Received: 25 July 2020 | Accepted: 27 September 2022

DOI: 10.1111/joop.12410

ARTICLE

the british psychological society
promoting excellence in psychology

Patterns and predictors of change in energy and mood around a vacation from the workplace: Distinguishing the effects of supplemental work activity and work-related perseverative cognition

Paul E. Flaxman[1] | Christopher B. Stride[2] | Sonja A. Newman[1] | Julie Ménard[3]

[1]Department of Psychology, City, University of London, London, UK

[2]Management School, University of Sheffield, Sheffield, UK

[3]Département de Psychologie, Université du Québec à Montréal, Montreal, Quebec, Canada

Correspondence

Paul E. Flaxman, Department of Psychology, City, University of London, Northampton Square, London EC1V 0HB, UK.
Email: paul.flaxman.1@city.ac.uk

Present address

Sonja A. Newman, Hertfordshire Business School, University of Hertfordshire, Hertfordshire, UK

Funding information

City, University of London

Abstract

This study contributes to the vacation literature by exploring predictors of change in school teachers' negative affective states around a 2-week (Christmas) vacation. Drawing from a combination of self-regulatory and effort-recovery theoretical principles, we hypothesized that supplemental work activity during the vacation might have some positive consequences for mood state, while simultaneously impairing the ability to recover from work-related exhaustion. Ninety teachers completed measures across eight consecutive weeks, spanning the period before, during and after vacation (710 observations in total). Teachers' weekly levels of emotional exhaustion, anxious mood and depressed mood decreased significantly from before to during the vacation. Following the vacation, anxious mood showed the most rapid rate of increase, returning to its prevacation level within 2 weeks of work resumption. Exhaustion and depressed mood re-emerged more gradually across 4 consecutive weeks following the vacation. Supplemental work activity during the vacation was associated with weaker recovery from exhaustion, but did not exhibit a detrimental relationship with change in anxious or depressed mood. Of note, supplemental working during the vacation was associated with a less pronounced re-emergence of anxious mood after the vacation. Work-related perseverative cognition (worry and rumination) during the vacation impeded energy restoration and mood repair and was related to faster fade out of beneficial vacation effects. These findings demonstrate the utility of examining discrete energy and mood states in respite research, reveal the mixed functions of engaging in supplemental work activity during vacations and highlight the harmful impact of perseverative cognition on the recovery from work process.

KEYWORDS
exhaustion, mood, perseverative cognition, recovery, vacation

Practitioner Points

- Employees may engage in work-related activities while on vacations to reduce their level of anxiety when returning to work.
- Completing job tasks during a vacation impairs recovery from exhaustion.
- Work-related worry and rumination significantly reduce employees' ability to recover during nonwork time.
- Practitioners are advised to raise awareness about the subtle features of burnout and to implement worksite interventions that reduce the impact of worry and rumination.

BACKGROUND

The ability to recover from work-related effort during nonwork time has attracted considerable scholarly interest, spanning the fields of occupational health, leisure studies, work and organizational psychology, and human resource management (Bennett et al., 2018; Sonnentag et al., 2017, 2022; Steed et al., 2021). While successfully recovering from job demands and stressors carries implications for ensuring that employees do not become overly exhausted, there is growing recognition that employee recovery during leisure time is important for preventing short-term mood states from escalating into the common mental health problems (i.e., anxiety and depression) that afflict a significant proportion of the global workforce (Goetzel et al., 2018; Horan et al., 2021; Kim, 2019).

For many employees, a vacation from the workplace represents a significant recovery opportunity. Epidemiological evidence underscores the health benefits of vacations, with a tendency to take fewer vacations increasing long-term risk of cardiovascular disease and premature mortality (Gump & Matthews, 2000; Strandberg et al., 2017); opportunities for paid leave have also been linked to lower rates of workforce depression (Kim, 2019). Over shorter timescales (e.g., several weeks), vacations provide researchers with a unique context for gaining insight into how time away from the workplace counteracts employees' strain reactions, as well as the specific vacation-time behaviours and experiences that contribute to this process (de Bloom et al., 2009; Sonnentag et al., 2022; Syrek et al., 2018).

In the present study, we investigate the temporal characteristics and predictors of school teachers' negative affective states as they transition into and out of a two-week (Christmas) vacation period. Our intention is to utilize this nationally homogenous respite to examine a set of unresolved questions surrounding the recovery process. First, we apply an often overlooked distinction between two main functions of vacation recovery: energy restoration and mood repair. Specifically, we assess levels of teachers' work-related emotional exhaustion, anxious mood and depressed mood across eight consecutive weeks (including during the two-week respite) to examine the degree to which discrete energy- and mood-related states follow different change trajectories in response to time away from the workplace. Second, we scrutinize the notion that engaging in work activity while on vacation (i.e., supplemental working) might simultaneously be beneficial and harmful to the recovery process (Ďuranová & Ohly, 2016; Weigelt & Syrek, 2017). In this regard, we draw from a combination of self-regulatory (control theory; Carver & Scheier, 1998) and effort-recovery model (Meijman & Mulder, 1998) assumptions to investigate whether engaging in work activity while on a vacation has any positive consequences for teachers' mood state, while at the same time hindering recovery from work-related exhaustion. Finally, extending control theory assumptions, we contrast the mood-related consequences of (1) supplemental working during the vacation (a behavioural self-regulatory strategy with goal-related discrepancy-resolving potential) and (2) work-focused perseverative cognition (a cognitive self-regulatory activity that makes goal-related discrepancies more salient).

Vacation recovery: distinguishing energy restoration and mood repair

Recovery from work during nonwork time has been defined as 'the process of psychophysiological unwinding that counteracts the strain process triggered by job demands and other stressors' (Sonnentag et al., 2017, p. 365). Consistent with this definition, prominent recovery theories, particularly the effort-recovery model (Meijman & Mulder, 1998) and allostatic load theory (McEwen, 1998, 2007), provide accounts of the basic mechanisms through which an episode of nonwork time counteracts employees' strain reactions.

The effort-recovery model posits that employees experience short-term physiological and psychological load reactions when expending effort meeting job demands and stressors, including fluctuations in negative affect, fatigue and heart rate, which under normal circumstances are viewed as adaptive and easily reversible (Meijman & Mulder, 1998). If lengthy periods of workload are not punctuated by adequate recovery opportunities, the initially adaptive short-term strain reactions may lead to chronic and harmful negative load effects (or allostatic load), such as cardiovascular dysregulation, mental health problems (e.g., anxiety and depression) and job burnout (Geurts & Sonnentag, 2006; McEwen, 2007). The contribution of poor recovery to the strain process is viewed as cumulative: when employees fail to recover sufficiently after a demanding period of work, they may re-enter the workplace in a suboptimal state; being in a suboptimal (i.e., not fully recovered) state requires employees to call upon compensatory effort to perform at work; the compensatory effort in turn serves to elevate the intensity and prolongation of load reactions. If this cycle continues over time, recovery may become progressively more elusive (Flaxman et al., 2012; Meijman & Mulder, 1998). These theoretical principles underpin the so-called 'passive' mechanism of recovery (Geurts & Sonnentag, 2006), whereby sufficient voluntary time away from the workplace itself facilitates the recovery process because employees have been temporarily released from exposure to the usual demands and stressors of working life.

In the vacation context, support for this passive recovery mechanism derives from the *vacation effect*, which is empirically demonstrated via a lowering of strain levels (e.g., decreased negative affect and exhaustion) from before to during (or very soon after) vacation (de Bloom et al., 2009; Reizer & Mey-Raz, 2019). The counteracting effect of vacations on strain appears to be a reliable phenomenon, in that the vacation effect has been observed in response to an array of respite events, including spring time vacations (Flaxman et al., 2012; Kühnel & Sonnentag, 2011), summer vacations (de Bloom et al., 2013; Etzion, 2003; Fritz & Sonnentag, 2006; Westman & Eden, 1997), the Christmas holiday period (Kasser & Sheldon, 2002; Syrek et al., 2018), winter sports excursions (de Bloom et al., 2010) and brief breaks from the workplace lasting around one week (Blank et al., 2018; de Bloom et al., 2012; Horan et al., 2021). There is less certainty surrounding the rate at which beneficial vacation effects on strain indicators fade out (or decay) once employees return to work. Some findings suggest that vacation effects have mostly faded out (i.e., markers of strain have returned to their prevacation levels) within the first few days of work resumption (de Bloom et al., 2013); others suggest that benefits of vacations can be detected 3–4 weeks later (Blank et al., 2018; Gump et al., 2021).

Given the vacation effect's reliability, we embarked on the current study anticipating that school teachers would generally experience a reduction in negative affective states during the two-week Christmas vacation period. To advance understanding about the temporal characteristics of the vacation effect and postvacation fade out, we implemented a measurement strategy designed to distinguish between two core functions of the recovery from work process: energy restoration and mood repair (Sonnentag, 2018; Sonnentag & Fritz, 2007). Aside from the effort-recovery model, these two functions of recovery tend to be informed by different theoretical approaches and captured by different instruments. Energy restoration is predominantly viewed from a resource-based perspective and (at least in respite research) assessed by change on measures of the emotional exhaustion facet of job burnout (Etzion, 2003; Halbesleben et al., 2013; Kühnel & Sonnentag, 2011; Quinn et al., 2012; Westman et al., 2004). By contrast, the mood repair function has been conceptualized via mood- and self-regulation models, and assessed by change on state affect measures (Horan et al., 2021; Sonnentag & Fritz, 2007; Syrek et al., 2018). Distinguishing between vacation outcomes aligns with a wider empirical trend towards exploring discrete negative affective states. Contributors to this trend include experimental work demonstrating that anxious and depressed affect have different consequences (Raghunathan & Corfman, 2004); application of dimensional models of affective well-being (Mannell et al., 2014; Russell & Daniels, 2018; Warr et al., 2014); the notion that anxious and depressed affect arise from the (thwarted) pursuit of different types of self-regulatory goals (Carver & Scheier, 1998); and research focused on clarifying the extent of overlap between burnout and depression (Bianchi et al., 2015).

Vacation research methods may have resulted in these nuances being overlooked or obscured. For example, vacation studies have often focused on either energy restoration (by assessing change in emotional exhaustion; Etzion, 2003; Kühnel & Sonnentag, 2011; Reizer & Mey-Raz, 2019) or mood repair (by assessing change in negative and/or positive affect; Gump et al., 2021; Syrek et al., 2018). Another group of studies combined energy and mood items to measure vacation effects and aftereffects on employees' overall health and well-being (de Bloom et al., 2013). While all these approaches have their strengths, they preclude formal investigation of (1) the possibility that distinct negative affective states exhibit different change trajectories in response to vacations, or (2) whether some vacation-time activities or experiences (e.g., completing unfinished job tasks) have different consequences for discrete mood and energy markers of the recovery from work process. There are nascent signs that such issues warrant further exploration. Two recent studies suggest that the benefits of vacations on anxious affect fade out particularly rapidly when employees return to work (Horan et al., 2021; Syrek et al., 2018). This pattern appears congruent with the idea that threat appraisals (and closely associated anxious arousal) are especially likely to be triggered as individuals face an imminent or acute increase in demands and performance pressure, a likely scenario when transitioning back to work after a vacation (Kühnel & Sonnentag, 2011; Skinner & Brewer, 2002; Warr et al., 2014).

To explore the utility of distinguishing among discrete outcomes of a respite event, the current study's first goal is to model week-to-week patterns of change in anxious mood, depressed mood and emotional exhaustion during and after the Christmas vacation. We use the term anxious mood to refer to week-level experiences of high activation 'agitated' negative affect (i.e., feeling tense, worried and anxious); depressed mood refers to a low activation 'dejected' negative affective state (i.e., feeling gloomy, sad, miserable and depressed; Mäkikangas et al., 2007). Consistent with previous vacation studies, we assess weekly levels of emotional exhaustion to capture the degree to which teachers work-related energy resources have become over-depleted (i.e., feeling used up or burnt out over the past week as a result of one's job; Flaxman et al., 2012; Kühnel & Sonnentag, 2011). We anticipated observing the vacation effect, hypothesizing that levels of all three negative affective states would decrease significantly from before to during the vacation. In addition, consistent with the proposition that high activation unpleasant affect might arise quickly after a vacation (Horan et al., 2021; Syrek et al., 2018; Warr et al., 2014), and the notion that exhaustion and depression (i.e., low activation negative affective states) share phenomenological characteristics (Bianchi et al., 2015), we test the hypothesis that anxious mood increases at a significantly faster rate after the vacation when compared to the rates of change in depressed mood and exhaustion.

Hypothesis 1 *Teachers' emotional exhaustion (hypothesis 1a), anxious mood (hypothesis 1b) and depressed mood (hypothesis 1c) will decrease from before to during the vacation (i.e., the vacation effect).*

Hypothesis 2 *Teachers' anxious mood will exhibit a higher rate of postvacation increase when compared to postvacation rates of increase in depressed mood (hypothesis 2a) and emotional exhaustion (hypothesis 2b).*

Mood-related consequences of supplemental work activity during a vacation: a self-regulation perspective

Distinguishing between discrete negative affective states supports our study's second goal: to explore whether the same behaviour—supplemental working—is differentially related to changes in energy and mood elicited by a vacation. We adopt the term supplemental working to refer to vacation time allocated to work-related activities. Engaging in job tasks during nonwork time has traditionally been viewed as detrimental to recovery (Geurts & Sonnentag, 2006). However, when assessed during vacations, allocating time to job tasks has often been unrelated to employees' affective state (de Bloom et al., 2011, 2013; Flaxman et al., 2012; Syrek et al., 2018). This has been attributed in part to methodological issues (de Bloom et al., 2011) and individual differences (Horan et al., 2021). We explore another potential explanation: For some employees, supplemental working may function as a self-regulatory (discrepancy resolving) strategy that might help to rectify a negative mood state.

The theoretical rationale underpinning this proposition stems from the classic *Zeigarnik* and *Ovsiankina* effects (Ovsiankina, 1928; Zeigarnik, 1938; also see Syrek et al., 2017; Weigelt & Syrek, 2017), and the more contemporary control theory account of human self-regulation (Carver & Scheier, 1990, 1998, 2012). These interrelated theoretical approaches appear well-suited for explaining the psychological dynamics that may unfold when employees transition between periods of work and leisure time. For instance, when transitioning into a vacation (and other episodes of off-job time, such as evenings and weekends), it is assumed that many employees must leave some job tasks unfinished and personally valued work goals yet to be attained. In self-regulatory system terms, unfulfilled tasks and goals may automatically signal a goal-related discrepancy (e.g., a perceived deviation between current performance state and some desired reference state or rate of goal progress). Registering such a discrepancy is likely to give rise to an urge to resume work tasks during leisure time to satisfy the need for closure, maintain a sense of goal progress and obtain peace of mind (Carver, 1996; Carver & Scheier, 1998; Weigelt & Syrek, 2017). Without some type of overt goal-oriented action to signal progress towards discrepancy resolution, unfulfilled work goals may maintain high activation potential, manifesting at the subjective level in frequent and easily triggered thoughts about work tasks and topics (i.e., 'Zeigarnik intrusions'; Masicampo & Baumeister, 2011). Accordingly, scholars conceptualize the heightened accessibility of unattained or interrupted work goals as a key mechanism underpinning failures to psychologically detach (and hence recover) from work demands during leisure time (Smit, 2016). This theoretical framing helps explain why employees may at times feel inclined (if not compelled) to engage in supplemental work activity even while on a vacation, given that such behaviour is likely to be perceived as an obvious antidote to cognitive preoccupation with work topics while away from the workplace.

Researchers have begun utilizing these self-regulatory principles to investigate relationships between incomplete work goals and tasks and the (in)ability to switch off from work during leisure time (Smit, 2016; Syrek et al., 2017; Syrek & Antoni, 2014; Weigelt & Syrek, 2017). Consistent with control theory and Zeigarnik assumptions, Smit (2016) demonstrated that during post-work evenings, employees experience greater difficulty psychologically detaching from daily unfulfilled goals, and especially from goals with a stronger motivational pull. Weigelt and Syrek (2017) found that unfinished job tasks at the end of the working week were (as expected) negatively associated with psychological detachment and relaxation at weekends. However, corresponding with control theory principles, the perception of making progress towards goals through supplemental work activity at weekends 'neutralized' this adverse impact of unfinished tasks on recovery experiences. Such findings imply that supplemental working during off-job time is a complex phenomenon that is (1) linked to self-regulatory (i.e., discrepancy resolving, goal progress) motives and (2) may exhibit some beneficial influences on employees' propensity to recover during any remaining leisure time (e.g., by reducing work goal accessibility; Smit, 2016).

To our knowledge, research has yet to extend these self-regulatory assumptions to explore the degree to which supplemental work behaviour is associated with any favourable mood-related consequences during or after a period of vacation. From a control theory standpoint, if supplemental working helps teachers manage anxious arousal during or after a vacation, it implies this action is operating (at least in part) within a *discrepancy-enlarging* feedback loop, which is primarily oriented towards preventing some undesirable end state (e.g., falling behind in one's work and/or being negatively evaluated by others). In this scenario, the self-regulating system is 'doing well' (and anxiety specifically is likely to decrease) when it increases distance between current performance state and the (threatening or unwanted) reference state (Carver & Scheier, 1998). By contrast, if supplemental work activity helps teachers regulate a depressed mood state, a *discrepancy-reducing* feedback loop may be operating, whereby engaging in job tasks while on vacation provides teachers with a pleasing sense of progress towards a promotion-type or 'ideal-self' goal (e.g., being a highly efficient and effective educational professional, or improving one's career prospects; Carver & Scheier, 1998). In accordance with these self-regulatory system dynamics, we test the proposition that time spent on supplemental work activity will exhibit a generally favourable pattern of associations with the change trajectories of teachers' negative mood states during and after the vacation.

Hypothesis 3 *Time spent on supplemental work activities will be positively associated with pre-to-during vacation reductions in teachers' anxious mood (hypothesis 3a) and depressed mood (hypothesis 3b).*

Hypothesis 4 *Time spent on supplemental work activities will be negatively associated with the rate of increase in teachers' anxious mood (hypothesis 4a) and depressed mood (hypothesis 4b) after the vacation.*

Energy-related costs of supplemental work activity during a vacation: an effort-recovery perspective

Theorizing about self-regulatory functions of supplemental work behaviour during a vacation does not negate the potential costs of such behaviour to the recovery process. An intriguing argument surrounding supplemental work activity is that it functions as a 'double-edged sword' (Weigelt & Syrek, 2017, p. 2). For instance, investing time and energy in work tasks during a vacation may help to resolve inner tension or repair dejected feelings associated with unfulfilled work goals, yet still impair employees' ability to recover from work-related effort. From an effort-recovery model perspective, engaging in additional work activities during nonwork time naturally diminishes available recovery time and places employees at risk of over-taxing the same functional systems that were taxed during the prevacation working period (Geurts & Sonnentag, 2006).

Accordingly, we examine the degree to which supplemental working exerts an adverse influence on teachers' ability to recover from emotional exhaustion during the vacation. We predict that supplemental working would be associated with a less pronounced reduction in teachers' exhaustion (i.e., a weaker energy restoration effect) across the Christmas vacation period. Extending this line of reasoning, if teachers continue working during their vacation, and as a result are less able to replenish energy resources that are required for work, they increase the likelihood of facing the new school term in a suboptimal energetic state (Geurts & Sonnentag, 2006; Meijman & Mulder, 1998). To compensate for incomplete recovery, additional effort would be required, potentially accelerating the cycle of energetic depletion (i.e., re-emergence of exhaustion) in response to the new school term's demands and stressors.

Hypothesis 5 *Time spent on supplemental work activities will be negatively associated with pre-to-during vacation reductions in teachers' emotional exhaustion.*

Hypothesis 6 *Time spent on supplemental work activities will be positively associated with the rate of increase in teachers' emotional exhaustion after the vacation.*

Discrete influence of work-related perseverative cognition on mood and energy states around the vacation

Our final goal is to contrast the mood-related consequences of (1) supplemental work behaviour and (2) perseverative cognition about work during the vacation. From a control theory perspective, these behavioural and cognitive activities have the same basic underlying aim: discrepancy resolution (Carver, 1996; Carver & Scheier, 1998; Martin & Tesser, 1996; Trincas et al., 2018). However, that does not mean they are equally effective in achieving that aim. While supplemental work activity (akin to goal-directed action) has the potential to generate goal progress feedback (Weigelt & Syrek, 2017), perseverative cognition tends to occur when goal progress is threatened or problematic, and functions to make goal-related discrepancies even more salient (Carver, 1996; Carver & Scheier, 1998).

Perseverative cognition refers to 'the repeated or chronic activation of the cognitive representation of one or more psychological stressors'. (Brosschot et al., 2006, p. 114). Worry and rumination are the common subjective manifestations of this type of cognitive activity. A basic difference between worrying and ruminating is in their temporal focus: People tend to worry about the future (a type of anticipatory stress appraisal; Casper & Sonnentag, 2020), whereas ruminative thoughts focus on the past, manifesting in dwelling on recent stressors, brooding over perceived transgressions and associated feelings, or repeatedly reliving one's embarrassing or disappointing moments (Roger & Najarian, 1989; Trapnell & Campbell, 1999). Despite this distinction, worry and rumination are highly correlated (i.e., they tend to co-occur in the same individuals) and are initiated and maintained by the same cognitive-emotional processes (Berenbaum, 2010; Meeten & Davey, 2011). Hence, the perseverative cognition construct captures both types of thoughts (Brosschot et al., 2006; Flaxman et al., 2012).

Control theorists propose that the recurrent feature of this mode of cognitive processing indirectly reflects that a self-regulating individual has become 'stuck' in some way (Carver, 1996, p. 51). The thwarted goal progress origin of perseverative cognition aligns with control theory's cybernetic account of the origins of negative affect, thus accounting for the well-established relationship between perseverative cognition and negative mood states (Carver, 1996; Thomsen, 2006). Consistent with this view, we expected teachers who perseverate about work during the vacation to exhibit a reduced ability to repair an anxious and depressed mood. We also examine whether supplemental working and perseverative cognition have different influences on postvacation mood trajectories. In this respect, we draw from the idea that teachers who worry and ruminate about work during the vacation are exhibiting signs of a *perseverative-iterative style* (Berenbaum, 2010), suggesting that this cognitive self-regulatory strategy is habitually deployed whenever goal progress is thwarted or threatened. Characteristics of this style include more frequent and intense threat appraisals, meta-cognitive beliefs about perseverating (e.g., that worrying helps one to prepare and avoid failing); deployment of a stop rule that naturally generates long chains of scenarios related to the focal issue; and use of negative mood as 'input' for signalling whether or not perseveration has achieved its goal (Berenbaum, 2010; Meeten & Davey, 2011; Skinner & Brewer, 2002). Assuming that perseverating about work while on vacation is a valid marker of this cognitive appraisal style, it would suggest that perseverating teachers are likely to continue being caught up in threat appraisals and mood-as-input cycles when returning to work after the vacation. On these grounds, we test the dual proposition that cognitively perseverating about work over the Christmas break will not only lead to less effective mood repair during the vacation, but will also be associated with faster re-emergence of negative mood states across the working weeks immediately following the vacation.

Hypothesis 7 *Work-related perseverative cognition during the vacation will be negatively associated with pre-to-during vacation reductions in anxious mood (hypothesis 7a) and depressed mood (hypothesis 7b).*

Hypothesis 8 *Work-related perseverative cognition during the vacation will be positively associated with the rate of increase in anxious mood (hypothesis 8a) and depressed mood (hypothesis 8b) after the vacation.*

Beyond the negative consequences for mood state, theory and evidence indicate that perseverative cognition is also likely to place a burden on employees' energy resources. For example, Brosschot et al. (2006) refer to the hybrid nature of perseverative cognition. This type of thinking operates as a stress mediator, prolonging the (psychophysiological) impact of stressors (in mental representational form) far beyond any period of actual stressor exposure (Brosschot et al., 2005; Casper & Sonnentag, 2020; Ottaviani et al., 2016). In addition, due to its unpleasant, intrusive, and (relatively) uncontrollable nature, perseverative cognition is also considered a stressor in itself (Brosschot et al., 2006). Other strands of research have confirmed that worry and rumination are effortful forms of systematic cognitive processing, with some of the adverse impact on recovery appearing to stem from its 'mental load' (Sari et al., 2017; Verkuil et al., 2009). Accordingly, we expected work-related perseverative cognition to reduce the extent to which the vacation helps teachers recover from emotional exhaustion.

Hypothesis 9 *Work-related perseverative cognition during the vacation will be negatively associated with pre-to-during vacation reductions emotional exhaustion.*

Hypothesis 10 *Work-related perseverative cognition during the vacation will be positively associated with the rate of increase in emotional exhaustion after the vacation.*

METHOD

Sample and procedure

The data analysed for this study were collected from teachers in the United Kingdom (UK) around the 2013 Christmas vacation. Measures were administered once per week for eight consecutive weeks, with two measurement occasions before the vacation, two during vacation and four after the vacation. Participants were working in schools spread across the United Kingdom. Teachers were recruited to the study via a newsletter distributed by a teacher support organization and via emails to schools. A total of 140 teachers expressed interest in the study. These teachers were posted a pack containing survey instructions, an initial survey booklet of demographic and personality measures (which participants were asked to complete first), and eight weekly survey booklets. We asked participants to complete the weekly measures on the Friday, or early on Saturday, in each study week, and offered SMS reminder messages. Participants were instructed to leave a survey blank if it had not been completed at the correct time.

Of the 140 initial volunteers, 90 (64%) returned completed booklets. Among the weekly surveys, 10 were incomplete on some variables; listwise deletion of these missing timepoint-within-person observations resulted in a final analysis sample of 710 responses over eight time points. Most participants were female (89%), and average age was 40 (SD = 10.4, range 24–62 years). Participants had been teachers for 12 years on average (SD = 8.8, range 1–37 years). Fifty-six teachers worked in UK primary schools (students aged 4–11), and 34 worked at secondary schools (students aged 11–18). All participants were employed full-time. Hours worked before and after vacation were similar: an average 48 hours per week (SD = 15) over the two weeks prevacation and 49.1 hours per week (SD = 15) postvacation. Most participants (85%) reported some supplemental work during the vacation, with an average of 5.1 h (SD = 5.3; range = <1 to 30 h). A total of 20% of the sample stayed away from home during vacation (10% within the United Kingdom, 10% abroad).

Work and vacation period measures

Emotional exhaustion

We used five emotional exhaustion items from the Maslach Burnout Inventory (MBI; Maslach et al., 1996; e.g., 'I felt burned out from my work'), with wording adapted to reflect the past week. Participants indicated agreement using responses from 1 (*strongly disagree*) to 6 (*strongly agree*). Previous studies have validated similarly adapted MBI items for capturing short-term fluctuations in work-induced exhaustion (Derks et al., 2014; Flaxman et al., 2012).

Anxious and depressed mood

We assessed (context-free) negative mood states using emotion adjectives from Warr's (1990) affective well-being scale. Anxious mood was measured with the items 'anxious', 'tense' and 'worried'; depressed mood with 'depressed', 'miserable' and 'gloomy'. Participants indicated how frequently they had experienced these states over the past week, from 1 (*never*) to 6 (*all of the time*). Previous research has validated these items for assessing discrete aspects of negative affect among working populations (Flaxman et al., 2012; Mäkikangas et al., 2007).

We used confirmatory factor analysis (CFA) to test the proposed measurement model for exhaustion and negative mood states, and its invariance across time. Models were estimated via maximum likelihood estimation, using M*plus* software (v8). Establishing metric and strong temporal invariance of measures (i.e., invariance of item-factor loadings and intercepts across time) is crucial when investigating change processes (van de Schoot et al., 2012). If respondents are not interpreting items in a similar way at different measurement occasions, this would confound change observed in the measure. The modest person-level sample size ($N = 90$) meant it was not viable to estimate a global measurement model incorporating all eight time points and all three outcome measures. Thus, we tested the three-factor configuration of exhaustion, anxious mood and depressed mood outcomes one week at a time, and tested measurement invariance across weeks separately for each outcome. CFA results supported the three-factor measurement model (see Tables 1 and 2). We dropped one exhaustion item ('I felt frustrated with my job'), which had a consistently low R-square across time (.258 < R-square <.412, compared with R-square's averaging >.5 over time for all other items), and weakened internal consistency at 6 of the 8 time points.

The three-factor model yielded a satisfactory fit at all eight measurement occasions: .95 < CFI <.99; .01 < RMSEA <.12; .01 < SRMR <.06. The slightly high RMSEA (>.1 on two occasions) is not unexpected given its typical inflation with small sample sizes (Kenny et al., 2015). At each of the eight weeks, the three-factor model outperformed a two-factor model (anxious and depressed mood items measuring a single factor), a two-factor model (exhaustion and depressed mood items measuring a single factor) and a one-factor model (see Table 1). Temporal measurement invariance was supported for both factor loadings and item-factor intercepts (strong invariance): When testing between models using a chi-squared difference test, strong invariance models were not significantly weaker than metric or configural invariance, and the CFI, RMSEA and SRMR fit indices each varied only in the third decimal place (Table 2).

Internal consistency reliabilities as applied to multilevel data (Geldhof et al., 2014) were satisfactory. For emotional exhaustion, within-participants Cronbach's a =.89, within-participants McDonald's Ω = .90; for anxious mood, within-participants a =.84, multilevel (within-participants) Ω = .84; for depressed mood, within-participants a = .85, within-participants Ω = .85. Satisfactory internal consistency was also displayed when single level reliability coefficients were examined at each week separately (exhaustion .81 < Cronbach's a < .90; anxious mood .70 < a < .91; depressed mood .82 < a < .94).

Vacation period measures

Time spent on supplemental work activities

We used a single item to capture time spent on work activities (to the nearest hour) over the past vacation week. We provided the following descriptors: 'actually working', 'checking work emails', 'preparing or finishing work' and 'speaking to colleagues about work'. Responses were averaged across the two vacation weeks to create a person-level variable for mean weekly hours of supplementary work activities. Due to

TABLE 1 Testing three-factor measurement model for vacation outcomes (emotional exhaustion, anxious mood and depressed mood) for each week of response

Week	Factors	Chi sq	*df*	ΔChi sq vs. 3 factor model	Δ*df*	*p*	CFI	RMSEA	SRMR
1	3	48.057	32	–	–	–	.996	.075	.001
1	2 (exh, dep merged)	1365.979	34	1317.922	2	<.001	.698	.660	.077
1	2 (anx, dep merged)	54.576	34	6.519	2	.038	.995	.082	.001
1	1	1371.537	35	1323.480	3	<.001	.697	.651	.077
2	3	55.699	32	–	–	–	.950	.091	.063
2	2 (exh, dep merged)	136.228	34	80.529	2	<.001	.784	.183	.124
2	2 (anx, dep merged)	83.480	34	27.781	2	<.001	.896	.127	.067
2	1	192.420	35	136.721	3	<.001	.668	.224	.127
3	3	35.208	32	–	–	–	.999	.033	.004
3	2 (exh, dep merged)	149.048	34	113.840	2	<.001	.964	.194	.005
3	2 (anx, dep merged)	44.259	34	9.051	2	.011	.997	.058	.005
3	1	154.686	35	119.478	3	<.001	.963	.195	.006
4	3	31.817	32	–	–	–	1.000	.000	.003
4	2 (exh, dep merged)	1526.961	34	1495.144	2	<.001	.637	.698	.202
4	2 (anx, dep merged)	70.944	34	39.127	2	<.001	.991	.110	.003
4	1	1566.075	35	1534.258	3	<.001	.628	.697	.202
5	3	33.803	32	–	–	–	.997	.025	.051
5	2 (exh, dep merged)	126.319	34	92.516	2	<.001	.826	.174	.104
5	2 (anx, dep merged)	137.952	34	104.149	2	<.001	.804	.184	.097
5	1	227.489	35	193.686	3	<.001	.637	.247	.131
6	3	34.305	32	–	–	–	.996	.028	.040
6	2 (exh, dep merged)	58.524	34	24.219	2	<.001	.957	.090	.062
6	2 (anx, dep merged)	116.233	34	81.928	2	<.001	.856	.164	.078
6	1	139.603	35	105.298	3	<.001	.816	.182	.090
7	3	71.498	32	–	–	–	.990	.117	.001
7	2 (exh, dep merged)	212.387	34	140.889	2	<.001	.956	.241	.002
7	2 (anx, dep merged)	140.037	34	68.539	2	<.001	.974	.186	.001
7	1	282.026	35	210.528	3	<.001	.939	.280	.002
8	3	61.552	32	–	–	–	.993	.101	.001
8	2 (exh, dep merged)	153.565	34	92.013	2	<.001	.970	.198	.001
8	2 (anx, dep merged)	144.689	34	83.137	2	<.001	.972	.190	.001
8	1	237.019	35	175.467	3	<.001	.949	.253	.002

Note: $N = 90$ participants at each time point.

a few very high values, we log-transformed this variable (untransformed mean = 5.12 h, median = 3.50 h; transformed mean = 1.43, median = 1.50).

Work-related perseverative cognition

We measured work-related perseverative cognition during the vacation weeks using Flaxman et al.'s (2012) scale, which includes a mix of worry and rumination items. An example item was: 'My thoughts kept returning to a stressful situation at work'. Participants reported the degree to which they had experienced such thoughts over the past week, from 1 (*not at all*) to 5 (*a great deal*). Responses were averaged across the vacation weeks giving an overall perseverative cognition score.

TABLE 2 Results of temporal measurement invariance tests for each outcome factor

Factor	Invariance type	Chi sq	*df*	ΔChi sq	Δ*df*	*p*	CFI	RMSEA	SRMR
Anxious	Configural	381.53	218	–	–	–	.92	.08	.05
Mood	Metric	386.26	232	4.73	14	.989	.93	.07	.05
	Strong	408.88	246	22.61	14	.067	.92	.07	.05
Depressed	Configural	418.37	218	–	–	–	.92	.08	.06
Mood	Metric	433.81	232	15.44	14	.349	.92	.08	.06
	Strong	452.39	246	18.58	14	.182	.92	.08	.06
Exhaustion	Configural	777.29	424	–	–	–	.91	.08	.09
	Metric	803.84	445	26.55	21	.186	.91	.08	.09
	Strong	831.36	466	27.52	21	.154	.91	.08	.09

Note: $N = 710$ observations from 90 participants.

CFA results supported a one-factor measurement model for work-related perseverative cognition during the vacation period (i.e., study weeks 3 and 4). The measure exhibited temporal invariance across the two vacation weeks: configural invariance model, χ^2 (5) = 13.18, CFI = .98, RMSEA = .14, SRMR = .05; metric invariance, $\chi^2(7) = 13.52$, $\Delta\chi^2(2) = .34$, $p = .844$, CFI = .98, RMSEA = .10, SRMR = .05; strong invariance, $\chi^2(9) = 24.84$, $\Delta\chi^2(2) = 11.32$, $p = .003$, CFI = .95, RMSEA = .14, SRMR = .05. Given that we aggregated across the vacation weeks for this measure, the loss of fit between metric and strong invariance is less critical, and the strong invariance model still offered an adequate fit. The scale demonstrated satisfactory internal consistency (Week 3, $a = .87$; Week 4, $a = .86$).

Control variable: Neuroticism

Given the well-established influence of neuroticism on both perseverative cognitive and negative affective states (Muris et al., 2005; Swider & Zimmerman, 2010), and the recommendation to account for this dispositional influence when investigating detachment from work during leisure time (Wendsche & Lohmann-Haislah, 2017), we assessed neuroticism in the initial survey with the two relevant items from the Ten Item Personality Inventory (TIPI; Gosling et al., 2003). The items are: [I see myself as….] 'anxious, easily upset'; and, 'calm, emotionally stable', with a response scale from 1 (*disagree strongly*) to 7 (*agree strongly*). Given it has two items, the scale exhibited satisfactory internal consistency ($a = .66$).

Statistical analyses

The initial analysis stage was to establish an appropriate model for change in exhaustion and negative mood outcomes. We followed recommendations to choose the model offering the closest match to the theoretical process (Pinheiro & Bates, 2001; Singer & Willett, 2003). Our theoretical assumption is that, away from transition periods between work and vacation, employees will have stable work and vacation levels (i.e., asymptotes) of exhaustion and negative mood. We expect teachers' exhaustion and negative mood to: (a) decrease towards their vacation asymptotes as they transition into, and hopefully recover during, the vacation; and (b) increase back towards their work asymptotes, at a decelerating rate, as teachers resume work postvacation.

To build a model for this pattern of change, we followed the method used by Horan et al. (2021). This approach combines the use of piecewise longitudinal mixed models (also known as *discontinuous multilevel growth models*; Bliese et al., 2017; Chou et al., 2004; Lang & Bliese, 2009; Singer & Willett, 2003)—which allow for different functions to be applied to different periods of the change process—with a non-linear function, specifically an exponential decay function (Grimm et al., 2011; Pinheiro & Bates, 2001), to model the postvacation convergence back to the work period asymptotes of exhaustion and negative mood.

The mixed (multilevel) modelling framework enables the model parameters (i.e., the work asymptote, the difference between work and vacation asymptotes, and the rate of change between them) to be specified as random effects (i.e., to vary between participants). The first stage of our analysis followed the sequence suggested by Horan et al. (2021) to demonstrate the piecewise non-linear mixed effects model's suitability—and advantage over linear and polynomial alternatives—when modelling changes into and out of a vacation. Sample size constraints predicated the use of observed (i.e., scale mean composite) scores for the weekly outcome measures, rather than latent variables. Each outcome was modelled separately.

Model 1, an unconditional mixed effects model used as a baseline comparison, simply allows variation in participants' average levels of the outcome. We extended this to Model 2, which fitted a step change in the level of exhaustion/negative mood between work and vacation asymptotes; and Model 3, in which the work-to-vacation transition was modelled by a linear slope. We then focused on the postvacation piece of the model, modelling the vacation-to-work transition first by a non-zero linear slope (Model 4); then by a quadratic curve (Model 5); and finally as an exponential decay curve converging to the prevacation value, that is the work asymptote (Model 6a).

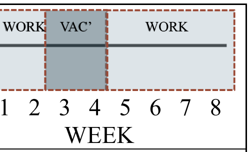
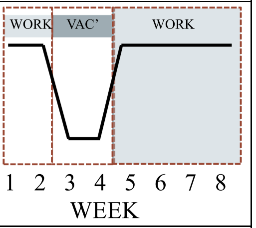
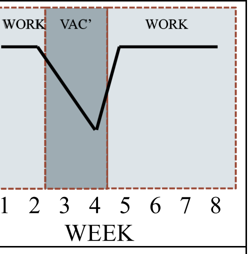
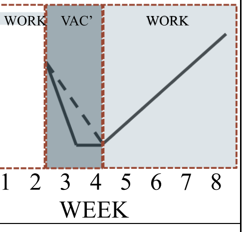
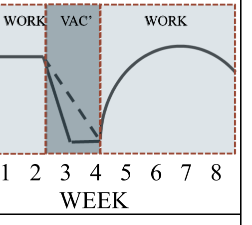
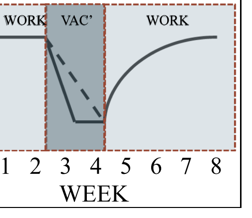
Figure 1 illustrates models 1–6a, giving the variable coding, parameter interpretation, and respective piecewise equations. To further clarify the coding of time within our models, we have included a table showing the coding of each time variable for each week of the study in a Supporting Information (Appendix S1). We fine-tuned this model by adding a within-participants autoregressive type-1 correlation structure (i.e., controlling for the lag effect of the outcome at previous weeks, hence removing this 'nuisance' variation; Model 6b). The model coefficients for extent of change into vacation (the *difference* parameter) provided a test of Hypothesis 1. The *difference* parameter, which represents the difference between work and vacation asymptotes, was calculated as work asymptote minus vacation asymptote.

The second stage of our modelling process extended the method described by Horan et al. (2021) to a *parallel process* or *multivariate* piecewise non-linear mixed effects model, which fitted growth curves for each outcome simultaneously. This provided a test of the difference in postvacation change across different outcomes (Hypothesis 2). This model was constructed by temporarily restructuring the dataset so that the three outcomes were nested within each participant at each week (i.e., one row of data per outcome, per week, per participant; for clarity, this restructured dataset is illustrated in a Supporting Information, Appendix S2). We then fitted the best model that had emerged from the initial modelling stage, allowing the work asymptote, and the difference between work and vacation asymptotes *to vary by outcome* using dummy variables. We tested this model against an alternative in which the rate of the vacation-to-work transition was also free to differ between outcomes. Improved model fit would indicate that the postvacation rate of change differed according to the outcome variable being considered.

In the third stage of the modelling process, we returned to analysing each outcome separately. Beginning from model 6b, we introduced random effects parameters for between-participant variability in the difference between work and vacation asymptotes; the rate of postvacation return to the work asymptote; and the covariance between the work asymptote and the difference between work and vacation asymptotes (Model 7). We then sought to explain variability in each of: the work asymptote, difference between work and vacation asymptotes, and postvacation rate of change parameters. In Model 8, we added neuroticism as a predictor of each parameter. Model 9 tested hypotheses 3–10 by examining the predictive influences of time spent on supplemental work activities during the vacation, and work-related perseverative cognition, on both the difference between work and vacation asymptotes and the postvacation rate of change.

We fitted the piecewise mixed effects models using statistical programming language R (version 3.5), using the lme and nlme functions (Pinheiro & Bates, 2001). The code used for these analyses is available in a Supporting Information (Appendix S3). Maximum likelihood estimation was used for the fitting process. We compared competing nested models using chi-squared difference tests between model deviances. To compare models that were not nested, we compared AIC and BIC statistics (smaller values indicate a better fit).

We ran two robustness checks. First, given the aforementioned decision to drop an item from the emotional exhaustion scale, we refitted models 1–9 using a mean score constructed from all five items of the administered scale rather than just four. Second, given overlap between one of the anxious mood

Model 1: No difference in work and vacation asymptotes (therefore no rate of change between them either) Predicted OUTCOME$_{tj}$ = *work_asymptote*$_j$ • *work_asymptote*$_j$ is the subject intercept in a standard linear mixed effects model	
Model 2: Difference between work and vacation asymptotes, step change between them work and vacation asymptotes Predicted OUTCOME$_{tj}$ = *work_asymptote*$_j$ - *difference**VAC_DUM$_{tj}$ • VAC_DUM$_{tj}$ coded = 0 for working weeks (1, 2, 5-8); = 1 for vac' weeks (3, 4) • *work_asymptote*$_j$ is the subject intercept and represents the work asymptote • *difference* is the fixed regression coefficient for VAC_DUM$_{tj}$ in a standard linear mixed effects model and represents the estimated difference between work and vacation asymptotes (work asymptote – vacation asymtote)	
Model 3: Difference between work and vacation asymptotes, linear change from work to vacation, step change from vacation to work Predicted OUTCOME$_{tj}$ = *work_asymptote*$_j$ - *difference**VAC_LIN$_{tj}$ • VAC_LIN$_{tj}$ is coded = 0 for working weeks, 0.5 for first vacation week (week 3), 1 for second vacation week (week 4) • *work_asymptote*$_j$ is the subject intercept and represents the work asymptote • *difference* is fixed linear regression coefficient for VAC_LIN$_{tj}$ in a standard linear mixed effects model and represents the estimated rate of linear change per fortnight from work to vacation asymptote	
Model 4: Difference between work and vacation asymptotes, step (or linear†) change work to vacation, linear change vacation to work Predicted OUTCOME$_{tj}$ = *work_asymptote*$_j$ - *difference** PRE_VAC_DUM$_{tj}$ + *ratelin**WEEKS_AFTER_VAC$_{tj}$ • *work_asymptote*$_j$ and *difference* as for model 2 • PRE_VAC_DUM$_{tj}$ = 0 for prevacation weeks (weeks 1, 2); = 1 otherwise • WEEKS_AFTER_VAC$_{tj}$ coded = 0 weeks 1-4, = 1 week 5, = 2 week 6 etc. • *ratelin* is fixed regression coefficient for WEEKS_AFTER_VAC$_{tj}$ in a standard linear model and represents the estimated rate of change per week postvacation	
Model 5: Difference between work and vacation asymptotes, step (or linear†) change work to vacation, quadratic change vacation to work Predicted OUTCOME$_{tj}$ = *work_asymptote*$_j$ - *difference**PRE_VAC_DUM$_{tj}$ + *ratelin**WEEKS_AFTER_VAC$_{tj}$ + *ratequad**WEEKS_AFTER_VAC$^2_{tj}$ • PRE_VAC_DUM$_{tj}$, WEEKS_AFTER_VAC$_{tj}$, *work_asymptote*$_j$, *difference* as model4 • *ratelin and ratequad* are fixed regression coefficients for WEEKS_AFTER_VAC$_{tj}$ and WEEKS_AFTER_VAC$^2_{tj}$ in a standard polynomial regression model and together represent the quadratic function for change per week postvacation	
Model 6: Difference between work and vacation asymptotes, step (or linear†) change between work and vacation (whichever was better from model 2 vs model 3), exponential decay change from vacation to work, converging back to work asymptote Predicted OUTCOME$_{tj}$ = *work_asymptote*$_j$ + *difference**PRE_VAC_DUM$_{tj}$ - *difference**(exp(-1**rate**WEEKS_AFTER_VAC$_{tj}$)) • PRE_VAC_DUM$_{tj}$, WEEKS_AFTER_VAC$_{tj}$, *work_asymptote*$_j$, *difference* as model 4 • *rate* is the fixed regression coefficient for rate of change in the nonlinear (exponential decay) function for change between weeks 4 and 8.	

†models 4, 5 and 6 assume immediate step change from work to vacation; the dashed line shows the alternative linear change provided by swapping PRE_VAC_DUM$_{tj}$ for PRE_VAC_LIN$_{tj}$, coded = 1 for prevacation weeks, = 0.5 for week 3 and = 0 otherwise, so fitting a linear decrease towards the vacation asymptote over the vacation. To further clarify the coding of time, we have included a table showing the coding of each time variable for each week of the study in a supplementary file.

FIGURE 1 Competing piecewise linear, polynomial and non-linear growth curve models for change over time items ('worried') and the perseverative cognition scale, we reran models 1–9 using the anxious mood measure without this item.

RESULTS

Table 3 reports descriptive statistics for all study variables. Table 4 summarizes the initial model fitting process to ascertain the best overall model for change over time. For all three outcomes, allowing the vacation asymptote to differ from the work asymptote significantly improved model fit (Model 2 vs. Model 1: exhaustion, $\Delta\chi^2(1) = 147.67$, $p < .001$; anxious mood, $\Delta\chi^2(1) = 161.26$, $p < .001$; depressed mood, $\Delta\chi^2(1) = 42.41$, $p < .001$) and explained a non-trivial proportion of within-participants variability (exhaustion 21%; anxious mood 23%; depressed mood 7%). These results, coupled with the positive estimated difference between work and vacation asymptotes for each outcome, indicate that teachers' levels of exhaustion, anxious and depressed mood were lower during vacation (i.e., providing support for Hypothesis 1, the vacation effect).

Modelling the transition from work to vacation was improved by fitting a linear change in emotional exhaustion extending to the second vacation week (Model 3). Model fit statistics and the unexplained within-participants variance suggested that, for exhaustion only, Model 3 performed better than Model 2 (Model 1 AIC = 2330.9; Model 2 AIC = 2185.2; Model 3 AIC = 2164.2). For anxious and depressed mood, the single-step decrease from Week 2 to Week 3 (i.e., into vacation) was sufficient, with linear change extending to Week 4 offering little benefit (e.g., for anxious mood, Model 2 AIC = 1926.1; Model 3 AIC = 1961.7). Therefore, the reduction in exhaustion during vacation appeared more gradual than reduction in negative mood.

For the postvacation period, the piecewise mixed effects model with a polynomial (i.e., quadratic) curve (Model 5) provided a significant improvement over models with single-step postvacation change (Models 2 and 3); and, for anxious mood and exhaustion, over a linear change (Model 4). However, for each outcome, the polynomial model's performance was matched or eclipsed (in terms of AIC, BIC, variance explained) by the more parameter-efficient exponential decay function (Model 6). For example, for anxious mood, model 5 AIC = 1923.6 with 6 parameters and Model 6a AIC = 1923.5 with 5 parameters. Given the smaller number of parameters, and theoretical advantage of convergence to an asymptote, we concluded that using an exponential decay function to model vacation-to-work transition was most appropriate. Adding an autoregressive within-participants correlation to fine-tune this model further improved model fit (Model 6b, Table 5): exhaustion ΔDev = 2102.8–2021.9 = 80.9, $\Delta df = 6–5 = 1$, $p < .001$; anxious mood ΔDev = 52.5, $\Delta df = 1$, $p < .001$; depressed mood ΔDev = 77.1, $\Delta df = 1$, $p < .001$.

Figure 2 illustrates the shape of the estimated piecewise non-linear models for each outcome (lines), their excellent fit to the sample means (bars) and parameter estimates for Model 6b for each outcome. The significant positive *difference* coefficient indicates the positive effect of the vacation on each outcome: exhaustion *difference* = 1.811, $SE = .127$, $p < .001$; anxious mood *difference* = .976, $SE = .084$, $p < .001$; depressed mood *difference* = .591, $SE = .088$, $p < .001$. Likewise, positive *rate* coefficients indicate a postvacation re-emergence of negative affective states towards prevacation levels: exhaustion *rate* = .620, $SE = .100$, $p < .001$; anxious mood *rate* = 1.441, $SE = .420$, $p < .001$; depressed mood *rate* = .505, $SE = .211$, $p = .017$. Consistent with Hypothesis 2, these results indicate that anxious mood had the most rapid postvacation increase, returning to its work asymptote within two weeks after the vacation.

Next, we used a parallel process growth model to simultaneously model change on all three outcomes over time, enabling us to test differences in model parameters between anxious mood, emotional exhaustion and depressed mood. Freeing the *rate* of change parameter to differ between outcomes in the vacation-to-work transition significantly improved model fit (Δ Model deviance for the free vs. fixed model = 9.13 [2*df*], $p = .010$). In support of Hypothesis 2, when the *rate* parameter was freed to differ between outcomes, the postvacation rate of increase back to the work asymptote was most rapid for anxious mood (*rate* = 1.416, $SE = .441$, $p = .001$). Exhaustion and depressed mood exhibited more grad-

TABLE 3 Means, standard deviations and zero-order correlations

		Mean	Std dev	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	Neuroticism	3.47	1.54																										
2	Vacation hours wkd	1.41	.90	.08																									
3	Vacation PC	2.67	.95	.24*	.35*																								
4	Emot Exh—Week 1	4.90	1.05	.25*	−.17	.03																							
5	Emot Exh—Week 2	4.56	1.29	.18	.09	.04	.60*																						
6	Emot Exh—Week 3	3.45	1.32	−.06	.18	.21	.34*	.47*																					
7	Emot Exh—Week 4	2.78	1.20	.08	.28*	.35*	.22*	.23*	.65*																				
8	Emot Exh—Week 5	3.78	1.17	.01	.37*	.29*	.24*	.33*	.29*	.45*																			
9	Emot Exh—Week 6	4.02	1.14	.13	.27*	.39*	.39*	.26*	.19	.37*	.67*																		
10	Emot Exh—Week 7	4.04	1.31	.02	.30*	.34*	.40*	.29*	.38*	.43*	.57*	.76*																	
11	Emot Exh—Week 8	4.17	1.29	.09	.21	.27*	.32*	.36*	.39*	.46*	.60*	.62*	.67*																
12	Anx Mood—Week 1	3.15	.99	.53*	−.01	.15	.45*	.16	.08	.03	.22*	.24*	.20	.17															
13	Anx Mood—Week 2	2.99	1.06	.39*	.15	.40*	.35*	.51*	.29*	.26*	.34*	.25*	.20	.27*	.54*														
14	Anx Mood—Week 3	2.07	.91	.28*	.00	.41*	.12	.00	.32*	.32*	.12	.21	.17	.17	.38*	.34*													
15	Anx Mood—Week 4	2.26	1.04	.36*	.26*	.59*	.03	.02	.21	.53*	.32*	.33*	.27*	.27*	.24*	.38*	.61*												
16	Anx Mood—Week 5	2.94	1.15	.05	.11	.40*	.06	.06	.17	.26*	.38*	.37*	.23*	.26*	.28*	.45*	.43*	.49*											
17	Anx Mood—Week 6	3.28	1.23	.26*	.10	.43*	.21	.12	.11	.18	.17	.48*	.38*	.24*	.44*	.50*	.39*	.40*	.66*										
18	Anx Mood—Week 7	3.19	1.27	.22*	.14	.41*	.23*	.15	.19	.29*	.25*	.45*	.50*	.36*	.37*	.48*	.33*	.39*	.63*	.79*									
19	Anx Mood—Week 8	3.25	1.20	.20	.07	.35*	.12	.14	.22*	.32*	.21	.25*	.34*	.51*	.31*	.47*	.34*	.39*	.57*	.55*	.66*								
20	Dep Mood—Week 1	2.28	1.03	.38*	.05	.15	.43*	.31*	.15	.06	.32*	.26*	.28*	.30*	.65*	.49*	.28*	.17	.12	.27*	.32*	.33*							
21	Dep Mood—Week 2	2.21	1.12	.20	.15	.24*	.32*	.38*	.23*	.24*	.25*	.18	.26*	.30*	.41*	.64*	.27*	.27*	.05	.15	.22*	.24*	.60*						
22	Dep Mood—Week 3	1.66	.95	.13	.09	.34*	.15	.06	.29*	.26*	.23*	.26*	.22*	.15	.25*	.27*	.73*	.42*	.28*	.23*	.21*	.13*	31*	.44*					
23	Dep Mood—Week 4	1.67	.92	.17	.28*	.53*	.06	.14	.30*	.49*	.28*	.29*	.33*	.25*	.19	.32*	.56*	.75*	.33*	.33*	.35*	.30*	.29*	.49*	.69*				
24	Dep Mood—Week 5	1.76	1.01	.05	.33*	.44*	.16	.18	.32*	.45*	.51*	.46*	.43*	.32*	.25*	.31*	.48*	.56*	.51*	.37*	.42*	.31*	.35*	.32*	.55*	.70*			
25	Dep Mood—Week 6	2.13	1.30	.19	.26*	.46*	.29*	.22*	.22*	.33*	.34*	.61*	.59*	.37*	.39*	.42*	.32*	.39*	.33*	.65*	.55*	.30*	.50*	.47*	.40*	.52*	.57*		
26	Dep Mood—Week 7	2.16	1.34	.10	.27*	.45*	.21*	.16	.27*	.41*	.34*	.53*	.62*	.39*	.23*	.33*	.29*	.38*	.31*	.53*	.74*	.37*	.36*	.37*	.35*	.50*	.53*	.77*	
27	Dep Mood—Week 8	2.23	1.22	.17	.21*	.41*	.22*	.20	.28*	.41*	.40*	.52*	.59*	.67*	.35*	.38*	.31*	.36*	.33*	.43*	.57*	.62*	.49*	.48*	.30*	.47*	.57*	.66*	.71*

Note: $N = 90$; *$p < .05$.

Abbreviations: Anx Mood, anxious mood; Dep Mood, depressed mood; Emot Exh, emotional exhaustion; Vacation hours wkd, Log' hours worked per week during vacation; Vacation PC, work-related perseverative cognition during the vacation.

TABLE 4 Comparative fit for competing growth curve models for shape of change over time in emotional exhaustion, anxious mood and depressed mood

Outcome	Model	Deviance, *N* of model parameters	AIC	BIC	Within-subjects variance	Between-subjects variance
Exhaustion	1: No difference in work and vacation asymptotes	2324.90, 3	2330.90	2344.60	1.28	.57
	2: Immediate step change from work to vacation and from vacation to work asymptotes	2177.23, 4	2185.23	2203.49	1.01	.61
	3: Linear change from work into vacation, immediate step change between vacation and work asymptotes	2156.28, 4	2164.28	2182.54	.97	.62
	4: Linear change from work into vacation, postvacation linear change	2132.80, 5	2142.80	2165.63	.94	.62
	5: Linear change from work into vacation, postvacation polynomial (quadratic) change	2095.78, 6	2107.78	2135.17	.88	.63
	6a: Linear change from work into vacation, postvacation exponential decay change back to work asymptote	2102.82, 5	2112.82	2135.65	.89	.63
	6b: As 6a, with AR1 within-subjects autoregressive correlation	2021.90, 6	2033.90	2061.30	1.06	.45
Anxious mood	1: No difference in work and vacation asymptotes	2079.31, 3	2085.31	2099.01	.88	.54
	2: Immediate step change from work to vacation and from vacation to work asymptotes	1918.05, 4	1926.05	1944.32	.68	.56
	3: Linear change from work into vacation, immediate step change between vacation and work asymptotes	1953.69, 4	1961.69	1979.95	.72	.56
	4: Immediate step change from work to vacation asymptote, postvacation linear change	1952.11, 5	1962.11	1984.94	.71	.56
	5: Immediate step change from work to vacation asymptote, postvacation polynomial (quadratic) change	1911.61, 6	1923.61	1950.99	.67	.56
	6a: Immediate step change from work to vacation asymptote, postvacation exponential decay change back to work asymptote	1913.50, 5	1923.50	1946.33	.67	.56
	6b: As 6a, with AR1 within-subjects autoregressive correlation	1861.98, 6	1873.98	1901.37	.77	.46
Depressed mood	1: No difference in work and vacation asymptotes	1953.59, 3	1959.59	1973.29	.71	.60
	2: Immediate step change from work to vacation and from vacation to work asymptotes	1911.18, 4	1919.18	1937.44	.66	.60
	3: Linear change from work into vacation, immediate step change between vacation and work asymptotes	1916.54, 4	1924.54	1942.80	.67	.60
	4: Immediate step change from work to vacation asymptote, postvacation linear change	1892.78, 5	1902.78	1925.61	.64	.60
	5: Immediate step change from work to vacation asymptote, postvacation polynomial (quadratic) change	1890.96, 6	1902.96	1930.36	.64	.61
	6a: Immediate step change from work to vacation asymptote, postvacation exponential decay change back to work asymptote	1892.30, 5	1902.30	1925.13	.64	.60
	6b: As 6a, with AR1 within-subjects autoregressive correlation	1815.15, 6	1827.15	1854.54	.76	.49

Note: $N = 710$ observations from 90 participants.

ual (and similar) rates of increase across postvacation weeks (exhaustion *rate* = .589, SE = .086, p < .001; depressed mood *rate* = .461, SE = .217, p = .013).

In the final stage of analysis, we returned to modelling each outcome separately, and extended the best-fitting model (Model 6a) for each outcome by allowing the difference between the work and vacation asymptotes (*difference*) and the rate of change parameter (*rate*) to vary between participants (Model 7). Having controlled for neuroticism (Model 8), we investigated whether such between-participant variance in *difference* and/or *rate* was explained by the hypothesized predictor variables (Model 9). Table 5 summarizes and compares these models. Adding the effects of time spent on supplemental work activities and work-related perseverative cognition during the vacation as predictors of the work asymptote, difference between work and vacation asymptotes, and postvacation rate of return to the work asymptote (Model 9), significantly improved model fit for each outcome: exhaustion ΔDev = 33.2, Δdf = 4, p < .001; anxious mood ΔDev = 22.9, Δdf = 4, p < .001; depressed mood ΔDev = 34.1, Δdf = 1, p < .001.

Table 6 reports the fixed effects regression coefficients from Model 9, and the respective model equations. Contrary to Hypothesis 3a and 3b, we did not find a significant association between supplemental working and change in anxious or depressed mood during the vacation. However, in support of Hypothesis 4a, there was a negative association between time spent on work activities during the vacation and the postvacation rate of increase in anxious mood (effect on *rate* B = −2.13, p = .034). That is, greater time spent on supplementary job tasks during the vacation was typically followed by a shallower increase in anxiety when teachers returned to work. Results also revealed support for Hypotheses 5 and 6. Specifically, higher vacation time spent on supplemental work activities was associated with smaller recovery from exhaustion (effect of supplemental work activities on *difference* B = −.22, p = .048). Also, supplemental working during the vacation was associated with a more rapid postvacation rate of increase in exhaustion (effect on *rate* B = .16, p = .033).

In support of Hypotheses 7 and 9, work-related perseverative cognition during the vacation was negatively related to the *difference* parameter for each outcome: anxious mood B = −.36, p < .001; depressed mood B = −.31, p < .001; exhaustion B = −.36, p = .002. This set of results indicates that teachers who perseverated about work exhibited smaller decreases in negative affective states during the vacation. Figure 3 illustrates the nature of perseverative cognition's detrimental influence on each outcome variable. Finally, supporting Hypotheses 8 and 10, work-related perseverative cognition during the vacation was significantly positively related to rate of re-emergence of anxious mood (Hypothesis 8a), depressed mood (Hypothesis 8b) and exhaustion (Hypothesis 10) after the vacation: anxious mood B = .82, p = .034; depressed mood B = .43, p = .005; exhaustion B = .24, p = .006.

When performing the robustness checks (using an emotional exhaustion mean score constructed from all five scale items, and using an anxious mood mean score that excluded the 'worried' item), results were unchanged in terms of significant parameters and substantive conclusions.

DISCUSSION

This study's overall aim was to address a set of questions concerning the temporal dynamics and predictors of recovery from work in response to a vacation. We began by modelling week-level patterns of change in energy- and mood-related markers of the recovery process. Results revealed that discrete negative affective states changed at different rates in response to time away from the workplace, with teachers' anxious mood increasing at a significantly faster rate after the vacation when directly compared with change in emotional exhaustion and depressed mood. Our findings provide only partial support to the proposed self-regulatory (i.e., discrepancy resolving) functions of supplemental work behaviour while on a vacation. Specifically, time spent on supplemental job tasks was unrelated to change in the two mood outcomes from before to during the vacation. Nonetheless, in line with prediction, supplemental working was associated with a less pronounced rate of increase in anxious mood when teachers returned to school after the vacation. Engaging in work activity during the vacation still imposed a cost on the recovery

TABLE 5 Model fit and variance components from mixed effects piecewise non-linear growth curve models for change over time in emotional exhaustion, anxious mood and depressed mood, with step or linear change between work and vacation asymptotes, and exponential decay change from vacation to work asymptotes

Outcome	Model	Deviance	Δ deviance, Δ No. of model parameters	*p*	AIC	BIC	Within-subjects residual variance	Within-subjects residual autocorr	Between-subjects variance: *work_asymptote*	Between-subjects variance: *difference*	Between-subjects variance: *rate*	Between-subjects covariance: *work_asymptote, difference*
Exhaustion	6b	2021.90	–	–	2033.90	2061.30	1.06	.43	.45			
	7	2020.61	1.29, 4	.863	2038.61	2079.70	1.05	.45	.50	.36	9.81E-06	.38
	8	2017.59	3.02, 3	.389	2041.59	2096.37	1.06	.45	.48	.41	7.23E-08	.37
	9	1984.44	33.15, 4	<.001	2016.44	2089.48	.95	.38	.53	.20	2.88E-07	.61
Anxious mood	6b	1861.98	–	–	1873.98	1901.37	.77	.35	.46			
	7	1849.95	12.03, 4	.017	1867.95	1909.04	.71	.33	.58	.23	1.29E-11	.67
	8	1829.80	20.15, 3	<.001	1853.80	1908.58	.71	.35	.49	.23	1.73E-05	.71
	9	1806.91	22.89, 4	<.001	1838.91	1911.96	.69	.32	.48	.31	3.19E-07	.73
Depressed mood	6b	1815.15	–	–	1827.15	1854.54	.76	.41	.49			
	7	1805.93	9.22, 4	.055	1823.93	1865.02	.72	.41	.65	.18	4.73E-07	.77
	8	1799.73	6.21, 3	.102	1823.73	1878.51	.72	.41	.60	.17	6.51E-07	.74
	9	1765.63	34.10, 4	<.001	1797.59	1870.67	.67	.36	.61	.21	4.71E-07	.76

Note: $N = 710$ observations from 90 participants. *work_asymptote* = work asymptote; *difference* = difference between work and vacation asymptotes (work–vacation); *rate* = postvacation rate of change from vacation asymptote back to work asymptote. Model 6b: Piecewise growth curve model, exponential decay for vacation-to-work transition (from Table 4). Model 7: Add between-participants variance for *difference* and *rate* and between-participants covariance between *work_asymptote* and *difference*. Model 8: Add neuroticism as predictor of *work_asymptote*, *difference* and *rate*. Model 9: Add vacation time spent on work activities and work-related worry and rumination as predictors of *difference* and *rate*.

process, reducing teachers' ability to recover from exhaustion during the vacation itself and accelerating exhaustion's postvacation rate of re-emergence.

Contrasting with the mixed consequences of supplemental working, our results offer support to the assertion that perseverative cognition (worry and rumination) about work is a cognitive self-regulatory activity that makes goal-related discrepancies more obvious (Carver, 1996; Carver & Scheier, 1998). Over and above the influence of supplemental working, cognitively perseverating about work issues during the vacation restricted both the magnitude and durability of mood and energy benefits that teachers derived from the Christmas break.

Theoretical implications

These results demonstrate that increased precision can be achieved by simultaneously examining short-term trajectories among discrete negative affective states in response to the same respite event. Reflecting a pattern suggested in two other recent vacation studies (see Horan et al., 2021; Syrek et al., 2018), our findings indicate that anxious mood tends to arise at a statistically faster rate following vacation when directly compared with low activation negative affective states (i.e., exhaustion and depressed mood).

A potential explanation for these differences among the outcome change trajectories resides in control theory's account of self-regulatory feedback loops (Carver & Scheier, 1998). Specifically, the more rapid rise in anxious arousal after the vacation implies operation of a discrepancy-enlarging loop (as opposed to a discrepancy-reducing loop), with teachers presumably motivated to prevent some undesirable end state, such as perceived failure, unfavourable evaluation by significant others, or excessive workload accumulation. This interpretation attracts further support from the negative association observed between time spent on supplemental work tasks during the vacation and the postvacation rate of increase in anxious mood. Supplemental work activity completed during the vacation may have signalled acceptable (or perhaps even better than expected) goal-related progress, making the undesirable scenario seem less probable, thereby slowing the otherwise rapid increase in anxious mood when teachers first returned to school after their Christmas break.

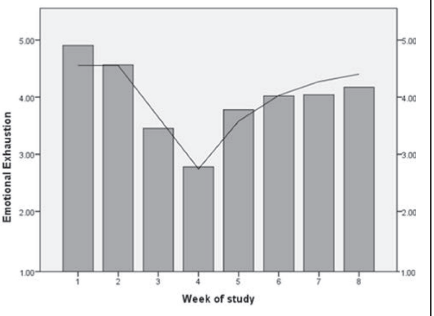
Another (related) explanation is offered by appraisal-based theories of stress, coping and emotion (Lazarus & Folkman, 1984; Skinner & Brewer, 2002; Tuckey et al., 2015). Specifically, the comparatively rapid rate of increase in anxious mood after the vacation points to the underlying influence of 'threat-based' cognitive appraisals (Lazarus & Folkman, 1984; Michel et al., 2016; Skinner & Brewer, 2002). This conceptualization suggests that some teachers involved in the current study were anticipating that some type of 'harm' could occur to their self-worth, perceived sense of competence, or coping capacity as they transitioned back to work after the Christmas break. The *anticipatory* characteristic of threat appraisals may be key to understating why anxious affect appears most likely to return quickly to its prevacation level after time away from the workplace. For anxiety to be triggered, teachers did not have to be exposed to an 'actual' psychosocial stressor (e.g., work overload, role conflict, or uncivil behaviour from a student); rather, heightened anxious reactivity can stem immediately from the cognitive anticipation of such events (Casper & Sonnentag, 2020). Extending this appraisal-based reasoning to the other two study outcomes, the comparatively less pronounced post-vacation increase in depressed mood and emotional exhaustion may imply that these low arousal negative affective states are more gradually elicited when some kind of 'loss' has already been experienced (Stoeber & Rennert, 2008). For instance, experiencing depressive (e.g., self-critical) rumination following something unpleasant that occurred at work; or, with regard to exhaustion, the accumulative cycle of energy resource depletion that comes from repeated exposure to job stressors (Fritz & Sonnentag, 2006; Kühnel & Sonnentag, 2011; Westman et al., 1997). Although these interpretations of our study's postvacation patterns of change remain speculative, they are consistent with growing interest in threat appraisals in occupational stress research (Brady & Cunningham, 2019; Casper & Sonnentag, 2020; Michel et al., 2016; Tuckey et al., 2015). Consideration of these conceptual arguments may ultimately carry implications that extend beyond theoretical curiosity. As Hobfoll and colleagues have noted, slower change processes (such as emotional exhaustion and depressed mood in the current study) 'might not be as easily noticed' (Hobfoll et al., 2018, p. 105).

Outcome: Exhaustion
Predicted EXHAUSTION =
work_asymptote + *difference**PRE_VAC_LIN - *difference**(exp(-1**rate**WEEKS_AFTER_VAC))

Variable coding:
- PRE_VAC_LIN: for study weeks 1,2 = 1; week 3 = 0.5, otherwise = 0
- WEEKS_AFTER_VAC = number of weeks since end of vacation (= 0 for pre-vacation and vacation weeks)

Model parameters to be estimated:
- *work_asymptote* – level of exhaustion in work periods
- *difference* – change in exhaustion per two-week period of vacation
- *rate* – rate of change in exhaustion after end of vacation

Parameter estimates (standard errors):
work_asymptote = 4.555 (0.109) $p < 0.001$
difference = 1.811 (0.127) $p < 0.001$
rate = 0.620 (0.100) $p < 0.001$

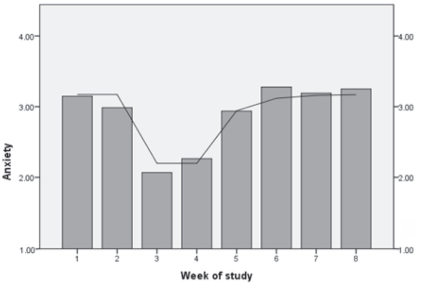


Outcome: Anxious Mood
Predicted ANXIETY =
work_asymptote + difference*PRE_VAC_DUM - difference*(exp(-1*rate*WEEKS_AFTER_VAC))

Variable coding:
- PRE_VAC_DUM: = 1 for weeks 1,2; = 0 otherwise
- WEEKS_AFTER_VAC = number of weeks since end of vacation (= 0 for pre-vacation and vacation weeks)

Model parameters to be estimated:
- *work_asymptote* – level of anxiety in work periods
- *difference* – difference in level of anxiety between work and vacation periods
- *rate* – rate of change in anxiety after end of vacation

Parameter estimates (standard errors):
work_asymptote = 3.173 (0.090) $p < 0.001$
difference = 0.976 (0.084) $p < 0.001$
rate = 1.441 (0.420) $p < 0.001$



Outcome: Depressed Mood
Predicted DEPRESSION =
work_asymptote + difference*PRE_VAC_DUM - difference*(exp(-1*rate*WEEKS_AFTER_VAC))

Variable coding:
- PRE_VAC_DUM: = 1 for weeks 1,2; = 0 otherwise;
- WEEKS_AFTER_VAC = number of weeks since end of vacation (= 0 for prevacation and vacation weeks)

Model parameters to be estimated:
- *work_asymptote* – level of depression in work periods
- *difference* – difference in level of depression between work and vacation periods
- *rate* – rate of change in depression after end of vacation

Parameter estimates (standard errors):
work_asymptote = 2.257 (0.104) $p < 0.001$
difference = 0.591 (0.088) $p < 0.001$
rate = 0.505 (0.211) $p = 0.017$

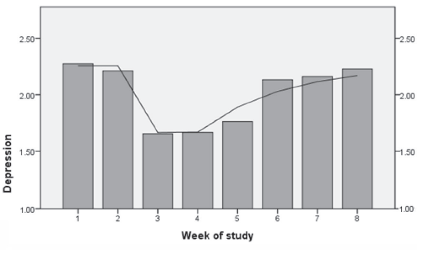


FIGURE 2 Piecewise non-linear mixed models for change over time in emotional exhaustion, anxious mood and depressed mood (lines), with sample means (bars)

The similar postvacation trajectories in teachers' depressed mood and exhaustion could be a manifestation of the overlap between these constructs (Bianchi et al., 2015; Bianchi & Schonfeld, 2018; Schonfeld et al., 2019). Evidence that burnout is essentially a depressive condition has been derived from clinically oriented measures of depressive symptoms administrated alongside mainstream job burnout scales (such as the Maslach Burnout Inventory; Schonfeld et al., 2019). The current study's design and results indicate that these low activation states also share influential subjective features (e.g., fatigue, urge to socially withdrawal, difficulty concentrating) at an earlier stage in their development (i.e., before they have escalated into more chronic or 'end state' conditions). Our findings at least imply that exploring short-term change sensitivities of exhaustion and depressed mood states around nonwork periods could generate an interesting source of evidence for this debate.

The nonuniform pattern of associations between time investment in work-related activity during the vacation and the three outcomes provides novel (albeit partial) support to the notion that supplemental working during nonwork time functions as a double-edged sword (Ďuranová & Ohly, 2016; Weigelt & Syrek, 2017). During the vacation itself, engaging in job tasks neither hindered nor enhanced teachers' ability to repair an anxious or depressed mood, replicating the lack of association reported in previous vacation studies (de Bloom et al., 2011; Flaxman et al., 2012). The negative association found between supplemental work activity and the postvacation increase in anxious mood implies that some teachers subsequently 'felt better' (i.e., relieved) as a result of performing work tasks during the vacation. Consistent with the theoretical arguments outlined above, the teachers who successfully completed or prepared job tasks may have returned to a less daunting workload after the vacation and therefore experienced a less rapid return to their prevacation level of anxiety. At the same time, spending time on supplemental job tasks reduced teachers' ability to recover from emotional exhaustion, thereby placing them at potentially greater risk of burning out. It is important not to downplay this risk, given the high rates and costs of burnout syndrome reported by this occupational group (García-Carmona et al., 2019).

Our final contribution was to test the proposition—derived from self-regulation theory—that supplemental working and work-focused perseverative cognition during the vacation would exhibit dissimilar influences on teachers' mood states. As predicted, teachers who became entangled in perseverative thinking gained weaker and less sustained mood benefits from the vacation. At a theoretical level, the different mood consequences of supplemental work behaviour and perseverative cognition correspond with the idea that—although these behavioural and cognitive activities share a goal progress aim—they differ in effectiveness for solving goal-related discrepancies (Carver, 1996; Martin & Tesser, 1996; Trincas et al., 2018). At a subjective level, it is not hard to imagine how perseverative cognition keeps discrepancies circulating in the mind. For instance, anticipatory worrying about how to deal with an impending situation at work may highlight an unfavourable comparison between one's current state of (perceived) preparedness and a mental representation of the unwanted or threatening outcome. Likewise, recurrently dwelling over something unpleasant that happened at work may draw attention to the (current) lack of behavioural means for quickly resolving a perceived mismatch between what happened and how one ideally wants to be at work.

Interestingly, supplemental working and perseverative cognition appeared to be independently and equally harmful to teachers' capacity to recover from work-related exhaustion and were also independently associated with a faster rate of re-emergence of exhaustion at the beginning of the new school term. It is possible that completing job tasks and perseverating about work-related problems during the vacation exert somewhat similar 'mental loads' (Verkuil et al., 2009), thereby restricting the extent to which (work-related) energy resources could be replenished (Geurts & Sonnentag, 2006).

By focusing on perseverative cognition (a combination of work-related worry and rumination), our study contributes to the growing research exploring specific work-related thoughts experienced by employees during off-job time (Cropley et al., 2012; Jimenez et al., 2021; Sonnentag & Fritz, 2015; Weigelt et al., 2019; Wendsche & Lohmann-Haislah, 2017). We narrowed our focus specifically to perseverative cognition for three reasons. First, by including both worry and rumination items, we captured the (future and past) temporal focus, an important feature of cognitive processing that appears to have been neglected in recovery from work research (Jimenez et al., 2021; Weigelt et al., 2019). Second, from a control theory perspective, the recurring nature of worrying and rumination is considered especially important, as it indicates stifled or thwarted goal progress (Carver, 1996). Third, studies confirm that adults can accurately report when they have been embroiled in this distinctive mode of cognitive processing (Kircanski et al., 2015). Thus, in

TABLE 6 Fixed estimates of model parameters from model 9 with parameters predicted by neuroticism, supplemental work activities and work-related perseverative cognition

		Exhaustion‡			Anxious mood‡‡			Depressed mood‡‡‡		
Model parameter	**Predictor**	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
work_asymptote	(Intercept)	4.23	.25	<.001	2.37	.22	<.001	1.67	.24	<.001
work_asymptote	Neuroticism	.10	.07	.132	.23	.06	<.001	.17	.07	.007
difference	(Intercept)	2.67	.41	<.001	1.51	.29	<.001	1.01	.28	<.001
difference	Neuroticism	.13	.08	.131	.08	.06	.228	.12	.06	.057
difference	Supp work during vacation§	−.22	.13	.048	.10	.09	.119	.01	.08	.439
difference	Pers cog during vacation	−.36	.13	.002	−.36	.08	<.001	−.31	.08	<.001
rate	(Intercept)	.13	.18	.479	9.79	4.93	.048	.15	.35	.662
rate	Neuroticism	−.07	.04	.078	−1.26	.61	.040	−.16	.07	.025
rate	Supp work during vacation§	.16	.09	.033	−2.13	1.17	.034	.07	.10	.237
rate	Pers cog during vacation	.24	.09	.006	.82	.45	.034	.43	.17	.005

Note: $N = 710$ observations from 90 participants.

Abbreviations: Pers cog, work-related perseverative cognition; Supp work, supplemental working.

§Natural logarithmic transformation of hours spent on supplemental work activities during vacation.

Model equations (subscripts refer to the t'th time point of the j'th subject):

‡Predicted $\text{EMEXH}_{tj} = \textit{work\_asymptote}_j{*} + \textit{difference}_j{*}\text{PRE\_VAC\_LIN}_{tj} - \textit{difference}_j{*}(\exp[-1{*}\textit{rate}_j{*}\text{WEEKS\_AFTER\_VAC}_{tj}])$

$\textit{work\_asymptote}_j = 4.23 + .10{*}\text{NEUROT}_j$

$\textit{difference}_j = 2.67 + .13{*}\text{NEUROT}_j - .22{*}\text{LWORKACT}_j - .36{*}\text{WORRY}_j$

$\textit{rate}_j = .13 – .07{*}\text{NEUROT}_j + .16{*}\text{LWORKACT}_j + .24{*}\text{WORRY}_j$.

‡‡Predicted $\text{ANX}_j = \textit{work\_asymptote}_j + \textit{difference}_j{*}\text{PRE\_VAC\_DUM}_{tj} - \textit{difference}_j{*}(\exp[-1{*}\textit{rate}_j{*}\text{WEEKS\_AFTER\_VAC}_{tj}])$

$\textit{work\_asymptote}_j = 2.37 + .23{*}\text{NEUROT}_j$

$\textit{difference}_j = 1.51 + .08{*}\text{NEUROT}_j + .10{*}\text{LWORKACT}_j - .36{*}\text{WORRY}_j$

$\textit{rate}_j = 9.79 – 1.26{*}\text{NEUROT}_j - 2.13{*}\text{LWORKACT}_j + .82{*}\text{WORRY}_j$.

‡‡‡Predicted $\text{DEP}_{tj} = \textit{work\_asymptote}_j + \textit{difference}_j{*}\text{PRE\_VAC\_DUM}_{tj} - \textit{difference}_j{*}(\exp[-1{*}\textit{rate}_j{*}\text{WEEKS\_AFTER\_VAC}_{tj}])$

$\textit{work\_asymptote}_j = 1.67 + .17{*}\text{NEUROT}_j$

$\textit{difference}_j = 1.01 + .12{*}\text{NEUROT}_j + .01{*}\text{LWORKACT}_j - .31{*}\text{WORRY}_j$

$\textit{rate}_j = .15 – .16{*}\text{NEUROT}_j + .07{*}\text{LWORKACT}_j + .43{*}\text{WORRY}_j$.

Variable and parameter naming, and variable coding in equations: *work_asymptote* = work asymptote; *difference* = difference between work and vacation asymptotes (work minus vacation); *rate* = postvacation rate of change back to work asymptote.

EMEXH = Emotional exhaustion. ANX = Anxious mood. DEP = Depressed mood. PRE_VAC_DUM = Dummy identifying prevacation weeks, coded = 1 for weeks 1,2; =0 otherwise. PRE_VAC_LIN: Dummy identifying prevacation weeks and fitting linear change between asymptotes during vacation, coded for study weeks 1,2 = 1; week 3 = .5, otherwise = 0. WEEKS_AFTER_VAC = number of weeks since end of vacation (coded = 0 for prevacation and vacation weeks). NEUROT: trait neuroticism. LWORKACT: natural logarithm of hours spent on supplemental work activities during vacation. WORRY: vacation levels of work-related worry and rumination.

recovery from work research, perhaps the surest method for capturing perseverative characteristics is to ask employees whether they have been worrying and/or ruminating about work (Casper & Sonnentag, 2020; de Bloom et al., 2014; Flaxman et al., 2012, 2018; Smyth et al., 2020).

Limitations and directions for future research

A number of limitations should be considered when interpreting these results. First, we focused exclusively on negative affective states and did not examine change in positive mood states, work engagement or the influence of replenishing vacation experiences. Second, our design included only two measurement occasions during the vacation, preventing the modelling of non-linear change in energy and mood across the vacation. Third, we assessed only one aspect of supplemental working (number of hours spent on work-related activities during the vacation). Going forward, it would be informative to see studies uncovering employees' more specific motivations for engaging in work tasks while on vacation, and the different

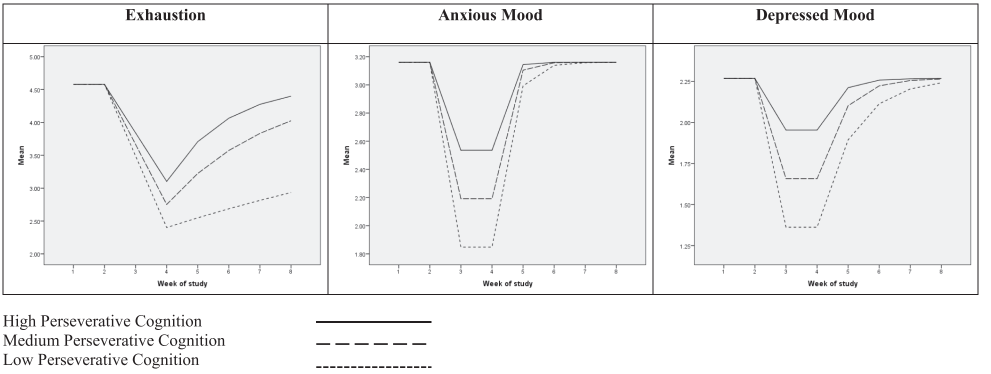


FIGURE 3 Predicted levels of emotional exhaustion and negative mood states conditional on levels of work-related perseverative cognition during the vacation (low = mean−1*SD*; medium = mean; high = mean + 1*SD*). Neuroticism and time spent on supplemental work activities during the vacation were held constant at the respective sample means

types of goals being served by such behaviour (Ohly & Latour, 2014). It would also be useful to assess the degree to which supplemental working during vacation elicits a perception of goal-related progress, as this is likely to influence any mood benefits. Fourth, we collected data via paper surveys, so did not objectively record whether teachers completed every survey booklet on the correct date. We sought to increase the likelihood that teachers would respond on the correct dates by offering personalized feedback on the outcomes and emphasizing the importance of leaving a survey blank if not completed at the scheduled time. Despite the increased use of electronic surveys, paper measures are still deemed suitable for some contexts, such as when investigating off-job experiences (Firoozabadi et al., 2018; Flaxman et al., 2018; Hülsheger et al., 2018; ten Brummelhuis & Trougakos, 2014). Fifth, the study may also be limited by our exclusive focus on teachers working in UK schools, potentially raising questions about generalizability to other countries and different occupational groups. Given that structured vacations are built into school calendars in other parts of the world, our results likely hold relevance for a wider population of teachers. In addition, the supplemental working and perseverative cognition measures are not specific to teachers and capture leisure time behaviours and experiences reported by employees in other occupations (Flaxman et al., 2012; Querstret & Cropley, 2012; Weigelt et al., 2019). Finally, only 20% of the study sample spent time away from home during the Christmas break, so we cannot be certain whether a similar pattern of findings would emerge when the focal vacation involves more travel and staying away from home.

Practical implications

In occupations (such as teaching) that exhibit a tendency for job demands to spill over into vacations, there could be utility in training employees to be more effective and efficient when engaging in supplemental work tasks during nonwork time. This may help to reduce the (additional) energy costs and enhance perceptions of goal-related progress (Weigelt & Syrek, 2017). Another idea is to promote the use of planning interventions, aimed at reducing preoccupation with incomplete goals and unfinished tasks. For example, Smit (2016) demonstrated the self-regulatory functions of making regular and concrete plans about where, when and how unfulfilled work goals will be accomplished, thereby in theory reducing work goal accessibility during periods of leisure time (also see Masicampo & Baumeister, 2011). The simplicity of this technique means it could be easily communicated to employees and deployed as part of the work-to-vacation transition process. Consistent with Karabinski et al.'s (2021) recent meta-analytic review, detachment-enhancing training programmes may benefit from greater integration of techniques (e.g., mindfulness and decentring) that help people disentangle themselves from stress-related cognitive perseveration (Querstret et al., 2017). At the organizational level, we draw practitioners' and school leaders' attention to (1) recommendations and toolkits specifically aimed at reducing teacher workloads (Churches, 2020) and (2) the potential role of improving perceptions of organizational support in extending the benefits of vacations (Reizer & Mey-Raz, 2019).

CONCLUSION

The study shows that discrete negative affective states can follow different change trajectories in response to a vacation from the workplace. Engaging in supplemental work activity while on vacation may have relatively little impact on some employees' mood state and may even reduce the level of anxiety experienced when returning to work, yet such behaviour appears to make it more difficult to recover from work-related exhaustion. Our findings further indicate that being caught up in worry and rumination about work issues is highly likely to reduce the benefits gained from vacations. We hope these findings serve to advance understanding of the energy restoration and mood repair functions of nonwork time, and help to inform initiatives designed to improve employees' leisure time recovery experiences.

AUTHOR CONTRIBUTIONS

Paul Flaxman: Conceptualization; investigation; methodology; supervision; writing – original draft; writing – review and editing. **Julie Ménard:** Conceptualization; methodology; writing – review and editing. **Christopher B. Stride:** Conceptualization; data curation; formal analysis; writing – original draft; writing – review and editing. **Sonja A. Newman:** Conceptualization; investigation; methodology; project administration; writing – review and editing.

ACKNOWLEDGEMENTS

This research was supported by a City, University of London doctoral studentship awarded to Sonja A. Newman.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

The authors do not intend to make the data publicly available. The reasons for this are as follows: (1) when signing up to the study, participants were not informed that their data would be publicly available; and (2) to ensure that the data are not used by third parties (e.g., media) to draw general conclusions about teachers or schools in the United Kingdom. Access will be provided to identifiable researchers under restrictions to protect confidentiality. Researchers should contact the corresponding author to request access to the data via an institutional repository, providing that access is required for confirming study results or for conducting research reviews.

ORCID

Paul E. Flaxman https://orcid.org/0000-0002-6417-2499

REFERENCES

Bennett, A. A., Bakker, A. B., & Field, J. G. (2018). Recovery from work-related effort: A meta-analysis. *Journal of Organizational Behavior*, *39*, 262–275. https://doi.org/10.1002/job.2217

Berenbaum, H. (2010). An initiation-termination two-phase model of worrying. *Clinical Psychology Review*, *30*(8), 962–975. https://doi.org/10.1016/j.cpr.2010.06.011

Bianchi, R., & Schonfeld, I. S. (2018). Burnout-depression overlap: Nomological network examination and factor-analytic approach. *Scandinavian Journal of Psychology*, *59*(5), 532–539. https://doi.org/10.1111/sjop.12460

Bianchi, R., Schonfeld, I. S., & Laurent, E. (2015). Burnout-depression overlap: A review. *Clinical Psychology Review*, *36*, 28–41. https://doi.org/10.1016/j.cpr.2015.01.004

Blank, C., Gatterer, K., Leichtfried, V., Pollhammer, D., Mair-Raggautz, M., Duschek, S., Humpeler, E., & Schobersberger, W. (2018). Short vacation improves stress-level and well-being in German-speaking middle-managers—A randomized controlled trial. *International Journal of Environmental Research and Public Health*, *15*(1), 130.

Bliese, P. D., Adler, A. B., & Flynn, P. J. (2017). Transition processes: A review and synthesis integrating methods and theory. *Annual Review of Organizational Psychology and Organizational Behavior*, *4*, 263–286. https://doi.org/10.1146/annurev-orgpsych-032516-113213

Brady, L., & Cunningham, C. J. L. (2019). Challenge, hindrance, and threat stressors: A within- and between-persons examination of general and specific stressor appraisal tendencies and a priori categorizations. *Industrial and Organizational Psychology Translational Research and Working Papers*. https://scholar.utc.edu/iopsy/3

Brosschot, J. F., Gerin, W., & Thayer, J. F. (2006). The perseverative cognition hypothesis: A review of worry, prolonged stress-related physiological activation, and health. *Journal of Psychosomatic Research*, *60*, 113–124. https://doi.org/10.1016/j.jpsychores.2005.06.074

Brosschot, J. F., Pieper, S., & Thayer, J. F. (2005). Expanding stress theory: Prolonged activation and perseverative cognition. *Psychoneuroendocrinology*, *30*(10), 1043–1049. https://doi.org/10.1016/j.psyneuen.2005.04.008

Carver, C. S. (1996). Goal engagement and the human experience. In R. S. Wyer (Ed.), *Ruminative thoughts: Advances in social cognition* (Vol. IX, pp. 49–61). Lawrence Erlbaum Associates.

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review*, *97*, 19–35. https://doi.org/10.1037/0033-295X.97.1.19

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. Cambridge University Press. https://doi.org/10.1017/CBO9781139174794

Carver, C. S., & Scheier, M. F. (2012). Cybernetic control processes and the self-regulation of behavior. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 28–42). Oxford University Press.

Casper, A., & Sonnentag, S. (2020). Feeling exhausted or vigorous in anticipation of high workload? The role of worry and planning during the evening. *Journal of Occupational and Organizational Psychology*, *93*, 215–242. https://doi.org/10.1111/joop.12290

Chou, C.-P., Yang, D., Pentz, M. A., & Hser, Y.-I. (2004). Piecewise growth curve modelling approach for longitudinal prevention study. *Computational Statistics & Data Analysis*, *46*, 213–225. https://doi.org/10.1016/S0167-9473(03)00149-X

Churches, R. (2020). *Supporting teachers through the school workload reduction toolkit*. Department for Education.

Cropley, M., Michalianou, G., Pravettoni, G., & Millward, L. J. (2012). The relation of post-work ruminative thinking with eating behaviour. *Stress and Health*, *28*, 23–30. https://doi.org/10.1002/smi.1397

de Bloom, J., Geurts, S. A. E., & Kompier, M. A. J. (2012). Effects of short vacations, vacation activities and experiences on employee health and well-being. *Stress and Health*, *28*(4), 305–318. https://doi.org/10.1002/smi.1434

de Bloom, J., Geurts, S. A. E., & Kompier, M. A. J. (2013). Vacation (after-) effects on employee health and well-being, and the role of vacation activities, experiences and sleep. *Journal of Happiness Studies*, *14*, 613–633. https://doi.org/10.1007/s10902-012-9345-3

de Bloom, J., Geurts, S. A. E., Sonnentag, S., Taris, T., De Weerth, C., & Kompier, M. A. J. (2011). How does a vacation from work affect employee health and well-being? *Psychology & Health*, *26*, 1606–1622. https://doi.org/10.1080/08870446.2010.546860

de Bloom, J., Geurts, S. A. E., Taris, T. W., Sonnentag, S., De Weerth, C., & Kompier, M. A. J. (2010). Effects of vacation from work on health and well-being: Lots of fun, quickly gone. *Work and Stress*, *24*, 196–216. https://doi.org/10.1080/02678373.2010.493385

de Bloom, J., Kompier, M., Geurts, S., De Weerth, C., Taris, T., & Sonnentag, S. (2009). Do we recover from vacation? Meta-analysis of vacation effects on health and well-being. *Journal of Occupational Health*, *51*, 13–25. https://doi.org/10.1539/joh.k8004

de Bloom, J., Radstaak, M., & Geurts, S. (2014). Vacation effects on behaviour, cognition and emotions of compulsive and non-compulsive workers: Do obsessive workers go 'cold Turkey'? *Stress and Health*, *30*(3), 232–243. https://doi.org/10.1002/smi.2600

Derks, D., van Mierlo, H., & Schmitz, E. B. (2014). A diary study on work-related smartphone use, psychological detachment and exhaustion: Examining the role of the perceived segmentation norm. *Journal of Occupational Health Psychology*, *19*, 74–84. https://doi.org/10.1037/a0035076

Ďuranová, L., & Ohly, S. (2016). *Persistent work-related technology use, recovery and well-being processes: Focus on supplemental work after hours*. Springer International Publishing. https://doi.org/10.1007/978-3-319-24759-5

Etzion, D. (2003). Annual vacation: Duration of relief from job stressors and burnout. *Anxiety, Stress, and Coping*, *16*, 213–226. https://doi.org/10.1080/1061580021000069425

Firoozabadi, A., Uitdewilligen, S., & Zijlstra, F. (2018). Should you switch off or stay engaged? The consequences of thinking about work on the trajectory of psychological well-being over time. *Journal of Occupational Health Psychology*, *23*(2), 278–288. https://doi.org/10.1037/ocp0000068

Flaxman, P. E., Ménard, J., Bond, F. W., & Kinman, G. (2012). Academics' experiences of a respite from work: Effects of self-critical perfectionism and perseverative cognition. *Journal of Applied Psychology*, *97*, 854–865. https://doi.org/10.1037/a0028055

Flaxman, P. E., Stride, C. B., Söderberg, M., Lloyd, J., Guenole, N., & Bond, F. W. (2018). Relationships between two dimensions of employee perfectionism, postwork cognitive processing, and work day functioning. *European Journal of Work and Organizational Psychology*, *27*, 56–69. https://doi.org/10.1080/1359432X.2017.1391792

Fritz, C., & Sonnentag, S. (2006). Recovery, well-being, and performance-related outcomes: The role of workload and vacation experiences. *Journal of Applied Psychology*, *91*, 936–945. https://doi.org/10.1037/0021-9010.91.4.936

García-Carmona, M., Marín, M. D., & Aguayo, R. (2019). Burnout syndrome in secondary school teachers: A systematic review and meta-analysis. *Social Psychology of Education: An International Journal*, *22*(1), 189–208. https://doi.org/10.1007/s11218-018-9471-9
Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychological Methods*, *19*(1), 72–91. https://doi.org/10.1037/a0032138
Geurts, S. A. E., & Sonnentag, S. (2006). Recovery as an explanatory mechanism in the relation between acute stress reactions and chronic health impairment. *Scandinavian Journal of Work, Environment and Health*, *32*, 482–492.
Goetzel, R. Z., Roemer, E. C., Holingue, C., Fallin, M. D., McCleary, K., Eaton, W., Agnew, J., Azocar, F., Ballard, D., Bartlett, J., Braga, M., Conway, H., Crighton, K. A., Frank, R., Jinnett, K., Keller-Greene, D., Rauch, S. M., Safeer, R., Saporito, D., … Mattingly, C. R. (2018). Mental health in the workplace: A call to action proceedings from the mental health in the workplace-public health summit. *Journal of Occupational and Environmental Medicine*, *60*(4), 322–330. https://doi.org/10.1097/JOM.0000000000001271
Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the big-five personality domains. *Journal of Research in Personality*, *37*, 504–528. https://doi.org/10.1016/S0092-6566(03)00046-1
Grimm, K. J., Ram, N., & Hamagami, F. (2011). Nonlinear growth curves in developmental research. *Child Development*, *82*(5), 1357–1371. https://doi.org/10.1111/j.1467-8624.2011.01630.x
Gump, B. B., Hruska, B., Pressman, S. D., Park, A., & Bendinskas, K. G. (2021). Vacation's lingering benefits, but only for those with low stress jobs. *Psychology & Health*, *36*(8), 895–912. https://doi.org/10.1080/08870446.2020.1814958
Gump, B. B., & Matthews, K. A. (2000). Are vacations good for your health? The 9-year mortality experience after the multiple risk factor intervention trial. *Psychosomatic Medicine*, *62*(5), 608–612. https://doi.org/10.1097/00006842-200009000-00003
Halbesleben, J. R. B., Wheeler, A. R., & Paustian-Underdahl, S. C. (2013). The impact of furloughs on emotional exhaustion, self-rated performance, and recovery experiences. *Journal of Applied Psychology*, *98*, 492–503. https://doi.org/10.1037/a0032242
Hobfoll, S. E., Halbesleben, J., Neveu, J.-P., & Westman, M. (2018). Conservation of resources in the organizational context: The reality of resources and their consequences. *Annual Review of Organizational Psychology and Organizational Behavior*, *5*(1), 103–128.
Horan, S., Flaxman, P. E., & Stride, C. B. (2021). The perfect recovery? Interactive influence of perfectionism and spillover work tasks on changes in exhaustion and mood around a vacation. *Journal of Occupational Health Psychology*, *26*(2), 86–107. https://doi.org/10.1037/ocp0000208
Hülsheger, U. R., Walkowiak, A., & Thommes, M. S. (2018). How can mindfulness be promoted? Workload and recovery experiences as antecedents of daily fluctuations in mindfulness. *Journal of Occupational and Organizational Psychology*, *91*, 261–284. https://doi.org/10.1111/joop.12206
Jimenez, W. P., Hu, X., & Xu, X. V. (2021). Thinking about thinking about work: A meta-analysis of off-job positive and negative work-related thoughts. *Journal of Business and Psychology*, *37*, 237–262. https://doi.org/10.1007/s10869-021-09742-7
Karabinski, T., Haun, V. C., Nübold, A., Wendsche, J., & Wegge, J. (2021). Interventions for improving psychological detachment from work: A meta-analysis. *Journal of Occupational Health Psychology*, *26*(3), 224–242. https://doi.org/10.1037/ocp0000280
Kasser, T., & Sheldon, K. M. (2002). What makes for a merry Christmas? *Journal of Happiness Studies*, *3*(4), 313–329. https://doi.org/10.1023/A:1021516410457
Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research*, *44*, 486–507. https://doi.org/10.1177/0049124114543236
Kim, D. (2019). Does paid vacation leave protect against depression among working Americans? A national longitudinal fixed effects analysis. *Scandinavian Journal of Work, Environment & Health*, *45*(1), 22–32. https://doi.org/10.5271/sjweh.3751
Kircanski, K., Thompson, R. J., Sorenson, J., Sherdell, L., & Gotlib, I. H. (2015). Rumination and worry in daily life: Examining the naturalistic validity of theoretical constructs. *Clinical Psychological Science*, *3*(6), 926–939. https://doi.org/10.1177/2167702614566603
Kühnel, J., & Sonnentag, S. (2011). How long do you benefit from vacation? A closer look at the fade out of vacation effects. *Journal of Organizational Behavior*, *32*, 125–143. https://doi.org/10.1002/job.699
Lang, J. W. B., & Bliese, P. D. (2009). General mental ability and two types of adaptation to unforeseen change: Applying discontinuous growth models to the task-change paradigm. *Journal of Applied Psychology*, *94*, 411–428. https://doi.org/10.1037/a0013803
Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.
Mäkikangas, A., Feldt, T., & Kinnunen, U. (2007). Warr's scale of job-related affective well-being: A longitudinal examination of its structure and relationships with work characteristics. *Work and Stress*, *21*, 197–219. https://doi.org/10.1080/02678370701662151
Mannell, B., Walker, G. J., & Ito, E. (2014). Ideal affect, actual affect, and affect discrepancy during leisure and paid work. *Journal of Leisure Research*, *46*(1), 13–37. https://doi.org/10.1080/00222216.2014.11950311
Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In R. S. Wyer (Ed.), *Ruminative thoughts: Advances in social cognition* (Vol. IX, pp. 1–47). Lawrence Erlbaum Associates.
Masicampo, E. J., & Baumeister, R. F. (2011). Consider it done! Plan making can eliminate the cognitive effects of unfulfilled goals. *Journal of Personality and Social Psychology*, *101*(4), 667–683. https://doi.org/10.1037/a0024192
Maslach, C., Jackson, S. E., & Leiter, M. P. (Eds.). (1996). *Maslach burnout inventory manual* (3rd ed.). Consulting Psychologists Press.
McEwen, B. S. (1998). Stress, adaptation, and disease. Allostasis and allostatic load. *Annals of the New York Academy of Sciences*, *840*, 33–44. https://doi.org/10.1111/j.1749-6632.1998.tb09546.x
McEwen, B. S. (2007). Physiology and neurobiology of stress and adaptation: Central role of the brain. *Physiological Reviews*, *87*(3), 873–904. https://doi.org/10.1152/physrev.00041.2006
Meeten, F., & Davey, G. C. (2011). Mood-as-input hypothesis and perseverative psychopathologies. *Clinical Psychology Review*, *31*(8), 1259–1275. https://doi.org/10.1016/j.cpr.2011.08.002

Meijman, T. F., & Mulder, G. (1998). Psychological aspects of workload. In P. J. Drenth, H. Thierry, & C. J. de Wolff (Eds.), *Handbook of work and organizational psychology* (pp. 5–33). Psychology Press.

Michel, A., Turgut, S., Hoppe, A., & Sonntag, K. (2016). Challenge and threat emotions as antecedents of recovery experiences: Findings from a diary study with blue-collar workers. *European Journal of Work and Organizational Psychology*, *25*(5), 674–689. https://doi.org/10.1080/1359432X.2015.1128414

Muris, P., Roelofs, J., Rassin, E., Franken, I., & Mayer, B. (2005). Mediating effects of rumination and worry on the links between neuroticism, anxiety and depression. *Personality and Individual Differences*, *39*(6), 1105–1111. https://doi.org/10.1016/j.paid.2005.04.005

Ohly, S., & Latour, A. (2014). Work-related smartphone use and well-being in the evening: The role of autonomous and controlled motivation. *Journal of Personnel Psychology*, *13*(4), 174–183. https://doi.org/10.1027/1866-5888/a000114

Ottaviani, C., Thayer, J. F., Verkuil, B., Lonigro, A., Medea, B., Couyoumdjian, A., & Brosschot, J. F. (2016). Physiological concomitants of perseverative cognition: A systematic review. *Psychological Bulletin*, *142*, 231–259. https://doi.org/10.1037/bul0000036

Ovsiankina, M. (1928). Untersuchungen zur Handlungs- und Affektpsychologie. *Psychologische Forschung*, *11*, 302–379. https://doi.org/10.1007/BF00410261

Pinheiro, J. C., & Bates, D. M. (2001). *Mixed-effects models in S and S-PLUS*. Springer-Verlag.

Querstret, D., & Cropley, M. (2012). Exploring the relationship between work-related rumination, sleep quality and work-related fatigue. *Journal of Occupational Health Psychology*, *17*, 341–353. https://doi.org/10.1037/a0028552

Querstret, D., Cropley, M., & Fife-Schaw, C. (2017). Internet-based instructor-led mindfulness for work-related rumination, fatigue and sleep: Assessing facets of mindfulness as mechanisms of change. A randomised waitlist control trial. *Journal of Occupational Health Psychology*, *22*, 153–169. https://doi.org/10.1037/ocp0000028

Quinn, R. W., Spreitzer, G. M., & Lam, C. F. (2012). Building a sustainable model of human energy in organizations: Exploring the critical role of resources. *The Academy of Management Annals*, *6*(1), 337–396. https://doi.org/10.1080/19416520.2012.676762

Raghunathan, R., & Corfman, K. P. (2004). Sadness as pleasure-seeking prime, anxiety as attentiveness prime: The different affect different effect (DADE) model. *Motivation and Emotion*, *28*, 23–41. https://doi.org/10.1023/B:MOEM.0000027276.32709.30

Reizer, A., & Mey-Raz, N. (2019). Slowing down vacation fade-out effects. *International Journal of Stress Management*, *26*(3), 213–222. https://doi.org/10.1037/str0000103

Roger, D., & Najarian, B. (1989). The construction and validation of a new scale for measuring emotion control. *Personality and Individual Differences*, *10*, 845–853.

Russell, E., & Daniels, K. (2018). Measuring affective well-being at work using shortform scales: Implications for affective structures and participant instructions. *Human Relations*, *71*, 1478–1507. https://doi.org/10.1177/0018726717751034

Sari, B. A., Koster, E., & Derakshan, N. (2017). The effects of active worrying on working memory capacity. *Cognition & Emotion*, *31*(5), 995–1003. https://doi.org/10.1080/02699931.2016.1170668

Schonfeld, I. S., Verkuilen, J., & Bianchi, R. (2019). Inquiry into the correlation between burnout and depression. *Journal of Occupational Health Psychology*, *24*(6), 603–616. https://doi.org/10.1037/ocp0000151

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modelling change and event occurrence*. Oxford University Press. ISBN: 0-19-515296-4.

Skinner, N., & Brewer, N. (2002). The dynamics of threat and challenge appraisals prior to stressful achievement events. *Journal of Personality and Social Psychology*, *83*(3), 678–692. https://doi.org/10.1037//0022-3514.83.3.678

Smit, B. W. (2016). Successfully leaving work at work: The self-regulatory underpinnings of psychological detachment. *Journal of Occupational and Organizational Psychology*, *89*, 493–514. https://doi.org/10.1111/joop.12137

Smyth, A., de Bloom, J., Syrek, C., Domin, M., Janneck, M., Reins, J. A., & Lehr, D. (2020). Efficacy of a smartphone-based intervention — "Holidaily" — Promoting recovery behaviour in workers after a vacation: Study protocol for a randomised controlled trial. *BMC Public Health*, *20*, 1286. https://doi.org/10.1186/s12889-020-09354-5

Sonnentag, S. (2018). The recovery paradox: Portraying the complex interplay between job stressors, lack of recovery, and poor well-being. *Research in Organizational Behavior*, *38*, 169–185. https://doi.org/10.1016/j.riob.2018.11.002

Sonnentag, S., Cheng, B. H., & Parker, S. L. (2022). Recovery from work: Advancing the field toward the future. *Annual Review of Organizational Psychology and Organizational Behavior*, *9*, 33–60. https://doi.org/10.1146/annurev-orgpsych-012420-091355

Sonnentag, S., & Fritz, C. (2007). The recovery experience questionnaire: Development and validation of a measure assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology*, *12*, 204–221. https://doi.org/10.1037/1076-8998.12.3.204

Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior*, *36*(S1), S72–S103. https://doi.org/10.1002/job.1924

Sonnentag, S., Venz, L., & Casper, A. (2017). Advances in recovery research: What have we learned? What should be done next? *Journal of Occupational Health Psychology*, *22*(3), 365–380. https://doi.org/10.1037/ocp0000079

Steed, L. B., Swider, B. W., Keem, S., & Liu, J. T. (2021). Leaving work at work: A meta-analysis on employee recovery from work. *Journal of Management*, *47*(4), 867–897. https://doi.org/10.1177/0149206319864153

Stoeber, J., & Rennert, D. (2008). Perfectionism in school teachers: Relations with stress appraisals, coping styles, and burnout. *Anxiety, Stress, and Coping*, *21*(1), 37–53. https://doi.org/10.1080/10615800701742461

Strandberg, T. E., von Bonsdorff, M., Strandberg, A., Pitkala, K., & Raikkonen, K. (2017). Associations of vacation time with lifestyle, long-term mortality and health-related quality of life in old age: The Helsinki businessmen study. *European Geriatric Medicine*, *8*, 260–264. https://doi.org/10.1016/j.eurger.2017.03.003

Swider, B. W., & Zimmerman, R. D. (2010). Born to burnout: A meta-analytic path model of personality, job burnout, and work outcomes. *Journal of Vocational Behavior*, *76*, 487–506. https://doi.org/10.1016/j.jvb.2010.01.003

Syrek, C. J., & Antoni, C. H. (2014). Unfinished tasks foster rumination and impair sleeping – particularly if leaders have high performance expectations. *Journal of Occupational Health Psychology*, *19*(4), 490–499. https://doi.org/10.1037/a0037127

Syrek, C. J., Weigelt, O., Kuehnel, J., & De Bloom, J. (2018). All I want for Christmas is recovery: Changes in employee affective well-being before and after vacation. *Work and Stress*, *32*, 313–333. https://doi.org/10.1080/02678373.2018.1427816

Syrek, C. J., Weigelt, O., Peifer, C., & Antoni, C. H. (2017). Zeigarnik's sleepless nights: How unfinished tasks at the end of the week impair employee sleep on the weekend through rumination. *Journal of Occupational Health Psychology*, *22*(2), 225–238. https://doi.org/10.1037/ocp0000031. Epub 2016 Apr 21. PMID: 27101340.

ten Brummelhuis, L. L., & Trougakos, J. P. (2014). The recovery potential of intrinsically versus extrinsically motivated off-job activities. *Journal of Occupational and Organizational Psychology*, *87*, 177–199. https://doi.org/10.1111/joop.12050

Thomsen, D. K. (2006). The association between rumination and negative affect: A review. *Cognition and Emotion*, *20*(8), 1216–1235. https://doi.org/10.1080/02699930500473533

Trapnell, P. D., & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology*, *76*, 284–304.

Trincas, R., Schepisi, C., Leombruni, E., Di Mauro, V. E., & Mancini, F. (2018). Goals and functions of rumination: A review. *Clinical Neuropsychiatry: Journal of Treatment Evaluation*, *15*(6), 360–372.

Tuckey, M. R., Searle, B. J., Boyd, C. M., Winefield, A. H., & Winefield, H. R. (2015). Hindrances are not threats: Advancing the multidimensionality of work stress. *Journal of Occupational Health Psychology*, *20*(2), 131–147. https://doi.org/10.1037/a0038280

van de Schoot, R., Lugtig, P., & Hox, J. J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, *9*, 486–492. https://doi.org/10.1080/17405629.2012.686740

Verkuil, B., Brosschot, J. F., Borkovec, T. D., & Thayer, J. F. (2009). Acute autonomic effects of experimental worry and cognitive problem solving: Why worry about worry? *International Journal of Clinical and Health Psychology*, *9*(3), 439–453.

Warr, P. (1990). The measurement of well-being and other aspects of mental health. *Journal of Occupational Psychology*, *63*, 193–210.

Warr, P. B., Bindl, U., Parker, S. K., & Inceoglu, I. (2014). Four-quadrant investigation of job-related affects and behaviours. *European Journal of Work and Organizational Psychology*, *23*, 342–363. https://doi.org/10.1080/1359432X.2012.744449

Weigelt, O., Gierer, P., & Syrek, C. J. (2019). My mind is working overtime: Towards an integrative perspective of psychological detachment, work-related rumination, and work reflection. *International Journal of Environmental Research and Public Health*, *16*(16), 2987. https://doi.org/10.3390/ijerph16162987

Weigelt, O., & Syrek, C. J. (2017). Ovsiankina's great relief: How supplemental work during the weekend may contribute to recovery in the face of unfinished tasks. *International Journal of Environmental Research and Public Health*, *14*(12), 1606. https://doi.org/10.3390/ijerph14121606

Wendsche, J., & Lohmann-Haislah, A. (2017). A meta-analysis on antecedents and outcomes of detachment from work. *Frontiers in Psychology*, *7*, 2072. https://doi.org/10.3389/fpsyg.2016.02072

Westman, M., & Eden, D. (1997). Effects of a respite from work on burnout: Vacation relief and fade-out. *Journal of Applied Psychology*, *82*, 516–527. https://doi.org/10.1037/0021-9010.82.4.516

Westman, M., Hobfoll, S., Chen, S., Davidson, R., & Lasky, S. (2004). Organizational stress through the lens of conservation of resources (COR) theory. In P. Perrewé & D. Ganster (Eds.), *Research in occupational stress and well-being* (Vol. 5, pp. 167–220). JAI Press/Elsevier Science.

Zeigarnik, B. (1938). On finished and unfinished tasks. In W. D. Ellis (Ed.), *A source book of gestalt psychology* (pp. 300–314). Kegan Paul, Trench, Trubner & Company. https://doi.org/10.1037/11496-025

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Flaxman, P. E., Stride, C. B., Newman, S. A., & Ménard, J. (2022). Patterns and predictors of change in energy and mood around a vacation from the workplace: Distinguishing the effects of supplemental work activity and work-related perseverative cognition. *Journal of Occupational and Organizational Psychology*, *00*, 1–28. https://doi.org/10.1111/joop.12410