

The effect of problem-solving work reflection during nonwork time on employees, stress recovery: a daily study

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Abstract: Employees are generally subjected to intense work demands in today's increasingly competitive environment, and stress that is not promptly addressed can have a direct impact on their psychological state and the following day's work performance. Consequently, managers are concerned with how employees release work-related stress after hours and replenish their psychological resources to face new work challenges. It is unavoidable to still engage in work-related thinking activities during non-working hours, and the circumstances under which such thinking is conducive to stress recovery are worthy of investigation. On the basis of the resource conservation theory, this study aims to examine the effect of employees' problem-solving work reflection during non-work time on stress recovery.

Using an experience sampling design across five consecutive workdays (79 employees, 393 data points), we found that employees' after-work problem-solving work reflection was positively associated with end-of-day vigor and self-efficacy; individuals' segmentation preferences negatively moderated this relationship. For employees with high segmentation preferences, the relationship between after-hours problem-solving work reflection and positive affect, vitality, and self-efficacy was weaker.

This study enhances and broadens the scope of existing research in the field of stress recovery by examining the dynamic effects of work-related recovery activities on psychological resources and the moderating role of personality factors in them, contributes to the advancement of research in the field of stress recovery and makes it more comprehensive.

Keywords: stress recovery; problem-solving work reflection; segmentation preference; experience sampling methodology

1. Introduction

How to motivate employees to reduce stress, recover psychological resources, and regain enthusiasm after a demanding workday has become an important issue in contemporary human resource management. "Stress recovery" refers to the process of restoring individual functioning to pre-stress levels after the stressor has disappeared, and numerous studies have demonstrated that stress recovery is crucial for employees' physical and mental health, and successful recuperation enables workers to face new challenges at work, prevents the continued accumulation of fatigue, and promotes better health.

Most of the current research on stress recovery has focused on non-work-related experiences such as psychological disengagement, relaxation, mastery, and control, all of which emphasize that employees are temporarily removed from work demands and do not engage in work-related thoughts during non-work time. Nonetheless, especially these days, with the flexibility and permeability of work-family boundaries, work-related activities should also be investigated as a possible recovery mechanism, as employees frequently continue to think about their jobs after hours. The present study focused on an adaptive work-solving work reflection behavior (problem-solving work reflection) in an attempt to investigate its influence on employee stress recovery, and to examine the moderating role of individual work-life partitioning preferences in the stress recovery process.

2. Hypothesis Development

Problem-solving work reflection, in which employees objectively review or evaluate problems encountered at work during leisure time to enhance work deficiencies and find problem-solving strategies, is distinct from emotional rumination in that it does not provoke negative emotional responses in individuals, so it may be a positive experience that aids in recovery. The present study refers to previous research on stress recovery and selects individuals' psychological resources before bedtime each night as an indicator of stress recovery. "Psychological resources" are personal characteristics, conditions, or energies that individuals perceive as contributing to the achievement of their goals. This study focused on positive affect, vitality, and work efficacy, which have received considerable attention in the field of stress recovery.

In accordance with resource conservation theory, if employees re-examine and reassess work matters after work hours, they may be able to make sense of the larger number of work tasks, thereby mitigating the adverse effects of work demands, stopping further depletion of resources by stressors, and may provide opportunities to replenish new psychological and emotional resources, bringing the individual's physical and mental systems back to pre-stress levels. Additionally, if workers can concentrate on the aspects of their work that were beneficial to them on the condition that reviewing their work after hours and explaining the problems they positively encountered during the day, this way of thinking will enable employees to transform problematic events at work into positive ones, thus contributing to their positive affect before bedtime.

Hypothesis 1a: On daily basis, employees' problem-solving work reflection after work will be positively related with their positive affect before sleep.

Vigor is a state in which individuals feel full of energy and stamina and can think quickly. According to the theory of resource conservation, if employees actively consider problem-solving strategies after work and find a feasible solution to implement them, their energy reserves may be restored, causing them to feel more energized and to think more rapidly. Some research suggested that individuals engaging in problem-solving work reflection in their spare time may be beneficial to their health and well-being, and it may help people reduce fatigue and facilitate individual recovery.

Hypothesis 1b: Employees' after-work problem-solving work reflection will be positively related with their pre-bedtime vigor.

Self-efficacy is a core dimension of an individual's psychological capital, and this study focuses on employees' work efficacy, which refers to an individual's confidence in his or her ability to perform successfully and effectively in a variety of work situations. Problem-solving work reflection involves employees considering solutions to problems they encounter at work during their free time, moreover, effective problem-solving can mitigate the negative effects of workplace stress, which can increase their confidence in their work abilities. confidence in their workability. Additionally, problem-solving work reflection involves planning for the upcoming work, a process that enables workers to prepare for upcoming work, eliminating confusion and anxiety when faced with the task, and thus boosting their confidence in their upcoming work duties.

Hypothesis 1c: Employees' after-work problem-solving work reflection will be positively related to their pre-bedtime self-efficacy.

Due to inter-individual disparities, the same recovery mechanism may have distinct recovery effects for various individuals. In accordance with the boundary theory, one's segmentation preferences influence one's work-family boundary management through specific rules and practices. Individuals with high segmentation preferences incline to keep the work and family domains as differentiated as possible, creating and maintaining psychological, cognitive, or behavioral boundaries between the two domains, thus preventing work-related tasks or thoughts from entering the family sphere., they prefer to stay away from work-related thoughts at home and devote themselves to family life. Consequently, for such individuals, engaging in problem-solving work reflection after work each day may prevent them from establishing a mental divide between work and home, which creates a mismatch with their preferences and may diminish their recovery effects. Furthermore, individuals with high segmentation preferences, do not prefer to bring work matters home to deal with and try to avoid contemplating work difficulties while resting at home, so performing daily problem-solving work reflection at the end of the day will continually transfer work-related stressors that people perceive as harmful to them to the home domain, which may somewhat hinder them from achieving recovery.

In summary, this study proposed that after-hours engagement and work-related recovery experiences have distinct recuperative effects for employees with distinct segmentation preferences. Specifically, engaging in problem-solving work reflection may be more effective for individuals with lower segmentation preferences, i.e., those with low segmentation preferences may experience greater positive emotion, vitality, and self-efficacy when engaging in problem-solving work reflection in comparison to individuals with higher segmentation preferences.

Hypothesis 2: The daily positive relation of problem-solving work reflection with end-of-day personal resource will be stronger for employees with high (vs. low) segmentation preferences.

3. Method

3.1 Sample and Procedure

We recruited participants from part-time MBA students. The participants completed the baseline measures including demographic information (e.g., age, gender, education level, average working hours, marital status) and trait variables (negative emotional tendency, segmentation preference). A week after the initial survey, participants continued to participate in daily surveys online for five consecutive workdays. Participants completed two short daily surveys each day. At the end of each workday before going home (T1), participants reported their work demand throughout the day. The Time 2 survey was sent at 9:00 PM. Participants were invited to complete the questionnaire before sleep. The questions included their recovery experiences (problem solving work reflection, non-work related recovery activities) and their current personal resource (emotional state, vigor state, felt work efficacy).

A total of 79 individuals participated throughout the research and passed the screening process, yielding 393 daily data. The average age of participants was 27.76 years old (SD = 4.60), with 60.8% being female. The final sample represented a variety of industries and jobs, including manufacturing, education, management, finance, sales, HR, etc.

3.2 Measurements:

Problem-solving work reflection after work: We use problem-solving pondering subscale of Work-Related Rumination Questionnaire to measure daily problem-solving work reflection. Participants answered five items on a 5-point scale (1 = strongly disagree to 5=strongly agree). The average Cronbach's α across observations was 0.880.

End-of-day positive affect: We used 6 items from PANAS scale to measure end-of-day positive affective states. Sample affective descriptors are "distressed, upset, irritable, nervous, jittery, afraid". Participants reported their current felt emotion state on a 5-point scale (1

= strongly disagree to 5=strongly agree). The average Cronbach's α across observations was 0.896.

End-of-day vigor: We used Shirom-Melamed Vigor Measure (SMVM) to assess the end-of-day vigor state. Participants reported their current felt vigor state on a 5-point scale (1 = strongly disagree to 5=strongly agree). Sample items included "I feel vigorous" and "I feel I can think rapidly". The average Cronbach's α across observations was 0.947.

End-of-day work efficacy: Participants reported their work efficacy on two items on a 5-point scale (1 = strongly disagree to 5=strongly agree). Sample items included "I am confident about my ability to do my job" and "I am self-assured about my capabilities to perform my work activities". The average Cronbach's α across observations was 0.952.

Work-home Segmentation preference: We measured personal segmentation preferences using 4-item Segmentation Preference Scale. Participants indicated their agreement (1 = strongly disagree; 7 = strongly agree) with statements such as "I don't like work issues creeping into my home life.". The average Cronbach's α across observations was 0.848.

Control variables: Control variables included age, gender, marital status, negative affect disposition, daily work demand, daily non-work recovery experience.

4.Results

Correlation analysis showed that problem-solving work reflection after work was positively associated with end-of-day positive affect($r = 0.31, p < 0.01$), vigor($r = 0.34, p < 0.01$) and work-efficacy($r = 0.21, p < 0.01$). The results of null model test showed that it was appropriate to use a multilevel approach to test the current hypotheses. Then we used Hierarchical Linear Modeling (HLM) to test the main effect. At the within-person level (Level 1), we included all the with-in level variables, and at the between-persons level (Level 2) we included representative demographic variables. Table 1 shows the standard coefficients for the model. The relation between employees' problem-solving work reflection after work and their end-of-day positive affect was not significant($\gamma = 0.123, p > 0.05$), Hypothesis 1a was not supported. However, problem-solving work reflection was positively associated with end-of-day vigor($\gamma = 0.254, p < 0.05$) and work-efficacy($\gamma = 0.178, p < 0.05$), Hypothesis 1b and 1c were supported.

Table 1 Results From Hierarchical Linear Modeling Analysis

	positive affect	vigor	work-efficacy
	Model 1	Model 2	Model 3
Control variable			
Gender (Level 2)	-0.151	-0.248	-0.026
Age (Level 2)	0.003	0.007	0.032
Number of children (Level 2)	0.025	0.009	0.159
Negative affect disposition (Level 2)	-0.367***	-0.581***	-0.375***
Average work time (Level 2)	-0.069	-0.283	0.213
Daily work demand (Level 1)	-0.051	-0.013	-0.019
Non-work recovery experiences (Level 1)	0.486***	0.636***	0.288*
Independent variable			
problem-solving work reflection (Level 1)	0.123	0.254*	0.178*
Level 1 R2	0.244	0.294	0.142
Level 2 R2	0.012	0.165	0.009

note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Next, we tested the moderating effect by adding segmentation preference to Level 2. Results showed that the interactive effect of segmentation preference and problem-solving work reflection negatively predicted positive affect($\gamma = -0.206, p < 0.05$). Simple slope tests in multilevel modeling indicated that problem-solving work reflection was a positive predictor of positive emotion state before sleep among individuals with low segmentation preference($\gamma = 0.433, p < 0.01$), for individuals with high segmentation preference, the effect of problem-solving work reflection on positive affect was not significant($\gamma = -0.011, p > 0.05$). Similarly, segmentation preference moderated the relationship between problem-solving work reflection and vigor and efficacy before sleep($\gamma = -0.242, p < 0.05$; $\gamma = -0.135, p < 0.01$), for

employees with low segmentation preference, problem-solving work reflection enhanced their vigor state ($\gamma = 0.615$, $p < 0.01$; $\gamma = 0.288$, $p < 0.01$), but not those with high segmentation preference ($\gamma = -0.023$, $p > 0.05$; $\gamma = 0.081$, $p > 0.05$). Supporting Hypothesis 2.

5. Discussion

5.1 The effect of problem-solving work reflection on employees, stress recovery

The present study discovered that the positive effect of problem-solving work reflection during employees' non-working hours on their psychological resource recovery was primarily reflected in the recovery of energy and increased sense of efficacy. Hypothesis 1b and Hypothesis 1c were supported, and the results were consistent with prior research, for example, the research of Querstret & Cropley (2012) and Kinnunen et al. (2017) have indicated that problem-solving work reflection enhances individuals' sleep quality and alleviates physical fatigue. However, the results of the study found no correlation between non-work problem-solving work reflection and their positive affect before sleep, thus hypothesis 1a was not supported. Possible explanations is that indicators of affective states such as positive affect are more closely associated with non-work recovery experiences, and that employees' choice of non-work-related recovery experiences, such as mental detachment and relaxation after work is favorable to increasing their positive affect. In conclusion, non-work-related recovery experiences namely, problem-solving work reflection or psychological disengagement, relaxation, mastery, and control after work can offer assistance to employees to increase their psychological resources, only the contribution of both t distinct kinds of resource replenishment differs.

5.2 The Moderating Role of Work-home Segmentation Preference

Thinking about work constructively may not always be beneficial for different types of people and may differ in terms of resource complementarity. The present study explored the impact of the personal characteristic of "work-life splitting" on recovery outcomes, i.e., whether employees' tendency to separate or integrate work and family may be a crucial factor in their stress recovery. In particular, the positive effects of after-hours problem-solving work reflection on positive affect, vitality, and efficacy before bedtime were diminished among workers with pronounced segmentation preferences compared to those with low segmentation preferences. This result suggests that problem-solving reflection is not equally effective for all types of employees and that individuals with different personality traits should choose stress recovery strategies that correspond more closely with their preferences when engaging in stress recovery.

5.3 Practical Implication

The results of this study suggest that non-work-related activities (e.g., mentally getting away from work, relaxing, learning new skills) are not the only method for employees to recover from work-related stress, but also to use a rational perspective to review the day's tasks, summarize lessons learned, and appropriately consider solutions to work-related issues, all of which are adaptive ways of considering work that can help supplement an individual's psychological resources. Managers can take some interventions to enhance employees' ability to optimistically consider work by telling them how to take into account work and when to stop thinking about work (e.g., when they cannot find a solution or coping strategy to a problem even After pondering it for a very long time) to prevent them from getting caught in a whirlwind of emotional rumination, which can affect the effectiveness of stress recovery. Finally, employees can choose recovery strategies that are more appropriate for them on the basis of their work-family split preferences. For instance, employees who wish to separate work and family may be better suited for non-work-related recovery experiences namely, psychological detachment and relaxation, whereas employees who prefer to integrate work and family are better equipped to actively consider solutions to work-related issues after work, thereby enhancing their physical and mental health and self-efficacy to meet the next day's work challenges in a more energized state.

5.4 Limitations and Future Direction

The independent and dependent variables in this study were measured every night before bedtime, and the data were obtained from the subjects' self-reports, which may contain some common method bias. Future studies can improve the research design, including separately measuring the independent and dependent variables, employing a combination of subjective and objective indicators, or adding data on leaders, colleagues, and partners. Second, future research could examine the effects of employee stress recovery more at the behavioral and performance levels, such as task performance, proactive behaviors, innovative behaviors, etc., as a means of investigating the direct relationship between employee recovery activities and organizational performance. Again, future research could investigate additional boundary conditions, such as the effects of other personality traits, work characteristics, and organizational characteristics.

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