

## BUILDING POSITIVE RESOURCES: EFFECTS OF POSITIVE EVENTS AND POSITIVE REFLECTION ON WORK STRESS AND HEALTH

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**This three-week longitudinal field study with an experimental intervention examines the association between daily events and employee stress and health, with a specific focus on positive events. Results suggest that both naturally occurring positive work events and a positive reflection intervention are associated with reduced stress and improved health, though effects vary across momentary, lagged, daily, and day-to-evening spillover analyses. Findings are consistent with theory-based predictions: positive events, negative events, and family-to-work conflict independently contribute to perceived stress, blood pressure, physical symptoms, mental health, and work detachment, suggesting that organizations should focus not only on reducing negative events, but also on increasing positive events. These findings show that a brief, end-of-workday positive reflection led to decreased stress and improved health in the evening.**

Research has established that work stress physically and psychologically damages workers and economically burdens organizations and societies

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The first two authors contributed equally to this research. Data were collected when all the authors were at the University of Minnesota. Funding was provided by the University of Minnesota Institute for Advanced Study, the Carlson School of Management Small Grants Program, and a sabbatical supplement awarded to the first author by the University of Minnesota. We thank Devasheesh Bhave, Jonathan Booth, and Matthew Borneman for helping pilot our protocol. We are grateful to Joanna Mark, Erin Spoerri, Nafisa Teague, and Chantelle Shoff for assistance in data collection and to participants of the Carlson School OB Research Group, Department of Work and Organizations Workshop, and 2009 CREW Emotions Conference for their input and suggestions. We also offer a special thanks to our organizational participants for their willingness to wear blood pressure monitors, respond to beeping devices, and take evening phone calls, all while carrying on with already full lives.

(Pfeffer, 2010; Schnall, Dobson, & Roskam, 2009). Numerous studies have addressed sources of work stress (e.g., Kamarck et al., 2002), ways to eliminate them from work environments (e.g., Israel, Baker, Goldenhar, Heaney, & Schurman, 1996), and ways to mitigate their negative effects (e.g., Rau, Georgiades, Fredrikson, Lemne, & de Faire, 2001; Van der Doef & Maes, 1998). Overwhelmingly, this line of research has focused on negative aspects of work (e.g., long hours, time pressure, role ambiguity; see Crawford, LePine, & Rich, 2010), with positive aspects of work playing primarily a buffering role. Moreover, research has tended to treat positive work resources (e.g., autonomy, support) as relatively stable characteristics of an environment, despite the fact that theory suggests a more ongoing, dynamic, and continuous depletion and replenishment of resources.

Over the past decade, a contrasting line of research has emerged that focuses explicitly on positive events (e.g., positive psychology [Seligman & Csikszentmihalyi, 2000]; positive organizational

scholarship [Cameron, Dutton, & Quinn, 2003]) and ways to capitalize on the beneficial effects of these events (e.g., Fredrickson & Joiner, 2002; Gable, Reis, Impett, & Asher, 2004; Ilies, Keeney, & Scott, 2011). To date, there has been little integration of these lines of research, in part because they represent fundamentally different points of view. Work stress and occupational health research has focused on understanding how negative work events affect employees, with the ultimate goal of reducing negative events and their concomitant psychological, physical, and economic costs. In contrast, positive psychology and positive organizational scholarship research has highlighted the experience and amplification of positive experiences in promoting health and well-being. One assumption that underlies positive organizational scholarship has been that the factors that lead to stress are not the same as those that lead to thriving (Dutton, Glynn, & Spreitzer, 2006). Another assumption has been the importance of focusing on positive events to counteract the natural human tendency toward focusing on negative events (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Taylor, 1991). A bias toward focusing on negative antecedents has also been suggested in the management and psychology literatures. Seligman and Csikszentmihalyi wrote, "It seems an unspoken (or more precisely, unwritten) and underexamined assumption of the literature that positive events, if and when they do occur, have relatively limited impact on individual well-being and interpersonal life" (2000: 10). Spreitzer, Sutcliffe, Dutton, Sonenshein, and Grant suggested that much more is known about combating "disease and infirmity" than about supporting "positive health, wellness, and positive functioning" at work (2005: 537).

Despite their differences in perspective, models of work stress and positive psychology theories share similarities; in both, resources are viewed as essential to optimal human functioning. Our goal is to integrate and extend theory from positive psychology into literature on work stress and occupational health (broaden and build theory [Fredrickson, 1998, 2001], the conservation of resources model [Hobfoll, 1989], and the job demands-resources model [Demerouti, Bakker, Nachreiner, & Schaufeli, 2001]). We do this by first examining dynamic variation in a broad variety of work events, including those that build resources (positive events), those that deplete resources (negative events), and those that may deplete resources in one domain while building them in another (family-

to-work conflict). Second, we examine the effects of an assigned positive reflection intervention designed to help workers capitalize on positive events. Third, following the conservation of resources and job demands-resources traditions, we examine the effects of work events and the intervention on stress, but we also expand the scope of our study to include other outcomes relevant to employees, including blood pressure, health complaints, and work detachment, a measure of thriving derived from the positive psychology tradition. Work detachment is defined as an "individual's sense of being away from the work situation" (Etzion, Eden, & Lapidot, 1998: 579), and it represents a psychological detachment, in that employees are able to switch off thoughts of work when they leave (Sonnentag & Bayer, 2005).

We contribute to theory by providing a more complete test of conservation of resources theory (via dynamic examination of a wide variety of resource-building and -depleting events), by testing a potential boundary condition of popular positive psychology interventions, and by extending the range of outcomes affected by these interventions. Our study recognizes the interplay of positive experiences, stress, and health as a dynamic process including both immediate reactions to work events and cumulative effects that build over the course of a workday and spill over into evening to better capture the depleting/restorative properties of events and resources. Following Thoresen, Kaplan, Barsky, Warren, and de Chermont (2003), we also challenge the widely held notion in psychology that positively and negatively valenced constructs have different nomological networks, whereby positive outcomes (e.g., job satisfaction, organizational commitment) are associated with positive events, traits, and mood states, and negative outcomes (e.g., stress, poor health) are associated with negative events, traits, and mood states. We also seek to determine whether assigning an average worker to an intervention designed to help her/him capitalize on positive events will have the same beneficial effects as such interventions do when they are voluntarily chosen (often by mildly depressed individuals; e.g., Seligman, Steen, Park, & Peterson, 2005), or when they explicitly involve sharing positive experiences with others (e.g., Ilies et al., 2011). Moreover, we contribute to the practice of management by examining the health benefits of small work events that can be initiated by managers (e.g., positive feedback) as well as more formal exercises (e.g., positive reflection). Understanding the rela-

tionship between positive work events and health is valuable to employers, given the financial implications associated with poor employee health (e.g., health insurance costs, illness-related productivity losses).

We tested our hypotheses in a sample of health care workers who wore ambulatory blood pressure monitors at work and at home for three weeks and reported four times daily on work events and stress as they occurred. We also interviewed them nightly about evening stress, work detachment, and health. At the study midpoint, we implemented a positive reflection intervention at the end of each workday, which we link to stress, health, and work detachment in the evening.

## THEORY AND HYPOTHESES

Hobfoll's (1989) conservation of resources model made an important theoretical contribution to understanding of stress by focusing explicitly on the role of resources, including positive resources. The central notion of the model is that humans strive to protect and enhance the self through the acquisition and maintenance of resources. When environmental conditions deplete or threaten resources, people suffer increased stress, and when environmental conditions provide or build resources, people enjoy better health and reduced stress. The conservation of resources model recognizes the importance of stable characteristics of individuals (e.g., personal characteristics) and work environment (e.g., job characteristics) but also explicitly posits ongoing depletion and replenishment of resources over time. Yet most empirical studies treat resources as stable characteristics of individuals or their environments. For example, Neveu (2007) used one-time assessments of typical levels of work resources, such as skill utilization and coworker support. In keeping with conservation of resources theory, we treat stress as a dynamic function of events and experiences. This notion is also consistent with the propositions of affective events theory (Weiss & Cropanzano, 1996), which posits work events as the proximal causes of employees' affective experiences. We suggest that, in addition affecting mood, day-to-day workplace events and experiences serve as mechanisms for depleting resources and fostering their replenishment.

An important issue to consider when examining the effects of positive (and negative) events is the extent to which they have immediate effects or build over time. For example, in the stress litera-

ture, it has been clearly established that stress reactions to events are immediate (e.g., Dickerson & Kemeny, 2004) but can also build and have a lasting effect (Block & Zautra, 1981). In the health literature, the effects of events, especially on blood pressure, are more complicated. It has been well established that both negative and positive events can create immediate spikes in blood pressure, which seems more sensitive in a given moment to arousal than to event valence (see Schwartz, Pickering, & Landsbergis, 1996). However, in the long run, evidence suggests that positive events may be associated with lower blood pressure (Uchino, 2006). For this reason, we consider the effects of positive workplace events on health and well-being outcomes in the moment, throughout workdays, and as they spill over into evening.

## Positive Workplace Events

Meta-analytic work by Thoresen and colleagues (2003) challenged the notion of affect symmetry, whereby positive traits and moods predict positive outcomes and negative traits and moods predict negative outcomes. For positive attitudes, such as job satisfaction, they showed that both positive and negative affect contribute equally, but for negative workplace outcomes (e.g., burnout), the results were less clear. A usefulness analysis showed primarily symmetrical links (negative traits and mood states predicted negative outcomes), but some asymmetrical effects (positive traits and mood states predicted negative outcomes) were found, even though studies linking positive affect with negative outcomes are uncommon.

Much of the research on positive events and experiences has emerged from positive psychology and its foundational broaden and build theory (Fredrickson, 1998, 2001), which explicitly addresses positive experiences and emotions as they enhance health and flourishing; this research has followed the tradition of affect symmetry (positive events → positive emotions → positive outcomes). Taking an evolutionary approach, Fredrickson argued that in contrast to negative emotions, which narrow a person's thought and action repertoires in preparation for quick action (e.g., to fight off an imminent threat), positive emotions broaden people's thought and action repertoires, allowing them to consider more expansive ideas, actions, or solutions. Positive emotions are associated with play, creativity (cf. George & Zhou, 2002), exploration, and the ability to absorb new information; they

inspire people to savor and share experiences. In a line of reasoning congruent with the conservation of resources model, Fredrickson suggested that positive emotions provide immediate and enduring benefits because they create physical, intellectual, and psychological resources that individuals can use on the spot or hold in reserve to manage future threats. Application of broaden and build theory to the work setting suggests that when employees experience positive events at work, they will generate new ideas, additional resources, better social relationships, and improved problem solving via recognition of a wider scope of possible solutions, thereby reducing stress. The links between work events, emotions, and mood states proposed by broaden and build theory are consistent with results from a number of studies testing affective events theory. For example, when employees experience positive work, supervisor, and coworker events, they report more positive momentary mood (Miner, Glomb, & Hulin, 2005), and on days when employees receive more than they expected (i.e., promises are exceeded), they experience more positive emotions (Conway & Briner, 2002). Although the positive psychology tradition tends to focus on positive events and positive outcomes (but see Seligman et al. [2005] for an exception), our linkage of positive psychology perspectives to the conservation of resource theory leads us to expect that positive work events, via their resource-building capacity, will also affect negative work outcomes, such as stress and health complaints.

Positive events may directly build psychological resources by fulfilling basic human needs, including belongingness and autonomy (Baumeister & Leary, 1995; Ryan & Deci, 2000). In an effort to define positive human health as something more than the absence of illness or disease, Ryff and Singer (1998) identified four core, universal features of well-being: mastery, a purposeful life, quality interpersonal connections, and positive self-regard. According to the conservation of resources model, workplace events that build or enhance these features should enhance core resources and combat stress. For example, accomplishing a task might enhance a sense of mastery, and fun interactions with coworkers might highlight social resources.

Empirical research has suggested links between work events and core resources. Research testing the job demands-resources model in flight attendants (Xanthopoulou, Bakker, Heuven, Demerouti, & Schaufeli, 2008) linked daily fluctuations in coworker support to daily fluctuations in self-

efficacy, which affected achievement of work-related goals. Spreitzer et al. (2005) suggested that working in a climate of trust and respect can build relational resources via more positive day-to-day interactions, which in turn lead to behaviors that support self-determination and autonomy. In an experimental study, Grant and Gino (2010) found that positive events (e.g., helpers being thanked for their efforts) increased self-efficacy and social self-worth. Research outside the work context also has shown that positive events can build core resources. Results of a series of experience sampling studies suggested that daily positive events are associated with increased self-esteem and perceived control (Nezlek & Plesko, 2001; Reis & Gable, 2003).

Emerging research also suggests that positive work events may have salutary effects on immune functioning (Heaphy & Dutton, 2008). Research directly linking positive experiences and health is far less common than research linking negative experiences and health, but human and animal studies are suggestive. For example, Panksepp (1993) found that play in animals increased dopamine use in their brains, and numerous studies (see Ryff and Singer [1998] for a review) have linked social interactions to reduced cortisol levels; both cortisol and dopamine are implicated in healthy immune functioning and stress. Additionally, a set of empirical studies following employees over several days showed that positive events lowered heart rates during work hours and evenings (Evans & Steptoe, 2001; Rau et al., 2001).

*Hypothesis 1. Positive workplace events are negatively associated with (a) stress, (b) blood pressure, and (c) health complaints and positively associated with (d) work detachment.*

### Positive Reflection Intervention

The positive psychology literature includes intervention techniques that reduce physical complaints, increase life satisfaction, and decrease depressive symptoms (Emmons & McCullough, 2003; Seligman et al., 2005; see Lyubomirsky [2008] for a review). These techniques include interventions such as meditating (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008), helping others (Steger, Kashdan, & Oishi, 2008), focusing on blessings (Emmons & McCullough, 2003) or positive events (Seligman, Rashid, & Parks, 2006), and others (Lyubomirsky, 2008). Many of these interventions have not been examined in work settings. More importantly, they are often chosen by those seeking improvement in



well-being (Seligman et al., 2005, 2006). We chose an intervention that promotes reflection on positive events by asking study participants to write about three good things that happened during their day (Seligman et al., 2005, 2006). The “three-good-things intervention” is designed to improve well-being by causing people to reflect on and “savor” positive events (Bryant, 1989). One unique feature of this intervention, especially as an assigned exercise, is that it does not rely on social elements (e.g., capitalizing on positive events by sharing them with others [see Gable et al., 2004; Ilies et al., 2011]). Rather, it relies on internal processes whereby participants ruminate on positive events, counteracting their natural human tendencies to ruminate on negative events.

In addition to the mechanisms noted for positive events, there are four additional theoretical explanations for the efficacy of a positive reflection intervention. First, as mentioned above, the intervention works against the human tendency to pay special attention to negative events (Baumeister et al., 2001; Taylor, 1991). “Human beings are naturally biased toward remembering the negative, attending to the negative, and expecting the worst” (Seligman et al., 2006: 783). Positive reflection attempts to break this pattern by moving the focus of attention from negative events to positive ones, leading people to experience more positive emotions and concomitant positive effects (Fredrickson, 2001). Second, the three-good-things intervention may counteract hedonic adaptation, which causes people to grow accustomed to their circumstances (Diener & Diener, 1996). Focusing explicitly on good things may decrease the likelihood of becoming accustomed to and thus failing to notice or benefit from positive events and resources (Frijda, 1988). Third, writing about a positive event provides an opportunity to relive the positive event, making the event and the resources associated with it more accessible in memory and making the event more likely to be shared with others (Gable et al., 2004). Fourth, a cognitive adaptation explanation suggests identifying the cause of events allows individuals to make sense of events and incorporate them into their understanding of the world and of themselves (Janoff-Bulman, 1992). Identifying and writing about why three good things happened may highlight available resources in individuals and their environments.

Empirical results for the efficacy of this intervention among the general population are impressive. Seligman et al. (2006) reported an uncontrolled

study in which participants’ pre- and post-test scores on a depression inventory showed a dramatic decrease in depressive symptoms following a three-good-things exercise. Seligman et al. (2005) reported similar results in a randomized controlled study, with effects persisting six months later. Although research evidence is impressive for the beneficial effects of positive refocusing on stress and well-being (Seligman et al., 2006), existing research is limited in two important ways. First, the efficacy of the three-good-things intervention has been tested primarily among those seeking improvements in well-being and those who reported being mildly depressed at baseline. Second, most research has examined the effects of the intervention on depression or happiness. Seligman et al. noted that more behavior-based assessment is needed; they “welcome the day when objective productivity and health measures supplement subjective happiness measures” (2005: 420). We build on existing research by linking an assigned positive reflection intervention at work to a broader variety of outcomes.

*Hypothesis 2. Reflecting on positive events at the end of a workday is negatively associated with (a) stress, (b) blood pressure, and (c) health complaints and positively associated with (d) work detachment.*

### **Negative Workplace Events**

Our primary focus is on the resource-building effects of positive experiences and events, but we would be remiss if we failed to consider the effects of negative events. Existing research tends to link positive events to positive outcomes (e.g., positive communication and life satisfaction [Gable et al., 2004]) and negative events to negative outcomes (but see Crawford et al. [2010] for an exception). Stress, health, and well-being are expected to be affected by the net resources resulting from resource-building positive experiences and resource-depleting negative experiences, yet studies have chiefly examined either positive or, more often, negative experiences, rarely examining both positive and negative experiences as they occur and co-occur at work (e.g., Miner et al., 2005). The question of whether both positive and negative work events independently influence health has not been thoroughly examined, though theory suggests both are important. Because our interest is in the overall effects of both resource-building and resource-depleting workplace events, the inclusion

of negative events in this research is important. But, given the fairly deep literature—theoretical and empirical—linking negative work events to stress, health, and work detachment, we are not breaking new ground in our examination of negative events. Rather, it serves as a way for us to test the notion that positive and negative events have independent effects.

Occupational health psychology has long linked negative workplace characteristics with employee stress and health (e.g., Cohen & Wills, 1985; Hobfoll, 1998; see Van der Doef and Maes [1999] for a summary). For the most part, this research has also taken a resource-based approach, whereby negative workplace events diminish or threaten resources in several ways, via negative mood states, deleterious effects on physiological functioning, and threats to basic needs such as belongingness and autonomy. Numerous studies have linked negative job-related characteristics such as long work hours, low control at work, and high work demands to cardiovascular disease as well as other psychological and physical outcomes (e.g., Ilies, Dimotakis, & De Pater, 2010; Sonnentag & Bayer, 2005; Teuchmann, Totterdell, & Parker, 1999; Totterdell, Wood, & Wall, 2006). Other studies (e.g., DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982) have linked daily work hassles (e.g., disliking work duties) to somatic symptoms such as headaches, chest pain, and back trouble. Research has also shown that negative work events influence health by increasing negative mood states (Bolger, DeLongis, Kessler, & Schilling, 1989; Evans, Johansson, & Rydstedt, 1999).

In addition to their effects on mood, negative work events may deplete resources via physiological means. In a study on immune responses resulting from exposure to a cold virus, Cohen, Tyrrell, and Smith (1993) showed that negative events had effects on illness that were independent from perceived stress or negative emotions. Stone and colleagues (1993) also found that among study participants infected with a virus, those with more negative life events exhibited more symptoms, even though mood and stress did not differ for those who did and did not develop colds. Additionally, Kamarck et al. (1998) linked psychosocial demands at work with ambulatory blood pressure, and Ilies et al. (2010) found that work overload resulted in higher blood pressure. In keeping with existing research, we expect negative work events to negatively affect employee health and well-being.

*Hypothesis 3. Negative workplace events are positively associated with (a) stress, (b) blood pressure, and (c) health complaints and negatively associated with (d) work detachment.*

### **Family-to-Work Conflict**

Up to this point, we have focused primarily on positive and negative events, without consideration of the nature of these events. However, within the organizational sciences, there is an entire literature focused on a specific type of workplace event—work-family conflict. Given our aim to examine the independent effects of a broad variety of resource-building or -depleting workplace events, we incorporate work-family conflict into this research. A number of studies have examined the health consequences of work-to-family and family-to-work conflict, which are defined as interrole conflict due to mutually incompatible role pressures from work and family domains (Greenhaus & Beutell, 1985). Because our focus is explicitly on events that occur at work, we narrow our attention to family-to-work conflict or the extent to which family demands interfere with employees' work. Although most of work-family research posits conflict between work and family as a negative stressor, some research suggests that work-family conflict's effects are not uniformly negative. For example, work-family enrichment is defined as "the extent to which experiences in one role improve the quality of life in the other role" (Greenhaus & Powell, 2006: 72). Surface examination of work-to-family conflict may suggest resource-depleting effects. But more careful consideration leads us to argue that family-to-work conflict may have both resource-building and resource-depleting effects, but in different domains and during different time periods. When family tasks interfere with work, work-related resources may diminish, but family-related resources may grow. For example, complications related to transportation of children from school to activities may creep into the workday and have negative effects at work, but dealing with such issues at work may make evening time with family more enjoyable. Thus, family-to-work conflict may both build and deplete resources. Further, family-to-work conflict may operate differently in the moment and over time. Thoughts of family at work may interfere with performance in the moment, but such thoughts aggregated across the day may have positive effects on general well-being, because family interactions can build re-

sources and are good for one's health (Gable et al., 2004; Heaphy & Dutton, 2008).

Despite the potential for family-to-work conflict to build and deplete resources, several reviews have suggested that it generally damages psychological and physical health (Allen, Herst, Bruck, & Sutton, 2000; Greenhaus, Allen, & Spector, 2006; Kelly et al., 2008). Allen and colleagues' meta-analytic work (2000) linked work-family conflict to psychological strain ( $r = .29$ ), somatic/physical symptoms ( $r = .29$ ), and work-related stress ( $r = .41$ ). Other meta-analytic results confirm negative associations between work-family conflict and health (Mesmer-Magnus & Viswesvaran, 2005). These assessments, however, often rely on narrow health indicators (e.g., anxiety or alcohol use) or overall health perceptions. Allen et al. (2000) suggested a need for research that examines the effects of work-family conflict on a broader range of health indexes, including objective measures. Current work-family conflict research is also limited by its predominant use of a between-participants approach, which allows for the possibility of spurious correlations between work-family conflict and health outcomes due to something about an individual (e.g., personality) that causes both work-family conflict and its outcomes.

Because existing research has built a strong empirical case for the resource-depleting effects of family-to-work conflict, we hypothesize only negative effects. However, the possibility that this type of negative event may be unique leads us to separate family-to-work conflict from more general work-related negative events, so that we can independently assess the effects of family-to-work conflict on well-being during the workday, when its resource depleting effects should be the strongest, and in the evening at home, when employees would be most likely to experience resource-building effects via stronger family relationships.

*Hypothesis 4. Family-to-work conflict is positively associated with (a) stress, (b) blood pressure, and (c) health complaints and negatively associated with (d) work detachment.*

### **Buffering and Enhancing Effects of Positive Events and Intervention**

Conservation of resources theory and broaden and build theory both suggest that positive events may cumulate over time to build enduring resources that increase resiliency in the face of re-

source loss (Fredrickson, 2001). Hence, our positive reflection intervention and naturally occurring positive events might not only have direct effects, but they might also serve as a buffer, moderating the effects of negative events and family-to-work conflict on stress and health. The empirical literature, however, provides limited and inconsistent empirical support for buffering effects (e.g., Van der Doef & Maes, 1998, 1999).

Typically, the stress literature has treated positive resources as a buffer against the effects of negative events, but recent research suggests that interventions such as ours might also amplify the beneficial effects of naturally occurring positive workplace experiences. Fredrickson's (1998, 2001) broaden and build theory suggests this possibility, as does empirical research showing that when positive events are savored or shared, their effects are enhanced (Gable et al., 2004; Ilies et al., 2011; Langston, 1994). Because our positive reflection is an exercise that involves savoring but not sharing, it was not clear whether it would magnify the effects of positive events.

Given inconsistent support for the buffering effects of positive events and limited theoretical and empirical rationale for hypothesizing enhancing effects for our positive reflection exercise, we offer no formal moderation hypotheses. However, we tested for effects of interactions between work events and our positive reflection intervention on stress and health, whereby the intervention buffered employees from the effects of negative events and family-to-work conflict and enhanced the effects of positive events. We also tested whether naturally occurring positive events buffered the effects of negative events and family-to-work conflict.

## **METHOD**

### **Procedures**

We collected data over three weeks (Monday–Friday, 15 days total) from three sources: ambulatory blood pressure monitors, personal digital assistant (PDA) surveys, and evening phone interviews. Each day, participants (a) reported work events and stress through four PDA surveys at work, (b) wore ambulatory blood pressure monitors that automatically measured their blood pressure every 30 minutes for two hours in the morning (between two morning PDA signals), two hours in the afternoon (between two afternoon PDA signals), and two hours in the evening (between a phone

reminder and an evening interview), and (c) answered questions about their current stress and health during the evening phone interview. At the midpoint of the three-week study, we introduced an additional task: at the end of each workday (study days 8–15), following the last PDA signal, participants performed a daily positive reflection exercise. Figure 1 shows the elements and timing of the data collection.

Participants were paid \$250 for any level of participation and \$100 more if they completed 80 percent of activities. Over the three weeks, participants completed 86 percent of daily PDA surveys, 92 percent of daily blood pressure measurements, 92 percent of evening interviews, 84 percent of evening blood pressure measurements, and 82 percent of positive reflections.

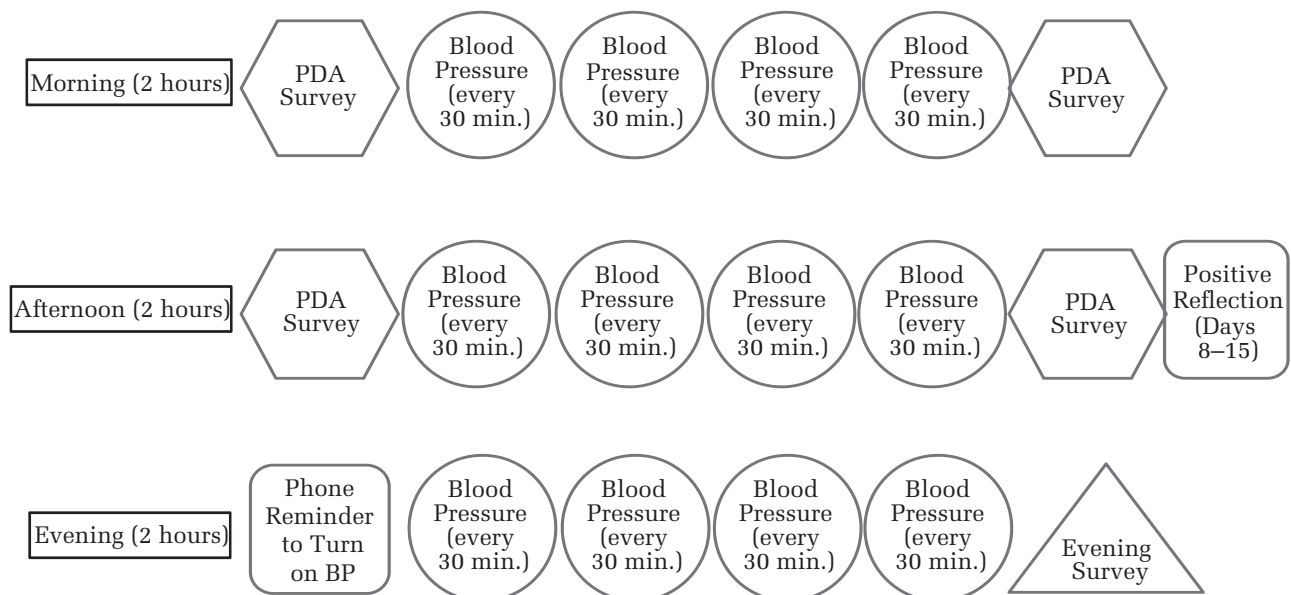
### Participants

Participants worked in nine outpatient family practice clinics operated by two health care organizations in a large metropolitan area. All these clinics were quite similar in that they were traditional physicians' offices providing nonemergency care. The organizations invited employees via e-mail to an information session. After providing study information, we directed interested attendees to our study website, where they completed a background

survey (e.g., health, work schedule). Following enrollment, participants were trained to use the equipment.

Eighty-two employees expressed interest in our study, but 12 did not complete the background survey, 8 were scheduled to be away from work during the data collection period, and 1 did not meet requirements (i.e., no known hypertension, good general health). We dropped a single male from the study. Our final sample consisted of 61 women who worked at least 32 hours a week and whose jobs involved some direct contact with patients. Job titles included nurse, receptionist, medical assistant, and lab technician. Although responsibilities varied across jobs (e.g., receptionists helping with scheduling and billing issues, nurses and medical assistants helping with clinical procedures), in this clinic setting, all participants were part of the direct patient care team. The average wage was \$15.93 per hour (s.d. = \$2.68/hour; range \$11.75–\$26.50). The average age of participants was 33.65 years (s.d. = 10.33) and most were white/Caucasian (69%; 18%, Asian/Pacific Islander; 10% black/African-American; 3% Hispanic). Most (79%) had a two-year college degree; 18 percent had completed high school; and 3 percent had a bachelor's degree. Average tenure at the clinic and in the current job was four years.

**FIGURE 1**  
Daily Data Collection over the 15-Day Period





## Measures

Before beginning the three-week daily survey period, participants completed an online survey reporting demographic characteristics (e.g., age, race, gender), work schedules, and trait positive affectivity (PA) and negative affectivity (NA). PA and NA were assessed with the ten PA (e.g., “enthusiastic,” “active”) and ten NA (e.g., “upset,” “distressed”) items from the Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Participants indicated the extent to which they “generally feel this way,” using a Likert-type scale (1 = “very slightly or not at all,” 5 = “very much”).

**Daily PDA survey.** PDAs were scheduled to signal participants two hours after they arrived at work and then approximately every two hours thereafter (i.e., two signals in the morning and two signals in the afternoon). Daily surveys took approximately two minutes to complete and asked about work events and stress.

**Work events.** In keeping with other event sampling studies (e.g., Ilies et al., 2011; Wang, Liao, Zhan, & Shi, 2011), we developed a work event scale by drawing on existing literature (e.g., Bono & Campana, 2007; Hart, Wearing, & Headey, 1994; Oishi, Diener, Choi, Kim-Prieto, & Choi, 2007; Stone & Neale, 1982). We developed 13 items that were broad enough to apply to many jobs and also encompassed the wide array of work events found in the literature. Items fell into three broad categories: positive events, negative events, and family-to-work conflict.

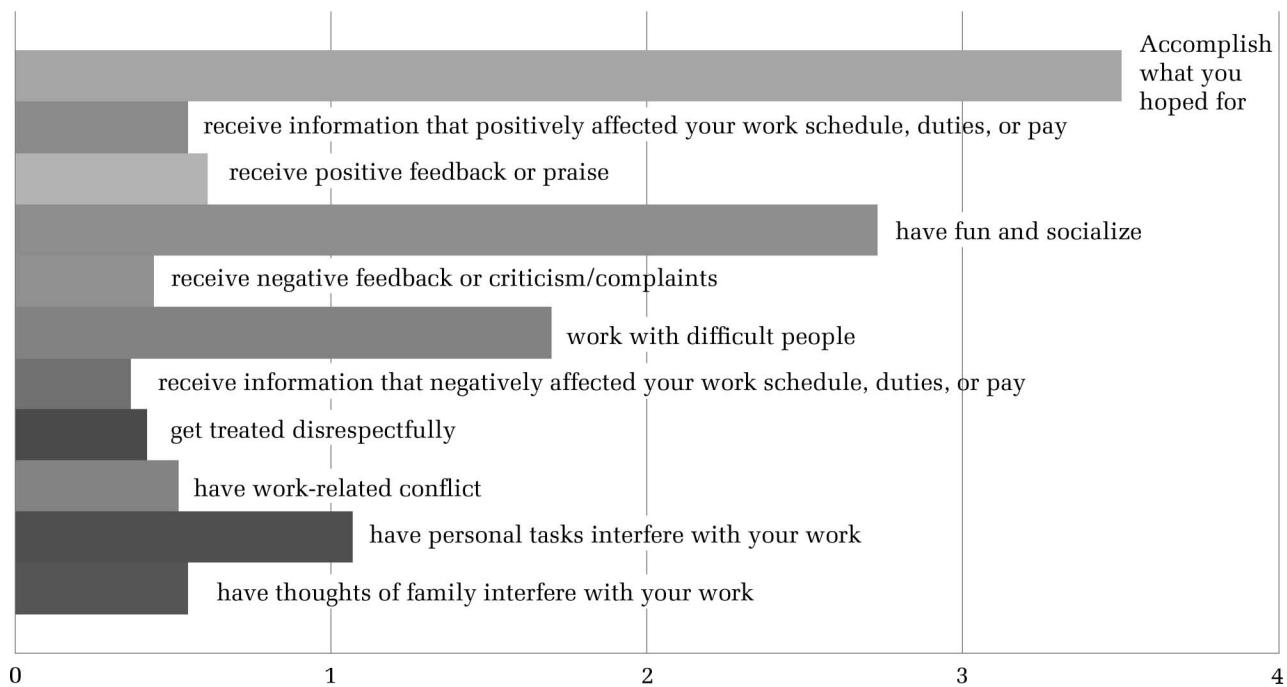
Because discrete work events such as those assessed tend not to occur frequently during small time segments (e.g., two-hour periods), the use of dichotomous items is common in event studies (Ilies et al., 2011; Kim & Yoon, 2012; Tsai & Huang, 2002; Wang et al., 2011). Skarlicki, van Jaarsveld, and Walker (2008) provided evidence that—at least for negative events directed toward customers—most of the variance in work events can be captured with a dichotomous (yes/no) scale. However, because we assessed a broad array of work events, including family-to-work conflict, which is not common in event studies, we asked participants to report whether each work event had occurred since the last signal (or since arriving at work for the first signal of the day), using a scale (0 = “not at all,” to 3 = “a lot”) that allowed us to verify the appropriateness of a dichotomous (yes/no) scaling for the events we studied. As with past research, we found

nonnormal distributions for the work event items; 96 percent of responses (across items) fell into two response categories: “not at all” or “a little.” Therefore, we dichotomized the work event items (0 = “did not occur,” 1 = “occurred”; “a little,” “a moderate amount,” and “a lot” were all coded as 1). We then summed the number of events experienced to form scales for positive events (four items: “accomplish what you hoped to,” “have fun and socialize,” “receive information that positively affected your work schedule, duties, or pay,” and “receive positive feedback or praise”), negative events (five items: “receive information that negatively affected your work schedule, duties, or pay,” “receive negative feedback or criticism/complaints,” “get treated disrespectfully,” “work with difficult people,” and “have work-related conflict”), and family-to-work conflict (two items: “have personal tasks interfere with your work” and “have thoughts of family interfere with your work”).<sup>1</sup>

We created two versions of each event scale. The first represents events experienced during each two-hour measurement period (momentary scales). The second represents events experienced each day, averaged across the four PDA signals (workday scales). There is redundancy between the momentary and workday scales, but both are important, as momentary scales allowed us to assess immediate responses to workplace events, and workday scales allowed us to assess the effects of these events as they cumulate over the course of a workday, which is especially important for our spillover analyses. Coefficient alpha is not an appropriate measure of reliability for these scales because they include distinct events that may not co-occur and are not meant to represent a latent psychological construct (e.g., Liu, Wang, Zhan, & Shi, 2009; Wang et al., 2011). In Figure 2, we present the average frequency of the 11 events.

<sup>1</sup> Two items were dropped after data collection. We dropped “regret” from the negative events scale because it occurred in less than 1 percent of our responses. Results were the same with the inclusion or exclusion of this item. We also dropped a family interference item that had ambiguous wording (“talk or email with family and friends”), because we did not ask if the activity interfered with work; it is possible that this activity occurred during a break. Also, talking with family might be positive (sharing a positive work event with family) or negative (getting a call from a family member who needs help).

**FIGURE 2**  
**Frequency of Events in a Day**



**Stress.** Participants indicated whether their day had been stressful since the last signal or since the start of their workday (1 = “strongly disagree,” 5 = “strongly agree”).

**Systolic blood pressure.** Participants wore A&D™ TM-2430 ambulatory blood pressure monitors for two hours in the morning, afternoon, and evening. Each monitor included a small computer worn at the waist, with a tube running under or over their clothing to a cuff worn on the upper arm. The computer was programmed to measure blood pressure every 30 minutes, on the hour and half hour. Participants activated their monitor on the first morning and first afternoon PDA signal and deactivated it on the second morning and second afternoon signal. In the evening, two hours before their scheduled phone interview, participants received an automated telephone reminder to activate their monitor, which they removed after the evening interview. Although the monitors record both systolic and diastolic pressure, systolic pressure is most responsive to work events (Theorell, Knox, Svensson, & Waller, 1985), is the best predictor of cardiovascular disease (Benetos, Thomas, Bean, Gautier, Smulyan, & Guize, 2002), and has been the focus of work-related blood pressure research (Ilies et al., 2010; Kamarck et al., 2002).

**Evening interview.** Participants responded to a five-minute structured phone interview, at a time arranged the prior evening and as close to their bedtime as possible. We asked questions about health complaints, stress, and work detachment.

**Evening health complaints.** We drew interview questions about health from Goldberg (1972). We asked about both physical and mental health complaints, prefacing all items with “Since you left work today, to what extent did you experience the following?” “Upset stomach,” “neck or back pain,” “headaches,” “painful or tense muscles” comprised the physical scale, and “felt tired or fatigued,” “difficulty concentrating,” and “difficulty making decisions” comprised the mental scale. Participants answered interviewer questions using a five-point scale (1 = “not at all,” 2 = “slight,” 3 = “moderate,” 4 = “a great deal,” 5 = “severely”). Items were averaged to form scales for physical and mental complaints ( $\alpha = .72$  and  $.63$ , respectively).

**Evening stress.** We used a single interview question for stress. Participants reported the level of stress they had experienced since leaving work that day, using the same responses as for the health complaint items.

**Evening work detachment.** Drawing from the literature (e.g., Sonnentag & Fritz, 2007), we as-

essed work detachment in three ways. First, we asked participants to agree or disagree with the statement, "I was able to forget about my work this evening" (1 = "strongly disagree," 2 = "disagree," 3 = "neither agree nor disagree," 4 = "agree," or 5 = "strongly agree"; mean = 3.87, s.d. = .72). Later in the interview, we asked, "To what extent did you experience difficulty switching off your mind after work?" using the same response options as for health complaints (mean = 1.26, s.d. = .61). Finally, we asked them the number of hours or minutes they had spent "thinking about work, preparing for work, or doing work activities" that evening (range = 0–3 hours, mean = 8.5 minutes, s.d. = 22.10). The second and third items were reverse-scored, then items were standardized and averaged to form a work detachment scale ( $\alpha = .74$ ).

### Positive Reflection Intervention

On study days 8 through 15, participants logged into our website at a work computer after they completed their final PDA survey of the day. Participants recorded three good things that had happened that day (personal or work-related) and explained why they thought these events had occurred (see the Appendix), an intervention based on those used in prior research (Seligman et al., 2005, 2006). On study day 7, we visited each participant's clinic with instructions for accessing the survey. To determine whether participants took our intervention seriously, we examined the good things they recorded. Three of the authors independently coded participants' responses, assigning 1 if a participant did not appear to take the intervention seriously (e.g., [good thing] "It's Friday"; [why] "It comes after Thursday") or 2 if they completed the intervention in a thoughtful, reflective manner (e.g., [good thing] "A doctor gave me a compliment today" [why] "Because I knew exactly what to do in an emergency situation, and I helped a patient who was having a seizure"). Initial agreement between the raters was 96 percent; the research team discussed and resolved 20 disputed ratings. Because only 10 incidents appeared to lack some effort, all data were included in our analyses.

## RESULTS

### Data Analysis

We used HLM 6 (Raudenbush, Bryk, Cheong, & Congdon, 2004) with group mean centering. In

group-mean-centered analyses, a positive relationship between negative work events and stress means that on days when participants experienced more negative work events than was typical, they also experienced elevated stress levels. We focused on within-person effects because they remove the effects of individual characteristics (e.g., "trait" positive or negative affectivity), allowing us to directly examine the association between events and outcomes.<sup>2</sup>

We modeled the effects of work events occurring over three time periods/levels, to examine whether the association between work events and health built or diminished over time. For the *momentary* level, work events and outcomes were assessed during the same time period (e.g., during a morning at work). For the *lagged momentary* level, we linked work events from the morning to health in the afternoon, controlling for events in the afternoon and health in the morning. For the *workday* level, work events and outcomes were aggregated over the course of an entire workday. For the *evening*, or *spillover* analyses, work events during an entire workday were linked to outcomes that evening. For completeness, Table 1 presents associations between variables both within- and between-persons, but these correlations do not appropriately model the nested nature of our data.

### Partitioning of Variance

Before hypothesis testing, we examined variance at the within- and between-individual levels for our level 1 variables. At the momentary level, 33 percent of the variance in stress and 51 percent of the variance in systolic blood pressure was within-individual. At the workday level, 48 percent of the variance in stress and 65 percent of variance in systolic blood pressure was within-individual. A large portion of the variance for evening outcomes was within-individual: evening stress (40%), systolic blood pressure (37%), physical complaints (49%), mental health complaints (60%), and work detachment (34%). Results suggested that multi-level modeling was appropriate. We also examined

<sup>2</sup> Within-person centering effectively controls for the effects of all individual difference variables, as each person's data are centered around her own mean. Nonetheless, because there is a debate in the literature about whether PA and NA should be controlled for in stress and health research, we reran all our analyses controlling for trait PA and NA. Results were unchanged.

TABLE 1  
Means, Standard Deviations, and Within- and Between-Person Correlations<sup>a</sup>

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Momentary</i>																			
1. Positive events	1.89	0.55		.00	.03	-.10	-.01												
2. Negative events	0.89	0.79	.02		.32	.61	.19												
3. Family conflict	0.41	0.41	.11	.01		.33	.23												
4. Stress	3.10	0.67	-.14	.28	.07		.17												
5. Blood pressure	124	10	.05	.05	.05	.14													
<i>Workday</i>																			
6. Positive events	7.40	2.20							-.01	.06	-.05	-.04	-.02	-.17	-.09	-.11	.08	.10	.25
7. Negative events	3.42	2.94						.00		.32	.59	.14	.35	.08	.32	.31	-.37	-.02	.41
8. Family conflict	1.66	1.66						.09	-.03		.40	.23	.28	-.06	.37	.33	-.20	-.14	.24
9. Stress	3.04	0.64						-.20	.26	.12		.17	.54	.04	.46	.42	-.26	-.06	.28
10. Blood pressure	123	10						.00	.05	.03	.11		.14	.77	.10	.22	-.02	.09	-.21
<i>Evening</i>																			
11. Stress	1.66	0.61						-.06	.12	.06	.24	.00		-.05	.78	.78	-.68	.08	.25
12. Blood pressure	125	9.42						-.05	-.01	.02	.00	.12	.10		-.20	-.03	.19	.08	-.18
13. Mental complaints	1.48	0.46						-.03	.05	.06	.10	-.02	.29	.02		.82	-.68	-.05	.22
14. Physical complaints	1.38	0.44						-.03	.12	-.02	.09	-.03	.19	.07	.27		-.67	.00	.21
15. Work detachment	0.00	0.50						.08	-.17	.02	-.19	-.07	-.22	-.11	-.13	-.15		.04	-.39
<i>Person-level</i>																			
16. Positive affect	3.68	0.63																	-.23
17. Negative affect	1.68	0.41																	

<sup>a</sup> The upper-left block represents momentary correlations; the lower-right block represents workday and spillover correlations. Within each block, within-person correlations (computed for each person and averaged across people [Miner et al., 2005]) are below the diagonal, and between-person correlations are above the diagonal. Within-person  $n$ 's range from 14 through 30 for momentary events and from 4 through 15 for workday and spillover.  $n = 61$  for between-person analyses.

the effects of clinic, organization, and weekday on the outcomes and found them to be nonsignificant; therefore, we did not model them in subsequent analyses.

### Work Events, Health, and Stress

Our first set of analyses examined the association between work events, stress, and health, using only data from study days 1 through 7, as our goal was to examine the association between work events on stress and health as a baseline, prior to our positive reflection intervention.

**Momentary results.** We present the results of our momentary analyses, in which we measured work events and outcomes concurrently, in columns two and three of Table 2. Because our goal was to examine the incremental effects of each type of work event, all three types of events were entered into the model simultaneously. Results supported a negative association between positive events at work and stress (Hypothesis 1a:  $\gamma = -.14, p < .01$ ); when a person experienced more positive events than normal, she also reported less stress. A similar pattern of findings emerged for negative events, but in the opposite direction; negative events were as-

sociated with increased stress (Hypothesis 3a:  $\gamma = .29, p < .01$ ). When family interfered with work, participants also experienced increased stress (Hypothesis 4a:  $\gamma = .16, p < .05$ ). We found no significant associations between work events and blood pressure in our momentary analysis.

**Lagged momentary results.** Because the momentary results involved analyses in which events, stress, and blood pressure were measured concurrently, it is possible that the results we report could be spurious because of the effects of another factor present during that two-hour time period, such as transient mood, which might affect reactions to (and reporting of) work events and perceptions of stress. For this reason, we conducted lagged momentary analyses in which we examined the association between work events in the morning and stress and blood pressure in the afternoon, controlling for both morning stress levels and subsequent (afternoon) work events. Our results in columns four and five in Table 2 reveal a significant, negative association between morning positive events and stress ( $\gamma = -.10, p < .05$ ); when a person experienced more positive events than normal in the morning, she also reported less stress



TABLE 2  
Results of Momentary and Workday Regression Analyses for the Effects of Work Events on Stress and Health, Study Days 1–7<sup>a</sup>

Variables	Momentary Analyses		Lagged Momentary Analyses		Workday Analyses	
	Stress	Systolic Blood Pressure	Stress	Systolic Blood Pressure	Stress	Systolic Blood Pressure
Intercept	3.15** (.07, 43.14)	123.31** (1.35, 91.32)	3.19** (.10, 32.35)	123.78** (1.44, 86.20)	3.07** (.07, 45.69)	123.27** (1.32, 93.12)
Positive events	-.14** (.06, -2.48)	.33 (.50, 0.66)	-.10* (.06, -1.87)	.89 (.73, 1.21)	-.06** (.02, -3.68)	.23 (.19, 1.16)
Negative events	.29** (.04, 6.47)	.52 (.37, 1.40)	-.03 (.06, -0.51)	.29 (.46, 0.62)	.09** (.01, 6.32)	.35* (.21, 1.66)
Family-to-work conflict	.16* (.07, 2.35)	.82 (.57, 1.43)	.12 (.10, 1.18)	.22 (1.09, 0.20)	.08** (.02, 4.64)	.57* (.30, 1.88)

<sup>a</sup> Values are unstandardized HLM coefficients (s.e., *t*). For momentary analyses, variables were measured concurrently ( $n = 738-741$  observations,  $df = 734-737$ ). Momentary lagged analyses predict afternoon outcomes from morning events ( $n = 351-353$  observations,  $df = 343-345$ ), with morning stress and afternoon stress and afternoon events controlled for. For workday analyses, variables were aggregated across a single workday ( $n = 332$  observations;  $df = 328$ ).

\*  $p < .05$

\*\*  $p < .01$

in the afternoon. There were no lagged effects for negative events, family-to-work conflict, or blood pressure.

**Workday results.** In the last two columns of Table 2, we present the results of our workday analyses, which examined the association between work events aggregated over an entire day and average stress and blood pressure for that workday. The pattern of associations between work events and stress at the workday level was similar to that at the momentary level. Workers were significantly less stressed on the days they experienced more positive events throughout the workday ( $\gamma = -.06$ ,  $p < .01$ ). Negative events were significantly and positively associated with stress ( $\gamma = .09$ ,  $p < .01$ ), as was family interference with work ( $\gamma = .08$ ,  $p < .01$ ).

In the workday analysis, we also found significant associations between negative work events and blood pressure ( $\gamma = .35$ ,  $p < .05$ ) and family-to-work conflict and blood pressure ( $\gamma = .57$ ,  $p < .05$ ). On days when participants experienced more negative events than normal, and on days when their family interfered with work more than normal, their blood pressure was slightly and significantly higher. Positive events were not significantly associated with blood pressure.

**Spillover results.** Next, we examined the link between workday events and evening health and well-being. Table 3 presents results. Comparing Tables 2 and 3 clearly shows that work events are associated with stress and health differently over time. Although positive events were not associated with lower blood pressure during workdays (perhaps because positive events can be exciting and raise blood pressure in the moment [Pressman & Cohen, 2005]), we found a significant spillover ef-

fect. On days when participants had more than their normal number of positive events, blood pressure was lower in the evening ( $\gamma = -.55$ ,  $p < .05$ ). Positive workplace events were also associated with greater work detachment in the evening ( $\gamma = .03$ ,  $p < .05$ ).

Examining the spillover effects of negative events, we found that experiencing more negative events during a workday was associated with increased evening stress ( $\gamma = .06$ ,  $p < .01$ ) and reduced work detachment ( $\gamma = -.06$ ,  $p < .01$ ). No spillover effects were found for family-to-work conflict.

### Positive Reflection Intervention

**Main effects.** One of the central purposes of our study was to determine whether an assigned (not voluntarily chosen), brief, positive reflection performed at the end of the workday would improve employee stress and health (Hypothesis 2). We conducted all tests of the intervention effects within-persons, with participants serving as their own controls. That is, we compared evening stress and health before and after the positive reflection intervention. We examined intervention effects in two ways. First, we compared evening health and stress in the preintervention period (study days 1–7) to health and well-being during the intervention (study days 8–15). However, some participants missed a day of the study during the intervention period, so we also compared health and well-being on days when participants completed the positive reflection intervention and days when they did not, regardless of where they were in the study (no participants completed the intervention before day 8, but not all completed the intervention on each of

TABLE 3  
Results of Spillover Regression Analyses for the Effects of Work Events on Evening Stress and Health, Study Days 1–7<sup>a</sup>

Variables	Stress	Systolic Blood Pressure	Physical Complaints	Mental Complaints	Work Detachment
Intercept	1.76** (.08, 21.67)	124.99** (1.32, 94.36)	1.42** (.05, 27.57)	1.52** (.05, 32.01)	-.03 (.07, -0.40)
<i>Intrapersonal effects</i>					
Positive events	-.02 (.03, -0.70)	-.55* (.26, -2.11)	.00 (.01, 0.16)	.02 (.01, 1.11)	.03* (.02, 1.75)
Negative events	.06** (.02, -2.25)	.12 (.27, 0.45)	.02 (.01, 1.25)	.00 (.01, 0.07)	-.06** (.02, -3.04)
Family-to-work conflict	-.01 (.04, -0.27)	.67 (.44, 1.50)	.01 (.02, 0.72)	.02 (.02, 1.23)	.01 (.04, 0.14)

<sup>a</sup> Values are unstandardized HLM coefficients (s.e., *t*). *n* = 327–329 observations. Spillover analyses link events aggregated across workday with evening outcomes. *df* = 323–325.

\*  $p < .05$

\*\*  $p < .01$

days from 8 through 15). Our results in Table 4 clearly demonstrate the efficacy of a positive reflection intervention. Comparing the preintervention period with the intervention period, we found that participants experienced reduced stress ( $\gamma = -.16$ ,  $p < .01$ ) and reported fewer health complaints (physical:  $\gamma = -.07$ ,  $p < .01$ ; mental:  $\gamma = -.07$ ,  $p < .05$ ). Comparing outcomes on days when participants did not complete the intervention with those on days when they did complete it, we also found significant effects for evening stress ( $\gamma = -.07$ ,  $p < .01$ ) and health complaints (physical:  $\gamma = -.11$ ; mental:  $\gamma = -.04$ ,  $p < .01$ ). Additionally, participants experienced greater detachment from work ( $\gamma = .06$ ,  $p < .05$ ) on days when they completed the intervention. Effect sizes were generally small (physical complaints:  $d = -.16$ ; mental complaints:  $d = -.15$ ; inability to switch off work:  $d = -.09$ ; stress:  $d = -.23$ ). The only outcome our intervention failed to affect significantly ( $p < .05$ ) was evening blood pressure. In Figure 3, we depict results comparing mean levels of each outcome for all participants before and during the intervention period.<sup>3</sup> Overall, the results shown in Table 4 and Figure 3 suggest that our intervention meaningfully affected participants' stress, health, and well-being, providing support for Hypothesis 2.

**Buffering effects.** In addition to examining the main effects of our intervention, we were interested in whether the positive reflection or naturally occurring positive events might buffer the effects of negative events and family-to-work conflict and whether the positive reflection intervention might

help employee capitalize on the beneficial effects of positive events.

**Intervention.** For positive and negative events, we found no enhancing or buffering effects of the intervention; Table 5 shows results. Although our intervention had main effects (reducing health complaints and stress), it was not helpful in protecting employees from the effects of negative work events, nor was it helpful in amplifying the benefits from positive events employees experienced. When people experienced negative events, they felt more stressed, suffered more health complaints, and had difficulty detaching from work in the evening, and these effects were not mitigated when they reflected on good things in their lives.

We did find buffering effects for family-to-work conflict. Results in Table 5, which are depicted in Figure 4, suggest that the positive reflection intervention reduced the negative effects of family-to-work conflict on blood pressure and mental complaints. The main effect of family-to-work conflict on blood pressure was not significant (i.e., simple slope = .67, n.s.; see Table 3). Nonetheless, our moderation test indicated a significant reduction in the effects of family-to-work conflict on blood pressure during the intervention period ( $\gamma = -1.56$ ,  $p < .05$ ). The same pattern of effects was found for health complaints; the positive reflection exercise reduced the negative effects of family-to-work conflict on evening mental health ( $\gamma = -.07$ ,  $p < .05$ ).

To better understand why we found buffering effects for the intervention on family-to-work conflict and not for other types of negative events, we conducted a post hoc examination of the content of participants' positive reflections. Specifically, we coded for whether the positive reflections referenced family members or family events. For all participants and days ( $n = 397$ ), participants refer-

<sup>3</sup> Work detachment is standardized (mean = 0, s.d. = 1), and the average value before the intervention was less than zero, and the average value after the intervention was greater than zero, indicating an increase in work detachment during the intervention period.

TABLE 4  
Effects of the Positive Reflection Intervention on Stress and Health<sup>a</sup>

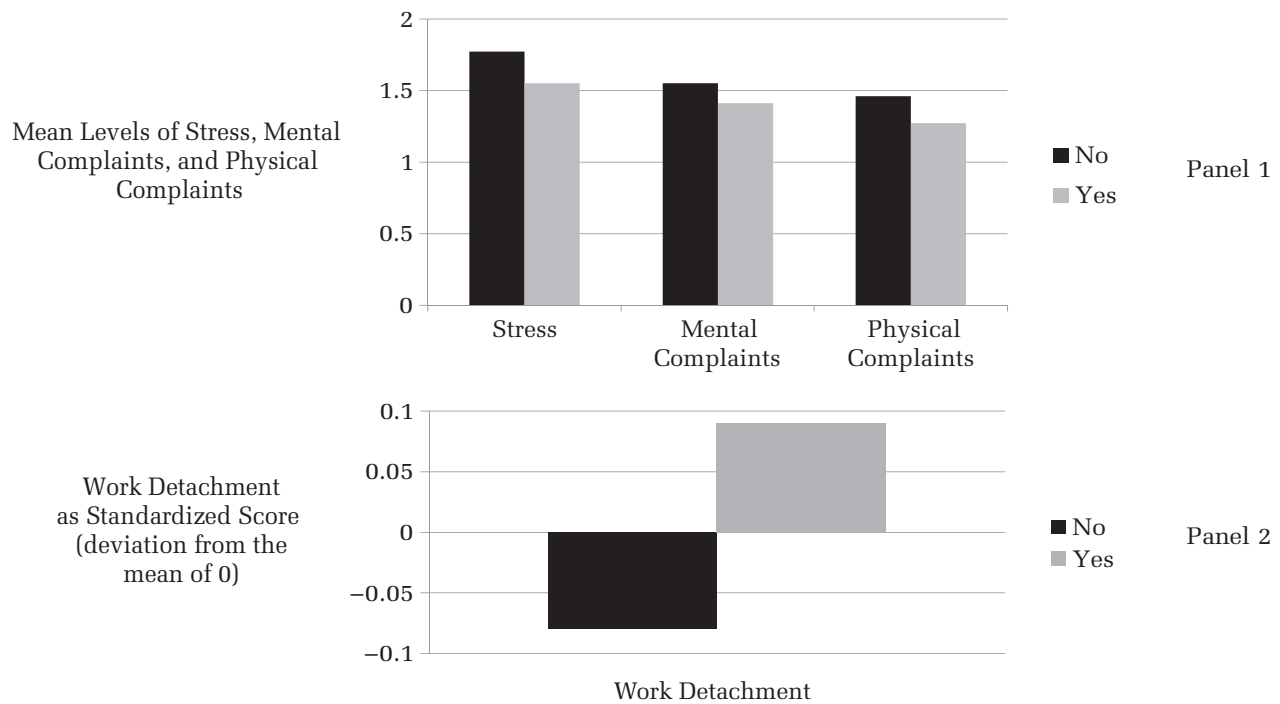
Variables	Evening Stress	Evening Systolic Blood Pressure	Physical Complaints	Mental Complaints	Work Detachment
Intervention period	-.16** (.08, 21.60)	0.99 (.81, 1.23)	-.07** (.03, 2.46)	-.07* (.03, -2.26)	.06 (.07, 0.89)
Intervention completed	-.07** (.03, -2.43)	.36 (.42, 0.86)	-.11** (.02, -4.61)	-.04** (.01, -2.75)	.06* (.03, 2.22)

<sup>a</sup> Values are unstandardized HLM coefficients (s.e.,  $t$ ).  $n = 61$  participants; 773–838 observations,  $df = 60$ , 771–836. “Intervention period” is the comparison of study days 1–7 (preintervention) to days 8–15 (intervention period). “Intervention completed” is the comparison of days when individuals actually completed the intervention to days when they did not.

\*  $p < .05$

\*\*  $p < .01$

**FIGURE 3**  
**Effects of Positive Intervention on Evening Stress and Health**



No = days on which participants did not complete the positive reflection intervention  
 Yes = days on which participants completed the positive reflection intervention

enced family in almost half of their daily reflection exercises (44%). Only five individuals (8% of sample) failed to reference family in their positive reflections at some point. Thus, it appears that many participants used the positive reflection to reflect on family members, family events, and family issues in their lives, which possibly explains why we found buffering effects of the intervention for family-to-work conflict but not for negative events more generally. As an additional post hoc analysis, we created a variable for each participant that indicated the percentage of her entries that included family content. For example, if a person wrote three good things a day for eight days and talked about family only five times, the score was .21 (5/24); for a person who talked about family in two entries every day for eight days, the score was .67 (16/24). A cross-level analysis tested whether the buffering effects of the intervention for family-to-work conflict were stronger for participants who wrote about family more; results of this analysis were not statistically significant ( $p > .05$ ).

**Positive workplace events.** We also tested whether positive workplace events foster the con-

servation or building of resources by buffering employees from the effects of negative events and family-to-work conflict. In contrast to our intervention results, positive events were found to have no buffering effects on family-to-work conflict (Table 5). However, we did find significant buffering effects for negative events; specifically, the association between negative events and stress ( $\gamma = -.01$ ,  $p < .05$ ) and physical health ( $\gamma = -.004$ ,  $p < .05$ ) was smaller on days when employees experienced more positive events (Figure 4).

## DISCUSSION AND CONCLUSION

Studs Terkel opened his classic book *Working* with these lines: "This book, being about work, is, by its very nature about violence—to the spirit as well as to the body. It is about ulcers >as well as accidents, about shouting matches as well as fistfights, about nervous breakdowns as well as kicking the dog around. It is, above all (or beneath all), about daily humiliations" (1972: xiii). This punishing view of work serves as the basis for much existing research on employee stress, but our



TABLE 5  
Enhancing and Buffering Effects of Positive Events and Reflection<sup>a</sup>

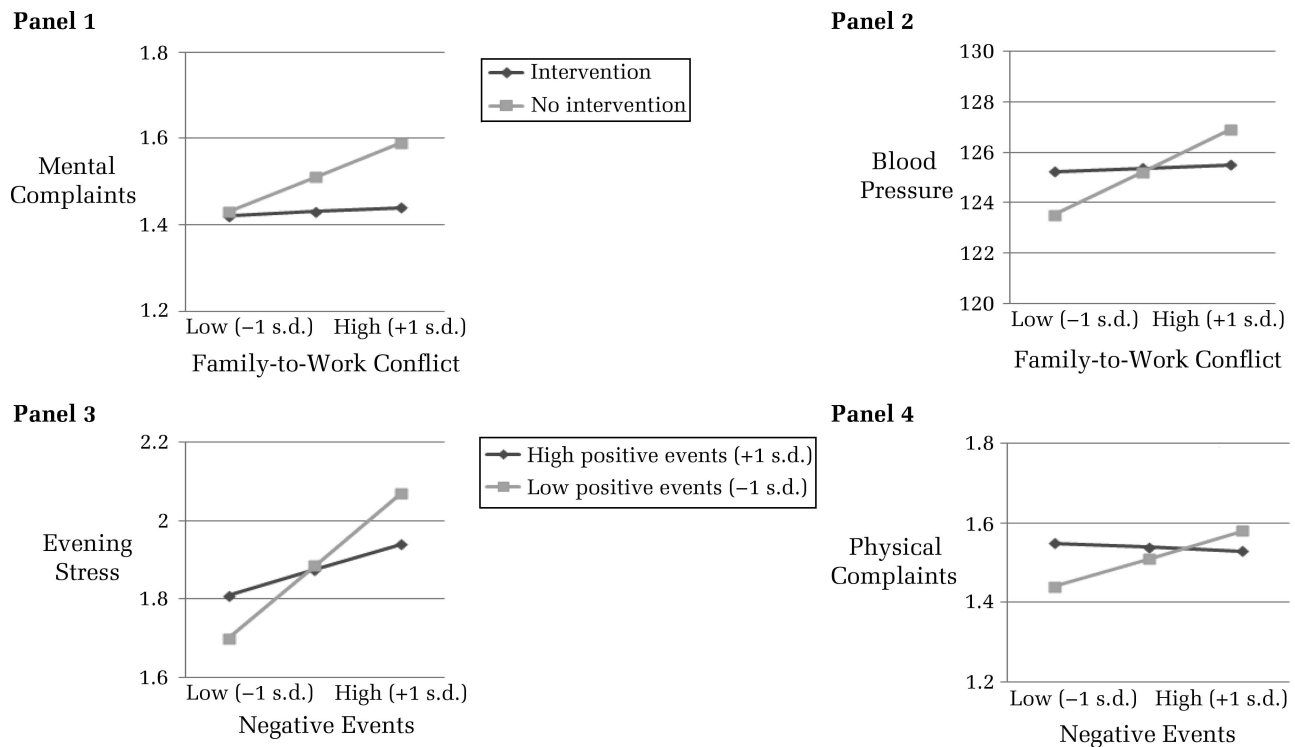
Variables	Evening Stress	Evening Systolic Blood Pressure	Physical Complaints	Mental Complaints	Work Detachment
<i>Enhancing effects</i>					
Positive events × intervention	.01 (.06, -0.19)	.75 (.90, -0.83)	-.01 (.01, -0.87)	-.04 (.03, -1.14)	-.04 (.04, -0.94)
<i>Buffering effects: Intervention</i>					
Negative events × intervention	-.08 (.07, -1.12)	.24 (.65, -0.37)	.01 (.01, -0.63)	.02 (.03, -0.52)	-.00 (.07, -0.00)
Family-to-work events × intervention	-.02 (.07, -0.23)	-1.56* (.68, -2.31)	-.00 (.01, -0.11)	-.07* (.03, -2.31)	-.02 (.02, -0.04)
<i>Buffering effects: Positive events</i>					
Negative events × positive events	-.01* (.00, -1.87)	-.03 (.05, -0.56)	-.004** (.00, -2.55)	-.00 (.00, -0.32)	-.00 (.00, -0.95)
Family-to-work events × positive events	.01 (.00, -1.61)	.09 (.11, -0.81)	-.00 (.00, -0.18)	.00 (.00, -0.11)	.00 (.01, -0.46)

<sup>a</sup> Values are unstandardized HLM coefficients (s.e., *t*). Interactions were modeled simultaneously with main effects (not presented here; results in Tables 3 and 4). *n* = 61 participants; 631–701 observations; *df* = 60, 627–697.

\* *p* < .05

\*\* *p* < .01

**FIGURE 4**  
**Buffering Effects of the Positive Reflection Intervention and Positive Events**



research suggests that daily work comprises more than pain and suffering. In support of Kanov, Maitlis, Worline, Dutton, Frost, and Lilius, who claimed that organizations “are also places of healing” (2004: 809), our results suggest that—even if only in small ways—positive daily experiences at work, such as socializing, positive feedback, and goal accomplishment, relate directly to reduced stress and improved health. Spreitzer et al. noted that simply reducing unsafe working conditions or job insecurity “does not mean that an individual will thrive” (2005: 539). Our results converge with existing research in documenting links between negative work experiences, stress, and health, but they also clearly suggest that incorporating positive work experiences has salutary benefits. In *Working*, Terkel also suggested the promise of positive experiences: “It [work] is about a search, too, for daily meaning as well as daily bread, for recognition as well as cash, for astonishment rather than torpor; in short, for a sort of life rather than a Monday through Friday sort of dying” (1972: xiii).

Our research explicitly incorporates positive events—both naturally occurring and induced via intervention—as a key contribution to the study of

work stress. Partly because the positive psychology literature emerged in reaction to psychology’s historical focus on negative events, the work stress literature has failed to soundly integrate the principles and practices of positive psychology. Moreover, although popular stress theories (e.g., conservation of resources, job demands-resources) include positive aspects of the work environment (e.g., job control), researchers have treated them more as stable buffers than as direct and dynamic influencers of work stress. Few researchers have examined the direct effects of discrete positive work events as they affect stress, blood pressure, or psychosomatic symptoms. Given the history of inconsistent findings when researchers treat positive events as buffers, our research makes an important contribution by showing that stress is reduced both when employees experience fewer negative events and when they have more positive experiences. Naturally occurring positive work events were associated (negatively) with perceived stress, in the moment and over a workday. Moreover, our lagged analyses are consistent with a causal interpretation of the results. Specifically, positive morning events were associated with reduced afternoon stress,

even when we controlled for afternoon events and morning stress levels. We also found associations between workday positive events and reduced blood pressure and enhanced ability to detach in the evening. Our results also highlight the potential of positive intervention experiences. Participants reported lowered stress, decreased physical and mental complaints, and improved detachment from work in the evening. The intervention failed, however, to reduce blood pressure. Although our effects were generally small, they are impressive, given our “rather minimal intervention” (Emmons & McCullough, 2003: 386), and they support the efficacy of positive reflection exercises at work.

### Implications for Theory and Research

One way we contribute to theory is by challenging assumptions of symmetry held in basic psychology that are reflected in both theory and empirical research in the organizational sciences (Thoresen et al., 2003). We do not dispute the existence of two distinct affect systems (i.e., positive and negative affect), nor do we dispute that positive and negative events may have their strongest effects on positive and negative outcomes, respectively. Rather, what this research does is highlight the importance of considering asymmetrical effects whereby positive events are not only associated with positive health (lower blood pressure), but also—perhaps via their resource-building capacities—negatively associated with stress. Indeed, our momentary lagged analysis clearly suggests the importance of positive events for stress reduction, as the negative association between positive events and stress persisted throughout workdays, even when we controlled for subsequent positive and negative events. This research clearly illustrates the importance of including asymmetrical effects in theories explicitly and is consistent with emerging studies in the positive psychology tradition (e.g., Seligman et al., 2005) in documenting asymmetrical effects. Decades of work stress research has focused on removing stressors (e.g., negative events) from work environments. Our study supports this approach but also suggests that, taken together, positive events stand as an untapped potential waiting to be leveraged in theories of stress and in practice.

Although our study highlights the importance of naturally occurring positive events, effect sizes for negative events were stronger—a pattern consistent with existing literature on the asymmetry of nega-

tive and positive stimuli (Baumeister et al., 2001; Taylor, 1991). However, it is noteworthy that in our momentary lagged analysis, it was only the association between positive events and stress that remained over the course of workdays. Our results suggest that although the effects of bad may be stronger, the effects of good may be longer, at least with respect to employee perceptions of stress. Our spillover results for blood pressure also suggest that there may be either a cumulative effect or a delayed effect for positive events. The pattern of results in our data also underscores the rationale behind the intervention: people typically do not pay as much attention to positive events as they do to negative events. Although this tendency persists for numerous reasons grounded in the evolutionary advantages of paying attention to negative stimuli, the simple fact is that to fully exploit the power of positive events, specific positive refocusing or reflection exercises, such as the one used in this study, may be needed.

We do not intend to downplay the importance of negative events in the daily lives of workers. In keeping with the literature, our results show that negative events have damaging effects on perceived stress and blood pressure at work and spill over to influence evening stress, physical complaints, and ability to detach from work. However, our results also suggest that positive events, which are often overlooked in studies of negative workplace outcomes such as stress or health complaints, deserve more attention. It is also important to note that although we did not find lagged effects for negative events on family-to-work conflict, this does not mean these events are short lived. Rather, their effects might be fully mediated via stress and subsequent negative events in a cycle, whereby negative events in the morning cause stress (immediately), and that stress causes more negative events and more stress in the afternoon, in a repeating cycle. If this were the case, significant lagged effects might or might not be found, because the effects of morning work events on afternoon stress might be fully mediated by morning stress and subsequent afternoon events.

This need for a shift in approaches to stress can also be illustrated in the work-family conflict literature. Our work-family results are intriguing in that they demonstrate consistent negative associations between family-to-work conflict and stress and health during workdays, but our intervention acted as a buffer, preventing these effects from spilling over into evenings. Our post hoc analysis suggests

that the positive reflection may have acted as a buffer, because family was a common topic for the positive reflection. Work-family research has been overwhelmingly focused on the negative until fairly recently, when researchers began to examine topics such as enrichment and positive spillover. Our research extends work-family literature by suggesting that explicitly bringing thoughts of family into their workplace via positive reflections may benefit, rather than harm, employees and their families.

Our study is also unique in that we examine both buffering effects of daily positive events and buffering and enhancing effects of an intervention. We did not find enhancing effects for the positive reflection intervention, in that it did not increase the association between positive events and outcomes, but we did find that naturally occurring positive events tended to reduce the association between negative events and outcomes, further reinforcing the importance of including positive events in stress theories.

### Implications for Practice

Emphasis on the role of positive events and experiences has important implications for organizations, managers, and employees. Considering that organizations, much like individuals, often focus on the negative—what went wrong, what problems need solving, what threats are present—organizations might benefit from giving positive events more prominence. Some companies are beginning to focus on strengths rather than deficiencies (e.g., Buckingham & Clifton, 2001) and on performance management and positive feedback rather than performance appraisals and corrective action (Williams, 1997). Such efforts should foster more positive work events. Companies such as Southwest Airlines are using celebrations, encouraging employees to have fun, and generating positive events for customers and employees. Case studies often showcase organizations that focus on positive actions, such as Southwest, suggesting that attention to positive activities is still innovative and that organizations could do more to foster positive experiences. Imagine a manager modifying the three-good-things intervention, starting weekly staff meetings by asking employees to share good events from the past week. Focusing on accomplishments, sharing positive experiences, celebrating success, and expressing gratitude would be a change for most organizations and their employees. Our re-

sults suggest that such a focus could have important effects on employee stress and health, in keeping with the focus of many corporate wellness programs (Hollander & Lengermann, 1988).

### Limitations and Future Directions

This research has a number of important strengths, including collecting data on stress and work experiences as they occurred, objectively measured health indicators on the job, and nightly interviews about a broad range of health indicators, along with a field experiment. Nonetheless, it also has important limitations. One prominent limitation is our all-female sample. On the one hand, this presents minimal concern for generalizability, because the sex balance in our sample is representative of health care workers; 80 percent of employees in the health care sector are women (United States Bureau of Labor Statistics, 2009). On the other hand, the absence of men and the health care setting of our sample mean that caution should be taken when generalizing results to male workers or other job settings, especially predominantly male settings or work with fewer interpersonal interactions. Existing research suggests that men and women differ in physiological reactivity (e.g., blood pressure) to events (Stoney, Matthews, McDonald, & Johnson, 1988), underscoring the importance of future research with male samples and other occupations.

A strength of our study is its assessment of a broad range of health and well-being indexes, including ambulatory blood pressure. However, this also presents challenges, because blood pressure is sensitive to many factors. We did not control for factors such as caffeine use or physical activity prior to each blood pressure measurement, leaving us with a great deal of measurement error, thereby limiting our power to find effects that might exist. Moreover, the association between events and blood pressure is complex, because both positive (exciting) and negative (stressful) events can increase blood pressure in the moment. This may explain why our aggregated blood pressure effects were stronger than momentary effects. Our design may also have interfered with our ability to find blood pressure effects. Our positive intervention was intended to lower blood pressure, but some participants may have viewed it as one more demanding study activity at the end of the workday. Thus, the nature and timing of our manipulation may have mitigated its salutary effects. Further-



more, although we assessed ambulatory blood pressure, which predicts cardiovascular disease better than clinical measurements, we captured only three 2-hour segments each day. Emerging research suggests that capturing circadian blood pressure rhythms is superior to episodic ambulatory measurement. For this reason, our initial design included 24-hour blood pressure measurement, but pilot testing suggested such an approach would eliminate most of our participants because blood pressure measurement made it difficult to simultaneously eat, sleep, or drive. The current literature offers no clear guidance—*theoretically or empirically*—as to what types of events show immediate effects and which have cumulative effects over time. Thus, 24-hour monitoring might aid in understanding the role of time in links between work events, stress, and health, as would jointly examining a diverse set of physiological measures (e.g., both blood pressure and cortisol).

Our goal of comprehensively sampling work events also has benefits and drawbacks. Despite carefully developing an event scale drawn from the existing literature and discussing it with organizational personnel to determine its comprehensiveness, we acknowledge that by creating a scale that is both short (few items) and general (broad items), we may have achieved comprehensiveness at the risk of specificity. For example, we ask only if an employee has received positive information, but there are many types of positive information that might have been received, and they may have differing effects. Another measurement drawback was our exclusive focus on whether certain positive or negative events occurred (“yes”/“no”) and not on which events, how often they occurred during a time period, or their intensity. Our underlying assumption is that the number of events matters more than which events occur (e.g., disrespect vs. conflict) or how bad they are. It is a challenge in experience sampling research to collect fine-tuned data, but using rough measures (dichotomous scales and simple counts of event types), as we did in this study, results in considerable loss of information. Other measures, such as asking about best and worst events (and how bad and how good they were), are critical in future research if we are to gain a full understanding of the effects of work events. Perhaps even more important is the development of a comprehensive theory about when and why frequency and intensity matter, and which types of events are likely to have varying effects

according to their intensity, to aid researchers in more precisely capturing the effects of work events.

Another drawback of our study was that some of our analyses used data collected concurrently. It is possible that our momentary results were inflated by factors such as transient affect, which might influence both perception and reporting of work events and perceptions and reporting of stress. However, given significant results in both our lagged analyses (lagged momentary and day-to-evening spillover) and significant spillover results for evening blood pressure, which we measured objectively, common method variance is not a plausible explanation for our overall pattern of results, and especially not for the associations we found for positive events.

Perhaps the most important limitation of our design was our decision not to include a no-intervention control group, which would have provided stronger evidence of internal validity and greater confidence that it was our intervention that caused our results. Common threats to validity with this type of design (Cook & Campbell, 1979) are mitigated by our short time interval (three weeks) and the fact that we collected data over ten months in nine different clinics, which reduces threats associated with history and maturation. The biggest threat to validity is the possibility that our participants may have experienced less stress and better health during the intervention stage because they knew the study was coming to an end. This seems unlikely, because the intervention actually created additional work for participants in the second half of the study. This concern is also mitigated by the fact that time trends such as these have not been found in other experience-sampling studies with similar dependent variables but without interventions (e.g., Beal & Ghandour, 2011; Miner et al., 2005). Nonetheless, research replicating our results with a no-intervention control group is needed.

Although our study demonstrated the efficacy of a positive reflection, we cannot speak to the efficacy of other positive reflection interventions. Prior research has shown our intervention to have beneficial effects, although it was not designed for busy workplaces. We asked participants to complete the intervention at the end of their workday, when the rush to finish daily tasks and go home may have diminished their opportunity to reflect deeply and savor positive events. Given these challenges, our effects—though small and nonsignificant for blood pressure—are impressive, and future research can build on them. For example, future research might

consider whether limiting reflection to positive events that occurred in participants' work setting could improve work-related outcomes such as job satisfaction and organizational commitment. The timing of intervention might also be considered, especially for workers with less discrete boundaries between work and life. Our participants worked in health care, an industry that represents more than 10 percent of the US workforce and continues to grow, and they earned the 2010 median wage for a US worker (United States Bureau of Labor Statistics, 2012). In this industry, shift work is common, but for a growing number of managerial, professional, and technical jobs, work-life boundaries are becoming blurred due in part to increasing use of technology. For workers in these jobs, the nature and timing of positive reflection interventions may differ.

Future research might also consider whether a positive reflection would be more effective for some employees than for others. There is clear evidence that high-negative-affect individuals react more to negative events (Gray, 1981; Larsen & Ketelaar, 1991). Others may respond more strongly to positive events or reflections. Another area for future research would be to examine the effects of a positive reflection intervention on work recovery activities. A growing body of research examines the efficacy of various activities for work recovery (Fritz & Sonnentag, 2005; Trougakos, Beal, Green, & Weiss, 2008). Positive reflection exercises at the end of a workday might increase proclivity for recovery activities such as socialization or exercise. Indeed, this may be the mechanism by which our intervention had its effects. Interventions focused on dealing with negative events might also be tested, though much of the stress literature is already focused on coping with negative events.

In this research, we posit mechanisms by which positive work events build resources and improve worker well-being but do not explicitly examine these mediating mechanisms. Future work might directly test the pathways we suggest, wherein positive events build core psychological resources. Perusing the good things responses, we found abundant evidence that the intervention prompted reflection on resources identified as universal features of well-being (Ryff & Singer, 1998), including mastery ([good thing] "Several coworkers have expressed their faith in me" [why] "Today was my first day as 'lead' and others wanted to let me know that they knew I could do it"), a purposeful life ([good thing] "Received a thank you from our clinic

administrator for doing a great job" [why] "I try very hard to do my best and I take a lot of pride in the work I do!"), quality interpersonal connections ([good thing] "My husband texted me to let me know he loves me and that he hopes I have a good day at work" [why] "Because my husband loves me, supports me at work, and cares about how my day goes"), and positive self-regard ([good thing] "I managed to keep up with Dr. and maintained complete control of the flow and tasks needed to be done" [why] "Because I am good at what I do, I do well with a busy pace, and am great at prioritizing my tasks"). These quotations provide compelling examples of mechanisms suggested in the literature, but research explicitly examining mediating mechanisms is needed.

Although we had no explicit theory of time and duration, we found that work events have somewhat different effects at the momentary, daily, and day-to-evening spillover levels. Our results should be considered preliminary, but they seem to suggest that negative events and family-to-work conflict elicit more immediate reactions, whereas positive workday events have stronger effects when they accumulate throughout the course of a workday. The lack of guiding theory and inconsistent empirical results in the literature suggest that more empirical and theoretical work is needed to better understand the role of time in the effects of work events on stress. This study is a first step.

## Conclusion

Considered as a whole, our results highlight the powerful role that discrete work events play in employees' health and well-being. Although the literature is replete with studies focusing on negative work events, our results suggest that positive events are important because they are independently associated with stress and health. Our results showing the potential benefits of an easy to implement, positive refocusing intervention in the workplace are also promising.

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## APPENDIX

### Positive Reflection Intervention

We think too much about what goes wrong and not enough about what goes right in our lives and work. Of course, sometimes it makes sense for us to analyze bad events so that we can learn from them and avoid them in the future. However, people tend to spend more time thinking about what is bad in life or work than is helpful. Worse, this tendency to focus on bad events sets us up for anxiety and depression. One way to keep this from happening is to develop our ability to think about the good in work and in life.

Your assignment is as follows:

Every day for the next 8 days, you will be writing for 5–10 minutes about three things that went really well on that day and why they went well. At the last signal of each day, you will log into this website and write your thoughts for the day. Remember, your employer has said

it is OK for you to take 10 minutes away from work to complete this exercise.

The three things you list each day can be relatively small in importance (“My husband picked up my favorite ice cream for dessert on the way home from work today” or “I was able to make someone feel better at work today”) or relatively large in importance (“I got a raise today” or “My sister just gave birth to a healthy baby boy”). What you write about can be related to good things that happened that day at work, but they do not need to be work related.

Next to each positive event in your list, answer the question, “Why did this good thing happen?” For example, someone might write that her husband picked up ice cream “because my husband is really thoughtful sometimes” or “because I remembered to call him from work and remind him to stop by the grocery store.” When asked why you got a raise today, someone might write that “God was looking out for me” or “I worked hard and did well on my job.”

Writing about “why” the positive events in your life happened may seem awkward at first, but as you do this each day for the next 8 days, it will get easier.

It is critical to our research that you take the time to carefully complete this exercise for the next eight days. Some days you will have only small “good things” to write about, but even these small things are important to record. When the study is complete, we will link your ID number to your name so that we can email you a record of your “Good Things” journal.



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