

Which Daily Experiences Can Foster Well-Being at Work? A Diary Study on the Interplay Between Flow Experiences, Affective Commitment, and Self-Control Demands

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Previous research has provided strong evidence for affective commitment as a direct predictor of employees' psychological well-being and as a resource that buffers the adverse effects of self-control demands as a stressor. However, the mechanisms that underlie the beneficial effects of affective commitment have not been examined yet. Drawing on the self-determination theory, we propose day-specific flow experiences as the mechanism that underlies the beneficial effects of affective commitment, because flow experiences as peaks of intrinsic motivation constitute manifestations of autonomous regulation. In a diary study covering 10 working days with $N = 90$ employees, we examine day-specific flow experiences as a mediator of the beneficial effects of interindividual affective commitment and a buffering moderator of the adverse day-specific effects of self-control demands on indicators of well-being (ego depletion, need for recovery, work engagement, and subjective vitality). Our results provide strong support for our predictions that day-specific flow experiences a) mediate the beneficial effects of affective commitment on employees' day-specific well-being and b) moderate (buffer) the adverse day-specific effects of self-control demands on well-being. That is, on days with high levels of flow experiences, employees were better able to cope with self-control demands whereas self-control demands translated into impaired well-being when employees experienced lower levels of day-specific flow experiences. We then discuss our findings and suggest practical implications.

Keywords: commitment, flow experiences, self-control demands, self-determination theory, well-being

Positive psychology (Seligman & Csikszentmihalyi, 2000) has promoted research on employees' psychological well-being (simply referred to as well-being throughout the article), which has become a major research topic in the field of personnel psychology. Thus, recent research on stress and work-related psychological health, instead of exclusively focusing on negative work-related outcomes (e.g., burnout or depression; Alarcon, 2011), has also focused on positive outcomes at work (e.g., positive mood and creativity; Davis, 2009). Consequently, this line of research has identified multiple stressors (e.g., self-control demands [SCDs]; Schmidt & Diestel, 2015) that impair well-being as well as resources that help to foster psychological well-being (Hobfoll,

2002). In particular, there is strong empirical evidence for the direct beneficial effects of organizational commitment on well-being and for the buffering effects of commitment on the adverse relations between stressors and well-being (for a review, see Meyer & Maltin, 2010). To account for these effects, Meyer and Maltin (2010) proposed a theoretical framework drawing on the self-determination theory (SDT). This framework suggests that basic psychological needs satisfaction (autonomy, competence, and relatedness) at work constitutes the basis for the experience of both commitment and autonomous (in contrast to controlled) action regulation or intrinsic motivation, which in turn facilitate well-being (Deci & Ryan, 1985; Ryan & Deci, 2000). More specifically, the authors suggest that affective commitment and autonomous regulation are reciprocally related (cf., Meyer & Maltin, 2010, p. 330). That is, basic needs satisfaction may promote autonomous regulation at work, which facilitates the initial emergence of employees' commitment. In turn, once commitment is established it may reinforce autonomous regulation, which can be expected to buffer the adverse effects of job stressors such as SCDs (e.g., by reducing depletion of regulatory resources and by recovering regulatory resources after depletion; Muraven, 2008; Muraven, Gagné, & Rosman, 2008; Rivkin, Diestel, & Schmidt, 2015). Drawing on these arguments, we propose flow experiences, which constitute manifestations of autonomous regulation as a

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mediator of the beneficial effects of stable affective commitment on well-being.

Furthermore, in the field of self-control, cross sectional and diary studies have demonstrated buffering effects of commitment on the adverse effects of SCDs on well-being (Schmidt, 2007; Rivkin et al., 2015). SCDs at work require employees to engage in self-control, which involves the inhibition, modification, or override of spontaneous and automatic reactions, urges, emotions, and desires that would otherwise interfere with goal-directed behavior and impede goal achievement at work (Baumeister, Heatherton, & Tice, 1994). Muraven and Baumeister (2000) delineated the strength model of self-control according to which different self-control processes tax on a common limited regulatory resource and that depletion of this resource can impair well-being. Integrating SDT and research on the effects of autonomous regulation on regulatory resource depletion (Muraven, 2008; Muraven et al., 2008), Rivkin et al. (2015) proposed that the buffering effects of commitment on the negative day-specific relations between SCDs and well-being are provided by autonomous regulation and associated positive experiences that have the potential to replenish regulatory resources.

However, despite the large body of evidence on the beneficial effects of commitment and the adverse effects of SCDs on well-being, scholarly knowledge suffers from at least three limitations. First, although the strength model of self-control implies day-specific adverse effects of SCDs, to our knowledge, only a few studies have examined such day-specific relations (exceptions are: Muraven, Collins, Shiffman, & Paty, 2005; Rivkin et al., 2015). Thus, research on self-control could benefit from examining day-specific mechanisms and processes that underlie the proposed relations. Second, despite the theoretical arguments that predict the beneficial effects of commitment on well-being, to our knowledge, there are no empirical studies that have examined the mechanisms proposed by Meyer and Maltin (2010). And third, for multiple occupations, particularly in the services sector, SCDs constitute an integral part of the work role. Hence, to protect employees from impairments in

well-being that result from high SCDs, research needs to identify further resources that have the potential to buffer the adverse effects of SCDs.

In the present study, we address these drawbacks by integrating theories and findings from research on self-control, commitment and flow experiences. Csikszentmihalyi (1990) defined flow experiences as states of consciousness occasionally experienced by individuals who are deeply involved in an enjoyable activity. Therefore, flow experiences reflect pleasant states that are highly intrinsically motivating and during which employees experience high levels of autonomous regulation. On the basis of Meyer and Maltin's (2010) theoretical framework, we propose that strongly committed employees are more likely than less committed employees to experience autonomous regulation or intrinsic motivation at work, which manifests as day-specific flow experiences. Thus, we predict that flow experiences mediate the direct effects of already established levels of employees' commitment on well-being. Additionally, experimental research in the field of self-control has demonstrated that in contrast to controlled or enforced self-control, autonomous forms of self-control, also referred to as self-regulation, help to restore limited regulatory resources (Muraven, 2008; Muraven et al., 2008). Because autonomous self-regulation or intrinsic motivation constitutes an integral component of flow experiences, we propose that day-specific flow experiences also moderate (buffer) the adverse effects of SCDs on well-being. Figure 1 depicts the hypothesized model of the present study.

In the following, we first elaborate on the concept of affective commitment and the theoretical model proposed by Meyer and Maltin (2010), which form the basis for our prediction on mediating effects of day-specific flow experiences. Then, we review research on SCDs to derive arguments for the moderating effects of flow experiences on the day-specific adverse relations between SCDs and well-being. Finally, we test our predictions in a diary study.

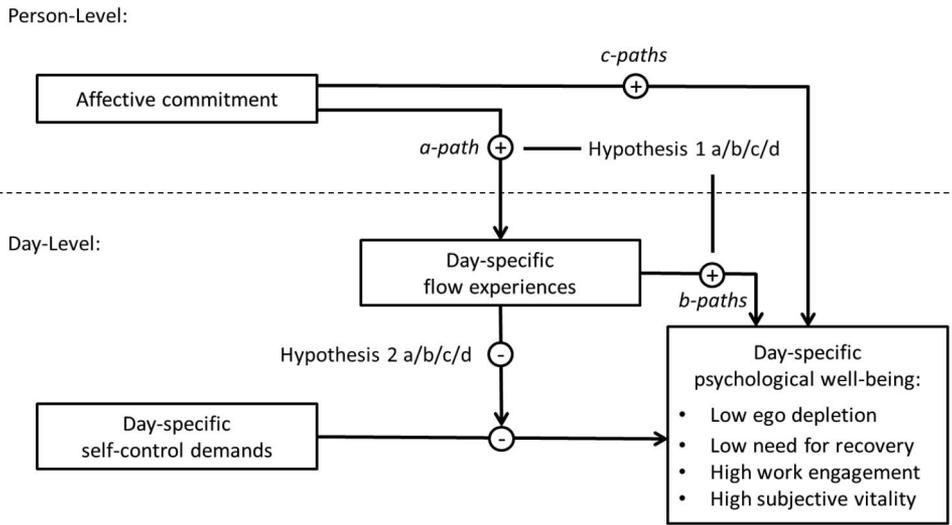


Figure 1. Theoretical model.

Beneficial Effects of Affective Commitment on Well-Being: Flow Experiences as a Mediator

Organizational commitment refers to “a force that binds an individual to the target and to a course of action of relevance to that target” (Van Dick, Becker, & Meyer, 2006). Whereas Allen and Meyer (1990) originally proposed three components (affective, normative, and continuance commitment), most scholars agree that affective commitment constitutes the conceptual core of organizational commitment. This notion was grounded in the large body of empirical evidence that inevitably demonstrates that affective commitment exerts the strongest beneficial effects on job performance and psychological well-being (Meyer & Maltin, 2010). Previous research has proposed commitment as an intermediate variable, which on the one hand predicts job outcomes such as performance, turnover, and well-being and on the other hand can be determined by multiple factors such as personal characteristics (e.g., age and tenure), job characteristics (e.g., skill variety and task autonomy), leadership (e.g., consideration; Mathieu & Zajac, 1990), and not least through satisfaction of basic psychological needs and associated forms of autonomous regulation (cf., Meyer & Maltin, 2010). Thus, studies emphasizing the emergence of commitment have examined it as an outcome variable (for an overview see Meyer, Stanley, Herscovitch, & Topolnytsky, 2002), while research focusing on the consequences of established forms of commitment have considered it as a predictor of work-related outcomes (e.g., Leong, Furnham, & Cooper, 1996; Ng & Feldman, 2011; Schmidt & Diestel, 2012; Rivkin et al., 2015). Furthermore, studies on commitment have demonstrated that once employees have established a certain level of commitment to their organization—for example, through basic needs satisfaction and autonomous regulation—this level remains relatively stable over time. For example, in a sample of experienced nursing employees, Bateman and Strasser (1984) found that over a time lag of five months the correlation of Time 1 and Time 2 commitment was .65 ($p < .01$). In addition, analyses of the temporal stability of affective commitment indicate that those with high tenure tend to experience more stable levels of commitment. Consistent with this finding, only meaningful changes in job or organizational characteristics and perceptions have the potential to influence the level of employee commitment (Johnston, Parasuraman, Futrell, & Black, 1990). In light of these findings, Meyer and Allen (1997, p. 120) concluded that after a state of flux, commitment rapidly begins to stabilize. Drawing on these arguments in the present study, we examine established levels of affective commitment as a predictor, which is expected to be stable over the time frame covered by our study.

The theoretical focus on affective commitment is also consistent with the SDT, which suggests that the satisfaction of employees’ basic psychological needs promotes autonomous regulation at work and thereby particularly fosters affective commitment. In turn, once employees have established a certain level of work-related commitment, it is expected to be strongly reciprocally related to autonomous regulation or intrinsic motivation (Meyer & Maltin, 2010). In contrast to controlled regulation, which is necessary when aiming for external rewards or avoiding punishment, autonomous regulation implies that activities are freely chosen and consistent with one’s core values. Consistently, research in organizational contexts has repeatedly demonstrated that states of

autonomous regulation are positively related to work outcomes such as work engagement, performance, and well-being (e.g., Baard, Deci, & Ryan, 2004; Gagné, Koestner, & Zuckerman, 2000). Thus, drawing on Meyer and Maltin’s (2010) theoretical framework, we propose that autonomous regulation is thought to constitute the mechanism that underlies the beneficial effects of established affective commitment on well-being.

In the present study, we propose flow experiences as a manifestation of autonomous regulation and thus as a mediator of the positive effects of stable affective commitment on day-specific indicators of well-being. According to Csikszentmihalyi (1990), flow experiences comprise nine interrelated components: challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on the task at hand, a sense of control, loss of self-consciousness, time transformation, and autotelic experience. These components reflect states in which individuals are completely immersed in an activity and draw their motivation from performing this specific activity rather than from external rewards that may be associated with the activity. Consequently, flow experiences reflect peaks of intrinsic motivation, which are expected to be positively related to day-specific indicators of well-being. Rheinberg, Vollmeyer, and Engeser (2003) conceptualized a scale to measure flow that consists of two correlated but distinct dimensions. The first dimension reflects the fluency of performance during an activity, while the second dimension describes the absorption into an activity. Consistent with the proposition that the beneficial effects of flow on well-being result from intrinsic motivation, which occurs during states of total immersion into a task, in the present study we use the absorption dimension to operationalize flow. Conceptualized as absorption into a task, flow experiences are likely to reflect day-specific states rather than traits that are constant across different days. Hence, experience sampling has been proposed as an appropriate method to measure flow experiences (Csikszentmihalyi & Rathunde, 1993). In line with this argument, we use day-specific measurements of flow experiences to capture the anticipated fluctuations of flow experiences across days.

From a theoretical perspective, two central propositions strongly suggest that flow experiences mediate the positive relations between established commitment and day-specific well-being. First, we propose a positive relation between stable levels of affective commitment and flow. As suggested by the challenge-skill balance component, flow experiences are facilitated by activities, which are challenging for a specific individual. Thus, research suggests that the investment of personal energetic resources constitutes a psychological precondition to experience flow (Nakamura & Csikszentmihalyi, 2002). Accordingly, studies have demonstrated that task (e.g., appropriate task difficulty, Nakamura & Csikszentmihalyi, 2002) as well as personal characteristics (e.g., state of recovery, Debus, Sonnentag, Deutsch, & Nussbeck, 2014) facilitate flow experiences. Consistent with this argument, we propose affective commitment as another externally influenced characteristic that promotes flow experiences. We argue that employees with low levels of affective commitment tend to invest lower amounts of energetic resources at work because they are more likely to perform according to “work to rule.” In contrast, highly committed employees tend to invest larger amounts of resources at work because, for example, they are more likely to engage in extrarole behavior (Organ & Ryan, 1995), which neces-

sitates the investment of regulatory energetic resources (Sonntag, Mojza, Demerouti, & Bakker, 2012). Consequently, we expect strongly committed employees to experience higher levels of day-specific flow at work.

Second, we argue that flow experiences are positively related to well-being. The autotelic component of flow implies that flow experiences are highly intrinsically motivating and thus reflect high levels of autonomous regulation because activities are performed for their own sake rather than for gaining external reward (Csikszentmihalyi & Rathunde, 1993; Ellis, Voelkl, & Morris, 1994). SDT in turn states that basic needs satisfaction at work fosters autonomous regulation, which in turn predicts well-being (Ryan & Deci, 2000). Kowal and Fortier (1999) demonstrated positive relations between basic needs satisfaction and flow experiences as manifestations of autonomous regulation, which in turn are expected to predict employees' psychological well-being. Integrating both arguments, we propose:

Hypothesis 1: Day-specific levels of flow experiences mediate the positive relations between affective commitment at the person level and indicators of day-specific psychological well-being (Hypothesis 1a: low ego-depletion; Hypothesis 1b: low need for recovery; Hypothesis 1c: high work engagement; Hypothesis 1d: high subjective vitality).

However, because Meyer and Maltin's (2010) theoretical framework proposes a reciprocal relationship of affective commitment and autonomous regulation, and because commitment may be studied as a predictor as well as an outcome (Mathieu & Zajac, 1990), one may also assume alternative models for the interplay of SCDs, flow experiences, and commitment. For example, the above-mentioned arguments may also lead to the prediction that affective commitment is an outcome of flow experiences and SCDs. Thus, we conduct additional analyses to test this prediction. Demonstrating that empirical data provides only limited support for such a model is supposed to strengthen the evidence for our proposed Hypothesis 1.

As indicators of well-being, we focus on ego depletion, need for recovery, work engagement, and subjective vitality. According to previous research, these outcomes constitute short-term indicators of well-being that correspond with day-specific fluctuations of stressors and resources (Rivkin, Diestel, & Schmidt, 2014; Diestel, Rivkin, & Schmidt, 2015). Ego depletion refers to a state of regulatory resource depletion and an inner experience of exhaustion (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Need for recovery reflects the requirement to recuperate from work tasks that is strongest in the last hours of work and directly after work (Van Veldhoven & Broersen, 2003). These indicators represent cognitive and behavioral manifestations of regulatory resource depletion (Diestel et al., 2015).

Work engagement is a fulfilling and motivational state of mind reflected by perceived energy, vitality and mental resilience (vigor), strong work-related involvement (dedication), and being positively engrossed in and focused on work (absorption; Bakker, 2011). Subjective vitality is a positive feeling of aliveness and energy (Ryan & Frederick, 1997). While subjective vitality may directly reflect the availability of regulatory resources, Sonntag et al. (2012) proposed that work engagement may be largely influenced by the perceived availability of regulatory resources.

Particularly when perceived regulatory resource availability is low, employees attempt to conserve regulatory resources by reducing work engagement (Ryan & Deci, 2008).

Adverse Effects of SCDs on Well-Being: Flow Experiences as a Moderator

A growing body of research indicates that frequent acts of self-control are associated with psychological costs, which can manifest in impairments of cognitive and behavioral control (Hagger, Wood, Stiff, & Chatzisarantis, 2010). In a series of experimental studies that demanded two successive acts of self-control (e.g., the suppression of emotions or thoughts and attention control), self-control performance on the second act was consistently impaired, even in apparently unrelated spheres of activity (see Hagger et al., 2010, for a meta-analysis).

In addition, recent research in occupational health psychology has also demonstrated that SCDs constitute a major stressor at work. Neubach and Schmidt (2007) identified three forms of SCDs at work. First, impulse control refers to the demand to inhibit spontaneous, impulsive response tendencies and associated affective states, which manifest, for example, in injudicious expressions. Second, resisting distractions involves the requirement to ignore or resist distractions evoked by task-irrelevant stimuli. Third, overcoming inner resistances relates to the requirement to overcome motivational deficits that result from unappealing tasks. Multiple studies have demonstrated adverse effects of these SCDs on indicators of well-being (e.g., burnout and depression) and a decrease in productivity (e.g., absenteeism; Diestel & Schmidt, 2011). The strength model of self-control (Muraven & Baumeister, 2000) accounts for these findings by proposing that SCDs cause employees to engage in self-control, which, in turn, depletes limited regulatory resources and thereby impairs psychological well-being.

In addition to the broad empirical evidence from cross-sectional studies suggesting that SCDs impair well-being (Schmidt & Diestel, 2015), initial research has demonstrated that work-related SCDs exhibit high day-specific variation, which indicates that SCDs are not constant over time but are subject to day-specific change and that high day-specific SCDs impair psychological well-being (Rivkin et al., 2015). To protect employees from the adverse effects of SCDs, research has also identified resources (e.g., sleep quality and trait self-control; Diestel et al., 2015) that have the potential to buffer the adverse effects of SCDs on well-being. Accordingly, in the present study, we examine day-specific flow experiences as yet another resource that may buffer the adverse effects of day-specific SCDs on day-specific well-being. Our proposition draws from findings on recovery of regulatory resources (Muraven, 2008; Muraven et al., 2008; Tice, Baumeister, Shmueli, & Muraven, 2007), suggesting that in contrast to controlled regulation, which is performed for the sake of extrinsic motives (e.g., gaining rewards or avoiding punishments), autonomous regulation requires less effort and thus is less depleting. Multiple studies have demonstrated that participants were less depleted and performed better on subsequent self-control tasks when they engaged in self-regulation (autonomous self-control) instead of forced or pressured self-control (Muraven, 2008; Muraven et al., 2008). Consistent with the idea that pleasant experiences during self-control-related tasks facilitate recovery of lim-

ited resources, Muraven et al. (2008) argued that autonomous regulation and associated positive affective states facilitate and accelerate recovery of limited regulatory resources. In line with this argument, we propose that flow experiences as a manifestation of autonomous regulation buffer the negative day-specific relations between SCDs and indicators of well-being by facilitating recovery of regulatory resources after depletion. Thus, we derive the following Hypothesis:

Hypothesis 2: Day-specific flow experiences moderate the negative relations between day-specific SCDs and indicators of day-specific psychological well-being (Hypothesis 2a: low ego-depletion; Hypothesis 2b: low need for recovery, Hypothesis 2c: high work engagement; Hypothesis 2d: high subjective vitality): The negative relations are attenuated as a function of day-specific flow experiences.

Method

Participants

We conducted a diary study to test our hypotheses. The method of data collection was adopted by Rivkin et al. (2015). However, the present data sample was collected exclusively for the present study, and thus has not been previously published. The present study was conducted in Germany and focused on employees from the services sector who had regular contact with clients, patients, customers, or other individuals. Overall, participants held different occupations; a large part of the sample worked as consultants, followed by salespersons. Furthermore, some participants worked in care institutions, as kindergarten teachers and in elder care. For these participants, SCDs constitute a predominant stressor at work. For example, to promote customer satisfaction, employees must inhibit affective states or behavioral tendencies that may displease customers (Schmidt & Diestel, 2015). This description of SCDs may resemble emotional labor in general and emotional dissonance in particular because both job demands are thought to rely on a common limited regulatory resource (e.g., Diestel & Schmidt, 2011). However, there are also conceptual differences between these both job demands. For example, while emotional dissonance largely involves the display of emotions, which are not felt at that particular moment, SCDs also include the inhibition of impulsive reactions and behavioral tendencies, resisting distractions and completing unattractive assignments. These conceptual differences are also supported by confirmatory factor analyses (cf., Diestel & Schmidt, 2011).

We recruited participants by announcements via e-mail. Therefore, over the course of the last years, we collected contact information from individuals who expressed their willingness to participate in a scientific study. Additionally, we invited personal contacts to participate in our electronic diary study. Individuals did not receive any compensation for participating in our study. A final sample of 90 participants was included in our study. Of the participants, 79% were female, 26% worked part-time, and the mean age was 39.51 ($SD = 14.08$) years. In advance of the day-specific measurements, the participants responded to a general questionnaire that assessed demographic variables and person-level constructs (e.g., affective commitment). Over 10 consecutive work days, three times per day (morning, noon, and evening), participants

received e-mails reminding them to complete day-specific questionnaires. However, only two measurement points (noon and evening) were relevant for the present study. At noon, participants rated SCDs and flow experiences; in the evening after work, ego depletion, need for recovery, work engagement, and subjective vitality were assessed. On weekends or public holidays, the diary study was suspended and continued on the next regular work day. Overall, response rate to our daily questionnaires was 76%, resulting in 648 daily measurement points, which were included into our analyses.

Measures and Control Variables

The general questionnaire included age, gender, work-time, and affective commitment. In the day-specific questionnaires, we explained that the items of the SCD scale, flow experiences and all items of psychological well-being refer to recent experience.

Affective commitment. To measure affective commitment, four items from the German translation (Schmidt, Hollmann, & Sodenkamp, 1998) of Allen and Meyer's (1990) affective commitment scale were used. The scale reflects the affective attachment to and involvement in the organization. A typical item is "This organization has a great deal of personal meaning for me." All items were rated on a 7-point intensity-rating scale (1 = *not at all*; 7 = *a great deal*).

Flow experiences absorption (noon). Our measure of flow experiences is comprised of four items that reflect the absorption dimension of flow (Rheinberg et al., 2003; for the English version, see Rheinberg, 2008; for studies published in English using this measure, see Engeser & Rheinberg, 2008; Schüller & Brunner, 2009). On a 7-point intensity-rating scale (1 = *not at all*; 7 = *a great deal*) participants rated how absorbed they were into the task they performed before responding to our survey. An example is "I did not realize that time is going by."

SCDs (noon). We assessed day-specific SCDs with the 15-item scale developed by Neubach and Schmidt (2007). On a 5-point intensity-rating scale (1 = *not at all*; 5 = *a great deal*), the participants rated the degree to which they had to control their impulses in "the last hours" of work. An example of an item is "In the last hours, my job required me not to lose my temper."

Ego depletion (evening). Day-specific ego depletion was assessed using five items related to the participants' current experiences with resource depletion and low willpower (e.g., "At the moment, I feel increasingly less able to focus on anything."). The scale was developed and validated by Bertrams, Unger, and Dickhäuser (2011), who intended to assess the psychological state of ego depletion proposed by Muraven and Baumeister (2000). All items were scored using a 4-point intensity-rating format (1 = *not at all*; 4 = *a great deal*).

Need for recovery (evening). We assessed the day-specific need for recovery using five items from Van Veldhoven and Broersen's (2003) scale (e.g., "Today, I cannot really show any interest in other people when I have just come home myself."). In essence, this scale indicates the extent to which employees are incapable of expressing interest in other things and perceive a strong need for a rest period to recover from stressful activities. All items were scored using a 4-point intensity-rating format (1 = *not at all*; 4 = *a great deal*).

Work engagement (evening). The assessment of day-specific work engagement was based on the nine-item version of the Utrecht Work Engagement Scale (Breevaart, Bakker, Demerouti, & Hetland, 2012; Schaufeli, Bakker, & Salanova, 2006), which was adapted for day-specific assessment and involves three facets: vigor (e.g., “Today, I felt strong and vigorous at my work.”), dedication (e.g., “Today, I was enthusiastic about my job.”), and absorption (e.g., “Today, I was immersed in my work.”). The response format ranges from 0 (*strongly disagree*) to 6 (*strongly agree*). As suggested by Xanthopoulou, Bakker, Demerouti, and Schaufeli (2009), we incorporated vigor, dedication and absorption into a general work engagement factor that was computed as the mean of the three facets of work engagement.

Subjective vitality (evening). Day-specific subjective vitality was assessed with four items from Ryan and Frederick’s (1997) subjective vitality scale. The scale was conceptualized to measure the feeling of being alive and alert. An example of an item is “Right now I feel alive and vital”. The response format ranges from 1 (*not at all*) to 7 (*a great deal*).

Construct Validity

We conducted multilevel confirmatory factor analyses (MCFAs) to assess the psychometrical distinctiveness of our day-level measures. First, MCFAs for SCDs and state flow experiences as different predictors indicated a satisfactory fit: $\chi^2(38) = 84.01$, $p < .01$, root-mean square error of approximation (RMSEA) = .043, comparative fit index (CFI) = .979, standardized root-mean-square residual within-person/between-person (SRMRw/SRMRb) = .037/.056; however, a model with SCDs and flow experiences as one factor performed worse ($\chi^2(40) = 355.85$, $p < .01$, RMSEA = .110, CFI = .856, SRMRw/b = .104/.232). Second, the construct validity of the outcomes ego depletion, need for recovery, work engagement, and subjective vitality was tested in a 4-factor model. The 4-factor model ($\chi^2(42) = 98.96$, $p < .01$, RMSEA = .046, CFI = .986, SRMRw/b = .034/.085) performed better compared to other models that integrated all variables into one factor ($\chi^2(54) = 2185.26$, $p < .01$, RMSEA = .247, CFI = .463, SRMRw/b = .195/.347) or a 2-factor model with ego depletion and need for recovery as one factor and work engagement and subjective vitality as another factor ($\chi^2(47) = 174.87$, $p < .01$, RMSEA = .065, CFI = .968, SRMRw/b = .038/.172). MCFAs thus suggest distinguishing among all four outcomes in our analyses.

Analytical Procedure

Even though the present study lasted for 10 working days, mean participation was 7.20 days ($SD = 2.45$) resulting in 252 missing data points. As outlined by Reise and Duan (2003) missing data does not pose a problem for multilevel analysis provided that data are missing completely at random and thus missing data is not related to predictor or outcome variables under examination. To examine whether missing data was random in our data sample we introduced a dummy variable for missing data (0 = missing data, 1 = no missing data) and correlated it with all relevant variables in our study (age, sex, work-time, affective commitment, SCDs, flow experience, ego depletion, need for recovery, work engagement, and subjective vitality). All correlations except for age ($r =$

.21 $p < .01$) were below .10 and did not reach significance. However, because participants’ age was not a core variable in our study, our analyses provide strong support for the proposition that missing data were completely at random in our data sample. Thus, missing data were excluded in the subsequent analyses.

To test our hypotheses, we used the multilevel modeling software MLWin (Rasbash, Steele, Browne, & Goldstein, 2012) because the day-level data (Level 1: SCDs, flow experiences, ego depletion, need for recovery, work engagement, and subjective vitality) were nested within the person-level data (Level 2: affective commitment) and MLWin considers the interdependence of both levels. To analyze the mediating effects of flow experiences in the relations between affective commitment and all four outcomes, we applied a stepwise procedure to test for a 2–1–1 mediation as recommended by Zhang, Zyphur, and Preacher (2009). First, the null model only included the intercept and was used to estimate the between-subjects variance of flow experiences and all outcomes (Intra-Class-Coefficient). In Model 1, we added the person-level variables gender, age, working time, and affective commitment at Level 2 to predict flow experiences. Model 2 included identical predictors as Model 1 (gender, age, working time, and affective commitment) that were specified to predict each of the four indicators of day-specific well-being (ego-depletion, need for recovery, work-engagement and subjective vitality). According to Zhang et al. (2009; p. 700) Model 1 estimates the a-path from affective commitment to flow experiences whereas the c-paths from affective commitment to all four outcomes were ascertained on the basis of Model 2 (cf., Figure 1). In Model 3, we included day-specific SCDs and flow experiences at Level 1. Both predictors were centered around their person-mean to reduce the risk of confounding effects (Enders & Tofighi, 2007). This procedure allowed us to determine the b-paths from flow experiences to all four outcomes. In addition, we aggregated and added flow experiences at the person-level (Level 2) to examine the indirect effects (c-c’; cf., Figure 1). These effects are a measure for the reduction of the direct effect of affective commitment on all outcomes resulting from integrating the aggregated measure of flow experiences into the model. Thus, a large indirect effect indicates that flow experiences mediate the relations between affective commitment and employees’ well-being. Consistent with the recommendations of Zhang et al. (2009), we used Sobel tests to determine the significance of indirect effects. In Model 4, we analyzed the proposed interaction of SCDs and flow experiences on all outcomes by including a cross-product term of both predictors. To avoid the biasing effects of multicollinearity when testing interaction effects (Aiken, West, & Reno, 1991), we centered the predictors before calculating the interaction term (Dollard, Tuckey, & Dormann, 2012). Consistent with Hofmann and Gavin (1998), Level 2 variables were centered on their grand mean.

Results

Table 1 displays the descriptive statistics, internal consistencies, and correlations among the study variables. Before testing our hypotheses, we examined the within- and between-person variations in all outcomes (state flow experiences, ego depletion, need for recovery, work engagement, and subjective vitality). Flow experiences exhibited a within-person variation of 42.5%. For ego depletion, need for recovery, work engagement, and subjective

Table 1
Means, Standard Deviations, Internal Consistencies (Cronbach's Alpha), and Intercorrelations

Variable	1	2	3	4	5	6	7	8	9	10
1. SCDs—noon	(.88)	.04	.14	.23	-.05	-.07				
2. Flow experiences—noon	-.07	(.75)	-.15	-.20	.60	.30				
3. Ego depletion—evening	.18	-.33	(.86)	.71	-.27	-.64				
4. Need for recovery—evening	.29	-.45	.74	(.84)	-.27	-.61				
5. Work engagement—evening	.03	.68	-.37	-.30	(.94)	.44				
6. Subjective vitality—evening	-.09	.55	-.62	-.70	.49	(.89)				
7. Affective commitment	.05	.28	-.13	-.08	.39	.16	(.79)			
8. Gender ^a	.07	.09	-.22	-.11	.02	.10	.06	—		
9. Work time ^b	-.15	-.09	-.10	-.18	-.03	-.03	-.20	.39	—	
10. Age	-.04	.29	-.09	-.01	.14	.17	.25	.29	-.23	—
<i>M</i>	2.53	5.02	1.89	1.85	4.36	4.36	4.55	1.31	1.74	39.51
<i>SD</i>	.60	.87	.42	.45	.92	.86	1.22	.47	.44	14.08

Note. Cronbach's alpha for day-level variables is mean internal consistencies averaged over all measurement days. Correlations below the diagonal are person-level correlations ($N = 90$). Correlations above the diagonal are day-level correlations ($N = 648$). Numbers in bold $p < .05$.

^a Gender (1 = female, 2 = male) ^bWork time (1 = part-time, 2 = full-time).

vitality, the proportions of within-person (Level 1) variance were, respectively: 71.7%, 66.7%, 41.4%, and 65.6%. The high amounts of within-person variance in the outcomes justify the application of multilevel models.

Test of Hypothesis 1: Mediating Effects of State Flow Experiences

Hypothesis 1 (a–d) predicted that state flow experiences mediate the positive relations between affective commitment and all four indicators of day-specific well-being. Model 1 in Table 2 indicates that affective commitment is positively related to state flow experiences (a-path: $\gamma = .35$; $p < .01$). Furthermore, Model 2 for all outcomes in Tables 2 and 3 demonstrates that affective commitment is related to all four day-specific indicators of well-being with signs corresponding to expectations: Ego depletion (c-path: $\gamma = -.09$; $p < .01$), need for recovery (c-path: $\gamma = -.10$; $p < .05$), work engagement (c-path: $\gamma = .42$; $p < .01$), and

subjective vitality (c-path: $\gamma = .20$; $p < .01$). Additionally, as predicted, interindividual flow experiences (aggregated) predicted all four outcomes (b-paths [Model 3]: ego-depletion: $\gamma = -.10$; need for recovery: $\gamma = -.14$; work engagement: $\gamma = .71$; subjective vitality: $\gamma = .42$; all $ps < .01$). We conducted Sobel tests to demonstrate that the indirect effects of affective commitment on all four outcomes were significant. These tests provided strong support for Hypothesis 1 (a–d) (ego-depletion: $\gamma_{IND} = .03$; need for recovery: $\gamma_{IND} = .05$; work engagement: $\gamma_{IND} = -.25$; subjective vitality: $\gamma_{IND} = -.15$; all $ps < .05$).

Test of Hypothesis 2: Moderating Effects of State Flow Experiences

Hypothesis 2 (a–d) predicted that state flow experiences moderate (buffer) the adverse effects of SCDs on all day-specific indicators of well-being. All Model 3s demonstrate significant relations between SCDs and all outcomes with signs according to

Table 2
Multilevel Estimates for Predicting Flow Experience, Ego-Depletion, and Need for Recovery

Parameter	Flow experiences				Ego depletion				Need for recovery												
	Null model		Model 1		Null model		Model 2		Model 3		Model 4		Null model		Model 2		Model 3		Model 4		
	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	
Fixed effects																					
γ_{00} = Intercept	4.79**	(.10)	4.87**	(.40)	1.87**	(.04)	2.24**	(.19)	2.27**	(.18)	2.24**	(.18)	1.82**	(.04)	2.31**	(.19)	2.35**	(.17)	2.33**	(.17)	
γ_{01} = Gender			-.03	(.24)			-.17	(.11)	.00	(.05)	.00	(.05)			.04	(.11)	.02	(.05)	.01	(.05)	
γ_{02} = Age			.20	(.11)			-.02	(.05)	-.17	(.11)	-.16	(.11)			-.02	(.05)	-.04	(.10)	-.02	(.10)	
γ_{03} = Work time			-.05	(.25)			-.08	(.12)	-.08	(.11)	-.08	(.11)			-.25*	(.12)	-.25*	(.11)	-.27*	(.11)	
γ_{04} = Affective commitment			.35**	(.09)			-.09*	(.05)	-.05	(.05)	-.06	(.05)			-.10*	(.05)	-.04	(.05)	-.05	(.05)	
γ_{05} = Flow experiences (aggregated)									-.12**	(.05)	-.10*	(.05)					-.16**	(.05)	-.14**	(.05)	
γ_{10} = SCDs									.11+	(.06)	.17**	(.06)					.18**	(.05)	.22**	(.05)	
γ_{20} = Flow experiences (FE)									-.12*	(.04)	-.11*	(.04)					-.11**	(.03)	-.10**	(.03)	
γ_{30} = SCDs \times FE											-.23**	(.08)							-.19**	(.07)	
Random effects																					
Level 1 intercept variance	.59		.59		.33		.33		.30		.29		.26		.26		.24		.24		
Level 2 intercept variance	.80		.65		.13		.11		.10		.10		.13		.12		.10		.10		
$-2^2 \log$ (lh)	1700.44		1680.61		1231.10		1220.98		1194.72		1184.38		1100.84		1089.88		1045.34		1035.64		

Note. Gender, age, work time, affective commitment, and flow experiences (aggregated) are person-level (Level 2) variables; all other predictor variables are day-level (Level 1) variables.

* $p < .05$. ** $p < .01$.

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Table 3
Multilevel Estimates for Predicting Work Engagement and Subjective Vitality

Parameter	Work engagement								Subjective vitality							
	Null model		Model 2		Model 3		Model 4		Null model		Model 2		Model 3		Model 4	
	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE
Fixed effects																
γ_{00} = Intercept	4.37**	(.10)	4.25**	(.40)	4.13**	(.28)	4.14**	(.28)	4.42**	(.09)	4.08**	(.38)	3.99**	(.33)	4.02**	(.34)
γ_{01} = Gender			-.16	(.23)	-.05	(.08)	-.05	(.08)			.12	(.22)	.03	(.09)	.03	(.09)
γ_{02} = Age			.09	(.10)	-.15	(.16)	-.17	(.17)			.11	(.10)	.10	(.20)	.09	(.20)
γ_{03} = Work time			.18	(.25)	.17	(.17)	.19	(.17)			.09	(.24)	.11	(.21)	.11	(.21)
γ_{04} = Affective commitment			.42**	(.10)	.16*	(.07)	.17*	(.07)			.20*	(.09)	.05	(.09)	.05	(.09)
γ_{05} = Flow experiences (aggregated)					.72**	(.07)	.71**	(.07)					.44**	(.09)	.42**	(.09)
γ_{10} = SCDs					-.15 ⁺	(.08)	-.22*	(.09)					-.18 ⁺	(.10)	-.25*	(.10)
γ_{20} = Flow experiences (FE)					.36**	(.05)	.33**	(.05)					.29**	(.07)	.26**	(.07)
γ_{30} = SCDs \times FE							.25**	(.12)							.25*	(.13)
Random effects																
Level 1 intercept variance	.55		.55		.40		.38		1.03		1.03		.92		.91	
Level 2 intercept variance	.78		.63		.28		.28		.54		.51		.35		.36	
-2*log (lh)	1664.23		1644.01		1465.97		1453.73		1992.35		1983.68		1927.81		1924.03	

Note. Gender, age, work time, affective commitment, and flow experiences (aggregated) are person-level (Level 2) variables; all other predictor variables are day-level (Level 1) variables.

⁺ $p < .10$ * $p < .05$ ** $p < .01$.

expectations (cf., Tables 2 and 3). Additionally, and theoretically more important, the day-level interaction effects of SCDs and flow experiences on all four outcomes were also significant (ego-depletion: $\gamma = -.23$; need for recovery: $\gamma = -.19$; work engagement: $\gamma = .25$; subjective vitality: $\gamma = .25$; all $ps < .05$).

To facilitate the interpretation of the interaction effects, we depicted the interactions and performed simple slope tests, as recommended by Preacher, Curran, and Bauer (2006). As shown in Figure 2, the interactions are consistent with our Hypothesis 2 (a–d). In particular, on days with low levels of state flow experiences, subjects reported an increase in day-specific ego-depletion and need for recovery as a result of increased day-specific SCDs, whereas on days with high levels of state flow experiences, the

positive relations between SCDs and both indicators of well-being were weaker. For day-specific work-engagement and subjective vitality, we identified similar interaction patterns: the negative relations between SCDs and both outcomes were attenuated as a function of state flow experiences. Thus, state flow experiences buffered the day-specific adverse relations of SCDs with ego depletion, need for recovery, work engagement, and subjective vitality.

Additional Analyses

We conducted additional analyses to test whether affective commitment may also be regarded as an outcome. Consequently,

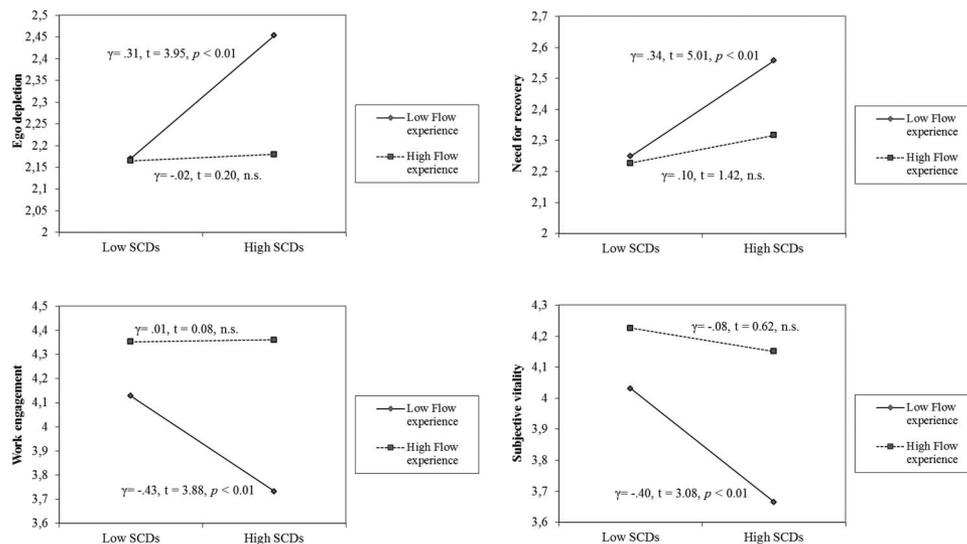


Figure 2. Interaction effects of SCDs and flow experiences on ego depletion, need for recovery, work engagement, and subjective vitality.

we examined whether SCDs and flow experiences may also predict affective commitment. Because affective commitment was a Level 2 variable, which cannot be included as an outcome in multilevel analysis, we aggregated SCDs and flow experiences to the person level (Level 2) by computing the mean value of the Level 1 values for each individual across all days. Afterward, we specified hierarchical linear regression models. In the first step, we entered demographic variables into the regressions. In the second step, we added the main predictors SCDs and flow experiences. In the third step, the interaction term between SCDs and flow experiences was included into the regressions. To avoid biased estimations due to multicollinearity, we centered both predictors prior to calculating the cross-product term (cf., Aiken et al., 1991).

The results of our analyses demonstrated that flow experiences were positively related to affective commitment ($\beta = 0.41$; $p < .01$). However, both SCDs ($\beta = -0.02$; p [ns]) as well as the interaction of SCDs and flow experiences ($\beta = 0.06$; p [ns]) had no effect on affective commitment. The overall variance explained by the model was $R^2 = .154$, $p < .05$. Consequently, our additional analyses provide further support for our hypothesized model by demonstrating that the SCDs and their interaction with flow experiences did not predict affective commitment.

Discussion

Previous research has demonstrated convincing evidence for affective commitment as a predictor of employees' psychological well-being (Meyer & Maltin, 2010). Thus, not only researchers but also practitioners have focused on how organizations may help foster employees' affective commitment (Mathieu & Zajac, 1990). However, today's dynamic working environment is characterized by continuous organizational change (e.g., mergers or acquisitions), which can be associated with layoffs and thus may prevent employees from developing strong affective commitment. Additionally, to effectively adapt to organizational change, employees cannot rely on rigid, automatic, and habitual behavioral patterns but rather must exert volitional self-control (e.g., Schmidt & Diestel, 2012). Our research sought to help employees preserve and even enhance psychological well-being in such dynamic and changing working environments. Hence, we examined flow experiences as a mechanism that underlies the beneficial effects of already established affective commitment and simultaneously helps to protect employees' well-being, particularly against the adverse consequences of SCDs. On the basis of Meyer and Maltin's (2010) theoretical framework, which suggests that the beneficial effects of stable levels of employees' commitment on well-being are provided by autonomous regulation, we proposed that flow experiences constitute peaks of intrinsic motivation during which employees experience a high degree of autonomous regulation. We further argued that highly committed employees are more likely to experience flow at work because during work-related tasks these employees are more willing and thus more likely to invest energetic resources and in turn experience flow at work more frequently. Furthermore, consistent with the notions a) that SCDs impair psychological well-being by depleting regulatory resources (Schmidt & Diestel, 2015) and b) that autonomous regulation facilitates the recovery of regulatory resources (Muraven, 2008; Muraven et al., 2008), we proposed that flow experiences as states of high autonomous regulation, foster coping with

high job-related SCDs and prevent impaired well-being. Thus, we predicted buffering effects of flow experiences on the adverse day-specific effects of SCDs on well-being.

The results of our diary study provide strong support for both propositions: First, state flow experiences mediate the beneficial relations between affective commitment and indicators of well-being. Thus, the beneficial effects of intraindividual affective commitment are mediated by day-specific flow experienced during work-related tasks. Second, flow experiences also buffer the negative day-level relation between SCDs and well-being. That is, on days with high levels of flow experiences, employees were better able to cope with SCDs whereas SCDs translated themselves into impaired well-being when employees reported low levels of day-specific flow experiences.

Theoretical Implications

Our research offers several contributions to the literature and complements previous studies (such as Schmidt & Diestel, 2012; Rivkin et al., 2015). First, we demonstrated how affective commitment, state flow experiences and daily SCDs correspond with indicators of psychological well-being at the day-level. Most studies on the beneficial effects of affective commitment were based on cross-sectional samples and demonstrated that affective commitment predicts interindividual differences in psychological well-being (cf., Meyer & Maltin, 2010). Consequently, these studies did not allow inferences regarding the underlying causal structure of these relations. The present study further disentangles the positive effects of commitment on well-being by demonstrating that highly committed employees report higher levels of psychological well-being over the course of 10 working days compared to employees with low commitment. In addition, the present study provides further support for Rivkin et al.'s (2015) initial results on the beneficial effects of commitment on day-level indicators of well-being by replicating these results in another sample and by examining subjective vitality as an additional indicator of day-specific well-being. Thus, in line with previous research our study strongly supports the notion that affective commitment predicts employees' day-specific psychological well-being. Furthermore, our research provides further evidence for the adverse day-specific effects of SCDs on indicators of well-being as proposed by Schmidt and Diestel (2015). Finally, our study demonstrates day-specific flow as a strong predictor of employees' psychological well-being, even after controlling for SCDs as a stressor. Thus, flow experiences function as another personal resource (Hobfoll, 2002) that contributes to employees' well-being over and above day-specific SCDs.

Second, past research on affective commitment has primarily focused on the direct or interactive effects of commitment on well-being (cf., Meyer & Maltin, 2010). For example, scholars have hypothesized that employees with strong commitment are either less likely to experience workplace stressors or have greater access to resources (e.g., social support) to help them cope with stressors (Meyer & Maltin, 2010). Drawing on the SDT (Deci & Ryan, 1985; Ryan & Deci, 2000), Meyer and Maltin (2010) proposed a well-founded theoretical framework in which they disentangle the mechanisms that underlie the beneficial effects of commitment. These authors argued that the relation between already established affective commitment and autonomous regula-

tion provides the beneficial effects of affective commitment on well-being. However, we know of no empirical studies that have examined this theoretical proposition. To our knowledge, the present study is the first to examine and provide empirical evidence for the underlying mechanisms that determine the beneficial effects of commitment on employees' psychological well-being. We integrated literature on commitment, flow experiences, and well-being, and examined flow experiences as the day-specific manifestation of autonomous regulation mediating the beneficial effects of affective commitment as proposed by Meyer and Maltin (2010). Thus, our research provides strong evidence for flow experiences as the mechanism that underlies the beneficial effects of affective commitment.

Finally, experimental findings in the field of self-control have demonstrated that autonomous forms of regulation are less depleting than controlled forms of regulation (Muraven, 2008; Muraven et al., 2008). Conceptualizing flow experiences as states of autonomous regulation, the results of our study provide evidence for flow experiences as a buffering moderator of the adverse effects of SCDs on well-being and thus support the results of these experimental findings in an occupational setting. Furthermore, our study supports central arguments of the SDT (Deci & Ryan, 1985; Ryan & Deci, 2000) by demonstrating that flow experiences as day-specific manifestations of autonomous regulation counteract the depleting effects of SCDs. The results of our research thus demonstrate that flow experiences can help employees to cope with high day-specific SCDs.

Limitations and Suggestions for Further Research

Our research is subject to several limitations that must be discussed. First, because we operationalized our study variables as self-report measures, common method variance may have biased the analyses in our research (Podsakoff, MacKenzie, Podsakoff, & Lee, 2003). However, because of the temporal separation of the measures and adequate construct validity, as demonstrated by MCFAs, mutual contamination of the constructs appears unlikely. Nevertheless, future research on the combined effects of SCDs and flow experiences may benefit from using the experience sampling method with multiple random measurement points across days to measure flow (Csikszentmihalyi & Larson, 1987) because this method may be more appropriate for identifying day-specific fluctuations in flow experiences.

Second, although our research design separated two measurement occasions by day, strong causal conclusions cannot be derived from such correlational data structures. For example, a general low level of psychological well-being may have influenced the experience of SCDs during the course of a day. In addition, Meyer and Maltin's (2010) theoretical framework may also propose commitment as an outcome of flow experiences as a consequence of basic needs satisfaction and their interaction with SCDs. Although we are not able to completely rule out these possibilities, previous research strongly suggests that SCDs predict psychological well-being and not vice versa (e.g., Diestel et al., 2015). Moreover, experimental research on SCDs and associated states of ego depletion provides strong evidence for the causal directions hypothesized in our research (Robinson & Demaree, 2007). Finally, demonstrating that a model with commitment as an outcome receives only limited support by our data further strengthens the

validity of the model proposed in the present study. However, further research could benefit from examining the development of commitment over time to disentangle the potential reciprocal relationship of autonomous regulation and commitment proposed by Meyer and Maltin (2010).

Practical Implications

From a practical point of view, to promote employees' psychological well-being at work and particularly to protect employees from the adverse effects of day-specific SCDs our research suggests fostering affective commitment, which in turn helps provide day-specific flow experiences. In line with SDT and Meyer and Maltin's (2010) theoretical framework, satisfaction of basic psychological needs is expected to facilitate commitment as well as flow experiences. Thus, to enhance well-being, organizations should satisfy employees' needs for autonomy, competence, and relatedness. For example, need for autonomy can be satisfied by reducing the number of rules and formal procedures and giving employees the opportunity to decide when and how they perform tasks (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008). Furthermore, need for competence may be satisfied by stimulating the utilization of various skills and thereby enhance employees' skills levels and distribute tasks, which correspond with employees' skill levels (Van den Broeck et al., 2008). Finally, need for relatedness can be satisfied by organizing corporative events and establishing a culture of acceptance and support in the organization (Fernet, Austin, Trépanier, & Dussault, 2013). In turn, satisfaction of basic psychological needs is expected to facilitate commitment and associated flow experiences, which in turn help to promote psychological well-being. Furthermore, previous research has demonstrated that leadership can have a strong influence on commitment (Mowday, Porter, & Steers, 1982). Servant leadership is a leadership style, which focuses on integrating the interests of different organizational stakeholders and in particular on the empowerment of employees to release their full potential (Greenleaf, 2002). Previous research has demonstrated that among other outcomes, servant leadership predicts commitment (Walumbwa, Hartnell, & Oke, 2010). Consequently, a leadership training based on the principles of servant leadership (e.g., Bröker, Rivkin, & Günnewig, 2015) may help leaders to enhance employees' well-being by increasing commitment and associated flow experiences.

From an employee's perspective, because states of flow experiences are difficult to initiate and very fragile, it is also necessary to maintain such states to enhance job performance and well-being. Interruptions of work such as distractions or intrusions can impair flow experiences (Jett & George, 2003) or even prevent individuals from experiencing flow at all. Additionally, because flow is such a pleasant state (cf., Nakamura & Csikszentmihalyi, 2002), interrupting flow experiences is likely to be associated with negative outcomes such as distress or a decrease in mood. Currently, by means of electronic communication (e-mails, phone calls, messages), most employees are subject to numerous sources of interruptions at work (e.g., by coworkers, customers, or even family members). Thus, to facilitate flow experiences, employees must reduce possible sources of interruption, particularly when performing solitary work. This can be achieved, for example, by turning off electronic communication devices such as phones or determin-

ing specific time slots for checking e-mails and messages (Jett & George, 2003).

Thus, to foster psychological well-being, it is necessary for organizations and employees themselves to promote affective commitment at work and thereby help employees get into and maintain states of flow experiences.

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