Off-Work Work-Related Rumination and Psychological Detachment: The Predictive Role of Workload and Need Frustration

Virginie Paquette[1], Sarah-Geneviève Trépanier[1], & Julie Ménard[2]

[1] Université du Québec à Trois-Rivières

[2] Université du Québec à Montréal

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Abstract

Few studies have examined the spillover effects of workload on off-work rumination and psychological detachment, and more precisely the mechanisms leading to it. Drawing on Self-Determination Theory, we proposed that psychological need frustration explains how workload leads to work-related rumination (affective rumination and problem-solving pondering) and difficulties in psychologically detaching from work over time. More specifically, using a two-wave panel design and a cross-lagged statistical approach, this study investigated the temporal relationships among these variables and the mediating role of need frustration (autonomy, competence, and relatedness). This study was conducted among a sample of 282 nurses who completed an online questionnaire at two time points over a 12-month period. Cross-lagged analyses revealed that, controlling for baseline effects, T1 workload positively predicted T2 need frustration (both autonomy and competence), T2 affective rumination, T2 problem-solving pondering, and negatively predicted T2 psychological detachment. Furthermore, the relationship between T1 workload and T2 affective rumination was mediated by T1 competence need frustration. In sum, these results highlight that, over time, workload undermines employees' competence needs, which fosters recurrent negative thoughts and feelings about work (i.e., affective rumination). Therefore, organisational efforts to reduce employees' workload and support their psychological needs are advised to decrease off-work work-related rumination and promote psychological detachment.

Keywords: Workload, need frustration, affective rumination, problem-solving pondering, psychological detachment

Off-Work Work-Related Rumination and Psychological Detachment: The Predictive Role of Workload and Need Frustration

Work environments include various job demands that impose a considerable mental toll on workers (Bakker et al., 2023; Demerouti et al., 2001). One important job demand is workload, which refers to the perceived amount, pace, and difficulty of job tasks required as part of one's job (Bowling & Kirkendall, 2012; Spector & Jex, 1998). According to the challenge-hindrance occupational stressor model (Cavanaugh et al., 2000), workload is considered a challenge stressor, meaning it can cause strain but also offer opportunities for psychological benefits, such as for a sense of achievement when workers effectively handle the tasks at hand (Webster et al., 2011). While past research has highlighted the effects of workload (e.g., exhaustion, job performance; Bruggen, 2015; Van Bogaert et al., 2013), fewer studies have examined its psychological impact *outside* of work. Findings indicate that workload may have spillover effects outside the workplace (Türktorun et al., 2020), particularly in the form of work-related rumination and difficulties in psychologically detaching from work (e.g., Pindek et al., 2022; Sousa & Neves, 2021; Van Laethem et al., 2019). Work-related rumination refers to recurrent and perseverative thoughts about work issues outside of work (Cropley & Zijlstra, 2011) and has been shown to hinder the replenishment of personal resources, as it is positively associated with exhaustion and sleeping problems (Kinnunen et al., 2017; Mullen et al., 2020). Conversely, psychological detachment (the ability to unwind from work) protects against these negative outcomes (e.g., reduced burnout; Fritz et al., 2010; Medrano & Trógolo, 2018). Although the relationships between workload, work-related rumination, and psychological detachment have been established, few studies have investigated these associations over time (e.g., Germeys & DeGieter, 2017; Pindek et al., 2022; Sousa & Neves, 2021, Van Laethem et al., 2019) and none

have explored their temporal dynamics. This gap in research limits our understanding of the directionality of the associations between these variables.

Furthermore, no research has delved into the psychological mechanisms underlying these relationships. Need frustration (i.e., feeling oppressed, incompetent, or socially rejected or excluded; Ryan & Deci, 2017) appears to be a key process that could explain these relationships. Indeed, past research has shown that job demands, by imposing a psychological or/and physical strain on employees, tend to thwart employees' basic psychological needs (e.g., Basson & Rothmann, 2018; Trépanier et al., 2015). We propose that this impoverished psychological state will subsequently increase one's proneness to rumination and lead to difficulties in psychologically detaching from work (Heissel et al., 2023; Vansteenkiste et al., 2020).

Finally, it is worth noting that most studies have examined the determinants of the two facets of rumination (affective rumination and problem-solving pondering) and psychological detachment in isolation. Exploring these variables in an integrated way could provide a more comprehensive understanding of the differential effects of their determinants. Indeed, studies indicate that work-related rumination and psychological detachment are distinct processes (Jimenez et al., 2022; Weigelt et al., 2019a) that can relate differently and to varying degrees with job demands (e.g., Feng, 2022; Lin & Bai, 2022) and psychological need experiences (Heissel et al., 2023).

Thus, using a two-wave panel design and a cross-lagged statistical approach, which tests and compares various temporal sequences (e.g., reversed, reciprocal, etc.), the present study aims (a) to better understand the temporal relationships between workload, work-related rumination, and psychological detachment, (b) to investigate the mediating role of need frustration in the relationships between workload and workers' functioning outside of work, and (c) to explore the

differential effects of workload and need frustration on work-related rumination and psychological detachment in an integrated manner.

Work-Related Rumination and Psychological Detachment

Work-related rumination is defined as recurrent thoughts about work-related issues that occur during off-job time (Cropley & Zijlstra, 2011). Cropley and Zijlstra (2011) have proposed a three factor conceptualization of work-related rumination: affective rumination, problem-solving pondering, and psychological detachment. Affective rumination refers to intrusive, pervasive, and recurrent thoughts directed toward negative feelings (e.g., frustration, annoyance) related to work problems (Pravettoni et al., 2007). Although workers may try to avoid thinking about job issues during off-work hours, their effort to suppress these thoughts may actually make them more intrusive (Cropley & Zijlstra, 2011). Affective rumination, by maintaining a high level of psychophysiological activation, has been shown to impair the recovery process and deplete workers' resources (Firoozabadi et al., 2018; Weiher et al., 2023). Problem-solving pondering involves prolonged, goal-directed thinking aimed at finding solutions to specific problems or improving previous work. Contrary to affective rumination, problem-solving pondering does not include an emotional component. Moreover, it is generally associated with more positive consequences than affective rumination (e.g., lower levels of chronic and acute fatigue, Querstret & Cropley, 2012; life satisfaction, work engagement, Weigelt et al., 2019a). Problem-solving pondering may facilitate recovery and help workers free their minds by solving the problem or devising a plan to manage it (Kinnunen et al., 2019). Lastly, psychological detachment refers to the ability to mentally unwind and disengage from work (Sonnentag & Fritz, 2014). This disconnection from work provides opportunities for workers to restore their resources and regain energy for the next workday (Sonnentag & Fritz, 2014). Research has shown that psychological

detachment fosters psychological health, including greater life satisfaction and reduced burnout (Bennett et al., 2017; Medrano & Trógolo, 2018).

Workload as a Determinant of Work-Related Rumination and Psychological Detachment

Job demands are defined as the aspects of the job (physical, psychological, social, or organizational) that require sustained physical, emotional, or mental effort and are thus associated with energy depletion and physical or psychological costs (Bakker et al., 2023; Demerouti et al., 2001). The frequency and/or intensity of job demands lead to increased effort, which drains employees' energy, increases their stress levels, depletes their resources (physical, emotional, and cognitive), and may gradually result to exhaustion and health impairment (Bakker et al., 2023; Crawford et al., 2010).

A job demand that is a great source of strain among employees is workload (Bowling, Alarcon, Bragg, & Hartman, 2015; Keenan & Newton, 1985). Studies have shown that workload is associated with negative affect (e.g., anxiety; Bowling et al., 2015; Rodell & Judge, 2009) that may be carried off-work, fostering affective rumination. In addition, Martin and Tesser (1996) suggest that when work environments are chronically demanding and employees perceive slower-than-expected progress toward important goals, they may experience ruminative thoughts. Consistent with this proposition, cross-sectional (Epstein et al., 2020; Košir et al., 2015) and prospective studies (Pindek et al., 2022; Sousa & Neves, 2021; Van Laethem et al., 2019) have shown that workload is positively related to affective rumination.

Research (Feng, 2022; LePine et al., 2005) also suggests that challenging job demands, such as workload, are likely to prompt proactive coping strategies, which align with problem-solving pondering. Indeed, employees may analyze how to allocate their time, energy, and resources efficiently to successfully meet demands and cope with resource losses. They may also seek various solutions to enhance their productivity and ensure the best outcomes. These

propositions are supported by past studies, which show that workload facilitates problem-solving pondering over time (Sousa & Neves, 2021).

Regarding psychological detachment, Bennett et al. (2017) suggest that the high activation and the negative emotions associated with job demands, such as workload, may spill over into non-work time and impede the ability to disengage from work. Indeed, when facing a heavy workload, employees may be more inclined to bring work home or anticipate the tasks that they will need to complete the next day (Sonnentag & Bayer, 2005). Past prospective studies have supported these propositions (DeArmond et al., 2014; Germeys & DeGieter, 2017; Sousa & Neves, 2021; Van Laethem et al., 2019), showing negative relationships between workload and psychological detachment.

In line with these findings, we formulated the following hypotheses (see Figure 1 for a representation of the hypotheses):

Hypothesis 1: Workload will have positive cross-lagged effects on affective rumination (H1a) and problem-solving pondering (H1b), as well as a negative cross-lagged effect on psychological detachment (H1c).

Notably, one aim of the present study is to explore the temporal dynamics between workload and work-related rumination (affective rumination and problem-solving pondering) as well as psychological detachment. Specifically, in addition to investigating whether workload predicts work-related rumination and psychological detachment over time, this study will also examine the reversed relationships (where work-related rumination and psychological detachment predict workload) and reciprocal relationships (where there is mutual influence over time). Past research suggests that affective rumination could negatively influence workload perceptions due to the exhaustion it fosters (Kinnunen et al., 2017; Weiher et al., 2023). Conversely, problem-solving pondering may energize workers and help them perceive a lighter

workload because it is associated with vigor and vitality at work (Weigelt et al., 2019a), and it facilitates recovery when paired with high self-regulation (Firoozabadi et al., 2018). Similarly, psychological detachment during non-work time may mitigate the perception of a heavy workload by allowing the replenishment of depleted resources (Sonnentag & Bayer, 2005; Wendsche & Lohmann-Haislah, 2017), which can then be used to manage work demands. With these considerations in mind, the present study offers the opportunity to clarify the temporal relationships between workload, work-related rumination, and psychological detachment by testing these exploratory alternative models using a two-wave panel design.

The Role of Basic Psychological Needs in Rumination and Psychological Detachment

One mechanism that could explain the relationships between workload, on the one hand, and work-related rumination and psychological detachment, on the other hand, is psychological need frustration. Self-Determination Theory (Ryan & Deci, 2017) posits that there are three fundamental psychological needs: autonomy (to feel at the origin of one's actions and decisions), competence (to feel efficient in important areas of life), and relatedness (to feel connected to others). Employees function most effectively in work environments that satisfy these needs, while environment thwarting these needs will lead to non-optimal development and ill-being (Bartholomew et al., 2014; Deci & Ryan, 2000). Importantly, need satisfaction and need frustration are not merely opposites (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2011; Vansteenkiste et al., 2020). In need-thwarting situations, feelings of autonomy, competence, and relatedness are not simply low: employees experience their needs as hampered or actively frustrated (e.g., they feel oppressed, incompetent, or socially isolated; Bartholomew et al., 2014; Trépanier et al., 2015). Moreover, while a lack of need satisfaction hinders personal development, need frustration erodes inner resources and increases the risk of defensiveness, psychological maladjustment, and ill-being (e.g., psychological distress; Bartholomew,

Ntoumanis, & Thøgersen-Ntoumani, 2011; Trépanier et al., 2015; Vansteenkiste et al., 2020). By its nature, need frustration appears to be the most suitable mechanism to better understand the relationships between workload, work-related rumination and psychological detachment, as it typically arises from turbulent, restrictive, or demanding conditions (e.g., high workload; Vander Elst et al., 2012) and imposes a considerable mental toll on workers (e.g., Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2011).

The Mediating Role of Need Frustration

Research has shown that work-related factors, such as job demands, influence employees' functioning through need frustration (e.g., Gillet et al., 2015; Trépanier et al., 2015). By draining employees' energy and consuming their personal resources, job demands are generally positively associated with need frustration (e.g., Bartholomew et al., 2014; Basson & Rothmann, 2018; Trépanier et al., 2015). Although some job demands, such as workload, may offer opportunities to experience feelings of accomplishment (Webster et al., 2011), past studies have shown that workload is positively related to need frustration (Basson & Rothmann, 2018). Indeed, Basson and Rothmann (2018) suggest that high workload may induce a feeling of "being forced to do something", which could contribute to autonomy need frustration. Additionally, findings indicate that a heavy workload might impede workers from completing tasks, potentially undermining their sense of efficiency and competence (Weigelt et al., 2019b). Lastly, research has shown that heavy workload can impair interpersonal relationships at work (e.g., it is positively related to incivility in the workplace; Keller et al., 2020), which might result in relatedness need frustration. Aligning with these findings, the following hypothesis was formulated:

> Hypothesis 2: Workload will have positive cross-lagged effects on the frustration of the needs for autonomy (H2a), competence (H2b), and relatedness (H2c).

Regarding the relationships between need frustration and rumination, research is quite limited, highlighting the need for further exploration of the links between these variables. To our knowledge, only three studies have investigated the role of need frustration in relation to rumination (Heissel et al., 2023; Schulz et al., 2024) and psychological detachment (Olafsen et al., 2024; Schulz et al., 2024). In their recent study among university students and workers, Heissel et al. (2023) examined the effects of need frustration (globally) on two dimensions of rumination as defined by Treynor et al. (2003): brooding (i.e., an emotional comparison of one's situation to unattained standards) and reflection (i.e., a non-emotional engagement in cognitive problem-solving to alleviate one's depressive symptoms). Their findings indicate that need frustration facilitates both types of rumination. The authors suggest that individuals may resort to ruminative thoughts as a compensatory strategy to better understand and manage the negative feelings arising from need frustration. Although there are conceptual differences, brooding and reflection share similarities with affective rumination and problem-solving pondering, respectively (Cropley & Zijlstra, 2011). Thus, similar relationships may be expected between need frustration and work-related rumination. Two other studies have examined the effects of the frustration of each distinct need on workers' affective rumination (Schulz et al., 2024) and psychological detachment (Olafsen et al., 2024; Schulz et al., 2024), but not on problem-solving pondering. Results show that frustration of competence and autonomy needs facilitate affective rumination (Schulz et al., 2024) and hinder psychological detachment (Olafsen et al., 2024; Schulz et al., 2024). In contrast, frustration of the relatedness need was unrelated to psychological detachment (Olafsen et al., 2024) and was not examined in relation to affective rumination. In their study, Olafsen et al. (2024) also found that, compared to the other needs, competence need frustration was more strongly associated with negative affect, suggesting that this need may have a stronger effect on off-work rumination of this negative affect.

Based on these limited findings and the principles of Self-Determination Theory, we hypothesize that workers may engage in affective rumination to manage the negative emotions resulting from need frustration, and experience difficulties in unwinding from these emotions outside of work. Moreover, we expected that workers may attempt to proactively find solutions to alleviate the negative psychological experiences resulting from the frustration of all three needs. Therefore, the following hypotheses were proposed (see Figure 1):

> Hypotheses 3, 4, and 5: Taking into account the cross-lagged effects of workload, the frustration of the needs for autonomy (H3), competence (H4), and relatedness (H5) will have positive effects on affective rumination (H3a, H4a, H5a) and problem-solving pondering (H3b, H4b, H5b), and a negative effect on psychological detachment (H3c, H4c, H5c).

Methods

Sample and Procedure

This study was conducted among nurses because they typically experience heavy workload, such as working long shifts and seeing many patients daily (McVicar, 2003; Min et al., 2019; Trinkoff et al., 2006). Furthermore, research shows that rumination, along with difficulty in psychologically detaching from work, are prominent issues for workers with a strong occupational calling, such as nurses (Pindek & Gazica, 2020). A total of 2 500 nurses working in Québec's healthcare system (Canada) were invited to participate in this study. They received an email describing the general purpose of the study and were asked to complete both a baseline questionnaire and a follow-up questionnaire online over a 12-month period (October 2014 – October 2015). Of the 399 nurses who participated at Time 1 (15.96 % response rate), 282 completed the follow-up questionnaire at Time 2 (70.68% response rate). The final sample

included only the participants who completed the questionnaires at both Time 1 and Time 2. This sample consisted mainly of women (87.94%) and full-time employees (70.21%). On average, participants were 43.70 years old (*SD* = 11.18) and had 20.19 years (*SD* = 11.29) of job experience. A multivariate analysis of variance (MANOVA) conducted prior to the main analyses indicated no differences between participants who completed only the baseline questionnaire and those who participated in both phases of the study.

Measures

Participants completed the same set of scales at Time 1 (T1; baseline) and Time 2 (T2; follow-up). All measures used were validated scales.

Workload

Workload was measured using the Areas of Work Life Scale (AWLS; Leiter & Maslach, 2004). This scale consists of six items, such as "*I do not have time to do the work that must be done*" (T1 α = .80 and T2 α = .81). Participants indicated the extent to which they agreed with each item on a 5-point Likert scale (1 = *totally disagree* to 5 = *totally agree*).

Need Frustration

Psychological need frustration was measured using the French adaptation (Gillet et al., 2012) of the Psychological Need Thwarting Scale (Bartholomew, Ntoumanis, Ryan et al.; 2011). This scale, adapted for the work context, includes three 3-item subscales assessing the frustration of the need for autonomy (e.g., "*I feel prevented from making choices with regard to the way I work*"; T1 α = .81 and T2 α = .73), competence (e.g., "*There are situations at work where I am made to feel inadequate*"; T1 α = .75 and T2 α = .82), and relatedness (e.g., "*I feel my work colleagues dislike me*"; T1 α = .65 and T2 α = .68). Participants indicated the extent to which they agreed with each item on a 5-point Likert scale (1 = *totally disagree* to 5 = *totally agree*).

Work-Related Rumination

The Work-Related Rumination Questionnaire (Cropley et al., 2012) was used to assess participants' affective rumination, problem-solving pondering, and psychological detachment from work. This scale consists of three 5-item subscales: affective rumination (e.g., "*I am troubled by work-related issues when not at work*"; T1 α = .92 and T2 α = .92), problem-solving pondering (e.g., "*After work I tend to think about how I can improve my performance*"; T1 α = .86 and T2 α = .87), and psychological detachment (e.g., "*I am able to stop thinking about work-related issues in my free time*"; T1 α = .84 and T2 α = .82). Participants indicated the extent to which they agreed with each item on a 5-point Likert scale (1 = *do not agree at all* to 5 = *totally agree*).

Data Analyses

The main analyses were conducted using *Mplus* software version 8 (Muthén & Muthén, 1998-2017). All models were tested using standardized coefficients obtained through Maximum Likelihood Estimation with Robust standard errors (MLR), and missing data from item-level nonresponses were handled using Full Information Maximum Likelihood (FIML) procedures. Manifest variables (i.e., average scores for each scale and subscale) were used to preserve statistical power given the complexity of the proposed model and the relatively small sample size. In accordance with Kline's (2016) recommendations, goodness-of-fit of the tested models was assessed using the following fit indices: the chi-square test, where a non-significant *p*-value suggests an acceptable fit, the Comparative Fit Index (CFI) and the Tucker–Lewis Index (TLI), with values equal to or greater than .90 indicating of a good fit, as well as the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR), with values equal to or below .08 suggesting an adequate fit.

First, we tested the adequacy of the proposed model (M2) and the three competing models: the stability model (M1), the reverse causation model (M3), and the reciprocal model

(M4). In all models (M1-M4), autoregressive effects (e.g., T1 workload to T2 workload) were included to control for the baseline levels of each variable. Additionally, covariances among T1 variables and among T2 variables were estimated. The stability model (M1) included only autoregressive effects (no cross-lagged effects). The proposed model (M2, see Figure 1) included unidirectional paths from T1 workload to T2 frustration of all three psychological needs, as well as to T2 work-related rumination (affective rumination and problem-solving pondering) and T2 psychological detachment. M2 also included unidirectional paths from T1 frustration of all three psychological needs to T2 work-related rumination and T2 psychological detachment. The reversed causation model (M3) included unidirectional paths from T1 frustration of all three needs, T1 work-related rumination, and T1 psychological detachment to T2 workload, as well as from T1 work-related rumination and T1 psychological detachment to T2 frustration of all three needs. Finally, the reciprocal model (M4) combined elements of M2 and M3, incorporating bidirectional paths between all investigated variables. To investigate the temporal directionality of the relationships between the variables, we compared the proposed model (M2) with the three competing models (M1, M3, and M4). The proposed model (M2), the reversed causation model (M3), and the reciprocal model (M4) were first compared to the stability model (M1) to ensure that they provided more information than merely the passage of time and the stability of measurements. Next, M2 and M3 were compared to the reciprocal model (M4) to determine the best-fitting model.

Results

Descriptive statistics and bivariate correlations among all variables are displayed in Table 1. A MANOVA was conducted prior to the main analyses to examine whether the variables included in our models differed based on sociodemographic variables typically related to work-related rumination and psychological detachment (i.e., age, gender, years of job experience;

Johnson & Whisman, 2013; Neill, 2011; Sütterlin et al., 2016). The results indicated no significant differences, so sociodemographic characteristics were not integrated into the main analyses. Additionally, boxplots and Mahalanobis distances at the critical chi-square value of p = .001 were examined, revealing no univariate and multivariate outliers in our dataset. A confirmatory factor analysis (CFA) was conducted with all model variables to ensure they represented seven distinct factors: workload, frustration of the needs for autonomy, competence, relatedness, affective rumination, problem-solving pondering, and psychological detachment. Moreover, measurement invariance was tested to verify that measurement models operated similarly at both T1 and T2. The results showed that the seven-factor model fit the data well ($\chi 2$ = 2572.04, df =1696, p < .001; RMSEA = .04 [CI = .04, .05]; CFI = .91; TLI = .90; SRMR = .08). The results of the CFA with full measurement invariance are presented in Figure S1 of the supplemental files.

We first estimated the stability model in which each construct predicted itself over time (M1: $\chi 2$ = 75.42, df = 42, p = .001; RMSEA = .05 [CI = .03, .07], p = .373; CFI = .97; TLI = .95; SRMR = .08). Then, the proposed model (M2: $\chi 2$ = 36.64, df = 27, p = .102; RMSEA = .04 [CI = .00, .06], p = .789; CFI = .99; TLI = .98; SRMR = .03), the reversed causation model (M3: $\chi 2$ = 54.26, df = 27, p = .001; RMSEA = .06 [CI = .04, .08], p = .224; CFI = .97; TLI = .93; SRMR = .06), and the reciprocal model (M4: $\chi 2$ = 17.85, df = 12, p = .121; RMSEA = .04 [CI = .00, .08], p = .595; CFI = .99; TLI = .97; SRMR = .02) were all estimated. All four models provided an adequate fit to the data. The standardized results of M2 are presented in Figure 2, and those of M1, M3, and M4 are presented in Figures S2, S3, and S4 of the supplemental files. The nested models were then compared to select the best-fitting solution. All models were first compared to the stability model. Chi-square difference tests indicated that the proposed model (M2 vs M1: $\Delta\chi 2$ (15) = 39.38, p < .001) and the reciprocal model (M4 vs. M1, $\Delta\chi 2$ (30) = 57.83, p = .002)

fitted the data significantly better than the stability model, while the reversed causality model did not differ significantly from the stability model (M3 vs. M1, $\Delta\chi2$ (15) = 21.23, p = .130).

Next, the comparison of the reversed causation model (M3) with the reciprocal model (M4) indicated that the reciprocal model provided a better fit (M4 vs. M3, $\Delta\chi2$ (15) = 37.05, p = .001). However, the reciprocal model did not offer any improvement over the proposed model (M4 vs. M1, $\Delta\chi2$ (15) = 18.70, p = .227). It was concluded that the proposed model provided the best-fitting solution, and it was thus retained. Considering the autoregressive effects, T1 workload positively predicted T2 frustration of the needs for autonomy and competence, as well as T2 affective rumination and T2 problem-solving pondering, while negatively predicting T2 psychological detachment. These findings support the hypotheses regarding the direct effects of T1 workload on T2 outcomes (H1a-1c) and T2 need frustration (H2a-2b), with the exception of the frustration of the need for relatedness (H2c).

Additionally, controlling for the cross-lagged effects of T1 workload on T2 outcomes, T1 competence need frustration positively predicted T2 affective rumination. Following the recommendations of Cole and Maxwell (2003) for calculating the indirect effect in "half-longitudinal designs" (i.e., two time points), the path from T1 workload to T2 competence need frustration was multiplied by the path from T1 competence need frustration to T2 affective rumination. This calculation yielded an indirect effect of .02 between T1 workload and T2 affective rumination. We also tested the indirect effect more formally using a path analysis (see the results in Footnote 1). These findings support the mediating role of competence need frustration in the relationship between T1 workload and T2 affective rumination (H4a). However, these results do not support the mediating role of competence need frustration in the relationships between T1 workload and T2 problem-solving pondering (H4b) and T2 psychological detachment (H4c), as well as the mediating role of the frustration of the needs for autonomy

(Hypotheses 3a-c) and relatedness (Hypotheses 5a-c) in the relationships between T1 workload and all T2 outcomes.

Discussion

The first objective of this two-wave panel study was to investigate the temporal relationships between workload, work-related rumination, and psychological detachment. Results showed that high work volume (workload) played an important role in predicting off-work recurrent negative thoughts and feelings about work problems (affective rumination), persistent cognitions aimed at finding solutions to work issues (problem-solving pondering), and difficulty in mentally detaching from work (psychological detachment) over time. The second objective was to examine the mediating role of need frustration in the relationships between these variables. Results revealed that only the frustration of the need for competence mediated the relationship between workload and affective rumination. The use of an integrative approach provided insight into the determinants of rumination and psychological detachment, revealing that while the facets of rumination share common work-related determinants (workload), they relate differently to psychological need frustration. These findings underscore the importance of examining all three processes in an integrated manner.

Theoretical Implications

On the Role of Workload in Work-Related Rumination and Psychological Detachment

Previous studies have identified the spillover effects of workload on work-related rumination and difficulties in psychologically detaching from work (e.g., DeArmond et al., 2014; Sousa & Neves, 2021; Van Laethem et al., 2019). However, only few of them have investigated the relationships between these variables over time (Germeys & DeGieter, 2017; Perko et al., 2017; Pindek et al., 2022; Sousa & Neves, 2021; Van Laethem et al., 2019), and none have examined the temporal dynamic between these variables. Work-related rumination and

psychological detachment often develop and evolve over time (Sonnentag & Fritz, 2014; Watkins & Roberts, 2020), making the use of multi-wave designs particularly important. As such, the first implication of the present study is to deepen our understanding of the temporal relationships between workload, work-related rumination, and psychological detachment.

Consistent with previous research (e.g., Pindek et al., 2022; Sousa & Neves, 2021), our results revealed that, over time, workload positively predicted affective rumination. Research has shown that employees, such as nurses, are often confronted with staff shortages, extended work hours, and an inability to complete tasks on time, leading to the perception of role overload (Hegney et al., 2019; McVicar, 2003, Min et al., 2019). Such psychologically and physically taxing conditions may deplete nurses' energy and lead them to experience negative emotions (e.g., anxiety; Demerouti et al., 2001; Marvaldi et al., 2021). These negative emotions may persist over time, fostering off-work affective rumination (Pindek et al., 2022). Furthermore, in accordance with Martin and Tesser's (1996) propositions, the inability to complete work on time due to high workload may slow employees' progress toward achieving their work goals and lead them to ruminate.

Our results also showed that workload positively predicted problem-solving pondering over time. This finding is consistent with previous studies (e.g., Sousa & Neves, 2021) and LePine et al.'s (2005) propositions that challenging job demands (i.e., demands, such as workload, that are stressful but can lead to achievement), are likely to elicit proactive coping strategies. Employees may proactively reflect on how to optimize their tasks to reduce the volume of work and increase their pace at work (see Cropley & Zijlstra, 2011). Additionally, our results revealed that workload negatively predicted psychological detachment, which aligns with previous findings (e.g., Germeys & DeGieter, 2017; Sousa & Neves, 2021) and Bennett et al.'s

(2017) propositions that the high activation and the negative emotions associated with job demands may spill over into non-work time and impede psychological detachment.

Overall, the pattern of results underscores that high workload, a significant source of distress for employees (Bowling et al., 2015; Keenan & Newton, 1985), is a key factor influencing work-related rumination and psychological detachment off-work. By testing and comparing various temporal configurations, our study contributes to a better understanding of the nature and direction of the relationships between workload, work-related rumination, and psychological detachment. These results are particularly important because they show that taxing job characteristics (i.e., workload) predict work-related rumination and low psychological detachment, not the opposite. These findings align with past research showing the predictive effects of job demands (e.g., job insecurity, Kinnunen et al., 2017; workload, Germeys & DeGieter, 2017; Sousa & Neves, 2021) on off-work psychological outcomes over time.

Building on our results and to enhance our understanding of the factors influencing work-related rumination and psychological detachment over time, future longitudinal studies should also investigate how resources (e.g., job control, social support) within one's work environment can mitigate the taxing effects of workload. Indeed, Martin and Tesser (1996) suggest that rumination may stem from a perceived lack of control over one's life or work. Furthermore, the Job Demand-Control model (Karasek, 1979) and its expanded version, the Job Demand–Control–Support (JDCS) model (Johnson & Hall, 1988), propose that high job demands combined with low job control and low social support lead to high psychological strain. Past studies have examined the effects of the interaction between workload and job control on ruminative thoughts and psychological detachment among teachers using short-term diary studies (Cropley et al., 2006; Cropley & Millward Purvis, 2003). Additionally, other research has investigated the effects of the interaction between job stressors and social support/climate on work-related rumination

(Song & Zhao, 2022; Pauli & Lang, 2021). However, none of these studies have yet investigated the combined impact of job demands, job control, and social support on work-related rumination and psychological detachment, or the long-term effects of these interactions. Therefore, future longitudinal studies should examine the interaction between these variables to deepen our understanding of work conditions that predict off-work rumination over time. A better understanding of the role of job control and social support is particularly important, as these factors are related to important employee outcomes, such as work engagement (Taipale et al., 2011) and intention to stay within the organization (Chen et al., 2016; Li et al., 2020).

On the Mediating Role of Competence Need Frustration

Our results also revealed that workload positively predicted the frustration of both autonomy and competence needs, and that competence need frustration positively predicted repetitive negative thoughts and feelings about work (affective rumination). These findings are consistent with previous studies showing that workload thwarts employees' basic psychological needs (Basson & Rothmann, 2018) and that need frustration, specifically competence need frustration, leads to ruminative thoughts as a way to manage the negative feelings resulting from this frustration (Heissel et al., 2023; Olafsen et al., 2024; Schulz et al., 2024).

Our results highlight the importance of competence need frustration in predicting employees' affective rumination over time. Employees, such as nurses, may face long shifts and the feeling of being unable to complete their work on time (Hegney et al., 2019). According to the stress-as-offense-to-self perspective (Semmer et al., 2007), these unfinished tasks and difficulties in progressing toward important work goals can be perceived as failures by the employee. This perception of failure can then become a source of stress and a threat to self-esteem, especially if attributed to a lack of competence, and lead to rumination outside of work (Martin & Tesser, 1996). In line with this, past studies have shown that unfinished tasks are

positively associated with low satisfaction of the competence need (Weigelt et al., 2019b) and high rumination (Syrek et al., 2014; Weigelt et al., 2019b). More research is needed to examine how other job demands may impact employees' psychological needs, work-related rumination, and psychological detachment differently.

On the Integrative Perspective of Rumination and Psychological Detachment

Our results showed that workload had the strongest cross-lagged effects on psychological detachment and had similar positive effects on both affective rumination and problem-solving pondering. These findings underscore that a heavy workload, due to its pervasive nature, occupies workers' mind. However, our results showed that competence need frustration only leads to affective rumination, revealing that this type of rumination may be more maladaptive as it stems from a negative psychological experience. These differentiated results emphasize the importance of studying the facets of rumination and psychological detachment within an integrated framework to gain a comprehensive understanding of their specific determinants. In line with this, recent findings have identified two additional types of work-related rumination: positive and negative work reflections (Weigelt et al., 2019a). These facets of rumination refer to reflecting on the positive and negative aspects of one's job, respectively. Although they share some similarities with problem-solving pondering and affective rumination, research has shown that they are distinct types of rumination (Weigelt et al., 2019a). As such, future studies could expand upon our findings and investigate how organizational and individual factors (e.g., job demands, psychological need experiences) differently impact all five facets of rumination / psychological detachment.

Practical Implications

Our results highlight the importance for organizations to reconsider their expectations regarding employees' workload and to design work tasks with an appropriate pace, volume, and

level of difficulty. For instance, by reducing the length of nurses' work shifts and limiting mandatory overtime, healthcare establishments could help prevent rumination and low psychological detachment outside of work, as well as reduce health problems among nurses (e.g., burnout) and medical errors (Farid et al., 2020). These results also stress the importance of creating work environments that foster employees' psychological needs, particularly the need for competence. Our findings suggest that decreasing workload could be an indirect but effective way to achieve this objective.

Limitations and Future Research Perspectives

The present research has some limitations that need to be discussed. First, the conclusions regarding causality and the mediational process are limited by the two-wave panel design. Because the variables were observed at only two time points, there was insufficient temporal separation to prevent the concurrent assessment of both the determinants and the mediators or both the mediators and the outcomes (Cole & Maxwell, 2003). Furthermore, since work-related rumination and psychological detachment are concepts that fluctuate over time, using more than two time points and shorter intervals could provide a better understanding of the evolution of these variables, as well as the role of workload and psychological need frustration. Having three or more time points could also allow the use of a random-intercept cross-lagged model to control for stable trait-like individual differences (Mulder & Hamaker, 2021). Nonetheless, our results are in accordance with previous studies on workload, need frustration, work-related rumination, and psychological detachment (e.g., Basson & Rothmann, 2018; Heissel et al., 2023; Sousa & Neves, 2021). Second, the present research examined only the effects of a job-related factor (workload) on need frustration, work-related rumination, and psychological detachment. In line with the person-environment fit perspective (Edwards & Shipp, 2007), the effects of personal characteristics (e.g., personality traits such as neuroticism; Liu et al., 2023) should also be

considered to gain a more nuanced understanding of the factors influencing the development and persistence of these outcomes. Finally, this study was conducted with a sample of nurses from Québec (Canada), which restricts the generalizability of our results. Notably, our sample was predominantly composed of women, who tend to ruminate more than men (Johnson & Whisman, 2013). However, the results of a MANOVA indicated no gender differences on all outcomes at both time points. Nevertheless, future research is needed to replicate our model with samples of nurses from other provinces and countries, as well as with employees in other occupational sectors.

Conclusion

Overall, the results of the present study show that workload increases work-related rumination and undermines psychological detachment over time. Furthermore, workload positively predicts frustration of the competence need, which in turn leads to affective rumination. Organizations are therefore advised to reconsider their employees' workload to help them feel more competent, protect them from work-related rumination, and promote psychological detachment outside of work.

Declaration and Compliance with Ethical Standards: The authors declare no conflicts of interest and comply with ethical standards. This study was approved by the research ethics board of the institution of the first two authors (information will be added after the evaluation process). Informed consent was obtained from all individual participants included in the study. Data is available upon request to the corresponding author.

Footnote

1. We also tested the indirect effects of workload on the outcomes via need frustration using a path analysis. The model included paths from T1 variables to their T2 correspondent variables (to control for stability over time), from T1 workload to T1 frustration of all three needs and T2 outcomes, as well as from T1 frustration of all three needs to T2 outcomes. This model provided a good fit to the data ($\chi 2 = 89.21$, $df = 39$, $p < .001$; RMSEA = .07 [CI = .05, .09], $p = .058$; CFI = .96; TLI = .91; SRMR = .08). All T1 variables were positively and significantly related to their T2 correspondent variables ($\beta = .49 – .64$, $p < .001$). Furthermore, T1 workload was positively related to T1 frustration of the needs for autonomy ($\beta = .35$ $p < .001$), competence ($\beta = .38$, $p < .001$), and relatedness ($\beta = .14$, $p = .026$). T1 workload was also positively related to T2 problem-solving pondering ($\beta = .12$, $p = .034$), negatively related to T2 psychological detachment ($\beta = -.19$, $p = .001$), and not directly related to T2 affective rumination ($\beta = .08$, $p = .148$). T1 competence need frustration was positively related to T2 affective rumination ($\beta = .14$, $p = .024$), but not significantly to problem-solving pondering ($\beta = .01$, $p = .832$) and psychological detachment ($\beta = -.10$, $p = .103$). T1 frustration of the needs for autonomy and relatedness were unrelated to the outcomes ($\beta = -.08 – .04$, $p = .079 – .972$). To test the indirect effects of T1 workload on T2 outcomes via the competence need frustration, we used bootstrap with 5,000 samples, 95% bias-corrected confidence intervals (CI), and the ML estimator (because bootstrap is impossible with MLR). The unstandardized results indicated that T1 frustration of the need for competence mediated the relationship between T1 workload and T2 affective rumination, $b = .06$ (95% CI = .00 – .12, $p = .038$), but it did not significantly mediate the relationships between T1 workload and T2 problem-solving pondering ($b = .01$ [95% CI = -.04 – .05], $p = .842$) and T1 workload and T2 psychological detachment ($b = -.05$ [95% CI = -.11 – .01], $p = .124$).

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Table 1

Descriptive Statistics and Correlations for Study Variables

	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13
Time 1														
1. Workload	3.09 (.79)	—												
2. Autonomy NF	2.85 (.93)	.36**	—											
3. Competence NF	2.55 (.95)	.38**	.47**	—										
4. Relatedness NF	1.73 (.70)	.15*	.28**	.42**	—									
5. AR	2.13 (.98)	.51**	.41**	.41**	.18**	—								
6. PSP	2.44 (.94)	.36**	.17**	.28**	.01	.62**	—							
7. PD	3.36 (1.00)	-.50**	-.26**	-.28**	-.07	-.58**	-.53**	—						
Time 2														
8. Workload	2.92 (.76)	.66**	.20**	.31**	.11	.37**	.27**	-.36**	—					
9. Autonomy NF	2.82 (.85)	.31**	.54**	.34**	.15*	.26**	.07	-.16**	.33**	—				
10. Competence NF	2.47 (.97)	.35**	.35**	.59**	.31**	.35**	.24**	-.29**	.36**	.43**	—			
11. Relatedness NF	1.78 (.68)	.16**	.25**	.24**	.53**	.22**	.01	-.13*	.18**	.34**	.43**	—		
12. AR	2.00 (.93)	.41**	.29**	.40**	.15*	.62**	.40**	-.38**	.53**	.41**	.50**	.30**	—	
13. PSP	2.36 (.94)	.36**	.16**	.22**	-.03	.42**	.66**	-.44**	.38**	.22**	.29**	.04	.52**	—
14. PD	3.49 (.94)	-.48**	-.19**	-.33**	-.07	-.49**	-.44**	.62**	-.52**	-.30**	-.42**	-.20**	-.59**	-.52**

Note. $N = 282$. NF = Need Frustration. AR = Affective Rumination. PSP = Problem-Solving Pondering. PD = Psychological Detachment.
*$p < .05$. **$p < .01$.

Fig. 1

The Proposed Model (M2)

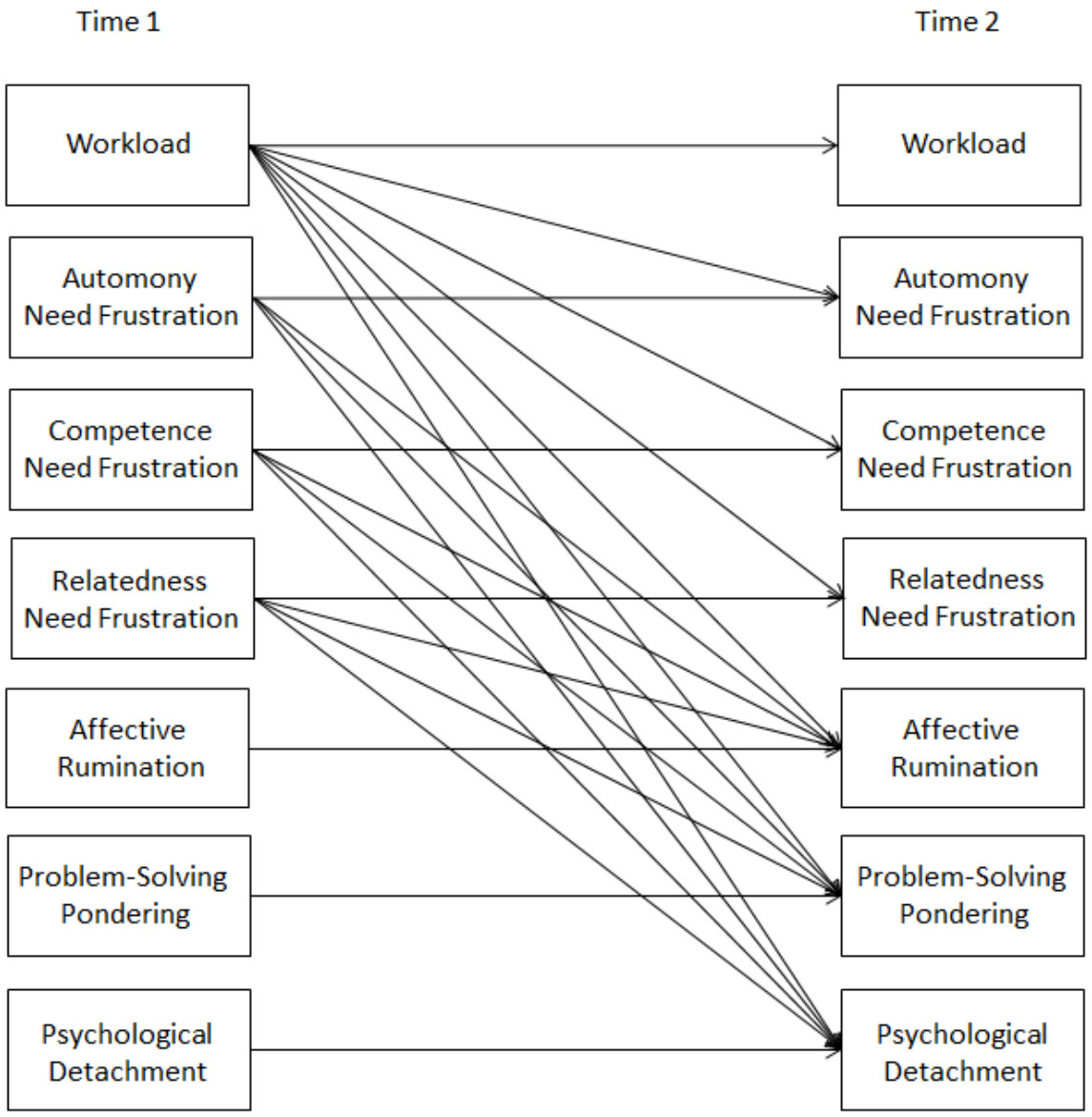
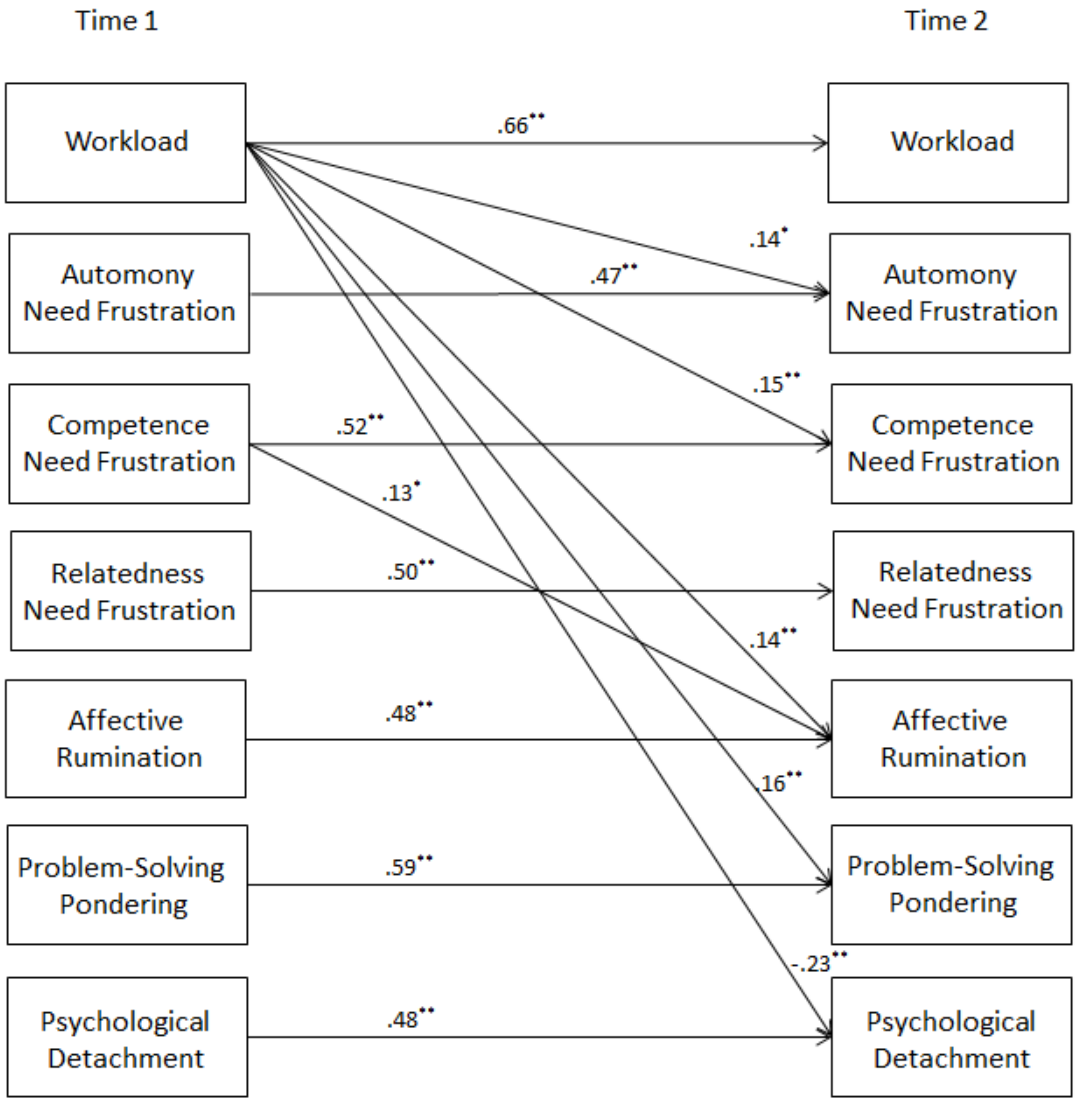


Fig. 2

Results of the Final Model (M2)



Note. $N = 282$. Standardized path coefficients are presented. For clarity concerns, covariances are not shown between the variables.
*$p < .05$. **$p < .01$.