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Sleep Quality and Self-Control Capacity as Protective Resources in the Daily Emotional Labor Process: Results From Two Diary Studies

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Daily emotional labor can impair psychological well-being, especially when emotions have to be displayed that are not truly felt. To explain these deleterious effects of emotional labor, scholars have theorized that emotional labor can put high demands on self-control and diminishes limited regulatory resources. On the basis of this notion, we examined 2 moderators of the daily emotional labor process, namely day-specific sleep quality and individual self-control capacity. In particular, in 2 diary studies (N_{TOTAL} = 171), we tested whether sleep quality moderates the influence of emotional dissonance (the perceived discrepancy between felt and required emotions) on daily psychological well-being (ego depletion, need for recovery, and work engagement). In addition, we examined 3-way interactions of self-control capacity, sleep quality, and emotional dissonance on indicators of day-specific psychological well-being (Study 2). Our results indicate that the negative relations of day-specific emotional dissonance to all day-specific indicators of well-being are attenuated as a function of increasing day-specific sleep quality and that self-control capacity moderates this interaction. Specifically, compared with low self-control capacity, the day-specific interaction of emotional dissonance and sleep quality was more pronounced when trait self-control was high. For those with low trait self-control, day-specific sleep quality did not attenuate the negative relations of emotional dissonance to day-specific well-being. Implications for research on emotional labor and for intervention programs are discussed.

Keywords: day-specific emotional dissonance, sleep quality, self-control capacity, day-specific psychological strain, day-specific, work engagement

Emotional labor, which is a form of emotion regulation in which individuals create a bodily or facial display to meet organizational requirements, has become an integral part of the job role in many occupations (Hochschild, 1983). Whereas most empirical studies on the effects of emotional labor on employees' psychological well-being draw on cross-sectional and longitudinal samples (Hülsheger & Schewe, 2011), scholars have recently begun to analyze the emotional labor process on the day-level (Judge, Woolf, & Hurst, 2009; Scott, Barnes, & Wagner, 2012). Scholarly interest in the day-level effects of emotional labor is based on the self-control strength model, according to which emotion regulation can involve self-control and deplete limited regulatory resources (Muraven & Baumeister, 2000). Self-control refers to volitionally inhibiting, modifying, or overriding automatic and spontaneous response impulses, emotions, and motivational processes. A large body of experimental and field studies shows that self-control entails psychological costs that immediately manifest as exhaustion, a state referred to as *ego depletion* (Hagger, Wood, Stiff, & Chatzisarantis, 2010).

To meet emotional job demands, employees are required to exert self-control, especially when they have to display emotions that they do not genuinely feel (Zapf & Holz, 2006). The perceived discrepancy between emotions truly felt and those required by the job role is commonly referred to as *emotional dissonance* (Morris & Feldman, 1996). Emotional dissonance has been found to predict job dissatisfaction, burnout symptoms, and absenteeism (Hülsheger & Schewe, 2011). Consistent with the self-control perspective, several diary studies also demonstrate day-level negative effects of emotional labor on employees' well-being (Judge et al., 2009). One of the key findings of these studies is that emotional labor and associated levels of well-being exhibit substantial fluctuations during the course of a week. That is, on some days employees are strongly required to regulate their emotions because of frequent discrepancies between felt and organizationally desired emotions, and on other days emotional labor is less stressful or less required because employees' can express emotions that are more in line with organizational requirements or employees have less contact with customers, clients, or patients. Correspondingly, well-being also shows high day-specific variations that are caused by job demands, job conditions, and personality traits (Kühnel, Sonnentag, & Bledow, 2012). For example, extraversion and emotional stability moderate the negative day-specific relations of emotional labor demands to well-being (Judge et al., 2009).

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However, although scholars have proposed that daily emotional labor can put high demands on self-control (e.g., Scott et al., 2012), a nuanced analysis of the relevant psychological mechanisms that are delineated in the self-control strength model is lacking in the literature. This gap in the literature is accentuated by the lack of knowledge regarding how employees can cope with daily emotional demands to prevent themselves from impaired well-being even in cases of high emotional dissonance. Most moderators examined in past research were job characteristics (e.g., job control) or personality traits (e.g., extraversion), which are difficult to be altered (Ilies, Dimotakis, & De Pater, 2010). To identify moderators that are more likely to be influenced by employees, our study focuses on day-specific sleep quality, which should facilitate coping with emotional dissonance. In light of the finding that day-specific impacts of demands on well-being are contingent upon stable individual traits (Judge et al., 2009), we also examine, whether, and to what extent, trait self-control moderates the day-specific interaction of sleep quality and emotional dissonance on well-being.

One of the conceptual challenges of providing insight into the underlying nature of the day-specific emotional labor process is that our understanding of this phenomenon cannot be solely derived from one theory or model because several lines of research on self-control have developed in recent years that have only rarely been related to one another thus far. Thus, we integrate propositions of the self-control strength model (Muraven & Baumeister, 2000) and its theoretical extensions (conservation of resources and role of motivation, Baumeister & Vohs, 2007), theories on sleep quality and sleep disruption (Beebe & Gozal, 2002), models of emotional labor (Hülsheger & Schewe, 2011), and state work engagement (Breevaart, Bakker, Demerouti, & Hetland, 2012). Our theoretical integration centers on the well-founded proposition that processes of self-control (e.g., when emotions have to be displayed that are not truly felt) tax a limited regulatory resource, whose day-specific availability does not only determine self-control functioning, but also affects psychological experience of exhaustion, vitality, and motivational strength (Muraven & Baumeister, 2000). The day-specific availability of resources for self-control functioning can be characterized as a function of day-specific processes (e.g., sleep quality, Beebe & Gozal, 2002) and individual differences in the capacity to exert self-control (Tangney, Baumeister, & Boone, 2004).

On the basis of our theoretical integration, we derive two predictions (see Figure 1): First, day-specific sleep quality moderates the negative relations of emotional dissonance to well-being such that the relationships are attenuated as a function of increasing sleep quality. Second, self-control capacity moderates the day-specific interaction of sleep quality and emotional dissonance on well-being (three-way interaction). In particular, when trait self-control is high, day-specific sleep quality attenuates the negative effects of emotional dissonance on well-being. In contrast, in cases of low trait self-control, sleep quality should not interact with emotional dissonance. Given that psychological well-being involves both strain and motivational states, we consider need for recovery (van Veldhoven & Broersen, 2003) and ego depletion (Muraven & Baumeister, 2000) as strain outcomes, as well as work engagement (Bakker, 2011) as an indicator of a fulfilling and motivational state of mind.

In the following, we conceptualize emotional dissonance as a demand on self-control, and develop the prediction of day-specific interactions of emotional dissonance and sleep quality on well-being. We test these predictions in a diary study. In addition, we elaborate on theoretical extensions of the self-control strength model to clarify how self-control capacity moderates the interaction of emotional dissonance and sleep quality on well-being. Finally, we analyze the hypothesized three-way interaction in a second diary study.

Emotional Dissonance and Self-Control: Depletion of Limited Regulatory Resources

Compared with other emotional labor demands (e.g., specific display rules or sensitivity requirements), emotional dissonance exerts the strongest negative effects on well-being (Zapf & Holz, 2006). In addition, several studies have also demonstrated that emotional dissonance mediates the relations of emotional display rules to strain and thus explains why emotional labor can impair well-being (Cheung & Tang, 2010). To provide a conceptual framework for emotional dissonance, Zapf and Holz (2006) argued that the discrepancy between felt and required emotions puts high demands on self-control (see also Diestel & Schmidt, 2011a, 2011b). Their argument is grounded in the self-control strength model, according to which self-control processes draw on and deplete limited regulatory resources (Muraven & Baumeister, 2000). In support of this argument, several studies have revealed that both suppressing felt emotions and exaggerating a required emotional display cause ego depletion and, hence, temporarily impair self-control processes such as working memory operations and response inhibition (Schmeichel, Vohs, & Baumeister, 2003; Schmeichel, 2007). In addition, experimentally induced emotional dissonance also predicts high sympathetic activation and health impairments (Gross & Levenson, 1997; Robinson & Demaree, 2007). In line with Morris and Feldman's (1996; p. 992) argument that "when mismatches between genuinely felt and organizationally required emotions exist, then, greater control, skill, and attentive action will be needed," we propose that coping with emotional dissonance requires high self-control efforts and affects well-being through the consumption of limited regulatory resources.

Although the framework for self-control processes has been widely acknowledged in the literature on emotional labor (e.g.,

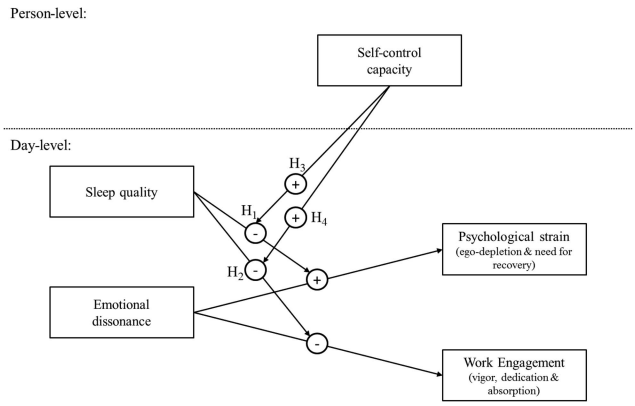

Figure 1. Theoretical model. Numbers refer to hypotheses.

Judge et al., 2009), past research has largely failed to derive implications for day-level effects of emotional dissonance on well-being and, more important, protective mechanisms that facilitate coping with daily emotional dissonance. Drawing from the theoretical assertion that day-specific emotional dissonance consumes the limited resource for self-control functioning, we seek to extend scholarly knowledge on such protective mechanisms by focusing on processes, which promote the day-specific availability of the limited resource taxed by emotional labor.

The Protective Function of Sleep Quality: Filling the Limited Regulatory Resource

Theories on sleep quality and sleep disruption suggest that high sleep quality buffers the negative day-level effects of emotional dissonance on well-being because sleep as a psychological process fuels and restores limited regulatory resources and thus, facilitates self-control functioning during the following day (Barber, Munz, Bagsby, & Powell, 2010; Beebe & Gozal, 2002). According to Buyssé, Reynolds, Monk, Berman, and Kupfer (1989; p. 194), sleep quality involves "[. . .] quantitative aspects of sleep, such as sleep duration, sleep latency, or number of arousals, as well as more purely subjective aspects, such as 'depth' or 'restfulness' of sleep." Because of the storing function of sleep (Killgore, 2010), high sleep quality stabilizes the cerebral metabolic rate and ensures adequate resource or energetic supply of the prefrontal cortex, whose structures are important for executive self-control (Hofmann, Schmeichel, & Baddeley, 2012; Tabibnia et al., 2011). In contrast, low sleep quality results in reduced metabolic activity in the prefrontal cortex (Boonstra, Stins, Daffertshofer, & Beek, 2007), deficits in self-control functioning (Ghumman & Barnes, 2013) and hence low psychological well-being (Barber et al., 2010). Experimental findings indicate that impaired sleep causes self-control deficits, such as impaired decision making, response inhibition, and attention control (e.g., Chuah, Venkatraman, Dinges, & Chee, 2006) even after one night's sleep loss (Nilsson et al., 2005). To explain these deleterious effects, Barber et al. (2010) explicitly refer to limited regulatory resources that are diminished by impaired sleep.

Inspired by research on self-control and sleep quality, scholars have analyzed the effects of impaired sleep on organizational behavior. For example, Christian and Ellis (2011) found that impaired sleep results in workplace deviance through diminished self-control. Similarly, Wagner, Barnes, Lim, and Ferris (2012) found a positive relation of impaired sleep to subsequent cyberloafing at work, which is associated with lower productivity. Arguing in line with theories on sleep quality and sleep disruption, the authors of these studies have suggested that because of their low resources caused by impaired sleep, individuals are limited in their ability to exert self-control at work. In particular, Christian and Ellis (2011; p. 917) noted that "[. . .] sleep deprivation has the potential to impair emotion regulation [as a form of self-control], whereby individuals modulate [their] emotions [. . .] and how they express them."

Hypothesis Development: Interactions of Sleep Quality and Emotional Dissonance

As elaborated above, on the basis of the self-control strength model, we propose that high daily emotional dissonance taxes limited regulatory resources and causes psychological strain through decrements in these resources. Consistent with theories on sleep quality and sleep disruption, we further argue that sleep quality facilitates coping with daily emotional dissonance because high sleep quality fuels the limited resource and thus, the day-specific availability of that resource depends on the level of sleep quality. Consequently, because of high resource availability, coping with daily emotional dissonance will be less straining if sleep quality on the previous night is high. In contrast, in cases of low sleep quality, emotional labor should become more difficult, and employees' effort toward self-control should deplete their regulatory resources at a greater rate. Thus, we expect day-specific emotional dissonance to interact with sleep quality in predicting psychological strain:

> *Hypothesis 1:* Day-specific sleep quality moderates the positive relations of day-specific emotional dissonance to day-specific ego depletion (Hypothesis 1a) and need for recovery (Hypothesis 1b). The positive relations are attenuated as a function of high sleep quality.

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). Inspired by this conceptualization, Sonnentag, Mojza, Demerouti, and Bakker (2012; p. 844) argued that day-specific work engagement is affected by the "availability of energetic and affective resources" and emotional regulation that consumes these resources. This argument is consistent with Baumeister and Vohs's (2007) proposition that because of adaptive patterns of conserving limited regulatory resources, high self-control efforts and associated decrements in these resources result in shifts of motivation, which should manifest in lower vitality, impaired task involvement and less absorption (see also Ryan & Deci, 2008). In support of this proposition, Muraven, Gagné, and Rosman (2008) reported impaired subjective vitality and diminished concentration after high external demands on self-control. Consequently, state work engagement is based upon the same limited resource as experiences of exhaustion and thus, should also be predicted by interactions of emotional dissonance and sleep quality:

> *Hypothesis 2:* Day-specific sleep quality moderates the negative relations of day-specific emotional dissonance to day-specific vigor (Hypothesis 2a), dedication (Hypothesis 2b), and absorption (Hypothesis 2c). The negative relations are attenuated as a function of high sleep quality.

Study 1

Method

Research design and participants. Because our model (see Figure 1) is based on the proposition that the negative relations of emotional dissonance to well-being are not uniform across all days, we conducted a diary study. The day-specific interaction of emotional dissonance and sleep quality on well-being was analyzed on the basis of a sample that involved employees from different occupational contexts. We recruited our participants from various organizations in Germany through announcements, indi-

vidual contacts, and contacts of undergraduate management students. A final sample of 63 participants (response rate: 67%) could be employed for our study. Among the participants, 54% were female, and 11.7% worked part time. Mean age was 36.32 (SD = 13.98) years, and mean tenure was 16.11 (SD = 14.08) years. Most of the participants worked in the services sector, with regular contact with clients, patients, customers, or others. All participants received € 40 (approx. $53.26) as compensation for completing the study. Three times per day, the participants completed questionnaires over 10 consecutive work days (617 daily measurement points). On weekends or (public) holidays, the diary study was interrupted and continued on the next regular work day. At morning, the participants rated sleep quality of the previous night. At midday, day-specific emotional dissonance, and after the work day, indicators of well-being were assessed.

Measures. At the beginning of the diary study, participants completed a general survey. This survey included age, gender, and trait negative affect (NA; five items with a 5-point Likert-scale: *distressed*, *upset*, *irritable*, *nervous*, and *afraid*; Watson, Clark, & Tellegen, 1988). NA predicts emotional mood and thus, may explain individual differences in emotional dissonance and well-being during the course of a week (Langeveld, Koot, & Passchier, 1999). In the day-specific questionnaires, we explained that the items of sleep quality refer to the last night and the items of emotional dissonance refer to momentary experience and to the last hours of working time.

Sleep quality (morning). Day-specific sleep quality was measured with a shortened version of the Pittsburgh Sleep Quality Index (PSQI, Buyssé et al., 1989), which was adapted for night-specific assessment. That is, all items referred to the previous night. For each person and each night, we calculated a day-specific sleep quality score. In line with Buyssé et al. (1989, p. 194), our score involves both subjective (sleeping quality and restfulness) and objective components (sleep efficiency, sleep duration, and sleep latency). Efficiency, duration, and latency were calculated on the basis of participants' reports on their bedtime, number of minutes required to fall asleep, time of awakening in the morning, and number of hours of sleep. Two items (4-point Likert scale), assessed the participants' sleep quality ["How would you rate the quality of your previous night's sleep?"; 0 (*very good*) to 3 (*very bad*)] and restfulness ["This morning, how much of a problem has it been for you to keep up enough enthusiasm to get things done?"; 0 (*not at all*) to 3 (*a very big problem*)]. Because higher values of the original PSQI indicate lower sleep quality or impaired sleep, we recoded our score (range: 0–15), whose higher values now reflect higher day-specific sleep quality.

Emotional dissonance (noon). We assessed day-specific emotional dissonance on the basis of five items that reflected the daytime frequency of experienced discrepancies between genuinely felt emotions and those required by participants' job role (e.g., "In the last few hours, how often did you have to show feelings at work that you did not really feel?"). The items were adapted from the Frankfurt Emotion Work Scales (Zapf, Vogt, Seifert, Mertini, & Isic, 1999). The response format of this scale ranged from 1 (*never*) to 5 (*very often*).

Ego depletion (evening). Day-specific ego depletion was assessed using five items related to 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 are scored using a 4-point intensity rating format (1 = *not at all*, 5 = *a great deal*).

Need for recovery (evening). We assessed 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 high requirement for a rest period to recover from straining activities. Again, all items are scored using a 4-point intensity rating format (1 = *not at all*, 5 = *a great deal*).

Work engagement (evening). The assessment of day-specific work engagement was based on the 9-item version of the Utrecht Work Engagement Scale (Breevaart et al., 2012; Schaufeli, Bakker, & Salanova, 2006), which was adapted for day-specific assessment and involved 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 (*never*) to 6 (*always*).

Construct validity. To test validity of our measures, we performed multilevel confirmatory factor analyses (MCFAs). MCFA for emotional dissonance showed a well data fit: $\chi^2(10) = 31.53$, $p < .01$, root mean square error of approximation (RMSEA) = .059, comparative fit index (CFI) = .981, standardized root-mean-square residual within-person/between-person ($SRMR_w/SRMR_b$) = .023/.010. The distinctiveness of ego depletion, need for recovery, and the three work engagement facets was tested in a 5-factor model. The 5-factor model ($\chi^2(284) = 633.74$, $p < .01$, RMSEA = .045, CFI = .952, $SRMR_{w/b}$ = .033/.048) best fitted our data compared with other models (4-factor model with one strain factor: $\chi^2(292) = 825.09$, $p < .01$, RMSEA = .054, CFI = .927, $SRMR_{w/b}$ = .040/.054; 3-factor model with one engagement factor: $\chi^2(298) = 720.39$, $p < .01$, RMSEA = .048, CFI = .942, $SRMR_{w/b}$ = .040/.069; 2-factor model with one strain and one engagement factor: $\chi^2(302) = 906.63$, $p < .01$, RMSEA = .057, CFI = .917, $SRMR_{w/b}$ = .046/.071). Additional tests for work engagement and both strain outcomes showed that models with separate facets also best fitted the data (for information, please consult the first author). Although need for recovery and ego depletion are highly correlated, they refer to different aspects of short-term strain: ego depletion reflects inner experience of exhaustion (Bertrams et al., 2011), whereas need for recovery is a behavioral manifestation of exhaustion (van Veldhoven & Broersen, 2003). In line with studies on daily well-being (Breevaart et al., 2012; Sonnentag & Zijlstra, 2006), we distinguished between all measures (ego depletion, need for recovery, vigor, dedication, and absorption). Our procedure aims at testing whether the hypothesized interaction generalizes across different, albeit highly correlated indicators of well-being (and is not specific to certain operationalizations).

Analytical procedure. To test our hypotheses, we used stepwise multilevel modeling with random intercepts because the day-level data (Level 1) were nested within the person-level data (Level 2) and this procedure takes into account the interdependence of both levels (Hox, 2002). All parameter specifications and

estimations were conducted with the MLwiN program (Rasbash, Steele, Browne, & Goldstein, 2012). The null model only included the intercept. In Model 1, we added the Level 2 variables gender, age, and trait NA; Model 2 included emotional dissonance and sleep quality at Level 1; in Model 3, we tested the interactions of emotional dissonance and sleep quality. All Level 1 and Level 2 variables (except gender) were centered around their grand mean to reduce the risk of confounding effects (Hofmann & Gavin, 1998). To avoid multicollinearity when testing the interaction at Level 1, we formed the interaction term by multiplying both of the grand-mean centered predictors (emotional dissonance and sleep quality) (Aiken & West, 1991). On a conceptual level, our centering decision is grounded in the proposition that the day-specific levels of emotional dissonance and sleep quality should be interpreted in absolute terms. For example, the PSQI has been validated on the basis of reference samples and thus, is designed to reflect the individual level of sleep quality relative to other individuals (Buyssé et al., 1989).

Results

Table 1 displays the descriptive statistics and reliabilities of the study variables. Before testing our hypotheses, we examined the within-person (Level 1) variance in all five outcomes. For ego depletion and need for recovery, the proportion of within-person variation was 49.3% and 57.1%, respectively. For work engagement, the Level 1variance was 44.1% (vigor), 45.7% (dedication), and 45.2% (absorption). In line with our proposition of day-specific fluctuations, the results of variance decomposition necessitate the application of multilevel modeling.

Test of hypotheses. Hypothesis 1 proposed day-specific interactions of emotional dissonance and sleep quality on ego depletion and need for recovery. In line with this proposition, multilevel estimates revealed that emotional dissonance and sleep quality significantly interacted in predicting both strain outcomes at the day-level (see Table 2). Model 3 showed an improved fit compared with Model 2, as indicated by the difference in the log likelihood ratios. To facilitate the interpretation of the interactions, we depicted the interactions and performed simple slope tests, as recommended by Preacher, Curran, and Bauer (2006). As Figures 2a and 2b show, the interaction patterns are consistent with Hypothesis 1 (a-b). In particular, day-specific emotional dissonance was strongly related to ego depletion and need for recovery (in the evening) when day-specific sleep quality (last night) was low. In comparison, on days with high sleep quality, the positive relations of day-specific emotional dissonance to both strain outcomes were weaker. Thus, in support of Hypothesis 1, sleep quality attenuated the positive effects of emotional dissonance on ego depletion and need for recovery.

Hypothesis 2 proposed that day-specific sleep quality moderates (buffers) the negative effect of day-specific emotional dissonance on work engagement. A significant interaction of emotional dissonance and sleep quality was only found for absorption, whereas vigor and dedication failed to reflect an interaction of both (see Table 3). For absorption, the improvement of model fit was significant. As Figure 2c shows, the day-specific negative relation of emotional dissonance to absorption is attenuated as a function of sleep quality. After nights with high sleep quality, absorption was less affected by daily emotional dissonance, whereas emotional dissonance was negatively related to absorption when sleep quality was low. Thus, Study 1 provides strong support for Hypothesis 2c, but not for Hypotheses 2a and b.

Supplemental analyses. Because several authors have recommended group-mean (or person-related) centering when testing Level 1 interactions (Enders & Tofighi, 2007), we reanalyzed the interactions of emotional dissonance and sleep quality using person-related centered values of both predictors and their interaction. Our results revealed significant interactions of both predictors on ego depletion, need for recovery, and absorption with signs corresponding to expectations.

In addition, on the basis of person-related centering (Raudenbush & Bryk, 2002), we also analyzed slope variability of the relations of emotional dissonance, sleep quality, and their interaction. Our interest in slope variance results from recent findings, which suggest that the day-level effects of emotional labor and sleep quality on well-being largely differ between individuals (Judge et al., 2009; van Dongen, Vitellaro, & Dinges, 2005). In support of this suggestion, models with all three random slopes

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

Variable	1	2	3	4	5	6	7	8	9	10
1. Emotional dissonance—noon	*(.95)*	**−.37**	**.57**	**.56**	**−.36**	**−.22**	**−.30**			
2. Sleep quality—previous night	**−.49**	*(.74)*	**−.44**	**−.43**	**.43**	**.33**	**.37**			
3. Ego depletion—evening	**.73**	**−.60**	*(.94)*	**.83**	**−.55**	**−.43**	**−.48**			
4. Need for recovery—evening	**.77**	**−.57**	**.88**	*(.92)*	**−.49**	**−.37**	**−.42**			
5. Vigor—evening	**−.39**	**.52**	**−.59**	**−.53**	*(.89)*	**.84**	**.89**			
6. Dedication—evening	−.21	**.42**	**−.45**	**−.39**	**.87**	*(.91)*	**.92**			
7. Absorption—evening	**−.29**	**.45**	**−.49**	**−.44**	**.91**	**.95**	*(.91)*			
8. Negative affect	**.44**	**−.46**	**.67**	**.57**	**−.58**	**−.57**	**−.56**	*(.76)*		
9. Age	−.03	.19	**−.26**	−.17	.19	.13	.15	−.18	—	
10. Gender[a]	−.08	.23	−.14	−.13	.23	.24	**.28**	−.20	**.34**	—
M	2.31	11.06	1.97	2.09	3.01	2.91	2.88	2.66	36.32	1.46
SD	0.74	1.99	0.64	0.62	1.15	1.19	1.13	0.70	13.98	0.50

Note. Cronbach's alpha for day-level variables are mean internal consistencies averaged over all measurement days. Correlations below the diagonal are person-level correlations ($N = 63$). Correlations above the diagonal are day-level correlations ($N = 617$). Numbers in bold $p < .05$.
[a] Gender (1 = female, 2 = male).

Table 2
Multilevel Estimates for Models Predicting Ego Depletion and Need for Recovery (Study 1)

	Ego depletion								Need for recovery							
	Null model		Model 1		Model 2		Model 3		Null model		Model 1		Model 2		Model 3	
Parameter	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)
Fixed effects																
γ_{00} = Intercept	1.97**	(0.08)	1.89**	(0.20)	1.85**	(0.15)	1.87**	(0.15)	2.09**	(0.08)	2.09**	(0.20)	2.04**	(0.16)	2.05**	(0.16)
γ_{01} = Gender			0.05	(0.14)	0.08	(0.10)	0.07	(0.10)			0.00	(0.14)	0.04	(0.10)	0.03	(0.10)
γ_{02} = Age			−0.01	(0.00)	−0.01*	(0.00)	−0.01*	(0.00)			−0.00	(0.01)	−0.00	(0.00)	−0.00	(0.00)
γ_{03} = Negative affect			0.60**	(0.07)	0.39**	(0.06)	0.41**	(0.06)			0.50**	(0.07)	0.27**	(0.06)	0.29**	(0.05)
γ_{10} = Emotional dissonance (EmoDis)					0.31**	(0.04)	0.30**	(0.04)					0.31**	(0.04)	0.30**	(0.04)
γ_{20} = sleep quality (SQ)					−0.05**	(0.01)	−0.05**	(0.01)					−0.07**	(0.01)	−0.06**	(0.01)
γ_{30} = EmoDis × SQ							−0.03**	(0.01)							−0.02*	(0.01)
Random effects																
σ^2 = Residual variance at Level 1	0.36		0.36		0.30		0.29		0.44		0.44		0.37		0.36	
$\tau^2_{Intercept}$ = Residual variance at Level 2	0.37		0.17		0.08		0.08		0.33		0.20		0.09		0.09	
—2*log (lh)	1267.62		1226.71		1082.55		1070.76		1375.12		1349.05		1206.94		1200.60	
Diff—2*log (lh)			40.91**		144.16**		11.79**				26.07**		142.11**		6.34*	
Number of parameters	3		6		8		9		3		6		8		9	

Note. Gender, age and negative affect are person-level (Level 2) variables; all other predictor variables are day-level (Level 1) variables.
* $p < .05$. ** $p < .01$.

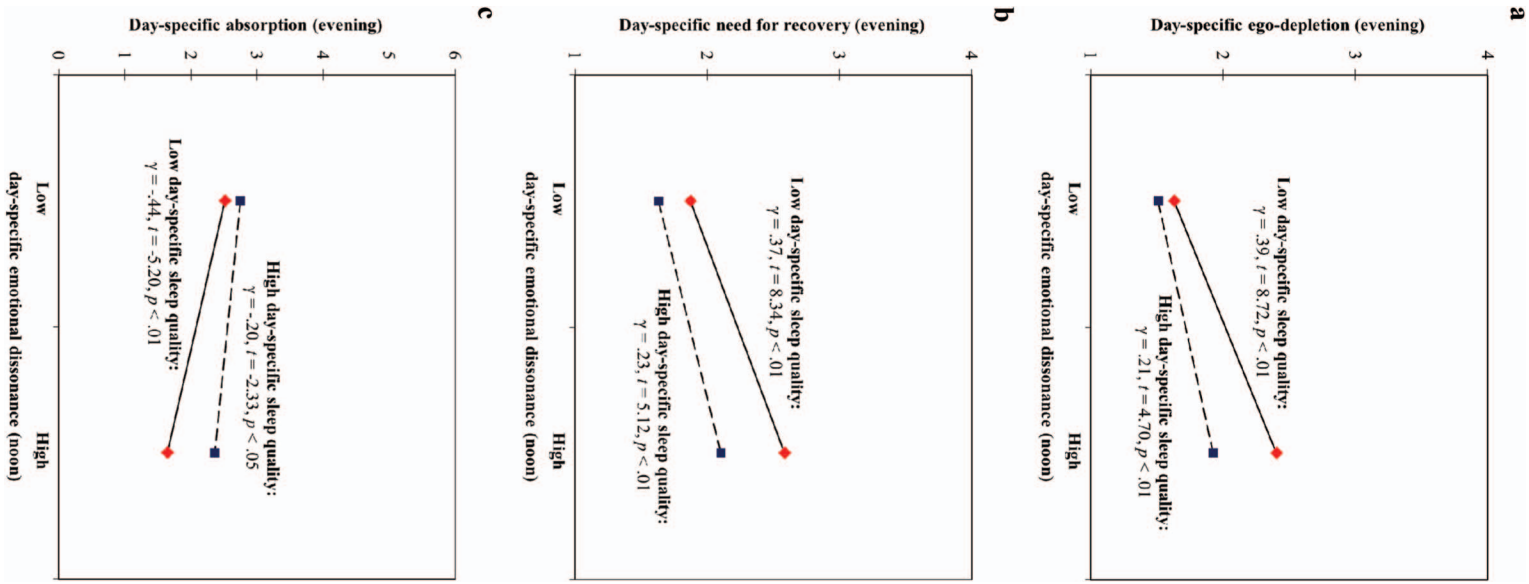

Figure 2. Interaction effects of emotional dissonance and sleep quality on ego depletion (Figure 2a), need for recovery (Figure 2b) and absorption (Figure 2c), Study 1. See the online article for the color version of this figure.

Table 3
Multilevel Estimates for Models Predicting Work Engagement (Study 1)

Parameter	Vigor: Null model β	(*SE*)	Model 1 β	(*SE*)	Model 2 β	(*SE*)	Model 3 β	(*SE*)
Fixed effects								
γ_{00} = Intercept	3.02**	(0.14)	2.65**	(0.39)	2.74**	(0.38)	2.72**	(0.38)
γ_{01} = Gender			0.25	(0.24)	0.19	(0.23)	0.20	(0.23)
γ_{02} = Age			0.01	(0.01)	0.00	(0.01)	0.00	(0.01)
γ_{03} = Negative Affect			−0.90**	(0.19)	−0.61**	(0.19)	−0.63**	(0.18)
γ_{10} = Emotional dissonance (EmoDis)					−0.33**	(0.08)	−0.32**	(0.08)
γ_{20} = sleep quality (SQ)					0.12**	(0.02)	0.11**	(0.02)
γ_{30} = EmoDis × SQ							0.03	(0.02)
Random effects								
σ^2 = Residual variance at Level 1	0.94		0.94		0.78		0.77	
$\tau^2_{\text{Intercept}}$ = Residual variance at Level 2	1.19		0.73		0.67		0.66	
−2*log (lh)	1876.84		1849.12		1738.95		1733.36	
Diff—2*log (lh)			27.72**		110.17**		5.59*	
Number of parameters	3		6		8		9	

Parameter	Dedication: Null model β	(*SE*)	Model 1 β	(*SE*)	Model 2 β	(*SE*)	Model 3 β	(*SE*)
Fixed effects								
γ_{00} = Intercept	2.91**	(0.15)	2.41**	(0.41)	2.48**	(0.43)	2.46**	(0.43)
γ_{01} = Gender			0.34	(0.24)	0.29	(0.26)	0.30	(0.26)
γ_{02} = Age			−0.00	(0.01)	−0.00	(0.01)	−0.00	(0.01)
γ_{03} = Negative Affect			−0.94**	(0.18)	−0.71**	(0.19)	−0.73**	(0.18)
γ_{10} = Emotional dissonance (EmoDis)					−0.25**	(0.09)	−0.24**	(0.09)
γ_{20} = sleep quality (SQ)					0.09**	(0.02)	0.08**	(0.02)
γ_{30} = EmoDis × SQ							0.03	(0.02)
Random effects								
σ^2 = Residual variance at Level 1	1.08		1.08		0.98		0.97	
$\tau^2_{\text{Intercept}}$ = Residual variance at Level 2	1.28		0.79		0.84		0.83	
−2*log (lh)	1957.65		1930.64		1877.12		1873.37	
Diff—2*log (lh)			27.01**		53.52**		3.75	
Number of parameters	3		6		8		9	

Parameter	Absorption: Null model β	(*SE*)	Model 1 β	(*SE*)	Model 2 β	(*SE*)	Model 3 β	(*SE*)
Fixed effects								
γ_{00} = Intercept	2.88**	(0.14)	2.28**	(0.37)	2.35**	(0.39)	2.32**	(0.38)
γ_{01} = Gender			0.41	(0.23)	0.36	(0.24)	0.38	(0.24)
γ_{02} = Age			−0.00	(0.01)	−0.00	(0.01)	−0.00	(0.01)
γ_{03} = Negative Affect			−0.84**	(0.19)	−0.58**	(0.20)	−0.60**	(0.20)
γ_{10} = Emotional dissonance (EmoDis)					−0.33**	(0.08)	−0.32**	(0.09)
γ_{20} = sleep quality (SQ)					0.09**	(0.02)	0.08**	(0.02)
γ_{30} = EmoDis × SQ							0.04*	(0.02)
Random effects								
σ^2 = Residual variance at Level 1	0.95		0.95		0.82		0.81	
$\tau^2_{\text{Intercept}}$ = Residual variance at Level 2	1.15		0.72		0.74		0.73	
−2*log (lh)	1880.35		1853.77		1770.72		1763.42	
Diff—2*log (lh)			26.58**		83.05**		7.30**	
Number of parameters	3		6		8		9	

Note. Gender, age and negative affect are person-level (Level 2) variables; all other predictor variables are day-level (Level 1) variables.
* $p < .05$. ** $p < .01$.

(emotional dissonance, sleep quality, and their interaction) showed an improvement in data fit compared with fixed slopes (ego depletion: Δ-2*log (Δ*df*) = 39.13 (3); need for recovery: Δ-2*log (Δ*df*) = 21.70 (3); vigor: Δ-2*log (Δ*df*) = 38.84 (3); dedication: Δ-2*log (Δ*df*) = 43.99 (3); absorption: Δ-2*log (Δ*df*) = 42.24 (3); all *ps* < .01). In performing the difference tests, we considered all three slopes simultaneously, because the form of an interaction and its variation across higher level units does not only depend on the varying slope of that interaction, but is also contingent upon the varying slopes of the main effects (Aiken & West, 1991). To avoid convergence problems and enable summation of all three slope variances, we restricted the covariance terms among the random slopes and intercepts to be zero. The sum of slope variances of emotional dissonance, sleep quality and their interaction indicate that the moderation effect of sleep quality may take different shapes as a function of individual traits (ego depletion (percentage of slope variance relative to total variance): $\tau^2_{\text{Slopes}} = 0.08$ (11%); need for recovery: $\tau^2_{\text{Slopes}} = 0.06$ (8%); vigor: $\tau^2_{\text{Slopes}} = 0.21$ (10%); dedication: $\tau^2_{\text{Slopes}} = 0.29$ (12%); absorption: $\tau^2_{\text{Slopes}} = 0.21$ (10%)).

Discussion of Study 1

The findings of Study 1 show that day-specific sleep quality is a protective factor that buffers the effects of emotional dissonance on psychological well-being. On days with high emotional dissonance, high sleep quality prevented employees from impaired well-being in terms of high strain and low absorption. In contrast, low sleep quality in combination with high emotional dissonance resulted in disproportionally low well-being. Our finding highlights the necessity of focusing on the daily mechanisms that provide employees with a high availability of regulatory resources and that thus facilitate emotion regulation at work.

Furthermore, our supplemental analyses revealed significant interindividual differences in the day-specific relations of emotional dissonance and sleep quality to well-being. That is, the form of the moderating effect of sleep quality may be contingent upon person-related variables, which may determine whether and to what extent employees benefit from high sleep quality when they have to cope with daily emotional dissonance. Our findings on slope variations join recent observations, according to which the negative effects of impaired sleep on self-control functioning differ between individuals (van Dongen et al., 2005). For example, the effects of impaired sleep on inhibitory processes as a core mechanism of emotional regulation (Gross, 1998) vary as a function of individuals' ability to control inhibitory processes (Chuah et al., 2006). Both this finding and the self-control perspective suggest that self-control capacity may moderate the beneficial impact of sleep quality on coping with emotional dissonance. According to the model of self-control strength, people differ in their capacity to exert self-control (Tangney et al., 2004). Thus, people with high trait self-control can be expected to more effectively cope with self-control demands compared with those with low self-control capacity. Because we did not consider person-related variables in Study 1, we conducted a second diary study that aimed to disentangle the moderating role of self-control capacity in the interaction of daily emotional dissonance and sleep quality on well-being.

Study 2

Self-Control Capacity and Conservation of Resources

As we elaborated above, experimental evidence suggests that the effect of nightly sleep quality on self-control functioning depends on one's capacity to control or regulate attention and behavior (Alhola & Polo-Kantola, 2007; van Dongen et al., 2005). In line with Muraven and Baumeister's (2000) definition of self-control capacity, some individuals are more effective in modulating their emotional expression, resisting temptations, overcoming inner resistance, or controlling their behavior than others (Tangney et al., 2004). Self-control capacity is considered as a dispositional, trait-like factor that operates as a protective resource when individuals face high demands on self-control. Compared with low trait self-control, people with high trait self-control have greater academic success, demonstrate better psychological adjustment, and report higher self-acceptance (for review, de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012). Less anger and fewer interpersonal conflicts are also associated with high self-control capacity, suggesting that trait self-control may facilitate coping with emotional labor demands. In support of this suggestion, Schmidt, Hupke, and Diestel (2012) revealed that trait self-control moderates (attenuates) the positive relations of job-related self-control demands to psychological strain.

To disentangle the potential interplay between trait self-control, sleep quality, and emotional dissonance in predicting well-being, a detailed understanding of the underlying mechanism of resource depletion is needed. In elaborating on and extending the self-control strength model, Muraven, Shmueli, and Burkley (2006) proposed that individuals often allocate and conserve their limited regulatory resources during self-control exertion, especially when they anticipate further self-control demands (see also Baumeister & Vohs, 2007; p. 11). One's motivation to flexibly conserve resources or selectively invest self-control effort is based upon inner goals or actual priorities, which are rooted in the intention to retain and protect resource supply (Hobfoll, 2002). That is, low self-control performance may result from goal-based conservation of resources (rather than "total" resource depletion). By demonstrating that individuals can be highly adaptive in coping with self-control demands, several experimental studies provide strong support for the proposition of flexible conservation and selective allocation of limited regulatory resources (Gröpel, Baumeister, & Beckmann, 2014; Muraven et al., 2006; Vohs, Baumeister, & Schmeichel, 2012).

The integration of the proposition of resource allocation with theories on sleep quality and sleep disruption suggests that self-control capacity moderates the day-specific interaction of emotional dissonance and sleep quality on well-being. In particular, compared with low self-control capacity, the buffering effect of sleep quality on the negative relations of emotional dissonance to well-being should be more pronounced for those with high trait self-control. Our prediction of a three-way interaction is derived from two implications that are grounded in the abovementioned theories. First, compared with low trait self-control, individuals with high self-control capacity are thought to be more effective in monitoring and regulating their goal-directed behavior (Wan & Sternthal, 2008) and, hence, more efficient in allocating their limited regulatory resources (Gröpel et al., 2014; see also Baumeister & Alquist, 2009). Thus, when self-control capacity is high, greater day-specific availability of resources provided by high sleep quality should facilitate coping with daily emotional dissonance and thus reduce the risk of impaired well-being. In contrast, sleep quality should not facilitate emotional labor for those with low self-control capacity because they are less able to control their emotions effectively and to allocate their resources efficiently.

Second, impaired sleep causes considerable decrements in metabolic activity in the prefrontal cortex and affects self-control functioning by restricting day-specific availability of regulatory resources (Boonstra et al., 2007; Nilsson et al., 2005). As a result, individuals are less able to cope with emotional dissonance and to prevent feelings of exhaustion, even when they are generally capable of conserving and allocating resources. In other words, the reduced availability of resources cannot be compensated by effective regulation of goal-directed behavior or efficient resource allocation of those with high trait self-control. Thus, regardless of one's self-control capacity, low daily sleep quality should impair emotional control and amplify the negative effects of dissonance on well-being.

Hypothesis Development: Interactions of Sleep Quality, Emotional Dissonance and Self-Control Capacity

According to our lines of reasoning, we propose that when self-control capacity is low, day-specific sleep quality should not moderate the positive relations of day-specific emotional dissonance to ego depletion and need for recovery. Because low trait self-control reflects limited ability to regulate emotions or comply with display rules, those with low self-control capacity are expected to experience increases in strain with increasing day-specific emotional dissonance even when sleep quality is high. Similarly, because of the diminished resources resulting from sleep impairment, low sleep quality impairs employees' ability to cope with emotional dissonance and thus leads to disproportionally high strain when emotions should be displayed that are not truly felt, regardless of one's self-control capacity. In contrast, when trait self-control is high, increasing day-specific sleep quality should prevent day-specific emotional dissonance to cause ego depletion and need for recovery. Self-control capacity facilitates efficient usage of resources, which are provided by high sleep quality, and thus should protect employees from being strained when emotional dissonance is high.

> *Hypothesis 3:* Three-way interaction: Self-control capacity moderates the day-specific interaction of sleep quality and emotional dissonance on day-specific ego depletion (Hypothesis 3a) and need for recovery (Hypothesis 3b). In cases of high trait self-control, sleep quality moderates the positive relations of emotional dissonance to both indicators of strain, whereas in cases of low trait self-control, emotional dissonance and sleep quality do not interact in predicting strain.

Because the availability of regulatory resources influences motivational states, which become manifest in vitality, job involvement, and absorption (Muraven et al., 2008), we hypothesize that state work engagement should also be predicted by a three-way interaction of emotional dissonance, sleep quality, and trait self-

control as they determine availability and usage of limited resources. Our hypothesis is consistent with Xanthopoulou, Bakker, and Fischbach's (2013) resource-based view on work engagement, according to which daily experiences of vigor, dedication, and absorption are strongly influenced by self-regulatory processes of conscious emotion control, goal-directed behavior, and being engrossed in work. Self-control capacity fosters such processes by effective task-related action regulation and efficient allocation of limited regulatory resources (de Ridder et al., 2012). Therefore, state work engagement should also reflect the moderating effect of self-control capacity on the day-specific interaction between emotional dissonance and sleep quality.

Hypothesis 4: Three-way interaction: Self-control capacity moderates the day-specific interaction between sleep quality and emotional dissonance on day-specific vigor (Hypothesis 4a), dedication (Hypothesis 4b) and absorption (Hypothesis 4c). In cases of high trait self-control, sleep quality moderates the negative relations of emotional dissonance to work engagement, whereas in cases of low trait self-control, emotional dissonance and sleep quality do not interact in predicting engagement.

Method

Participants and research design. The procedure for recruiting the participants and completing the diary study was exactly the same as in Study 1. Again, we ideally asked people who were employed in the services sector and who had daily work-related contact with clients, patients, or customers. In sum, we recruited 108 people (response rate: 97.3%; 1,073 daily measurement points). Among the participants, 49.1% were female, and 22.2% worked part time. Mean age was 41.64 (SD = 13.34) years, and mean tenure was 20.44 (SD = 13.47) years. For completing the study, the participants received € 40 (approx. $53.26).

Measures. We assessed NA, sleep quality (morning), emotional dissonance (noon), ego depletion, need for recovery, and engagement (evening) with the same scales from Study 1.

Self-control capacity (peer-rating). We assessed self-control capacity with Tangney et al.'s (2004) self-control capacity scale, which addresses several self-regulatory domains, namely, control over thoughts, emotions, and impulses; motivation regulation; and habit breaking. Because Tangney et al. (2004; pp. 282–283) found that their scale comprises at least five dimensions, we focused on seven items, which refer to one's capacity for conscious attention and behavioral control and one's inclination toward deliberative and nonimpulsive action. Muraven and Baumeister (2000) considered both aspects as core components of trait self-control. Others aspects of this scale (work ethic, healthy habits, and reliability) are domain-specific behavioral manifestations of self-control capacity (de Ridder et al., 2012). Although we could not replicate the factorial structure as reported by Tangney et al. (2004), the reduced 7-item scale yielded an acceptable model fit ($\chi^2(14)$ = 20.57, n.s., RMSEA = .066, CFI = .938, SRMR = .055, AIC = 2084.68, BIC = 2141.01). Models with all items failed to fit the data (e.g., all 15 items loading on one factor: $\chi^2(90) = 275.18$, $p <$ .01, RMSEA = .138, CFI = .467, SRMR = .114, AIC = 4428.16, BIC = 4548.85).

For two reasons, we used a peer-rating procedure. First, different sources of assessment reduce the risk of common method biases. Second, meta-analyses on personality traits have shown that peer-ratings of conscientiousness are valid and reliable (Connelly & Ones, 2010). More importantly, the positive relation of this trait to academic achievement is even stronger for peer-ratings than for self-reports. That is, peers are very good at judging a person's self-discipline, trustworthiness, and tendency to be organized and controlled. Factor analyses suggest that conscientiousness is a manifestation of self-control capacity (Digman, 1997; McCrae & Löckenhoff, 2010; Olson, 2005). Thus, peer ratings on trait self-control should provide valid information about one's ability to exert self-control, especially in social interactions. The participants were asked to select persons for peer rating who knew them very well (e.g., friends, family members, colleagues; Johnson, 2000; Kolar, Funder, & Colvin, 1996). Each selected person evaluated trait self-control of the corresponding participant. We modified the self-control capacity scale items for peer rating by specifically referring to the third person instead of the first person (e.g., "She/he is impulsive," "She/he often interrupts people."). The response format ranged from 1 (*not at all*) to 5 (*very much*). The responses are scored such that higher values indicate higher trait self-control in the target person. The item scores are averaged to generate an overall measure (Bertrams & Dickhäuser, 2009).

Construct validity. We were able to replicate the factor structures provided in Study 1: the MCFA of emotional dissonance indicated a good fit ($\chi^2(10)$ = 32.41, $p <$ .01, RMSEA = .046, CFI = .984, $SRMR_{w/b}$ = .019/.003). The MCFAs of the outcomes (ego depletion, need for recovery, vigor, dedication, and absorption) showed that the 5-factor model provided the best fit with the data ($\chi^2(284)$ = 795.66, $p <$ .01, RMSEA = .041, CFI = .951, $SRMR_{w/b}$ = .034/.053) compared with the other models (4-factor model with both strain outcomes as one factor: $\chi^2(292)$ = 1114.57, $p <$ .01, RMSEA = .051, CFI = .921, $SRMR_{w/b}$ = .040/.055; 3-factor model with one engagement factor: $\chi^2(298)$ = 880.45, $p <$ .01, RMSEA = .043, CFI = .944, $SRMR_{w/b}$ = .038/.061; 2-factor model with one strain factor and one engagement factor: $\chi^2(302)$ = 1194.20, $p <$ .01, RMSEA = .053, CFI = .914, $SRMR_{w/b}$ = .044/.062). Separate tests for the three engagement facets and both strain facets confirm distinctiveness of all outcomes.

Results

Table 4 displays the descriptive statistics and reliabilities for all the study variables. Analyses of variation suggest substantial Level 1 variance in the outcomes (ego depletion: 47.2%; need for recovery: 50.2%; vigor: 33.3%; dedication: 36.1%; absorption: 35.5%).

Test of hypotheses. We tested our hypotheses by comparing four different models: In the null model, we included the intercept as the only predictor. In Model 1, we added the control variables (gender, age, and trait NA). In Model 2, we entered self-control capacity at Level 2 and day-specific emotional dissonance, sleep quality and their interaction at Level 1, to determine slope variance at Level 1 (see Analytical Procedure and Supplemental Analyses sections for Study 1). Finally, in Model 3, we introduced the cross-level interactions (emotional dissonance × self-control capacity, sleep quality × self-control capacity, and emotional dissonance × sleep quality × self-control capacity). To provide an unbiased and pure test of the hypothesized cross-level interactions, both Level 1 variables and their interaction were centered around

Table 4
Means, Standard Deviations, Internal Consistencies (Cronbach's Alpha) and Intercorrelations (Study 2)

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Emotional dissonance—noon	*(.96)*	**−.14**	**.44**	**.44**	**−.19**	**−.12**	**−.16**				
2. Sleep quality—previous night	−.16	*(.64)*	**−.40**	**−.39**	**.26**	**.16**	**.19**				
3. Ego depletion—evening	**.53**	**−.53**	*(.93)*	**.82**	**−.39**	**−.30**	**−.33**				
4. Need for recovery—evening	**.52**	**−.52**	**.88**	*(.92)*	**−.40**	**−.32**	**−.36**				
5. Vigor—evening	−.17	**.29**	**−.35**	**−.37**	*(.88)*	**.85**	**.91**				
6. Dedication—evening	−.09	.15	**−.24**	**−.28**	**.88**	*(.90)*	**.92**				
7. Absorption—evening	−.14	**.20**	**−.29**	**−.33**	**.95**	**.95**	*(.93)*				
8. Self-control capacity (peer-rating)	−.02	.11	−.17	−.13	−.05	.05	−.04	*(.75)*			
9. Negative affect	**.36**	**−.44**	**.54**	**.51**	**−.27**	**−.22**	**−.25**	−.15	*(.77)*		
10. Age	−.03	−.05	.01	.04	.12	.02	.06	−.11	.09	—	
11. Gender[a]	.06	.15	.06	.04	−.02	.00	.01	−.08	−.16	−.08	—
M	2.13	11.99	1.68	1.80	3.21	3.17	3.16	3.57	2.38	41.64	1.51
SD	0.81	1.85	0.51	0.54	1.17	1.21	1.19	0.65	0.62	13.34	0.50

Note. Cronbach's alpha for day-level variables are mean internal consistencies averaged over all measurement days. Correlations below the diagonal are person-level correlations ($N = 108$). Correlations above the diagonal are day-level correlations ($N = 1{,}073$). Numbers in bold $p < .05$.
[a] Gender (1 = female, 2 = male).

the person-mean (centering within cluster; Enders & Tofighi, 2007; pp. 132–134). Before analyzing the four models, we tested whether the relations of emotional dissonance and sleep quality to all five outcomes and their interactions at Level 1 considerably vary across the persons (Level 2). As in Study 1, the log-likelihood difference tests indicated significant improvements in data fit of the model with random slopes as compared with fixed slopes for emotional dissonance, sleep quality, and their interaction (ego depletion: $\Delta\text{-}2^*\log(\Delta df) = 26.03$ (3); need for recovery: $\Delta\text{-}2^*\log(\Delta df) = 19.35$ (3); vigor: $\Delta\text{-}2^*\log(\Delta df) = 39.02$ (3); dedication: $\Delta\text{-}2^*\log(\Delta df) = 27.31$ (3); absorption: $\Delta\text{-}2^*\log(\Delta df) = 29.64$ (3); all $ps < .01$). In addition, the sum of slope variations also provide evidence for potential cross-level interactions (ego depletion (percentage of slope variance relative to total variance): $\tau^2_{Slopes} = 0.04$ (9%); need for recovery: $\tau^2_{Slopes} = 0.04$ (8%); vigor: $\tau^2_{Slopes} = 0.14$ (7%); dedication: $\tau^2_{Slopes} = 0.14$ (7%); absorption: $\tau^2_{Slopes} = 0.14$ (7%)).

As in Study 1, day-specific emotional dissonance, sleep quality and their interaction term predicted all five outcomes with signs corresponding to expectations (see Table 5 and 6). Hypothesis 3 predicted that trait self-control moderates the day-specific interaction of emotional dissonance and sleep quality on ego depletion and need for recovery. As shown in Table 5, the three-way interaction was significant for both outcomes. For ego depletion, Model 3 provided a significantly better fit compared with Model 2, whereas no significant improvement in model fit was found for need for recovery. Figure 3 depicts the three-way interactions on both outcomes: For those with high self-control capacity, the interaction of emotional dissonance and sleep quality on both outcomes was more pronounced as compared with low trait self-control. That is, in cases of high trait self-control, sleep quality attenuated the positive relations of emotional dissonance to ego depletion and need for recovery. In contrast, when trait self-control was low, emotional dissonance was significantly and positively related to both outcomes regardless of sleep quality. Thus, data of Study 2 lend strong support for Hypothesis 3a and partial support for Hypothesis 3b (because of the insignificant difference test). Hypothesis 4 proposed that trait self-control moderates the interaction of day-specific emotional dissonance and sleep quality on work engagement. As Table 6 displays, the three-way interactions were significant for all three engagement facets. Each Model 3 yielded a significant improvement in data fit. Figure 4 demonstrates patterns of the three-way interactions: When trait self-control was high, the negative relations of emotional dissonance to engagement were attenuated as a function of day-specific sleep quality. In contrast, for those with low self-control capacity, sleep quality did not moderate the negative relations of emotional dissonance to all three engagement components. In conclusion, the three-way interactions patterns were also consistent with Hypotheses 4a–c.[1]

General Discussion

A growing body of empirical evidence substantiates the theoretical proposition that emotional labor can involve self-control and thus consume a limited regulatory resource, especially when employees perceive high discrepancies between felt and required emotions. On the basis of this proposition, we sought to identify moderators, which determine day-specific availability as well as usage of that resource and thus, have the potential to attenuate the negative relations of day-specific emotional dissonance to psychological well-being.

Theories on sleep quality and sleep disruption (Beebe & Gozal, 2002) as well as models on self-control (Muraven & Baumeister, 2000) strongly suggest that both day-specific sleep quality and trait self-control counteract the deleterious effects of emotional dissonance on strain (ego depletion and need for recovery) and work engagement (vigor, dedication, and absorption). In two diary studies, we found day-specific sleep quality to attenuate the negative relations of emotional dissonance to daily well-being. In Study 2, we tested whether self-control capacity moderates the day-specific interaction of emotional dissonance and sleep quality on well-being. In support of our

[1] We also tested the three-way interactions with the full self-control scale (see Measures section [self-control capacity] for Study 2). Our supplementary analyses indicated that the three-way interaction was significant in the prediction of day-specific ego depletion ($p < .01$), vigor ($p < .05$), and absorption ($p < .05$) with patterns corresponding to our hypotheses.

Table 5
Multilevel Estimates for Models Predicting Ego Depletion and Need for Recovery (Study 2)

	Ego depletion								Need for recovery							
	Null model		Model 1		Model 2		Model 3		Null model		Model 1		Model 2		Model 3	
Parameter	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)
Fixed effects																
γ_{00} = Intercept	1.68**	(0.05)	1.46**	(0.13)	1.48**	(0.13)	1.48**	(0.13)	1.80**	(0.05)	1.60**	(0.14)	1.61**	(0.14)	1.61**	(0.14)
γ_{01} = Gender			0.15	(0.08)	0.14	(0.08)	0.14	(0.08)			0.14	(0.09)	0.13	(0.09)	0.13	(0.09)
γ_{02} = Age			−0.00	(0.00)	−0.00	(0.00)	−0.00	(0.00)			−0.00	(0.00)	−0.00	(0.00)	−0.00	(0.00)
γ_{03} = Negative Affect			0.46**	(0.08)	0.45**	(0.07)	0.45**	(0.07)			0.46**	(0.09)	0.46**	(0.09)	0.46**	(0.09)
γ_{04} = *Self-control capacity (SCC)*					−0.06	(0.07)	−0.06	(0.07)					−0.04	(0.07)	−0.04	(0.07)
γ_{10} = Emotional dissonance (EmoDis)					0.19**	(0.03)	0.19**	(0.03)					0.24**	(0.03)	0.24**	(0.03)
γ_{20} = Sleep quality (SQ)					−0.05**	(0.01)	−0.05**	(0.01)					−0.06**	(0.01)	−0.05**	(0.01)
γ_{30} = EmoDis × SQ					−0.03**	(0.01)	−0.03**	(0.01)					−0.03**	(0.01)	−0.03**	(0.01)
γ_{14} = EmoDis × SCC							−0.13	(0.07)							−0.04	(0.08)
γ_{24} = SQ × SCC							0.01	(0.01)							−0.00	(0.01)
γ_{34} = EmoDis × SQ × SCC							−0.03**	(0.01)							−0.02*	(0.01)
Random effects																
σ^2 = Residual variance at Level 1	0.22		0.22		0.17		0.16		0.27		0.27		0.20		0.20	
τ^2_{Slopes} = Residual variance of the slopes[ab]					0.04		0.03						0.04		0.04	
$\tau^2_{Intercept}$ = Residual variance at Level 2	0.24		0.16		0.16		0.16		0.26		0.18		0.19		0.19	
—2*log (lh)	1,673.95		1,634.22		1,453.32		1,441.11		1,885.38		1,850.55		1,657.44		1,654.04	
Diff—2*log (lh)			39.73**		180.90**		12.21**				34.83**		193.11**		3.40	
Number of paramaters	3		6		13		16		3		6		13		16	

Note. Gender, age, negative affect and self-control capacity are person-level (Level 2) variables; all other predictor variables are day-level (Level 1) variables.
[a] We summed up all three random slopes (covariances among the random slopes and intercepts were restricted to be zero; see Supplemental Analyses section for Study 1). [b] On the basis of non-restricted covariances, parameter estimates were identical to those reported (Pinheiro & Bates, 2000).
* $p < .05$. ** $p < .01$.

Table 6
Multilevel Estimates for Models Predicting Work Engagement (Study 2)

	Vigor								Dedication			
	Null model		Model 1		Model 2		Model 3		Null model		Model 1	
Parameter	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)
Fixed effects												
γ_{00} = Intercept	3.21**	(0.11)	3.39**	(0.34)	3.42**	(0.34)	3.42**	(0.34)	3.17**	(0.12)	3.29**	(0.36)
γ_{01} = Gender			−0.12	(0.21)	−0.14	(0.21)	−0.14	(0.21)			−0.08	(0.22)
γ_{02} = Age			0.01	(0.01)	0.01	(0.01)	0.01	(0.01)			0.00	(0.01)
γ_{03} = Negative affect			−0.55**	(0.19)	−0.57**	(0.18)	−0.57**	(0.18)			−0.44*	(0.17)
γ_{04} = Self-control capacity (SCC)					−0.15	(0.15)	−0.15	(0.15)				
γ_{10} = Emotional dissonance (EmoDis)					−0.23**	(0.06)	−0.24**	(0.06)				
γ_{20} = Sleep quality (SQ)					0.08**	(0.02)	0.08**	(0.02)				
γ_{30} = EmoDis × SQ					0.06**	(0.02)	0.05**	(0.01)				
γ_{14} = EmoDis × SCC							0.25*	(0.11)				
γ_{24} = SQ × SCC							−0.01	(0.02)				
γ_{34} = EmoDis × SQ × SCC							0.06**	(0.02)				
Random effects												
σ^2 = Residual variance at Level 1	0.65		0.65		0.48		0.48		0.77		0.77	
τ^2_{Slopes} = Residual variance of the slopes[ab]					0.14		0.12					
$\tau^2_{Intercept}$ = Residual variance at Level 2	1.30		1.17		1.18		1.18		1.37		1.30	
—2*log (lh)	2,905.88		2,895.20		2,725.57		2,710.05		3,084.09		3,078.59	
Diff—2*log (lh)			10.68*		169.63**		15.52**				5.50	
Number of parameters	3		6		13		16		3		6	

Note. Gender, age, negative affect and self-control capacity are person-level (Level 2) variables; all other predictor variables are day-level (Level 1) variables.
[a] We summed up all three random slopes (covariances among the random slopes and intercepts were restricted to be zero; see Supplemental Analyses section for Study 1). [b] On the basis of non-restricted covariances, parameter estimates were identical to those reported (Pinheiro & Bates, 2000).
* $p < .05$. ** $p < .01$.

predictions, when trait self-control was high, high day-specific sleep quality attenuated the positive relations of emotional dissonance to need for recovery and ego depletion. However, in cases of low trait self-control, sleep quality did not interact with dissonance to predict strain. We found similar three-way interaction patterns in predicting state work engagement: those with low self-control capacity reported decrements in day-specific work engagement with increasing emotional dissonance regardless of their sleep quality of the previous night. When trait self-control was high, the negative relations of emotional dissonance to engagement were attenuated as s function of sleep quality.

Theoretical Implications

Our findings have several implications for research on emotional labor and occupational health. First, the protective function of sleep quality in the daily emotional labor process extends recent findings on the restoring function of sleep. For example, Sonnentag and Binnewies (2013) found that sleep quality buffers the positive effects of NA during the evening on NA on the next morning. According to our findings, the daytime effects of sleep quality also manifest in high well-being even when employees experience high discrepancies between felt and required emotions. Thus, and consistent with theories on sleep quality and sleep disruption, sleep quality facilitates not only recovery from high strain on the previous day but also emotion regulation during the following day.

Second, the interactions of sleep quality and emotional dissonance on daily work engagement provide further insight into the psychological function of regulatory resources for work engagement (Sonnentag & Grant, 2012). Drawing from the finding that resource depletion at the morning (due to low sleep quantity) is negatively related to engagement at the afternoon, Lanaj, Johnson, and Barnes (2014; p. 20) pointed out that "the resource perspective provides a more holistic understanding of the factors that predict daily work engagement." According to our results, work engagement results from a combination of several factors, which influence the daily resource levels. Thus, and in line with the notion that regulatory resources influences motivational states of vitality, involvement, and being engrossed, daily work engagement depends on the interplay of psychological mechanisms, which enable employees to invest their limited resources in their job role and ignore nonwork distractions.

Third, the moderating effects of trait self-control advance our knowledge about individual differences in how people cope with emotional dissonance. On the one hand, self-control capacity attenuated the negative relations of emotional dissonance to engagement. This finding is consistent with Schmidt et al.'s (2012) argument that compared with low trait self-control, those with high self-control capacity are less vulnerable to the depleting effects of job-related self-control demands because they are better able to regulate their behavior, emotions, and motivational impulses. In support of this argument, our results show that trait self-control stabilizes work engagement when daily emotional dissonance is high. On the other hand, trait self-control moderates the day-specific interaction of sleep quality and emotional dissonance on well-being. This result indicates that on days with high emotional dissonance, individuals with high self-control capacity benefit more from high sleep quality than do individuals with low trait self-control. Interestingly, high self-control capacity did not prevent employees from being strained when they experienced high emotional dissonance and low sleep quality. Consistent with the notion of conservation and allocation of resources, we argue that daily availability and efficient usage of limited regulatory resources are sine qua non (and together sufficient conditions) for

Dedication				Absorption							
Model 2		Model 3		Null model		Model 1		Model 2		Model 3	
β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)	β	(*SE*)
3.28**	(0.37)	3.28**	(0.37)	3.17**	(0.12)	3.25**	(0.36)	3.28**	(0.36)	3.28**	(0.36)
−0.08	(0.23)	−0.08	(0.23)			−0.06	(0.22)	−0.08	(0.22)	−0.08	(0.22)
0.00	(0.01)	0.00	(0.01)			0.01	(0.01)	0.01	(0.01)	0.01	(0.01)
−0.44*	(0.17)	−0.44*	(0.17)			−0.51**	(0.19)	−0.53**	(0.19)	−0.53**	(0.19)
0.03	(0.15)	0.03	(0.16)					−0.14	(0.15)	−0.14	(0.15)
0.22**	(0.06)	−0.23**	(0.06)					−0.22**	(0.06)	−0.23**	(0.06)
0.07**	(0.02)	0.07**	(0.02)					0.07**	(0.01)	0.06**	(0.01)
0.07**	(0.01)	0.07**	(0.01)					0.07**	(0.02)	0.07**	(0.01)
		0.27*	(0.12)							0.26*	(0.10)
		−0.00	(0.02)							−0.01	(0.02)
		0.04*	(0.02)							0.06**	(0.02)
0.63		0.63		0.77		0.74		0.60		0.60	
0.14		0.13						0.14		0.12	
1.31		1.31		1.37		1.24		1.24		1.24	
2,955.88		2,944.41		3,035.14		3,026.05		2,893.77		2,877.81	
122.71**		11.47**				9.09*		132.28**		15.96**	
13		16		3		6		13		16	

successful coping with high emotional dissonance and preventing impaired psychological well-being. High sleep quality increases the availability of limited resources and trait self-control ensures efficient usage of that resource.

Finally, our findings invite scholars to reconsider the psychological role of protective factors in coping with job demands. Most studies on protective factors have focused on two-way interactions of personal or job resources and demands on well-being with divergent findings (Bakker, 2011; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010). In an attempt to integrate these findings in an overarching theory, de Jonge and Dormann (2006) have proposed the triple-match principle, according to which a buffering effect of protective factors will be most likely emerge, if demands, resources, and outcomes conceptually correspond to each other or draw on the same psychological domain (that is, match to each other). For example, cognitive resources should rather attenuate the effects of cognitive demands on cognitive strains than emotional or physical resources (Van den Ven & Vlerick, 2013).

However, the present interactions involve variables from different psychological domains (emotional dissonance: emotional domain; sleep quality: physical domain; trait self-control: behavioral/cognitive domain) and thus, are not entirely consistent with the idea of triple-match. Our findings complement a series of studies, which also demonstrate interactions of variables from different domains (e.g., Dollard, Tuckey, & Dormann, 2012; Meier, Semmer, Elfering, & Jacobshagen, 2008). For example, Dollard et al. (2012) found psychosocial safety climate to moderate the interaction of emotional demands and resources on distress, whereas Meier et al. (2008) reported that high self-efficacy enables job control to buffer the relations of demands to affective strain. In extending the theoretical notion of triple-match, we argue that the match of demands, protective factors, and outcomes is not limited to (surface-level) psychological domains, but is also applicable to (deep-level) underlying psychological mechanisms, which determine the observed moderating effects. In our case, all variables refer to the functioning and availability of regulatory resources. In comparison, the findings of Dollard et al. (2012) reflect social-contextual dynamics of managerial support (psychosocial safety) in enabling the usage of protective factors to cope with job demands, whereas the study of Meier et al. (2008) revealed the psychological function of perceived action control (self-efficacy and job control) in facing job demands. In conclusion, scholarly understanding of occupational health may benefit from a clearly defined "mechanistic match" of demands, protective factors, and outcomes.

Limitations and Avenues for Future Research

Our research is subject to several limitations. First, our study variables were assessed with self-report measures. Thus, common method variance may have biased the parameter estimates (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Scholars often cast doubt on self-report data because even interactions may partially reflect semantic overlaps (Spector, 1994). To address this issue, we used peer ratings for self-control capacity and thus, limited the possibility of mutual contamination of the constructs. However, future research should also consider physiological indicators, such as cortisol awakening response (e.g., Stetler & Miller, 2005), to assess stress or impaired sleep.

Second, the negative relations of daily emotional dissonance to well-being could be partially (or fully) explained by mood, which may have caused both variables to be related. However, we did not assess day-specific mood and thus, were not able to rule out that daily mood drives the emotional labor process. To address this issue, we examined the role of trait NA, because day-specific

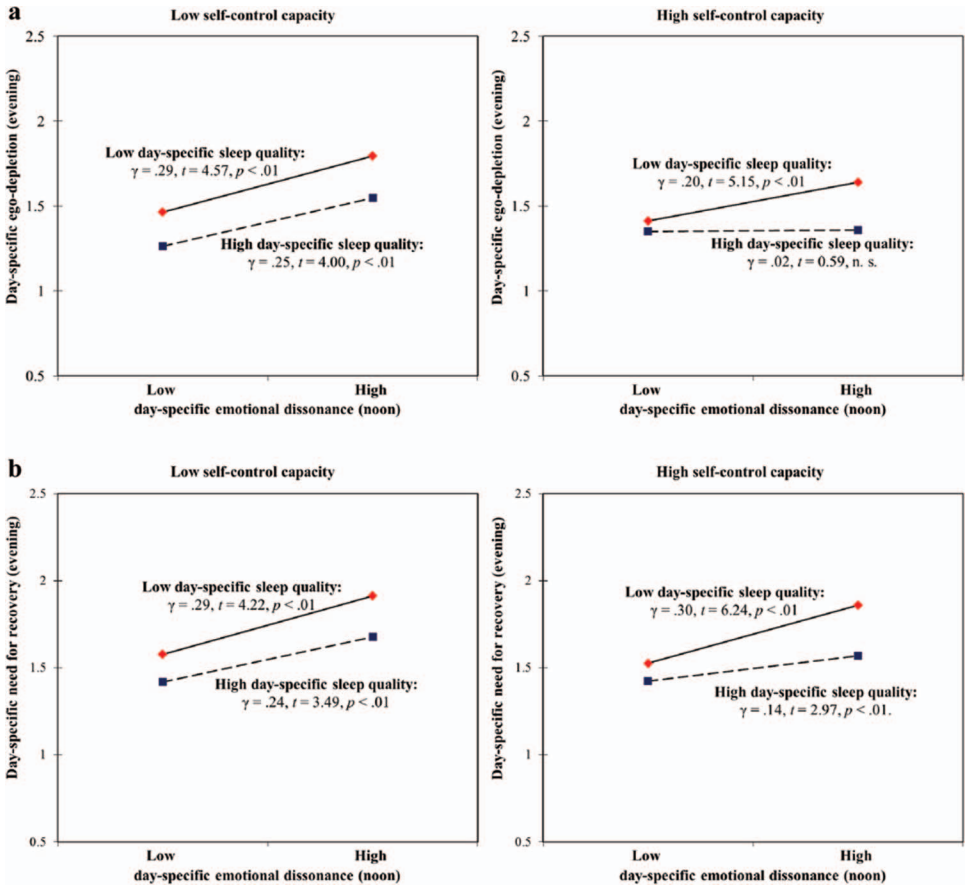

Figure 3. Interaction effects of emotional dissonance, sleep quality, and self-control capacity on ego depletion (Figure 3a) and need for recovery (Figure 3b), Study 2. See the online article for the color version of this figure.

changes in mood vary as a function of interindividual differences in affectivity (Ilies, Dimotakis, & Watson, 2010). Thus, we controlled for individual variation in the level of daily emotional dissonance and well-being. In addition, we further tested whether trait NA moderated the negative relations of emotional dissonance to well-being (with all other variables and interactions included). In Study 1, NA amplified the negative relation of emotional dissonance to vigor, whereas the positive relation of dissonance to need for recovery was amplified by NA, in Study 2. Thus, our results indicate that one's inclination toward negative mood partially explains the effects of emotional dissonance on well-being. However, given that mood exhibits high intraindividual variation (Sonnentag & Grant, 2012), we only provided a proximal test of a third variable confoundation of the relations examined.

Nevertheless, because all predicted interactions of emotional dissonance, sleep quality and trait self-control remained significant in the additional analyses, we argue that regardless of the level of daily mood, discrepancies between felt and required emotions tax limited resources and thus, cause impaired well-being. According to Tice and Bratslavsky (2000), the self-control pressure on limited regulatory resources indeed increases with negative mood, which may heighten the likelihood of high emotional dissonance and high ego depletion during the working day (e.g., Sonnentag & Binnewies, 2013). However, the underlying mechanism of diminished resources would still explain the effects of emotional dissonance on well-being, even when daily NA is high (see also Lanaj et al., 2014; p. 16). Thus, besides sleep quality, daily mood can be viewed as another factor, which determines day-specific availability of resources for self-control functioning (Robinson & Demaree, 2007).

Third, although we assessed sleep quality, emotional dissonance, and well-being at different points in time during the working days, our correlational data structure did not permit strong causal conclusions. For example, impaired well-being may have caused emotional dissonance during the day. This concern is further accentuated by the time frame that was used to measure work engagement ("during the day today"). In addition, Sonnentag et al. (2012) provided evidence on the reciprocal relations of day-specific recovery experiences to engagement, indicating that low engagement can diminish the availability of resources. To test opposite causal directions, we analyzed relations of all five outcomes and sleep quality to emotional dissonance. While the five outcomes significantly predicted emotional dissonance, no interactions of well-being and sleep quality on emotional dissonance were found in Study 1. In Study 2, only absorption interacted with sleep quality to predict emotional dissonance, whereas all other interactions (including the three-way interactions) were not significant (with random slopes, some two-way interactions were sig-

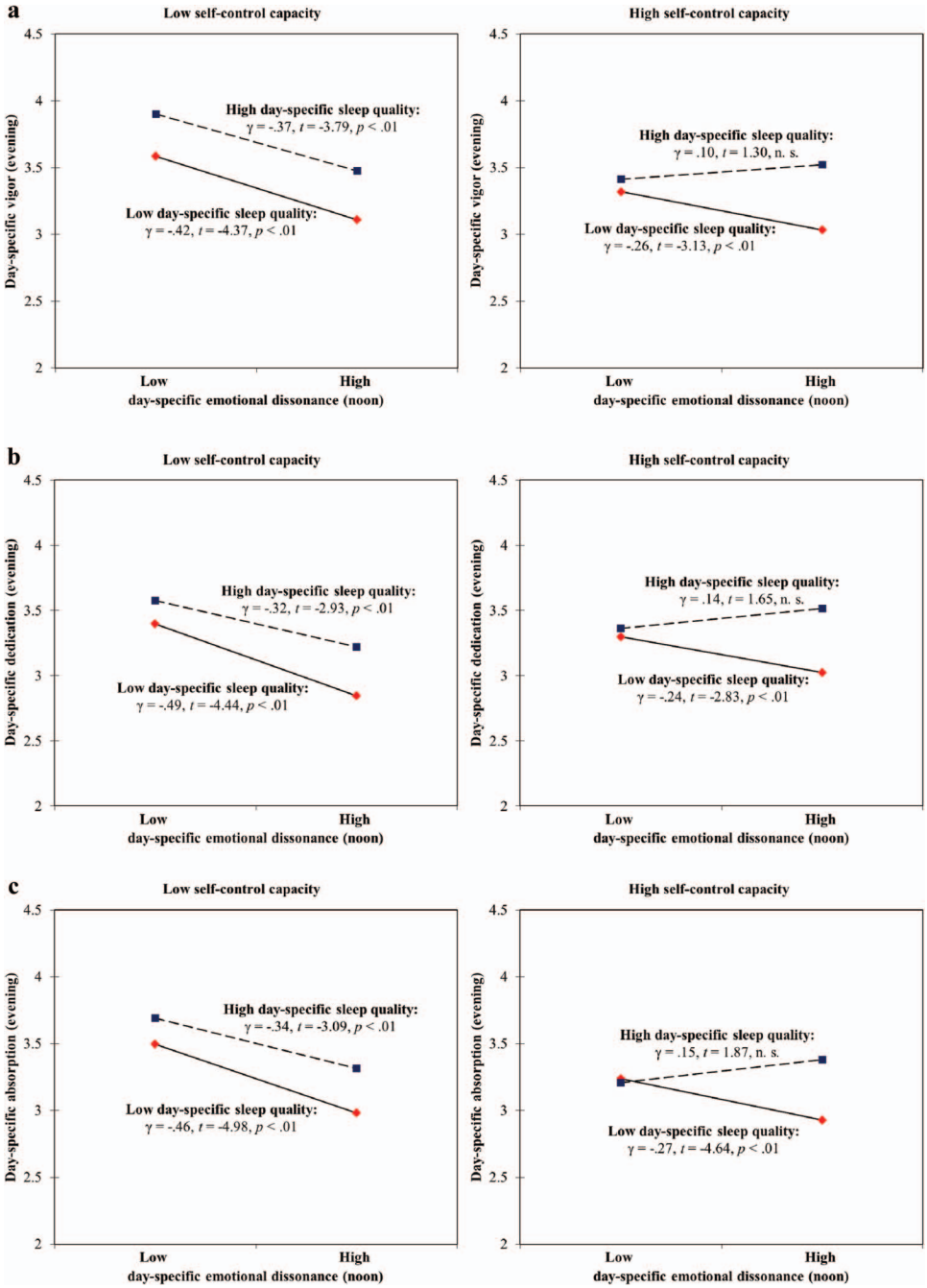

Figure 4. Interaction effects of emotional dissonance, sleep quality, and self-control capacity on ego depletion (Figure 4a), vigor (Figure 4b) and absorption (Figure 4c), Study 2. See the online article for the color version of this figure.

nificant at $p < .05$). Although we cannot fully rule out reverse causation, our analyses provide some evidence for hypothesized directions of causality. Furthermore, past research has strongly suggested that emotional dissonance and other demands result in impaired well-being, not vice versa (Diestel & Schmidt, 2011a, 2011b; Sonnentag, Binnewies, & Mojza, 2010). Thus, low resources owing to, for example, impaired sleep may increase the likelihood of loss spirals involving reciprocal relations among demands and well-being. However, job demands most likely drive these relationships, which are further influenced by impaired well-being.

Finally, our findings suggest job performance as an outcome of emotional dissonance, sleep quality, and trait self-control. In our study, daily engagement reflected the combined effects of these three variables, and past research has revealed that engagement is strongly related with performance (Christian, Garza, & Slaughter,

2011). In light of the relevance of self-control for action regulation at work (Hacker, 2005), fluctuations in performance should also be influenced by sleep quality and self-control capacity (Halbesleben & Wheeler, 2011).

Practical Implications

Our results suggest that people who sleep better and have high trait self-control cope best with emotional dissonance. In the long run, sleep quality can be enhanced by sleep hygiene programs that address sleep sufficiency (average sleep duration) and consistency (low variation in sleep duration). Such programs may include preventive tactics, such as sleep awareness, sleep rituals, and insomnia-reduction strategies (e.g., Brown, 2004). Whereas our theoretical framework that explains the moderating effect of sleep quality has been only tentatively tested on the basis of natural variation in sleep quality, such programs would also provide an internally valid design, which allows for testing causality on the basis of comparisons between those, who undergo a sleep training and a waiting group.

However, in occupations with stressful time schedules, shifts, or serviceability, organizational support systems and psychosocial safety climate (Dollard et al., 2012) are imperative to stabilize well-being when sleep quality is low (Christian & Ellis, 2011). Support systems and safety climate foster awareness of impaired sleep and the associated risks of low self-control, and provide opportunities to recover from high stress. Because sleep consistency reduces day-specific fluctuations in sleep quality (Barber et al., 2010), our results also suggest that organizations with night shifts provide constant shift schedules (e.g., over the period of a week), which enable employees to adapt their sleep routines and thus their circadian rhythms to required attendance times. Given that many organizations (hospitals or nursing homes) change shift schedules quite frequently (Gumenyuk, Roth, & Drake, 2012), service delivery or other forms of interaction with clients should account for disproportionally high strain because of high emotional labor demands. Thus, those organizations are well advised to ensure high sleep quality through constant shift schedules.

In addition, although self-control capacity is considered as a stable trait, training efforts may improve one's ability to exert self-control. Intervention studies aiming to enhance trait self-control have shown that repeated and controlled exertion of self-control can lead to improved behavioral regulation, executive functioning, and emotion control (Baumeister, Gailliot, DeWall, & Oaten, 2006). For example, Oaten and Cheng (2007) reported that students who participated in such an intervention showed higher performance on laboratory self-control tasks, not only in the trained self-control domain but also in a wide range of other domains, such as emotion control. Thus, the development of training interventions tailored to, for example, emotional labor in service jobs would be a promising direction for future research.

Finally, self-control capacity and sleep quality are inherently related to the psychological domains of human functioning and, together, form a strong resource basis for effective, goal-directed self-control (Hagger et al., 2010). In particular, improvements in both sleep consistency and sleep sufficiency enhance self-control capacity in the long run, whereas high self-control capacity fosters sleep hygiene, which promotes daily resource recovery (Barber et al., 2010). Thus, to improve both sleep hygiene and self-control capacity, occupational health programs may benefit from our finding that both sleep quality and trait self-control jointly interact with job demands to influence psychological well-being.

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