

## Empirical Article

## Daily within-fluctuations in need frustration and implications for employee recovery and well-being: A mixed-methods study

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## Introduction

Daily variations in frustration of basic psychological needs (autonomy, competence, and relatedness) have received limited attention. This mixed-methods study examines such daily variations and their relations to recovery from work and employee well-being.

## Method

The study uses multilevel modeling of repeated measures through daily surveys from a period of 8 working days across 2 consecutive weeks, combined with in-depth interviews. A sample of 54 Norwegian health-care workers completed a total of 242 daily surveys, and follow-up interviews were conducted with 10 participants.

## Results

Quantitative results showed that need frustration at work fluctuates from day to day, with competence frustration notably impairing recovery (i.e., lower psychological detachment and relaxation) and increasing ill-being (i.e., higher exhaustion and negative work affect). Autonomy frustration was related to increased exhaustion and sleep complaints, while relatedness frustration showed no significant relation to recovery, ill-being, or sleep. Qualitative findings corroborated and expanded on these results, offering deepened insights into how competence and, sometimes, relatedness need frustration hampered the recovery process and sleep.

## Conclusion

The results of the current study add to the scarce body of literature on daily fluctuations in need frustration at work and its adverse consequences.

**Key words:** Basic psychological need frustration, recovery from work, employee well-being, self-determination theory, daily diary, mixed-methods.

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## INTRODUCTION

According to self-determination theory (SDT), the interaction between an employee and their surrounding social context is the premise for explaining their growth, flourishing, and well-being (Ryan & Deci, 2017). Because employees' experiences at work can vary from day to day, organizational research based on SDT has started to make use of daily diary studies to capture employees' experiences in their working life as it is lived (e.g., Bakker & Oerlemans, 2019; van Hooff & De Pater, 2019). This line of research aligns with the growing trend of daily diary studies being utilized by researchers in work and organizational psychology, as a useful method to capture the short-term dynamics of experiences within the work context (Ohly, Sonnentag, Niessen & Zapf, 2010). With an emphasis on the importance of satisfying employees' basic psychological needs for autonomy, competence, and relatedness, these diary studies have facilitated an understanding of the degree to which needs vary at the daily level and the individual and contextual antecedents and outcomes with which such variations correlate. Because employees' work situations may indeed fluctuate, capturing these fluctuations is important to predict their effects. In a recent systematic review of such studies, Coxen, Van Der Vaart, Van den Broeck, and Rothmann (2021) showed how need satisfaction predicted

affect, energy, performance, and motivation at the within-person level.

In addition to need satisfaction as an important factor that enriches well-being at work, a more recent research stream focuses on need frustration as a predictor of ill-being and work dysfunctioning (e.g., Niemiec, Olafsen, Halvari & Williams, 2022; Olafsen, Niemiec, Halvari, Deci & Williams, 2017). Because frustration of basic needs means more than a mere lack of need satisfaction in that the needs are acutely thwarted or hampered (Vansteenkiste & Ryan, 2013), the concept of need frustration contributes to understanding, in particular, the dark side of motivational processes at work that can lead to maladjustment and ill-being (Deci, Olafsen & Ryan, 2017; Olafsen & Deci, 2020). However, when it comes to daily fluctuations in basic psychological needs, need frustration has so far not received a whole lot of attention. Given that need frustration may not be the most prevailing experience for the majority of employees (which is indicated by low mean levels in past studies), studies capturing only the general level of these experiences might fail to uncover variation in the constructs, thus not detecting the potential adverse effects elevations in need frustration can have on a daily basis for a particular individual. Recognizing need frustration as a distinct and significant concept in understanding the dark side of motivational processes,

highlights the importance of gaining a better understanding of its daily fluctuations.

The aim of the current study is to contribute to the growing body of literature on the harmful effects of need frustration at work by studying daily fluctuations in this important, and potentially harmful, experience at work. Specifically, this study aimed to (1) evaluate if need frustration at work varies on a daily level, and (2) examine the associations between fluctuating need frustration and its associated outcomes (i.e., psychological detachment, relaxation, negative and positive work affect, vigor, emotional exhaustion, and sleep quality). Due to the study's focus on gaining novel perspectives on how need frustration and its consequences occur in employees' daily lives, we employ a mixed-methods design that combines daily diary assessments to capture daily fluctuations with qualitative in-depth interviews to enrich the quantitative data. The qualitative analysis contributes to elaborate on the concept of need frustration as it relates to day-level experiences and provides deeper insight into the processes underlying the quantitative results. Furthermore, in doing this, we examine the basic psychological needs separately, rather than as a composite score (Van den Broeck, Ferris, Chang & Rosen, 2016). These efforts contribute to a nuanced understanding of daily variations in frustration of each of the basic psychological needs and its consequences in the context of work using a study design that captures the life as it is lived. Also, more broadly, the study contributes to the growing, but still small, body of literature on daily fluctuations in basic psychological needs and their associated consequences, which has been called for (Van den Broeck, Ferris, Chang & Rosen, 2016).

#### *Basic psychological needs as a predictor of optimal functioning at work*

As a motivational theory, SDT emphasizes satisfaction of humans' basic psychological needs as a necessity for growth, functioning, and wellness. Specifically, SDT posits that the needs for autonomy, competence, and relatedness are key determinants for human functioning across various life domains, including the workplace. Meta-analytic evidence (Van den Broeck, Ferris, Chang & Rosen, 2016) shows that with satisfaction of autonomy (i.e., feeling volition and choice in the things one undertakes), competence (i.e., feeling that you are capable and effective in the things that you undertake as well as having the opportunity to develop), and relatedness (i.e., feeling a sense of belongingness to other individuals and groups), employees tend to demonstrate more positive work attitudes (i.e., affective commitment), more positive work behavior (i.e., work performance), and higher levels of both work-related (i.e., work engagement) and general well-being (i.e., vitality).

While the majority of SDT-based research in the workplace has studied basic psychological need satisfaction and its beneficial outcomes, a growing body of literature has recognized basic psychological need frustration as a separate state with distinct consequences. In particular, with need frustration being an active threat to the basic psychological needs, it has been shown to be an important predictor of detrimental consequences over and above satisfaction of the very same needs (e.g., Trépanier, Forest, Fernet & Austin, 2015). The experience of frustration of

autonomy (i.e., feeling coerced or controlled in one's actions), competence (i.e., feeling ineffective or incapable of achieving desired outcomes), and relatedness (i.e., feeling rejected or disconnected from others) at work has been linked to a wide range of adverse outcomes for employees (for a review, see Deci, Olafsen & Ryan, 2017; Forest, Grady Dubord, Olafsen & Carpentier, 2023; Olafsen & Deci, 2020).

For instance, in a recent study, Niemiec, Olafsen, Halvari, and Williams (2022) showed how frustration of the three psychological needs at work predicted sleep disturbance and, in turn, mental ill-health over a period of 15 months. In another longitudinal study by Olafsen, Niemiec, Halvari, Deci, and Williams (2017), need frustration at work was associated with higher levels of work-related stress, which predicted higher levels of somatic symptoms, emotional exhaustion, and sickness absence, while Trépanier, Forest, Fernet, and Austin (2015) showed how need frustration was positively related to controlled work motivation, which, in turn, was positively related to psychological distress and psychosomatic complaints and negatively related to work engagement and work performance. Relatedly, need frustration has recently been found to jeopardize employees' recovery process (Schulz, Fay, Schöllgen & Wendsche, 2024), a critical process for restoring energy and mitigating long-term negative consequences of work-related stress (Sonnetag, Cheng & Parker, 2022). Taken together, having basic psychological needs frustrated at work has been linked to a variety of adverse outcomes spanning from psychological distress and exhaustion to impaired recovery, sleep disturbance, and overall well-being.

#### *Basic psychological need frustration: A within-person perspective*

Daily diary studies have garnered significant attention in recent years within work and organizational psychology as a method for examining short-term processes and everyday experiences of working individuals (e.g., Pindek, Arvan & Spector, 2019). In these study designs, the researchers are occupied with studying variations at the within-person level, rather than examining differences between persons. Because experiences related to psychological needs are dependent on the environment (Deci & Ryan, 2000) and the environment and people's perceptions of it change, it is suggested that the experience of these needs (i.e., whether they are satisfied or frustrated) can fluctuate within persons over time (Ryan & Deci, 2017), and investigations to examine these fluctuations have thus been called for (Van den Broeck, Ferris, Chang & Rosen, 2016). Consecutively, studies have shown that experiences related to psychological needs indeed fluctuate within persons. For instance, Bakker and Oerlemans (2019) found that an employee's daily crafting of structural job resources was related to increased momentary satisfaction of the employee's needs for autonomy and competence, whereas daily crafting for social resources was related to higher satisfaction of the need for relatedness. Further, van Hooft and De Pater (2019) found satisfaction of autonomy, competence, and relatedness to be associated with employees' well-being at the daily level.

Still, with the emergence of need frustration as an important predictor of maladaptive motivational processes, there is a clear

lack of focus on need frustration at the within-person level. We have found only a few exceptions to this general observation, all pointing to experiences of need frustration being distinguishable at the within-person level (Bidee, Vantilborgh, Pepermans, Griep & Hofmans, 2016; Coxen, van der Vaart, Van den Broeck, Rothmann & Schreurs, 2023; Mabbe, Soenens, Vansteenkiste, van der Kaap-Deeder & Mouratidis, 2018; van der Goot, Duvivier, Van Yperen, *et al.*, 2021; Verstuyf, Vansteenkiste, Soenens, Boone & Mouratidis, 2013). Of these, only the studies by van der Goot, Duvivier, Van Yperen, *et al.* (2021) and Coxen, van der Vaart, Van den Broeck, Rothmann, and Schreurs (2023) are based on need experiences in the work context. First, the study by van der Goot, Duvivier, Van Yperen, *et al.* (2021) examined psychological distress among frontline workers in the context of the COVID-19 pandemic as a consequence of need frustration. Their mixed-methods study found that perceived psychological distress fluctuated over time and that need frustration (especially frustration of autonomy and competence) was positively associated with such distress. Further, based on a qualitative analysis, they observed that organizational logistics and unfamiliarity with COVID-19 frustrated the needs for autonomy and competence, respectively. Importantly, in their study, van der Goot, Duvivier, Van Yperen, *et al.* (2021) collected data at the weekly level with more than a month between each data collection across the 8-month study period, leaving daily variation in need frustration at work unaddressed. Second, the recent study by Coxen, van der Vaart, Van den Broeck, Rothmann, and Schreurs (2023) showed that need frustration varied slightly more than need satisfaction at the daily level, and results indicated that daily need frustration was linked to amotivation as well as indirectly to exhaustion through intrinsic motivation. However, this study did not explore the implications of daily frustration of each need separately, and the composite measure of need frustration had a poor reliability at the within-person level, rendering findings inconclusive and pointing to potentially distinct patterns in the three basic needs' daily frustration.

Taken together, with most studies having examined need frustration in general or over a long period, it is unclear if experiences of frustration at work are constant or if frustration consists of single frustrating events that are separated from one another in time. Because it can be argued that basic psychological need frustration generally is experienced at low levels, studying it within shorter periods might detect important variations that otherwise would have been missed and that may very well have implications for employee well-being. Indeed, as frustration can be experienced when the basic psychological needs are actively undermined as a result of social contextual influences (Vansteenkiste, Ryan & Soenens, 2020), need frustrating experiences could be fluctuating depending on the situational conditions at work on a day-to-day basis. Moreover, since there may be differences between the three basic needs regarding their potential for daily frustration fluctuations, given their conceptually distinct nature as independent and non-compensatory (see also Van den Broeck, Ferris, Chang & Rosen, 2016), as well as their distinct relation to specific outcomes (Coxen, Van Der Vaart, Van den Broeck & Rothmann, 2021), it is imperative to study them individually. Consequently, in the present study we seek to examine employees' experiences of need frustration at work on a

daily basis. Unlike the study by Coxen, van der Vaart, Van den Broeck, Rothmann, and Schreurs (2023), as well as some of the prior diary studies on need frustration in other contexts (Bidee, Vantilborgh, Pepermans, Griep & Hofmans, 2016; Mabbe, Soenens, Vansteenkiste, van der Kaap-Deeder & Mouratidis, 2018), we examine each need separately (as opposed to a composite score) to detect whether and how each of them fluctuate, informing us of possible differences between the needs in terms of which of them show short-term fluctuations and which of them may be more stable. As such, our study adds to these past findings by being the first to comprehensively focus on distinct experiences and processes related to daily frustration of the three basic psychological needs at work by asking the following research questions:

*RQ1: How does need frustration vary at the daily level?*

*RQ2a: What is the relation between need frustration and recovery experiences (psychological detachment and relaxation) at the daily level?*

*RQ2b: What is the relation between need frustration and energy (exhaustion and vigor) and need frustration and work-related affect (negative and positive work affect) at the daily level?*

*RQ2c: What is the relation between need frustration and sleep quality at the daily level?*

## METHOD

### *Study design*

This study used a sequential mixed-methods research design (Ivankova, 2014) including a diary study with daily collection of quantitative data from employees, followed by qualitative data collection with individual interviews for a sub-sample of the participants to capture their experiences regarding the research topic. The use of mixed-methods, with a combination of both quantitative and qualitative methods in the same study, is a growing methodological trend in organizational sciences (Harrison, Reilly & Creswell, 2020; Molina-Azorin, Bergh, Corley & Ketchen Jr, 2017). As "mixed-method research providing opportunities to meaningfully engage with differences and nuances in the topic studied" (Molina-Azorin, Bergh, Corley & Ketchen Jr, 2017), such a design is especially suitable for improving our understanding of daily variations in need frustration as a topic that is currently scarcely studied and has several unresolved questions. For the current study, a sequential QUANTITATIVE → qualitative approach was deliberately chosen. The arrow indicates that the quantitative data influenced both the collection and the interpretation of the qualitative data (Morse, 2003), whereas the capital letters indicate that the quantitative data is the dominant source of data (Miller, 2003).

### *Procedures and participants*

Employees working within mental health care have reported higher levels of ill-being (e.g., burnout rates) and higher absenteeism and turnover rates compared with staff in other health-care sectors (Johnson, Hall, Berzins, Baker, Melling & Thompson, 2018). This might be related to findings that having an emotionally demanding work situation can be a risk factor for exhaustion and poor recovery from work (e.g., Fouquereau, Morin, Lapointe, Mokoukolo & Gillet, 2019; Posluns & Gall, 2020). Thus, mental health care employees constitute ideal participants for an in-depth investigation on daily need frustration at work, with the potential of both



occurring and variable experiences of need frustration. The current study was conducted in four different Norwegian mental health care institutions offering inpatient treatment for patients with severe mental illnesses. Two of the institutions are considered larger institutions ( $N$  inpatients  $\approx 50$ ), whereas the two others are considered smaller institutions ( $N$  inpatients  $\approx 15$ ). Data were collected through an electronic survey sent to the employees' work e-mail early in the morning (7 a.m.), in which they were asked to respond in relation to their experiences the previous day regarding both work and leisure time and the previous night regarding their sleep quality. As it was of importance to capture the participants' full recovery period, from the afternoon until they went to bed, we found it most ethical and meaningful to send out the questionnaire the next morning, rather than late in the evening. Participants had to fill out one general survey including background characteristics and eight daily surveys (Tuesday through Friday) for 2 consecutive weeks. To encourage participation, we announced that respondents who completed the full study would receive a gift card of 20 USD/Euros. We obtained approval from SIKT (formerly the Norwegian Center for Research Data) prior to data collection, and all participants provided informed consent.

The baseline survey was sent out to a total of 100 employees across the four institutions. As the design of the study was a diary study exploring fluctuations from day to day measured in the morning, only employees working during the daytime and in 80–100% full-time positions were included. The work at these mental health institutions was interdisciplinary and consisted of a range of occupations such as psychiatrists, psychologists, psychiatric nurses, social workers, music therapists, physical activity instructors, administrative leaders, and occupational therapists. A total of 61 employees answered the baseline measures, of which 54 filled out at least one diary measure (response rate = 89%) and 49 filled out at least two measures (response rate = 80%). Three-fourths (74%) of the employees were female, and approximately half (46%) had completed a master's level education or higher. Two-thirds (68%) were married/lived together with a partner, and 16% had children under 6 years.

The participants filled out a total of 282 daily diary entries. Of these, 46 entries had a mismatch between the date of invitation and the response date. Duplicate records from respondents who had answered multiple invitations the same day were deleted ( $n = 40$ ), keeping the diary that was answered on the same date as the invitation. We decided to keep entries that had been answered on a different day than the invitation was sent if that day corresponded with another day of the diary period and if there were no other diary records from that day ( $n = 6$ ). This resulted in a sample of 242 diary entries across the 8 study days (response rate = 56%). A post hoc power analysis using G\*Power (Faul, Erdfelder, Lang & Buchner, 2007) indicated that a medium effect size ( $f^2 = 0.25$ ) and an alpha error probability of 0.05 with our sample size would have resulted in a power of 0.98 for testing effects at the within-person level. As such, the daily diary sample was sufficiently powered. The qualitative data was collected from the overall sample of organizations three and four. These two organizations were chosen as they represented both a smaller and a larger in-patient mental health care institution. From this sample, 17 participants were invited to participate in an in-depth individual interview. Of these, 10 accepted the invitation to participate; two were men and eight were women. Their occupations were psychologists, social workers, physical activity instructor, psychiatric nurses, and leaders. The leaders had backgrounds as psychiatric nurses and were all engaged with supervision of their employers regarding the daily treatment of patients.

### Data collection Part 1: Quantitative measures

**Basic psychological need frustration.** Respondents were asked to rate frustration of their basic psychological needs the previous workday using the Basic Psychological Need Satisfaction and Frustration Scale in the Work Domain (Olafsen, Halvari & Frølund, 2021). Autonomy need frustration (e.g., "Many of the things I did at work yesterday I felt pressured to do"), competence need frustration (e.g., "At work yesterday I felt like a failure because of the mistakes I made"), and relatedness need frustration (e.g., "Yesterday I got the impression that people I spent time with at work disliked me") were each assessed with four items on a scale

ranging from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha ranged from 0.85 to 0.92 ( $M = 0.88$ ) for autonomy frustration, from 0.87 to 0.98 ( $M = 0.93$ ) for competence frustration, and from 0.85 to 0.94 ( $M = 0.90$ ) for relatedness frustration. McDonald's omegas at the within-person level were 0.87 for autonomy frustration, 0.94 for competence frustration, and 0.89 for relatedness frustration.

**Recovery experiences.** Psychological detachment from work and relaxation during the evening were measured each with four items adapted from the Recovery Experience Questionnaire (Sonnentag & Fritz, 2007). Items were adapted to assess psychological detachment and relaxation experienced the previous evening (sample item for psychological detachment: "Yesterday after work, I forgot about work"; sample item for recovery: "Yesterday after work, I relaxed"), and were assessed on a scale ranging from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha ranged from 0.84 to 0.94 ( $M = 0.90$ ) for psychological detachment and from 0.92 to 0.97 ( $M = 0.95$ ) for relaxation. McDonald's within-person omegas were 0.90 for psychological detachment and 0.96 for relaxation.

**Emotional exhaustion.** Respondents' degree of emotional exhaustion was assessed with five items from the Maslach Burnout Inventory (Maslach, Jackson & Leiter, 1996) adapted to a day-level assessment. The respondents rated the extent to which they experienced emotional exhaustion (e.g., "I felt exhausted by my work") the previous day on a scale ranging from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha ranged from 0.82 to 0.93 ( $M = 0.89$ ), while McDonald's within-person omega was 0.89.

**Vigor.** Respondents' degree of vigor was assessed with an adapted version of the short version of the Utrecht Work Engagement Scale (Schaufeli, Bakker & Salanova, 2006). The respondents rated the extent to which they experienced vigor (e.g., "I felt strong and vigorous at work") the previous day on a scale ranging from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha ranged from 0.82 to 0.93 ( $M = 0.88$ ), while McDonald's within-person omega was 0.90.

**Work affect.** To capture respondents' affect if and when they were thinking about work after work hours the previous evening, we used the Job-Related Affective Well-Being Scale (Van Katwyk, Fox, Spector & Kelloway, 2000). In particular, respondents were asked to rate their degree of work-related negative (five items; e.g., irritable) and positive (six items; e.g., enthusiastic) affect when thinking about work during their leisure time the previous day on a scale ranging from 1 (*to a little extent*) to 7 (*to a large extent*). Cronbach's alpha ranged from 0.71 to 0.91 ( $M = 0.83$ ) for negative work affect and from 0.86 to 0.91 ( $M = 0.88$ ) for positive work affect. McDonald's within-person omegas were 0.86 for negative work affect and 0.88 for positive work affect.

**Sleep complaints.** Degree of experienced sleep complaints was measured using four items from the Karolinska Sleep Questionnaire (Kecklund & Åkerstedt, 1992). The respondents were asked to indicate their agreement with the four statements in relation to their sleep the previous night (e.g., difficulties falling asleep) on a scale ranging from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha ranged from 0.75 to 0.88 ( $M = 0.83$ ), while McDonald's within-person omega was 0.84.

### Data collection Part 2: Qualitative interview

Individual semi-structured interviews were chosen as the methodology to collect the qualitative data (Patton, 2014). This data collection was conducted within 10 weeks after the completion of the diary study. The interview guide was built around the core themes of the diary study, capturing these topics: descriptions of the participants' work and their typical workday; descriptions of a good day/bad day at work; what recovery (relaxation and psychological detachment) from work meant to them, how this manifested in their everyday life, and its daily variations; perceptions of work-related well-being and energy; and sleep quality.

Although the interviews were centered around these themes and in this order, the conversation was not bound to this structure, and the participants could freely share their experiences related to the mentioned topics throughout the interview. As such, reflections on daily fluctuations regarding their work experiences, recovery, and work-related health and energy were the essence of the interview. Of importance, prior to the interview, the researchers had pre-analyzed the quantitative data for the total population. As such, the interviewer was aware of these findings and was able to ask probing questions related to both expected and unexpected findings in the quantitative results. All interviews in the present study were carried out by the last author. She has an extensive research background in qualitative methods and prior work experience in psychiatric settings. This background and contextual knowledge were of importance in making the participants feel comfortable and her being able to probe and ask clarifying questions during the interviews. Due to practical logistics, nine of the interviews were conducted via an online communication tool with audio and video, while one was conducted face-to-face in the office of the participant. All interviews were audio-recorded (and lasted in the range of 21–60 min) and later transcribed verbatim (raw data: 117 pages, Times New Roman 12, single space).

### Data analytic strategy

**Quantitative data.** As the data had a nested structure (days nested in participants), the quantitative examination of the research questions was conducted with multilevel path modeling in Mplus 8.8 (maximum likelihood estimation) using all available data. First, to examine RQ1 (within- and between-person level variation in need frustration at work), a null model was created for each study variable to assess variation at the within- and the between-person levels (Bryk & Raudenbush, 1992). RQ2a–c were assessed with a model including all predictors (basic psychological need frustration at work) and outcomes (psychological detachment, relaxation, sleep, exhaustion, vigor, negative work affect, and positive work affect). Person-mean centering was used to divide variance at the within and the between-person levels. Although our hypotheses focused on daily (i.e., within-person) variation, all relationships between predictors and outcomes were included simultaneously at the within- and the between-person levels (Preacher, Zyphur & Zhang, 2010). Due to scarce prior research examining day-level need frustration, we did not have clear theoretical reasons to control for background characteristics, and hence, as recommended by Becker, Atinc, Breugh, Carlson, Edwards, and Spector (2016), we did not include these variables in our models. We predicted each outcome by time to account for the chronological structure of the data (Bliese & Ployhart, 2002). As time is what allows the relationships between need frustration and potential outcomes to unfold, including time as a predictor is the most accurate representation of these relationships even for the outcomes that are not significantly predicted by time (i.e., the day of measurement). We estimated the models with a random intercept and fixed slope for each variable, as random slopes can add “unnecessary complications and may reduce the probability of convergence” (Preacher, Zyphur & Zhang, 2010, p. 217).

**Qualitative data.** To analyze the qualitative data, a three-step content analysis was used (Miles & Huberman, 1994). To become immersed in the data, we read the transcribed data several times to become familiar with the content. The analytic process could be described as abductive, as it involved both inductive and deductive coding (Graneheim & Lundman, 2004). First, the initial themes were derived deductively, guided by the structure of the interview guide. Thereafter, inductive coding was done by identifying concepts and sub-themes throughout the raw data within each of the subdomains created in the deductive phase. The inductive coding was guided by creating patterns of meaning units from the raw data across data from all the participants. The last author was responsible for these two phases of the analyses. However, all three researchers participated in the last phase of the analytic process and were immersed in the discussion of overlapping subthemes, until the core findings related to each of the three major

research questions were discovered. Central during this phase was a critical discussion regarding the possible interpretations of the findings, until a level of agreement was reached. In the presentation of results, direct quotes from the data have been translated into English. To enhance validity in a possible loss of meaning during translation into English, the research team has collaborated to minimize such loss (Van Nes, Abma, Jonsson & Deeg, 2010). The direct quotes are of importance to reflect and respect the content of the participants' experiences. Pseudonyms are used when referring to the quotes of the participants, allowing for data to be de-identified without being de-personalized (Heaton, 2022).

## RESULTS

### *Variations in need frustration at the within- and the between-person levels*

Descriptive statistics indicated that levels of daily need frustration were low to moderate among the sample, with relatedness frustration showing the lowest levels (see Table 1). Frustrations of the three needs were significantly positively correlated with one another at the within-person level. These correlations were small to moderate, indicating that daily changes in frustration of the three needs are relatively independent of each other.

Intra-class correlation coefficients (ICC1) were used to quantitatively examine variation in need frustration at the within- and between-person levels. The ICC1 for the study variables varied between 0.37 and 0.72 (Table 1), indicating that conducting a multilevel analysis was appropriate (Bliese, Maltarich & Hendricks, 2018). For need frustration, competence frustration (ICC1 = 0.55) and relatedness frustration (ICC1 = 0.57) varied slightly more at the between-person level compared with the within-person level. However, less than a third of the variance in autonomy frustration was at the within-person level (ICC1 = 0.72). Thus, autonomy frustration was more stable across days compared with competence and relatedness frustration.

The qualitative findings revealed that the participants generally had positive experiences at work, reflecting the ability to a large extent to decide for themselves how to plan their days and perform their jobs, feeling competent in what they did and having mutual positive connections with their colleagues. Several described their workplace as a job “to retire from, not to quit from.” Yet, daily fluctuations in need frustration were expressed, and the participants had vivid experiences regarding days and situations that differed from the average. Looking at the three needs separately, matching with the quantitative results, the participants experienced less daily variation in frustration of the need for autonomy compared with the other two needs. They all described having a general experience of being able to shape their workday and their work content (such as tasks) and being able to decide for themselves how to go about the way in which they performed their work assignments. In addition to that, the participants mentioned very few events related to autonomy frustration.

Competence frustration stood out as the clearest qualitative finding among all participants in relation to within-person daily fluctuations in the basic needs. All the participants described days when they experienced competence frustration, which occurred

Table 1. Descriptive statistics of the study variables

Variable	ICC	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Autonomy frustration	0.72	2.61	1.16		0.66**	0.23	−0.29*	−0.20	0.37**	0.64**	−0.70**	0.51**	−0.07
2. Competence frustration	0.55	2.23	1.01	0.52**		0.41**	−0.40**	−0.05	0.20	0.57**	−0.48**	0.59**	−0.03
3. Relatedness frustration	0.57	1.64	0.82	0.35**	0.40**		−0.08	−0.08	0.27	0.38**	−0.23	0.16	−0.03
4. Psychological detachment	0.40	4.68	1.18	−0.25**	−0.36**	−0.11		0.53**	−0.28*	−0.38**	0.21	−0.53**	−0.30*
5. Relaxation	0.39	5.13	1.19	−0.24**	−0.31**	−0.11	0.54**		−0.32*	−0.37**	0.40**	−0.35*	−0.06
6. Sleep complaints	0.50	3.11	1.28	0.21**	0.20**	0.11	−0.22**	−0.18*		0.56**	−0.40**	0.29*	−0.00
7. Exhaustion	0.64	3.04	1.11	0.32**	0.41**	0.13	−0.31**	−0.21**	0.21**		−0.74**	0.41**	−0.14
8. Vigor	0.60	4.38	1.12	−0.09	−0.15*	−0.13	0.05	0.05	−0.01	−0.10		−0.33*	0.37**
9. Negative work affect	0.37	2.32	0.92	0.28**	0.38**	0.17*	−0.51**	−0.29**	0.21**	0.18*	−0.19*		0.27
10. Positive work affect	0.54	3.79	1.09	0.03	−0.10	−0.10	−0.07	0.16*	0.06	0.04	0.28**	0.21**	

Note: Correlations at the within-person level are below the diagonal, and correlations at the between-person level are above the diagonal. ICC = intra-class correlation coefficient; *M* = mean; *SD* = standard deviation.

\**p* < 0.05;

\*\**p* < 0.01.

either in situations in which the participants experienced having too much to do (a high workload) or in incidents that were challenging to handle (feeling uncertain regarding making the right decisions). Furthermore, competence frustration was experienced in relation to evaluation and feedback on their work performance, both based on their own evaluation and based on evaluations from their colleagues. This is how Nancy describes her self-evaluation of competence frustration after her being responsible for holding a course for colleagues that failed to achieve the intended outcomes: “After, I reflect a lot about why I was not able to lead the meeting in a good way. I go into details, why were they so uninterested? What could I have done to keep their attention, making the course relevant for them? I question myself, and I ruminate a lot on how I can improve.” Further, the following quote describes how Susan felt in relation to a feedback situation in which her need for competence was frustrated:

First I get annoyed that someone needs to point it out, like “No, this is not a thing.” But then a feeling of insecurity comes at me like maybe what I did was not good enough? Well, eh, it depends really whether I have a feeling of energy that day or not. Those days with energy, I don’t care about situations like this. But on other days (when feeling tired), I stop and sort of give such comments more room. These are the days I don’t feel I am good enough and not capable of doing my job, because other persons’ (patients’) lives are counting on me, and they come here because I should help them and make a difference.

In general, the participants experienced their relationships to colleagues as warm, with mutual trust and ability to seek help and support if needed. However, incidences of need frustration based on interpersonal relations could occur in situations in which there were disagreements on work-related matters or in the mentioned feedback situations. The following quote also comes from Susan,

in which she gives an example of a typical situation in which she questioned her interpersonal relation with a colleague, leading her to feeling insecure about the quality of their relation:

Well, sometimes I get feedback on formal assignments that I have done, which can make me feel insecure both at work and in my private life. Because then I am not quite sure if it is just the written feedback on my performance of the task, or if she (a colleague) is sending me a signal of her being annoyed at me. Yes, if this happens, I feel more stress and I bring it with me home and I get insecure, and this can make me ruminate for a period of time.

This quote illustrates how the feedback situation can be related to frustration of both the need for relatedness and the need for competence. Susan’s reflection is related to her questioning whether the quality of the relation with her colleague is hampered. As such, the feedback situation is setting the stage leading to the experiences of relatedness need frustration. Further, Susan points out that it is this feeling of insecurity in their relation that makes her “feel more stress,” which leads to potential consequences for need frustration.

Linda explained how being in a conflict with a close colleague made her ruminate about her own competence at work: “During the last week I have been really pissed off at a colleague, because we cannot really make it work and I think he is stupid. It drains energy to be in this conflict, we are two people that are in this conflict, and we are not able to solve it, and our leaders need to negotiate between us. So that we are not able to handle it and solve it, I feel this is silly and strange.” In this situation, Linda is describing a feeling of competence frustration; however, it is also notable that she is evaluating not only her own competence frustration but also her colleague and that she is describing the frustration in relation to both herself and her colleague as “we are not competent to solve this on our own.”

*The relation between need frustration and recovery at the within-person level*

In the quantitative examination at the within-person level, competence frustration negatively predicted psychological detachment ( $\gamma = -0.49$ ,  $SE = 0.12$ ,  $p < 0.001$ , 95% CI  $[-0.716, -0.261]$ ) and relaxation ( $\gamma = -0.39$ ,  $SE = 0.12$ ,  $p < 0.01$ , 95% CI  $[-0.632, -0.155]$ ). Autonomy frustration (psychological detachment:  $\gamma = -0.15$ ,  $SE = 0.14$ ,  $p = 0.28$ , 95% CI  $[-0.433, 0.127]$ ; relaxation:  $\gamma = -0.17$ ,  $SE = 0.15$ ,  $p = 0.25$ , 95% CI  $[-0.465, 0.121]$ ) and relatedness frustration (detachment:  $\gamma = 0.11$ ,  $SE = 0.15$ ,  $p = 0.45$ , 95% CI  $[-0.180, 0.407]$ ; relaxation:  $\gamma = 0.05$ ,  $SE = 0.16$ ,  $p = 0.78$ , 95% CI  $[-0.262, 0.352]$ ) did not have any significant effects on recovery at the within-person level. Measurement time did not have a significant effect on psychological detachment ( $\gamma = 0.06$ ,  $SE = 0.03$ ,  $p = 0.10$ ) or relaxation ( $\gamma = 0.02$ ,  $SE = 0.04$ ,  $p = 0.59$ ).

Similar to the quantitative results, the qualitative results clearly indicated that the experience of competence frustration stemming from work hampered the recovery process that same day. More specifically, the participants described how experiences of competence frustration at work led to difficulties in psychological detachment during their leisure time (i.e., afternoons and evenings) as they were having negative thoughts and emotions regarding their work. These difficulties were expressed in the following quotes that exemplify how Clara and Michael expressed this:

[Clara]: *Yesterday, where there were three incidents (at work) which kind of made me wonder ... did I take the right decision, could I have done anything differently, where I ruminate about this during the afternoon and evening, right? And I kind of go to bed and think about how I can handle this tomorrow. Should I call the family first, should I? Could I have done anything differently? It is those days I feel it sort of ... recovery is more difficult to achieve, like switch off, switch away job ... which is important for me.*

[Michael]: *Well, sometimes I really worry about going to work the next day. Being insecure that something more (escalating incidents with patients) might have happened. I can have thoughts related to me not being able to handle what have and what might happen. And, that it might be too much for me to handle, that I will become insecure if I am capable, right.*

Further, the participants described how, in days with high workloads, they did not feel they were handling all their assignments adequately due to the overload or complexity of the situations and experienced that this negatively affected recovery experiences (i.e., relaxation) at home. The feeling of being stressed manifested both mentally and physically, which resulted in difficulties with unwinding and relaxing, not wanting to be social (with friends, for instance), and not being able to be mentally present at home. It also affected their mood and caused shorter tempers toward family.

[Susan]: *I get more easily annoyed, right. I hear that I, in particular how I answer my kids, like very short and*

*definite ... just because there is a bit of noise or fuss. I interpret everything like noise or too much, and very often I know that this is not real ... It is within me. And it is more of situations like this if I bring stuff with me home (from work).*

[Nancy]: *Well, me and my husband have talked about it. We need to stop talking about work during dinner in front of the kids. We get stuck at those demanding topics, and it is not really uplifting. So yes, I spend a lot of time on that.*

*The relation between need frustration and energy and work-related affect at the within-person level*

In the quantitative examination at the within-person level, competence frustration positively predicted exhaustion ( $\gamma = 0.30$ ,  $SE = 0.07$ ,  $p < 0.001$ , 95% CI  $[0.158, 0.446]$ ) and negative work affect ( $\gamma = 0.34$ ,  $SE = 0.09$ ,  $p < 0.001$ , 95% CI  $[0.173, 0.509]$ ), but not positive work affect ( $\gamma = -0.15$ ,  $SE = 0.09$ ,  $p = 0.10$ , 95% CI  $[-0.321, 0.027]$ ) or vigor ( $\gamma = -0.11$ ,  $SE = 0.09$ ,  $p = 0.20$ , 95% CI  $[-0.280, 0.059]$ ). Autonomy frustration positively predicted exhaustion ( $\gamma = 0.18$ ,  $SE = 0.09$ ,  $p < 0.05$ , 95% CI  $[0.006, 0.360]$ ), but not the other outcomes (vigor:  $\gamma = -0.01$ ,  $SE = 0.11$ ,  $p = 0.92$ , 95% CI  $[-0.218, 0.198]$ ; negative work affect:  $\gamma = 0.13$ ,  $SE = 0.11$ ,  $p = 0.20$ , 95% CI  $[-0.071, 0.340]$ ; positive work affect:  $\gamma = 0.15$ ,  $SE = 0.11$ ,  $p = 0.16$ , 95% CI  $[-0.061, 0.363]$ ). Relatedness frustration was not significantly related to energy or work-related affect (exhaustion:  $\gamma = -0.06$ ,  $SE = 0.10$ ,  $p = 0.52$ , 95% CI  $[-0.248, 0.126]$ ; vigor:  $\gamma = -0.11$ ,  $SE = 0.11$ ,  $p = 0.32$ , 95% CI  $[-0.328, 0.107]$ ; negative work affect:  $\gamma = 0.01$ ,  $SE = 0.11$ ,  $p = 0.91$ , 95% CI  $[-0.203, 0.229]$ ; positive work affect:  $\gamma = -0.10$ ,  $SE = 0.12$ ,  $p = 0.38$ , 95% CI  $[-0.327, 0.124]$ ). Negative work affect ( $\gamma = -0.12$ ,  $SE = 0.03$ ,  $p < 0.001$ ) tended to decrease during the study period, whereas time had no effect on exhaustion ( $\gamma = 0.00$ ,  $SE = 0.02$ ,  $p = 0.86$ ), vigor ( $\gamma = 0.01$ ,  $SE = 0.03$ ,  $p = 0.75$ ), or positive work affect ( $\gamma = -0.04$ ,  $SE = 0.03$ ,  $p = 0.10$ ).

The qualitative results indicated that the participants overall described their work-related energy and work-related affect in positive terms. At the same time, similar to the quantitative data, based on Susan's, Nancy's, Linda's, Michael's, and Clara's quotes above, it was apparent that experiences of need frustration (in particular, competence) was related to ill-being outcomes (e.g., lowered mood and energy depletion). As such, although the implications of need-frustrating experiences on lack of recovery were most explicit in the data, findings related to lack of energy and negative affect were also present. In this way, the qualitative data mirrored the quantitative data, in terms of frustration manifesting in the ill-being outcomes explicitly and not the well-being outcomes. Further, and beyond what we were able to analyze based on the quantitative data, the qualitative data also indicated spillover effects from one day to another as well as from private life to work life. As some participants described it, negative experiences in their private lives occupied their thoughts at work.



[Bob]: *If I am in a bad phase and I argue with my wife and things suck ... Well, I think it affects my work life, that I let my experiences in my private life affect my work. At work ... I dwell on my issues at home, more so than I do at home with problems I have at work.*

#### *The relation between need frustration and sleep at the within-person level*

Autonomy frustration positively predicted sleep complaints at the within-person level ( $\gamma = 0.29$ ,  $SE = 0.14$ ,  $p < 0.05$ , 95% CI [0.018, 0.564]). Competence frustration ( $\gamma = 0.19$ ,  $SE = 0.11$ ,  $p = 0.10$ , 95% CI [-0.033, 0.411]) and relatedness frustration ( $\gamma = -0.19$ ,  $SE = 0.15$ ,  $p = 0.20$ , 95% CI [-0.473, 0.100]) did not have a significant effect on sleep complaints. Measurement time was unrelated to sleep complaints ( $\gamma = 0.00$ ,  $SE = 0.03$ ,  $p = 0.93$ ). The qualitative findings did reveal a relation between days of experiencing higher levels of need frustration at work and sleep quality. This was apparent in the way several of the participants talked about how they from time to time had difficult experiences at work that disturbed both their ability to fall asleep in the evening and their sleep quality at night. These were situations related to competence frustration (having made serious administrative mistakes that head management had to overlook) or relatedness frustration (being in a conflict with a colleague). An example of this is how Linda talked about how a conflict could keep her awake at night: "The other night, I did not sleep well, because I was so angry with my colleague that I was going to meet today. Then I ruminated intensely, but it is, yes it is something that happens now and then." Moreover, half of the population openly shared their experiences of having poor sleep quality, but that this was perceived as being due to non-related work causes such as having small children or physical complaints (e.g., being in menopause and chronic back pain). Despite the informants not perceiving work-related matters as causing sleep disturbances, they all said that when lying awake, they could start ruminating about work and most often this was related to complicated situations and work demands ahead. As Nancy explained: "Well, If I am in a period with stress (heavy workload) it will affect my ability to fall asleep again."

#### *Summary of the quantitative and qualitative results*

Figure 1 summarizes and illustrates the findings across the two data sources. In relation to RQ1, the findings revealed that the experience of need frustration for all three basic psychological needs varies on the daily level, although autonomy frustration does so less than the others. This was apparent in both the quantitative and qualitative data and is further emphasized by the qualitatively derived sources of need frustration, which primarily correspond to competence and relatedness frustration. As for RQ2a, the findings revealed that only competence frustration had associations with recovery experiences supported by findings in both data sources. In relation to RQ2b, autonomy and competence frustration were associated with higher levels of exhaustion, while only competence frustration had an association with negative work affect, whereas vigor and positive affect seemed unrelated to

frustration of any of the three needs. Finally, in relation to RQ2c, the quantitative data revealed a positive association between autonomy frustration and sleep complaints, while the qualitative data suggested that competence and relatedness frustration can also contribute to such issues.

#### DISCUSSION

The aim of the current study was to examine daily within-level fluctuations in need frustration and their implications for employee recovery, energy, work affect, and sleep. Compared with need satisfaction, need frustration may to a greater extent be caused by single events rather than an overall experience that makes diary and qualitative studies needed to better capture experiences of need frustration at work. By using a mixed-methods design constituted of a daily diary and in-depth interviews, we were able to provide a nuanced picture of employee experiences of need frustration at work. The findings showed that frustration of the basic psychological needs for autonomy, competence, and relatedness at work indeed varied within persons, but that there are differences between the three needs when it comes to their variability and relations to employee recovery and well-being.

#### *"I don't feel I am good enough and not capable of doing my job": Variations in basic psychological need frustration*

The results from both methods utilized revealed generally low levels of need frustration among participants, indicating that it is not their typical experience at work, but nevertheless that it fluctuates at the daily level as single need-frustrating events occurring every now and then. Thus, this finding importantly underscores the significance of studying need frustration on the daily level within populations that mostly thrive at work in order to be able to robustly capture incidents and events of need frustration that do not occur frequently, and thereby reduce the methodological bias caused by low mean values, referred to as the "healthy worker effect" (Karasek & Theorell, 1990).

Based on the results, it seems that autonomy need frustration at work is less prone to change at the daily level, while competence and relatedness frustration tend to fluctuate more. It seems logical that autonomy need frustration varies little from day to day as its measure could be argued to reflect the level of autonomy frustration in connection with one's job role (e.g., yesterday I felt pressured to do many of the things I did at work), which may not in practice be fluctuating to the same extent as, for instance, competence frustration (e.g., yesterday at work I felt like a failure because of the mistakes I made), at least not on a daily basis. Although today's workforce performs various tasks, the experienced autonomy frustration in relation to the overall job might be quite stable, or at least fluctuate quite rarely, making the 2-week study period too short to pick up on such variations. While autonomy frustration was reported to have an 82% within-person variance in the study by van der Goot, Duvivier, Van Yperen, *et al.* (2021), this was measured at the weekly level and in the context of COVID-19, which represented a rather big change to the status quo for frontline employees in the health-care context of this study, where their tasks might have changed quite



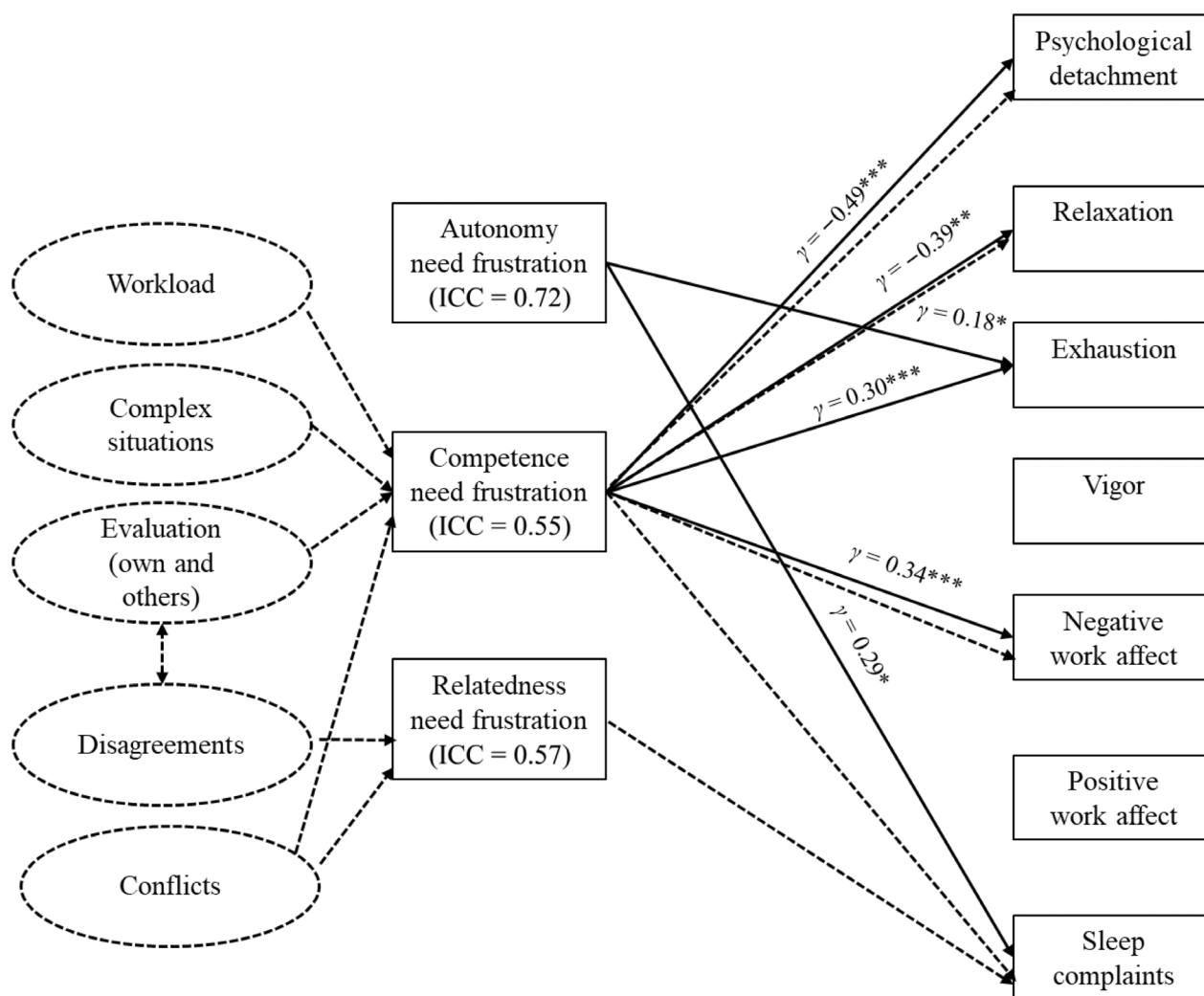


Fig. 1. Results of the mixed-methods analysis. Rectangles represent study variables, and ovals represent the source of need frustration detected in the qualitative data. Solid lines represent the results of the quantitative analysis, and dotted lines represent the main results of the qualitative analysis.

drastically, and the degree of autonomy at work may have been markedly challenged during this time by necessity.

The qualitative data pointed especially to high workload, conflicts, challenging/uncertain situations, and self-evaluation of work performance as sources of competence need frustration, whereas performance evaluations from peers (i.e., negative feedback) was perceived as both competence and relatedness frustrating. How the informants described these incidents or situations fits well with the definition of frustration as actively undermining the basic needs (Vansteenkiste, Ryan & Soenens, 2020), herein through events in which one feels incompetent through an excessive workload, uncertainty of the situation, or negative feedback from others. As illustrated in the quotes, it appears that the sense of reduced professional efficacy is a large part of the competence frustration these employees are experiencing. As a lack of professional efficacy is one of the key symptoms of burnout (Mäkikangas, Leiter, Kinnunen & Feldt, 2021), this finding is interesting for the recovery context in our study.

Relatedness frustration was the least frustrated need in the quantitative data (as per mean level), and in the qualitative data

the situations referring to social relationships similarly appeared satisfying on a general basis. However, the quantitative data did point to fluctuations in relatedness frustration, and the qualitative findings further revealed that these experiences do occur in some situations. Since incidences of relatedness frustration can be rare in work teams where there is a general tendency of positive connections between colleagues, when they do happen, they can be perceived as rather unexpected. This unpredictable nature of relatedness frustration may explain its variation at the daily level in the quantitative data. The qualitative findings also showed that when relatedness frustration does occur, it is experienced rather strongly. Moreover, when mentioning interactions with colleagues leading to relatedness frustration, these interactions also seemed to cause competence frustration as these situations in which the informants felt disliked by colleagues involved disagreement on work-related matters and in feedback situations rather than relating to the social relation itself. As such, it could be that relatedness need frustration can be experienced due to more subtle and indirect incidents, compared with more explicit and clear incidents such as, for instance, bullying or exclusion. This

may explain why we found few mentions of relatedness frustration in isolation from experiences related to competence frustration.

*“It is those days I feel it sort of . . . , recovery is more difficult to achieve”: Impact of fluctuating need frustration on employee recovery, energy, work affect, and sleep*

Experiences of need frustration have in previous research been shown to have adverse consequences for employees (e.g., Niemiec, Olafsen, Halvari & Williams, 2022; Olafsen, Niemiec, Halvari, Deci & Williams, 2017), which is also supported in the current study. In particular, the results point to the risk factor competence frustration represents in impairing employees' recovery, energy, and work affect at the within-person level. To start, the results showed that competence frustration can hinder workers' recovery processes by impairing psychological detachment from work as well as relaxation, which are key experiences for successful recovery from work stress (Sonnentag & Fritz, 2007). In the qualitative data, this seemed especially so for psychological detachment. Psychological detachment is a pervading recovery experience that is directly connected to stressful work-related thoughts as a primary source of stress (Sonnentag & Fritz, 2015). In contrast, lack of relaxation during off-job time can also result from demands outside the workplace such as family-related responsibilities (Reifman, Biernat & Lang, 1991). As such, it may be that the participants experienced both a lack of detachment and relaxation after competence-need-frustrating incidences but focused on detachment when describing their troubles related to recovery from work.

The positive association from experiences of daily need frustration to negative work affect might be explained by employees having trouble mentally disconnecting from work on days when their need for competence and relatedness were frustrated (i.e., ruminating about negative aspects of their work). This can again be a reason for employees to report more daily exhaustion when experiencing competence need frustration, as psychological detachment tends to be connected to reduced exhaustion (Wendsche & Lohmann-Haislah, 2017). Accordingly, when experiencing frustration of the need for competence, employees may be prone to a negative cycle whereby competence need frustration leads to decreased recovery and, over time, results in burnout. For example, experiencing competence need frustration may impair key off-job recovery processes, resulting in lack of focus at work, which could further increase competence frustration and, in turn, lead to a pronounced emotional exhaustion and a lack of professional efficacy in the longer run (see also Sitaloppi, Kinnunen, Feldt & Tolvanen, 2011). In addition, experienced competence frustration may be particularly detrimental for well-being in the work context, as such frustration can be particularly closely tied to and damaging to one's work identity (Kira, Balkin & San, 2012).

The findings for competence frustration in relation to outcomes did not fully match the findings for autonomy and relatedness frustration, except for the positive relationship between autonomy frustration and exhaustion, as autonomy and relatedness frustration were unrelated to recovery from work (i.e., psychological detachment and relaxation) and negative work

affect. For autonomy frustration, a reason might be that it did not fluctuate as much on the within-person level. Yet, given that autonomy frustration had a positive association with exhaustion, it is possible that autonomy frustration has a more immediate effect in contributing to energy depletion at the end of the workday caused by lack of control and volition. Given that the measures of recovery and work affect referred to the time after work, the effects of autonomy frustration may be less pronounced during these periods as employees are away from the context in which their need for autonomy is frustrated, allowing other factors to facilitate recovery and influence affect. As such, frustration of the need for autonomy might operate differently from the frustration of competence; it was evident in the qualitative data that competence frustration can lead to rumination, which jeopardized the recovery process by inducing negative thoughts and rumination about one's experiences at work after work hours, making it difficult to detach and relax.

As for relatedness, the average level of relatedness need frustration was very low. A similar level of relatedness frustration was reported in the study by van der Goot *et al.* (2021), who also failed to detect an association between within-person level relatedness frustration and employee well-being (i.e., psychological distress). The results did not support any detrimental consequences of any type of need frustration in relation to vigor and positive work affect, which is in accordance with studies done at the between-person level showing that need frustration tends to be more strongly related to ill-being than to well-being (e.g., Olafsen, Halvari & Frølund, 2021).

Finally, as for sleep disturbance, we found only a positive association from autonomy frustration to poor sleep quality in the quantitative analysis. Previous studies focusing on associations from basic psychological need frustration to sleep quality or disturbance have typically not distinguished between the different needs in their analysis, offering limited insights into which specific need(s) might contribute to disturbed sleep (e.g., Campbell, Tობback, Delesie, Vogelaers, Mariman & Vansteenkiste, 2017; Niemiec, Olafsen, Halvari & Williams, 2022). However, the known impact of psychological stress (Espie, 2002; Morin, Rodrigue & Ivers, 2003), including work stress (Henry, McClellan, Rosenthal, Dedrick & Gosdin, 2008), on sleep, combined with the strong link between work autonomy and stress experiences likely explains the unique association observed between autonomy frustration and sleep disturbance. The qualitative results indicated that, in particular, competence need frustration hampered sleep quality on some occasions. As such, it is interesting to point to the likely mechanism of rumination that arises when basic needs are frustrated that could lead to decreasing psychological detachment from work. In Table 1, it is shown that both autonomy and competence frustration are significantly associated with recovery (i.e., psychological detachment from work and relaxation) and sleep complaints at the within-person level, yet in the model, only competence frustration remains a significant predictor of the former.

#### *Strengths, limitations, and future research directions*

A major strength of the present study is its triangulation of data to explore within-person variability in frustration of the basic

psychological needs for autonomy, competence, and relatedness, an under-researched topic in the work context, and its implication on employees' recovery, energy, work affect, and sleep. However, a larger sample for the quantitative data collection would have been preferable as it could enable analyses of mediation and moderation in line with the basic SDT model of motivation in the workplace (Deci, Olafsen & Ryan, 2017) and the stressor-detachment model (Sonnentag & Fritz, 2015). Furthermore, all constructs included were assessed in one daily survey, whereas assessing different constructs at different times across the day (e.g., need frustration at the end of the workday and recovery in the evening; see also Sonnentag & Geurts, 2009) would have been optimal. Yet, with the opportunity to collect one daily assessment, we considered it important to assess the former night's sleep in the morning instead of later on in the day. For the qualitative data collection, it was a limitation that the data was collected during one interview asking the participants to reflect retrospectively on daily variations. Future diary studies could quantitatively assess need frustration more than once per day and with measures that rely less on memory, such as ecological momentary assessments, while qualitative data could be collected by short daily reflections with, for instance, voice recorders. Moreover, in examining the implications of need frustration, future studies could assess need frustration also in the off-job domain, where research currently is scarce. Such studies could be informative in relation to recovery processes as well as for areas such as home-to-work conflict and work–non-work balance. Finally, given the severity of need frustration related to undermining of the basic needs, we observe that the mean level of these experiences is low among the participants. This suggests that, fortunately, most employees do not experience such frustration to a large degree. With the introduction of the concept of need unfulfillment (i.e., the experiential state of lack of need fulfillment; Bhavsar, Bartholomew, Qusted, *et al.*, 2020), future research can examine the experience of this need state across the basic psychological needs. This can help unravel such negative daily need experiences and their consequences, which might be more prevalent than those caused by active undermining of needs.

## PRACTICAL IMPLICATIONS AND CONCLUSION

Based on the results of the current mixed-methods study, daily experiences of frustration of the basic psychological need for especially competence is revealed to be a potential risk factor when it comes to employees' recovery process, energy, and work-related affect, whereas experiences of autonomy and competence frustration have negative consequences for sleep quality. These results highlight the need for preventing the presence of such need-depriving experiences at work. As the qualitative results point to workload and negative feedback as the most prominent sources of competence and, to some extent, relatedness need frustration, effective prevention strategies could aim at avoiding overburdening employees with tasks and making sure that they have a balance between their workload and the time available for performing work tasks. In addition, raising awareness of constructive feedback strategies among coworkers seems important so that feedback is perceived as informational rather than as mere criticism (see, for instance, Stone, Deci & Ryan, 2009). Interventions could also be

developed with an aim of reducing frustration at work directly, which has proven effective in other life domains (Cheon, Reeve, Lee, *et al.*, 2019; Weinstein, Khabbaz & Legate, 2016). As organizational constraints such as conflicting priorities or downsizing can undermine workplace interventions designed to enhance well-being and recovery (Biron & Karanika-Murray, 2014), our findings highlight the need to address these constraints during interventions, as they can exacerbate employee competence frustration, further hindering recovery and well-being. Overall, the current study offers a close-up perspective on need frustration at work by assessing how frustration manifests itself on a daily basis and the consequences it can have. Avoiding such daily experiences of frustration of employees' basic psychological needs are crucial to secure employees' well-being and optimal work functioning.

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## CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

## ETHICS APPROVAL STATEMENT

We obtained approval from SIKT (formerly the Norwegian Center for Research Data, project numbers 61526 and 493087) prior to data collection. All participants provided informed consent.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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