Mindfulness
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ORIGINAL PAPER

Mindfulness, Work Climate, and Psychological Need Satisfaction in Employee Well-being

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Abstract The present study investigated how both mindfulness and managerial autonomy support affect work adjustment. Two hundred and fifty-nine working adults were recruited online, and they were assessed for individual differences in mindfulness and the autonomy-supportive versus controlling style of their management at work. Also assessed were indicators of work-related adjustment, namely, burnout, turnover intention, and absenteeism. Results showed that both autonomy support and mindfulness had direct relations with employee work well-being. Less autonomy-supportive work climates thwarted employee's basic psychological needs at work, which partially explained the association of lower autonomy support at work and decreased work adjustment. These indirect effects were moderated by mindfulness. Specifically, people higher in mindfulness were less likely to feel need frustration, even in unsupportive managerial environments. Mindfulness thus appears to act as a protective factor in controlling work environments. These results not only highlight mindfulness as a potential pathway to wellness at the workplace, but also speak to the relevance of autonomy support in work environments in promoting employee work well-being.

Keywords Mindfulness · Work climate · Autonomy support · Employee well-being · Basic psychological needs · Self-determination theory

Introduction

Recent estimates suggest that working adults, on average, spend at least a quarter to a third of their waking life at work (Harter et al. 2003). In the past two decades, the average work year in the USA increased by nearly 700 hours for working couples (Murphy and Sauter 2003; U. S. Department of Labor 1999). Given the substantial amount of time spent at work, workplaces and organizations are responsible for a major proportion of the total stress experienced by adults (DeFrank and Cooper 1987). One important factor affecting employee wellness and work satisfaction is the managerial climate they experience (for a review, see Gagne and Deci 2005). Specifically, research has shown that *autonomy support*, or interpersonal encouragement for people to be themselves, from managers increases job commitment and wellness. In contrast, *controlling* managerial climates, or those that pressure someone to behave or perform in certain ways, can undermine employee health and work adjustment (e.g., Baard et al. 2004; Gagne et al. 2000; Kovjanic et al. 2012).

In addition to workplace contexts, individual characteristics of employees can enhance employee adjustment and well-being at work and potentially buffer against negative workplace climates. Recently, one much discussed factor thought to promote wellness in employees is *mindfulness*, or open, receptive awareness to the present moment. Increasingly, organizations are promoting and training their employees in mindfulness (e.g., Apple, Procter & Gamble, Aetna, General Mills; Gelles 2012; Hansen 2012), with the hope that it will contribute to employee health and motivation. However,

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evidence on the role of mindfulness in the workplace has been scant.

Exploring new pathways that are conducive to work well-being, such as mindfulness, can lead to the development of novel tools to alleviate the substantial amount of stress experienced daily at work and its consequences. To be sure, 69 % of employees say that work is a major source of stress and 41 % report being stressed or tense while working (American Psychological Association 2009). Workplace stress is a significant contributor to turnover, as 51 % of employees say they have entertained or decided to leave their job or declined a promotion as a result of stress (American Psychological Association 2009). Work stress is also a contributor to absenteeism. In 2001, the median number of missed workdays as result of stress-related disorders was 25, larger than the median number of missed workdays (6) for injuries and illness (Bureau of Labor Statistics 2001). Work burnout is one of the most recurrent health issues among Europeans and Americans after diabetes and cardiovascular diseases (Akerstedt 2004; Weber and Jaekel-Reinhard 2000). Its physical manifestations include musculoskeletal pain, headaches, constant fatigue, sleep disorders, gastrointestinal disorders, cardiovascular illnesses, and substance use, while its psychological manifestations include lack of concentration, emotional lability, negative affect, low self-esteem, and aggression (Constantino et al. 2013).

Furthermore, much evidence shows that healthy employees and healthy organizations go hand in hand. Employee well-being has been associated with increased competitive advantage, productivity, performance, customer satisfaction, and hiring selectivity, as well as decreased absenteeism, turnover, injury/accident rates, and health care costs (e.g., Aldana 2001; Anderson et al. 2001; Browne 2000; DeJoy and Wilson 2003; Grawitch et al. 2006; Limm et al. 2011; Noblet and LaMontagne 2006; Wright et al. 2007). Indeed, 51 % of employees report being less productive at work due to stress (American Psychological Association 2009), and work-related stress is estimated to cost American companies over $300 billion per year in absenteeism, turnover, decreased productivity, and insurance and medical expenses (Rosch 2001). In sum, it is in employers' and employees' best interest to identify factors that facilitate well-being at work.

Why Mindfulness May Promote Work Well-being

Mindfulness is a receptive state of mind wherein attention, informed by an open and receptive awareness of what is occurring at the moment, observes internal (e.g., psychological and somatic experiences) and external events that are taking place (Brown and Ryan 2003; Kabat-Zinn 2003). Simply put, to be mindful is to openly pay attention to and be aware of what is happening at the moment. Over the last three decades, research on mindfulness training interventions has shown its benefits for a wide array of psychological and physical health outcomes in clinical and nonclinical populations (for reviews, see Baer 2003, 2006; Bishop 2002; Chiesa and Serretti 2009, 2010, 2011; Grossman et al. 2004).

In addition to mindfulness instruction (when one is taught how to be more mindful), mindfulness has also been researched as a trait, or dispositional characteristic. Dispositional mindfulness has been shown to be a distinct construct from other personality traits such as emotional intelligence, neuroticism, and openness to experience (Baer et al. 2006; Brown et al. 2007, 2011; Weinstein et al. 2009). Mindfulness, regardless of how it originated (cultivated through training or as a natural disposition), has been linked with well-being and human flourishing (Allen and Kiburz 2012; Bowlin and Baer 2012; Brown et al. 2009; Brown and Ryan 2003; Howell et al. 2010; Weinstein et al. 2009), better relationship quality (Barnes et al. 2007; Saavedra et al. 2010), and better affect regulation such as lower rumination (Carmody et al. 2008; Creswell et al. 2007; Frewen et al. 2010). It is thus important to explore whether mindfulness promotes similar well-being benefits at the workplace, where many stressful and challenging situations occur routinely.

How Mindfulness May Promote Work Well-being

Numerous studies have examined the underlying processes through which mindfulness yields positive wellness outcomes (Bishop et al. 2004; Brown and Ryan 2003; Brown et al. 2007; Glomb et al. 2011). Emotional regulation has been consistently proposed as a central mechanism for the salutary benefits of mindfulness. A nonevaluative open attention to the moment allows one to recognize events and thoughts for what they are, refraining from critical judgments or getting caught in rumination spirals (Bishop et al. 2004; Brown et al. 2007; Goldin and Gross 2010; Jain et al. 2007; Ramel et al. 2004).

Mindful individuals are also more likely to see stressful events as less demanding or threatening, which is without adding negative appraisals to challenging situations (Weinstein et al. 2009). Garland et al. (2011) demonstrated a salutary, upward spiral between mindfulness and adaptive coping in which mindful states promoted a more adaptive coping style, and this more objective appraisal style, in turn, increased mindfulness. Indeed, maladaptive cognitive habits such as rumination and catastrophizing (which are negatively related to mindfulness) have been related to greater intensity and duration of stressful experiences (e.g., Nolen-Hoeksema 2000). Mindfulness is proposed to counter this process by fostering a broader range of coping skills by creating space between emotions and reactions to them and the recognition of the impermanence of thoughts and feelings, a concept also named decentering (Shapiro et al. 2006; Teasdale et al. 2000). This broadened mental state frees individuals from automatic responses and allows for a more neutral reframe of one's

current experience. Indeed, mindfulness has been proposed to foster and accelerate equanimity, which is defined as the ability to maintain serenity and mental balance when confronted with provocative events, resulting in a faster recovery from stressful situations and thus decreasing one's probability of experiencing chronic stress (Carmody et al. 2009; Desbordes et al. in press; Kerr et al. 2011). Mindfulness therefore appears to be associated with less negative appraisals and may lead to healthier functioning by softening the impact of negative stimuli.

Furthermore, neuroscience research provides some findings on the effect of mindfulness training on alterations in the brain's activities and structure. Research using electroencephalography (EEG) has reported associations between ongoing mindfulness meditation with increased alpha activity (marker of relaxation), increased theta activity (marker of reduced anxiety), and increased gamma activity (marker of affect regulation) (Treadway and Lazar 2009). Other studies applying functional magnetic resonance imaging (fMRI) underscore this argument, showing that more mindful people appear better able to regulate affect through enhanced prefrontal cortical inhibition of amygdala responses (e.g., Chiesa and Serretti 2010; Creswell et al. 2007). This pattern of activation suggests that mindfulness promotes self-monitoring of stress reactivity and attentional disengagement from stress appraisals.

In addition to its impact through emotion regulation, the open and receptive awareness that characterizes mindfulness appears to facilitate more autonomous motivation and satisfaction of basic psychological needs for autonomy (i.e., volition, choice), competence (i.e., self-efficacy), and relatedness (i.e., interpersonal connection), which in turn boost wellness (Schultz and Ryan 2014). More mindful people's actions tend to be experienced as more authentic and congruent, or aligned with their deeply held values, interests, and basic psychological needs (Brown and Ryan 2003; Brown et al. 2007; Levesque and Brown 2007; Shapiro et al. 2006; Ryan and Rigby 2014). Moreover, mindfulness has been shown to facilitate openness, decreased ego-defensive behavior, and decreased automatic maladaptive behaviors, thus promoting more authentic functioning and healthier relationships (Brown et al. 2007; Kernis and Goldman 2006; Leroy et al. 2013; Levesque and Brown 2007; Niemiec et al. 2010; Ryan and Rigby 2014). A growing body of research also suggests that more mindful individuals are more likely to pursue aspirations that are positively related to need satisfaction and wellness (e.g., Brown and Kasser 2005; Brown et al. 2008). In sum, mindfulness has been related to both greater basic psychological need satisfaction and autonomous self-regulation (Brown and Ryan 2003; Levesque and Brown 2007), and these concepts will be discussed further in the "Conceptual Framework" section below.

Given this past evidence, we hypothesize that mindfulness will be an asset in fostering work adjustment and wellness, and thus will be negatively related to basic psychological need frustration and ill-being at work and positively related to basic psychological need satisfaction at work. We also posit that mindfulness will be a protective factor for those in nonautonomy-supportive environments by buffering the negative effects of such contexts on well-being. In other words, the healthier affect regulation, higher decentering, decreased critical judgment, decreased rumination, decreased negative appraisals, and higher autonomous motivation afforded by mindfulness will translate to less experience of basic psychological need frustration and consequently less work ill-being. For example, a mindful individual may be more likely to see criticism in a constructive and nonthreatening manner and consequently not feel a huge impact on his sense of competence, still feel connected with the "critic," and feel more volition/autonomy in making changes. See Fig. 1 for a graphic account based on the above discussion.

Mindfulness and Organizational Settings

Considering the growing body of evidence indicating that mindfulness significantly benefits clinical and nonclinical populations across dimensions of physical and psychological well-being, in addition to the increasing amount of time individuals spend at work and the stressors commonly present in such environments, it seems relevant to explore its role at the workplace. The bulk of research with workers has been on the instruction of mindfulness for the helping professions, which makes sense given the high levels of distress and suffering health care workers such as nurses, doctors, and therapists encounter (Shapiro and Carlson 2009). Outcomes of these trainings are successful at improving mindfulness in health care professionals and trainees, as well as enhancing their well-being, empathy, and emotional stability and decreasing their burnout, anxiety, and depression (e.g., Cohen-Katz et al. 2005; Jain et al. 2007; Krasner et al. 2009; Rosenzweig et al. 2003; see for reviews, Escuriex and Labbe 2011; Shapiro and Carlson 2009). As Hulsheger et al. (2013) observed, most research on mindfulness has been conducted outside the workplace, and only very recently have scholars started to look at the role of mindfulness in organizational settings other than health care centers. Dane (2011) and Glomb et al. (2011) provided theoretical accounts of how mindfulness may promote task performance, physical health, and psychological health. Yet, empirical evidence on mindfulness at the workplace is scarce.

Recent work on the topic has begun to address this issue with promising results (e.g., Allen and Kiburz 2012; Wolever et al. 2012). More specifically, Hulsheger et al. (2013) conducted two studies with employees from various organizations in the Netherlands, Belgium, and Germany. The first study used a diary method and indicated that both state and trait mindfulness are related to lower emotional exhaustion and

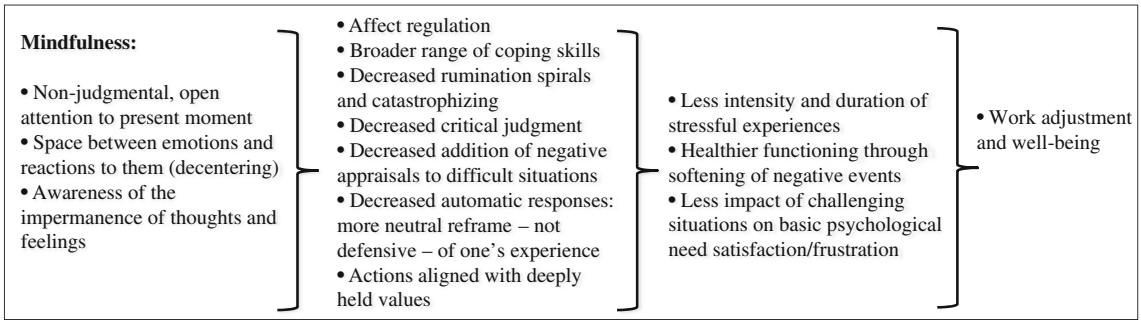

Fig. 1 Theoretical account of how mindfulness may influence psychological need satisfaction/frustration in the workplace, and in turn on work well-being

enhanced job satisfaction, with a work-related emotion regulation construct (i.e., surfacing acting) mediating both relations. The second was a field study with a control group and a mindfulness self-training intervention group that replicated effects from the first study with the exception that emotional regulation only mediated the effects of mindfulness on emotional exhaustion. Leroy et al. (2013) showed that mindfulness is positively related to work engagement and that this relation is at least in part mediated by authentic functioning (i.e., being aware of oneself and regulating oneself accordingly). Finally, Dane and Brummel (2013) found a positive relation between mindfulness and job performance and a negative relation between mindfulness and turnover intention (although this last finding became nonsignificant when controlling for work engagement).

Conceptual Framework

We will use self-determination theory (SDT) as a theoretical framework to better understand the role of mindfulness in promoting wellness at work (Ryan and Deci 2000). In a nutshell, SDT states that people will be motivated and experience well-being to the degree that they experience basic psychological need satisfaction. SDT identifies three psychological needs required for growth and wellness across the lifespan and cross-culturally, namely, autonomy, competence, and relatedness (Deci and Ryan 2000; Ryan 1995). These components represent the cross-developmental and culturally universal necessities for growth and wellness. The *need for autonomy* (de Charms 1968) is satisfied when one feels choice and consistency with self-endorsed values in the activities one engages. It is relevant to note that autonomy as specified in SDT does not equate to independence, but rather to the experience of volition (e.g., follow-up on a supervisor's request willingly because the supervisor explained the importance of the task). The *need for competence* (White 1959) is satisfied when one feels effective and thus has the resources and capabilities required to accomplish one's activities and goals. The *need for relatedness* (e.g., Baumeister and Leary 1995) is fulfilled when one feels connected with and cared for by others.

Substantial research across varied life contexts has shown that, in addition to individual differences in one's disposition to display autonomous motivation (Weinstein et al. 2012), social environments that are *need supportive* facilitate autonomous motivation (i.e., behaving volitionally and according to one's own values) and, consequently, wellness. In contrast, *need thwarting* environments, lifestyles, or activities are associated with controlled motivation (e.g., behaving out of external pressure or guilt) and, consequently, ill-being and psychopathology in various age groups and cultures (e.g., Deci and Ryan 2012; Deci et al. 2001; Soenens et al. 2007; Vansteenkiste et al. 2006; see Deci and Ryan 2008, for an overview). Research conducted in the workplace has supported this model. Evidence shows positive relations between employees' need satisfaction and their work-related well-being (i.e., lower burnout, higher engagement, and higher job satisfaction), more positive attitudes toward work (i.e., increased readiness to change, lower turnover intention), and better performances (see for reviews Gagne and Deci 2005; Van den Broeck et al. 2008). Accordingly, need satisfaction at work has been related to lower general ill-being and higher general well-being (e.g., Baard et al. 2004; Gagne et al. 2000; Ilardi et al. 1993; Kovjanic et al. 2012; Parfyonova 2009).

Work climates that are need supportive are labeled, within SDT, autonomy-supportive social contexts. Managers that are autonomy supportive consistently (1) take and acknowledge their employees' perspective; (2) provide greater choice when possible; (3) encourage self-initiation; (4) provide enough structure for tasks to be challenging, but not overwhelming; (5) provide meaningful rationale for tasks; and (6) are genuinely concerned about and respectful to all employees (Gagne and Deci 2005). These components are directly related to the fulfillment of the three basic psychological needs (Gagne et al. 1997). As an illustration, when a manager takes an employee's perspective, that employee is likely to feel competent, as his/her opinions matter, feel connected with the manager, and experience greater volition, given that the manager is listening to his/her opinion or seeing things through his/her frame of

reference rather than pressuring him/her to a particular outcome.

Most of the evidence within SDT has focused on social contexts and processes that promote healthy and effective human functioning and development. The exploration of conditions or factors that actively promote ill-being and psychopathology, in contrast, has been less studied (Bartholomew et al. 2010, 2011a; Vallerand et al. 2008). Recently, given conceptual and measurement advancements, SDT research has demonstrated that separately evaluating the effects of need-supportive and need-thwarting aspects of social contexts is important in understanding their specific effects with respect to well-being and ill-being (e.g., Bartholomew et al. 2011a, b; Vansteenkiste and Ryan in press). More specifically, Bartholomew et al. (2011b) explained that low psychological need satisfaction might mean need dissatisfaction, but not necessarily active need frustration. For example, an employee may not feel particularly connected with others at work and experience less work engagement, but an employee can also experience active ostracism from coworkers and suffer intense sadness (e.g., "I do not feel related" vs "I feel excluded").

There is accumulating evidence showing that need satisfaction is a better predictor of positive outcomes (e.g., vitality) than low need frustration, and need frustration is a stronger predictor of negative outcomes (e.g., depression, negative affect, psychological stress biomarkers) than low need satisfaction (Bartholomew et al. 2010, 2011a; Stebbings et al. 2012). In line with past SDT research, we expect that autonomy-supportive work climates will promote satisfaction of employees' basic psychological needs, which in turn will facilitate work wellness. In contrast, controlling work climates will undermine and actively thwart need satisfaction, which in turn will negatively impact work wellness.

Therefore, the current study expands on the well-researched benefits of being in an autonomy-supportive work climate (and the negative consequences of being in a controlling work context) by testing whether individual differences in mindfulness would have a buffering effect on the impact of controlling work climates, and as such aim to fill an important gap in the literature. Beyond being a generally positive influence on psychological health and motivation (see Brown and Ryan 2003), mindfulness is an attribute that may insulate people from the costs of negative environments, allowing individuals more equilibrium in nonideal contexts (Glomb et al. 2011; Weinstein et al. 2009). As such, mindfulness should reduce the negative impact of controlling work climates on psychological needs, and thus their effects on wellness.

The Present Study

The present study proposes and tests a conditional process model (moderated mediation) of employees' work-related well-being (see Fig. 2). More specifically, we aimed to test whether the indirect effect of work climate (perceived managerial autonomy support) through need satisfaction/frustration on employees' work adjustment depended on employees' mindfulness levels. Given the reported associations between mindfulness and work climate with basic psychological needs, we propose the latter as a mediator between work climate and mindfulness in predicting employee well-being.

The first component of the model (labeled *A*) was that an autonomy-supportive work environment would relate negatively to employee work ill-being. The second component (labeled *B*) was that an autonomy-supportive work environment would relate positively to employees' basic psychological need satisfaction at work and negatively to employees' basic psychological need frustration at work. The third component (labeled *C*) was that employees' basic psychological need satisfaction would relate negatively to employees work ill-being, whereas employees' basic psychological need frustration would relate positively to employees' work ill-being. The fourth component (labeled *D*) was that the association between work environment and basic psychological needs would be moderated by mindfulness, such that employees who are high in mindfulness would show higher need satisfaction and lower need frustration, even in nonsupportive work climates, when compared to employees low in mindfulness. Mindfulness would thus act as a protective factor to employees in unsupportive environments. The fifth component (labeled E) was that mindfulness would also directly relate negatively to worker ill-being, as we were also interested in exploring the relationship between mindfulness and work ill-being that is not mediated by basic psychological need satisfaction/frustration at work.

Method

Participants

A total of 280 participants (119 males) were obtained from Amazon's Mechanical Turk (MTurk), a reliable way to obtain high-quality data with a wide range of background diversity (e.g., age, ethnicity, and occupation) (Buhrmester et al. 2011; Mason and Suri 2012). Growing evidence shows that findings of studies conducted on MTurk are similar to those from offline settings and other online platforms, including survey research (e.g., Buhrmester et al. 2011; Gosling et al. 2004), decision-making studies (e.g., Amir et al. 2012; Paolacci et al. 2010), behavior and cognitive behavior experiments (e.g., Jasmin and Casasanto 2012; Suri and Watts 2011), and research using clinical populations (e.g., Shapiro et al. 2013).

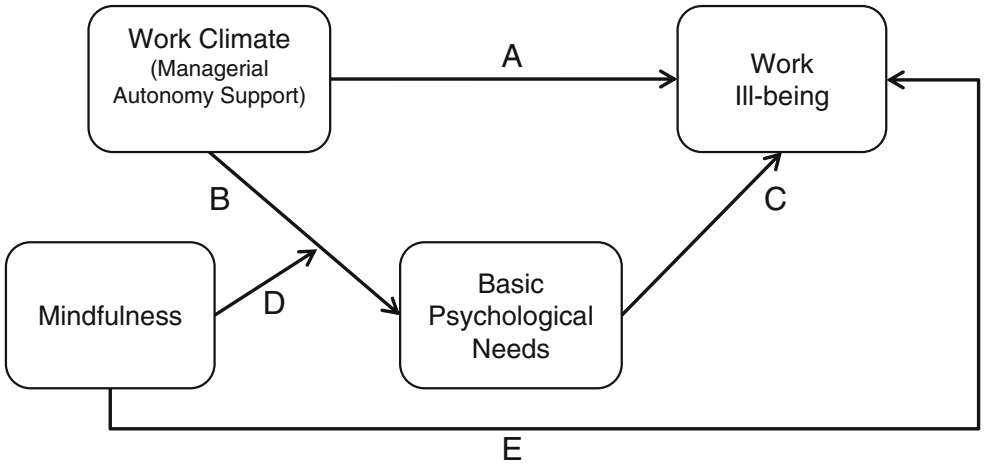

Fig. 2 Proposed model: mindfulness as a protective factor to employees in nonsupportive environments

Participation in the study was restricted to US residents who have worked in a company (not self-employed) for at least a month. Data from fourteen student workers were deleted because they represented a distinct population, one participant was excluded due to an inconsistent item response pattern, and six participants were excluded due to duplicate IP addresses. The final sample therefore included 259 employees (112 males) with a mean age of 35.47 years (SD=9.81) and a range from 25 to 68 years old. Most participants (n=208) were full-time employees, and 51 were part-time employees. In terms of race, 77.2 % were White/Caucasian, 8.5 % were Asian, 6.6 % were African American, 5.4 % were Hispanic/Latino, and 2.3 % were "other." Participants were a heterogeneous group of workers, as 18.9 % worked in management or finance; 16.3 % worked in administration; 14.7 % worked in marketing, sales, or customer service; 13.3 % worked in technical positions, production, or logistics; 12.4 % worked in education or research; 6.6 % worked in information technology; 4.6 % worked in health care; 4.3 % worked in design and development; and 8.9 % worked in others (e.g., cook, mail carrier). Table 1 shows participants' personal and household yearly incomes. Participants completed the questionnaire online and were compensated $0.40 in accordance with standard MTurk wages (Buhrmester et al. 2011).

Table 1 Sample yearly income

US$	Personal (%)	Household (%)
Less than 10,000	4.2	1.9
10,000 to 29,999	32.5	19.3
30,000 to 49,999	25.5	22.8
50,000 to 69,999	12.5	20.5
70,000 to 89,999	6.6	12.4
Above 90,000	8.2	23.2

Measures

Managerial Autonomy Support The Work Climate Questionnaire, Short Form (Baard et al. 2004) assessed perceptions of autonomy support from the participant's most immediate supervisor over the past 4 weeks. The scale comprises six items, and responses were made on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores indicating greater perceived managerial autonomy support. Sample items include "My supervisor tries to understand how I see things before suggesting a new way to do things" and "I feel that my supervisor provides me with choices and options." Reliability in this sample was good, α=0.94.

Mindfulness The Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003) assessed the participant's trait-level of mindfulness over the past 4 weeks. The scale consists of 15 items rated on a 6-point scale from 1 (*almost always*) to 6 (*almost never*). Higher scores indicate higher levels of mindfulness. Sample items include "I do jobs or tasks automatically without being aware of what I'm doing" and "I find myself doing things without paying attention." The MAAS has been extensively validated (see Brown et al. 2007 for review). Reliability in this sample was good, α=0.91.

Need Satisfaction and Frustration at Work The Basic Psychological Needs Scale-Revised (BPNS-R; Chen et al. 2013) was adapted to assess the levels of autonomy, competence, and relatedness satisfaction and frustration at work. The scale assesses both need satisfaction and need frustration as separate constructs (e.g., Bartholomew et al. 2010, 2011a, b; Vansteenkiste and Ryan in press) over the past 4 weeks. Twelve items measured need satisfaction at work (e.g., "I feel like I am free to decide for myself how to be at work"), and twelve items measured need frustration (e.g., "I feel rejected at work"). Participants were asked to rate all items on a 1

(*strongly disagree*) to 7 (*strongly agree*) scale, with higher scores indicating greater satisfaction or frustration of basic needs. Reliability in this sample was good, α=0.90 for need satisfaction and α=0.88 for need frustration.

Work Ill-Being To represent this conceptual variable parsimoniously, we created a latent variable composed of work burnout, turnover intention, and absenteeism as manifest variables. Principal component analysis (PCA) with varimax rotation on the three outcome variables was conducted to provide a preliminary test of how variables hang together. Both visual examination of the scree plot and the root-one criterion (eigenvalues>1) indicated the extraction of one component providing empirical support for creating the latent variable.

Work burnout over the past 4 weeks was measured by the emotional exhaustion subscale (5 items) and cynicism subscale (5 items) of the Maslach Burnout Inventory-General Survey (MBI-GS; Maslach et al. 1996). Emotional exhaustion is defined as depletion of one's emotional resources, and cynicism or depersonalization is defined as a detached attitude toward work tasks or others (Schaufeli 2003). Sample items include "I feel emotionally drained from my work" for emotional exhaustion and "I have become less enthusiastic about my work" for cynicism. Responses were made on 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores indicating higher levels of work burnout. Burnout has been linked to several negative outcomes, such as lower organizational commitment and performance as well as increased turnover, absenteeism, job strain, and health care costs (see Cordes and Dougherty 1993; Halbesleben and Bowler 2007; Halbesleben and Buckley 2004; Maslach et al. 2001). Reliability in this sample was good, α=0.95.

Turnover intention over the past 4 weeks was assessed with the 4-item Turnover Intention scale (Cammann et al. 1983; Colarelli 1984), which has been shown to predict turnover behavior (Chen et al. 1998; Granrose and Kaplan 1994; Richer et al. 2002; Tett and Meyer 1993). Sample items include "I often think of leaving the organization" and "If I may choose again, I will choose to work for the current organization" (reverse coded). Responses were on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores indicating stronger turnover intention. Items showed adequate reliability (α=0.89).

Absenteeism items measured the number of missed workdays because of a personal illness or for other reasons (not including scheduled vacations) for the past 3 months. Reliability in this sample was adequate, α=0.80. Although workers underreport their own absenteeism (Johns 1994), self-reported measures of absenteeism produce estimates that are very similar to those obtained through objective measures (Spector 1987).

Data Analysis

Item nonresponse did not exceed 5 % for any participants with missing data; thus, no participants were deleted in accordance with the recommendations of Tabachnick and Fidell (2007). Missing data per measure was null except for the variable need satisfaction at work, need frustration at work, and work burnout, which had percentages of missing data points of 1.16, 0.39, and 0.77 %, respectively. Additionally, the missing completely at random (MCAR) test statistic was calculated (*ns*) and indicated that data was indeed missing completely at random (Little 1988). Missing data was estimated via AMELIA II (Honaker et al. 2011), a multiple imputation program in which missing multivariate data are simulated $m>1$ times using expectation-maximization with bootstrapping algorithm. Ten imputations were generated (n=10), which is a conservative approach considering it has been established that three imputations (n=3) yield sufficient estimation efficiency for data sets containing 10 % or fewer missing data points (Rubin 1987; Schafer 1997, 1999). We opted for not using Amos Full Information Maximum Likelihood (FIML) method to impute missing values because we were planning on using bootstrapping to probe for indirect effects, and FIML precludes this strategy. All results reported below were estimated and appropriately combined from the multiple imputed data sets (Arbuckle 2010; Schafer 1997). All data were normal except for absenteeism, which was corrected by applying a logarithm transformation. In addition, Harman's one factor test and principal component analysis with promax rotation indicated that common method variance was rather limited in this research (Podsakoff et al. 2003).

Table 2 presents scale reliabilities (Cronbach's alpha), means, standard deviations, and intercorrelations for the study measures. Work climate, need satisfaction, and need frustration had significant univariate relations with work-related outcomes. In addition, individuals high in mindfulness reported less burnout and lower turnover intentions but were not significantly associated with levels of absenteeism. To test our hypotheses, we first conducted preliminary hierarchical regressions, then employed structural equation modeling (SEM) with Amos 4.0 software (Arbuckle and Wothke 1999).

Results

Our proposed model tested whether psychological need satisfaction and need frustration explain why autonomy-supportive work climates negatively relate to poorer work adjustment at different levels of mindfulness. Age, gender, work status (full-time versus part-time), personal income, and household income were included as covariates in all analyses.

Table 2 Scale reliabilities, descriptive statistics, and intercorrelations for the study measures

Measures		1	2	3	4	5	6	7
1	Work climate	0.94						
2	Mindfulness	0.19**	0.91					
3	Need satisfaction	0.59**	0.29**	0.90				
4	Need frustration	−0.46**	−0.34**	−0.63**	0.88			
5	Burnout	−0.49**	−0.34**	−0.55**	0.57**	0.95		
6	Turnover intention	−0.47**	−0.17**	−0.49**	0.42**	0.67**	0.89	
7	Absenteeism	−0.15*	−0.10	−0.11	0.19**	0.16**	0.15**	0.80
	M	4.79	3.99	4.77	3.19	3.96	3.81	0.18
	SD	1.50	0.88	1.05	1.11	1.66	1.78	0.22

Note: Scale reliabilities (Cronbach's alpha) are shown on the diagonal

*$p<0.05$, **$p<0.01$

First, two preliminary hierarchical regressions were performed to test whether mindfulness interacted with work climate in predicting basic psychological need satisfaction and basic psychological need frustration. In both regressions, covariates were entered in the first step, the main effects (work climate and mindfulness) were entered simultaneously in the second step, and the two-way interaction was included in the third step (see Table 3). The interaction of mindfulness and work climate in the third step did not predict need satisfaction, $\Delta R^2=0.001$, F (1, 250)=0.28, *ns*, but did predict need frustration, $\Delta R^2=0.018$, F (1, 250)=6.26, $p<0.02$. As such, given the focal construct of mindfulness as a moderator of work climate, our model will only consider need frustration as the mediator, and the simple slope analysis will be conducted in the context of tests below.

Structural Equation Model

We employed SEM with Amos 4.0 software (Arbuckle and Wothke 1999). In the model, we tested the SDT model of work well-being, in which controlling work climates would be related with higher psychological need frustration at work, which in turn would be associated with higher work ill-being. Most relevant to the present investigation, we further investigated how mindfulness affected this indirect effect in addition to its direct relationship to work adjustment. Given that we expected mindfulness to be a protective factor against the experience of need frustration in nonautonomy-supportive work environments, we added the variable as a moderator of the relationship between work climate and need frustration at work.

The maximum likelihood method was used to estimate parameters, and the following fit indices were used to examine model fit: (a) the root mean square error of approximation (RMSEA), with values of 0.08 or less reflecting reasonable fit (Browne and Cudeck 1993); (b) the standardized root mean square residual (SRMR), with values of 0.08 or less reflecting reasonable fit (Hu and Bentler 1999); (c) the comparative fit index (CFI), with values of 0.90 and higher indicating a good fit (Bentler 1990); and (d) the χ^2/df ratio, with values between 1 and 3 indicating acceptable fit (Arbuckle and Wothke 1999). In addition to the overall model fit indices, parameter

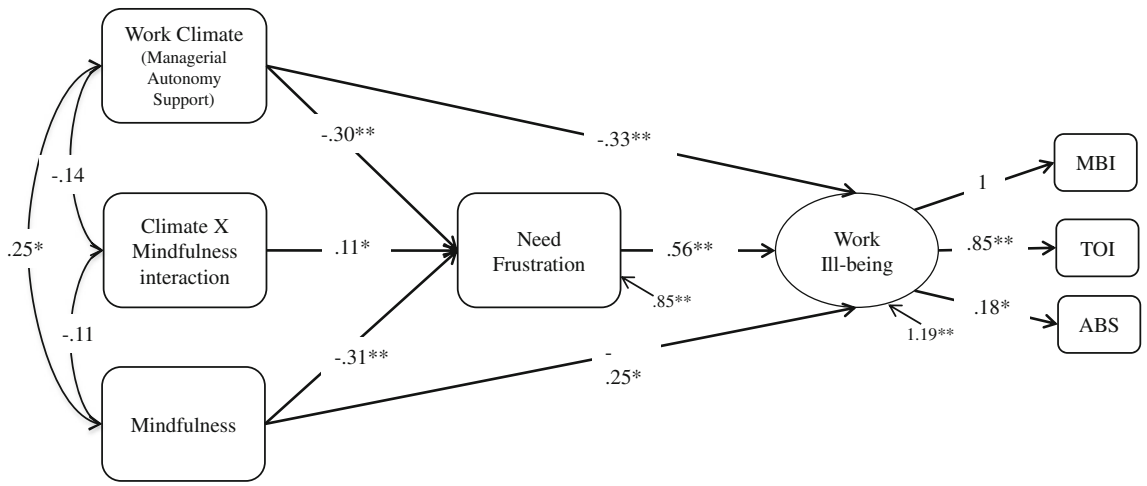

Fig. 3 SEM Model: mindfulness, autonomy-support, and work adjustment. Note: coefficients are unstandardized. Model fit was good, $\chi2(19)=30.03$, $p=0.04$; RMSEA=0.05; SRMR=0.03; CFI=0.98, $\chi2/df$ ratio=1.64. MBI=Maslach Burnout Inventory; TOI=Turn Over Intention; ABS=Absenteeism. *$p<0.05$ **$p<0.001$

Table 3 Preliminary hierarchical regression analyses

	Predictor	Need frustration		Need satisfaction	
		ΔR2	*b*	ΔR2	*b*
Step 1		0.02[a]		0.05*	
	Covariates				
Step 2		0.27**		0.35**	
	Work climate (managerial autonomy support)		−0.30**		0.37**
	Mindfulness		−0.31**		0.24**
Step 3		0.02*		0.001	
	Interaction (work climate X mindfulness)		0.11*		0.02

Note: Covariates include age, gender, personal and household income, work status full-time versus part-time. Regression coefficients (*b*) are unstandardized and refer to the full model

[a] $p = 0.05$

*$p<0.05$, **$p<0.001$;

estimates were analyzed to determine whether or not the relationships were supported by the data.

The model fit the data well, $\chi^2(19)=30.03$, $p=0.04$; RMSEA=0.05; SRMR=0.03; CFI=0.98, χ^2/df ratio=1.64 (see Fig. 3) structural paths were in the hypothesized directions. Specifically, less autonomy-supportive work environments and lower levels of mindfulness were associated with higher experience of need frustration ($B=-0.30$, $p<0.001$; $B=-0.31$, $p<0.001$, respectively). Higher levels of need frustration were associated with higher levels of work ill-being ($B=0.56$, $p<0.001$). The direct paths from work climate and mindfulness to work ill-being were still significant while controlling for need frustration, and thus, this variable acted as a partial mediator. More autonomy-supportive environments and higher levels of mindfulness were related negatively with work ill-being ($B=-0.33$, $p<0.001$; $B=-0.25$, $p<0.02$, respectively). We used bootstrapping to examine the indirect pathway from work climate to work ill-being through need frustration, as well as the indirect pathway from mindfulness to work ill-being through need frustration. Indirect effect results are reported using 95 % bias corrected confidence interval with 10,000 resamples [95 % BC CI]. Both indirect pathways were significant ($ab=-0.17$; $z'=3.38$, $p<0.01$), [95 % BC CI]: {−.27, −.07}, for work climate; ($ab=-0.17$; $z'=2.63$, $p<0.01$), [95 % BC CI]: {−0.31, −0.04}, for mindfulness.

The interaction of mindfulness and work climate predicting need frustration was significant ($B=0.11$, $p<0.02$). To examine the interaction between work climate and mindfulness on basic psychological need frustration, a simple slope analysis was conducted to determine whether work climate has a significant effect on need frustration at high (+1SD) and low (−1SD) levels of mindfulness (Preacher et al. 2006). Results showed that the less autonomy supportive the work climate, the higher the frustration of basic psychological needs among those low in mindfulness. The simple slope was −0.40 ($p<0.001$). The effect of work climate on basic psychological need frustration was also significant for those with high levels of mindfulness, that is, the less autonomy-supportive the work climate, the higher the frustration of basic psychological needs among those high in mindfulness. The simple slope was −0.20 ($p<0.001$). Although both those low and high in mindfulness experience need frustration when in controlling environments (as shown by significant simple slopes), the slope for those low in mindfulness is significantly steeper (becomes more strongly negative as levels of mindfulness decrease, as shown by the significant interaction) than those high in mindfulness. In other words, mindfulness mitigates the need frustration experienced in controlling work climates (see Fig. 4). To be sure, we reran a simple slope analysis at even higher (+2SD) and lower levels of mindfulness (−2SD). Results indicated that at two standard deviations above the mean of mindfulness, less autonomy-supportive environments are not related to higher levels of need frustration ($p>0.05$).

Discussion

Despite an accumulation of research indicating that mindfulness benefits clinical and nonclinical populations, little work has specifically examined its role in the workplace. In this study, we extended this line of research with a heterogeneous group of employees, and our findings echoed the positive results found in mindfulness studies within organizational settings (Hulsheger et al. 2013; Leroy et al. 2013). Moreover, this study is unique in showing a protective role of mindfulness in controlling environments, partially explained through lower basic psychological need frustration.

Our results showed that an autonomy-supportive work environment related negatively to employee ill-being and psychological need frustration, which in turn was positively associated with employee ill-being. Of main interest, the association between work environment and basic psychological need frustration was moderated by mindfulness, such that at higher levels of mindfulness, this relation was weaker (albeit still significant). Last, mindfulness related negatively to employee's work ill-being even after controlling for work climate and need frustration, indicating that it plays a powerful, direct role in protecting against work ill-being. Overall,

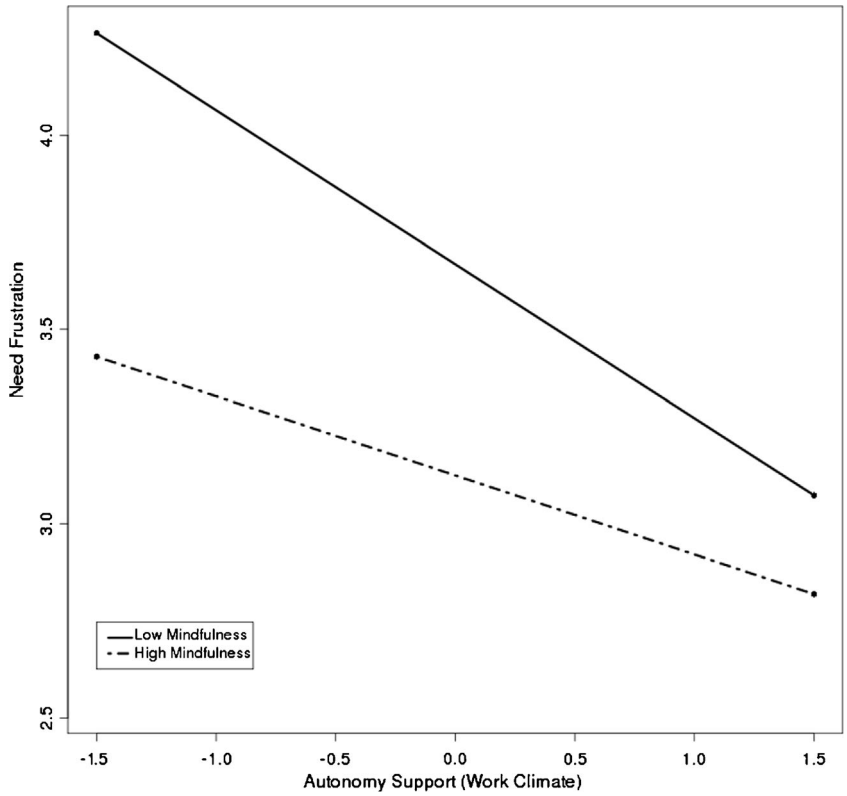

Fig. 4 Moderation effect of mindfulness on the relation between managerial autonomy support and need frustration. High and low values are 1 standard deviation above and below the mean, respectively

these findings suggest that mindfulness is positively related to work adjustment and can act as a partial buffer against nonsupportive work environments by mitigating their need frustration effects. Importantly, although mindfulness may serve as a protective factor, it does not eliminate the negative consequences of a nonsupportive work environment.

The fact that mindfulness did not moderate the relation between work climate and need satisfaction, as it did with work climate and need frustration, also suggests that mindfulness does not function merely as "rose-colored glasses," as if one sees things more pleasantly than they really are. Rather, the results suggest that when individuals high in mindfulness do not feel support at work, their needs are unfulfilled like those low in mindfulness, but they are more resilient to this need frustration. This is consistent with recent work by Weinstein et al. (2009) showing that, when faced with demanding challenges, those higher in mindfulness experience challenges as less overwhelming, and they also show more active coping to avert negative consequences.

Also informing our results, other research has shown that mindful people are more prone to disengage or take a step back from an initial negative appraisal and negative emotional reaction and engage in a state of broadened attention and increased cognitive flexibility (Garland et al. 2011; Hanley et al. 2014). This approach leads to resilience, as stressful events are more likely to be perceived as manageable by the individual who is able to respond more flexibly to his or her circumstances. Individuals who are unable to accept undesired negative experiences have their attentional capacity and decision-making narrowed, and instead of adapting in an active manner, they focus on avoiding the stressor, and hence are psychologically unavailable to respond and adapt actively to the cues of the environment (Kashdan and Rottenberg 2010). Corroborating the above argument, the high-quality awareness of mindfulness and its inherent openness and receptiveness appear to be precursors to psychological flexibility (Shapiro et al. 2004), which has been related to higher psychological health (Kashdan and Rottenberg 2010). Similarly, because mindfulness is characterized by a nonevaluative, open attention to the present, mindful individuals are less likely to add negative appraisals to their nonsupportive situation or get lost in ruminative spirals (Carmody et al. 2008; Creswell et al. 2007; Frewen et al. 2010; Weinstein et al. 2009).

On a related front, there is evidence that mindfulness enhances one's capacity to tolerate uncomfortable emotions by maintaining a healthy distance from distressing feelings (Coffey and Hartman 2008; Follette et al. 2006). Indeed, Creswell et al. (2007) used functional neuroimaging and reported that individuals low in mindfulness, when labeling thoughts and emotions as either positive or negative, exhibit activation in the limbic system. On the other hand, activation in individuals high in mindfulness was distinct such that, while labeling, there was greater prefrontal cortical activity and concomitant inhibition of the limbic system. This pattern of activation indicates a decrease in automatic affective

responses, reducing their duration and intensity. In sum, use of adaptive (e.g., decentering) versus maladaptive (e.g., rumination) coping patterns may act as buffer against need frustration and its deleterious effects on well-being. Understanding the potential mechanisms of how mindfulness buffers against workplace ill-being represents a critical next step in this line of inquiry.

Limitations and Future Directions

There are limitations to this study that are important to highlight. Although the current sample is heterogeneous and MTurk has been shown to be a valid and reliable research tool (Buhrmester et al. 2011; Mason and Suri 2012), the sample was not selected to be representative of all employees. Thus, caution is warranted in generalizing from the current results, and further field studies to replicate our results are warranted. Second, although self-reports were appropriate given our focal constructs, which were mainly phenomenological, and analyses suggested that common method variance was limited in this study, such common method effects might still impact results (Podsakoff et al. 2003). Future research adding objective measures of autonomy support at the workplace, or ratings from alternative sources (e.g., peers) could help address this limitation. Third, basic psychological need frustration did not fully explain why work climate and mindfulness related to better well-being at work. Future research might include other potential mediators such as rumination, stress appraisal, coping style, and external supports (e.g., Garland et al. 2011; Huffziger et al. 2013; Huffziger and Kuehner 2009). Fourth, cross-sectional designs do not permit conclusions regarding causal pathways. Thus, future studies should implement longitudinal or experimental designs to clarify directional effects.

It is also relevant to note that other scholars define and measure mindfulness differently than how we assessed it in this study (Dimidjian and Linehan 2003; Grossman 2011; Hayes and Wilson 2003). More specifically, Brown and Ryan's (2003) definition and measure of mindfulness (MAAS) as receptive attention and awareness differs from approaches that include other dimensions such as acceptance, diminished self-talk, and nonjudgment (Baer et al. 2006; Bishop et al. 2004; Leary and Tate 2007). Although the MAAS is one of the most widely used mindfulness instruments and has been translated into many languages (Barajas and Garra 2014), future studies could employ different operational definitions of this construct to assess generalizability of findings (e.g., Five Facet Mindfulness Questionnaire (FFMW), Baer et al. 2006; Philadelphia Mindfulness Scale (PHMLS), Cardaciotto et al. 2008).

Given that both managerial autonomy support (e.g., Deci et al. 2001) and mindfulness (Brown et al. 2007) can be significantly altered through interventions, another future direction would be to test such interventions in workplaces for their impact on workplace wellness. In addition, it may be clarifying to measure an overall organization level of autonomy, unrelated to managerial autonomy support, that can influence employees' work well-being. Future studies should also control for other theoretically related constructs (e.g., neuroticism, resilience, organizational justice, work-life balance, tenure, and rank) to clarify whether mindfulness explains the relation between workplace climate and need frustration above and beyond these other variables. The latent outcome variable of work well-being could also be expanded to include other work adjustment variables such as emotional labor, in-role performance, and organizational citizenship. Finally, mindfulness and perceived managerial autonomy support are weakly, but significantly, positively correlated. This could mean that more mindful individuals may actively seek work opportunities that are more autonomy supportive or influence environments to be more autonomy supportive. Future studies could explore the reciprocal associations between these constructs and work adjustment. Nevertheless, this research fills an important gap in that it shows a buffering effect of mindfulness in nonoptimal environments. Building on this line of research would further our understanding of the causal processes entailed and the conditions that foster well-being at work.

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