaptive patterns of affect: People who scored higher in dispositional mindfulness were less likely to experience NA instability compared with those who scored lower in dispositional mindfulness. The negative association between dispositional mindfulness and NA instability hints at lower affect reactivity to daily stressors when being mindful. Moreover, high dispositional mindfulness was associated with less NA inertia from noon to afternoon, which gives evidence for an easier release of negative affect experiences as the day goes by. An interesting find was that dispositional mindfulness was also positively associated with affect switches from NA in the morning to PA in the afternoon. This association, again, illustrates that mindfulness may be helpful in effectively regulating NA experiences. Even after controlling for several dispositional factors that relate to mindfulness (e.g., openness, self-esteem), the associations between mindfulness and affect dynamics remained stable. Hence, the study by Keng and Tong (2016) was the first to examine associations between dispositional mindfulness, assessed as present moment awareness, and various daily adaptive and maladaptive affect dynamics, with important implications for how mindfulness may be an important protective factor in maintaining and promoting affective well-being.

While the latter study found dispositional present moment awareness of highest relevance for affective experiences, recent theories highlight the importance of additional mindfulness features that may contribute to affect dynamics in daily life: For example, the Monitor and Acceptance Theory (MAT; Lindsay & Creswell, 2017) suggests that monitoring one's current sensations increases affective responses toward affect relevant stimuli. However, if these observed affective experiences were also accepted, this could help to reduce affective responses by noticing present feelings and letting them pass by. Hence, the dispositional mindfulness facets observing and accepting may also be related to affect dynamics in daily life. For this reason, we extended recent research (Keng & Tong, 2016) by examining further associations between affect dynamics in association to mindfulness as a multifaceted construct, including the facets acting with awareness, acceptance, observing, and describing (Baer et al., 2004).

Mindfulness Training

To allow for the conclusions of a causal relationship between mindfulness and affect dynamics, it is also important to examine the direct effect of meditation exercises on momentary mindfulness and ultimately dispositional mindfulness and affect dynamics, which could give further important insights into the small building blocks that maintain psychological health (Wichers et al., 2015). Meditation exercises have been shown to lead to higher levels of momentary mindfulness (Garland, Hanley, Farb, & Froeliger, 2015; Kiken et al., 2015). Further studies using an AA approach in mindfulness intervention trials found increased momentary mindfulness to predict increased PA and less NA (e.g., Gotink et al., 2016; Snippe, Nyklíček, Schroevers, & Bos, 2015). This effect of mindfulness training may stimulate an upward spiral of positive cognitions and PA (Garland et al., 2015) as well as momentary mindfulness and PA (Gotink et al., 2016), possibly facilitating adaptive affect dynamics.

The Present Study

The present study was part of the "Self-control and Mindfulness within Ambulatorily assessed network Systems across Health-related domains" (SMASH) study (Rowland, Wenzel, & Kubiak, 2016), a 6-week randomized controlled trial combining seven weekly laboratory sessions with a 40-day AA protocol to examine the effects of dispositional mindfulness on self-regulation and affect in daily life. Using the data that was collected during the SMASH study, the main goal of the present study was to gain a deeper understanding of how mindfulness influences affect dynamics in daily life.

Aims

To allow for a detailed look at how mindfulness is associated with affect dynamics, we differentiated between specific mindfulness facets, concepts, and affect dynamic patterns. We first aimed at extending Keng and Tong's (2016) results regarding associations between dispositional mindfulness (defined as the tendency to be aware of the present moment) and affect dynamics by further investigating whether the other dispositional mindfulness facets such as accepting without judgment, observing, and describing (Baer et al., 2004) were also associated with affect dynamics. We extended this line of research by differentiating between dispositional mindfulness, which captures between person differences, and state mindfulness, that captures within-person fluctuations. With a mindfulness training at the core of the design of the present study, we additionally investigated whether training momentary mindfulness influenced affect dynamics.

In regard to affect dynamics, we undertook further important differentiations. We examined several specific nuances of affect dynamics, reflected in affective instability, inertia, and valence switches (Houben et al., 2015). All of these indicators describe distinct affect dynamic patterns that reflect (mal)adaptive affective reactivity and recovery in daily life. Adaptive affective reactivity and recovery is assumed to combine less affective instability (small shifts in affect), less inertia (improved recovery from previous experiences), and smaller affect valence changes from moment-to-moment (less extreme valence switches; Houben et al., 2016).

Moreover, we considered the valence of affective experiences in the present study. Though there is a debate on whether PA and NA are independent from each other (Watson & Tellegen, 1985) or whether they are two poles of a single valence dimension (Russell & Carroll, 1999), recent evidence has shown that PA and NA tend to be unrelated on a between-person level (Schmukle, Egloff, & Burns, 2002), whereby the relation between PA and NA on a within-person level has been found to vary considerably between individuals (Dejonckheere et al., 2018). Furthermore, NA and PA dynamics tend to be differently associated with health-related constructs: NA inertia and instability have shown stronger negative associations with well-being and dispositional mindfulness than PA inertia and instability (Houben et al., 2015; Keng & Tong, 2016), which further highlights the need to differentiate between PA and NA.

Finally, we differentiated between low and high arousal PA and NA dynamics. In theory, mindfulness is assumed to come along with a calm and accepting stance toward all kinds of experiences, while high arousal and negative states may decrease (e.g., Chambers et al., 2009; Kabat-Zinn, 1990). In line with this, a recent diary study has found daily meditation to only enhance low arousal PA (Jones, Graham-Engeland, Smyth, & Lehman, 2018). Thus, differentiating between high and low arousal PA and NA offers the opportunity to examine specific associations between affect dynamics and mindfulness.

Research Questions

Based on Keng and Tong's (2016) findings, we assumed that dispositional mindfulness, assessed as present moment awareness, may be associated with more adaptive affective reactivity toward and recovery from negative experiences (less low and high arousal NA instability, less low and high arousal NA inertia, and smaller switches to low and high arousal NA). Though recent research has found extreme valence switches to be maladaptive (Houben et al., 2016), Keng and Tong (2016) have found stronger valence switches to PA in individuals reporting high mindfulness. We expected to replicate this Keng and Tong finding (Keng & Tong, 2016), which may be particularly driven by switches to low arousal PA, reflecting adaptive affective recovery. Additionally, we examined how further dispositional mindfulness facets, such as acceptance, observing, and describing, were associated with affect dynamics.

We then focused on fluctuating within-person processes of momentary mindfulness and their relationship to affect dynamics. Because momentary mindfulness may facilitate the implementation of a stable and calm stance toward unpleasant experiences (Desbordes et al., 2015), and momentary mindfulness has been found to be associated with PA in daily life (Brown & Ryan, 2003; Gotink et al., 2016), we expected momentary mindfulness to be associated with stable low arousal PA experiences (less low arousal PA instability and higher low arousal PA inertia). Furthermore, momentary mindfulness may be especially helpful when recovering from negative experiences and to switch to low arousal PA (stronger switches toward low arousal PA).

In regard to high arousal PA dynamics and low and high arousal NA dynamics, we hypothesized that momentary mindfulness improved adaptive affective reactivity toward highly arousing experiences (less instability of and weaker valence switches to low and high arousal NA, as well as high arousal PA). At the same time, we assumed that momentary mindfulness may be helpful in accepting and letting go of high arousal and negative experiences, which would hint at improved adaptive affective recovery (less high arousal PA and less low and high arousal NA inertia).

Finally, we examined whether a mindfulness training in comparison to a control condition influenced affect dynamics in daily life. As for momentary mindfulness, we expected the mindfulness training to improve adaptive affective reactivity and recovery and to implement a stable, calm, and positive stance.

Method

The SMASH study was registered with clinicalTrials.gov (NCT02647801) and was approved by the ethics committee of the Institute of Psychology in Mainz (reference code 2015_JGU_psychEK_011). A detailed description of the methods can be found in the published protocol (Rowland et al., 2016).

Participants

To detect small effects between conditions for our original primary outcomes momentary mindfulness and self-control (Cohen's $d = .33$; Rowland et al., 2016) with a power of $1\text{-}\beta = .95$, we aimed for a total sample size of $N = 134$, with an α level of $\alpha = .05$ and an expected total attrition of 10%. We recruited 137 undergraduate students (76% female) aged between 18 and 49 years ($M_{\text{age}} = 23.08$ years, $SD_{\text{age}} = 5.04$) in two assessment waves (Wave 1: October 2015 until February 2016; Wave 2: May, 2016 until December 2016) at the Johannes Gutenberg University of Mainz, Germany. The study was advertised via social networks and flyers as well as during lectures and seminars on campus. Study participation was on a strictly voluntary basis and participants were free to decline or withdraw participation at any time.

Participants had to meet the following inclusion criteria: (a) sufficient command of German, (b) aged between 18 and 65, (c) sufficient experience with smartphones, and (d) provided informed consent. Participants who carried psychiatric diagnoses or who had any sort of mental or physical impairment that might compromise their ability to use a smartphone were excluded from study participation. All participants received course credits and were entered to win one of two 100 EUR (approx. 113.51 USD) vouchers for an online shop if they completed more than 80% of the prompts of the AA protocol (this procedure will be explored in more detail in the section below).

Eleven participants (8.0%) dropped out over the course of the study and one participant (0.7%) was excluded from the analysis because of signal compliance below 33%, leaving a total of 125 participants with 22,813 complete sets of affect ratings (22,764 completely answered sets). The 12 excluded participants did not differ from the remaining 125 participants regarding age, mean NA and PA, momentary mindfulness, and dispositional mindfulness, $t(135) \leq -1.57$, $p \geq .119$, and gender, $\chi^2(1) = 2.22$, $p = .136$.

Design and Procedure

Figure 1 gives an overview of the study procedure. During a baseline measurement session (t_0) participants were randomly allocated to either a low-intensity mindfulness training or a wait-list control condition and completed several self-report questionnaires regarding self-control and mindfulness (for a complete overview of the measures see Rowland et al., 2016). We used a random allocation rule to generate a sequence of random condition assignments that allowed us to sequentially assign participants to either the mindfulness or control condition. To obtain an additional behavioral measure of mindfulness, participants were then asked to complete a breath-counting task (details in the "Training" section; Levinson, Stoll, Kindy, Merry, & Davidson, 2014).

The AA protocol was launched on the following day using participants' smartphones (or loaner smartphones, if needed), using movisensXS software, Version 0.8.4203 (movisens GmbH, Karlsruhe, Germany). For the next 40 days, participants completed questionnaires regarding their momentary affect and mindfulness six times per day between 10 a.m. and 8 p.m. These six assessment prompts were randomly distributed within the defined time period of 600 min, being at least 45 min and at most 200 min apart.

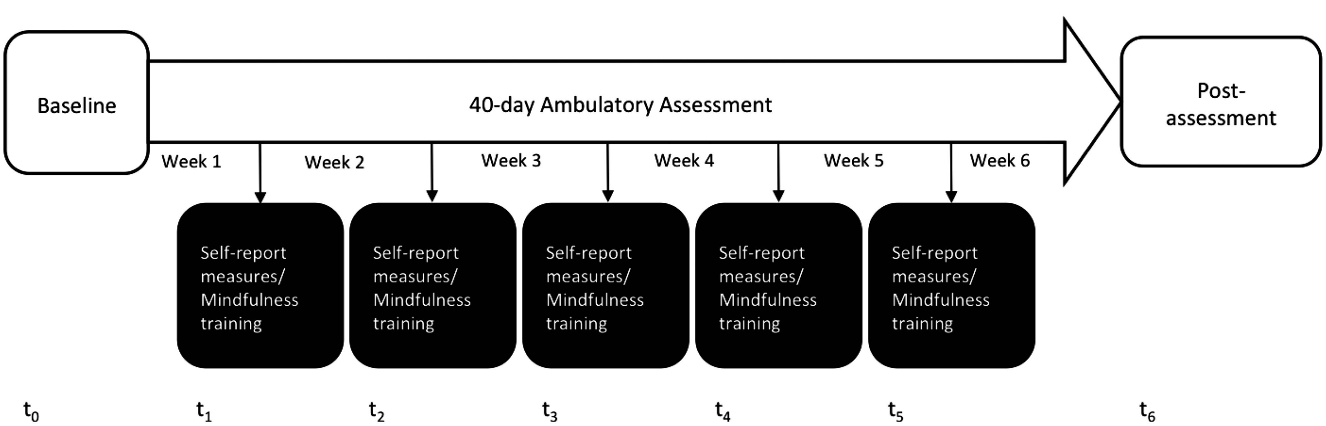

Figure 1. Study procedure. This figure gives an overview on the weekly laboratory sessions (t_0–t_6) and the ambulatory assessment procedure. Participants from both conditions came to weekly laboratory visits. Only participants who were allocated to the mindfulness condition engaged in weekly mindfulness trainings.

Because of technical issues in some cases, 1,243 affect observations (4.14%) and 679 missed observations (2.26%) were not located within the fixed time interval. For the sake of consistency, we excluded these affect observations from our analyses. The average between-signal interval was 103.35 min ($SD = 34.34$).

During these 40 days, all participants from both conditions also attended five additional weekly laboratory visits (10 to 20 min) during which they completed self-report questionnaires on dispositional mindfulness ($t_1 - t_5$) and practiced mindfulness via a breathing meditation (if allocated to the mindfulness condition). If feasible, all seven visits were scheduled for the same day and time at each consecutive week. Upon completion of the AA protocol, the study ended with a postmeasurement session (t_6), during which we obtained all baseline t_0 measures again.

Training

Participants in the mindfulness condition ($n = 61$) practiced mindfulness on five consecutive weekly appointments ($t_1 - t_5$) by completing a computer-based guided breathing meditation based on one created by Levinson and colleagues (2014). Participants learned to be aware of the present moment by concentrating on the sensations that arose while inhaling and exhaling. Other cognitions or emotions that occurred were to be noticed without judgment, guiding attention back to the sensations of breathing. Participants in the mindfulness condition were also encouraged, following the first mindfulness training session, to regularly practice mindfulness at home via a breathing meditation or a body-scan guided meditation provided via their smartphones (see Rowland et al., 2016 for further details).

Measures

Descriptive statistics and reliability of all measures are shown in Table 1.

AA measures.

Positive and negative affect. Affect was assessed six times a day during the 40-day AA, using eight items (Kuppens, Allen, & Sheeber, 2010) based on the circumplex model of affect (Russell, 1980). The circumplex model of affect (Russell, 1980) describes single affective states in a circular model of two universal dimensions: valence and arousal. Several findings from psychological assessments—examining one's own or others' affective states—support the assumption of a two-dimensional structure of affect (e.g., Russell, 1980). For this reason, we considered both valence and arousal of momentary affect in our analyses. Participants were asked to indicate how they felt at the current moment answering eight items on a visual slider scale from 0 (*not at all*) to 100 (*very much*): happy, excited (high arousal PA), relaxed, satisfied (low arousal PA), anxious, angry (high arousal NA), depressed, and sad (low arousal NA). All high and low arousal PA and NA items were averaged within each observation to indicate the overall high arousal PA, low arousal PA, high arousal NA, and low arousal NA of each assessment moment.

Based on the high and low arousal PA and NA scales, we investigated several affect dynamic patterns. First, we examined to what extent participants experienced extreme changes in moment-to-moment affect (affective instability; Jahng, Wood, & Trull, 2008; Koval et al., 2013). In the present study, we refer to moments as assessment prompts during AA, which were at least 45 min apart from each other. To examine affective instability, we calculated squared successive differences (SSD) separately for low and high arousal PA and NA (Jahng et al., 2008; Koval et al., 2013). First, four difference scores of consecutive affect assessments were calculated using unstandardized values (each low and high arousal affective valence state at time point *t-1* was subtracted from the respective low or high arousal affective valence at time point *t*) and were then squared ($SSD_{NA\text{-}low}$, $SSD_{NA\text{-}high}$, $SSD_{PA\text{-}low}$, and $SSD_{PA\text{-}high}$).

Second, we explored how persistent affect is experienced from moment to moment, with the degree to which people generally tend to carry over affective experience from one moment to the next known as emotional inertia (Kuppens, Allen, & Sheeber, 2010; Suls, Green, & Hillis, 1998). Inertia was represented by autoregressive slopes obtained from the mixed lagged models (described in the analytic approach section), with autoregressive slopes being allowed to vary between-persons. These autoregres-

Table 1
Range, Actual Range, Reliabilities, Means, SDs, and Inter-Correlations of Momentary and Dispositional Scales

Measure	Range	Actual range	R_{KRN}	R_{CN}	M	SD	1	2	3	4	5	6	7	8	9
1. PA_{low}	0–100	0–100	.98	.64	54.88	23.43									
2. PA_{high}	0–100	0–100	.98	.69	50.14	23.72	.71*								
3. NA_{low}	0–100	0–100	.98	.63	18.28	20.94	−.43*	−.38*							
4. NA_{high}	0–100	0–100	.98	.43	13.35	18.03	−.36*	−.24*	.66*						
5. S-MAAS	0–6	0–6	.99	.79	4.80	1.31	.21*	.14	−.37*	−.34*					
6. MAAS	1–6	2.20–5.33	.83[a]	—	3.96	.66	.15	.09	−.34*	−.27*	.44*				
7. KIMS observing	1–5	2.00–4.66	.78[a]	—	3.43	.55	.10	.14	.02	.00	−.06	.10			
8. KIMS describing	1–5	2.13–5.00	.86[a]	—	3.79	.70	.20*	.21*	−.10	−.09	.01	.29*	.31*		
9. KIMS awareness	1–5	1.40–4.50	.85[a]	—	3.03	.60	.26*	.27*	−.42*	−.30*	.41*	.61*	.10	.22*	
10. KIMS acceptance	1–5	1.00–5.00	.90[a]	—	3.31	.84	.16	.12	−.36*	−.40*	.29*	.39*	.05	.35*	.39*

Note. $N = 125$. NA = negative affect; PA = positive affect; low = low arousal; high = high arousal; MAAS = Mindfulness Attention Awareness Scale; S-MAAS = state version of the Mindfulness Attention Awareness Scale; KIMS = Kentucky Inventory of Mindfulness Skills; R_{KRN} = between-person reliability; R_{CN} = within-person reliability (within-subject differences in change over time; Shrout & Lane, 2012). Variables are not standardized. The upper part of the table presents variables, which were assessed during ambulatory assessment. The lower part of the table presents dispositional MAAS and KIMS, which were assessed at baseline t_0.
[a] Cronbach's α.
* $p < .05$.

sive effects were modeled by regressing each affect measure at time point *t* on a lagged within-person centered version of itself at time point *t-1*. This type of centering was used to remove between-person differences in mean from Level 1 estimates of inertia (e.g., Koval, Sütterlin, & Kuppens, 2016) and should be preferred if the main goal is investigating the effect of higher-level variables (e.g., dispositional mindfulness) on inertia (Hamaker & Grasman, 2015).

Finally, we examined how likely participants were to switch from one affect valence at one moment to the opposite affect valence at the following moment, as well as to what degree this change occurred (Houben et al., 2016). Keng and Tong (2016) define valence switch as an association between the affect valence measured at time point *t-1* and the opposite valence at the next time point *t*. As this association can be positive or negative, and large or small, independent of whether an actual affect valence switch occurs, we used two alternate measures more suitable to capturing valence switches: switching propensity and switch distance, in different directions (Houben et al., 2016). To indicate whether a switch occurred and in what direction the valence switch happened, switches from low and high arousal PA at time point *t-1* to low and high arousal NA at time point *t* (and vice versa) were represented by eight dichotomous variables coding whether a switch occurred or not (switch = 1, no switch = 0). These dichotomous variables were then used as outcomes in logistic mixed models, and the estimated odds ratios reflected switching propensities (Houben et al., 2016).

To further estimate the switch distance in different directions (Houben et al., 2016), we first calculated four separate difference scores by subtracting the unstandardized values of each low and high arousal NA scale at time point *t* from each low and high arousal PA scale at the same time point *t*. This resulted in four difference scales ranging from −100 to 100, with positive values indicating higher levels of PA than NA at time point *t*, and vice versa. Then, we calculated the distances (Dis) between each successive observation for all four difference scales, subtracting the affect difference score at the previous observation *t-1* from the respective affect difference score at time point *t* (Dis_{low}, Dis_{high}, $Dis_{PAlow–NAhigh}$, and $Dis_{PAhigh–NAlow}$). These absolute values of distances can be interpreted as switch distance between two consecutive observations. To further investigate switch distances for no switches, switches to PA, and switches to NA, these distances were regressed on the respective three dichotomous variables, which coded the switch direction (No switch, Switch to PA, and Switch to NA). Estimation procedures are described in the Analytic Approach section.

Given that some outcome variables were heavily right-skewed (NA measures of inertia; difference scores of instability and switch valence), we log-transformed these variables (e.g., Houben et al., 2016; Koval et al., 2013).[1]

Momentary mindfulness. We used a short form of the Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003) to reduce participant assessment burden. This short form comprises three items taken from the state version of the MAAS (Items 8, 10, and 14 of the MAAS) to assess present moment awareness on a 7-point scale Likert-type ranging from 0 (*not at all*), 3 (*somewhat*), to 6 (*very much*). Participants were asked to indicate to what degree they were acting with awareness since the last assessment prompt (unlike stated in the study protocol, the German version of these items assessed momentary mindfulness between time point *t-1* and time point *t*).

Dispositional measures. Dispositional mindfulness was assessed using the German version of the trait MAAS (Michalak, Heidenreich, Ströhle, & Nachtigall, 2008), which consists of 15 items on a 6-point Likert-type scale ranging from 1 (*almost always*) to 6 (*almost never*). The trait MAAS measures mindfulness as present moment awareness of sensations and activities.

As an additional measure of mindfulness for further analyses, we assessed several mindfulness facets using the German version (Ströhle, Nachtigall, Michalak, & Heidenreich, 2010) of the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004). This scale consists of 39 items assessing four facets of mindfulness—observing, describing, accepting without judgment, and acting with awareness—on a 5-point Likert-type scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*). All inverse items were recoded and individuals' mean scores for each subscale were calculated.

Analytic Approach

The ambulatory assessment approach led to repeated assessments within each subject, with observations being dependent on each other. Given the nested nature of the data, with daily signals (Level 1) nested within participants (Level 2), the commands "mixed" and "melogit" in Stata 15 (Stata Corporation, College Station, TX) were used to subject the data to two-level (logistic) linear mixed (lagged) models. These linear mixed models consider similarities of within-person observations while also allowing between-person differences when including random intercept and slopes. To examine affective instability, inertia, and switch, we used two-level models, the state-of-the art approach in recent affect dynamics research (e.g., Houben et al., 2016; Koval et al., 2016; Kuppens, Allen, & Sheeber, 2010).[2]

Using this multilevel approach, affect dynamics at a moment-to-moment level (Level 1) were predicted by between-person differences of dispositional MAAS and KIMS (Level 2), and within-person variations of momentary mindfulness (Level 1). Momentary mindfulness referred to experienced mindfulness be-

[1] To log-transform right-skewed variables, we replaced all zero values with half the smallest nonzero values (Koval et al., 2013). Skewness and kurtosis of all transformed variables are presented in the supplementary materials.

[2] Fixed effects, which represented associations between mindfulness and instability, and associations between switch distance and mindfulness did barely differ between two- and three-level models (instability: $r_{Coefficients}$ = .998; $r_{p\text{-}values}$ = .995; switch distance: $r_{Coefficients}$ = .969; $r_{p\text{-}values}$ = .898). Thus, results from three-level models did not lead to different conclusions. The three-level models for switching propensity did not converge. We note that a recent study introduced an alternative approach to study affective inertia, which is to use three-level models (with day as an additional level) to estimate day-level as well as observation-level affective inertia in a single model (De Haan-Rietdijk et al., 2016). Because simulation studies recommend a minimum of nine daily signals to obtain sufficiently precise estimates of parameters on the day level and to differentiate between a two- and a three-level structure (de Haan-Rietdijk, Kuppens, & Hamaker, 2016), we chose to only focus on affective inertia on the observation level in this present study. In case that we wrongly used two-level models as three-level models would best reflect the data, we might have overestimated observation-level inertia by ignoring the day-level. In the opposite case, if we wrongly used a three-level model over a two-level model, day-level inertia might be an artifact created by actual observation-level inertia.

tween time point *t-1* and *t*. Finally, we examined whether affect dynamics were changed by mindfulness training using a cross-level interaction of condition (Level 2) and week of study participation (Level 1). This cross-level interaction indicated weekly changes of affect dynamics depending on the condition allocation.

For all models, we only used completely answered affect sets assessed at consecutive time points. The first observation of each day was also removed from all analyses to exclude affect changes and associations from one day to another. Time distances between affect observations from evening to morning differed temporally from within-day signal time distances (e.g., Koval et al., 2016). To control for condition allocation (mindfulness training vs. control condition) and assessment wave (different research assistants), we added variables coding the condition (0 = control, 1 = mindfulness) and assessment wave (0 = first wave, 1 = second wave) to each model. Since affect may fluctuate systematically over time, possibly impacting affect dynamics measures (Trull et al., 2008), we added linear and quadratic time trends over the time of assessment (Day 1–40), as well as linear and quadratic time trends over the time of the day (Observation 1–6) as fixed effects control variables. In doing so, we controlled for possible changes because of training, study participation, or trends (Trull et al., 2015). Random slopes were added for Level 1 predictors and Level 1 within-person interactions of theoretical interest according to the guidelines for mixed-effect models suggested by Barr (2013).[3]

All mixed models were first fitted using unstandardized values as outcomes and predictors. To differentiate between within- and between-person processes, all continuous Level 1 predictors were either within- or between-person centered depending on whether we were interested in within- or between-person processes. Continuous Level 2 predictors were between-person centered. Time trends and dichotomous variables were not centered. We report effect sizes for continuous variables in the form of standardized coefficients or odds ratios. Because there are multiple accepted ways to provide effect sizes from mixed models (e.g., Cohen's f^2, or deriving standardized coefficients directly from unstandardized coefficients), we repeated all analyses using standardized outcomes and predictors to obtain standardized coefficients (Hox, 2010). By using standardized variables, we were able to facilitate interpretation, compare our results with the findings of other samples (Hox, 2010), and control for individual differences in variability when estimating Level 1 model parameters (Koval et al., 2016). However, as this approach can alter the estimates of the variance components at each level, the *p* values, and interaction effects of the mixed model (Hox, 2010), we provide unstandardized fixed effect estimates in the supplementary materials.

Model specification. We examined associations between affective instability and the predictors of interest (MAAS, KIMS facets, State MAAS, and Training) by regressing each of the SSD scores (SSD_{NAlow}, SSD_{NAhigh}, SSD_{PAlow}, and SSD_{PAhigh}) on one of the predictors in separate hierarchically two-level linear mixed models. We then expanded our affective instability models by controlling for individuals' mean levels of momentary affect, as suggested by Ebner-Priemer, Eid, Kleindienst, Stabenow, and Trull (2009).

We next examined associations between affective inertia and each predictor of interest: In separate two-level linear mixed lagged models, we regressed each of the affect measures (NA_{high}, NA_{low}, PA_{high}, and PA_{low}) on the respective *t-1* lagged version of itself, as well as on the interaction term between the predictor of interest and the respective lagged affect measure. A significant interaction term between the lagged affective state and the predictor of interest would indicate a significant association between affective inertia and the respective predictor of interest.

To examine associations between switching propensity and all mindfulness measures, we regressed the eight dichotomous variables that represented a switch or no switch at different arousal states on each predictor of interest, using two-level logistic linear mixed models. Odds ratios lower than 1 would indicate that the odds of experiencing a valence switch were lower for those with high as opposed to low levels of mindfulness, or for those who had undertaken mindfulness training as opposed to no mindfulness training.

We then tested whether switch distance was predicted by the predictors of interest by fitting linear mixed models. We regressed each distance score (Dis_{low}, Dis_{high}, $Dis_{PAlow–NAhigh}$, and $Dis_{PAhigh–NAlow}$) on the two-way interaction between a predictor of interest and the dichotomous switch variables. We controlled for the switch starting point (i.e., previous affective experience) because more extreme valence switches are needed to switch from a particularly pronounced affect valence to the opposite affect valence (Houben et al., 2016). Example STATA syntax for all models can be viewed in the supplementary materials. Full data and syntax are publicly available at https://osf.io/gs4jq/.

Results

Overall, participants ($N = 125$) answered 75.88% of the AA protocol assessment prompts ($SD = 14.84$, ranging between 34.58 and 97.50%). A goodness-of-fit test revealed significant differences between the weekly compliances, $\chi^2(5) = 48.48$, $p < .001$, with average compliance ranging from 78.93% in the first week to 74.47% in the fourth week.

Four unconditional two-level mixed models with the unstandardized variables PA_{low}, PA_{high}, and the log-transformed NA_{low} and NA_{high} as outcomes revealed that 62.34% (PA_{low}), 55.23% (PA_{high}), 53.41% (NA_{low}), and 55.13% (NA_{high}) of total variance were attributable to within-person differences in affective experience. Thus, there was enough room to include both dispositional and momentary measures of mindfulness. Associations between

[3] We tested for each model whether an unstructured covariance structure improved model fit in comparison with an independent covariance structure using a goodness-of-fit test. If this was the case, an unstructured covariance structure was included, allowing correlations between random intercept and slopes. Otherwise, and if the unstructured covariance structure led to nonconvergence of a model, we used an independent covariance structure, not overfitting the model with correlations between random slopes and intercepts. Autoregressive processes were modeled explicitly by adding the lagged outcome variable (assessed at time point *t-1*). Alternatively, autocorrelations can be modeled using an autoregressive residual structure (e.g. de Haan-Rietdijk, Kuppens, & Hamaker, 2016). To test whether our data were stationary to fit lagged models, we computed a Fisher-type unit-root tests, which tests against the null-hypothesis that all series contain a unit-root. This test indicated that data (at least one series) was stationary across the 40-day assessment $Z^{-1} \leq -38.21$, $p < .001$ regarding low and high arousal NA and PA when using one lag and including a linear time trend. Further Fisher-type unit-root tests indicated that data within any of the 6 weeks, $Z^{-1} < -10.06$, $p < .001$, did not contain a unit root when using one lag.

mean levels of momentary affect and the predictors of interest are presented in Table 2.

Affect Dynamics Results

In the interest of brevity, we only report the key findings presenting standardized coefficients. Additionally, we report unstandardized coefficients if those differed from standardized coefficients. For each affective dynamic indicator, we present the findings in the same order throughout the Results section: (a) between-person associations with dispositional MAAS, (b) between-person associations with dispositional KIMS facets, (c) within-person associations with state MAAS, and (d) the influence of the mindfulness training.[4]

Affective instability results. First, we modeled associations between affective instability and the predictors of interest and found a significant negative association between dispositional MAAS and both low and high arousal NA instability (SSD_{NAlow}: $\beta = -.14$, $SE = .04$, 95% CI [−.22, −.06], $p = .001$; SSD_{NAhigh}: $\beta = -.13$, $SE = .04$, 95% CI [−.21, −.05), $p = .002$]), replicating the recent findings by Keng and Tong (2016). However, when adding individuals' low and high arousal NA levels as predictors to the models, the association between dispositional mindfulness and low and high arousal NA instability did not reach statistical significance; thus, indicating that our found association between dispositional mindfulness and NA instability could be partially explained by the average NA level (see Table 3).

Regarding KIMS, KIMS Awareness was negatively associated only with low arousal NA instability, $\beta = -.10$, $SE = .04$, 95% CI [−.18, −.01], $p = .023$, but not high arousal NA instability, $\beta = -.06$, $SE = .04$, 95% CI [−.15, .03], $p = .167$. High arousal NA instability was significantly predicted by KIMS Acceptance, $\beta = -.11$, $SE = .05$, 95 CI [−.20, −.02], $p = .019$, showing that participants who were more accepting and nonjudgmental than others experienced less high arousal NA instability in daily life. However, when again controlling for the respective mean NA levels (see Table 3), the association between KIMS Awareness and low arousal NA instability and between KIMS Acceptance and high arousal NA instability also failed to reach significance, further highlighting that mean NA played an important role in predicting NA instability. The remaining mindfulness facets did not show any associations with either PA or NA instability.

Beyond and above our dispositional mindfulness findings, we found momentary mindfulness to better predict affective instability in daily life, independent of the individuals' mean NA: momentary mindfulness was not only negatively associated with low and high arousal NA instability, but also with low and high arousal PA instability (see Table 3), indicating that participants experienced less extreme changes in all affect valence and arousal states when being mindful in the present moment. However, the mindfulness training did not significantly influence affective instability (see Table 3).

Affective inertia results. Next, we modeled associations between affective inertia and the predictors of interest. We only found a significant negative association between dispositional MAAS and low arousal NA inertia, but not high arousal NA inertia (see Table 4). Furthermore, a more detailed look on mindfulness using the KIMS facets did first reveal a significant association between KIMS Awareness and low arousal NA inertia, $b = -0.06$, $SE = 0.03$, 95% CI [−0.12, −0.00], $p = .042$. This significant effect, however, vanished when using standardized variables, which control for between-person variability (see Table 4).

In contrast to our dispositional mindfulness findings where only low arousal NA inertia, but not PA inertia, was predicted by dispositional MAAS, we found momentary mindfulness to be of most relevance to positively predict low arousal PA inertia, but not NA inertia. This indicates that dispositional and momentary mindfulness are differentially related to affective inertia. Thus, participants who reported higher levels of dispositional MAAS than others experienced less low arousal NA inertia. However, when a participant was more mindful than usual, the participant experienced more low arousal PA inertia from moment to moment (see Table 4).

In addition, we first found a nonsignificant training effect on low arousal NA inertia, $b = -.03$, $SE = .01$, 95% CI [−.05, .00], $p = .062$, which seemed to be driven by between-person differences in variability and mean because when we controlled for between-person differences using within-person standardized affect variables, this training effect became significant, $p = .049$ (see Table 4). This finding indicates that participants who practiced mindfulness experienced less low arousal NA inertia (see Table 4).[5]

Switching propensity and switch distance results. In a next step, we computed eight separate logistic mixed models to model associations between switching propensity and each predictor of interest. We found that individuals with higher levels of dispositional MAAS experienced a lower switching propensity in that they reported a lower switching propensity in all switch directions (Table 5, odds ratios). A similar pattern was found for KIMS Awareness, showing a lower propensity to switch to low and high arousal PA and NA with increasing levels of KIMS Awareness.

[4] We found that the mindfulness training was indeed effective to increase momentary and dispositional mindfulness (Rowland, Wenzel, & Kubiak, 2018).

[5] Inertia findings should be interpreted with caution–we cannot rule out the possibility that a three-level rather than a two-level model best fitted data because of our small number of observations per day (de Haan-Rietdijk, Kuppens, & Hamaker, 2016). Please note that computing three-level models following the example of de Haan-Rietdijk, Kuppens, and Hamaker (2016) with day-centered lagged affect variables at Level 1 and person-mean centered lagged day mean affect variables at Level 2, led to slightly different results (supplementary materials): dispositional MAAS (grand-mean centered) was negatively associated with both high and low arousal NA day-to-day inertia (NA_{low}: $b = -.09$, $SE = .04$, 95% CI [−.16, −.02], $p = .014$.; NA_{high}: $b = -.12$, $SE = .04$, 95% CI [−.19, −.04], $p = .003$) but not with NA moment-to-moment inertia, absolute bs $\leq .00$, $p \geq .833$. Furthermore, KIMS Describing (grand-mean centered) was negatively associated with high arousal PA day-to-day inertia, $b = -.08$, $SE = .04$, 95% CI [−.15, −.01], $p = .029$. However, similar to the two-level model findings of this present study, momentary mindfulness (person-mean centered) was positively associated with low arousal PA moment-to-moment inertia, $b = .03$, $SE = .01$, 95% CI [.00, .05], $p = .032$, but also with high arousal PA day-to-day inertia, $b = .07$, $SE = .03$, 95% CI [.01, .12], $p = .018$. Furthermore, in contrast to the two-level findings, the training effect on low arousal moment-to-moment NA inertia did not reach significance, $b = -.00$, $SE = .01$, 95% CI [−.03, .02], $p = .738$. Based on the three-level model, the training rather increased low arousal PA moment-to-moment inertia, $b = .03$, $SE = .01$, 95% CI [.01, .05], $p = .015$, which would be in line with our momentary mindfulness findings.

Table 2
Associations Between Mean Levels of Momentary Affect and the Predictors of Interest (MAAS, KIMS-OBS, KIMS-AWA, KIMS-ACC, KIMS-DES, State MAAS, and Mindfulness Training)

Momentary affect	NA						PA					
	Low arousal			High arousal			Low arousal			High arousal		
Predictor	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*
MAAS	−.21 (.06)	[−.33, −.10]	<.001	−.18 (.06)	[−.29, −.07]	.002	.08 (.05)	[−.02, .19]	.126	.06 (.06)	[−.05, .18]	.292
OBS	.05 (.06)	[−.06, .17]	.374	.04 (.06)	[−.08, .16]	.501	.02 (.05)	[−.08, .13]	.649	.05 (.06)	[−.07, .16]	.449
AWA	−.19 (.06)	[−.31, −.07]	.002	−.13 (.06)	[−.25, −.01]	.035	.13 (.06)	[.02, .24]	.021	.16 (.06)	[.04, .28]	.011
ACC	−.13 (.06)	[−.26, −.01]	.041	−.18 (.06)	[−.30, −.05]	.005	.00 (.06)	[−.11, .12]	.958	−.02 (.06)	[−.15, .11]	.764
DES	−.03 (.06)	[−.15, .10]	.646	.00 (.06)	[−.12, .13]	.995	.10 (.06)	[−.02, .21]	.098	.10 (.06)	[−.03, .23]	.127
S-MAAS[a]	−.16 (.01)	[−.19, −.13]	<.001	−.14 (.01)	[−.16, .11]	<.001	.18 (.02)	[.15, .21]	<.001	.14 (.02)	[.11, .18]	<.001
Training[a]	−.01 (.02)	[−.05, .03]	.669	−.02 (.02)	[−.07, .02]	.289	.01 (.02)	[−.03, .05]	.681	.00 (.02)	[−.04, .04]	.960

Note. N = 125; 40 days; 21,570 complete affect sets; 21,530 complete S-MAAS sets. CI = confidence interval; NA = negative affect; PA = positive affect; MAAS = Mindfulness Attention Awareness scale; S-MAAS = state version of the Mindfulness Attention Awareness Scale; KIMS = Kentucky Inventory of Mindfulness Skills; OBS = KIMS observing; AWA = KIMS awareness; ACC = KIMS acceptance; DES = KIMS describing. Only fixed effects of the predictors of interest are presented in this table. Momentary affect values have been z-standardized when examining between-person associations with dispositional mindfulness and within-person standardized when examining within-person associations with S-MAAS; S-MAAS has been within-person standardized. p values of the fixed effect estimates are two-tailed. MAAS, OBS, AWA, ACC, and DES have been z-standardized.
[a] Unstructured covariance structure (exception: S-MAAS predicting high arousal NA).

Additionally, KIMS Acceptance predicted a lower propensity to switch from low arousal NA to high arousal PA (see Table 5).

We, then, modeled the association between switch distances and each predictor of interest.[6] We found that dispositional mindfulness (MAAS and KIMS facets) did not significantly explain the switch distance (Table 5, switch distance). Thus, dispositional mindfulness (MAAS and KIMS Awareness) predicted a lower switching propensity in all valence switch directions but failed to explain to what extend participants experienced a switch.

Regarding the within-person processes, momentary MAAS was only associated with a lower switching propensity to NA but not to PA, indicating that momentary mindfulness reduced only the amount of NA switches rather than generally reducing the propensity to experience valence switches in all directions, which was found for dispositional MAAS and KIMS Awareness in our present study. Moreover, momentary MAAS predicted the switch distance from high arousal NA to low arousal PA, $\beta = .07$, $SE = .03$, 95% CI [.01, .13], $p = .019$, indicating that participants who were more mindful than usual experienced a larger switch from high arousal NA to low arousal PA. However, this effect was rendered nonsignificant when controlling for the switch starting point (see Table 5).

Finally, we found no mindfulness training effects on either switching propensity or switch distance. Table 6 gives an overview of all significant effects that were reported in this section.[7]

Discussion

The present study aimed to extend previous work on associations between mindfulness and affect dynamics. We conducted a randomized controlled trial that included an AA protocol to examine the associations between dispositional mindfulness and a range of indicators of affect dynamics, and to investigate within-person associations between momentary mindfulness and affect dynamics in daily life. In addition, we set out to examine—in a real-world context—the impact of a mindfulness training on momentary mindfulness, as well as the underlying beneficial effects of enhanced momentary mindfulness on affect dynamics.

Dispositional Mindfulness and Affect Dynamics

Our first aim was to extend Keng and Tong's (2016) findings regarding associations between dispositional mindfulness and affect dynamics. We see dispositional mindfulness as a multifaceted construct, and momentary mindfulness as an additional important factor. We also see the importance of differentiating between the dynamics of high- and low arousal states of both PA and NA. Keng and Tong (2016) found negative associations between dispositional mindfulness (MAAS), NA inertia, and NA instability, as

[6] Following the approach described by Houben and colleagues (2016), we left out the intercept. In this way, we estimated the average switch distance for switch to PA and switch to NA when including the respective dichotomous variables as fixed as well as random intercepts, while controlling for average no switch distances (adding a random intercept for the variable No switch did not improve model fit). Because the No switch-interaction term was highly collinear with Switch to PA- and Switch to NA-interactions, we had to exclude this interaction term from our models.

[7] Since Keng and Tong's (2016) inertia and switch findings refer to analyses that examined affect dynamics from noon-to-afternoon, we additionally examined whether noon-to-afternoon inertia and valence switches were similarly associated with dispositional mindfulness in our present study. We aggregated affect measure at noon (observation between 10:00 a.m. and 12:00 p.m.) and afternoon (observations between 12:30 p.m. and 6:00 p.m.) separately for each of the 40 days. As described in the analytic approach section, we then examined inertia, switching propensity and switch distance in association to dispositional mindfulness measures MAAS and KIMS (supplementary materials). Some findings differed from our observation-level analyses: low arousal PA noon-to-afternoon inertia was negatively associated with dispositional MAAS, $\beta = -.05$, $SE = .02$, 95% CI [−.09, −.02], $p = .006$, high arousal PA noon-to-afternoon inertia was positively associated with KIMS Acceptance, $\beta = .05$, $SE = .03$, 95% CI [.00, .10], $p = .049$, and low arousal NA noon-afternoon inertia was significantly predicted by KIMS Awareness, $\beta = -.05$, $SE = .02$, 95% CI [−.09, −.01], $p = .026$. Furthermore, the negative associations between dispositional MAAS and the propensity to switch from high arousal PA to high arousal NA failed to reach significance. However, KIMS Acceptance gained a more important role in reducing switching propensity from noon-to-afternoon, showing significant effects on switching propensity in five out of eight possible switch directions, ORs $\leq .76$, $p \leq .033$. The rest of the noon-afternoon findings replicated our observation-level findings (supplementary materials).

Table 3
Standardized Regression Coefficients of Dispositional Mindfulness (MAAS, OBS, AWA, ACC, and DES), Momentary Mindfulness (State MAAS), and Mindfulness Training Predicting Affective Instability (SSD)

Affective instability	NA						PA					
	Low arousal			High arousal			Low arousal			High arousal		
Predictor	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*
MAAS	−.02 (.03)	[−.08, .04]	.483	−.03 (.03)	[−.09, .02]	.232	−.01 (.02)	[−.06, .04]	.661	−.03 (.03)	[−.08, .02]	.269
OBS	−.00 (.03)	[−.06, .05]	.990	.00 (.03)	[−.05, .06]	.904	−.01 (.03)	[−.06, .04]	.690	.01 (.03)	[−.04, .06]	.703
AWA	.03 (.03)	[−.03, .09]	.332	.01 (.03)	[−.05, .07]	.744	−.03 (.03)	[−.08, .02]	.300	−.02 (.03)	[−.08, .03]	.414
ACC	.01 (.03)	[−.06, .07]	.826	.02 (.03)	[−.04, .08]	.547	−.00 (.03)	[−.06, .04]	.966	−.02 (.03)	[−.08, .04]	.436
DES	−.06 (.03)	[−.12, .00]	.062	−.03 (.03)	[−.09, .03]	.309	−.01 (.03)	[−.07, .04]	.694	.01 (.03)	[−.05, .07]	.745
S-MAAS	−.08 (.01)	[−.10, −.06]	<.001	−.09 (.01)	[−.11, −.06]	<.001	−.04 (.01)	[−.06, −.02]	<.001	−.03 (.01)	[−.05, −.01]	.006
Training[a]	.00 (.02)	[−.03, .04]	.793	−.01 (.02)	[−.04, .03]	.717	−.03 (.01)	[−.06, .00]	.079	−.02 (.01)	[−.05, .01]	.219

Note. *N* = 125; 40 days; 14,257 complete successive affect sets; 14,228 complete sets of S-MAAS. CI = confidence interval; NA = negative affect; PA = positive affect; MAAS = Mindfulness Attention Awareness scale; S-MAAS = state version of the Mindfulness Attention Awareness Scale; KIMS = Kentucky Inventory of Mindfulness Skills; OBS = KIMS observing; AWA = KIMS awareness; ACC = KIMS acceptance; DES = KIMS describing. Fixed effect estimates were adjusted for the respective individual mean affect (*z*-standardized). Log-transformed squared successive differences values have been *z*-standardized when examining between-person associations with dispositional mindfulness and within-person standardized when examining within-person associations with S-MAAS. S-MAAS has been within-person standardized. MAAS, OBS, AWA, ACC, and DES have been *z*-standardized. *p* values of the fixed effects estimates are two-tailed.
[a] Unstructured covariance structure.

well as a positive association between dispositional mindfulness and adaptive affect switches from NA to PA. We were able to replicate some of these results, finding that more mindful participants reported less low arousal NA inertia, but not high arousal NA inertia, indicating that the association between dispositional MAAS and NA inertia reported by recent research might particularly be driven by low arousal NA inertia. Thus, dispositional mindfulness may be of the greatest importance in regulating persistent low arousal NA.

We also found that dispositional mindfulness was negatively associated with low and high arousal NA instability from moment to moment, possibly reflecting enhanced adaptive emotional reactions and regulatory processes in daily life. However, when controlling for each individual's NA level, as suggested by Ebner-Priemer et al. (2009), high- and low arousal NA instability was no longer associated with dispositional mindfulness, meaning that dispositional mindfulness only predicted NA instability when not controlling for mean NA. This indicates that the association between dispositional mindfulness and NA instability can be explained by differences in mean NA levels. It is important to consider mean NA levels when studying NA instability in relation to mindfulness to rule out the possibility that between-person differences in affective instability only originate from mean NA differences (Ebner-Priemer et al., 2009).

The previously described pattern of the present study's affective instability results was similar for KIMS Awareness and low arousal NA instability, and for KIMS Acceptance and high arousal NA instability. However, we found no negative association between KIMS Awareness and low arousal NA inertia. Although MAAS and KIMS Awareness were moderately correlated with

Table 4
Standardized Regression Coefficients of Dispositional Mindfulness (MAAS, KIMS-OBS, KIMS-AWA, KIMS-ACC, and KIMS-DES), Momentary Mindfulness (State MAAS), and Mindfulness Training Moderating Affective Inertia (Autoregressive Slope)

Affective inertia	NA						PA					
	Low arousal			High arousal			Low arousal			High arousal		
Predictor	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*	Est. (*SE*)	95% CI	*p*
MAAS	−.04 (.02)	[−.07, −.01]	.009	−.03 (.02)	[−.06, .01]	.107	−.02 (.02)	[−.06, .01]	.145	.00 (.02)	[−.03, .03]	.886
OBS	−.01 (.02)	[−.04, .02]	.528	−.00 (.02)	[−.04, .03]	.922	−.01 (.02)	[−.05, .02]	.403	.00 (.02)	[−.03, .03]	.994
AWA	−.03 (.02)	[−.06, .01]	.096	−.03 (.02)	[−.07, .01]	.101	−.00 (.02)	[−.04, .03]	.911	−.01 (.02)	[−.04, .03]	.648
ACC	.00 (.02)	[−.03, .04]	.825	−.00 (.02)	[−.04, .03]	.859	.02 (.02)	[−.02, .06]	.317	.03 (.02)	[−.00, .07]	.056
DES	.03 (.02)	[−.01, .06]	.155	−.00 (.02)	[−.04, .04]	.938	.00 (.02)	[−.03, .04]	.825	.01 (.02)	[−.03, .04]	.711
S-MAAS[a]	−.00 (.01)	[−.02, .01]	.772	.00 (.01)	[−.01, .02]	.639	.02 (.01)	[.00, .04]	.014	.01 (.01)	[−.01, .03]	.171
Training[a]	−.03 (.01)	[−.05, .00]	.049	−.00 (.01)	[−.02, .03]	.797	.01 (.01)	[−.02, .03]	.680	.01 (.01)	[−.01, .04]	.261

Note. *N* = 125; 40 days; 14,257 complete successive affect sets; 14,228 complete sets of S-MAAS. CI = confidence interval; NA = negative affect; PA = positive affect; MAAS = Mindfulness Attention Awareness scale; S-MAAS = state version of the Mindfulness Attention Awareness Scale; KIMS = Kentucky Inventory of Mindfulness Skills; OBS = KIMS observing; AWA = KIMS awareness; ACC = KIMS acceptance; DES = KIMS describing. Affective experiences at time point *t-1* and time point *t* have been within-person standardized. S-MAAS has been within-person standardized. MAAS, OBS, AWA, ACC, and DES have been *z*-standardized. To allow for an unstructured covariance structure in the models that used within-person standardized variables, we excluded the random intercept, which was 0. *p* values of the fixed effect estimates are two-tailed.
[a] Unstructured covariance structure.

Table 5
Standardized Regression Coefficients and Odds Ratios of Dispositional Mindfulness (MAAS, KIMS-OBS, KIMS-AWA, KIMS-ACC, and KIMS-DES), Momentary Mindfulness (S-MAAS), and Mindfulness Training Predicting Switching Propensity and Switch Distance

Affect switch		Low arousal affect		High arousal affect		PA_{low}–NA_{high}		NA_{low}–PA_{high}	
Switch	Predictor	*OR* (*SE*)	Dis. (*SE*)	*OR* (*SE*)	Dis. (*SE*)	*OR* (*SE*)	Dis. (*SE*)	*OR* (*SE*)	Dis. (*SE*)
To PA	MAAS	.77 (.06)**	−.04 (.03)	.79 (.07)*	−.02 (.04)	.77 (.08)**	−.05 (.04)	.81 (.06)**	−.03 (.03)
To NA	MAAS	.76 (.07)**	.02 (.04)	.81 (.08)*	.03 (.04)	.77 (.08)**	−.01 (.04)	.81 (.07)**	.02 (.03)
To PA	OBS	1.05 (.09)	−.00 (.03)	1.01 (.10)	−.06 (.04)	1.04 (.11)	−.05 (.04)	1.10 (.09)	.00 (.04)
	AWA	.79 (.07)**	−.01 (.04)	.80 (.08)*	−.04 (.04)	.81 (.09)*	−.01 (.04)	.77 (.06)**	−.01 (.04)
	ACC	.83 (.08)	−.06 (.04)	.80 (.08)*	−.02 (.05)	.81 (.09)	−.05 (.05)	.93 (.08)	−.02 (.04)
	DES	.95 (.09)	−.01 (.04)	.97 (.10)	.03 (.04)	1.03 (.11)	−.04 (.04)	.88 (.07)	.02 (.04)
To NA	OBS	.99 (.09)	.02 (.04)	1.00 (.10)	−.05 (.04)	.97 (.10)	−.03 (.04)	.99 (.08)	−.00 (.04)
	AWA	.81 (.07)*	.06 (.04)	.77 (.08)**	−.01 (.04)	.81 (.09)*	−.00 (.04)	.77 (.07)**	.02 (.04)
	ACC	.87 (.09)	−.05 (.05)	.87 (.09)	.06 (.05)	.86 (.10)	.02 (.05)	.93 (.09)	.01 (.04)
	DES	.94 (.09)	−.00 (.04)	.98 (.10)	−.01 (.04)	1.00 (.11)	−.00 (.04)	.92 (.08)	.02 (.04)
To PA	S-MAAS	1.04 (.04)	−.04 (.03)	.97 (.04)	−.06 (.03)	.93 (.03)	−.04 (.03)	1.03 (.04)	−.03 (.03)
To NA	S-MAAS	.72 (.03)**	−.02 (.03)	.76 (.03)**	.00 (.03)	.74 (.02)**	−.02 (.03)	.75 (.03)**	−.02 (.03)
To PA	Training	.95 (.05)	.00 (.04)	.94 (.06)	−.06 (.04)	.89 (.06)	−.01 (.04)	.99 (.05)	−.05 (.04)
To NA	Training	.97 (.06)	.02 (.03)	.94 (.05)	−.05 (.03)	.93 (.06)	−.03 (.04)	1.06 (.06)	.01 (.03)

Note. $N = 125$; 40 days; 14,257 complete successive affect sets; 14,228 complete sets of S-MAAS. *OR* = odds ratio; NA = negative affect; PA = positive affect; low = low arousal; high = high arousal; MAAS = Mindfulness Attention Awareness Scale; S-MAAS = state version of the Mindfulness Attention Awareness Scale; KIMS = Kentucky Inventory of Mindfulness Skills; OBS = KIMS observing; AWA = KIMS awareness; ACC = KIMS acceptance; DES = KIMS describing. Estimates of switch distance models (Dis.) were adjusted for the respective switch starting point (standardized affective experiences at time point *t-1*). Distance values have been *z*-standardized when examining between-person associations with dispositional mindfulness and within-person standardized when examining within-person associations with S-MAAS; S-MAAS has been within-person standardized. MAAS, OBS, AWA, ACC, and DES have been *z*-standardized. *p* values of the fixed effects estimates are two-tailed.
* $p \leq .05$. ** $p \leq .01$.

each other, they only shared 37% of their variance, indicating a difference in how they assessed the present moment awareness. This possible difference in assessment may be the reason for the nonsignificant association between KIMS Awareness and low arousal NA inertia. Nevertheless, by considering mindfulness as a multifaceted construct and by differentiating between low and high arousal affect valence states, our study offers a more nuanced picture on how mindfulness is related to both affective instability and affective inertia.

As a further extension to Keng and Tong's (2016) study, we implemented two alternative switch measures—switching propensity and switch distance—when investigating mindfulness in relation to affect valence switches (Houben et al., 2016). Keng and Tong (2016) originally used cross-lagged associations as valence switch measures, which reflect to what extent a previous affect valence is associated with the next moment's opposite affect valence. However, these cross-lagged associations do not indicate whether an actual valence switch occurred, while our alternative measure, switching propensity, refers to occasions when an actual valence switch happened (Houben et al., 2016). When examining the association between dispositional mindfulness and switching propensity, we found that dispositional present moment awareness (MAAS and KIMS Awareness) generally reduced the propensity of switching in either direction.

The second alternative valence switch measure, switch distance, indicates the magnitude of affect shift from a previously experienced valence to the opposite valence (Houben et al., 2016). However, we found that, in the case of a switch, dispositional

Table 6
Overview of Significant Associations Between the Predictors of Interest and Affect Dynamics

	Instability				Inertia				Propensity (*OR*)				Distance			
	NA		PA		NA		PA		To NA		To PA		To NA		To PA	
Predictors	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
MAAS					−.04				≤.81	≤.81	≤.77	≤.81				
OBS																
AWA									≤.81	≤.81	≤.81	≤.80				
ACC												.80				
DES																
S-MAAS	−.08	−.09	−.04	−.03			.02		≤.75	≤.76						
Training					−.03											

Note. MAAS = Mindfulness Attention Awareness Scale; S-MAAS = state version of the Mindfulness Attention Awareness Scale; KIMS = Kentucky Inventory of Mindfulness Skills; OBS = KIMS observing; AWA = KIMS awareness; ACC = KIMS acceptance; DES = KIMS describing; NA = negative affect; PA = positive affect; Low = low arousal; High = high arousal. Only significant standardized coefficients or odds ratios (*OR*), $p \leq .05$, are presented.

mindfulness did not explain to what degree individuals switched to the opposite valence. Hence, unlike Keng and Tong (2016), while we found mindfulness to reduce the propensity of experiencing affect switches to PA or NA, mindfulness did not seem to influence the magnitude of an affective response to affect-relevant stimuli. In our opinion, this alternative approach creates a more detailed picture regarding how mindfulness is related to actual valence switches, indicating that dispositional mindfulness may stabilize present moment affective experiences.

Finally, and similar to Keng and Tong (2016), we found no associations between dispositional mindfulness and moment-to-moment PA dynamics, reinforcing the inconsistent nature of evidence regarding how dispositional mindfulness is related to PA (e.g., Brown & Ryan, 2003; Brown, Ryan, & Creswell, 2007). Overall, the present findings highlight the crucial role of the present moment awareness component of dispositional mindfulness, in that individuals experienced less low arousal NA inertia and a reduced switching propensity.

We found no evidence that mindfulness facets other than present moment awareness or acting with awareness predicted affect dynamics (with the exception of KIMS Acceptance, which tended to reduce switching propensity). This finding is contrary to assumptions made in the MAT (Lindsay & Creswell, 2017), which posits that the combination of attention monitoring (e.g., KIMS Observing) and nonjudgmental acceptance (KIMS Acceptance) is crucial in effectively regulating affect, allowing observed feelings to be nonjudgmentally viewed (Lindsay & Creswell, 2017). One reason for our contrary findings may be that other mindfulness facets (e.g., observing) gain importance in experienced practitioners of mindfulness who have cultivated mindfulness skills in daily life (e.g., Baer et al., 2008). For such practitioners, KIMS Observing and Acceptance may be associated with less inertia, smaller switch distances, and a reduced switching propensity.

Another explanation for our findings may be that additional mindfulness facets are more relevant to day-to-day dynamics or to regulating affective experiences across several hours. This is supported by our additional models analyzing noon-to-afternoon and day-to-day affect dynamics (supplementary materials). Future researchers might find it rewarding to examine the associations between moment-to-moment as well as day-to-day affect dynamics and mindfulness facets in more experienced meditators to gain a more detailed picture of individual mindfulness facets.

Momentary Mindfulness and Affect Dynamics

Previous research largely focused on between-person associations between mindfulness and affect dynamics, as well as on between-person associations between well-being and affect dynamics (Houben et al., 2015; Keng & Tong, 2016). There is, however, scant evidence regarding the within-person processes underlying mindfulness. By examining momentary mindfulness in relation to moment-to-moment affect dynamics in daily life, we aimed to reveal important within-person processes of mindfulness. Investigating these underlying processes should give a deeper understanding of the positive effects of dispositional mindfulness and mindfulness trainings on affect dynamics, and, ultimately, on subjective well-being.

We hypothesized that higher momentary mindfulness would be associated with weaker NA and high arousal PA instability, NA and high arousal PA inertia, and valence switches to NA and high arousal PA. We also assumed momentary mindfulness to be positively associated with low arousal PA inertia and to be negatively associated with low arousal PA instability.

We did not expect to find that momentary mindfulness was not associated with NA inertia, and that it only influenced the propensity to switch to NA, not to PA. Thus, while individuals with higher levels of dispositional mindfulness experienced a lower switching propensity in general, momentary mindfulness only reduced the propensity to switch to NA.

However, similar to the findings on dispositional mindfulness reported in both the present study and in recent work by Keng and Tong (2016), we found momentary mindfulness to reduce low and high arousal NA instability indicating that momentary mindfulness seems to stabilize affective experiences within NA. Thus, these findings give further evidence that more effective affect regulation comes with increased present moment awareness, effectively buffering against NA responses to affect-relevant events.

As a further remarkable finding that goes beyond the reported findings on dispositional mindfulness, we found momentary mindfulness to be associated with more low arousal PA inertia and less low and high arousal PA instability. Hence, when people reported being more mindful than they usually are, they experienced more persistent low arousal PA and less fluctuating low and high arousal PA from moment to moment, giving evidence that increased momentary mindfulness may help in stabilizing and maintaining PA experiences within individuals (Garland, Geschwind, et al., 2015; Gotink et al., 2016). Our findings in the present study on momentary mindfulness can be interpreted as a PA upward spiral stimulated by mindfulness, ultimately resulting in increased well-being (Garland, Geschwind, et al., 2015). Thus, while higher levels of affective inertia (NA as well as PA) in comparison with other individuals is generally associated with less well-being (Houben et al., 2015), persistent low arousal PA within a person associated with momentary mindfulness could be beneficial. In summary, examining momentary mindfulness in relation to affect dynamics revealed important underlying within-person processes that go above and beyond between-person associations of dispositional mindfulness and affect dynamics, also explaining PA dynamics in daily life. Future research should further consider examining both within- and between-person processes of mindfulness and affect dynamics in different clinical samples to gain an even deeper understanding of how to promote affective wellbeing.

Mindfulness Training

To further understand how mindfulness training may improve well-being, our participants practiced momentary mindfulness with a low-intensity mindfulness training investigating whether increased momentary mindfulness is also useful in changing affect dynamics from week to week. In this way, our study would not just give evidence on how affect dynamics are associated with momentary mindfulness, but also on whether momentary mindfulness has the potential to change various maladaptive affect dynamics within individuals. We expected maladaptive NA dynamics and low arousal PA dynamics, especially, to be influenced by the mindfulness training.

However, the observed training effects are less straightforward to interpret: When first using unstandardized variables, we found no training effects on affect dynamics. However, after using within-person standardized affect variables to control for both between-person differences in variability and mean affect, we found that participants who practiced mindfulness reported less low arousal NA inertia over the course of the training than participants in the control condition. This indicates that participants who underwent mindfulness training experienced less persistent low arousal NA. Thus, the null-effect found seemed to be driven by between-person differences in both the mean and variability of NA, which had a strong effect on NA inertia. However, when we controlled for between-person differences, we observed small within-person differences in affective inertia, which were caused by the mindfulness training. This reduced low arousal NA inertia may mirror more flexible affective experiences and increased affective well-being on the within-person level (e.g., Houben et al., 2015). We note that our mindfulness training was very brief and did not involve group sessions led by an experienced mindfulness practitioner, both common features of established mindfulness trainings (Kabat-Zinn et al., 1992; Segal et al., 2002). These differences limit the extent to which our findings can indicate to what degree mindfulness may change affect dynamics in daily life.

Furthermore, although our training effects on affect dynamics are small, Wichers and colleagues (2015) argued that these microlevel processes are important building blocks of psychological health. The cumulative impact of such small effects of momentary mindfulness on affective experience could result in overall affective well-being, with affective experiences becoming more and more adaptive in daily life.

Affect Dynamics

We used three different kinds of affect dynamic patterns of which each describes a specific nuance of how affect fluctuates in daily life. While affective instability describes the magnitude of affective change from moment-to-moment, inertia indicates how self-predictive and persistent affect is. Additionally, switching distance and propensity indicate to what degree and to what propensity valence switches are experienced. On first sight, one suspects that these patterns may preclude each other in that, for example, very persistent affect (inertia) may not co-occur with strong fluctuations (instability). However, high affective inertia and high affective instability have been found to co-occur in overall low well-being, whereby low levels of affective inertia and instability characterize overall high well-being (Houben et al., 2015). In some cases, the co-occurrence of inertia and instability does not seem to be indicative for low or high well-being: For example, in the recent meta-analysis (Houben et al., 2015), positive affectivity was only negatively associated with inertia but not instability, whereas borderline personality disorder symptoms were only negatively predicted by instability, not inertia. Thus, different affect dynamic patterns can co-occur, but can also be independently predictive for well-being, which offers the opportunity to draw a detailed picture of how mindfulness is related with affective experiences in daily life.

Study Limitations

While our study offered various novel insights in how mindfulness shapes affect dynamics, some limitations have to be mentioned. First, our sample was highly self-selected. Because we recruited participants in seminars and lectures of our university's department of psychology, our sample mainly consisted of female psychology students. Thus, our sample is not representative of either the overall student population or the broader population, which limits the conclusions that can be drawn regarding the general population. We agree that future research must examine mindfulness and affect dynamics in the broader population, as well as within different specific clinical subgroups, to gain a deeper understanding of the possible underlying processes of mindfulness on affective wellbeing.

A second limitation was methodological, in that our AA protocol did not capture affect at the highest possible frequency (Trull et al., 2015). Unlike other AA protocols that assessed affect dynamics by measuring affect at least 10 times a day (e.g., Keng & Tong, 2016; Kuppens, Allen, & Sheeber, 2010), our AA protocol included only six observations a day, each approximately 100 min apart. This less frequent observation might have caused us to miss affect fluctuations, limiting our ability to accurately capture affect dynamics in relation to momentary mindfulness. This relatively low number of affect observations per day also prevented us from determining whether a two- or a three-level model was best to examine inertia (de Haan-Rietdijk, Kuppens, & Hamaker, 2016). As an incorrect model choice may lead to incorrect findings and conclusions regarding day- or observation-level inertia (de Haan-Rietdijk, Kuppens, & Hamaker, 2016), our results regarding inertia should be carefully interpreted. Future research into the effects of mindfulness using a higher frequency of affect observations might, therefore, yield more confident findings on observation- and day-level affect dynamics.

A third limitation was that our high arousal NA subscale, which consisted of the items "angry" and "anxious," showed low within-person reliability in comparison with all other affect subscales. This means that the two high arousal NA items fluctuated differently over time within individuals, possibly resulting in less consistent and precise measures of high arousal NA. This may be because of the very distinct items that we used for this subscale. In contrast, our other subscales consisted of semantically similar items (e.g., "sad" and "depressed" or "relaxed" and "satisfied"). Because the high arousal NA subscale showed only low within-person reliability, it is possible that the within-person associations between high arousal NA dynamics and the predictors of interest were underestimated in relation to the findings based on the more reliable low arousal NA subscale. We, therefore, cannot rule out the possibility that dispositional mindfulness and mindfulness trainings may also have beneficial effects on high arousal NA experiences.

Fourth, we also administered up to 50 items taken from several self-control domains in the SMASH study, which were presented in a fixed order at each measurement time point. The number of items and the consistent order in which items were answered may have posed too heavy a burden on participants. This may in turn have influenced response behavior and contributed to the 25% missed signal rate in our study, further limiting the validity of our results. However, we believe that these limitations are at least partially balanced out by our ability to directly examine within-person processes of mindfulness and affect dynamics in daily life, over the course of a mindfulness training. This natural setting then allowed us to precisely observe the processes underlying the mindfulness training.

A fifth limitation was that we investigated changes in affect dynamics from one week to the next, assuming them to be stationary within each week. However, there is evidence that, for example, affective inertia may change when individuals anticipate stressful situations (Koval & Kuppens, 2012). Hence, as suggested by Bringmann et al. (2016), it would be fruitful for future research to compute analyses such as time-varying autoregressive models (Bringmann et al., 2017) or multilevel threshold models (de Haan-Rietdijk, Gottman, Bergeman, & Hamaker, 2016) on AA data (e.g., assessed during mindfulness trainings) to capture affect dynamic changes during the training period in more detail.

A sixth limitation was that, because our training and the assessment of momentary mindfulness mainly focused on only one aspect of mindfulness (i.e., present moment awareness), we did not consider the multifaceted structure of mindfulness (e.g., Baer et al., 2004). Therefore, it would be interesting for future research to further examine whether a more elaborate mindfulness training that targets several facets of mindfulness more intensely (Kabat-Zinn et al., 1992; Segal et al., 2002) could be more effective in changing NA patterns, as well as whether focusing on the other aspects of mindfulness when assessing momentary mindfulness (e.g., Blanke & Brose, 2017) could help to explain associations with affect dynamics. We hope that our findings serve as basis for future studies investigating the effects of mindfulness on affect dynamics.

Conclusions

This study is among the first to examine how within-person processes of momentary mindfulness may help to shape affect dynamics in daily life. We conducted a randomized controlled trial that included an AA protocol enabling us to examine associations between momentary mindfulness and affect dynamics. In addition to extending previous evidence on the relationship between dispositional mindfulness and affect dynamics, we found momentary mindfulness to be an important within-person process that may help to reduce fluctuations in affect experiences. Remarkably, our findings give evidence that being mindful in the present moment facilitates the maintenance and stabilization of PA and reduces the possibility to switch to NA. Moreover, we found first small evidence that training mindfulness may be effective in reducing low arousal NA inertia in our everyday lives.

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