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Employee motivation profiles, energy levels, and approaches to sustaining energy: A two-wave latent-profile analysis

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Abstract

Human energy is often viewed as a limited resource, that is depleted through effort expenditure at work, and subsequently needs to be replenished either during or after working. Self-determination theory, however, argues that individuals vary in the degree to which work is experienced as draining: autonomous motivation makes work seem effortless; while controlled motivation makes it effortful. As employees can endorse multiple motivations for work, we examined how motivation profiles are associated with *energy levels* directly and indirectly through *approaches to sustaining energy* (i.e., energy management strategies and recovery experiences). Latent profile analysis with two-wave data revealed four profiles (i.e., amotivated, amotivated/external, highly motivated, and autonomous). Time 1 employee motivation profiles were used to predict outcomes at Time 1 (N=551) and Time 2 (N=391). Overall, amotivated employees had the lowest energy levels and autonomous employees the highest (i.e., more vigor, less exhaustion, less need for recovery). Autonomous and highly motivated employees used more work-related energy management strategies and less detachment, compared to the other profiles. The differential use of work-related strategies partially explained differences in vigor by Time 2. Profiles that used relatively less detachment experienced less favorable energy levels over time. Interestingly, by Time 2, autonomous employees detached more than highly motivated employees, which explained their increased vigor over time. Taken together, our research shows that employee motivation can explain individual differences in energy levels as well as approaches to sustaining energy. Advice on how to manage energy and recovery would benefit from considering the configuration of employee motivation.

Keywords: Human energy; well-being; motivation; energy management; recovery.

Introduction

Work is both energizing and depleting. Many theories cast work as effortful and energy draining, after which employees must recuperate (e.g., effort-recovery model, Meijman & Mulder, 1998; conservation of resources theory, Hobfoll et al., 2018). In contrast, self-determination theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2008) argues that motivation can explain why some people find work energizing while others find it depleting. Within SDT, motivation is considered in terms of a person's reasons for regulating their effort, including if it is their choice (or not) to direct effort into an activity. While having controlled types of work motivation (i.e., feeling pressured by others or oneself) is associated with feelings of being exhausted because of work, autonomous types of work motivation (i.e., working volitionally because it is important or fun) is associated with feeling vigorous and not exhausted (Gagné et al., 2015). Thus, investing effort into work can be relatively easy when one's reasons are autonomous, but more difficult when controlled or amotivated, which in turn has consequences for feelings of energy (Quinn et al., 2012). In this way, work should be more energizing than depleting for those who are autonomously motivated by it, and vice versa for those who are controlled or amotivated.

SDT also recognizes that employees can simultaneously hold multiple motives for working. Person-centered analyses (e.g., latent profile analysis: LPA) help to understand different configurations (i.e., profiles) of work motivation. Yet, researchers are only beginning to understand how different profiles of work motivation relate to work-related energy. Notably, when autonomous and controlled motivations are held simultaneously, then these motivations can exert competing influences on outcomes. Studies have revealed that the presence of autonomous motivation within a profile might offset some of the detrimental effects of controlled motivation for a range of outcomes, including burnout and engagement (e.g., Gillet et al., 2017; Howard et al., 2016; Van den Broeck et al., 2013; Van den Berghe et al., 2014). However, little is known about how motivation profiles are related to energy management during working (i.e., by using micro-breaks or work-related energy management strategies; Fritz et al., 2011; Zacher et al., 2014) or recovery after working (i.e., via detachment, relaxation, mastery experiences; Sonnentag & Fritz, 2007). Consequently, how employees with different motivation profiles attempt to sustain their energy for work is a missing piece of the puzzle. Such knowledge is important, as these approaches to sustaining energy are considered resources that can prevent energy loss and restore energy levels (Quinn et al., 2012; Halbesleben et al., 2014). Different motivations for work may influence the extent to which employees prioritize work, make time for recovery, or have the energy reserves to engage in other worthy pursuits in their leisure time. Thus, learning how motivation profiles are associated with these approaches to sustaining energy could further illuminate *why* some employees experience work as depleting versus energizing.

We aim to make three contributions in this area. First, we offer a more detailed perspective on how motivation profiles relate to specific indicators of work-related energy (i.e., vigor, exhaustion, and need for recovery), as compared to the broad indicators (i.e., burnout and engagement) commonly used in prior profile research. This distinction is important, as the broad indicators conflate energy and motivational constructs (Quinn et al., 2012). Second – and perhaps more important – we expand research on employee motivation profiles by addressing how motivation profiles are associated with approaches to sustaining energy (i.e., energy management and recovery), an area yet to be explored. Third, we take a step further, to examine if employees' approaches to sustaining energy can explain why specific motivation profiles relate to more favorable energy levels than others and/or whether the approaches used by some profiles can detract from energy levels over time. To this end we have used a two-wave study over one year, to examine both the direct and indirect effects (via energy approaches) of motivation profiles on energy levels. This approach provides insights into whether the use of certain energy approaches actually improves or compromises energy levels over time.

The Self-Determination Theory Approach to Employee Motivation

SDT is a broad theory of motivation that adopts a nuanced perspective on why people engage in particular activities and behaviors (Deci & Ryan, 2000; Gagné & Deci, 2005). According to SDT, different types of motivation can be organized along a continuum, ranging from completely autonomous or self-determined types of motivation to completely controlled types of motivation (Howard, et al., 2017). Intrinsic motivation is defined as doing something out of enjoyment and interest. Identified regulation is when people engage in a behavior because it is personally meaningful or valuable to them. Intrinsic motivation and identified regulation are autonomous types of motivation, because the behavior is self-driven and people engage in the activities volitionally. In contrast, external and introjected regulation are controlled types of motivation, because they are characterized by feelings of being controlled or put under pressure. Specifically, introjected regulation is defined as doing something out of internal pressure, guilt, or compulsion, and to boost or bolster one's self-esteem. External regulation refers to the classic type of extrinsic motivation, and is defined as doing something to obtain a reward or avoid a punishment – be it material or social – which is controlled by others. Finally, amotivation is a lack of motivation. Amotivated people do not intentionally drive their behavior, but go through the motions without intention.

SDT specifies that "*when people's goal-directed behavior is autonomous rather than controlled, the correlates and consequences are more positive*" (Deci & Ryan, 2000, p. 243). A growing number of studies largely support this claim, showing that people who are autonomously motivated for work have more beneficial outcomes, such as well-being, commitment, and performance, as compared to those holding controlled types of motivation or amotivation (Deci et al., 2017; Gagné & Deci, 2005; Van den Broeck et al., 2021). People can hold various unique types of motivation for the same activity, which means that it is important to consider a person's motivation profile. For example, an employee might be high on identified regulation (i.e., my work is personally meaningful) and also high on external regulation (i.e., I do it for the income). Variable-centered research shows that identified regulation is associated with more vigor and less exhaustion, whereas external regulation is associated with more exhaustion (Gagné et al., 2015). Thus, if an employee simultaneously holds both types of motivation, then these motivations may counteract each other (i.e., when someone holds both identified and external regulation they can be both more and less exhausted). Hence, to understand work-related energy, it is necessary to adopt a person-centered perspective and consider the profile of an individual's various motives for working.

To date, several studies have used employee motivation profiles to examine how work is experienced, mainly in terms of engagement and burnout. Cumulatively, these profile studies suggest that when controlled motivation is combined with autonomous motivation (i.e., a *highly motivated*, *moderately motivated*, or *high quantity* profile), employees experience low burnout and high engagement, at similar levels compared to employees who are mostly autonomously motivated (e.g., Fernet et al., 2020; Gillet et al., 2017; 2018; Howard et al., 2016; Van den Broeck et al., 2013; Van den Berghe et al., 2014). This indicates that holding controlled motivation may not have negative implications, as long as one is also autonomously motivated. However, many of these findings are limited to overall burnout and engagement scores, which conflate energy states (i.e., exhaustion and vigor) with constructs related to motivation (i.e., dedication, absorption, cynicism, professional efficacy). This is problematic, as energy and motivation are distinct, albeit related constructs (Quinn et al., 2012). Thus, to gain a clear understanding of whether motivation profiles are related to energy, we choose to focus on the specific energy components of burnout (i.e., exhaustion) and engagement (i.e., vigor), as opposed to overall burnout and engagement scores that contain motivational content as well.

In the following sections, we derive a set of hypotheses regarding the effects of motivation profiles on energy levels as well as energy approaches. Regarding the exact configurations of motivation expected, we anticipated similar profiles as Howard et al. (2016), who also adopted LPA and used the same motivations that we do (i.e., amotivation, social and material external regulation, introjection, identification, and intrinsic motivation; Gagné et al., 2015). Howard et al. found four profiles: (1) an amotivated profile, characterized by high amotivation and low to average levels of the other motivations, (2) a balanced profile, with average levels of all motivations, (3) a highly motivated profile, scoring higher on all motivations and low on amotivation, and (4) a moderately autonomous profile, typified by average intrinsic motivation and identification and low controlled and amotivated types of motivation. However, because LPA is an exploratory and descriptive technique, we did not know ahead of time which profiles would emerge in our study. For this reason, we expressed the hypotheses in terms of the relative internalization of motivation, expecting some profiles that will be characterized by more autonomous motivation (i.e., profiles with higher levels of intrinsic and identified motivation), compared to profiles with more controlled motivations (i.e., profiles with higher levels of external and/or introjected regulation) and/or amotivation, which is consistent with prior employee motivation profile research (e.g., Howard et al., 2016; Van den Broeck et al., 2013; Van den Berghe et al., 2014). We did not make specific predictions about the effects of profiles that may include a mixture of autonomous and controlled motivations, and thus exert competing effects on outcomes, as there is limited theory and research on which to ground expectations about these competing effects.

Employee Motivation and Energy Levels

Many literatures have invoked energy concepts using a variety of terminologies and assumptions (Quinn et al., 2012). Energy is defined as energetic activation, or as the "*subjective component of a bio-behavioral system of activation experienced as vitality, vigor, enthusiasm, zest, etc.*" (Quinn et al., 2012, p. 341). Occupational health psychology has long recognized the importance of energy by including components of energetic activation within the well-known constructs of engagement and burnout (i.e., vigor and emotional exhaustion). While vigor reflects high energy activation, exhaustion indicates a state of low energetic activation and a perceived inability to achieve activation (Quinn et al., 2012; see also Cole et al., 2012; Goering et al., 2017). Along these lines, recovery researchers have paid attention to employees' need for recovery, which is the desire to unwind after work because it has been draining (Van Veldhoven & Broersen, 2003). Need for recovery is empirically related to exhaustion, but conceptually distinct from it (Sonnentag & Zijlstra, 2006). Rather than focus solely on felt energy, like in the case of vigor and exhaustion, the need for recovery captures employees' recognition that work has been depleting and they have fewer resources left to invest in other activities. In order to achieve an encompassing view on the relation between motivation and energy, we therefore operationalize *energy levels* using indicators of work-related vigor and exhaustion, as well as the need for recovery.

Guided by SDT (Deci & Ryan, 2000; Ryan & Deci, 2008) and previous studies on motivation profiles (Gillet et al., 2017; 2018; Howard et al., 2016; Van den Broeck et al., 2013; Van den Berghe et al., 2014), we anticipate that employees with relatively more autonomous motivation in their profile, as compared to employees with relatively more controlled motivation or amotivation, will experience work as being more energizing and less draining. According to SDT, autonomous self-regulation involves less inhibition and control, and thus, should be less depleting as compared to working on the same activities when controlled by external or internal forces (Ryan & Deci, 2008). Autonomously motivated employees engage in work activities which are in line with what they want to do, while controlled employees struggle with the inner conflict between doing what they 'have' to do and what would feel more natural to them. This thinking is consistent with other theories of self-regulation, which argue that autonomous motivations should protect employees from the 'aversiveness of work-related effort' (Hockey, 2013). Moreover, prior research has found that autonomous motivations (i.e., intrinsic motivation) can help to make demanding work less draining (van Hooff & Geurts, 2015). Therefore, we expect:

> **Hypothesis 1:** Employees with more autonomous profiles will report higher energy levels (i.e., higher vigor, lower exhaustion, and lower need for recovery), than employees with more controlled or amotivated profiles.

Employee Motivation and Approaches to Sustaining Energy

We expect that one reason why employees with different motivation profiles have different energy levels is because they use different approaches to sustain their energy. A growing body of literature examines how employees can sustain their energy, including how they manage their energy during work and recover after work. These approaches are considered important energy sustaining resources. For example, energy management strategies have been described as "resources in use", that are leveraged to sustain energy while working (Quinn et al., 2012), while time away from work and recovery experiences after working have been classified as "energies resources" that can restore energy and support well-being (Halbesleben et al., 2014). Prior research on energy management (e.g., Trougakos et al., 2014; Hunter & Wu, 2016) and recovery (e.g., ten Brummelhuis & Trougakos, 2014; Ohly & Latour, 2014) has found that more intrinsically, as opposed to extrinsically, motivating leisure and break activities are more restorative of energy levels. However, prior research had not yet examined how motivation for work is associated with approaches to sustaining energy. We therefore draw on SDT (Ryan & Deci, 2008) to understand how employees with different motivation profiles may vary in their approaches to energy management during work and recovery after work, and in turn, if these energy approaches can explain differences in energy levels among the motivation profiles.

Energy Management During Working. Research in this emerging area has revealed that employees use a variety of strategies to sustain their energy while working. These strategies can be classified as either taking micro-breaks (i.e., taking respite by e.g., a walk outside or social chat) or work-related strategies (i.e., optimizing work by e.g., organizing, setting goals, learning, reflecting on its meaning, or prosocial helping; Trougakos & Hideg, 2009; Zacher et al., 2014). There is growing evidence that micro-breaks are especially helpful for gaining energy during the workday (Bennett et al., 2019; Zacher et al., 2014; Zhu et al., 2019). Work-related strategies also have been found to enhance energy, in particular vigor, and especially in between-persons comparisons (Fritz et al., 2011; Zacher et al., 2014; de Bloom et al., 2015).

To our knowledge, there is limited research on how work motivation, as operationalized in SDT, may be associated with energy management strategies. Early experimental research found that feeling fatigued and bored with a work task – which may be associated with less intrinsic motivation – can lead people to take longer micro-breaks (Henning et al., 1989). More recent field studies suggest that employees proactively use micro-breaks to top up their energy, rather than wait until they are already fatigued (Blasche et al., 2017; Zacher et al., 2014). Moreover, current thinking (Quinn et al., 2012; Trogakos & Hideg, 2009) suggests intrinsic motivation should particularly support the use of work-related energy management strategies, though perhaps not the use of breaks.

Drawing on these findings and SDT, we expect that employees with more autonomous motivation profiles, compared to those with more controlled or amotivated profiles, will use more work-related strategies and take less micro-breaks to manage their energy. We expect this pattern in energy management because more autonomous individuals find their work more enjoyable or valuable (Ryan & Deci, 2008; see also Trogakos & Hideg, 2009), are more engaged with their work (Howard et al., 2016; Van den Broeck et al., 2013), and committed to it (Graves et al., 2015; Fernet et al., 2020). As such, they will strive to optimize their ability to put further effort into their work via work-related energy management strategies (e.g., by organizing work, setting new goals, etc.), rather than via micro-breaks. Thus, we expect that:

Hypothesis 2a: Employees with more autonomous profiles will report use of more work-related strategies, but less micro-breaks, than employees with more controlled or amotivated profiles.

Recovery Experiences After Working. Recent meta-analyses (Bennett et al., 2018, Steed et al., 2019) and reviews (Sonnentag et al., 2017; Sonnentag et al., 2021) on the benefits of after-work recovery suggest that respite from work that involves psychological recovery experiences (i.e., detachment, relaxation, and mastery) is beneficial for employee performance, health, and well-being. However, it is unclear how work-related motivation, be it autonomous, controlled, or amotivated, is associated with recovery.

Research has found that higher job involvement (Sonnentag & Kruel, 2006) and work meaningfulness (Zheng et al., 2020) are related to less psychological detachment after work. Research also suggests that individuals with higher autonomous motivation may not experience the beneficial consequences of detachment (Olafsen & Bentzen, 2020). Given that autonomously motivated employees have a strong appreciation of work (Deci et al., 2017; Gagné & Deci, 2005; Van den Broeck et al., 2021), and have a healthier relationship with work (i.e., engage in less compulsive work: van Beek et al., 2011; Van den Broeck et al., 2011), they may, therefore, not feel the need for psychological detachment from work. Rather, these individuals may use other recovery experiences, such as relaxing and mastering activities outside of work during their leisure time, as their form of after-work recovery.

In contrast, employees with more controlled motivation (and amotivation), should have a greater need (and also desire) to withdraw from work (see also Graves et al., 2015;

Fernet et al., 2020; Van den Broeck et al., 2021), which would enable psychological detachment. Given that employees with more controlled motivation (and amotivation) tend to find work more draining (Ryan & Deci, 2008; Gagné et al., 2015; Van den Broeck et al., 2021), we also anticipate that these employees might not have the left-over energy to engage in the types of leisure that can bring about other beneficial recovery experiences, including relaxation or mastery (Sonnentag, 2018). Thus, we expect:

> **Hypothesis 2b:** Employees with more autonomous profiles will report more mastery and relaxation, but less psychological detachment, than employees with more controlled or amotivated profiles.

Energy Approaches as Mechanisms for Sustaining Energy Levels. As outlined so far, we expect that different approaches to sustaining energy will partially explain why there are differences in energy levels across motivation profiles (i.e., via the use of work-related strategies, relaxation, and mastery). However, building on our earlier theorizing, we have also considered that there could be competing processes; whereby, although some motivation profiles will have direct benefits for energy levels (i.e., more autonomous profiles), there also can be an indirect cost of holding these profiles via less use of certain energy approaches (i.e., micro-breaks and detachment).

Regarding energy management, we expect that employees with more autonomous motivation profiles will use work-related energy management strategies more than those with more controlled or amotivated profiles (H2a). As work-related strategies are typically beneficial for energy levels (de Bloom et al., 2015; Fritz et al., 2011; Zacher et al., 2014), we expect:

> **Hypothesis 3a:** There will be a positive indirect effect of more autonomous (versus controlled/amotivated) motivation profiles on vigor, via more work-related energy management strategies during work.

Hypothesis 3b: There will be a negative indirect effect of more autonomous (versus controlled/amotivated) motivation profiles on exhaustion and need for recovery, via more work-related strategies during work.

However, as employees with more autonomous profiles will use less micro-breaks than those with more controlled or amotivated profiles (H2a), and as the use of micro-breaks is typically beneficial for energy levels (de Bloom et al., 2015; Fritz et al., 2011; Zacher et al., 2014), we also expect:

Hypothesis 4a: There will be a negative indirect effect of more autonomous (versus controlled/amotivated) motivation profiles on vigor, via less micro-breaks during work.

Hypothesis 4b: There will be a positive indirect effect of more autonomous (versus controlled/amotivated) motivation profiles on exhaustion and need for recovery, via less micro-breaks during work.

Regarding after-work recovery, we expect that employees with more autonomous profiles will experience more relaxation and mastery compared to those with controlled or amotivated profiles (H2b). Given these recovery experiences are beneficial for energy levels (Bennett et al., 2018, Steed et al., 2019), we expect:

Hypothesis 5a: There will be a positive indirect effect of more autonomous (versus controlled/amotivated) motivation profiles on vigor, via more relaxation and mastery experiences after work.

Hypothesis 5b: There will be a negative indirect effect of more autonomous (versus controlled/amotivated) motivation profiles on exhaustion and need for recovery, via more relaxation and mastery experiences after work.

However, we also expect that employees with more autonomous profiles will experience less psychological detachment than those with controlled or amotivated profiles

(H2b). Given detachment is beneficial for energy levels (Bennett et al., 2018, Steed et al., 2019), we expect:

Hypothesis 6a: There will be a negative indirect effect of more autonomous (versus controlled/amotivated) motivation profiles on vigor, via less detachment after work.

Hypothesis 6b: There will be a positive indirect effect of more autonomous (versus controlled/amotivated) motivation profiles on exhaustion and need for recovery, via less detachment after work.

Method

Design and Procedure

This research uses a two-wave survey design, in order to separate the measurement of motivation from energy variables and to control for baseline energy levels. Ethical approval was obtained via the first author's institution. We recruited working adults based in the United Kingdom via Prolific Academic, a well-regarded survey panel (Peer et al., 2017). Participants were informed: "*This study is about your experiences of balancing work and life, and the types of activities you engage with at work and outside of work to manage your energy and recover from the daily grind*." Thus, participation was informed and voluntary.

At Time 1 (September, 2019), 606 surveys were submitted, of which *N* = 551 were retained. We screened duplicate surveys (i.e., one participant did two surveys), careless responders (*n* = 36), and participants who worked less than ten hours per week (*n* = 18). At Time 2, one year later (September, 2020), we invited respondents to complete a follow-up survey, resulting in *N* = 416 submitted surveys. Of these participants, *n* = 7 failed careless responder checks and *n* = 18 had become unemployed. These participants were removed, leaving *N* = 391 responses matched to Time 1 data. When we launched the Time 2 survey, Prolific Academic indicated *N* = 488 of the original 551 participants had been active on the platform in the past 90 days. Thus, the response rate was 70.96% (*N*=391/551) or 80.12%

(*N*=391/488), depending on the accuracy of the active user data. A MANOVA with Time 1 motivations, energy approaches, and energy levels as the dependent variables, and Time 2 response (0 = No; 1 = Yes) as the independent variable, found no significant differences between responders and non-responders, $F(14, 535) = 0.571$, $p = .888$, $\eta^2 = .015$, *ns*.

Participants

At Time 1 (*N* = 551), the average age was 35.45 years (18-69; *SD* = 10.69) and 62.6% of the participants were female (women = 345; men = 204). In total, 64.1% worked full-time, 24.1% part-time, and 11.8% were casual/contract. Average weekly work hours were 35.34 (*SD* = 10.50). Average tenure in their job was 4.76 years (*SD* = 5.72). At Time 2 (*N* = 391), the average age was 37.33 years (18-69; *SD* = 10.90) and 63.7% of the participants were female (women = 249; men = 140). In total, 65.2% worked full-time, 24.0% part-time, and 10.8% were casual/contract. Average work hours were 34.30 per week (*SD* = 10.33). Average tenure in the current job was 5.56 years (*SD* = 6.32). Participants were mostly highly educated, from a range of occupational groups, and varied in terms of their relationship status, caring responsibilities, and access to flexible work arrangements. Further information on our sample and procedure is given in the supplementary materials (Table S.1).

Pandemic

The covid-19 (coronavirus) pandemic commenced between Time 1 and Time 2 of our two-wave study. In our Time 2 survey, we therefore asked about the impact of the pandemic on participants' employment. This information was primarily used to screen participants who had become unemployed. Almost one third (28.90%) of our retained participants experienced a change to their employment (e.g., redeployed, job change, changes in work hours, temporarily furloughed). However, analyses indicated no differences for motivations, energy levels, or approaches to sustaining energy, for those whose employment did versus did not change. Please see the supplementary materials for more detail (Table S.2).

Measures

Descriptive statistics, correlations, and reliabilities are presented in Table 1.

Employee Motivation

Motivation was measured using the 19-item Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015), which includes six self-regulations for working. Each item was measured on a 1 "strongly disagree" to 7 "strongly agree" scale in response to "Why do you or would you put efforts into your current job?". Example items include: "I don't, because I really feel that I'm wasting my time at work" (amotivation); "Because I risk losing my job if I don't put enough effort in it" (external regulation - material); "To avoid being criticized by others (e.g., supervisor, colleagues, family, clients …)" (external regulation - social); "Because otherwise I will feel ashamed of myself" (introjected regulation); "Because putting efforts in this job has personal significance to me" (identified regulation); and "Because the work I do is interesting" (intrinsic motivation).

Energy Levels

Vigor. The vigor subscale from the shortened Utrecht Work Engagement Scale (Schaufeli & Bakker, 2004) was used as an indicator of energy. This measure has three items (e.g., "At my work, I feel bursting with energy") on a 1 "never" to 7 "every day" scale.

Exhaustion. Emotional exhaustion from the Maslach Burnout Inventory (Schaufeli et al., 1996) was used as another indicator of energy. It includes five items (e.g., "I feel emotionally drained from my work") on a 1 "never" to 7 "every day" scale.

Need for recovery. We used the 5-item need for recovery scale from Sonnentag et al. (2010), adapted from van Veldhoven and Broersen (2003). An example item is "Often, after a day's work I feel so tired that I cannot get involved in other activities." Responses were assessed on a 1 "strongly disagree" to 7 "strongly agree" scale.

Approaches to Sustaining Energy

Energy management during work. We instructed participants: “Below is a list of strategies people may or may not use to manage their energy during work. Which of the following strategies do you use to sustain your energy while at work?” Participants rated how frequently they used the strategies on a 1 “never” to 7 “always” scale. Following de Bloom et al. (2015), we selected the most common and effective work-related strategies and micro-breaks based on Fritz et al. (2011) and Zacher et al. (2014). We included six items on work-related strategies (e.g., “At work, I set a new goal” and “At work, seek to learn something new”). Drawing on prior research (de Bloom et al., 2015; Kim et al., 2017; Fritz et al., 2011; Zacher et al., 2014), we included 12 micro-breaks tapping into social (e.g., “At work, I text, message, or call friends or family members”), cognitive (e.g., “At work, I read books, newspapers, or magazines for personal learning or entertainment”), relaxing (e.g., “At work, I perform relaxation exercises”), and physical (e.g., “At work, I do some form of physical activity, including walks or stretching”) activities.

Recovery experiences after work. Participants also completed the Recovery Experiences Questionnaire (Sonnentag & Fritz, 2007) to indicate how often they experienced each recovery experience in the evenings after work. We included the four items on detachment (e.g., “After work, I distance myself from my work”), four items on relaxation (e.g., “After work, I do relaxing things”), and four items on mastery (e.g., “After work, I do things that challenge me”). Responses were assessed on a 1 “never” to 7 “always” scale.

Confirmatory Factor Analysis

We performed a confirmatory factor analysis (CFA) using AMOS of the factor structure of the MWMS at Time 1, specifying the distinct motivations: intrinsic motivation, identified regulation, introjected regulation, external regulations - social and material, and amotivation. We specified an error covariance for two items within introjection that share unique content variance (i.e., ‘feel bad’; ‘feel ashamed’; involving avoidance aspects of introjection; Green & Hershberger, 2000), which is recommended when using the MWMS (Gagné et al., 2015). This six-factor model had acceptable fit ($\chi^2[136] = 655.43$, $p < .001$; CFI = .933; TLI = .916; RMSEA = .083; SRMR = .077). A single-factor model did not fit the data ($\chi^2[151] = 3272.97$, $p < .001$; CFI = .596; TLI = .543; RMSEA = .194; SRMR = .165; $\chi^2\ \Delta\ [15] = 2617.54$, $p < .001$). As we are theoretically interested in the configuration of motivation we used the distinct motivations as variables within the LPA (Howard et al., 2016; Howard et al., 2020).

To assess the factor structure of the energy variables, we performed a second CFA including energy levels (3 factors) and energy approaches (5 factors): vigor, exhaustion, need for recovery, energy management strategies (micro-breaks, work-related strategies), and recovery experiences (detachment, relaxation, mastery). We parceled the items of the two energy management scales, as these each had more than 5 items (Little et al., 2002). Both at Time 1 and Time 2, a model with all eight factors had adequate fit (Time 1: $\chi^2[406] = 1166.12$, $p < .001$; CFI = .933; TLI = .923; RMSEA = .058; SRMR = .053; Time 2: $\chi^2[406] = 1001.56$, $p < .001$; CFI = .934; TLI = .924; RMSEA = .061; SRMR = .054). Items loaded on their respective factors above the usual cut offs (.63-.91). We did not allow cross loadings, covary error terms, or perform any other modifications. A single-factor model did not fit the data (Time 1: $\chi^2[434] = 8056.90$, $p < .001$; CFI = .330; TLI = .282; RMSEA = .179; SRMR = .182; Time 2: $\chi^2[434] = 6271.91$, $p < .001$; CFI = .349; TLI = .302; RMSEA = .186; SRMR = .185). As some scholars question the use of parceling (Marsh et al., 2013), we also tested the model not pursuing the parceling approach for the energy management variables, but instead modeling the qualitatively distinct strategies (i.e., work-related strategies and micro-breaks) as manifest variables in CFA. This approach is appropriate as scholars consider energy management strategies as formative rather than reflective constructs (Zacher et al., 2014; Kim et al., 2017). The fit of this model was satisfactory as well at Time 1 ($\chi^2[298] = 989.39$, $p <$

.001; CFI = .934; TLI = .922; RMSEA = .065; SRMR = .051) and Time 2 (χ^2[298] = 820.89, p < .001; CFI = .936; TLI = .925; RMSEA = .067; SRMR = .051).

Results

Latent Profile Analysis of Employee Motivation

Before conducting the automatic three-step procedure for Latent Profile Analysis (LPA: Asparouhov & Muthén, 2014) in MPlus, we standardized scores (i.e., mean = 0; standard deviation = 1) to provide partial control for measurement errors (Kam, Morin, Meyer, & Topolnytsky, 2016). Profile enumeration then estimated models including 1 to 8 profiles using the robust Maximum Likelihood (MLR) estimator. We identified the best-fitting set of profiles based on theoretical conformity and substantive meaning of the profiles as well as empirical adequacy (Nylund, Asparouhov, & Muthén, 2007). The statistical fit indices used to determine the optimal solution included: Akaike information criterion (AIC); Bayesian information criterion (BIC); sample-size adjusted BIC (SABIC); Lo-Mendell-Rubin likelihood ratio test (LMR); and the bootstrap likelihood ratio test (BLRT). Final considerations included visual examination of an elbow plot of the information criterion (Nylund-Gibson & Choi, 2018) and the entropy and the posterior probabilities (Morin et al., 2011). The most likely class membership was obtained from the posterior distribution from the enumeration (Asparouhov & Muthén, 2014), accounting for the estimated probability that an individual belongs to each profile (Morin et al., 2011).

The results of the profile enumeration at Time 1 can be found in Table 2. The fit indices identified the four-profile solution as optimal. First, an elbow plot of the information criteria revealed that the values reached a plateau around the four-profile solution. The fit statistics of the four-profile solution also demonstrated high entropy, significant LMR and BLRT values, and high classification precision. The addition of a fifth profile resulted in a non-significant LMR as well as a replication of an existing profile (i.e., the amotivated profile), that differed only quantitatively, and hence did not contribute any further theoretical value. Combined, this supports the selection of the more parsimonious four-profile solution. In comparison to the three-profile solution, the four-profile solution also revealed additional theoretically distinct and meaningful information, revealing a highly motivated profile. The four-profile solution also held when the means and variances of profile indicators were freely estimated (Morin et al., 2011; Peugh & Fan, 2013).

Figure 1 displays the four-profile solution. Profiles with relatively more amotivated and controlled content appear on the left (i.e., less internalized, lower quality motivation), and profiles with more autonomous content appear on the right (i.e., more internalized, higher quality motivation). As expected, our solution is consistent with Howard et al. (2016), with one exception: Profile 1 is the *amotivated* profile (10%), characterized by high amotivation and below average levels of all other motivations. Profile 2 (26%) is similar to the *balanced motivation* profile identified by Howard et al., however, in our data there are above average levels of extrinsic regulations and amotivation, and slightly below average levels of all other motivations. Thus, these motivations are not so balanced, but rather, seem indicative of amotivation and the external regulations. We therefore termed Profile 2 *amotivated/external motivation*. Profile 3 is the *highly motivated* (33%) profile, with low amotivation and above average levels of all other regulations. Profile 4 is the *autonomous* profile (31%), with above average intrinsic motivation and identified regulation, and low levels of all other regulations.

Employee Motivation Profiles and Energy Outcomes

We tested Hypotheses 1 and 2 using Time 1 motivation profiles as predictors of Time 1 and Time 2 energy outcomes, to examine both the immediate cross-sectional correlates as well as longitudinal associations. We assessed outcomes using a Wald chi-square test to assess the overall effect and individual pairwise class comparisons among the identified profiles. The profile comparison statistics, means, and standard errors of each outcome across profiles are reported in Table 3 (Time 1) and Table 4 (Time 2).

Energy Levels. A graphical representation of the standardized means for energy levels at Time 1 is presented in Figure 2. Hypothesis 1 stated that employees of profiles with more autonomous motivations (i.e., identified and intrinsic motivation) would report more favorable energy levels (i.e., higher vigor, lower exhaustion, and lower need for recovery), compared to those of profiles with more controlled motivations (i.e., external or introjected regulation) or amotivation. Given the profiles found, this would imply that employees holding the autonomous profile would report higher energy levels than those with a highly motivated profile, which will report more energy than the amotivated/external profile. The amotivated profile should experience the lowest levels of energy.

Results partially support this hypothesis. At Time 1, employees with an autonomous profile experienced less exhaustion and less need for recovery than employees with all other profiles, and more vigor than employees with an amotivated or an amotived/external profile. Highly motivated employees reported more vigor and less exhaustion, but not less need for recovery compared to the amotivated/external employees, but were different in all energy outcomes from the amotivated employees, who had the lowest vigor and the highest exhaustion scores.

At Time 2, the results were mostly replicated (see Figure 3). For all energy variables significant differences between the autonomous profile and all other profiles emerged, providing support for Hypothesis 1. The benefit of being highly motivated – compared to the amotivated and the amotivated/external profiles – for exhaustion and need for recovery disappeared, but *highly motivated* employees still had higher vigor levels than employees with an amotivated or an amotivated/external profile. Overall, the energy benefits of autonomous motivation (i.e., intrinsic motivation and identified regulation) were more evident within the autonomous profile rather than the highly motivated profile, which also included controlled motivations (i.e., introjected and external regulations).

Approaches to Sustaining Energy. A graphical representation of the standardized means for Time 1 approaches to sustaining energy is presented in Figure 4. Hypothesis 2 stated that profiles with more autonomous motivations would use less micro-breaks and detachment, but more work-related strategies, relaxation and mastery, compared to profiles with more controlled motivations or amotivation. Given the profiles found, this would imply that employees of the autonomous profile, and to a lesser extent those of the highly motivated profile, should report less use of micro-breaks and detachment, but more use of more work-related strategies, relaxation, and mastery, compared to the amotivated and amotivated/external profiles.

At Time 1, results revealed that employees with profiles that endorsed more autonomous motivation (i.e., autonomous and highly motivated) reported using significantly more work-related energy management than those in the other profiles (i.e., amotivated and amotivated/external). Moreover, the use of micro-breaks was lowest amongst employees with an autonomous profile, and significantly lower than employees with amotivated/external and amotivated profiles, who reported using more micro-breaks than average. In relation to the recovery experiences, those who endorsed an amotivated profile were more likely to detach from work than all other profiles, and were significantly more likely to relax after work than those in the highly motivated profile. Those in an autonomous profile were also more likely to relax after work than those in a highly motivated profile. Profiles did not differ with respect to mastery experiences.

As can be seen in Table 4 and Figure 5, the overall pattern of results was mostly replicated by Time 2. In relation to energy management, by Time 2 employees of the autonomous profile used micro-breaks less than the highly motivated and amotivated/external profiles. Highly motivated employees used work-related strategies more than employees with amotivated and amotivated/external profiles, while autonomous employees used these strategies more than amotivated employees. In relation to recovery experiences, highly motivated employees were detaching less than autonomous and amotivated profiles by Time 2. In addition, employees with an autonomous profile relaxed more than employees with a highly motivated or amotivated/external profile, and those with an amotivated profile relaxed more than the amotivated/external and highly motivated profiles. Again, motivation profile membership had no impact on mastery experiences. Thus, there was partial support for Hypotheses 2a and 2b.

Indirect Effects. To evaluate Hypotheses 3 to 6, regarding the indirect effects of motivation through the use of different approaches to sustaining energy, we conducted a series of mediation analyses using PROCESS version 3, which enabled the use of a categorical predictor (i.e., most likely profile membership). More specifically, we used Time 1 motivation profiles as predictors of Time 2 energy levels with Time 2 energy approaches specified as the mediators. We included all mediators simultaneously and controlled for Time 1 energy levels. We first evaluated indirect effects with the amotivated profile as the referent. We then evaluated the effects with the amotivated/external profile as the referent, in order to compare it with the more autonomous motivation profiles (i.e., highly motivated and autonomous). Finally, we evaluated the effects of the highly motivated profile compared to the autonomous profile.

Table 5 summarizes the significant indirect effects and their component paths. For full reporting please see the supplementary materials (Tables S.3 to S.5). In support of Hypothesis 3a, there were significant positive indirect effects on vigor via the use of more work-related strategies by the highly motivated profile compared to the amotivated and amotivated/external profiles. This pattern was also evident for employees of the autonomous profile compared to the amotivated profile. Thus, overall, employees of more autonomously motivated profiles used more work-related strategies, which in turn was associated with more vigor by Time 2. Interestingly, the direct positive effect of the autonomous profile on vigor, as compared to the amotivated profile, remained significant, which suggests that the use of work-related strategies can only partially explained this energy benefit of an autonomous profile. However, the use of work-related strategies did not explain exhaustion or need for recovery, so there was no support for Hypothesis 3b. Although there were profile-related differences in the use of micro-breaks, micro breaks did not mediate the effects of profile membership on energy levels. Thus, there was no support for Hypothesis 4.

With respect to recovery experiences, although profile-related differences in relaxation were evident, there was no support for relaxation as a mediating mechanism. Moreover, there were no effects with mastery, thus no support for Hypothesis 5. For detachment, a relatively consistent pattern emerged across the three energy indicators. Employees with a highly motivated profile detached less than those with amotivated and amotivated/external profiles, and low detachment in turn was associated with less vigor, more exhaustion, and more need for recovery by Time 2. Employees with amotivated/external and autonomous profiles detached less compared to amotivated employees, resulting in higher exhaustion and higher need for recovery. Thus, there was partial support for Hypotheses 6a and 6b. Interestingly, by Time 2, employees with an autonomous profile did detach more than highly motivated employees, and there was also a positive indirect effect, via increased detachment, for their level of vigor by Time 2. The direct positive effect of the autonomous profile on vigor, as compared to the highly motivated profile, remained significant, which suggests that detachment can only partially explain this energy-related benefit of an autonomous profile.

Sensitivity Analyses

We performed a series of sensitivity analyses, some planned and some as part of the review process. Full results of these analyses are available in the supplementary materials (pp.

9-15). To summarize: first, we included measures of work design in our Time 1 survey (i.e., workload, emotional demands, control, skill variety, and social support), to evaluate the impact of work design on motivation profiles (see Moran et al., 2012; Fernet et al., 2020). We found that work design features do not differentiate the amotivated/external and amotivated profile nor the autonomous and highly motivated profile. Second, using the Time 2 data (N = 391), we replicated the motivation profile solution and mostly replicated the associations of motivation profiles with energy outcomes in this new cross-section of data. Third, we used our Time 2 data to investigate the potential for reverse causation, that is, if energy levels at Time 1 predict profile membership by Time 2. Six out of 18 effects were significant in this predictor analysis (33.33% of possible effects), with most effects involving vigor predicting differences in profile membership. Thus, overall, our results suggest more support for the hypothesized pathways from Time 1 motivation profiles to Time 2 energy (i.e., 66.67% of possible effects), rather than from Time 1 energy to Time 2 motivation profiles.

Discussion

We set out to learn more about the role of employee motivation in understanding *when* and *why* work is experienced as energizing versus depleting. Guided by SDT, we theorized an energy benefit when motivation is relatively more autonomous rather than controlled or amotivated (i.e., Ryan & Deci, 2008). As expected, overall, the autonomous profile, and to a lesser extent the highly motivated profile, reported higher energy levels compared to the amotivated and amotivated/external profiles. However, and especially by Time 2, despite having higher than average levels of autonomous motivation (similar to the levels of the autonomous profile), those with a highly motivated profile did not benefit as much in terms of vigor, exhaustion, and need for recovery. Thus, holding autonomous types of motivations may not be a sufficient condition for work to be energizing rather than depleting. Instead, high autonomous motivation needs to be accompanied with low controlled motivation (i.e., introjected and external regulations), and low amotivation, to protect and sustain energy levels. Limited profile studies have focused on specific energy variables (i.e., exhaustion and vigor). Our finding that more autonomous employees are less exhausted than highly motivated employees is consistent with Van den Berge et al. (2014). However, this finding is in contrast to other profile research that has focused on overall burnout and engagement scores, which conflate energy states (i.e., exhaustion, vigor) with other motivational constructs (e.g., professional efficacy, dedication), where it was concluded that the detrimental effects of controlled motivation can be offset by the presence of autonomous motivation (Gillet et al., 2018; Howard et al., 2016; Van den Broeck et al., 2013). Thus, our results suggest that there is merit in examining energy-specific constructs (Quinn et al., 2012). Overall, employees with an autonomous profile seem to have the most favorable energy levels, compared to all other employees, and our mediation analyses show that some of these benefits remain (i.e., for vigor) even when accounting for Time 1 energy levels (as well as use of energy approaches).

More importantly, we examined if energy management strategies and recovery experiences might further elucidate *why* there are these energy differences between the various motivation profiles. Here, one of the most striking findings was that employees with autonomous and highly motivated profiles did not necessarily engage with ‘best practice’ energy management (i.e., micro-breaks) or recovery (i.e., psychological detachment) compared to the other profiles. Interestingly, this means that some approaches to sustaining energy that are considered ‘best practice’ might be potentially more difficult to enact, or not as attractive or essential for those employees who are autonomously motivated by their work. Instead, and as expected, employees with these profiles used more work-related energy management compared to other profiles (amotivated and amotivated/external). As expected, our mediation analyses revealed that this greater use of work-related strategies by employees with an autonomous or a highly motivated profile explained an increase in vigor by Time 2. However, these profiles also reported a lack of detachment, which, in turn, was also associated with increased exhaustion and need for recovery by Time 2. Indeed, this lack of detachment for highly motivated employees was also associated with less vigor by Time 2. Thus, there seem to be competing influences on the vigor level of highly motivated employees via their energy approaches (i.e., more work-related strategies and less detachment), which might explain their average levels of vigor by Time 2.

There were some interesting differences between the more autonomously motivated profiles (i.e., autonomous and highly motivated profiles). Autonomous employees relaxed more than highly motivated employees, at Time 1 and by Time 2. Also, by Time 2, autonomous employees were detaching more than their highly motivated counterparts, which in turn partly explained their increased vigor. It seems that a lack of detachment is a concerning pathway to low energy levels, and this pathway seems to be particularly concerning in highly motivated employees, as compared to other profiles. This lack of detachment by highly motivated employees attracted an indirect cost for all three energy outcomes (i.e., vigor, exhaustion, need for recovery). This is interesting, given recent research has found that highly engaged workers can become more exhausted over time (i.e., 6-12 months; Junker et al., 2020). A strong connection to work might promote excessive working (van Beek et al., 2011; Van den Broeck et al., 2011) and/or more dysfunctional recovery behaviors. Our data speaks to the later, as over a 12-month period, we found that highly motivated employees became more drained from work via an indirect effect of less detachment. Although this indirect effect was also evident for autonomous employees, at the same time, we also found that autonomous employees were somewhat protected by direct gains in their vigor over time (and also, via relatively more detachment than their highly motivated counterparts).

As profile comparisons are relative (i.e., one profile compared to another), it is also important to consider the opposite end of the motivational continuum, that is the unique effects of the more amotivated and controlled profiles. Although individuals with an amotivated profile initially had the lowest energy (i.e., less vigor, more exhaustion, more need for recovery) compared to other profiles, at the same time, these employees were seemingly 'doing the right thing' in relation to sustaining energy, that is, they reported psychologically detaching from work in the evenings more than other profiles, in particular compared to the highly motivated profile. Moreover, they were more likely to relax after work compared to the highly motivated profile, and to a lesser extent the amotivated/external profile. They also used more micro-breaks compared to autonomous employees. Interestingly, interpreting the mediation analyses in this way (i.e., with the more autonomous profiles as the referent), reveals an indirect benefit of holding an amotivated profile for detachment, and in turn, better energy levels by Time 2 (i.e., exhaustion and need for recovery). This suggests that when people are amotivated towards work, they will be more depleted and less energized than other employees; however, their disinterest in work can mean they are better able to detach from it in the evenings, which can lead them to experience work as relatively less draining over time.

Finally, it is important to note a limited role for some approaches to sustaining energy. Although motivation profiles were associated with some differences in micro-break use during work and relaxation after work, these energy approaches did not explain differences in energy levels across the profiles over time. Also, mastery recovery experiences were not predicted by motivation profile membership at all. It is possible that mastery experiences are more strongly driven by leisure interests and the opportunity to engage in specific leisure activities in non-work time. Indeed, prior research suggests mastery experiences are somewhat independent of one's work situation compared to the other recovery experiences (Steed et al., 2019).

Theoretical Contributions

Our findings explain *why* different groups of employees differ in work-related energy by showing how employee motivation profiles are associated with approaches to sustaining energy. In particular, the use of work-related strategies and psychological detachment across profiles could explain differences in vigor levels. Interestingly, our mediation analyses also revealed some paradoxical effects. For instance, even though autonomous and highly motivated employees have more favorable energy than the amotivated profiles (i.e., direct effect), they experienced more exhaustion and need for recovery one year later because they detached from work less (i.e., indirect effect). Conversely, as these comparisons are relative across profile membership, it is also the case that employees with an amotivated profile experience less exhaustion and need for recovery over a one-year time period, via more detachment.

Such insights are informative, given that research on energy management and recovery is beginning to seek to understand the choices people make in regard to sustaining their energy. For example, theorizing on the recovery paradox highlights that people might not always do what is best for them in terms of their recovery even when they recognize the need to recover (e.g., as they feel too drained to put effort into meaningful and restorative off-work pursuits; Sonnentag, 2018). At the same time, it has been observed that using some types of energy management strategies (e.g., work-related strategies) might consume some energy in the process (Zacher et al., 2014; Parker et al., 2017). Thus, although it is argued that in order to gain energy one must put energy resources to use (Quinn et al., 2012), prior research is unclear on how people choose the best approach for them. Our data speaks to these new lines of inquiry and suggests that the choices people make about how to sustain their energy is influenced by their motivation (i.e., their enjoyment of work and personal identification with work), which in turn has implications for their energy levels.

More generally, this research also contributes to organizational theorizing on human energy. While some literatures hold the assumption that energy is a *limited* (scarce) resource (e.g., conservation of resources theory; Hobfoll et al., 2018), others present energy as a *limitless* (abundant) resource (e.g., SDT; Ryan & Deci, 2008; and see Quinn et al., 2012 for a review). Our findings support both perspectives, as autonomous employees (i.e., with more ‘purely’ autonomous motivation) seem particularly energized by their work (even by Time 2), while employees who are amotivated/external or ‘purely’ amotivated seem particularly vulnerable to work being experienced as depleting, and highly motivated employees are in-between. Thus, our findings offer insights into whether energy is a limited resource (Quinn et al., 2012; Inzlicht & Schmeichel, 2012), and that is, it depends on the individual’s configuration of work motivation.

Limitations and Future Research Directions

Despite the inclusion of two waves of data collection, our study is primarily correlational, which means that causality cannot be inferred and common method bias may be present in the associations. To mitigate these issues in future, multi-source data and more extensive longitudinal designs could be used. However, we also note that many of the concepts studied here are best understood from the employee’s perspective. Thus, in particular, future research that can tease apart the temporal processes involved will be worthwhile. In our sensitivity analyses, we attempted to account for the potential of a reverse effect of energy on motivation (see supplementary materials; Table S.9). Although our analyses suggested a relatively limited effect of energy levels on motivation profile membership, as compared to motivation on energy, there were some effects evident. It is possible that motivation profiles are fairly stable over time (Fernet et al., 2020), thus, perhaps there is less potential for energy to explain profile membership in the longer term (i.e., over one year). However, the ways that these processes unfold over shorter time frames might be different. For example, employees of an autonomous profile can make choices about how they sustain their energy at work and home, which then impacts their subsequent daily energy levels, which in turn could influence subsequent choices for how they sustain their energy the next day. As a result, we may observe different temporal patterns day-to-day (e.g., set-points around which energy levels converge or oscillate). Thus, future research with experience sampling or daily diary study methodologies would help to unpack the influence of motivation profiles on the more dynamic fluctuations in energy levels and approaches.

We also acknowledge that other factors like work design, the home environment, or individual differences might shape the development of a certain motivational orientation, and also, possibly the ability to use certain approaches (or not) for sustaining energy. In the supplementary materials, we reported that work design features alone cannot account for the membership of the motivation profiles in our data (see Table S.6), which is in line with SDT's assumption that a particular motivational orientation may develop out of a mix of personal and situational factors (Gagné & Deci, 2005). Our findings demonstrate initial insights into the between-persons associations of employee motivation profiles and energy. However, future work is needed that unpacks the relative contribution of other factors, in particular, factors in the home environment (e.g., partner support) and other work-related contextual variables (e.g., supervisor or organizational support for segmentation).

A further consideration is whether our four-profile solution of employee motivation is generalizable (Spurk et al., 2020). Similar four-profile solutions have been reported in other employee samples (e.g., Howard et al., 2016; Van den Broeck et al., 2013; Van den Berghe et al., 2014). However, it is important to note that some other profile studies in the work domain have revealed a slightly different four-profile solution (Howard et al., 2021; Fernet et al., 2020; Gillet et al., 2017; 2018) or alternatively a five or six-profile solution (Graves et al., 2015; Moran et al., 2012). This divergence may be due to the fact that many of these studies with dissimilar or alternative solutions to ours have used a motivation measure other than the MWMS, or a different subset of motivations, aggregated motivations, or included a global factor of general self-determination. As the optimal model identified through LPA is determined by the measures entered into the analysis, the use of different measures and computations does make replication and extension of motivation profile research more challenging (Spurk et al., 2020). We also note that profile solutions with more than four profiles retained have tended to make quantitative distinctions among profiles (e.g., including both a *moderate* and *extreme* version of a profile), which does raise important questions about the benefit of more complex solutions. Finally, there is a recent trend to include a general self-determination factor in profile studies. However, we agree with Howard et al. (2021) that there is value in distinguishing the discrete motivations, especially in the prediction of employee outcomes. Thus, we recommend future researchers be considerate in selecting motivation variables and cautious about dropping or combining motivations (also see Howard et al., 2020), and also consider if more complex solutions are necessary (Spurk et al., 2020), to aid comparison in future profile studies.

A final limitation is that our sample included highly educated professionals, and we studied evenings as a time when recovery can occur. Whether our findings, and indeed much of the research on energy management and recovery, is also applicable to employees with different work schedules remains a subject for future research (Sonnentag et al., 2021). Related to this point, it would be interesting in future to examine if autonomous and highly motivated employees do not want to take micro-breaks and detach from work, or rather, if they are less able to (see also van Beek et al., 2011; Van den Broeck et al., 2011). Moreover, studies might examine if amotivated and amotivated/external employees use micro-breaks as part of their withdrawal from work-related effort (i.e., as counter-productive behaviors), rather than a genuine attempt to manage energy. Thus, future research might consider the intentions underlying energy approaches (also see Blasche et al., 2017), which might shape the efficacy of these strategies for protecting or restoring energy levels.

Practical Implications and Conclusions

Our findings indicate that 'best practice' energy management and recovery advice (e.g., Berman & West, 2007) may need to be adapted to consider employee motivation and a person-centered perspective. It is possible that respite that involves breaks from work or psychological detachment during leisure (i.e., 'best practice' advice) is not as essential for employees who derive energy from their motivation towards their work (i.e., autonomous employees). For them, work-related strategies that sustain energy are more important. Moreover, micro-breaks and psychological detachment are more often used by employees who find their work aversive and draining (i.e., more amotivated employees). However, that said, we did find that even though amotivated employees initially experience less favorable energy levels compared to other profiles, their use of detachment improved their exhaustion and need for recovery over time (i.e., by Time 2). There also are competing effects of the use of different strategies for some profiles. In particular, highly motivated employees use more work-related energy management, yet detach less after work, which seems to negate their potential to gain energy over time. These paradoxical insights may help to better support particular groups of employees (i.e., those who are at a disadvantage in terms of their motivation or who use particular combinations of energy approaches). Thus, our findings have implications for theorizing on human energy and also practical implications for how to sustain work-related energy. These adaptations to current thinking and practice could feed into employee wellness training and development, career management, team and leadership development, as well as culture-change projects related to well-being at work.

To conclude, profile analysis via LPA enabled us to model common and meaningful mixtures of motivation evident in employees. Overall, we found that employee motivation can help to understand individual differences in energy – not only energy levels, but also the approaches used for sustaining energy. Importantly, the use of different energy approaches can explain, at least partially, differences in energy levels over time. In this way, we draw on SDT's approach to motivation to further our understanding on *when* (i.e., motivation profiles) and *why* (i.e., energy approaches) work can be energizing for some while depleting for others.

References

Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling, 21,* 3, 329-341. doi:10.1080/10705511.2014.915181

Bennett, A.A., Bakker, A.B., & Field, J.G. (2018). Recovery from work-related effort: A meta-analysis. *Journal of Organizational Behavior, 39,* 3, 262-275. doi:10.1002/job.2217

Bennett, A.A., Gabriel, A.S., & Calderwood, C. (2019). Examining the interplay of micro-break durations and activities for employee recovery: A mixed-methods investigation. *Journal of Occupational Health Psychology, in press*. doi: 10.1037/ocp0000168

Berman, E., & West, J. (2007). The Effective Manager ... Takes a Break. *Review of Public Personnel Administration, 27,* 4, 380-400. doi: 10.1177/0734371X07307076

Blasche G, Pasalic S, Bauböck V-M, Haluza D, Schoberberger R. (2017). Effects of rest-break intention on rest-break frequency and work-related fatigue. *Human Factors, 59,* 289-298. doi:10.1177/0018720816671605

Cole, M.S., Walter, F., Bedeian, A.G., & O'Boyle, E.H. (2012). Job burnout and employee engagement: A meta-analytic examination of construct proliferation. *Journal of Management, 38,* 5, 1550–1581. doi:10.1177/0149206311415252

De Bloom, J., Kinnunen, U., & Korpela, K. (2015). Recovery processes during and after work: Associations with health, work engagement, and job performance. *Journal of Occupational and Environmental Medicine, 57,* 7, 732-742. doi:10.1097/JOM.0000000000000475.

Deci, E.L., Olafsen, A.H. & Ryan, R.M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior, 4,* 19-43. doi:10.1146/annurev-orgpsych-032516-113108

Deci, E.L., Ryan, R.M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11,* 4, 227–68. doi:10.1207/S15327965PLI1104_01

Fernet, C., Litalien, D., Morin, A.J.S., Austin, S., Gagné, M., Lavoie-Tremblay, M., & Forest, J. (2020). On the temporal stability of self-determined work motivation profiles: a latent transition analysis. *European Journal of Work and Organizational Psychology, 29*, 1, 49–63. doi:10.1080/1359432X.2019.1688301

Fritz, C., Lam, C.F., and Spreitzer, G.M. (2011). It’s the little things that matter: An examination of knowledge workers’ energy management. *Academy of Management Perspectives 25,* 3, 28–39. doi:10.5465/AMP.2011.63886528

Gagné, M., & Deci, E.L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior, 26,* 4, 331-362. doi:10.1002/job.322

Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., Van den Broeck, A., Aspeli, A. K., Bellerose, J., Benabou, C., Chemolli, E., Güntert, S.T., Halvari, H., Indiyastuti, D. L., Johnson, P.A., Molstad, M., Naudin, M., Ndao, A., Olafsen, A., Roussel, P., Wang, Z., & Westbye C. (2015). The Multidimensional Work Motivation Scale: Validation evidence in seven languages and nine countries. *European Journal of Work and Organizational Psychology, 24,* 2, 178-196. doi:10.1080/1359432X.2013.877892

Gillet, N., Becker, C., Lafrenière, M.A., Huart, I., & Fouquereau, E. (2017). Organizational support, job resources, soldiers’ motivational profiles, work engagement, and affect. *Military Psychology, 29*, 5, 418–433. doi:10.1037/mil0000179

Gillet, N., Fouquereau, E., Vallerand, R. J., Abraham, J., & Colombat, P. (2018). The role of workers’ motivational profiles in affective and organizational factors. *Journal of Happiness Studies*, *19,* 1151–1174. doi:10.1007/s10902-017-9867-9

Goering, D.D., Shimazu, A., Zhou, F., Wada, T., & Sakai, R. (2017). Not if, but how they differ: A meta-analytic test of the nomological networks of burnout and engagement. *Burnout Research, 5*, 21-34. doi:10.1016/j.burn.2017.05.003

Graves, L.M., Cullen, K.L., Lester, H.F., Ruderman, M.N., & Gentry, W.A. (2015). Managerial motivational profiles: Composition, antecedents, and consequences. *Journal of Vocational Behavior, 87*, 32-42. doi:10.1016/j.jvb.2014.12.002

Green, S.B., & Hershberger, S.L. (2000). Correlated errors in true score models and their effect on coefficient alpha. *Structural Equation Modeling, 7*, 251-270. doi:10.1207/S15328007SEM0702_6

Halbesleben, J. R. B., Neveu, J., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the "COR": Understanding the role of resources in conversation of resources theory. *Journal of Management, 40*, 1334–1364. doi:10.1177/0149206314527130

Henning, R., Salvendy, G., Sauter, S., & Krieg, E. (1989). Microbreak length, performance, and stress in a data entry task. *Ergonomics, 32*, 855-864. doi: 10.1080/00140138908966848

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*, 103-128. doi:10.1146/annurev-orgpsych-032117-104640

Hockey, R.J. (2013). *The Psychology of Fatigue: Work, Effort and Control*. New York: Cambridge University. Press.

Hunter, E.M., & Wu, C. (2016). Give me a better break: choosing workday break activities to maximize resource recovery. *Journal of Applied Psychology, 101,* 302–311. doi:10.1037/apl0000045

Howard, J.L., Gagné, M., & Bureau, J.S. (2017). Testing a continuum structure of self-determined motivation: A meta-analysis. *Psychological Bulletin, 143*, 12, 1346–1377.

doi:10.1037/bul0000125

Howard, J., Gagné, M., Morin, A.J.S., & van den Broeck, A. (2016). Motivation profiles at work: A self-determination theory approach. *Journal of Vocational Behavior, 95-96,* 74-89. doi:10.1016/j.jvb.2016.07.004

Howard, J.L., Gagné, M., Van den Broeck, A., Guay, F., Chatzisarantis, N., Ntoumanis, N., & Pelletier, L.G. (2020). A review and empirical comparison of motivation scoring methods: An application to self-determination theory. *Motivation and Emotion,* Advanced Online. doi:10.1007/s11031-020-09831-9

Howard, J. L., Morin, A. J. S., & Gagné, M. (2021). A longitudinal analysis of motivation profiles at work. *Motivation and Emotion, 45,* 1, 39–59. doi: 10.1007/s11031-020-09852-4

Inzlicht, M., & Schmeichel, B.J. (2012). What is ego depletion? Toward a mechanistic revision of the resource model of self-control. *Perspectives on Psychological Science, 7,* 5, 450-463. doi:10.1177/1745691612454134

Junker, N.M., Kaluza, A.J., Hausser, J.A., Mojzisch, A., van Dick, R., Knoll, M., Demerouti, E. (2020). Is work engagement exhausting? The longitudinal relationship between work engagement and exhaustion using latent growth modeling. *Applied Psychology: An International Review,* in press, doi: 10.1111/apps.12252

Kam, C., Morin, A.J.S., Meyer, J.P., & Topolnytsky, L. (2016). Are commitment profiles stable and predictable? A Latent Transition Analysis. *Journal of Management*. doi: 10.1177/0149206313503010

Kim, S., Park, Y., & Niu, Q. (2017). Micro-break activities at work to recover from daily work demands. *Journal of Organizational Behavior, 38,* 28-44. doi:10.1002/job.2109

Little, T.D., Cunningham, W.A., Shahar, G., & Widaman, K.F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9*, 2, 151-173. doi:10.1207/S15328007SEM0902_1

Marsh, H. W., Lüdtke, O., Nagengast, B., Morin, A. J., & Von Davier, M. (2013). Why item parcels are (almost) never appropriate: Two wrongs do not make a right—Camouflaging misspecification with item parcels in CFA models. *Psychological Methods, 18, 3,* 257. doi:10.1037/a0032773

Meijman, T.F., & Mulder, G. (1998). Psychological aspects of workload. In P.J.D. Drenth, H. Thierry, & C.J. de Wolff (Eds.), *Handbook of work and organizational psychology* (Vol 2). (pp. 5–33).

Moran, C.M., Diefendorff, J.M., Kim, T.Y., & Liu, Z.Q. (2012). A profile approach to self-determination theory motivations at work. *Journal of Vocational Behavior, 81,* 3, 354-363. doi:10.1016/j.jvb.2012.09.002

Morin, A.J.S., Maïano, C., Nagengast, B., Marsh, H.W., Morizot, J., & Janosz, M. (2011). General growth mixture analysis of adolescents' developmental trajectories of anxiety: The impact of untested invariance assumptions on substantive interpretations. *Structural Equation Modeling, 18,* 4, 613-648. doi:10.1080/10705511.2011.607714

Nylund, K.L., Asparouhov, T., & Muthén, B.O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling, 14,* 4, 535-569. doi: 10.1080/10705510701575396

Nylund-Gibson, K., & Choi, A.Y. (2018). Ten frequently asked questions about latent class analysis. *Translational Issues in Psychological Science, 4*(4), 440. doi:10.1037/tps0000176

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. doi:10.1027/1866-5888/a000114

Olafsen, A.H., & Bentzen, M. (2020). Benefits of psychological detachment from work: Does autonomous work motivation play a role? *Frontiers in Psychology,* in press, doi:10.3389/fpsyg.2020.00824

Parker, S.L., Zacher, H., de Bloom, J., Verton, T., & Lentink, C.R. (2017). Daily use of energy management strategies and occupational well-being: The moderating role of job demands. *Frontiers in Psychology, 8,* 1477, doi:10.3389/fpsyg.2017.01477

Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology*. doi:10.1016/j.jesp.2017.01.006

Peugh, J., & Fan, X. (2013). Modeling unobserved heterogeneity using Latent Profile Analysis: A Monte Carlo Simulation. *Structural Equation Modeling, 20,* 4, 616-639. doi:10.1080/10705511.2013.824780

Quinn, R.W., Spreitzer, G.M., & Fu Lam, C. (2012). Building a sustainable model of human energy in organizations: Exploring the critical role of resources. *Academy of Management Annals, 6,* 1, 337–396. doi:10.5465/19416520.2012.676762

Ryan, R.M., & Deci, E.L. (2008). From ego depletion to vitality: Theory and findings concerning the facilitation of energy available to the self. *Social and Personality Psychology Compass, 2,* 2, 702–717. doi:10.1111/j.1751-9004.2008.00098.x

Schaufeli, W.B., Leiter, M.P., Maslach, C., & Jackson, S.E. (1996). *MBI-General Survey*.

Schaufeli, W.B., & Bakker, A. (2004). *UWES – Utrecht Work Engagement Scale – Preliminary Manual.*

Sonnentag, S., Cheng, B.H., & Parker, S.L. (2022). Recovery from work: Advancing the field towards the future. *Annual Review of Organizational Psychology and Organizational Behavior*, in press, doi:10.1146/annurev-orgpsych-012420- 091355

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

Sonnentag, S., Kuttler, I., & Fritz, C. (2010). Job stressors, emotional exhaustion, and need for recovery: A multi-source study on the benefits of psychological detachment. *Journal of Vocational Behavior, 76,* 3, 355-365. doi:10.1016/j.jvb.2009.06.005

Sonnentag, S., & Kruel, U. (2006). Psychological detachment from work during off-work time: The role of job stressors, job involvement, and recovery-related self-efficacy. *European Journal of Work and Organizational Psychology, 15,* 2, 197-217. doi:10.1080/13594320500513939

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. doi:10.1037/ocp0000079

Sonnentag, S., & Zijlstra, F. R. H. (2006). Job characteristics and off-job activities as predictors of need for recovery, well-being, and fatigue. *Journal of Applied Psychology, 91, 2,* 330-350. doi:10.1037/0021-9010.91.2.330

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. doi:10.1016/j.riob.2018.11.002

Spurk, D., Hirschi, A., Wang, M., Valero, D., & Kauffeld, S. (2020). Latent profile analysis: A review and "how to" guide of its application within vocational behavior research. *Journal of Vocational Behavior*, 103445. doi:10.1016/j.jvb.2020.103445

Steed, L.B., Swider, B.W., Keem, S., Liu, J.T. (2019). Leaving work at work: A meta-analysis on employee recovery from work. *Journal of Management*, in press. doi:10.1177/0149206319864153

ten Brummelhuis & Trougakos (2014). The recovery potential of intrinsically versus extrinsically motivated off-job activities. *Journal of Occupational and Organizational*

Psychology, 87, 1, 177-199. doi:10.1111/joop.12050

Trougakos, J.P., Hideg, I., Cheng, B.H., & Beal, D.J., (2014). Lunch breaks unpacked: The role of autonomy as a moderator of recovery during lunch. *Academy of Management Journal, 57*, 405–421. doi:10.5465/amj.2011.1072

Trougakos, J.P., & Hideg, I. (2009). Momentary work recovery: The role of within-day work breaks, in *Research in Occupational Stress and Well-being*, Eds P. Perrewé, D. C. Ganster, and S. Sonnentag (Bingley: Emerald), pp. 37–84.

van Beek, I., Taris, T.W., & Schaufeli, W.B. (2011). Workaholic and work engaged employees: Dead ringers or worlds apart? *Journal of Occupational Health Psychology, 16*, 4, 468–482. doi:10.1037/a0024392

Van den Berghe, L., Soenens, B., Aelterman, N., Cardon, G., Tallir, I. B., & Haerens, L. (2014). Within-person profiles of teachers' motivation to teach: Associations with need satisfaction at work, need-supportive teaching, and burnout. *Psychology of Sport and Exercise, 15*, 4, 407–417. doi:10.1016/j.psychsport.2014.04.001

Van den Broeck, A., Schreurs, B., De Witte, H., Vansteenkiste, M., Germeys, F., & Schaufeli, W. (2011). Understanding workaholics' motivations: A self-determination perspective. *Applied Psychology: An International Review, 60*, 4, 600–621. doi:10.1111/j.1464-0597.2011.00449.x

Van den Broeck, A., Lens, W., De Witte, H., & Van Coillie, H. (2013). Unraveling the importance of the quantity and the quality of workers' motivation for well-being: A person-centered perspective. *Journal of Vocational Behavior, 82*, 1, 69–78. doi:10.1016/j.jvb.2012.11.005

Van den Broeck, A., Howard, J. L., Van Vaerenbergh, Y., Leroy, H., & Gagné, M. (2021). Beyond intrinsic and extrinsic motivation: A meta-analysis on self-determination theory's multidimensional conceptualization of work motivation. *Organizational*

Psychology Review, in press. doi:20413866211006173

Van Hooff, M.L.M. & Geurts, S.A.E. (2015). Need satisfaction and employees' recovery state at work: A daily diary study. *Journal of Occupational Health Psychology, 20,* 3, 377-387. doi:10.1037/a0038761

Van Veldhoven, M., & Broersen, S. (2003). Measurement quality and validity of the 'need for recovery scale'. *Occupational and Environmental Medicine, 60,* i3-i9. doi:10.1136/oem.60.suppl_1.i3

Zheng, Y., Wu, C., & Graham, L. (2020) Work-to-non-work spillover: The impact of public service motivation and meaningfulness on outcomes in work and personal life domains. *Public Management Review, 22,* 4, 578-601. doi:10.1080/14719037.2019.1601242

Zacher, H., Brailsford, H.A., & Parker, S.L. (2014). Micro-breaks matter: A diary study on the effects of energy management strategies on occupational well-being. *Journal of Vocational Behavior, 85,* 287–297. doi:10.1016/j.jvb.2014.08.005

Zhu, Z., Kuykendall, L., & Zhang, X. (2019). The impact of within-day work breaks on daily recovery processes: An event-based pre-/post-experience sampling study. *Journal of Occupational and Organizational Psychology, 92,* 1, 191–211. doi:10.1111/joop.12246

Table 1.

Means (M), Standard Deviations (SD), Correlations, and Reliabilities.

Variable	***M***	***SD***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
T1 Motivation																								
1. Amotivation	2.48	1.58	(.91)																					
2. Ext-Material	4.38	1.39	.06	(.74)																				
3. Ext-Social	3.66	1.56	.14**	.40**	(.87)																			
4. Introjected	4.75	1.33	-.41**	.21**	.30**	(.83)																		
5. Identified	5.26	1.37	-.66**	-.04	-.03	.66**	(.89)																	
6. Intrinsic	4.18	1.67	-.65**	-.10*	-.11**	.42**	.64**	(.93)																
T1 Energy Levels																								
7. Vigor	4.44	1.43	-.52**	-.05	-.07	.30**	.48**	.56**	(.91)															
8. Exhaustion	4.52	1.54	.41**	.13**	.27**	-.05	-.33**	-.50**	-.41**	(.92)														
9. Need for Recovery	4.60	1.40	.32**	.13**	.19**	-.06	-.28**	-.35**	-.34**	.69**	(.86)													
T1 Energy Approaches																								
10. WRS	4.39	0.97	-.34**	.08	.08	.31**	.41**	.44**	.39**	-.20**	-.13**	(.74)												
11. Micro-Breaks	3.74	0.93	.18**	.14**	.04	-.04	-.09*	-.07	-.05	.07	.04	.21**	(.76)											
12. Detachment	4.59	1.38	.14**	-.04	-.13**	-.21**	-.20**	-.11*	-.04	-.17**	-.23**	-.20**	.13**	(.90)										
13. Relaxation	4.94	1.19	.02	-.01	-.10*	-.11*	-.07	.03	.11**	-.18**	-.21**	-.09*	.09*	.54**	(.91)									
14. Mastery	3.39	1.26	.05	.02	-.03	-.01	.03	.14**	.17**	-.13**	-.20**	.21**	.14**	.10*	.23**	(.91)								
T2 Energy Levels																								
15. Vigor	4.39	1.53	-.39**	-.10*	-.12*	.16**	.36**	.47**	.64**	-.37**	-.35**	.38**	-.03	-.06	.08	.19**	(.94)							
16. Exhaustion	4.51	1.58	.26**	17*	.31**	.06	-.15*	-.36**	-.32**	.66**	.58**	-.08	.14*	-.15**	-.14**	-.12*	-.42**	(.93)						
17. Need for Recovery	4.38	1.46	.21**	.11*	.23**	.06	-.09	-.22**	-.25**	.49**	.66**	-.05	.13*	-.19*	-.13*	-.12*	-.38**	.75**	(.87)					
T2 Energy Approaches																								
18. WRS	4.27	1.00	-.19**	.08	.06	.23**	.30**	.36**	.23**	-.08	-.03	.64**	.19**	-.24**	-.10	.18**	.37*	-.02	.03	(.76)				
19. Micro-Breaks	3.65	0.91	.11*	.19**	.16**	.00	-.07	-.05	-.01	.14**	.16**	.17**	.66**	.04	.03	.07	-.01	.23**	.22**	.22**	(.78)			
20. Detachment	4.57	1.33	.08	-.01	.15**	.22**	-.18**	-.09	-.03	-.20**	-.27**	-.17**	.08	.64**	.36**	.06	.07	-.29**	-.32**	-.24**	.10	(.91)		
21. Relaxation	4.93	1.14	.05	-.03	-.19**	-.16**	-.11*	.02	.12*	-.15**	-.15**	.01	.09	.34**	.52**	.11*	.12*	-.20**	-.17**	-.07	.15**	.54**	(.90)	
22. Mastery	3.32	1.18	.04	.07	-.02	-.02	-.01	.10*	.16**	-.06	-.11*	.20**	.08	.02	.12**	.53**	.23**	-.14**	-.19**	.19**	.14**	.23**	.23**	(.92)

Notes. Correlations are at a between-persons level (Time 1, $N = 551$; Time 2, $N = 391$). Cronbach's α for internal consistency is listed in parentheses on the diagonal. All variables were measured using a 7-point response scale. *T1 = Time 1; T2 = Time 2; Ext-Material = external material regulations; Ext-Social = external social regulations; WRS = Work-related strategies*. *$p < .05$, **$p < .01$.

Table 2.

Employee Motivation Profile Enumeration at Time 1.

	Log Likelihood	***#fp***	**AIC**	**BIC**	**SABIC**	**LMR**	**BLRT**	**Entropy**
1 Profile	-4688.01	12	9400.02	9451.76	9413.66	N/A	N/A	N/A
2 Profiles	-4292.06	19	8622.13	8704.05	8643.74	<.05	<.001	0.88
3 Profiles	-4139.08	26	8330.15	8442.26	8359.72	<.05	<.001	0.90
4 Profiles	-4061.90	33	8189.80	8332.09	8227.33	<.05	<.001	0.82
5 Profiles	-3999.69	40	8079.38	8251.85	8124.88	0.21	<.001	0.85
6 Profiles	-3961.52	47	8017.04	8219.69	8070.50	0.23	<.001	0.81
7 Profiles	-3933.23	54	7974.45	8207.29	8035.87	0.32	<.001	0.83
8 Profiles	-3907.94	61	7937.88	8200.89	8007.25	0.24	<.001	0.83

Notes. *N=551*. #fp = number of free parameters; AIC = Akaike information criteria; BIC = Bayesian information criteria; SABIC = sample-size adjusted BIC; LMR = Lo, Mendell, and Rubin test; BLRT = bootstrapped log-likelihood ratio test.

Table 3.

Time 1 motivation profiles and Time 1 energy levels and energy approaches as outcomes: Latent profile means, standard errors, and Wald chi-square test of mean equality comparisons.

Outcome Variable	**Standardized profile means (SE)**				**Profile comparisons (X^2)**						**Overall X^2**
	Amotivated (Profile1)	Amotivated/ External (Profile2)	Highly Motivated (Profile 3)	Autonomous (Profile 4)	1 vs 2	1 vs 3	1 vs 4	2 vs 3	2 vs 4	3 vs 4	
Vigor	-1.18(0.14)	-0.49(0.09)	0.32(0.09)	0.45(0.11)	16.35***	79.38***	83.05***	35.04***	39.18***	0.51	148.36***
Exhaustion	0.74(0.13)	0.42(0.08)	0.04(0.08)	-0.63(0.09)	3.92*	21.96***	74.99***	10.53**	70.87***	25.23***	113.31***
Need for Recovery	0.53(0.14)	0.32(0.09)	0.04(0.10)	-0.47(0.09)	1.40	8.51**	35.54***	3.76	35.05***	11.32**	55.59***
Work-Related Strategies	-1.04(0.17)	-0.22(0.09)	0.32(0.08)	0.18(0.08)	17.37***	54.52***	43.98***	17.77***	10.81**	1.21	70.57***
Micro-Breaks	0.32(0.16)	0.12(0.10)	0.00(0.09)	-0.20(0.08)	1.04	2.99	8.28**	0.78	6.27*	2.45	11.77**
Detachment	0.53(0.16)	0.08(0.09)	-0.24(0.09)	0.02(0.08)	5.60*	17.74***	8.01**	5.80*	0.19	3.79	19.61***
Relaxation	0.30(0.17)	-0.05(0.09)	-0.18(0.08)	0.14(0.09)	2.91	6.18*	0.65	0.97	2.26	5.62*	9.02*
Mastery	-0.08(0.18)	0.07(0.09)	-0.04(0.08)	0.01(0.08)	0.56	0.06	0.21	0.69	0.25	0.11	0.90

Notes. Indicators are estimate from a scores with a mean of 0 and a standard deviation of 1 (*N* = 551). *p < .05, **p < .01, *** p < .001.

Table 4.

Time 1 motivation profiles and Time 2 energy levels and energy approaches as outcomes: Latent profile means, standard errors, and Wald chi-square test of mean equality comparisons.

Outcome Variable	**Standardized profile means (SE)**				**Profile comparisons (X^2)**						
	Amotivated (Profile1)	Amotivated/ External (Profile2)	Highly Motivated (Profile 3)	Autonomous (Profile 4)	1 vs 2	1 vs 3	1 vs 4	2 vs 3	2 vs 4	3 vs 4	**Overall X^2**
Vigor	-0.97(0.17)	-0.38(0.10)	-0.09(0.10)	0.80(0.10)	8.48**	21.37***	81.72***	3.90*	65.38***	30.79***	111.69***
Exhaustion	0.25(0.16)	0.32(0.09)	0.20(0.09)	-0.57(0.12)	0.16	0.08	17.22***	0.89	35.12***	22.53***	39.00***
Need for Recovery	0.14(0.15)	0.27(0.09)	0.12(0.10)	-0.41(0.12)	0.50	0.01	8.19**	1.11	19.95***	9.45**	20.96***
Work-Related Strategies	-0.61(0.19)	-0.20(0.10)	0.26(0.11)	0.09(0.12)	3.33	15.64***	9.85**	8.16**	3.43	0.80	22.06***
Micro-Breaks	0.09(0.15)	0.10(0.11)	0.11(0.10)	-0.24(0.10)	0.00	0.01	3.14	0.00	4.91*	4.56*	6.74
Detachment	0.42(0.14)	0.05(0.11)	-0.25(0.10)	0.10(0.11)	3.73	15.00***	3.36	3.63	0.08	4.43*	15.35**
Relaxation	0.34(0.15)	-0.05(0.11)	-0.31(0.11)	0.27(0.11)	4.23*	12.19***	0.16	2.58	4.16*	10.37**	15.86**
Mastery	-0.11(0.20)	0.07(0.10)	-0.03(0.10)	0.00(0.11)	0.62	0.13	0.24	0.47	0.21	0.03	0.82

Notes. Indicators are estimate from a scores with a mean of 0 and a standard deviation of 1 (N = 391). *p < .05, **p < .01, ***p < .001.

Table 5.
Summary of significant relative indirect effects of Time 1 motivation profiles on Time 2 energy levels via energy approaches (controlling for Time 1 energy levels).

Outcome *(Y)*	**Predictor** *(X)*	**Mediator** *(M)*	**Path a** *Coeff(SE)*	**Path b** *Coeff(SE)*	**Path c** *Coeff(SE)*	**Relative Indirect Effect** Coeff(SE)	95% CI
Vigor	AM vs. HM	Work-Related Strategies	.57(.20)**	.40(.06)***	.19(.23)	.22(.09)	[.05; .42]
	AM vs. AU		.44(.20)*		.62(.23)**	.17(.10)	[.00; .38]
	AM/EX vs. HM		.30(.13)*		.06(.15)	.12(.06)	[.02; .24]
	AM vs. HM	Detachment	-.85(.27)**	.18(.05)***	.19(.23)	-.16(.06)	[-.30; -.05]
	AM/EX vs. HM		-.40(.18)*		.06(.15)	-.07(.04)	[-.16; -.01]
	HM vs. AU		.36(.17)*		.43(.14)**	.07(.04)	[.00; .16]
Exhaustion	AM vs. AM/EX	Detachment	-.50(.24)*	-.20(.05)***	.25(.22)	.10(.05)	[.01; .21]
	AM vs. HM		-.97(.24)***		.22(.22)	.19(.07)	[.07; .35]
	AM vs. AU		-.79(.25)**		-.06(.23)	.16(.06)	[.05; .30]
	AM/EX vs. HM		-.47(.17)**		-.03(.15)	.09(.05)	[.02; .19]
Need for Recovery	AM vs. AM/EX	Detachment	-.50(.24)*	-.20(.05)***	.27(.20)	.10(.05)	[.02; .21]
	AM vs. HM		-.95(.23)***		.15(.20)	.19(.07)	[.07; .33]
	AM vs. AU		-.75(.24)**		-.01(.21)	.15(.06)	[.05; .28]
	AM/EX vs. HM		-.46(.17)**		-.12(.14)	.09(.04)	[.02; .18]

Notes. N = 391. AM vs. AM/EX = comparison Amotivated (0) and Amotivated/External (1); AM vs. HM = comparison Amotivated (0) and Highly Motivated (1); AM vs. AU = comparison Amotivated (0) and Autonomous (1); AM/EX vs. HM = comparison Amotivated/External (0) and Highly Motivated (1); HM vs. AU = comparison Highly Motivated (0) and Autonomous (1); Coeff = unstandardized regression coefficient; SE = standard error; 95% CI = 95% bootstrap confidence interval. This is a summary of the significant indirect effects. Please see our supplementary materials for the full results. *p < .05, **p < .01, ***p < .001.

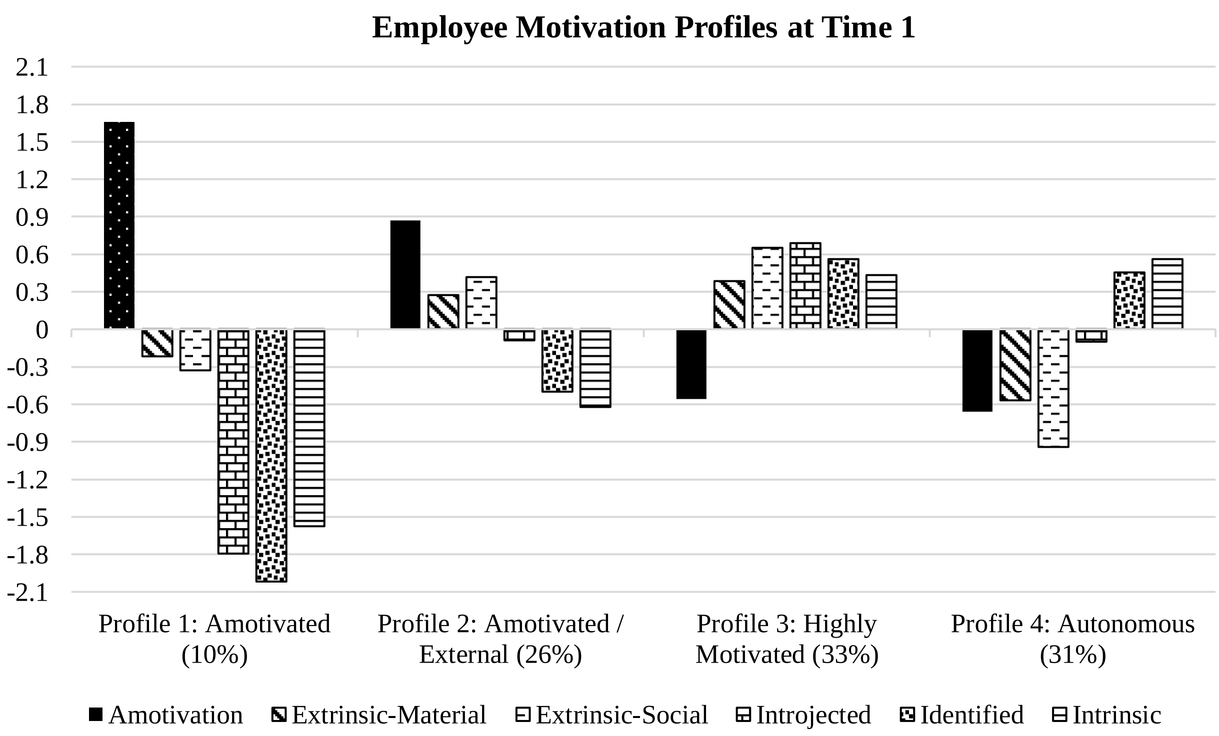

Figure 1. Four-factor employee motivation profiles solution (Time 1; N = 551). *Note.* Indicators are estimated from factor scores with a mean of 0 and standard deviation of 1.

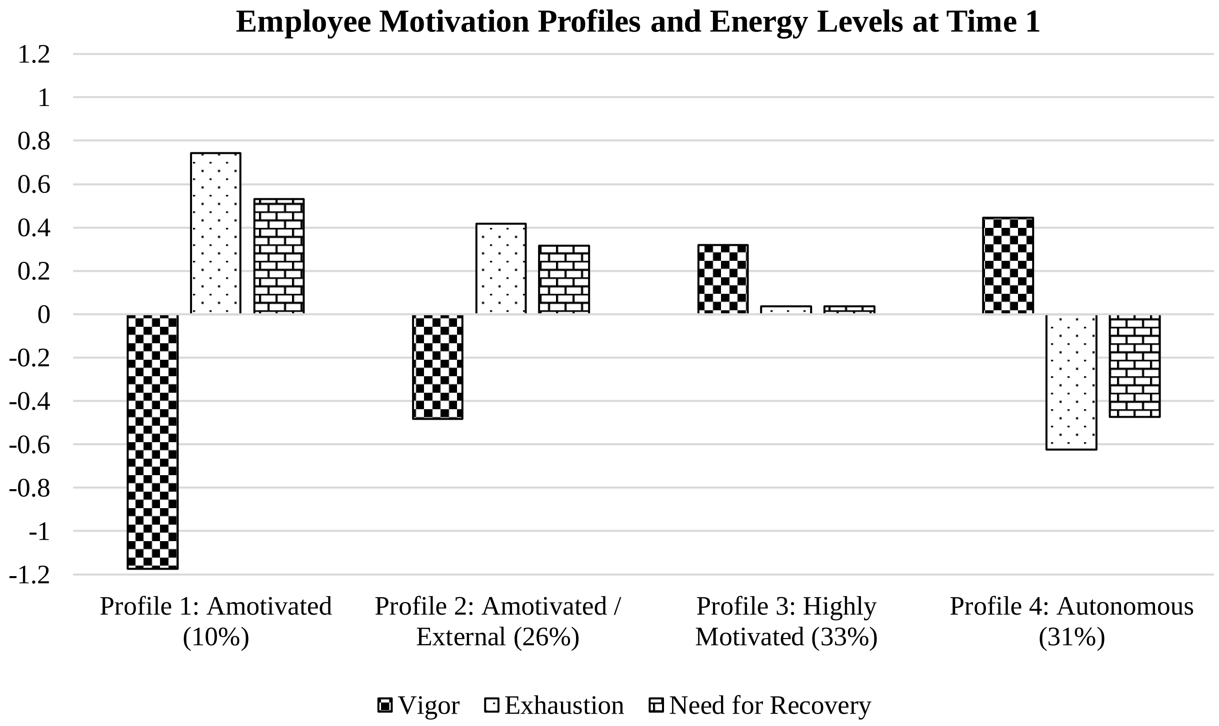

Figure 2. Energy levels associated with employee motivation profile membership (Time 1; *N* = 551). *Note*. Indicators are estimated from factor scores with a mean of 0 and standard deviation of 1.

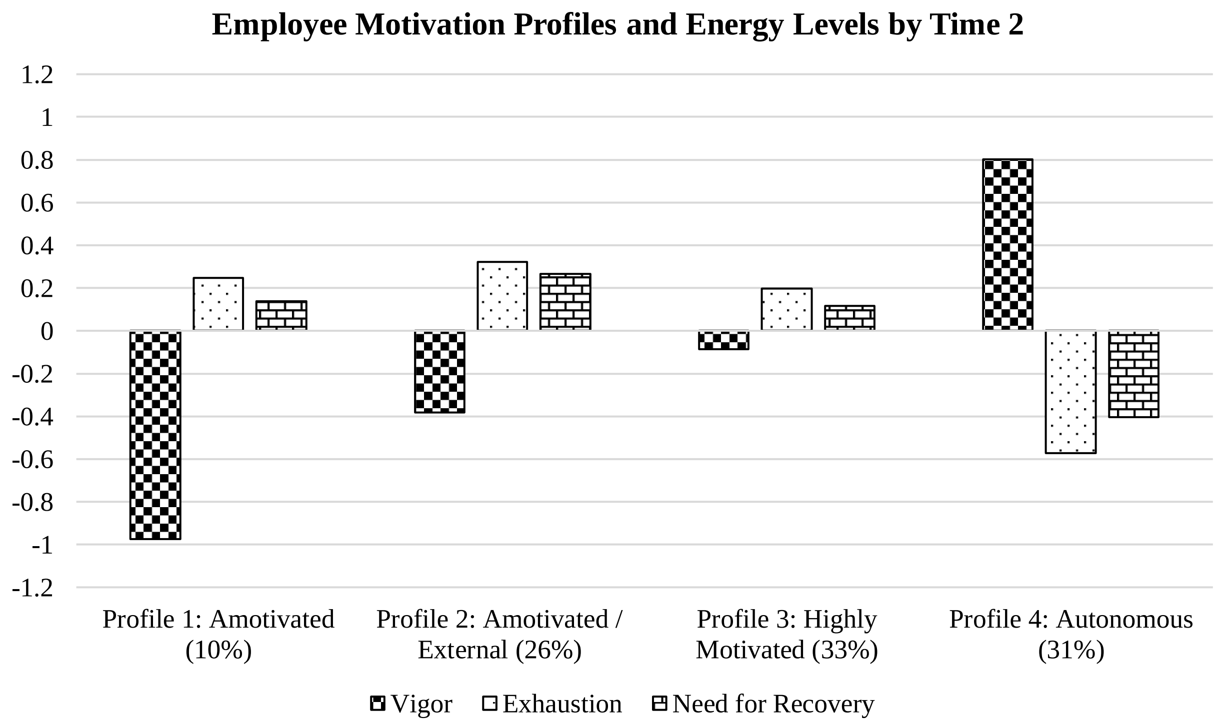

Figure 3. Energy levels associated with employee motivation profile membership (Time 1 Profiles on Time 2 Outcomes; *N* = 391). *Note*. Indicators are estimated from factor scores with a mean of 0 and standard deviation of 1.

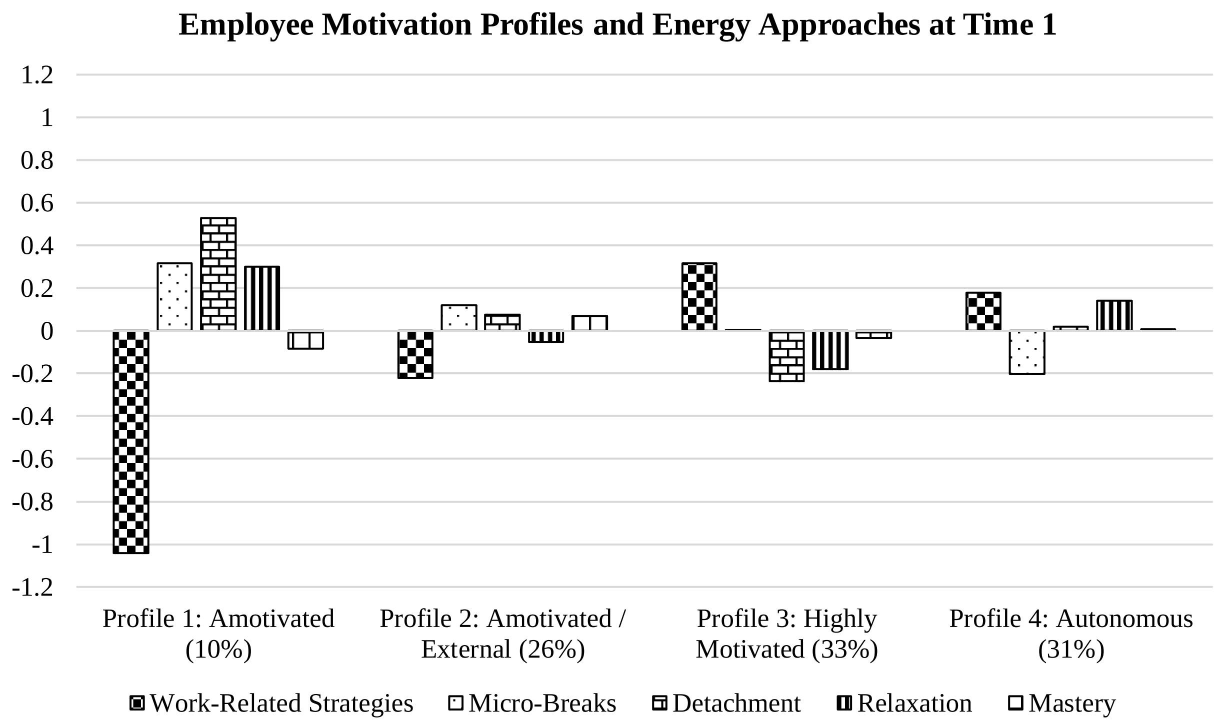

Figure 4. Energy approaches associated with employee motivation profile membership (Time 1; *N* = 551). *Note*. Indicators are estimated from factor scores with a mean of 0 and standard deviation of 1.

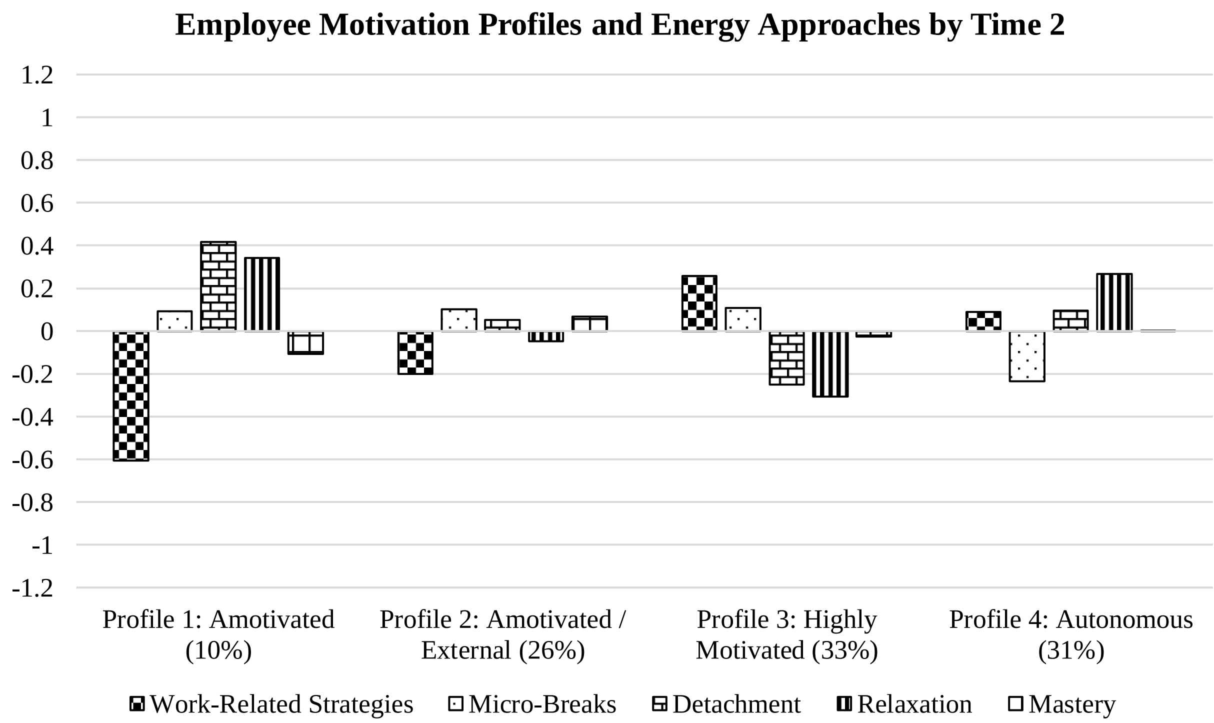

Figure 5. Energy approaches associated with employee motivation profile membership (Time 1 Profiles on Time 2 Outcomes; *N* = 391). *Note*. Indicators are estimated from factor scores with a mean of 0 and standard deviation of 1.

Supplementary Materials

Additional Sample Demographics

Table S.1. Additional Information on Participant Demographics.

Demographic Features	**Proportion of Sample Time 1** ***N* = 551**	**Proportion of the Sample Time 2** ***N* = 391**
Occupational Groups:		
Professional specialty	21.8%	19.7%
Executive, administrative, or managerial	17.2%	17.2%
Managerial or professional specialty	14.5%	17.4%
Administrative support or clerical	11.9%	11.0%
Sales	9.6%	5.9%
Service	8.5%	8.5%
Technical, sales, or administrative support	5.1%	6.9%
Technicians or related support	3.9%	3.3%
Education Level:		
Secondary school (or partial completion)	15.6%	14.3%
Apprenticeship or vocational qualification	10.4%	11.3%
Certificate or diploma	13.4%	9.5%
Degree/degree with honors	39.7%	41.2%
Postgraduate qualification	20.9%	23.8%
Relationship Status:		
Single	22.9%	21.7%
In a relationship (living apart)	12.2%	8.4%
In a relationship (defacto)	24.3%	24.3%
Married	36.3%	40.2%
Separated or divorced	3.6%	4.3%
Widowed	0.7%	1.0%
Caring Responsibilities:		
Dependent child/ren living at home	42.3%	45.3%
Dependent elderly relative/s living at home	4.9%	3.3%
Other dependent/s	4.2%	3.8%
Access to Flexible Work Arrangements:		
Flexibility in hours of work (e.g., start and finish times)	57.9%	68.3%
Flexibility in location of work (e.g., working from home)	31.9%	56.0%
Flexibility in patterns of work (e.g., split shifts, job sharing, compressed work week/schedule, or access to 'accrued time' or 'time off in lieu')	25.4%	24.6%

***Notes*.** Less common occupational groups (less than 2% each) included: operations labor, transportation labor, handling/cleaning equipment, production/craft or repair work, farming/forestry or fishing, machine operation/assembly/inspection, and other protective or household services; Participants described 'other dependents' as a dependent spouse or other relative.

Further Information on Sampling Procedure

As part of the data collection procedure, the Time 1 survey was advertised to participants in two batches launched at different times of day. Thus, our sample includes participants who accessed the initial survey as part of a first batch (i.e., at 2pm n = 274) or a second batch (i.e., at 8pm n = 277). To be clear, participants completed all constructs at once for each time point. We released the Time 1 survey in two batches to mitigate potential differences in work motivation or approaches to sustaining energy that might vary with individuals' survey taking behavior (e.g., less motivated participants might search for surveys during work; employees seeking learning experiences might search for surveys in their evenings). In any case, a MANOVA performed on all study variables, using batch as the independent variable, revealed no significant differences according to the timing of survey release, $F(14, 535) = 0.99$, $p = .465$, $\eta^2 = .025$, *ns*. We also asked participants where they were physically located when completing the Time 1 survey: 21.1% workplace, 77.1% home, 1.3% commuting, and 0.5% other (e.g., kid's school, hotel for work trip, canteen for work break, or on holiday).

At Time 2, participants were emailed by Prolific Academic about the opportunity to participate in our follow-up survey. We left the follow-up survey open for one month, to allow as many responders to participate as reasonable, and also, to ensure users with different levels of engagement with the survey platform were included in our sample (i.e., more and less active users). Most responders (n = 305; 73.1%) participated in the follow-up survey immediately (i.e., within 2 days) when emailed the opportunity. When completing the follow-up survey, participants were physically located: 10.7% workplace, 86.7% home, 1.5% commuting, and 1.0% other. These small differences in location (i.e., less surveys completed at a workplace and more from home) are possibly due to the 2020 coronavirus pandemic, which resulted in many employees working from home. However, it might be also due to respondents having more time at Time 2 to choose when to complete the survey.

Coronavirus Pandemic and Employment Changes

The coronavirus pandemic commenced between Time 1 and Time 2 of our survey study. As such, we attempted to evaluate the potential impact of any employment changes on our employees' motivation, energy levels, and energy approaches. In the follow-up survey, we asked employees to report any changes to their employment: "*If your employment situation has changed during the past 12 months, related to COVID-19(coronavirus) pandemic or not, can you please describe how it has changed? For example, please describe how your position, work tasks or routine, organization, or other aspects of your employment situation have changed since around this time last year (i.e., September, 2019).*"

Of the retained respondents at Time 2 (N = 391), N = 113 (28.90%) reported a change to their employment, including either the organization, job role/position (i.e., including redeployment), work hours (i.e., both more or less hours), being temporarily furloughed during the initial outbreak but then returned to their position or a new position, or some combination of these employment changes. A MANOVA with Employment Change (0=No; 1=Yes) as the independent variable, Time 2 variables (i.e., motivations, energy approaches, energy levels) as the dependent variables, and controlling for Time 1 variables as covariates, revealed no significant differences between those who experienced an employment change and those who did not, $F(14, 361) = 1.37$, $p = .166$, $\eta^2 = .050$, *ns*. We also conducted a series of mixed ANOVAs to evaluate if any changes in the study variables over time could be explained by employment changes. For these analyses, Time 1 and Time 2 variables (i.e., motivations, energy approaches, and energy levels) were included as a within-subjects variable and Employment Change as the between-subjects variable. There were no significant changes in any of the study variables from Time 1 to Time 2 that could be explained by employment change (*p*s > .084).

For descriptive purposes, in the Time 2 survey we also asked participants some more specific questions about the impact of the coronavirus pandemic on their work hours and their work-from-home arrangements. These items were provided by Prolific Academic. We have summarized participant responses below in Table S.2. The question stem for the work hours change item was "*Has your employment status been affected by the COVID-19 (coronavirus) pandemic?*", and for the work-from-home item was "*During the COVID-19 (coronavirus) pandemic, are you working from home?*". As per Table S.2, approximately 87.2% of participants reported no change in their work hours. Approximately 43.2% reported no change in their work-from-home arrangements (i.e., either continued to work-from-home or continued to commute to work).

Table S.2. Additional Coronavirus Descriptives.

Changes due to Coronavirus Pandemic	**Proportion of Respondents**
<u>Changes to work hours:</u>	
I was working full-time, and am now still working or being paid for full-time hours	**68.3%**
I was working part-time, and am now still working or being paid for part-time hours	**18.9%**
I was working full-time, but am now working or being paid for part-time hours	3.3%
I was working part-time, but am now working or being paid for full-time hours	4.1%
I was working part-time, and am now working or being paid for fewer part-time hours	2.8%
Other	2.6%
<u>Changes to work-from-home arrangements:</u>	
No, I am still commuting to work every day, even during the COVID-19 pandemic.	**35.8%**
Yes, I am working from home every day. I always worked from home before COVID-19.	**7.4%**
Yes, I am working from home every day. I rarely worked from home before COVID-19 (less than 1 day per week)	26.6%
Yes, I am working from home every day. I sometimes worked from home before COVID-19 (1 day a week or more)	11.3%
Yes, I am sometimes working from home, but still commuting to my workplace on other days	13.8%
Other	5.1%

Note. There were more response options, related to becoming unemployed or other patterns of changes, but these were not endorsed by the retained respondents (who maintained their employment). "Other" responses pertained to being on leave from work at the time of the follow-up survey or participants used this response option to provide details about their work arrangements.

Full Mediation Results: All Findings by each Dependent Variable

Indirect effects were evaluated using Time 1 motivation profiles as predictors, Time 2 approaches to sustaining energy as mediators, and Time 2 energy levels as outcomes. In the Tables below, path a is the effect of profile membership on energy approaches, path b is the effect of energy approaches on energy levels, path c is the direct effect, accounting for the mediators, of profile membership on energy levels. We included all mediators simultaneously and controlled for Time 1 energy levels. We reported a summary of the significant indirect effects in the manuscript, while here we provide the full results.

Table S.3. *Effects on Vigor.*

Predictor *(X)*	**Mediator** *(M)*	**Path a** *Coeff(SE)*	**Path b** *Coeff(SE)*	**Path c** *Coeff(SE)*	**Relative Indirect Effect**	
					Coeff(SE)	95% CI
Amotive vs. Am/Ext	Work-Related Strategies	.27(.19)	**.40(.06)*****	.13(.22)	.11(.08)	[-.06, .28]
Amotive vs. High		**.57(.20)****		.19(.23)	**.22(.09)**	**[.05, .42]**
Amotive vs. Autonomous		**.44(.20)***		**.62(.23)****	**.17(.10)**	**[.00, .38]**
Am/Ext vs. High		**.30(.13)***		.06(.15)	**.12(.06)**	**[.02, .24]**
Am/Ext vs. Autonomous		.17(.14)		**.49(.16)****	.07(.06)	[-.04, .20]
High vs. Autonomous		-.12(.12)		**.43(.14)****	-.05(.05)	[-.15, .05]
Amotive vs. Am/Ext	Micro-Breaks	-.03(.18)	-.11(.06)	.13(.22)	.00(.02)	[-.04, .05]
Amotive vs. High		-.07(.19)		.19(.23)	.01(.02)	[-.04, .06]
Amotive vs. Autonomous		-.32(.19)		**.62(.23)****	.04(.03)	[-.01, .11]
Am/Ext vs. High		-.04(.12)		.06(.15)	.01(.02)	[-.03, .04]
Am/Ext vs. Autonomous		**-.30(.13)***		**.49(.16)****	.03(.03)	[-.01, .10]
High vs. Autonomous		**-.25(.12)***		**.43(.14)****	.03(.02)	[-.01, .08]
Amotive vs. Am/Ext	Detachment	-.47(.26)	**.18(.05)*****	.13(.22)	**-.09(.05)**	**[-.20, -.00]**
Amotive vs. High		**-.85(.27)****		.19(.23)	**-.16(.06)**	**[-.30, -.05]**
Amotive vs. Autonomous		-.49(.28)		**.62(.23)****	**-.09(.05)**	**[-.21, .00]**
Am/Ext vs. High		**-.40(.18)***		.06(.15)	**-.07(.04)**	**[-.16, -.01]**
Am/Ext vs. Autonomous		-.03(.19)		**.49(.16)****	-.01(.04)	[-.08, .07]
High vs. Autonomous		**.36(.17)***		**43(.14)****	**.07(.04)**	**[.00, .16]**
Amotive vs. Am/Ext	Relaxation	**-.61(.22)****	-.06(.06)	.13(.22)	.04(.04)	[-.04, .12]
Amotive vs. High		**-.97(.23)*****		.19(.23)	.06(.06)	[-.06, .18]
Amotive vs. Autonomous		**-.51(.23)***		**.62(.23)****	.03(.02)	[-.03, .11]
Am/Ext vs. High		**-.36(.15)***		.06(.15)	.02(.02)	[-.02, .08]
Am/Ext vs. Autonomous		.11(.16)		**.49(.16)****	-.01(.02)	[-.04, .02]
High vs. Autonomous		**.46(.14)****		**.43(.14)****	-.03(.03)	[-.10, .03]
Amotive vs. Am/Ext	Mastery	-.01(.23)	**.12(.05)***	.13(.22)	-.00(.03)	[-.07, .06]
Amotive vs. High		-.27(.24)		.19(.23)	-.03(.04)	[-.11, .03]
Amotive vs. Autonomous		-.27(.24)		**.62(.23)****	-.03(.04)	[-.12, .03]
Am/Ext vs. High		-.25(.16)		.06(.15)	-.03(.02)	[-.08, .00]
Am/Ext vs. Autonomous		-.26(.17)		**.49(.16)****	-.03(.02)	[-.09, .01]
High vs. Autonomous		-.01(.15)		**43(.14)****	-.00(.02)	[-.04, .04]

Notes. N = 391. Amotive = Amotivated Profile; Am/Ext = Amotivated/External Profile; High = Highly Motivated Profile; Autonomous = Autonomous Profile; Coeff = unstandardized regression coefficient; SE = standard error; 95% CI = 95% bootstrap confidence interval. Note that the initial profile is the reference profile, e.g. Amotive vs. Am/Ext = comparison between Amotivated Profile (0) and Amotivated/External Profile (1).
*p < .05, **p < .01, ***p < .001

Table S.4. *Effects on Exhaustion.*

Predictor *(X)*	**Mediator** *(M)*	**Path a** *Coeff(SE)*	**Path b** *Coeff(SE)*	**Path c** *Coeff(SE)*	**Relative Indirect Effect** Coeff(SE)	95% CI
Amotive vs. Am/Ext	Work-Related Strategies	**.41(.19)****	-.07(.06)	.25(.22)	-.03(.04)	[-.11, .04]
Amotive vs. High		**.79(.18)********		.22(.22)	-.05(.06)	[-.18, .06]
Amotive vs. Autonomous		**.68(.19)********		-.06(.23)	-.05(.05)	[-.16, .05]
Am/Ext vs. High		**.38(.13)******		-.03(.15)	-.03(.03)	[-.09, .03]
Am/Ext vs. Autonomous		.27(.14)		-.31(.17)	-.02(.02)	[-.08, .02]
High vs. Autonomous		-.11(.13)		-.27(.15)	.01(.02)	[-.02, .05]
Amotive vs. Am/Ext	Micro-Breaks	.04(.17)	**.31(.07)********	.25(.22)	.01(.05)	[-.09, .12]
Amotive vs. High		.04(.17)		.22(.22)	.01(.05)	[-.09, .11]
Amotive vs. Autonomous		-.16(.18)		-.06(.23)	-.05(.05)	[-.16, .05]
Am/Ext vs. High		-.00(.12)		-.03(.15)	-.00(.04)	[-.09, .08]
Am/Ext vs. Autonomous		-.20(.13)		-.31(.17)	-.06(.05)	[-.16, .03]
High vs. Autonomous		-.20(.12)		-.27(.15)	-.06(.04)	[-.14, .01]
Amotive vs. Am/Ext	Detachment	**-.50(.24)****	**-.20(.05)********	.25(.22)	**.10(.05)**	**[.01, .21]**
Amotive vs. High		**-.97(.24)********		.22(.22)	**.19(.07)**	**[.07, .35]**
Amotive vs. Autonomous		**-.79(.25)******		-.06(.23)	**.16(.06)**	**[.05, .30]**
Am/Ext vs. High		**-.47(.17)******		-.03(.15)	**.09(.05)**	**[.02, .19]**
Am/Ext vs. Autonomous		-.29(.18)		-.31(.17)	.06(.04)	[-.01, .15]
High vs. Autonomous		.17(.17)		-.27(.15)	-.03(.04)	[-.12, .03]
Amotive vs. Am/Ext	Relaxation	**-.45(.21)** *	-.02(.06)	.25(.22)	.01(.03)	[-.06, .08]
Amotive vs. High		**-.73(.21)********		.22(.22)	.01(.05)	[-.09, .11]
Amotive vs. Autonomous		-.33(.22)		-.06(.23)	.01(.03)	[-.05, .06]
Am/Ext vs. High		-.28(.15)		-.03(.15)	.01(.02)	[-.04, .05]
Am/Ext vs. Autonomous		.12(.16)		-.31(.17)	-.00(.01)	[-.04, .02]
High vs. Autonomous		**.40(.15)******		-.27(.15)	-.01(.03)	[-.07, .05]
Amotive vs. Am/Ext	Mastery	.18(.23)	**-.13(.05)****	.25(.22)	-.02(.04)	[-.11, .05]
Amotive vs. High		.05(.22)		.22(.22)	-.01(.04)	[-.08, .07]
Amotive vs. Autonomous		.03(.23)		-.06(.23)	-.00(.04)	[-.08, .08]
Am/Ext vs. High		-.13(.16)		-.03(.15)	.02(.02)	[-.02, .07]
Am/Ext vs. Autonomous		-.15(.17)		-.31(.17)	.02(.03)	[-.02, .08]
High vs. Autonomous		-.02(.16)		-.27(.15)	.00(.02)	[-.04, .05]

Notes. N = 391. Amotive = Amotivated Profile; Am/Ext = Amotivated/External Profile; High = Highly Motivated Profile; Autonomous = Autonomous Profile; Coeff = unstandardized regression coefficient; SE = standard error; 95% CI = 95% bootstrap confidence interval. Note that the initial profile is the reference profile, e.g. Amotive vs. Am/Ext = comparison between Amotivated Profile (0) and Amotivated/External Profile (1).
*$p < .05$, **$p < .01$, ***$p < .001$

Table S.5. *Effects on Need for Recovery.*

Predictor *(X)*	**Mediator** *(M)*	**Path a** *Coeff(SE)*	**Path b** *Coeff(SE)*	**Path c** *Coeff(SE)*	**Relative Indirect Effect**	
					Coeff(SE)	95% CI
Amotive vs. Am/Ext	Work-Related Strategies	**.41(.19)***	.01(.06)	.27(.20)	.00(.03)	[-.06, .07]
Amotive vs. High		**.80(.18)*****		.15(.20)	.01(.05)	[-.10, .12]
Amotive vs. Autonomous		**.71(.19)*****		-.01(.21)	.01(.05)	[-.09, .10]
Am/Ext vs. High		**.40(.13)****		-.12(.14)	.00(.03)	[-.05, .06]
Am/Ext vs. Autonomous		**.30(.14)***		-.28(.15)	.00(.02)	[-.04, .05]
High vs. Autonomous		-.09(.13)		-.16(.14)	-.00(.01)	[-.02, .02]
Amotive vs. Am/Ext	Micro-Breaks	.03(.17)	**.25(.06)*****	.27(.20)	.01(.04)	[-.08, .09]
Amotive vs. High		.04(.17)		.15(.20)	.01(.04)	[-.07, .09]
Amotive vs. Autonomous		-.16(.17)		-.01(.21)	-.04(.04)	[-.13, .04]
Am/Ext vs. High		.01(.12)		-.12(.14)	.00(.03)	[-.06, .07]
Am/Ext vs. Autonomous		-.19(.13)		-.28(.15)	-.05(.04)	[-.12, .02]
High vs. Autonomous		-.20(.12)		-.16(.14)	-.05(.03)	[-.12, .01]
Amotive vs. Am/Ext	Detachment	**-.50(.24)***	**-.20(.05)*****	.27(.20)	**.10(.05)**	**[.02, .21]**
Amotive vs. High		**-.95(.23)*****		.15(.20)	**.19(.07)**	**[.07, .33]**
Amotive vs. Autonomous		**-.75(.24)****		-.01(.21)	**.15(.06)**	**[.05, .28]**
Am/Ext vs. High		**-.46(.17)****		-.12(.14)	**.09(.04)**	**[.02, .18]**
Am/Ext vs. Autonomous		-.25(.17)		-.28(.15)	.05(.04)	[-.02, .13]
High vs. Autonomous		.20(.16)		-.16(.14)	-.04(.04)	[-.12, .02]
Amotive vs. Am/Ext	Relaxation	**-.45(.21)***	.04(.06)	.27(.20)	-.02(.03)	[-.09, .04]
Amotive vs. High		**-.70(.21)*****		.15(.20)	-.03(.05)	[-.13, .06]
Amotive vs. Autonomous		-.27(.21)		-.01(.21)	-.01(.02)	[-.07, .03]
Am/Ext vs. High		-.26(.15)		-.12(.14)	-.01(.02)	[-.06, .02]
Am/Ext vs. Autonomous		.17(.16)		-.28(.15)	.01(.02)	[-.02, .04]
High vs. Autonomous		**.43(.14)****		-.16(.14)	.02(.03)	[-.04, .08]
Amotive vs. Am/Ext	Mastery	.17(.22)	**-.17(.05)*****	.27(.20)	-.03(.04)	[-.12, .06]
Amotive vs. High		.03(.22)		.15(.20)	-.01(.04)	[-.09, .08]
Amotive vs. Autonomous		-.00(.23)		-.01(.21)	.00(.05)	[-.09, .09]
Am/Ext vs. High		-.14(.16)		-.12(.14)	.02(.03)	[-.02, .08]
Am/Ext vs. Autonomous		-.17(.16)		-.28(.15)	.03(.03)	[-.02, .09]
High vs. Autonomous		-.03(.15)		-.16(.14)	.01(.03)	[-.05, .06]

Notes. N = 391. Amotive = Amotivated Profile; Am/Ext = Amotivated/External Profile; High = Highly Motivated Profile; Autonomous = Autonomous Profile; Coeff = unstandardized regression coefficient; SE = standard error; 95% CI = 95% bootstrap confidence interval. Note that the initial profile is the reference profile, e.g. Amotive vs. Am/Ext = comparison between Amotivated Profile (0) and Amotivated/External Profile (1).
*p < .05, **p < .01, ***p < .001

Sensitivity Analyses:

Predicting Profile Membership from Work Design

Based on prior research, there might be questions as to whether the energy-related effects associated with a particular motivation profile are due to employee motivation or due to the quality of employee work design (see Moran et al., 2012; Fernet et al., 2020; Gillet et al., 2020). Thus, we included a set of relevant job demands and resources in our Time 1 survey, to be used as predictors of motivation profile membership. We included two job demands: workload (3 items, e.g., "My job requires a great deal of work to be done"; $\alpha = .85$; Caplan, 1975) and emotional demands (3 items, e.g., "My work is emotionally demanding"; $\alpha = .90$; Van Veldhoven & Meijman, 1994). In addition, three job resources: autonomy (3 items, e.g., "The job allows me to make a lot of decisions on my own"; $\alpha = .92$), skill variety (3 items, e.g., "The job requires a variety of skills"; $\alpha = .90$), and social support (3 items, e.g., "I have the opportunity to develop close friendships in my job"; $\alpha = .91$; Morgeson & Humphrey, 2006). We assessed the factor structure of these measures using CFA, which revealed acceptable model fit ($\chi^2[80] = 187.27$, $p < .001$; CFI = .983; TLI = .978; RMSEA = .049; SRMR = .035).

The five work design variables were entered simultaneously through a multinomial logistic regression (i.e. R3STEP auxiliary command) to determine their relative association with one employee motivation profile versus another (Asparouhov & Muthén, 2014). The results of this analysis are included in Table S.6. Work design does contribute to motivation profile membership, as there are differences in job features for profiles 4 and 3 (*autonomous* and *highly motivated*) as compared to profiles 2 and 1 (*amotivated/external* and *amotivated*). The pattern of results suggests that less demands and more resources is associated with higher autonomous (i.e., identified and intrinsic) motivation. However, work design factors did not distinguish membership of the *autonomous* versus *highly motivated* profile, nor membership of the *amotivated* versus *amotivated/external* profile (expect for lower job autonomy for *amotivated* versus *amotivated/external* employees). Thus, it is not simply the case that autonomous employees have more energy because they are in better jobs, as the highly motivated employees are also in good jobs, and yet they do not enjoy all energy-related benefits that their autonomously motivated counterparts do. Similarly, it is not the case that amotivated employees are in the worse jobs, and this is why they experience the lowest levels of energy. Overall, *amotivated/external* employees also report more job demands and lower job resources, and at similar levels to those who are *amotivated*.

Table S.6. Work design variables as predictors of employee motivation profile membership.

Work Design	**Profile 1 vs 2 (R=1)**		**Profile 1 vs 3 (R=1)**		**Profile 1 vs 4 (R=1)**	
	Coefficient(SE)	OR	Coefficient(SE)	OR	Coefficient(SE)	OR
Workload Dem.	0.35(0.24)	1.42	0.65(0.24)**	1.91	0.59(0.24)*	1.81
Emotional Dem.	-0.07(0.26)	0.93	-0.69(0.27)*	0.50	-0.77(0.28)**	0.46
Job Autonomy	0.57(0.26)*	1.77	0.87(0.28)**	2.39	1.33(0.31)***	3.76
Skill Variety	0.15(0.29)	1.16	0.95(0.31)**	2.58	0.57(0.32)	1.77
Social Support	0.00(0.19)	1.00	0.47(0.22)*	1.60	0.49(0.21)*	1.63
	Profile 2 vs 3 (R=2)		**Profile 2 vs 4 (R=2)**		**Profile 3 vs 4 (R=3)**	
	Coefficient(SE)	OR	Coefficient(SE)	OR	Coefficient(SE)	OR
Workload Dem.	0.30(0.17)	1.35	0.24(0.17)	1.28	-0.05(0.14)	0.95
Emotional Dem.	-0.62(0.18)***	0.54	-0.70(0.18)***	0.50	-0.08(0.16)	0.92
Job Autonomy	0.30(0.19)	1.35	0.76(0.21)***	2.13	0.46(0.23)	1.58
Skill Variety	0.80(0.21)***	2.22	0.42(0.21)*	1.52	-0.38(0.22)	0.69
Social Support	0.47(0.17)**	1.60	0.49(0.15)**	1.63	0.02(0.17)	1.09

Notes. (N = 551); R = reference profile; SE = standard error of the coefficient; OR = odds ratio; Dem = Demands; Profile 1 = Amotivated; Profile 2 = Amotivated/External; Profile 3 = Highly Motivated; Profile 4 = Autonomous; **p* < .05, ***p* < .01, *** *p* < .001.

Time 2 Employee Motivation Profiles

The Time 2 survey provided an opportunity to re-assess employee motivation and our profile solution with new data. Prior to conducting profile enumeration, we first assessed the factor structure of the MWMS at Time 2. Encouragingly, the measure demonstrated acceptable fit (χ^2[136] = 456.28, $p < .001$; CFI = .940; TLI = .925; RMSEA = .078; SRMR = .078) and reliabilities (αs > .71). At Time 2, we followed the same profile enumeration procedures as reported in the manuscript. Table S.7 summarizes the profile enumeration and Figure S.1 displays the profiles, which replicate our initial four-profile solution from Time 1. We also evaluated the hypothesized relationships between profiles and energy-related outcomes at Time 2. Table S.8 and Figures S.2 and S.3 summarize the Time 2 outcome analysis. As can be seen, most of the same cross-sectional effects observed at Time 1 also replicated cross-sectionally in the Time 2 data.

Table S.7 *Time 2 Employee Motivation Profile Enumeration*.

	Log Likelihood	***#fp***	**AIC**	**BIC**	**SABIC**	**LMR**	**BLRT**	**Entropy**
1 Profile	-3325.83	12	6675.65	6723.28	6685.20	N/A	N/A	N/A
2 Profiles	-3054.93	19	6147.87	6223.27	6162.99	<.001	<.001	0.90
3 Profiles	-2952.78	26	5957.55	6060.74	5978.24	<.05	<.001	0.84
4 Profiles	-2891.79	33	5849.59	5980.55	5875.85	<.001	<.001	0.82
5 Profiles	-2853.24	40	5786.48	5945.23	5818.31	0.47	<.001	0.83
6 Profiles	-2821.26	47	5736.52	5923.05	5773.92	<.05	<.001	0.83
7 Profiles	-2798.37	54	5704.73	5919.04	5747.70	0.47	<.001	0.83
8 Profiles	-2774.49	61	5670.99	5913.08	5719.53	0.32	<.001	0.84

Notes. *N=391*. #fp = number of free parameters; AIC = Akaike information criteria; BIC = Bayesian information criteria; SABIC = sample-size adjusted BIC; LMR = Lo, Mendell, and Rubin test; BLRT = bootstrapped log-likelihood ratio test.

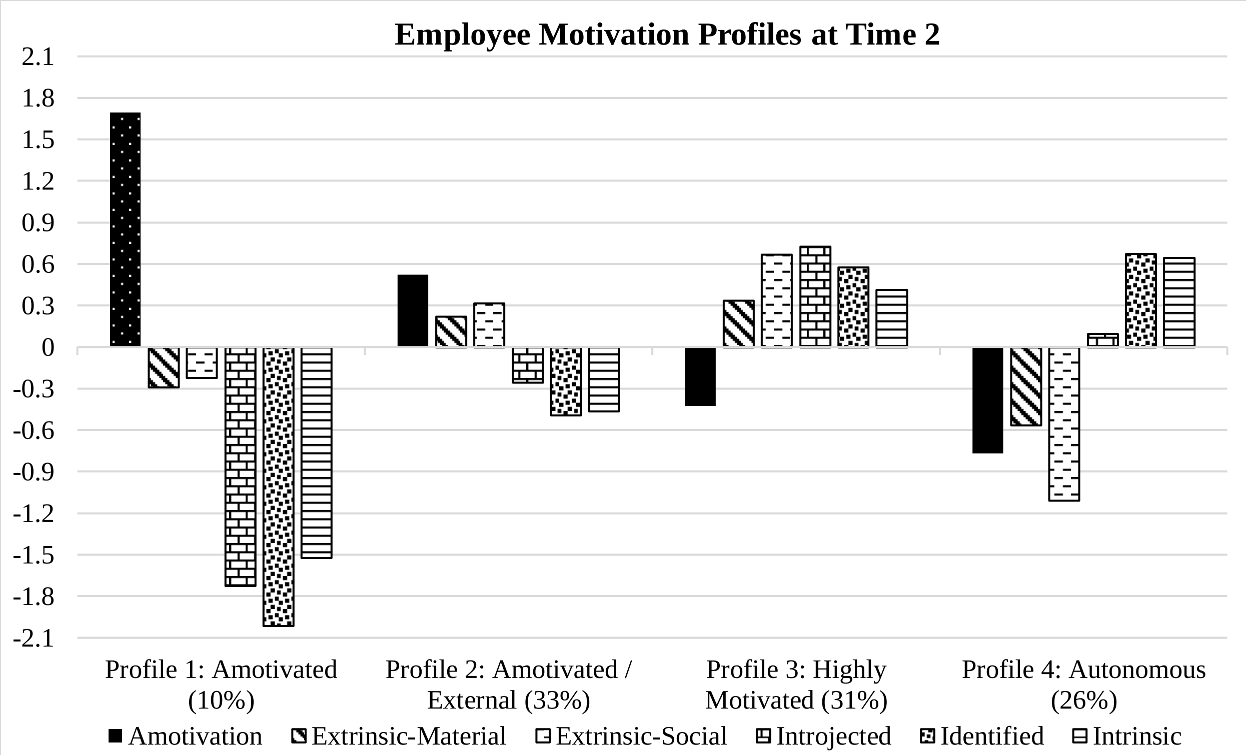

Figure S.1 Four-factor employee motivation profiles solution (*N* = 391). *Note.* Indicators are estimated from factor scores with a mean of 0 and standard deviation of 1.

Table S.8. *Time 2 motivation profiles and Time 2 energy approaches and energy levels as outcomes: Latent profile means, standard errors and Wald chi-square test of mean equality comparisons.*

Outcome Variable	**Standardized profile means (SE)**				**Profile comparisons (X^2)**						
	Amotivated (Profile1)	Amotivated/ External (Profile2)	Highly Motivated (Profile 3)	Autonomous (Profile 4)	1 vs 2	1 vs 3	1 vs 4	2 vs 3	2 vs 4	3 vs 4	**Overall X^2**
Vigor	-1.21(0.16)	-0.34(0.10)	0.18(0.14)	0.68(0.18)	19.80***	44.01***	62.57***	7.30**	24.82***	2.93	109.28***
Exhaustion	0.79(0.17)	0.24(0.10)	-0.02(0.09)	-0.57(0.12)	7.01**	18.65***	44.64***	3.05	26.81***	11.40***	56.84***
Need for Recovery	0.50(0.16)	0.18(0.09)	0.15(0.10)	-0.59(0.12)	2.58	3.38	28.62***	0.04	24.36***	19.06***	38.27***
Work-Related Strategies	-0.83(0.20)	-0.28(0.11)	0.43(0.20)	0.15(0.16)	5.59*	21.72***	14.38***	7.10**	6.86**	0.73	37.63***
Micro-Breaks	-0.07(0.17)	0.27(0.10)	0.02(0.11)	-0.33(0.10)	2.93	0.21	1.82	2.54	17.65***	4.94*	17.75***
Detachment	0.04(0.17)	0.31(0.09)	-0.41(0.11)	0.11(0.12)	1.86	5.09*	0.10	22.69***	1.72	8.45**	22.90***
Relaxation	0.20(0.18)	0.07(0.09)	-0.25(0.12)	0.15(0.11)	0.39	4.21*	0.07	4.04*	0.29	4.57*	6.27
Mastery	-0.24(0.20)	0.09(0.10)	-0.06(0.10)	0.06(0.10)	2.00	0.63	1.67	0.91	0.05	0.51	2.45

Notes. Indicators are estimate from scores with a mean of 0 and a standard deviation of 1 (*N* = 391). **p* < .05, ***p* < .01, *** *p* < .001.

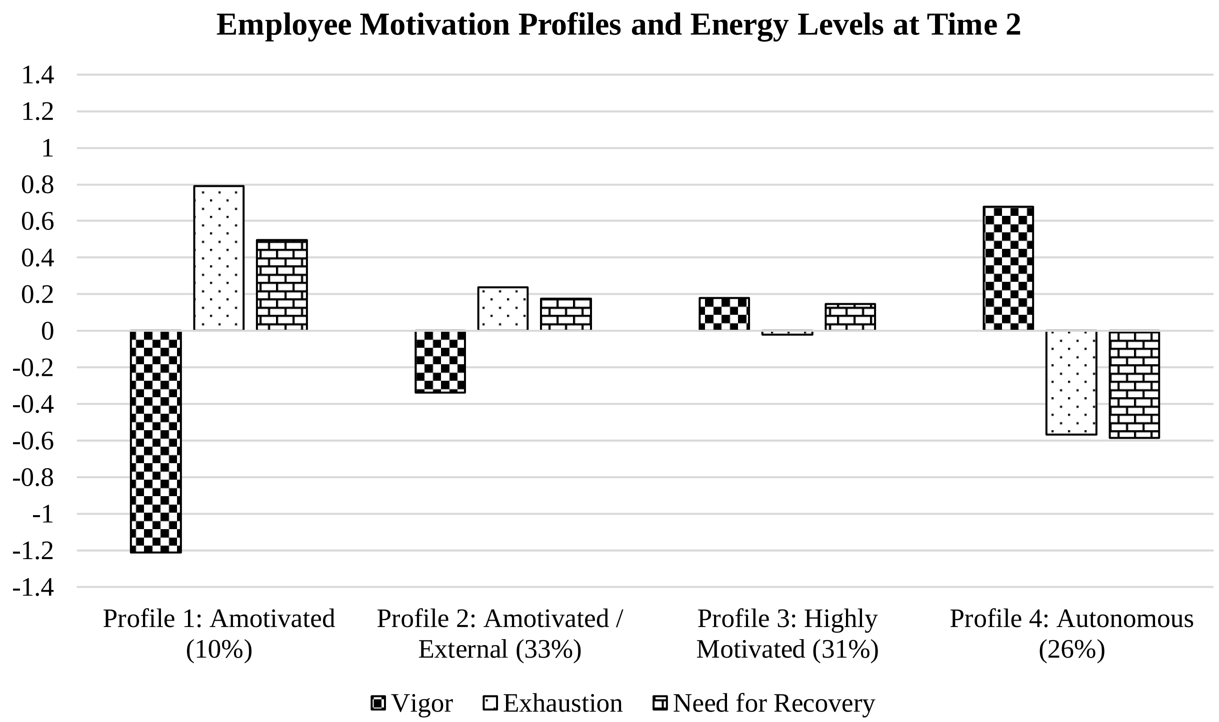

Figure S.2. Energy levels associated with employee motivation profile membership (Time 2; *N* = 391).
Note. Indicators are estimated from factor scores with a mean of 0 and standard deviation of 1.

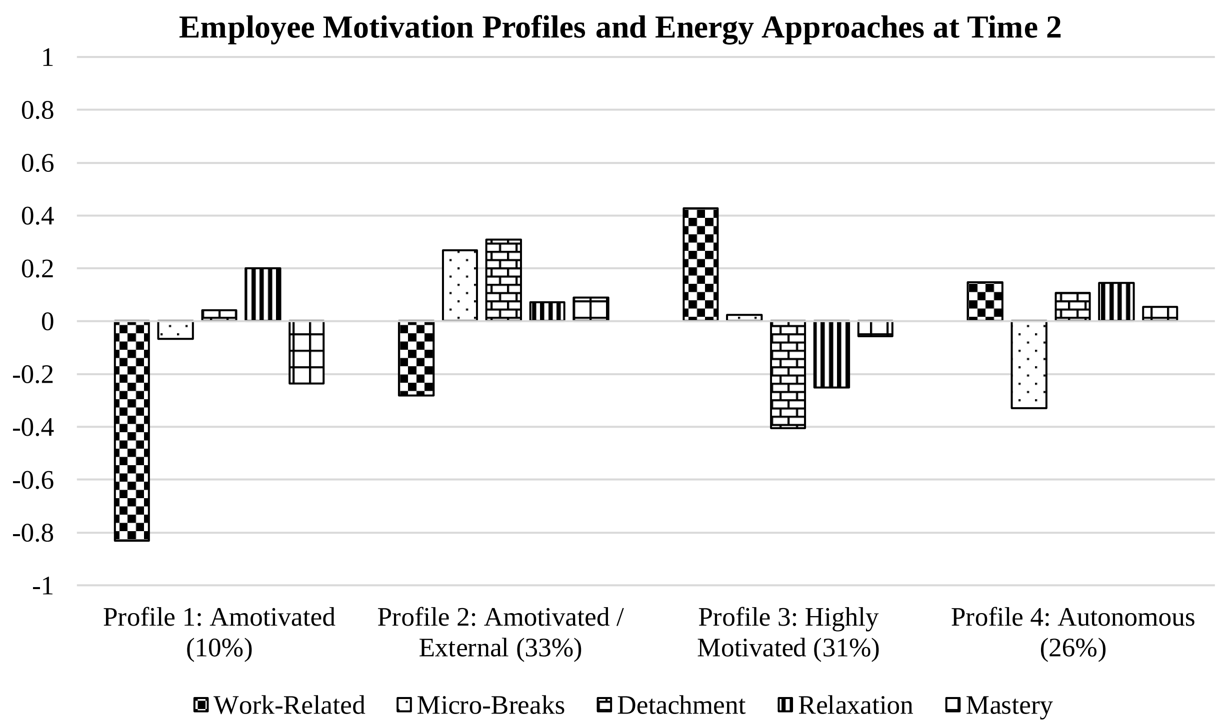

Figure S.3. Energy approaches associated with employee motivation profile membership (Time 2; *N* = 391).
Note. Indicators are estimated from factor scores with a mean of 0 and standard deviation of 1.

Predicting Profile Membership from Energy Levels

We also used our Time 2 data to investigate the potential for reverse causation, that is, energy levels at Time 1 predicting profile membership by Time 2. As per the table below, there were 6 significant effects out of a possible 18 (33.33%), with most effects pertaining to vigor levels at Time 1 predicting differences in profile membership at Time 2. Thus, overall, more support was found for the pathway from motivation profiles at Time 1 to energy levels at Time 2 (i.e., 66.67% of possible effects), rather than from energy levels at Time 1 to motivation profiles by Time 2 (i.e., 33.33% of possible effects).

Table S.9. Time 1 energy levels as predictors of Time 2 employee motivation profile membership.

Energy Levels	**Profile 1 vs 2 (R=1)**		**Profile 1 vs 3 (R=1)**		**Profile 1 vs 4 (R=1)**	
	Coefficient(SE)	OR	Coefficient(SE)	OR	Coefficient(SE)	OR
T1 Vigor	0.19(0.17)	1.21	0.71(0.20)***	2.04	0.62(0.20)***	1.86
T1 Exhaustion	-0.22(0.21)	0.80	-0.46(0.22)*	0.63	-0.49(0.24)*	0.61
T1 Need for Recovery	-0.08(0.21)	0.93	0.17(0.23)	1.19	-0.16(0.24)	0.85
	Profile 2 vs 3 (R=2)		**Profile 2 vs 4 (R=2)**		**Profile 3 vs 4 (R=3)**	
	Coefficient(SE)	OR	Coefficient(SE)	OR	Coefficient(SE)	OR
T1 Vigor	0.52(0.15)***	1.68	0.42(0.14)***	1.53	-0.09(0.18)	0.91
T1 Exhaustion	-0.24(0.14)	0.79	-0.27(0.15)	0.77	-0.03(0.16)	0.97
T1 Need for Recovery	0.25(0.15)	1.28	-0.09(0.15)	0.92	-0.33(0.18)	0.72

Notes. (N = 391); R = reference profile; SE = standard error of the coefficient; OR = odds ratio; Profile 1 = Amotivated; Profile 2 = Amotivated/External; Profile 3 = Highly Motivated; Profile 4 = Autonomous; *p < .05, **p < .01, *** p < .001.

Additional References (not included in the manuscript)

Caplan, R. D., & Jones, K. W. (1975). Effects of work load, role ambiguity, and type A personality on anxiety, depression, and heart rate. *Journal of Applied Psychology, 60,* 6, 713–719. doi:10.1037/0021-9010.60.6.713

Morgeson, F.P., & Humphrey, S.E. (2006). The work design questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of Applied Psychology, 91*, 6 1321-1339. doi: 10.1037/0021-9010.91.6.1321

Van Veldhoven, M., & Meijman, T. (1994) *Het meten van psychosociale arbeidsbelasting met een vragenlijst. De Vragenlijst Beleving en Beoordeling van de Arbeid (VBBA)*. Amsterdam: NIA, 1994.