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Investigating the Combined Effects of Workaholism and Work Engagement: A Substantive-Methodological Synergy of Variable-Centered and Person-Centered Methodologies

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Funding: The second author was supported by a grant from the Social Science and Humanity Research Council of Canada (435-2018-0368) in the preparation of this manuscript.

This is the prepublication version of the following manuscript:

Gillet, N., Morin, A. J. S., Sandrin, E., & Houle, S. (in press). Investigating the Combined Effects of Workaholism and Work Engagement: A Substantive-Methodological Synergy of Variable-Centered and Person-Centered Methodologies. *Journal of Vocational Behavior*. doi: 10.1016/j.jvb.2018.09.006

Abstract

The present series of three independent studies examines how workaholism and work engagement combine relying on a variety of distinct methodologies: interaction effects (Study 1, n = 160), a person-centered approach (Study 2, including two samples of n = 321 and 332), and a hybrid mixture regression approach (Study 3, n = 283). This research also documents the relations between workaholism, work engagement, and work outcomes (i.e., work-family conflicts, work performance, sleeping difficulties, and burnout). Furthermore, this research investigates the role of workload (Studies 2 and 3) and perceived social support (Study 2) in the prediction of profile membership. Studies 1 and 2 showed that that the combination of high levels of work engagement with high levels of workaholism was associated with a variety of negative outcomes. In Study 3, the highest levels of sleeping difficulties and work-family conflicts were associated with the workaholic profile, followed by the engaged-workaholic profile, and finally the engaged profile. Finally, in Studies 2 and 3, workload showed strong associations with an increased likelihood of membership into the profiles characterized by higher levels of workaholism.

Keywords: work engagement; workaholism; latent profile analyses; interactions; ill-being.

Work engagement and workaholism have received, in isolation or combination, a fair amount of scientific attention (Birkeland & Buch, 2015). Still, little is known about the impact of their interactions, or combinations within specific employees, in the prediction of work outcomes. Yet, the importance of considering their combined impact has oftentimes been highlighted. For instance, Stoeber and Damian (2016) proposed that the deleterious effects of workaholism could be compensated by the presence of work engagement. Similarly, van Beek, Taris, and Schaufeli (2011) emphasized the need to differentiate between at least three distinct types of hard-working employees: engaged, workaholics, and engaged-workaholics. Furthermore, research has started to examine how workaholism and work engagement combine within specific individuals, and the impact of these combinations (Innanen, Tolvanen, & Salmela-Aro, 2014; Mäkikangas, Schaufeli, Tolvanen, & Feldt, 2013). Nevertheless, the need for more person-oriented studies in order to obtain a clearer picture of the most common configurations of work engagement and workaholism, as well as of their antecedents and consequences, has also been highlighted (Upadyaya, Vartiainen, & Salmela-Aro, 2016; van Beek et al., 2011).

The present research thus seeks to contribute to our understanding of the combined effects of workaholism and work engagement by: (1) Examining how these two constructs interact (Study 1) in the prediction of work outcomes (i.e., sleeping difficulties, work-family conflicts, burnout, and work performance); (2) examining the naturally occurring configurations, or profiles, of these two constructs, their relations with the same work outcomes, and the extent to which these configurations and relations can be generalized across two independent samples of employees (Study 2); (3) examining whether residual relations between these two constructs and work outcomes remain once employees' profiles are taken into account, and the extent to which these residual relations differ as a function of profile membership (i.e., are moderated by profile membership; Study 3); and (4) examining the role of workload and perceptions of social support in the prediction of profile membership (Studies 2-3).

This research is a substantive methodological-synergy (Marsh & Hau, 2007) in which evolving statistical approaches are applied to this substantively important research question through a series of three distinct studies. As such, it has broad relevance to the organizational sciences by providing an illustration of the variety of complementary variable-centered (i.e., latent interactions), person-centered (i.e., latent profile analyses; LPA), and hybrid (i.e., mixture regressions) approaches that can be used to investigate the combined effects of psychological characteristics in the prediction of work outcomes. Just like in the analogy of the blind person having to touch the different parts of an elephant in order to be able to identify it as an elephant (rather than as a snake, a tree trunk, etc.), we seek to illustrate how these approaches can be used to obtained differentiated, and yet complementary, views of the same underlying phenomenon.

Workaholism

Oates (1971, p. 1) defined workaholism as "the compulsion or the uncontrollable need to work incessantly", to which Machlowitz (1980) added that workaholics tend to allocate as much time as they can to their work. Workaholism thus encompass two distinct, yet complementary, components (Schaufeli, Bakker, van der Heijden, & Prins, 2009; Schaufeli, Shimazu, & Taris, 2009): (a) working excessively: A behavioral component (i.e., being hardworking, spending a great deal of time in work activities, neglecting other spheres of life), and (b) working compulsively: A cognitive component (i.e., being obsessed with work, thinking compulsively about work). It follows that workaholism cannot be reduced to either of these components (Clark, Michel, Zhdanova, Pui, & Baltes, 2016). However, many studies have shown these components to be moderately to strongly interrelated (Hakanen, Peeters, & Schaufeli, 2018), calling into question whether they reflect distinct dimensions rather than complementary components of a global overarching construct (Birkeland & Buch, 2015; Gillet, Morin, Cougot, & Gagné, 2017). Although some have considered workaholism to be desirable (Baruch, 2011), recent studies (Clark et al., 2016) showed that it tends to be associated with a variety of negative outcomes such as sleeping difficulties (Salanova et al., 2016), work-family conflicts (Taris, Schaufeli, & Verhoeven, 2005), and burnout (Schaufeli, Bakker et al., 2009). In this research, we rely on a representation of workaholism as a global overarching dimension encompassing specific ratings of working excessively and compulsively, which is more aligned with our objective of assessing relations between constructs rather than looking at the internal structure of a specific construct. This is also in line with recent studies (Gillet, Morin et al., 2017; Huyghebaert et al., 2018) revealing high correlations ($r > .75$) between these specific components and workaholism profiles characterized by matching levels of excessive and compulsive work.

Work Engagement

Work engagement is "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli, Salanova, González-Roma, & Bakker, 2002, p. 74). Engaged workers possess high levels of energy, work hard, and tend to be involved and happily absorbed in their work (Hakanen et al., 2018). Despite the recognition that work engagement involves vigor, dedication, and absorption, the high correlations among these specific components (Hakanen & Peeters, 2015; Mäkikangas et al., 2013) calls into question their existence as separate dimensions and suggest that they may reflect an overarching global construct (Upadyaya et al., 2016; van Beek et al., 2011). Moreover, a recent 3-item version of the Utrecht Work Engagement Scale has been proposed by Schaufeli, Shimazu, Hakanen, Salanova, and De Witte (2018) on the basis of an emerging unidimensional operationalization of work engagement. Thus, and in accordance with our representation of workaholism, we rely on a representation of work engagement as a global construct encompassing specific ratings of vigor, dedication, and absorption. Research has supported the predictive validity of work engagement in relation to higher levels of performance (Hakanen, Schaufeli, & Ahola, 2008) and psychological and physical health (Seppälä et al., 2012), as well as lower levels of work-family conflicts (Babic, Stinglhamber, Bertrand, & Hansez, 2017) and sleeping difficulties (Reis, Arndt, Lischetzke, & Hoppe, 2016).

Workaholism and Work Engagement: Distinct Constructs

Whereas work engagement and workaholism are both characterized by a high level of activation, workaholics work hard due to a strong inner drive that is impossible to repress and anchored in guilt and self-imposed pressure, whereas engaged employees work hard because they find their job pleasurable and satisfying (Schaufeli, 2016). As such, work engagement is seen as involving both arousal and pleasure, whereas workaholism rather involves arousal and displeasure (Schaufeli et al., 2018). Indeed, Salanova, Del Libano, Llorens, and Schaufeli (2014) showed that engaged employees scored high on energy, pleasure, challenge, efficacy, and identification, while workaholic employees had high levels of energy, challenge, efficacy, and identification, but low levels of pleasure. Workaholism can be seen as an addiction to work (Schaufeli, Shimazu, & Taris, 2009; Spence & Robbins, 1992). Even more than engaged workers, workaholics invest time and energy at work, and keep on doing so regardless of whether they fail or succeed, whether their work interferes with their private lives (Hakanen & Peeters, 2015), and whether their physical and psychological health is altered as a result (Shimazu, Schaufeli, & Taris, 2010).

From the perspective of the conservation of resources theory (Hobfoll, 1989), which sees available material and psychological resources as limited and stress as emerging from the true or perceived loss of resources, this extreme level of work involvement characteristic of workaholic employees can be seen as leaving them with far fewer resources to devote to their family, other life activities, and social relations. In contrast, engaged employees are simply passionate about work, and free to enjoy other activities (Bakker Albrecht, & Leiter, 2011). This energizing nature of work engagement stands in stark contrast with the resource draining nature of workaholism. Furthermore, the work engagement research literature identifies a close link between the availability of organizational (e.g., social support) or personal (e.g. self-efficacy) resources and work engagement (Bakker & Demerouti, 2007), leading to a resource accretion process through which resources lead to engagement, which further energized employees into better participating into other work and life roles (e.g., Bakker, Westman, & Emmerik, 2009). In contrast, a lack of resources may lead employees to overcompensate via workaholism (Clark et al., 2016), leading to a downward spiral of resource erosion. In sum, although both constructs involve a strong investment (Schaufeli, 2016), the mindsets, motives, and processes underlying this investment differ across constructs (Hakanen & Peeters, 2015; Schaufeli, Shimazu, & Taris, 2009). Thus, work engagement is seen as being primarily motivated by autonomous motivation (engaging in an activity out of pleasure and/or volition and choice), while workaholism rather appears to be primarily motivated by controlled motivation (engaging in an activity for internal or external pressures; see Ryan & Deci, 2017).

Supporting the idea that constructs of workaholism and work engagement are distinct from one another, Hakanen et al. (2018) failed to find evidence of longitudinal relations between these constructs, while work engagement at Time 1 positively predicted job satisfaction at Time 2 and workaholism at Time 1 positively predicted burnout at Time 2. In addition, a recent meta-analysis only reported a small positive correlation (r = .05) between workaholism and work engagement (Clark et al., 2016). Numerous studies have also demonstrated the differentiated effects of workaholism and work engagement on a variety of work outcomes. Workaholism is associated with lower levels of job and life satisfaction, poorer social relationships outside of work, and higher levels of stress, strain, ill-health, and burnout, whereas opposite relations have been

identified for work engagement (Caesens, Stinglhamber, & Luypaert, 2014; Taris et al., 2005). Workaholics are less likely to recover sufficiently from work, leading to higher levels of burnout (Oerlemans & Bakker, 2014), making engaged employees, who work as hard, most valuable for companies (van Beek et al., 2011). Not surprisingly, workaholism is also associated with work-family conflicts (Hakanen & Peeters, 2015; Taris et al., 2005), whereas work engagement has a positive relation with work-family facilitation and family satisfaction (Bakker, Shimazu, Demerouti, Shimada, & Kawakami, 2014).

Workaholism and Work Engagement: Combined Effects

Theoretical Considerations

Despite their distinct nature, both mindsets can also co-exist in hard-working employees, who may experience an irresistible urge to get involved in pleasurable work activities. The distinction between engaged employees and engaged workaholics maps well with the well-established distinction between harmonious (which can co-exists with other life's activities) and obsessive (which tends to be all-consuming) passions (Vallerand et al., 2003). Harmonious passion is associated with an autonomous internalization process (working for pleasure, volition, and choice), whereas obsessive passion is linked to a controlled internalization (working as a result of internal or external pressures; see Ryan & Deci, 2017).

Self-determination theory (SDT; Ryan & Deci, 2017) suggests that work engagement and workaholism may combine synergistically to predict positive outcomes. Like obsessively passionate workers, workaholics are driven by controlled motivation, while engaged employees, like harmoniously passionate workers, are driven by autonomous motivation. In contrast, engaged workaholics are driven by a combination of both (van Beek et al., 2011). For instance, Gillet, Becker, Lafrenière, Huart, and Fouquereau (2017) showed that employees characterized by high levels of autonomous motivation and moderate to high levels of controlled motivation presented the highest levels of positive affect. More generally, research suggests that autonomous motivation could buffer the deleterious effects of controlled motivation (Gillet, Fouquereau, Vallerand, Abraham, & Colombat, 2017; Howard, Gagné, Morin, & Van den Broeck, 2016). These findings lead us to expect that workaholism may not necessarily translate into negative outcomes among highly engaged workers.

In contrast, non-engaged workaholics simply do not appear to feel passionate about their work, rather displaying the typical characteristics of people struggling with an addiction. Workaholics devote time and energy to professional activities that they do not enjoy (Spence & Robbins, 1992) at the expense of their personal life and health. This obsession with work is also accompanied by work-related ruminations, which make it harder for them to properly recover from work (Huyghebaert et al., 2018; Sonnentag & Bayer, 2005). According to SDT, non-engaged workaholics should display a purer form of controlled motivation, which has been shown to be associated with a variety of negative outcomes when it is not accompanied by autonomous motivation (Howard et al., 2016).

The combination of workaholism and work engagement (engaged workaholics) thus seems more adaptive than workaholism on its own (non-engaged workaholics). In fact, the results reviewed so far suggest that work engagement may buffer employees against the negative effects of workaholism, so that engaged workaholics could possibly rely on workaholism as a way to maintain persistence in the face of challenge. Without such a buffer (i.e., non-engaged workaholics), then a variety of negative outcomes should be associated with workaholism. Still, a question that remains is whether pure engagement, not tainted by workaholism, would lead to more positive work outcomes than engaged-workaholism. Generally, research on the effects of autonomous motivation (Ryan & Deci, 2017) and harmonious passion (Vallerand et al., 2003) suggests that this might be the case.

Work Outcomes

The overarching goal of the present research is to investigate the combined effects of workaholism and work engagement on a variety of work-related outcomes using a variety of variable-centered (Study 1), person-centered (Study 2), and hybrid (Study 3) methodologies. To this end, we rely on a complementary set of work outcomes across all studies, which were selected in part based on the previously reported evidence showing that they tend to present significant, yet differentiated, associations with both employees' levels of workaholism and work engagement. Specifically, we focus on outcomes related to participants' social relationships (i.e., work-family conflicts), work behaviors (i.e., work performance), physical health (i.e., sleeping difficulties), and psychological health (i.e., burnout). These variables were selected because of their potential to encompass multiple dimensions of workers' psychological, social, behavioral and physical health and functioning, as well as because of their key role in the prediction of turnover and absenteeism (Cai et al., 2018; Gaudet, Tremblay, & Doucet, 2014; Nohe & Sonntag, 2014; Peretz, Levi, & Fried, 2015), two

outcomes known to carry significant costs for organizations (e.g., Mauno et al., 2015). The positioning of these variables as "outcomes" in the present research is based on the results from prior longitudinal studies which showed that workaholism and work engagement significantly predicted later levels of work-family conflicts, work performance, sleeping difficulties, and burnout, rather than the reverse (e.g., Hakanen et al., 2008, 2018; Huyghebaert et al., 2018). For instance, Huyghebaert et al. (2018) showed that initial levels of workaholism were positively related to later levels of work-family conflicts, while initial levels of work-family conflicts failed to predict later levels of workaholism. Likewise, Upadyaya et al. (2016) demonstrated that initial levels of work engagement were associated with lower levels of burnout at a later time point, while initial levels of burnout did not significantly predict later levels of work engagement.

Variable-Centered Analyses and Empirical Evidence

Two distinct analytical paradigms can be used to assess the joint effects of variable combinations. The first one involves variable-centered analyses, which are designed to assess how specific variables, in themselves and in interaction, relate to other variables. These analyses are able to specifically tests for the presence of interaction effects among variables, and thus to assess the possibility that the effects of workaholism could decrease as a function work engagement levels. We are aware of a single study that has relied on this approach to assess possible interaction effects among workaholism and work engagement. In this study, van Beek et al. (2011) showed that work engagement protected (buffered) employees against the effects of workaholism on burnout through the application of a 2 X 2 ANOVA based on groups created by the arbitrary dichotomization of workaholism and work engagement levels into high and low groups. A key limitation of this study stems from this arbitrary dichotomization of naturally continuous variables which may obscure potentially important effects occurring when more precise variations of scores are considered. Another limitation of this study is related to the reliance on scale scores (mean or sum of the items forming a scale), which are known to be tainted by measurement errors, whereas tests of interactions are known to be particularly sensitive to the presence of measurement errors (Marsh, Hau, Wen, Nagengast, & Morin, 2013). Study 1 was designed to address both of these limitations through the implementation of tests of latent interactions (i.e., corrected for measurement errors; Marsh et al., 2013) among continuously defined levels of workaholism and work engagement. On the basis of the aforementioned theoretical and empirical evidence, we propose the following hypotheses:

Hypothesis 1. Work engagement levels will be associated with more desirable outcome levels.

Hypothesis 2. Workaholism levels will be associated with less desirable outcome levels.

Hypothesis 3. Work engagement and workaholism will interact so that work engagement levels will protect employees against the undesirable effects of workaholism.

Variable-centered analyses themselves present only a partial view of the reality. Indeed, variable-centered analyses seek to assess relations among variables as they occur, on the average, in the sample under study, without considering the possibility that subpopulations might exist in this sample. Although tests of interactions provide a way to assess the extent to which the effects of one variable differ as a function of another variable, even these tests are limited in their assumption that this interactive effect would equally apply to everyone in the sample and could be impacted by the presence of subpopulations characterized by more extreme relations. In addition, tests of interactions rely on a linearity assumption according to which the effects of one variable varies in a linear manner as a function of the other one. Although polynomial models make it possible to incorporate non-linear terms (Edwards, 2009), these more complex models are harder to interpret, and typically unrealistic to apply in a latent variable framework due to their high level of computational complexity (Marsh et al., 2009).

Person-Centered Analyses and Empirical Evidence

Contrasting with variable-centered analyses, the person-centered paradigm seeks to identify subpopulations of employees characterized by distinct configurations, or profiles, on a set of variables. Person-centered analyses are thus naturally suited to the consideration of the joint effect of variable combinations. For instance, person-centered analyses could directly investigate combinations of workaholism and work engagement among distinct types of employees, and the relative consequences of these combinations. When compared to the group-based approach adopted by van Beek et al. (2011) for tests of interactions, a key advantage of the person-centered approach lies in its ability to identify naturally-occurring (i.e., non-arbitrary) subpopulations. In addition, this approach does not rely on linearity assumptions in the investigation of relations between employees' profiles and work outcomes.

It is interesting to note that the previously reported interaction study conducted by Van Beek et al. (2011) was in fact driven by a mainly person-centered theoretical framework which emphasized the importance of

differentiating among four types of workers: (a) workaholics, (b) engaged employees, (c) engaged workaholics, and (d) disengaged employees. Based on their dichotomization approach, these authors found that, although engaged workaholics worked slightly more hours per week on the average (40 hours), workaholics and engaged workers did not differ in terms of work hours (37 hours). Unlike workaholics, engaged workaholics did not experience the highest levels of burnout, supporting the buffering role of work engagement. Yet, the lowest levels of burnout were observed among engaged employees. Unfortunately, as noted above, this approach is unable to identify naturally occurring profiles, particularly profiles characterized by average levels (Morin, Morizot, Boudrias, & Madore, 2011).

Emerging person-centered studies have looked at naturally occurring profiles of employees. However, most of these studies have identified profiles based on the combination of workaholism, work engagement, and additional variables (burnout: Innanen et al., 2014; burnout and job satisfaction: Mäkikangas et al., 2015), making it impossible to isolate the combined effects of workaholism and work engagement net of these additional variables. Mäkikangas et al. (2015) identified four profiles characterized by essentially identical levels of workaholism. Innanen et al.'s (2014) results supported the existence of the engaged and workaholics profiles proposed by van Beek et al. (2011). Other investigations have also the potential to inform this question, despite their reliance on indirect measures of workaholism and work engagement. Thus, based on measures of energy, pleasure, challenge, skills, and identification, Salanova et al. (2014) identified two profiles matching the engaged and workaholic configurations, and found that engaged employees displayed the highest levels of competence, commitment, interest, and positive emotions.

So far, we were able to locate a single person-centered study directly focusing on naturally occurring combinations of workaholism and work engagement, and this study was, unfortunately, limited by its reliance on a sample of managers, which are unlikely to generalize to more "typical" samples of workers. In addition, Mäkikangas et al. (2013) only considered one outcome of the profiles (job change) and did not examine the role of organizational factors (e.g., workload, perceived organizational support) in the prediction of profile membership. They identified profiles of managers based on their longitudinal trajectories of workaholism and work engagement over two years. Their results revealed four distinct trajectories characterized by: (1) high engagement and low workaholism; (2) low increasing engagement and average decreasing workaholism; (3) low decreasing engagement and low workaholism; and (4) high engagement and average workaholism. This fourth profile was characterized by the highest levels of both engagement and workaholism, and associated with job change during the two-year study period. This last engaged-workaholic profile was also the largest, corresponding to 68% of the sample. Despite the fact that these results focus on longitudinal change, it is interesting to note that they support the four combinations proposed by van Beek et al. (2011). Study 2 was specifically designed to see whether the four profiles proposed by van Beek et al. (2011) would be identified across two independent samples of non-managerial workers, while considering a more extensive set of work outcomes:

Hypothesis 4. We expect the four profiles proposed by van Beek et al. (2011) to be identified in the two independent samples of workers: Engaged, workaholics, engaged workaholics, and disengaged.

Hypothesis 5. We expect the two profiles characterized by the highest levels of workaholism (workaholic and engaged-workaholic profiles) to be associated with less desirable outcomes than the engaged profile.

Hypothesis 6. We expect the engaged-workaholic profile to be associated with the most desirable outcomes, and the disengaged profile to be associated with the least desirable outcomes.

A Hybrid Framework

On the one hand, variable-centered analyses look at the effects of variables on other variables, without considering the possibility that these effects could differ across subpopulations of workers. On the other hand, typical person-centered analyses, such as LPA or cluster analyses (Meyer & Morin, 2016; Morin, 2016), look at subpopulations characterized by distinct variable configurations. More advanced forms of person centered analyses, such as mixture regression analyses, provide even more flexibility by seeking to identify subpopulations of workers among which relations among variables differ (Van Horn et al., 2009). Thus, rather than profiling participants on the basis of their configuration on multiple indicators, this method identifies subpopulations characterized by different relations among constructs. Recently, a hybrid mixture regression approach (e.g., Chénard-Poirier, Morin, & Boudrias, 2017; Meyer & Morin, 2016; Morin, 2016) has been proposed as a way to build bridges between variable- and person-centered analyses. In this approach, profiles are simultaneously defined based on the specific configuration of predictors that best characterized the profile members, while also allowing relations between the predictors and outcomes to

differ across profiles. Such hybrid models are specifically designed to reveal complex interactions among predictors, resulting in profiles in which the relations among constructs may differ (i.e., be moderated) as a function of predictors' levels (e.g., Bauer, 2005). When compared to tests of latent interactions, this approach has the advantage of taking into account the relative size of the subpopulations characterized by different relations among constructs, and of not assuming that changes in the magnitude of the relations will differ in a linear manner as a function of predictors' levels. When compared to LPA, this approach has the advantage of considering the possibility that the associations between predictors and outcomes can change (i.e., moderated) as a function of profile membership.

More precisely, this hybrid approach provides a way to disaggregate the relations observed between the predictors (workaholism and work engagement) and outcomes into two distinct components (Chénard-Poirier et al., 2017). The first component occurs at the between-profile level, and is similar to the types of associations between profile membership and outcomes levels identified in more classical person-centered analyses. By comparing profiles defined based on the configuration of predictors (workaholism and work engagement) and outcomes (regression intercepts), it is possible to identify the global shape of the relation occurring at the between-profile level between the average levels of predictors and the average levels of outcomes. The second component occurs at the within-profile level. This component directly tests for the presence of any residual association between the predictors and the outcomes not already explained at the between-profile level (i.e., whether within-profile variations in predictors further contribute to the prediction of within-profile variations in outcomes). Whenever such residual within-profile associations are found to exist, the hybrid mixture regression approach also explicitly allows them to differ across profiles, thus proving a direct test of whether these associations are moderated by profile membership. To our knowledge, neither the classical mixture regression approach, nor the hybrid approach has ever been applied to the study of workohalism and/or work engagement. Study 3 was specifically designed to assess whether the profiles identified in Study 2 would be replicated using this more flexible approach on a new independent sample of employees. Based on the assumption that workaholism and work engagement represent a core mechanism underpinning profile formation, we propose the following hypotheses:

Hypothesis 7. We expect profiles characterized by a configuration of workaholism and work engagement similar to those identified in Study 2 in this new independent sample of workers and using this distinct hybrid methodology, and thus matching Hypothesis 4.

Hypothesis 8. Using this distinct hybrid methodology, we expect to identify between-profile associations between the predictors and the outcomes matching those identified in Study 2 and described in Hypotheses 5 and 6.

Research Questions. Lacking prior guidance, we leave as open research questions whether residual within-profile relations would be identified between workaholism, work engagement, and the outcomes (Research Question 1), and whether profile membership will moderate these relations (Research Question 2).

Job Demands and Resources

A key advantage of the person-centered approach is the ability to consider possible predictors of profile membership. Although variable-centered analyses could easily consider the role of different variables in the prediction of workaholism and work engagement, the role of these predictors cannot be extended to the interaction term. In contrast, predictors of profile membership reflecting different configurations of workaholism and work engagement can easily be incorporated to person-centered or hybrid analyses. Interestingly, the ability to identify key organizational variables related to profile membership is likely to importantly increase the practical value of person-centered analyses by suggesting possible intervention targets to support or limit the emergence of specific employees' profiles. In the present research, we more specifically consider workload (Studies 2 and 3) and social support (Study 2: Sample 2) because these variables have previously been shown to be related to workaholism and work engagement (Crawford, LePine, & Rich, 2010; Gillet, Morin et al., 2017; Mäkikangas et al., 2013).

The job demands-resources model (Bakker & Demerouti, 2007) classifies job characteristics in two general categories, job demands and job resources, providing an overarching model applicable to any work context. Job demands, such as workload, refer to those aspects of a job that require sustained physical and/or psychological effort and are assumed to be associated with a variety of physiological and/or psychological costs. In contrast, job resources, such as social support, help employees to achieve work-related goals, thus helping to balance the costs associated with job demands and stimulating personal development. Research has supported the idea that job demands and resources were significant determinants of workaholism

(Huyghebaert et al., 2018) and work engagement (Hakanen et al., 2008) considered separately. Likewise, Schaufeli, Bakker et al. (2009) tested the relations between job demands (e.g., work overload) and resources (e.g., social support from colleagues), and workaholism profiles. Their results showed that higher levels of job demands and lower levels of job resources predicted a higher likelihood of membership into a profile characterized by high levels of workaholism. Similarly, Upadyaya et al. (2016) showed that high levels of job demands were associated with low levels of work engagement, while job resources were positively related to work engagement (also see Caesens et al., 2014).

As a core form of job demands, excessive workload tends to impede workers' capacity to psychologically detach from their work once the day is over (Sonnentag & Bayer, 2005). Yet, workaholism and work engagement are also strongly linked to a lack of psychological detachment (Van Wijhe, Peeters, Schaufeli, & Ouweneel, 2013), and recent research suggests that overcommitment may mediate the relation between high workload and poor psychological detachment (Potok & Littman-Ovadia, 2014). High workload could thus reinforce employees' tendencies to over-invest time and efforts at work, in turn inhibiting their ability to mentally switch off from work (Huyghebaert et al., 2018). It is noteworthy that workload is more strongly related to workaholism than work engagement (Gorgievski, Moriano, & Bakker, 2014) and that work engagement may even be negatively related to workload (Upadaya et al., 2016). Based on these considerations, we hypothesized that:

Hypothesis 9. Higher workload perceptions would predict a higher likelihood of membership into the two profiles characterized by the highest levels of workaholism (workaholic and engaged-workaholic profiles) relative to the two other profiles (engaged and disengaged), as well as a higher likelihood of membership into the workaholic profile relative to the engaged-workaholic one.

According to the conservation of resources theory, social support at work, which can stem from a variety of sources (e.g., colleagues, supervisor, organization), is a powerful resource to help maintain employees' well-being (Hobfoll, 1989) and their ability to manage job demands effectively (Spurk, Hirschi, & Kauffeld, 2016). Generally, research tends to show that workers who feel supported at work tend to display higher levels of work engagement (e.g., Caesens et al., 2014), while being less likely to rely on destructive forms of overinvestment (e.g., workaholism) (Spurk et al., 2016) or to feel pressured to work extra hours (Mazzetti et al., 2016). Similarly, Gillet, Morin et al. (2017) recently showed that workers' perceptions of colleagues support predicted a higher likelihood of membership into a profile characterized by low levels of workaholism relative to profiles characterized by moderate to high levels of workaholism. Although we were not able to incorporate measures of social support across all studies, we were fortunate enough to capitalize on a favorable data collection context allowing us to incorporate measures of employee's perceptions of the social support received from their colleagues, supervisors, and organization to the second sample of Study 2, allowing us to test the following hypothesis:

Hypothesis 10. Higher social support perceptions from all three sources (colleagues, supervisors, and organization) would predict a higher likelihood of membership into the profile characterized by low levels of workaholism and high levels of work engagement (engaged), as well as into the engaged-workaholic profile relative to the workaholic one.

Study 1

Study 1 focuses on possible interactions between workaholism and work engagement in the prediction of sleeping difficulties, work-family conflicts, burnout, and work performance. Based on the research evidence reviewed so far, in which work engagement was positioned as a generally positive form of work involvement driven by autonomous motivation and pleasure, we hypothesized (Hypothesis 1) positive associations between work engagement levels and more desirable levels of work outcomes (higher levels of performance, and lower levels of work-family conflicts, sleeping difficulties, and burnout). In contrast, workaholism has generally been presented as a form of work addiction driven by controlled motivation, displeasure, guilt, and self-imposed pressure, leading us to expect (Hypothesis 2) positive associations between workaholism levels and less desirable levels of work outcomes (lower levels of performance, and higher levels of work-family conflicts, sleeping difficulties, and burnout). Finally, employees characterized by both workaholism and work engagement are seen as being driven by a combination of autonomous and controlled motivation, and previous research has generally tended to support the idea that autonomous motivation could buffer the deleterious effects of controlled motivation (Gillet, Fouquereau et al., 2017; Howard et al., 2016). Based on these considerations and on van Beek et al.'s (2011) results, we hypothesized that significant interactions would be identified showing that work engagement would protect employees against the undesirable effects of workaholism (Hypothesis 3).

Method

Participants and Procedure

A total of 160 nurses (95% women) working in public hospitals in France took part in a 15-minute online survey. Before completing the questionnaire, participants read a cover letter explaining the purposes of the study and signed a consent form stressing the anonymous and voluntary nature of participation. Respondents were aged between 21 and 60 years (*M* = 31.26) and had an average organizational tenure of 4.91 years (*SD* = 6.15). A total of 135 participants worked full-time (84.4%), 107 were permanent workers (66.9%), and 53 were temporary workers (33.1%).

Measures

Workaholism. Working compulsively (five items, α = .70; e.g., "I feel that there is something inside me that drives me to work hard") and excessively (five items, α = .78; e.g., "I find myself continuing to work after my co-workers have called it quits") were measured with the Dutch Workaholism Scale (Schaufeli, Shimazu, & Taris, 2009). Items were rated on a 7-point scale ranging from 1 (never) to 7 (always) and used to assess a single global construct (α = .84; Birkeland & Buch, 2015).

Work engagement. Work engagement was assessed using the nine-item Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2006): three items for vigor (α = .82; e.g., "At my work, I feel bursting with energy"), three items for dedication (α = .82; e.g., "I am enthusiastic about my job"), and three items for absorption (α = .77; e.g., "I feel happy when I am working intensely"). A global score of work engagement (α = .88; Upadyaya et al., 2016) was also computed.

Sleeping difficulties. Four items (α = .87' e.g., "difficulty staying asleep") were used to assess sleep problems during the last month (Jenkins, Stanton, Niemcryk, & Rose, 1988). Each item was rated on a six-point scale ranging from not at all (1) to 22 to 31 days (6).

Work-family conflicts. Three items were used to assess the possible interference of work obligations in family life (α = .83; e.g., "My work schedule makes it difficult for me to fulfill my domestic obligations?"; Huyghebaert et al., 2018) rated on a 7-point scale (1 - totally disagree to 7 - totally agree).

Burnout. Burnout was assessed with a five-item version (α = .93; e.g., "I feel emotionally drained by my work") of the emotional exhaustion scale of the Maslach Burnout Inventory-General Survey (Schaufeli, Leiter, Maslach, & Jackson, 1996). Items were rated on a 1 (strongly disagree) to 5 (strongly agree) scale.

Work performance. Performance was assessed with a single item asking workers to rate their work performance over the past four weeks (Kessler et al., 2003). Responses were made on a scale from 0 to 10 where 0 is the worst work performance anyone could have and 10 is the performance of a top worker.

Analyses

All studies considered in this article rely on identical measures of workaholism and work engagement. Similarly, all studies rely on computer-intensive analytical models in which the reliance on fully latent constructs (estimated at the item level) tends to be associated with convergence problems. This is unfortunate, given the ability of latent variable models to estimate latent constructs corrected for measurement errors. Thus, rather than using scale scores for our measures of workaholism and work engagement, analyses relied on factor scores (estimated in standardized units with *M* = 0, *SD* = 1) saved from preliminary measurement models. For each of these constructs, the measurement model was estimated using bifactor confirmatory factor analysis (Reise, 2012), allowing us to estimate global levels of workaholism and work engagement while accounting for subscales specificity. Only scores on these global factors are used in the present series of studies. To ensure comparability in the measures across the three studies and the two samples used in Study 2, these factors scores were saved from measurement models that were specified as invariant across all four samples. Although factor scores do not explicitly control for measurement errors the way latent variables do, they do provide a partial control for measurement errors (Skrondal & Laake, 2001). Furthermore, factors scores are able to preserve the nature of the underlying measurement structure (e.g., invariance) better than scale scores (for discussions of the advantages of factor scores, see Morin, Boudrias, Marsh, Madore, & Desrumaux, 2016; Morin, Meyer, Creusier, & Biétry, 2016). Details on these measurement models, their invariance, and correlations among variables used in all four studies are reported in the online supplements.

All models were estimated using Mplus 8.0 (Muthén & Muthén, 2017) robust maximum likelihood estimator (MLR). Due to the online nature of the data collection, there were no missing data in any of the studies. We first specified a Structural Equation Modeling (SEM) predictive model in which workaholism and work engagement were allowed to predict latent factors (estimated at the item level) representing sleeping difficulties, work-family conflicts, and burnout, as well as participants' observed scores on the single

performance indicator. Given the oversensitivity of interactions to measurement errors (Marsh, Hau, Wen, Nagengast, & Morin, 2013), an additional control for the residual level of measurement errors present in the factor scores representing the predictors (workaholism and work engagement) was incorporated following suggestions by Morin, Myers, and Lee (2018): Participants' scores of workaholism and work engagement were used as single indicators of latent variables controlled for measurement errors by fixing their uniquenesses to reflect the known reliability of these constructs (estimated as part of the preliminary models reported in the online supplements) as (1 – reliability) x variance. This initial predictive model was used to ascertain the ability of the underlying measurement and predictive models to provide an adequate representation of the data given that goodness-of-fit indices are not available for tests of latent interactions. Goodness-of-fit of this model was assessed using typical interpretation guidelines where values greater than .90 and .95 on the Tucker-Lewis index (TLI) and the comparative fit index (CFI), and values lower than .08 and .06 on the root mean square error of approximation (RMSEA) are respectively taken to reflect acceptable and excellent levels of fit to the data (Marsh, Hau, & Grayson, 2005). Tests of latent interactions were then performed using the latent moderated SEM approach (LMS). Properly standardized effects for the LMS approach are directly provided by Mplus (Marsh et al., 2013). Simple slope analyses for significant interactions were conducted using the approach described by Hayes and Preacher (2013), allowing us to assess the effects of workaholism at distinct levels of work engagement.

Results

The goodness-of-fit of the initial model supported its adequacy (χ^2 = 162.52, df = 78; CFI = .94; TLI = .92; RMSEA = .08). The parameter estimates from the measurement part of this model and the latent correlations are reported in Table S6 and S7 of the online supplements, and revealed well-defined, inter-related yet differentiated, and reliable constructs. The parameter estimates from the predictive part of this model, as well as those from the subsequent model including latent interactions are reported in Table 1. These results partially supported Hypothesis 1, showing that work engagement had a significant main effect in the prediction of work-family conflicts, burnout, and work performance, but not sleeping difficulties, being associated with decreases in work-family conflicts and burnout, as well as with increases in work performance. In contrast, workaholism had opposite main effects in the prediction of all outcomes, thus providing support to Hypothesis 2.

Workaholism and work engagement also interacted in the prediction of sleeping difficulties, work-family conflicts and burnout, but not performance. However, these interactions only resulted in minimal increases in the proportion of explained variance (1% to 2%), although this increase was aligned with the explanatory power of interaction effects typically observed in the social sciences (Marsh et al., 2013). Simple slope analyses are reported in the bottom section of Table 1, and graphically represented in Figure 1. Essentially, although the shape of these interactions changed slightly as a function of the outcome, their global interpretation remained similar and showed that work engagement did not protect employees against the undesirable effects of workaholism. Rather, the results showed that work engagement tended to amplify the effects of workaholism so that the combination of high levels of workaholism and work engagement was associated with the worst outcomes. These results do not support Hypothesis 3.

Discussion

The results from this first study revealed a particularly worrisome interaction effect showing that the combination of high levels of workaholism with high levels of work engagement was associated with higher levels of sleeping difficulties, work-family conflicts, and burnout, whereas only main effects were identified in the prediction of work performance. The observation that higher levels of work engagement amplified the deleterious effects of workaholism was not aligned with Hypothesis 3, or with the results from previous studies showing that high levels of work engagement tend to reduce the undesirable effects of workaholism on work outcomes (van Beek et al., 2011). A possible explanation might be found in research on the construct of overcommitment (Siegrist et al., 2004). More precisely, whereas employees' commitment tends to be associated with positive work outcomes (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002), extreme levels are more problematic (Morin, Vandenberghe, Turmel, Madore, & Maïano, 2013). The current results suggest that engaged workaholics could be overcommitted, which may make it even harder for them to disengage from their drive to pursue unreasonable objectives.

In addition, these results support previous person-centered studies showing that the combination of high levels of engagement coupled with low levels of workaholism (engaged) is associated with more adaptive outcomes than the combination of high levels of work engagement and workaholism (engaged workaholics; Salanova et al., 2014; Van den Broeck, Lens, De Witte, & Van Coillie, 2013). However, Study 1 left

important questions unanswered, such as whether this engaged workaholic combination naturally occurred among a large enough subpopulation of employees to represent a practical concern, or whether it was simply an artefact of the impact that a few individuals with higher scores can have in the assessment of interaction effects. The second study was specifically designed to address this question.

Study 2

Study 2 was designed to identify naturally occurring profiles of employees based on their levels of workaholism and work engagement to see whether an engaged-workaholic profile large enough to be meaningful would be identified. To our knowledge, a single person-centered research (Mäkikangas et al., 2013) has looked at this question among a sample of managers, and found tentative support for the four profiles proposed by van Beek et al. (2011): engaged, workaholics, engaged workaholics, and disengaged. In the present study, we expect to identify the same profiles (Hypothesis 4). Associations between these profiles and the outcomes considered in Study 1 (sleeping difficulties, work-family conflicts, burnout, and work performance) will also be estimated to verify the extent to which Study 1 results can be transposed to a person-centered approach, and to extend Mäkikangas et al.'s (2013) study which only considered job change. Based on the research reviewed previously, as well as the results from Study 1, we expect the two profiles characterized by higher levels of workaholism (the workaholic and engaged-workaholic profiles) to be associated with worse outcomes than the engaged profile, and the disengaged profile to be associated with the worst outcomes (Hypotheses 5 and 6).

Study 2 was also designed to assess the possible role of workload (Samples 1 and 2) and perceptions of the social support received from the organization, the supervisor, and colleagues (Sample 2) in the prediction of profile membership. Based on the job demands-resources model (Bakker & Demerouti, 2007), on the conservation of resources theory (Hobfoll, 1989), and on previously reviewed empirical evidence, we expect higher workload perceptions to predict a higher likelihood of membership into the profiles characterized by the highest levels of workaholism, as well as a higher likelihood of membership into the workaholic profile relative to the engaged-workaholic one (Hypothesis 9). In contrast, we expect social support perceptions from all three sources to predict a higher likelihood of membership into the profile characterized by low levels of workaholism and high levels of work engagement (engaged profile), as well as into the engaged-workaholic profile relative to the workaholic one (Hypothesis 10).

A key aspect of the process of construct validation that is required to ascertain that profiles represent substantively meaningful subpopulations involves the demonstration that these profiles can generalize to new samples (Meyer & Morin, 2016). Indeed, person-centered evidence is cumulative in nature, and requires an accumulation of studies to differentiate the core subset of profiles that systematically emerges, the less frequent set of peripheral profiles that emerges in specific situations, and the even less frequent set of profiles that reflects random sampling variations (Morin, 2016; Solinger, Van Olffen, Roe, & Hofmans, 2013). To test the generalizability of the profiles identified in this study, as well as of their associations with workload and with the outcomes considered, two independent samples of employees were recruited for Study 2 to assess the extent to which results would be replicated (Hypothesis 4).

Method

Participants and Procedure

Following procedures identical to those used in Study 1, a first sample of 321 teachers (83% women) working in various high schools located in France completed our questionnaire. Respondents were aged between 22 and 64 years (M = 36.50, SD = 9.18) and had an average organizational tenure of 6.00 years (SD = 6.00). A total of 293 participants were full-time workers (91.3%). A second sample of 332 nurses (92% women) working in various hospitals located in France also completed our questionnaire. This sample included 283 participants employed in the public sector and 49 employed in the private sector. Respondents were aged between 21 and 62 years (M = 35.42, SD = 9.34) and had an average organizational tenure of 9.04 years (SD = 7.53). A total of 307 participants were full-time workers (92.5%), 292 participants were permanent workers (88.0%) and 40 were temporary workers (12.0%).

Measures

Participants' levels of workaholism ($\alpha_{sample1}$ = .88; $\alpha_{sample2}$ = .84), work engagement ($\alpha_{sample1}$ = .90; $\alpha_{sample2}$ = .88), sleeping difficulties ($\alpha_{sample1}$ = .83; $\alpha_{sample2}$ = .89), work-family conflicts ($\alpha_{sample1}$ = .85; $\alpha_{sample2}$ = .89), burnout ($\alpha_{sample1}$ = .86; $\alpha_{sample2}$ = .88), and work performance (single item) were assessed as in Study 1. Participants also reported their workload using Spector and Jex's (1998) five-item scale (e.g., "My job requires me to work very hard?"; $\alpha_{sample1}$ = .81; $\alpha_{sample2}$ = .87). Responses were provided on a five-point scale ranging from 1 (never) to 5 (always). In addition, participants from Sample 2 also reported the level of social

support they received from their organization (α = .63; Eisenberger, Huntington, Hutchison, & Sowa, 1986) using four items (e.g., "My organization really cares about my well-being"). Supervisor (α = .84) and colleagues (α = .83) support were assessed with the same items in which the word "organization" was replaced by "supervisor" or "colleagues" (Caesens et al., 2014). Items were rated on a seven-point Likert-type scale (1- Strongly Disagree to 7- Strongly Agree).

Analyses

LPA including one to eight profiles were estimated in both samples using Mplus 8.0 (Muthén & Muthén, 2017) MLR estimator using factor scores already mentioned in Study 1. To avoid converging on local solutions, all models were estimated using 5000 random sets of start values, 1000 iterations, and 200 solutions retained for final optimization (Hipp & Bauer, 2006). In these models, the means of the profile indicators (workaholism and work engagement) were freely estimated across all profiles, indicators, and samples, but not their variances which were constrained to equality across profiles within each specific sample but allowed to differ across samples and indicators. Alternative models relying on the free estimation of the means and variance of these indicators across profiles converged on improper solutions or did not converge, suggesting overparameterization and the need for parsimony (Bauer & Curran, 2003).

The selection of the optimal number of profiles relies on multiple sources of information (e.g., Morin, 2016). Statistical indices are available to support this decision process: (i) The Akaïke Information Criterion (AIC), (ii) the Consistent AIC (CAIC), (iii) the Bayesian Information Criterion (BIC), (iv) the sample-size Adjusted BIC (ABIC), (v) the standard and adjusted Lo, Mendel and Rubin's (2001) Likelihood Ratio Tests (LMR/aLMR, as these tests typically yield the same conclusions, we only report the aLMR), and (vi) the Bootstrap Likelihood Ratio Test (BLRT). A lower value on the AIC, CAIC, BIC and ABIC suggests a better-fitting model. The aLMR and BLRT compare a *k*-class model with a *k-1*-class model. A significant *p* value indicates that the *k-1*-class model should be rejected in favor of a *k*-class model. Simulation studies indicate that three of these indicators (CAIC, BIC, and ABIC) are particularly effective (e.g., Diallo, Morin, & Lu, 2016, 2017; Henson, Reise, & Kim, 2007; Nylund, Asparouhov, & Muthén 2007; Peugh & Fan, 2013). Still, it should be noted that these tests remain heavily influenced by sample size (Marsh, Lüdtke, Trautwein, & Morin, 2009), so that with sufficiently large sample sizes, they may keep on suggesting the addition of profiles without ever reaching a minimum. In these cases, the point at which the observed decrease in the value of the information criteria flattens out may be used to suggest the optimal number of profiles present in the data (e.g., Morin, 2016). However, inspection of these indices needs to be accompanied by an examination of the substantive meaningfulness, theoretical conformity, and statistical adequacy of the solutions (Meyer & Morin. 2016; Morin, 2016). Finally, the entropy indicates the classification accuracy of the solution (ranging from 0 to 1), but should not be used to determine the optimal number of profiles (Lubke & Muthén, 2007).

The predictors (workload in both samples, and perceived organizational, supervisor, and colleagues support in Sample 2) and the outcomes (sleeping difficulties, work-family conflicts, burnout, and work performance) were then directly integrated to the final latent profile solution (e.g., Diallo et al., 2017). Multinomial logistic regressions were conducted to test the relations between the predictor and the likelihood of membership into the various profiles. Because demographic characteristics are known to be at least weakly associated with workers' levels of workaholism and work engagement (e.g., Huyghebaert et al., 2018), the relations between predictors and profile membership were estimated while controlling for sex and organizational tenure, incorporated to the models as additional predictors. Outcomes levels across profiles were contrasted using the multivariate delta method, implemented via the MODEL CONSTRAINT function (Raykov & Marcoulides, 2004). Participants' scores on the predictors and the outcomes were factor scores taken from preliminary Confirmatory Factor Analysis (CFA) models including all of these covariates (Sample 1: χ^2 = 319.21, df = 113; CFI = .91; TLI = .90; RMSEA = .08; Sample 2: χ^2 = 540.52, df = 323; CFI = .95; TLI = .94; RMSEA = .05). Orthogonal method factors were incorporated to the model estimated in Sample 2 to control for the methodological artefact related to the negative wording of half of the items from the social support questionnaire (Marsh, Scalas, & Nagengast, 2010), as well as to the strictly parallel wording of the items forming the three social support subscales (Marsh, Abduljabbar et al., 2013). The parameter estimates from these models and correlations among all constructs are reported in Tables S8 to S11 of the online supplements, and reveal well-defined, inter-related yet well-differentiated, and reliable constructs.

Once the optimal number of profiles was selected in both samples, we integrated these two solutions into a multi-group LPA model (Morin, Meyer et al., 2016). Tests of the similarity of these LPA solutions

across these two samples were conducted based on the sequential strategy recently proposed by Morin, Meyer et al. (2016). The first step examines whether the same number of profiles can be identified in each sample (*configural* similarity). The second step verifies whether the profiles retain the same shape across samples (*structural* similarity). The third step verifies whether the within-profile variability remains stable across samples (*dispersion* similarity). The fourth step ascertains whether the relative size of the profiles remains the same across samples (*distributional* similarity). This sequence was then extended to tests of "*predictive*" and "*explanatory*" similarity to investigate whether the associations between the profiles and their predictors (workload, sex, and tenure) and outcomes (sleeping difficulties, work-family conflicts, and burnout) remained the same across samples (Morin, Meyer et al., 2016). Morin, Meyer et al. (2016) suggested that at least two indices out of the CAIC, BIC, and ABIC should be lower for the more constrained model for the hypothesis of profile similarity to be supported.

Results

Identification of the Profiles: Sample 1

The fit indices associated with the alternative LPA solutions estimated in Study 2 are reported in Table 2. In Sample 1, these results show that the CAIC, BIC, aLMR, and BLRT all supported a 4-profile solution. In contrast, the AIC and ABIC kept on decreasing until they respectively reached the 7- and 8-profile solutions, although their decrease also flattened around 4 profiles. This statistical information thus supported the 4-profile solution. To accompany this statistical information by a careful examination of the parameter estimates associated with the various solutions, we contrasted the 4-profile solution with the adjacent 3- and 5-profile solutions. This examination showed that these solutions were proper statistically, and supported the added-value of the 4-profile solution over that of the 3-profile solution through the addition of a substantively meaningful and reasonably large profile to the solution. In contrast, adding a latent profile to the 4-profile solution simply resulted in the arbitrary division of already existing profiles into new profiles presenting the same global shape. Based on this information, the 4-profile solution was retained. This solution is graphically illustrated in Figure 2, and the exact within-profile means of workaholism and work engagement are reported in Table S12 of the online supplements.

These results revealed four profiles that meaningfully differed from one another. Profile 1 described 22.12% of *Engaged* employees presenting a low level of workaholism, but a moderately high level of work engagement. In contrast, Profile 2 characterized a relatively small proportion of employees (1.87%) who can be qualified as *Disengaged*, presenting very low levels of workaholism and even lower levels of work engagement. Despite being relatively rare, this profile appeared early in the class enumeration process (being already present in the 3-profile solution), and made sense theoretically. This small size might could possibly reflect the fact that disengaged employees were more likely to have left their job prior to the study, or that they might have been less likely to agree to participate in the study. Likewise, it is also possible that engaged-workaholic or workaholic employees could have been more likely to complete the survey due to perfectionist tendencies (Stoeber & Damian, 2016). Profile 3 was the largest (57.01%) and characterized *Engaged-Workaholic* employees, with moderately high levels of workaholism and work engagement. The last profile characterized 19.00% of employees presenting a purer *Workaholic* profile (i.e., low engagement and high workaholism). These results support Hypothesis 4.

Outcomes of Profile Membership: Sample 1

The within-profile means and 95% confidence intervals of each outcome are reported in Table 3 (exact tests of statistical significance are reported in Table S13 of the online supplements). As in Study 1, these results show a relatively consistent pattern across the three less desirable outcomes (sleeping difficulties, work-family conflicts, and burnout). More precisely, the highest levels on these outcomes tended to be associated with the workaholic profile (4), followed by the engaged-workaholic profile (3), and then by both the engaged (1) and disengaged (2) profiles, although all pairwise profile comparisons are not systematically significant for all outcomes. Levels of sleeping difficulties were indistinguishable between the disengaged (2) profile relative to the workaholic (4) and engaged-workaholic (3) profiles, but significantly higher among the disengaged (2) profile relative to the engaged (1) one. Levels of work-family conflicts did not statistically differ across the disengaged (2) and engaged (1) profiles. Levels of burnout also did not statistically differ across the disengaged (2) and engaged-workaholic (3) profiles. A slightly different pattern of results emerged for work performance levels, which were comparable across the engaged (1), disengaged (2), and engaged-workaholic (3) profiles, and higher in these profiles than among the workaholic (4) profile. These results support for Hypotheses 5 and 6.

Workload and Profile Membership: Sample 1

The results from the multinomial logistic regression in which workload was used to predict profile membership while controlling for the effects of sex and tenure are reported in Table 4. These results show that males are more likely to be members of the disengaged (2) profile relative to the workaholic (4) and engaged-workaholic (3) profiles, and more likely to be members of the engaged (1) profile relative to the engaged-workaholic (3) profile. Employees with more tenure were more likely to be members of the disengaged (2) profile relative to the workaholic (4) profile, and of the workaholic (4), engaged (1) and disengaged (2) profiles relative to the engaged-workaholic (3) profile. Although the coefficients of tenure appear small, this reflects the fact that tenure is measured in years: These coefficients reflect increases in the likelihood of profile membership associated with one-year increases in tenure. Finally, workload is associated with a higher likelihood of membership into the workaholic (4) profile relative to all other profiles, as well as into the engaged-workaholic (3) profile relative to the engaged (1) and disengaged (2) profiles, thus supporting Hypothesis 9.

Tests of Profile Similarity across Samples

In Sample 2 (see Table 2) the CAIC, BIC, and aLMR supported a 2-profile solution, whereas the ABIC and BLRT supported a 4-profile solution, and the AIC supported a 6-profile solution. Examination of the parameter estimates associated with these various solutions essentially supported the conclusions from Sample 1, showing that added profiles tended to be theoretically meaningful up to the 4-profile solution (and visually similar to those identified in Sample 1), whereas moving beyond the 4-profile solution resulted in the arbitrary division of already existing profiles into similar ones. Based on this information, the 4-profile solution was again retained. The results from all tests of profile similarity are reported in the bottom section of Table 2. Comparing the model of *configural similarity* with the alternative model of *structural similarity*, showed that this second model resulted in lower values on all information criteria, thereby supporting the *structural similarity* of the solution. The next two models also resulted in lower values on the CAIC and BIC, and highly similar values on the ABIC, thus supporting the *dispersion* and *distributional similarity* of the solution across samples. Finally, tests of *predictive* and *explanatory* similarly resulted in a lower value on all information criteria when compared with models in which these relations were freely estimated across samples, thereby supporting the *predictive* and *explanatory similarity* of the solution across samples. Taken together, these results show that the results from the present study can be considered to fully replicate across samples, thus supporting Hypothesis 4. Indeed, examination of the parameter estimates are virtually identical to those reported in Sample 2. As in Sample 1, the engaged-workaholic profile was the largest (47.59% of employees), followed by the engaged profile (31.93%), by the workaholic profile (19.58%), and finally by the disengaged profile (.90%). Due to evidence of distributional similarity, these sizes can be considered to be identical to those of Sample 1 (profile sizes aggregated across samples from the model of distributional similarity are reported in Figure 2). Detailed results obtained in Sample 2 are reported in Tables S14 to S17 of the online supplements.

Social Support and Profile Membership: Sample 2

A final model was estimated on Sample 2 data to test the associations between the three support variables and the likelihood of profile membership. These additional analyses were conducted while controlling for the effects of sex, tenure, and workload to test the added value of these predictors over that of the predictors already considered in the prior steps. The results from these analyses are reported in Table 5 and show that colleagues were the most decisive perceived source of social support in the prediction of profile membership, being associated with a higher likelihood of membership into the engaged (1) relative to the disengaged (2) and workaholic (4) profiles, into the engaged-workaholic (3) profile relative to the workaholic (4) one, and into the engaged-workaholic (3) and workaholic (4) profiles relative to the disengaged (2) one. In contrast, perceived supervisor support did not predict profile membership, and perceived organizational support only predicted a higher likelihood of membership into the workaholic (4) profile relative to the disengaged (2) profile. These results partially support Hypothesis 10.

Discussion

The results from Study 2 revealed that four profiles best represented our participants, and fully generalized across two distinct samples. The fact that both samples included employees from two highly distinct professional groups (teachers vs. nurses), which lends credibility to their potential generalizability to even more diversified groups of workers. These profiles corresponded to our expectations (Hypothesis 4) and to prior results (e.g., van Beek et al., 2011) in revealing profiles corresponding to engaged, workaholic, disengaged, and engaged-workaholic employees. Also in line with Hypothesis 5 and past research results

(e.g., Clark et al. 2016), higher levels of sleeping difficulties and work-family conflicts were associated with membership into profiles characterized by high levels of workaholism, regardless of whether these profiles were also characterized by high levels of work engagement. When work-family conflicts were more specifically considered, our results even suggested that it might be preferable for employees to be completely disengaged, rather than workaholics or engaged workaholics.

We also found that the workaholic profile tended to associated with higher levels of sleeping difficulties, work-family conflicts, and burnout, and with lower levels of work performance when compared to the engaged-workaholic profile. These findings thus confirm that high levels of work engagement could help buffer employees against the negative effects of workaholism (van Beek et al., 2011). However, it is important to keep in mind that levels of burnout, sleeping difficulties, and work performance observed in the engaged-workaholic profile were equivalent to those observed in the disengaged profile. Thus, although these results suggest that work engagement may protect employees against the deleterious effects of workaholism, they also indicate that workaholism eliminates the positive effects of work engagement. Taken together, these observations suggest that the amplificatory effects observed in Study 1 may have simply been due to the lack of consideration of profile membership in the estimation of the relations between workaholism/work engagement and the outcome variables. By focusing on relations among variables occurring, on the average, in a specific sample of participants, variable-centered results could be impacted by the presence of subpopulations characterized by more extreme patterns of scores (such as the small disengaged profiles examined here). We do not claim that this will always be the case and that variable-centered tests of latent interactions should be replaced by person-centered analyses. Rather, we argue that this difference between person-centered and variable-centered analyses reinforces their complementarity and illustrates how both can be used to obtain a more comprehensive representation of the question under study.

Importantly, our results also demonstrated that the engaged-workaholic profile was the largest of the estimated profiles, corresponding to half of the employees across the two samples. More generally, 67% (Sample 2) to 76% (Sample 1) of the employees could be characterized by moderate to high levels of workaholism (i.e., the workaholic and engaged-workaholic profiles). This result is concerning given the deleterious effects of workaholism demonstrated in our study and in the research literature in general (e.g., Clark et al., 2016). Together with previous findings (Huyghebaert et al., 2018), this result thus highlights the need to raise awareness among workers, managers, organizations, and the society in general regarding the darker side of heavy work investment and of over-valorizing hard work to the detriment of psychological health. Still, it is important to note that, despite evidence of generalizability across our two samples, these samples remained composed of teachers and nurses, two professions known to present a particularly high risk of burnout due to the need to successfully execute critical tasks in a context of resources restrictions (e.g., Aiken, Clarke, Sloane, Sochalski, & Silber, 2002). For instance. Gillet, Morin et al. (2017) also found that large proportions of employees (43% in Study 1; 50% in Study 2) presented moderate to high levels of workaholism, these figures remained slightly lower than those reported here.

Study 2 also revealed that workload tended to present relatively clear associations with an increased likelihood of membership into the profiles characterized by higher levels of workaholism. These results are in line with Hypothesis 9 and prior research results (Huyghebaert et al., 2018). By showing that workload predicted a higher likelihood of membership into the workaholic profile relative to the engaged-workaholic and engaged profiles, our findings also confirm that workload is more strongly related to workaholism than to work engagement (Gorgievski et al., 2014).

Finally, Sample 2 allowed us to investigate the role of organizational, supervisor, and colleagues support in the prediction of profile membership. In line with Hypothesis 10, the results showed that support from colleagues was associated with a higher likelihood of membership into the profiles characterized by higher levels of work engagement, as well as into most profiles relative to the disengaged one. These results underscore the importance of relying on carefully balanced levels of social support from colleagues in order to target work engagement and to avoid encouraging workaholic tendencies. In contrast, social support from the organization or supervisor did not have any desirable effects in terms of work engagement. Worse, organizational support contributed to increase the likelihood of membership into the workaholic profile relative to the disengaged one. These results do not support Hypothesis 10. Gillet, Morin et al. (2017) also showed that levels of hierarchical support predicted a higher likelihood of membership into profiles characterized by moderate to high scores of workaholism. These results are aligned with those from Ng and Sorensen (2008), who showed that distinct sources of support may sometimes yield highly differentiated effects. Their results, like ours, led them to recommend caution in the provision of organizational support, as

this source of support seems to be uniquely associated with higher levels of workaholism. Future research needs to more extensively look at positive workplace characteristics that might curb workaholism and enhance work engagement.

Study 3

Studies 1 and 2 have shown that the combination of high levels of work engagement with high levels of workaholism, a combination that appears to characterize more than 50% of the employees, was associated with a variety of negative consequences, but that work engagement protected against at least some of the undesirable effects of workaholism. These studies confirmed the role of workload in the likelihood of membership into the profiles characterized by higher levels of workaholism. Whereas Studies 1 and 2 relied either on variable-centered (latent interactions) or person-centered (LPA) methods, Study 3 relies on a hybrid mixture regression approach (Morin, 2016; Morin, Scalas, & Marsh, 2015). In this study, only two outcome variables (sleeping difficulties and work-family conflicts) were measured. This selection was made a priori, based in part on the results from Studies 1 and 2, due to the greater level of computational complexity of mixture regressions. The decision not to retain work performance was based on the lack of evidence of significant interactions between workaholism and work engagement in the prediction of this outcome observed in Studies 1 and 2. In contrast, the decision not to retain burnout was based on the presence of conceptual overlap between burnout and engagement, which are generally conceptualized as forming the opposite end of the same continuum (Mäkikangas et al., 2014).

All of the empirical and theoretical rationales presented earlier and leading us to expect positive associations between levels of work engagement and desirable outcome levels (Study 1, Hypothesis 1), as well as between workaholism and undesirable outcome levels (Study 1, Hypothesis 2) continue to apply here. Likewise, all of reasoning leading us to expect profile-specific associations between workaholism/work engagement configurations and outcome levels (Study 2, Hypotheses 5 and 6) can be directly transposed to the between-profile associations expected to be observed in this study (Hypothesis 8). More specifically, we still expect the profiles characterized by higher levels of workaholism (workaholics and engaged-workaholics) to be associated with less desirable outcomes levels than the engaged profile, and the disengaged profile to be associated with the least desirable outcomes. However, what is harder to anticipate is how these two sets of variable- and person-centered analyses will combine in Study 3. More precisely, Study 3 will verify whether the between-profile associations described in Hypothesis 8 will be sufficient to explain the entirety of the associations between workaholism/work engagement and the outcomes, or whether residual within-profile associations between workaholism/work engagement and the outcomes will also be identified (Research Question 1). In the second case, the possibility for these residual within-profile relations to be moderated by profile membership (i.e., to change in size or direction across profiles) will also be considered (Research Question 2). Finally, we also consider the possible role of workload in the prediction of profile membership, and expect our results to replicate those from Study 2 (Hypothesis 9).

Method

Following procedures identical to those used in Studies 1 and 2, a convenience sample of 283 workers (59% women) from various organizations (e.g., hospitals, industries, sales, and services) located in France completed our questionnaire. This sample included 34 participants employed in the public sector (12.0%) and 249 employed in the private sector (88.0%). Respondents were aged between 22 and 61 years (M = 34.13, SD = 9.28) and had an average organizational tenure of 6.93 years (SD = 8.23). A total of 244 participants were permanent workers (86.2%) and 39 were temporary workers (13.8%). Participants' levels of workaholism (α = .86), work engagement (α = .93), sleeping difficulties (α = .89), work-family conflicts (α = .91), and workload (α = .84) were assessed as in Studies 1 and 2.

Analyses

Mixture regression analyses including one to eight profiles were estimated using Mplus 8.0 (Muthén & Muthén, 2017) MLR estimator on the basis of factor scores representing employees' levels of workaholism, work engagement, sleeping difficulties, and work-family conflicts. All models were estimated using 10000 random sets of start values and 200 iterations, with the 500 best solutions retained for final stage optimization. These values were increased relative to those used in Study 2 due to the greater computational complexity of mixture regressions (Meyer & Morin, 2016; Morin, 2016). Factor scores of workaholism and work engagement were saved from preliminary analyses reported in the online supplements and mentioned in Study 1. Participants' factor scores on the additional predictor (workload) and outcomes (sleeping difficulties and work-family conflicts) were estimated in a preliminary CFA model including all covariates (χ^2 = 165.25, df = 51; CFI = .93; TLI = .91; RMSEA = .08). The parameter estimates from this model and correlations

among all constructs are reported in Table S18 and S19 of the online supplements, and reveal well-defined, inter-related yet well-differentiated, and reliable constructs.

The typical mixture regression approach (Van Horn et al., 2009) identifies profiles of participants characterized by different relations (i.e., different regression intercepts and slopes) among constructs. In mixture regression, it is necessary to freely estimate the outcomes' means (representing the intercepts of the regression) in each profile in order to obtain profile-specific regression equations. In the hybrid approach utilized here, the mean-levels of the predictors are also freely estimated, thereby combining LPAs and mixture regression in a single model. In the present study, hybrid mixture regression models were estimated in which the means of the workaholism and work engagement factor scores, the intercepts of the outcomes, and the regressions linking them were freely estimated in all profiles, but not the variances of the predictors and outcomes. Alternative models relying on the free estimation of these variances converged on improper solutions or did not converge, suggesting overparameterization and the need for more parsimony (Bauer & Curran, 2003). Profile selection and the integration of workload, sex, and tenure as predictors followed the procedures outlined in Study 2. Such hybrid models are specifically designed to assess whether the relations among constructs may differ as a function of predictors' levels. Evidence that relations differ across profiles (i.e., are moderated by profile membership) come from the observation of non-overlapping confidence intervals associated with the regression coefficients across profiles. For a more extensive presentation and illustration of this approach, see Chénard-Poirier et al. (2017).

Results

The fit indices associated with the alternative mixture regression solutions are reported in Table 6. The CAIC, BIC, and aLMR supported a 2-profile solution. In contrast, the AIC and ABIC kept on decreasing but reached a plateau around 3 profiles, and the BLRT supported the 6-profile solution. Examination of the parameter estimates associated with the various solutions shows that meaningful profiles (both in terms of levels of workaholism and work engagement, but also in terms of relations between these predictors and the outcomes) are added to the solution until the 3-profile solution, after which added profiles simply result in the arbitrary division of already existing profiles into similar ones characterized by similar relations with the outcomes. Based on this information, the 3-profile solution was retained. The mean-level of work engagement, workaholism, sleeping difficulties, and work-family conflicts observed on these profiles are graphically represented in Figure 3, while exact levels of work engagement and workaholism are reported in Table S20 of the online supplements. It is important to keep in mind that the mean-levels of sleeping difficulties and work-family conflicts presented in Figure 3 are in fact the intercepts of the profile-specific regressions estimated in these analyses. These profile-specific intercepts, as well as the profile-specific regression coefficients, are reported in Table 7 (confidence intervals for these coefficients are provided in Table S21 of the online supplements).

When we consider the profile specific mean-levels of workaholism and work engagement, the three profiles identified in this study very closely correspond to the engaged (profile 1), workaholic (profile 2), and engaged-workaholic (profile 3) profiles identified in Study 2, providing partial support to Hypothesis 7. Although the relative sizes of the profiles differ across this study and the previous one for the engaged (Study 2: 22.12%; Study 3: 49.67%) and engaged-workaholic (Study 2: 57.01%; Study 3: 32.76%) profiles, the engaged-workaholic profile remains large, characterizing almost a third of the participants, whereas the engaged profile is now the largest, corresponding to roughly half of the participants.

When we turn our attention to the between-profile associations between the constructs, the results generally support those from Study 2 and Hypothesis 8, showing the highest levels of sleeping difficulties and work-family conflicts to be associated with the workaholic (2) profile, followed by the engaged-workaholic (3) profile, with the lowest levels being associated with the engaged (1) profile. Examination of the confidence intervals associated with these mean (see Table S20 in the online supplements) supports the conclusion that sleeping difficulties levels are significantly distinct across all three profiles, whereas levels of work-family conflicts levels only differ between the engaged (1) and workaholic (2) profiles.

When we consider within-profile regressions, four additional conclusions can be reached. First, associations between work engagement and the outcomes occur strictly at the between-profile level, with no residual association occurring at the within-profile level, providing a null response to Research Questions 1 and 2 for work engagement. Second, although residual associations between workaholism and the outcomes occur at the within-profile level, there is very little evidence that profile membership plays a significant moderating role in these associations, providing a positive response to Research Question 1, but a mainly null response to Research Question 2 in relation to workaholism. Third, over and above the between-profile

associations identified between workaholism and work-family conflicts, within-profile increases in workaholism are significantly associated with within-profile increases in work-family conflicts in all profiles. These associations have the same magnitude (as shown by overlapping confidence intervals) across profiles. Finally, over and above the between-profile associations identified between workaholism and sleeping difficulties, within-profile increases in workaholism are significantly associated with within-profile increases in sleeping difficulties in the engaged (1) profile. Still, it is important to keep in mind that the confidence intervals associated with this last relation overlap across profiles.

The results from the multinomial logistic regression in which workload was used to predict profile membership while controlling for the effects of sex and tenure are reported in Table 8. These results show that neither sex nor tenure present any significant association with profile membership. These results also support previous results from Study 2 in revealing significant associations between workload and profile membership. More precisely, workload was associated with a higher likelihood of membership into the workaholic (2) profile relative to the engaged (1) and engaged-workaholic (3) profiles, as well as into the engaged-workaholic (3) profile relative to the engaged (1) one, providing support for Hypothesis 9.

Discussion

Study 3 relied on a hybrid mixture regression approach (Chénard-Poirier et al., 2017) to identify latent profiles defined based on workers' levels of workaholism and work engagement, but also based on the relations between these variables and employees' levels of sleeping difficulties and work-family conflicts. As expected (Hypothesis 7), we identified three profiles roughly corresponding to the three most frequent profiles identified in Study 2: engaged, workaholic, and engaged-workaholic. The fact that no disengaged profile could be identified in Study 3 could be due to the relatively small size of this profile in Study 2, to the greater computational complexity of the current analyses, and to the fact that this study relied on a different statistical model. In particular, the fact that highly similar profiles could be identified when relying on this different methodological approach suggests that workaholism and work engagement levels remain the core mechanisms involved in profile formation. In addition, despite differences, both studies converge on the conclusion that this disengaged profile, if it occurs, does so relatively rarely, which could be due to fully disengaged employees turnover or refusal to take part in the study, and to more engaged or workaholic employees greater likelihood of agreeing to complete the survey.

In addition, and in accordance with Hypothesis 8 and Study 2 results, our results revealed that the highest levels of sleeping difficulties and work-family conflicts were associated with the workaholic profile, followed by the engaged-workaholic profile, and finally by the engaged (1) profile. These results confirm the desirable effects of work engagement, as well as the undesirable effects of workaholism identified in previous research (Clark et al., 2016). However, examination of the within-profile regressions serve to reinforce the risk associated with workaholism and the fact that this risk cannot be fully buffered by work engagement in showing that within profile increases in workaholism remained associated with increases in undesirable outcomes. In particular, this additional effect of workahlism on sleeping difficulties was found to be limited to the engaged profile. Finally, as in Study 2 and in accordance with Hypothesis 9 and previous studies (Huyghebaert et al., 2018), we also found workload to be associated with a higher likelihood of membership into the profiles characterized by higher levels of workaholism.

General Discussion

The Joint Effects of Workaholism and Work Engagement

The present research examined the joint effects of workaholism and work engagement on work outcomes, and relied on a synergy of variable-centered, person-centered, and hybrid methods to do so. Previous research has underscored the importance of distinguishing these two forms of strong work involvement (Hakanen & Peeters, 2015) through the demonstration of well-differentiated positive (work engagement) or negative (workaholism) effects on a variety of work outcomes (Bakker et al., 2011; Clark et al., 2016). However, relatively little attention has been allocated to understanding the joint effects of these constructs in the work domain (van Beek et al., 2011). In Study 1, we tested latent interactions between workaholism and work engagement in the prediction of work outcomes, and unexpectedly found that the combination of high levels of workaholism and work engagement was associated with the highest level of sleeping difficulties, work-family conflicts, and burnout.

However, the results from Studies 2 and 3 suggested that this unexpected result could have been due to a lack of consideration of profile membership in the estimation of relations between workaholism/work engagement and the outcomes in Study 1. We do not claim that variable-centered tests of interactions will necessarily be biased by ignoring the possible presence of subpopulations. However, we believe that the

discrepant results obtained between Study 1 and Studies 2 and 3 provides a great illustration of the complementarity of variable- and person-centered analyses, and suggest that the later could be used to more specifically explore the underpinnings of unexpected variable-centered associations. Study 2 relied on LPA to more identify subpopulations of workers characterized by distinct configurations of workaholism and work engagement, and revealed four distinct profiles of employees matching our expectations based on direct (Mäkikangas et al., 2015; van Beek et al., 2011) and indirect (e.g., Gillet, Becker et al., 2017) research evidence. These profiles characterized engaged, workaholic, disengaged, and engaged-workaholic employees, and presented well-differentiated associations with the various outcomes considered. In line with prior research (Clark et al., 2016; Salanova et al., 2014; van Beek et al., 2011), the workaholic profile was associated with the worst outcomes (i.e., more sleeping difficulties, work-family conflicts, and burnout, and less work performance), while the engaged profile was associated with the most positive outcomes. In contrast, the engaged-workaholic profile was associated with outcomes that fell in between, and were similar to the levels observed in the disengaged profile.

In accordance with SDT (Ryan & Deci, 2017), employees corresponding to the workaholic profile should display higher levels of controlled motivation, which have been shown to be associated with a variety of negative outcomes when they are not coupled with matching levels of autonomous motivation (Howard et al., 2016). More generally, recent research has shown that autonomous motivation protects workers against the deleterious effects of controlled motivation (e.g., Gillet, Becker et al., 2017; Gillet, Fouquereau et al., 2017). Although our results somehow support this claim by suggesting that work engagement can protect employees against some of the deleterious effects of workaholism, they show that this effect is limited. Indeed, our results also indicate that workaholism eliminates the beneficial effects of work engagement so that no advantages are associated with displaying an engaged-workaholic profile relative to a fully disengaged profile. Worse, disengaged employees were even found to present lower levels of work-family conflicts than their engaged-workaholic counterparts. Thus, if engaged-workaholic employees are indeed driven by a combination of high levels of both autonomous and controlled motivation (van Beek et al., 2011), their motivational profile appears to be closer to that of obsessively passionate workers (Vallerand et al., 2003). In sum, our results showed that workaholism tends to translate into negative outcomes for employees, even among highly engaged workers.

In Study 3, we identified profiles of workers based on both their levels of workaholism and work engagement, and on the nature of the links between these two variables and work-related outcomes (i.e., sleeping difficulties and work-family conflicts). The results from Study 3 replicated Study 2 results in terms of between-profile relations between workaholism/work engagement and outcomes. However, unlike Study 2, no disengaged profile was identified in Study 3, which could likely be explained by the relatively small size of this profile to begin with, the different analytical strategy used in Study 3, and the weaker ties between disengaged employees and their workplaces. Thus, across studies, our results suggest that if this disengaged profile does occur, it does so relatively rarely.

Study 3 also revealed that within-profile increases in workaholism contributed to further increases in work-family conflicts, and in sleeping difficulties among engaged employees. These results raise a red flag against the implementation of interventions assuming that the effects of workaholism could be countered by increases in work engagement. They rather suggest that interventions would maximally benefit from nurturing work engagement as a high-involvement replacement strategy for workaholism.

Predictors of the Combination of Workaholism and Work Engagement

The current research also sought to address the relative scarcity of research on social factors contributing to the development of profiles of employees based on the combination of workaholism and work engagement (van Beek et al., 2011) by focusing more specifically on the role of workload and workplace support. In line with prior results (Crawford et al., 2010; Mäkikangas et al., 2013), Studies 2 and 3 demonstrated strong associations between workload and an increased likelihood of membership into both profiles characterized by high levels of workaholism (workaholic and engaged-workaholic). Interestingly, workload presented a stronger association with membership into the workaholic profile relative to the engaged-workaholic one, supporting previous observations that this environmental factor might be more strongly related to workaholism than to engagement (Gorgievski et al., 2014).

In addition, Study 2 (Sample 2) showed that colleagues support was associated with a higher likelihood of membership into the two profiles characterized by the highest levels of work engagement (engaged and engaged-workaholic), confirming the positive effects of this source of support at work (Caesens et al., 2014). However, colleagues support was also associated with a higher likelihood of membership into the engaged-

workaholic and workaholic profiles relative to the disengaged one, suggesting the importance of relying on carefully balanced levels of colleagues support in order to promote work engagement while avoiding encouraging workaholism. In contrast, supervisor support did not predict profile membership, and organizational support only displayed limited associations with profile membership. Supporting Gillet, Morin et al.'s (2017) results, perceived organizational support only predicted a higher likelihood of membership into the workaholic profile relative to the disengaged one. Future research would need to more extensively look at a broader set of theoretically-relevant predictors of profile membership (e.g., job crafting, autonomous and controlled motivation; Gillet, Becker et al., 2017; Hakanen et al., 2018), and try to unpack the mechanisms underlying the relation between different sources of social support and employees' profiles of workaholism and work engagement.

Limitations and Perspectives for Future Research

Despite their interest, the present results present limitations. First, we relied on self-report measures, and such measures can be impacted by social desirability and self-report biases. Additional research should be conducted using more objective data (e.g., absenteeism, turnover, performance), as well as informant-reported measures of environmental characteristics and work outcomes. Second, our research is based on a cross-sectional design, making it impossible to reach clear conclusions regarding the directionality of the associations, or the possible causal effect of workload and social support on profile membership, or that of profile membership on outcome levels. These additional variables were simply positioned as either predictors or outcomes of profile membership based on theoretical expectations of their likely role in relation to our focal variables (workaholism and work engagement) (e.g., Meyer & Morin, 2016). Future research would benefit from longitudinal studies allowing for a more precise investigation of profile stability over time, and of the direction of the associations between the profiles, their determinants, and their outcomes. A third limitation is related to our reliance on four samples of French workers, making it hard to assess the extent to which our results would generalize to additional cultural or linguistic groups. Still, the fact that our results were essentially replicated across two samples of nurses, one sample of teachers, and one sample of workers from diversified occupations lends credence to the generalizability of our results across occupational categories. Still, it would be important for future research to rely on more diversified (in terms of cultures, languages, and professions) and representative samples. Fourth, the samples considered in the present series of studies, particularly in Studies 1 and 2, were predominantly composed of women. Yet, prior research has shown that sex was significantly related to both workaholism (e.g., Beiler-May, Williamson, Clark, & Carter, 2017) and work engagement (e.g., Camgoz, Ekmekci, Karapinar, & Guler, 2016). Thus, although our analyses were conducted while controlling for the effects of sex, future research relying on more diversified samples are needed to better ascertain the generalizability of our findings to men and women. Finally, several studies noted the relevance of personal and family factors as key determinants of employees' well-being (Breevaart & Bakker, 2017). Future research should thus examine profiles of employees focusing on a broader set of factors outside of work. For instance, it would prove to be informative to consider the extent to which social support occurring in (e.g., supervisor), or out (e.g., family), of the work settings can have compensatory effects in the prediction of profile membership.

Practical Implications and Conclusions

Several recommendations for practitioners emerge from the present findings. First, our results suggest that managers and practitioners should be particularly attentive to workers displaying high levels of workaholism (and especially those who, at the same time, are characterized by low levels of work engagement) as these individuals appear to be at risk for a variety of undesirable outcomes, such as burnout, sleeping difficulties, and work-family conflicts. Organizations should also be warned about the detrimental effects of workaholism on their employees and given tools to understand and detect such addictive behaviors, and to prevent them. Specifically, organizations should also avoid situations where workload becomes unreasonably high to help reduce employees' workaholism. Organizations need to understand that high workload comes as a psychological cost for the organization and acknowledge employees' efforts through their human resource policies and practices.

Our research points to the necessity to carefully distribute workload and to make sure that such organizational demands do not get too high to avoid workaholic behaviors and a chain of negative outcomes for both individuals and organizations (Huyghebaert et al., 2018). Instead, organizations should provide employees with job resources (e.g., autonomy, organizational justice), which have been shown to foster a more positive form of work involvement: Work engagement (Crawford et al., 2010). Importantly, strategies should nurture work engagement as a replacement for workaholism rather than as a buffer for the undesirable

effects of workaholism. To take workaholism prevention one step further, organizations should encourage employees to lead balanced lives by stating clear organizational segmentation norms (Kreiner, Hollensbe, & Sheep, 2006). They should also limit workplace telepressure as well as information and communications technologies work-home boundary crossing (i.e., limiting amount of time or when information and communications technologies are used such as only until 7 p.m., and not during weekends) (Barber & Santuzzi, 2015). Finally, organizations could offer employees with more structured work habits such as giving them tools to prioritize and delegate, providing them with specific work schedules including breaks and times they should leave the office, and making sure they take time off work long-and-frequently-enough to recover from their efforts (Huyghebaert et al., 2018).

Findings from previous studies also suggest that second-generation mindfulness-based interventions may be suitable for treating workaholism (e.g., Shonin, Van Gordon, & Griffiths, 2014). More recently, Van Gordon et al. (2017) examined the effects of meditation awareness training on workaholism. Results revealed that meditation awareness training participants demonstrated a significant and sustained reduction in levels of workaholism over 3 months, when compared with control-group participants. Moreover, they demonstrated a significant reduction in hours spent working but without a decrease in work performance. Finally, our results suggest that it may be useful to promote colleagues support to facilitate the development of a profile characterized by low levels of workaholism and high levels of work engagement (engaged profile). In order to foster a climate of support among colleagues, managers may implement informal mentoring activities among colleagues, as well as help to organize informal social events after work aiming to encourage the development of stronger social relationships. Furthermore, managers should foster and encourage a culture where positive and supportive interactions between colleagues and across organizational levels, becomes the norm (Newman, Thanacoody, & Hui, 2012).

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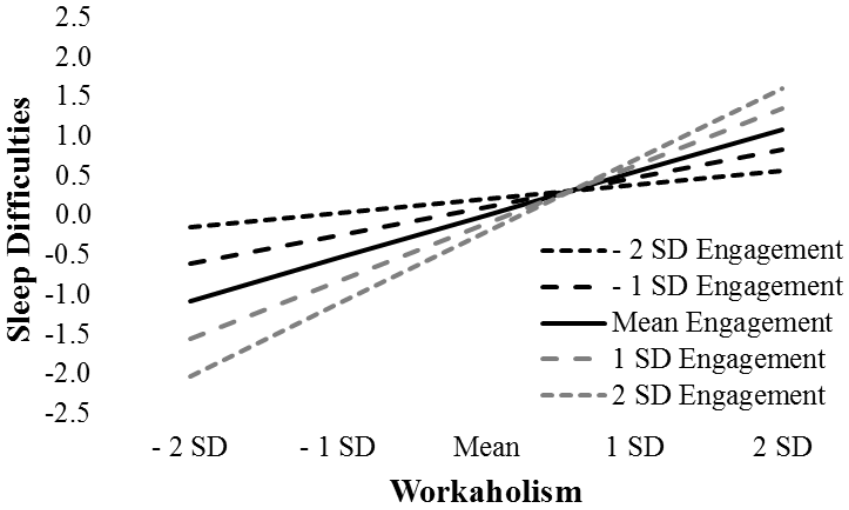

Figure 1a

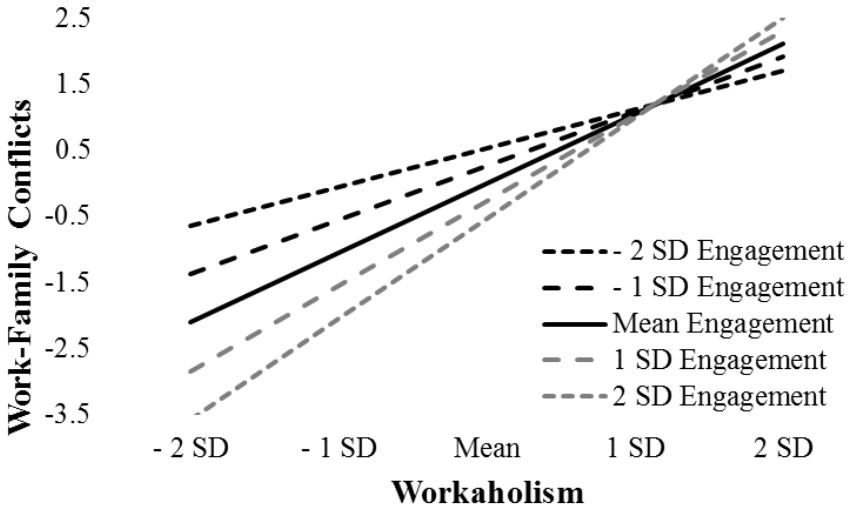

Figure 1b

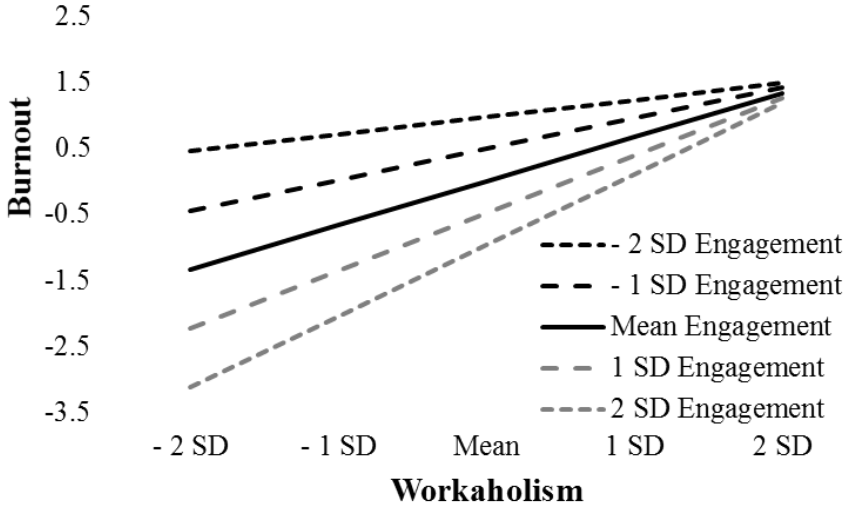

Figure 1c

Figure 1.

Simple Slope Analysis of the Effects of Workaholism at Different level of Work Engagement in the Prediction of a. Sleeping Difficulties b. Work-Family Conflicts c. Burnout.

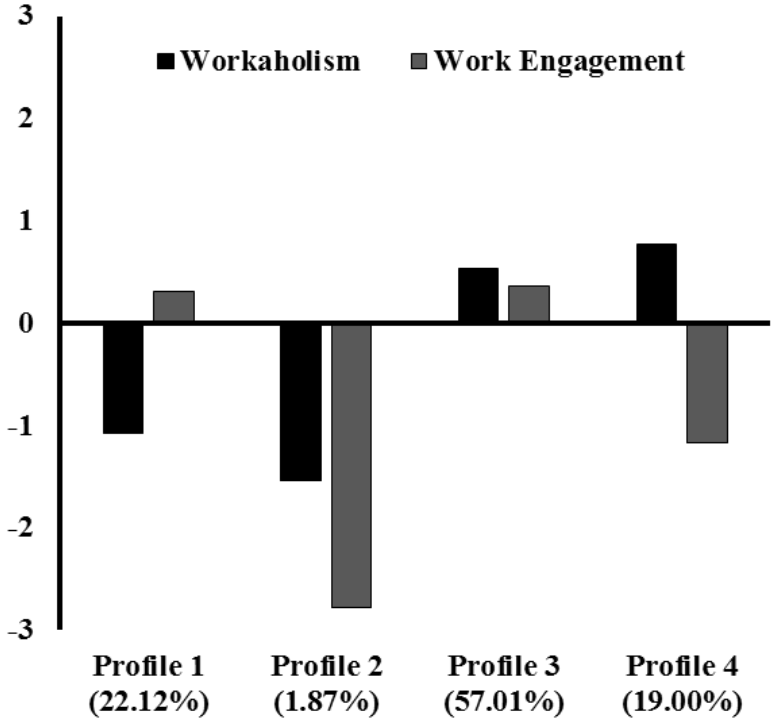

Figure 2. Final Latent Profile Solution Retained in Study 2.
Note. Profile 1: Engaged; Profile 2: Disengaged; Profile 3: Engaged-Workaholic; Profile 4: Workaholic.

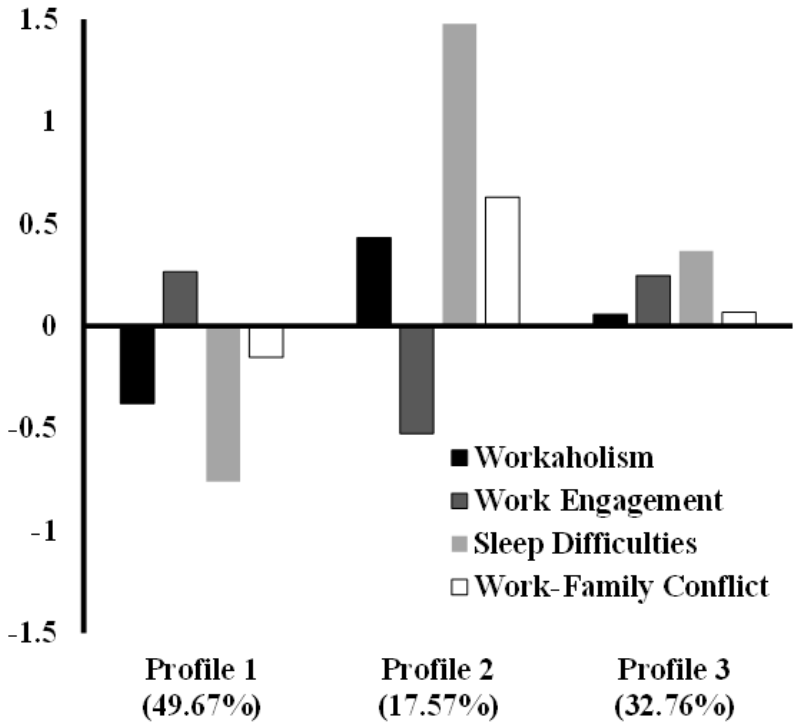

Figure 3. Within-Profile Mean Levels of Workaholism, Work Engagement, Sleeping Difficulties, and Work-Family Conflicts Observed in Study 3
Note. Profile 1: Engaged; Profile 2: Workaholic; Profile 3: Engaged-Workaholic

Table 1

Predictive Results from Study 1

	Sleeping Difficulties		Work-Family Conflicts		Burnout		Work Performance	
Predictors	*b* (s.e.)	β	*b* (s.e.)	β	*b* (s.e.)	β	*b* (s.e.)	β
No Interactions								
Workaholism	.553 (.117)**	.458	1.085 (.121)**	.705	.687 (.078)**	.579	-.203 (.088)*	-.204
Work Engagement	-.100 (.097)	-.083	-.259 (.111)*	-.168	-.481 (.072)**	-.405	.404 (.076)**	.405
R^2	.230 (.076)**		.567 (.077)**		.582 (.068)**		.235 (.061)**	
Interactions								
Workaholism	.543 (.115)**	.451	1.055 (.117)**	.692	.669 (.078)**	.570	-.203 (.099)*	-.204
Work Engagement	-.105 (.100)	-.087	-.268 (.112)*	-.176	-.486 (.069)**	-.414	.407 (.075)**	.408
Interaction	.182 (.091)*	.151	.234 (.083)**	.153	.204 (.045)**	.174	-.010 (.101)	-.010
R^2	.248 (.082)**		.575 (.078)**		.609 (.071)**		.237 (.063)**	

	Sleeping Difficulties		Work-Family Conflicts		Burnout	
	a	*b* (s.e.)	a	*b* (s.e.)	a	*b* (s.e.)
Workaholism: Simple slopes						
-2SD Work Engagement	.211	.179 (.186)	.536	.588 (.215)**	.972	.261 (.116)*
-1SD Work Engagement	.105	.361 (.126)**	.268	.821 (.152)**	.486	.465 (.088)**
Mean Work Engagement	0	.543 (.115)**	0	1.055 (.117)**	0	.669 (.078)**
1SD Work Engagement	-.105	.725 (.164)**	-.268	1.289 (.135)**	-.486	.873 (.093)**
2SD Work Engagement	-.211	.908 (.239)**	-.536	1.522 (.192)**	-.972	1.077 (.123)**

Note. R^2: Squared multiple correlation (reflecting the proportion of explained variance); a: Regression intercept (used in drawing the simple slope graphs); b: Unstandardized regression coefficient; s.e.: Standard error of the coefficient; β: Standardized regression coefficient; * $p \leq .05$; ** $p \leq .01$.

Table 2

Results from the Latent Profile Analysis Models (Study 2)

Model	LL	#fp	Scaling	AIC	CAIC	BIC	ABIC	Entropy	aLMR	BLRT
Sample 1										
1 Profile	-911.368	4	0.993	1830.727	1849.823	1845.823	1833.135	Na	Na	Na
2 Profiles	-897.029	7	1.067	1808.058	1841.458	1834.458	1812.255	.733	.025	< .001
3 Profiles	-886.048	10	0.994	1792.096	1839.811	1829.811	1798.092	.797	.050	< .001
4 Profiles	-874.162	13	1.003	1774.325	1836.354	1823.354	1782.120	.710	.007	< .001
5 Profiles	-870.216	16	1.126	1772.431	1848.774	1832.774	1782.025	.737	.574	.286
6 Profiles	-864.928	19	1.150	1767.855	1858.513	1839.513	1779.248	.712	.349	.090
7 Profiles	-859.574	22	1.069	1763.148	1868.120	1846.120	1776.339	.781	.204	.082
8 Profiles	-855.765	25	0.949	1761.530	1880.816	1855.816	1776.520	.763	.183	.158
Sample 2										
1 Profile	-872.069	4	.931	1752.138	1771.359	1767.359	1754.671	Na	Na	Na
2 Profiles	-851.620	7	.996	1717.241	1750.877	1743.877	1721.672	.698	< .001	< .001
3 Profiles	-845.529	10	1.086	1711.057	1759.109	1749.109	1717.388	.706	.215	< .001
4 Profiles	-839.693	13	1.234	1705.386	1767.853	1754.853	1713.617	.680	.416	.013
5 Profiles	-836.426	16	1.029	1704.851	1781.733	1765.733	1714.891	.678	.209	.375
6 Profiles	-831.595	19	1.059	1701.190	1792.488	1773.488	1713.219	.691	.247	.182
7 Profiles	-828.621	22	.888	1701.241	1806.954	1784.954	1715.169	.740	.057	.227
8 Profiles	-823.679	25	.930	1697.358	1817.486	1792.486	1713.185	.749	.190	.177
Profile Similarity Across Samples										
Configural Similarity	-2166.388	27	1.1141	4386.776	4534.779	4507.779	4422.054	.797		
Structural Similarity	-2173.231	19	1.0314	4384.463	4488.613	4469.613	4409.288	.790		
Dispersion Similarity	-2177.091	17	1.0162	4388.181	4481.368	4464.368	4410.393	.787		
Distribution Similarity	-2181.348	14	1.0117	4390.696	4467.438	4453.438	4408.988	.787		
4 Profiles: Predictors	-2065.439	24	.9541	4178.878	4310.399	4286.399	4210.200	.825		
Predictive Similarity	-2069.773	15	1.0208	4169.547	4251.747	4236.747	4189.122	.823		
4 Profiles: Outcomes Free	-5605.848	40	1.1114	11291.696	11510.959	11470.959	11343.959	.891		
Explanatory Similarity	-5613.356	24	1.1454	11274.711	11406.269	11382.269	11306.069	.889		

Note. LL: Model LogLikelihood; #fp: Number of free parameters; Scaling: Scaling factor associated with MLR loglikelihood estimates; AIC: Akaïke Information Criteria; CAIC: Constant AIC; BIC: Bayesian Information Criteria; ABIC: Sample-size adjusted BIC; aLMR: Adjusted Lo-Mendel-Rubin likelihood ratio test; BLRT: Bootstrap Likelihood Ratio Test.

Table 3

Associations between Profile Membership and the Outcomes (Study 2, Sample 1)

	Profile 1 M [CI]	Profile 2 M [CI]	Profile 3 M [CI]	Profile 4 M [CI]	Summary of Significant Differences
Sleeping Difficulties	-.814 [-.992; -.637]	-.003 [-.809; .803]	.146 [-.007; .298]	.582 [.329; .834]	4 > 3 >1; 2 >1; 2 = 3; 2 = 4
Work-Family Conflicts	-.999 [-1.286; -.712]	-1.350 [-2.020; -.680]	.233 [.114; .352]	.676 [.446; .906]	4 > 3 > 1 = 2
Burnout	-1.073 [-1.283; -.862]	-.094 [-.491; .304]	.139 [.003; .275]	.913 [.754; 1.072]	4 > 2 = 3 > 1
Performance	7.242 [6.990; 7.494]	7.201 [5.669; 8.733]	7.015 [6.799; 7.230]	5.551 [4.801; 6.301]	1 = 2 = 3 > 4

Note. M: Mean; CI: 95% Confidence Interval. Indicators of sleeping difficulties, work-family conflicts, and burnout are estimated from factor scores with a mean of 0 and a standard deviation of 1; Profile 1: Engaged; Profile 2: Disengaged; Profile 3: Engaged-Workaholic; Profile 4: Workaholic.

Table 4

Results from Multinomial Logistic Regressions for the Effects of the Predictors on Profile Membership (Study 2, Sample 1)

	Profile 1 vs. Profile 4		Profile 2 vs. Profile 4		Profile 3 vs. Profile 4	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Sex	.964 (.642)	2.622	2.705 (1.316)*	14.962	-.468 (.578)	.626
Tenure	.051 (.043)	1.052	.148 (.073)*	1.159	-.076 (.038)*	.927
Workload	-2.949 (.440)**	.052	-3.064 (.664)**	.047	-1.094 (.374)**	.335
	Profile 1 vs. Profile 3		Profile 2 vs. Profile 3		Profile 1 vs. Profile 2	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Sex	1.432 (.551)**	4.187	3.174 (1.272)*	23.903	-1.742 (1.188)	.175
Tenure	.127 (.043)**	1.135	.224 (.073)**	1.251	-.097 (.061)	.908
Workload	-1.854 (.293)**	.157	-1.969 (.587)**	.140	.115 (.553)	1.122

Note. * $p < .05$; ** $p < .01$; SE: Standard Error of the coefficient; OR: Odds Ratio; The coefficients and OR reflects the effects of the predictors on the likelihood of membership into the first listed profile relative to the second listed profile; Workload is estimated from factor scores with a mean of 0 and a standard deviation of 1; Profile 1: Engaged; Profile 2: Disengaged; Profile 3: Engaged-Workaholic; Profile 4: Workaholic.

Table 5

Results from Multinomial Logistic Regressions for the Effects of the Social Support Predictors on Profile Membership (Study 2, Sample 2)

	Profile 1 vs. Profile 4		Profile 2 vs. Profile 4		Profile 3 vs. Profile 4	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
POS	-.585 (.362)	.557	-1.806 (.800)*	.164	-.461 (.318)	.631
PSS	.076 (.309)	1.079	-.404 (.781)	.668	.493 (.263)	1.637
PCS	1.089 (.316)**	2.971	-2.267 (.548)**	.104	.914 (.298)**	2.494
	Profile 1 vs. Profile 3		Profile 2 vs. Profile 3		Profile 1 vs. Profile 2	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
POS	-.125 (.265)	.882	-1.345 (.740)	.261	1.220 (.722)	3.387
PSS	-.417 (.266)	.659	-.898 (.765)	.407	.481 (.725)	1.618
PCS	.175 (.270)	1.191	-3.180 (.526)**	.042	3.356 (.506)**	28.674

Note. * $p < .05$; ** $p < .01$; SE: Standard Error of the coefficient; OR: Odds Ratio; POS: Perceived organizational support; PSS: Perceived supervisor support; PCS: Perceived colleagues support; The coefficients and OR reflects the effects of the predictors on the likelihood of membership into the first listed profile relative to the second listed profile; POS, PSS, and PCS are estimated from factor scores with a mean of 0 and a standard deviation of 1; Profile 1: Engaged; Profile 2: Disengaged; Profile 3: Engaged-Workaholic; Profile 4: Workaholic.

Table 6

Results from the Mixture Regression Analysis Models (Study 3)

Model	LL	#fp	Scaling	AIC	CAIC	BIC	ABIC	Entropy	aLMR	BLRT
1 Profile	-1442.782	14	.9583	2913.564	2978.601	2964.601	2920.207	NA	NA	NA
2 Profiles	-1409.999	23	.9540	2865.998	2972.843	2949.843	2876.910	.814	≤ .001	≤ .001
3 Profiles	-1392.799	32	1.1626	2849.598	2998.252	2966.252	2864.780	.823	.509	.013
4 Profiles	-1377.080	41	1.0287	2836.160	3026.623	2985.623	2855.611	.829	.104	.030
5 Profiles	-1360.557	50	1.0398	2821.114	3053.386	3003.386	2844.836	.846	.242	≤ .001
6 Profiles	-1341.161	59	1.0634	2800.323	3074.404	3015.404	2828.315	.849	.315	.013
7 Profiles	-1325.924	68	1.1208	2787.849	3103.739	3035.739	2820.110	.860	.631	.076
8 Profiles	-1310.067	77	1.1618	2774.134	3131.833	3054.833	2810.665	.860	.695	.050

Note. LL: Model LogLikelihood; #fp: Number of free parameters; Scaling: Scaling factor associated with MLR loglikelihood estimates; AIC: Akaïke Information Criteria; CAIC: Constant AIC; BIC: Bayesian Information Criteria; ABIC: Sample-size adjusted BIC; aLMR: Adjusted Lo-Mendel-Rubin likelihood ratio test; BLRT: Bootstrap Likelihood Ratio Test.

Table 7

Profile-Specific Regression Equations Identified in Study 3

	Profile 1			Profile 2			Profile 3		
	a (s.e.)	b (s.e.)	β	a (s.e.)	b (s.e.)	β (s.e)	a (s.e.)	b (s.e.)	β (s.e)
Workaholism –> Sleeping Difficulties	-.760 (.074)**	.108 (.051)*	.244	1.477 (.119)**	.131 (.076)	.287	.368 (.136)**	-.145 (.176)	-.293
Engagement –> Sleeping Difficulties	-.760 (.074)**	.009 (.039)	.023	1.477 (.119)**	.064 (.069)	.155	.368 (.136)**	.187 (.211)	.417
Workaholism –> Work-Family Conflicts	-.152 (.117)	.558 (.088)**	.550	.630 (.321)*	.414 (.173)*	.440	.068 (.118)	.604 (.127)**	.582
Engagement –> Work-Family Conflicts	-.152 (.117)	.038 (.077)	.041	.630 (.321)*	.004 (.206)	.004	.068 (.118)	-.014 (.161)	-.015

Note. * $p < .05$; ** $p < .01$; a: Intercept; b: Unstandardized regression coefficient; β: Standardized regression coefficient; s.e.: Standard error of the coefficient; Predictors and outcomes are estimated from factor scores with a mean of 0 and a standard deviation of 1; Profile 1: Engaged; Profile 2: Workaholic; Profile 3: Engaged-Workaholic.

Table 8

Results from Multinomial Logistic Regressions for the Effects of the Predictors on Profile Membership (Study 3)

	Profile 1 vs. Profile 3		Profile 2 vs. Profile 3		Profile 1 vs. Profile 2	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Sex	-.208 (.413)	.812	-.808 (.532)	.446	.600 (.451)	1.822
Tenure	-.006 (.024)	.994	.023 (.028)	1.023	-.029(.023)	0.971
Workload	-.704 (.206)**	.494	.833 (.368)*	2.301	-1.538 (.363)**	0.215

Note. * $p < .05$; ** $p < .01$; SE: Standard Error of the coefficient; OR: Odds Ratio; The coefficients and OR reflects the effects of the predictors on the likelihood of membership into the first listed profile relative to the second listed profile; Workload is estimated from factor scores with a mean of 0 and a standard deviation of 1; Profile 1: Engaged; Profile 2: Workaholic; Profile 3: Engaged-Workaholic.

Online Supplements for:
Investigating the Combined Effects of Workaholism and Work Engagement: A Substantive Methodological Synergy of Variable-Centered and Person-Centered Methodologies

Preliminary Measurement Models

Preliminary measurement models were estimated using Mplus 8 (Muthén & Muthén, 2017) using the robust Maximum Likelihood (MLR) estimator, which provides parameter estimates, standard errors, and goodness-of-fit indices that are robust to the non-normality of the response scales used in the present study. Due to the online nature of the data collection process, there were no missing data in any of the studies considered here. Due to the complexity of the analyses conducted in the main article, our focus on global levels of workhaholism and work engagement (rather than on their sub-dimensions), and the typically high correlations observed between facets of workaholism (Huyghebaert et al., 2018) or wok engagement (Schaufeli, Bakker, & Salanova, 2006), we decided to rely on a bifactor confirmatory factor analytic (CFA) model (e.g., Holzinger & Swineford, 1937; Reise, 2012). In a single global model, two separate bifactor subsets were incorporated, one including a global factor (G-factor) reflecting global levels of workaholism and two specific factors (S-factors) reflecting workaholism facets (working excessively and compulsively), and one including a second G-factor reflecting global levels of work engagement and three S-factors reflecting work engagement facets (vigor, dedication, and absorption). In line with typical bifactor representations (Morin, Arens, & Marsh, 2016; Reise, 2012), all factors forming a specific subset were specified as orthogonal, although factors were allowed to correlate across subsets (i.e., workaholism factors were allowed to correlate with work engagement factors). Bifactor models have the advantage of providing a disaggregation of the item covariance into two components reflecting the global constructs under consideration (workaholism and work engagement) properly controlled for the item-level specificity uniquely related to the facets of these global constructs but not to the global constructs themselves.

Before saving the factor scores for our main analyses, we also verified that the measurement model operated in the same manner across studies and samples (Study 1, Study 2 Sample 1, Study 2 Sample 2, and Study 3), through sequential tests of measurement invariance (Millsap, 2011): (1) configural invariance, (2) weak invariance (loadings), (3) strong invariance (loadings and intercepts), (4) strict invariance (loadings, intercepts, and uniquenesses); (5) invariance of the latent variance-covariance matrix (loadings, intercepts, uniquenesses, and latent variances and covariances); and (6) latent means invariance (loadings, intercepts, uniquenesses, latent variances and covariances, and latent means). To ensure that the measures used in each specific study could be considered to be fully comparable, the factor scores used in main analyses were saved from the most invariant models from the previous sequence. Although only (partial) strict measurement invariance is required to ensure that measurement remains equivalent for models based on factor scores (e.g., Millsap, 2011), there are advantages to saving factors scores from a model of latent variance-covariance or latent mean invariance, which provides measures which are directly comparable across studies based respectively on a standard deviation of 1 and a mean of 0.

Given the known oversensitivity of the chi-square test of exact fit (χ^2) to sample size and minor model misspecifications (e.g., Marsh, Hau, & Grayson, 2005), we relied on sample-size independent goodness-of-fit indices to describe the fit of the alternative models (Hu & Bentler, 1999): The comparative fit index (CFI), the Tucker-Lewis index (TLI), as well as the root mean square error of approximation (RMSEA) and its 90% confidence interval. Values greater than .90 for the CFI and TLI indicate adequate model fit, although values greater than .95 are preferable. Values smaller than .08 or .06 for the RMSEA respectively support acceptable and excellent model fit. Like the chi square, chi square difference tests present a known sensitivity to sample size and minor model misspecifications so that recent studies suggest complementing this information with changes in CFIs and RMSEAs (Chen, 2007; Cheung & Rensvold, 2002) in the context of tests of measurement invariance. A ΔCFI of .010 or less and a ΔRMSEA of .015 or less between a more restricted model and the previous one supports the invariance hypothesis.

The goodness-of-fit results from all models are reported in Table S1. These results support the adequacy of the a priori bifactor-CFA models (with all CFI/TLI $\geq$ .90, and RMSEA $\leq$ .08). The tests of

measurement invariance support the configural and weak invariance of the model, but not its strong invariance (ΔCFI/TLI ≥ .010). We thus pursued tests of partial strong invariance, in in which a total of 8 equality constraints across studies had to be relaxed (out of 19 item intercepts specified to be invariant across 4 samples). From this model of partial strong invariance, the results also fail to support the complete strict invariance of the model (ΔCFI ≥ .010), but support a model of partial strict invariance in which a total of 8 equality constraints had to be relaxed. Subsequent steps support the invariance of the latent variances and covariances of the factors, but not the invariance of the latent means (ΔCFI/TLI ≥ .010). However, examination of these results suggested that the observed latent mean differences were limited to the S-factors, leading to a final model of partial latent mean invariance limited to the G-factors. These results globally show that the measurement models underlying our measures of global levels of workaholism and work engagement can be considered to be roughly equivalent across studies and samples.

The final parameter estimates from these models are reported in Tables S2 (Study 1), S3 (Study 2, Sample 1), S4 (Study 2, Sample 2), and S5 (Study 3). The results support the adequacy of the G-factors, which appear to be well-defined (workaholism: λ = .415 to .840, *M* = .588; work engagement: λ = .502 to .839, *M* = .678) and reliable (workaholism: ω = .861 to .876; work engagement: ω = .930 to .936; McDonald, 1970[1]). In addition, they show that the S-factors (working excessively, working compulsively, vigor, dedication, and absorption) are much more weakly defined, supporting our decision to focus on the global constructs of workaholism and work engagement in this research.

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[1] Composite reliability coefficients associated with each of the a priori factors are calculated from the model standardized parameters using McDonald (1970) omega (ω) coefficient:

$$\omega = \frac{(\sum|\lambda_i|)^2}{[(\sum|\lambda_i|)^2 + \sum \delta_i]}$$

where $|\lambda_i|$ are the standardized factor loadings associated with a factor in absolute values, and δi, the item uniquenesses. The numerator, were the factor loadings are summed, and then squared, reflects the proportion of the variance in indicators that reflect true score variance, whereas the denominator reflects total amount of variance in the items including both true score variance and random measurement errors (reflects by the sum of the items uniquenesses associated with a factor).

Table S1

Goodness-of-Fit Statistics for the Estimated Models (Workaholism and Work Engagement)

Description	χ^2 (*df*)	CFI	TLI	RMSEA	90% CI	CM	$\Delta\chi^2$ (*df*)	ΔCFI	ΔTLI	ΔRMSEA
Study 1	184.454 (121)*	.943	.919	.057	[.040; .073]					
Study 2, Sample 1	252.724 (121)*	.955	.936	.058	[.048; .068]					
Study 2, Sample 2	203.190 (121)*	.963	.948	.045	[.034; .056]					
Study 3	264.779 (121)*	.943	.919	.065	[.054; .075]					
M1. Configural invariance	955.622 (484)*	.946	.924	.060	[.054; .065]	-	-	-	-	-
M2. Weak invariance	1122.048 (577)*	.938	.926	.059	[.054; .064]	M1	170.721 (93)	-.008	+.002	-.001
M3. Strong invariance	1407.316 (613)*	.910	.899	.069	[.064; .073]	M2	252.184 (36)	-.028	-.027	+.010
M3’. Partial strong invariance	1224.206 (605)*	.929	.920	.061	[.056; .066]	M2	96.790 (28)	-.009	-.006	+.002
M4. Strict invariance	1391.128 (662)*	.917	.914	.063	[.059; .068]	M3’	153.164 (57)	-.012	-.006	+.002
M4’. Partial strict invariance	1337.290 (654)*	.922	.919	.062	[.057; .066]	M3’	111.019 (49)	-.007	-.001	+.001
M5. Var-Cov invariance	1440.808 (711)*	.917	.920	.061	[.057; .066]	M4’	103.354 (57)	-.005	+.001	-.001
M6. Latent means invariance	1628.310 (732)*	.898	.905	.067	[.062; .071]	M5	160.715 (21)	-.019	-.015	+.006
M6’. Partial means invariance	1481.591 (717)*	.913	.917	.062	[.058; .067]	M5	42.828 (6)	-.004	-.003	+.001

Note. * $p < .05$; χ^2: Scaled chi-square test of exact fit; *df*: Degrees of freedom; CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root mean square error of approximation; 90% CI: 90% confidence interval; Var-Cov: Variance-covariance; CM: Comparison model; Δ: Change in fit relative to the CM.

Table S2

Standardized Factor Loadings (λ) and Uniquenesses (δ) for the M6' Solution (Partial Latent Means Invariance with Partial Strict and Partial Strong Invariance) for Study 1

Items	G-W λ	S-WE λ	S-WC λ	G-E λ	S-V λ	S-D λ	S-A λ	δ
Working Excessively								
Item 1	.539	.478						.481
Item 2	.442	.419						.629
Item 3	.415	.405						.664
Item 4	.580	.233						.609
Item 5	.537	.368						.575
Working Compulsively								
Item 1	.530		.160					.694
Item 2	.560		*-.049*					.684
Item 3	.840		*.474*					*.070*
Item 4	.686		*-.312*					.432
Item 5	.641		*.243*					.530
ω	.861	.550	.389					
Vigor								
Item 1				.647	.685			.112
Item 2				.744	.407			.281
Item 3				.751	.111			.423
Dedication								
Item 1				.765		.339		.300
Item 2				.839		.296		.209
Item 3				.667		.204		.513
Absorption								
Item 1				.622			.125	.598
Item 2				.517			.736	.191
Item 3				.502			.778	.142
ω				.930	.639	.408	.743	

Note. G: Global factor estimated as part of a bifactor model; S: Specific factor estimated as part of a bifactor model; λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; W: Workaholism; WE: Working excessively; WC: Working compulsively; E: Work engagement; V: Vigor; D: Dedication; A: Absorption; Non-significant parameters ($p \geq .05$) are marked in italics.

Table S3

Standardized Factor Loadings (λ) and Uniquenesses (δ) for the M6' Solution (Partial Latent Means Invariance with Partial Strict and Partial Strong Invariance) for Study 2, Sample 1

Items	G-W λ	S-WE λ	S-WC λ	G-E λ	S-V λ	S-D λ	S-A λ	δ
Working Excessively								
Item 1	.539	.478						.481
Item 2	.442	.419						.629
Item 3	.504	.492						.504
Item 4	.696	.280						.436
Item 5	.537	.368						.575
Working Compulsively								
Item 1	.530		.160					.694
Item 2	.560		*-.049*					.684
Item 3	.840		*.474*					*.070*
Item 4	.686		*-.312*					.432
Item 5	.641		*-.243*					.530
ω	.876	.613	.389					
Vigor								
Item 1				.647	.685			.112
Item 2				.744	.407			.281
Item 3				.751	.111			.423
Dedication								
Item 1				.812		.360		.210
Item 2				.839		.296		.209
Item 3				.667		.204		.513
Absorption								
Item 1				.622			.125	.598
Item 2				.552			.786	.077
Item 3				.502			.778	.142
ω				.936	.639	.442	.777	

Note. G: Global factor estimated as part of a bifactor model; S: Specific factor estimated as part of a bifactor model; λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; W: Workaholism; WE: Working excessively; WC: Working compulsively; E: Work engagement; V: Vigor; D: Dedication; A: Absorption; Non-significant parameters ($p \geq .05$) are marked in italics.

Table S4

Standardized Factor Loadings (λ) and Uniquenesses (δ) for the M6' Solution (Partial Latent Means Invariance with Partial Strict and Partial Strong Invariance) for Study 2, Sample 2

Items	G-W λ	S-WE λ	S-WC λ	G-E λ	S-V λ	S-D λ	S-A λ	δ
Working Excessively								
Item 1	.539	.478						.481
Item 2	.442	.419						.629
Item 3	.504	.492						.504
Item 4	.580	.233						.609
Item 5	.537	.368						.575
Working Compulsively								
Item 1	.530		.160					.694
Item 2	.560		*-.049*					.684
Item 3	.840		*.474*					*.070*
Item 4	.686		*-.312*					.432
Item 5	.641		*-.243*					.530
ω	.862	.586	.389					
Vigor								
Item 1				.610	.646			.211
Item 2				.744	.407			.281
Item 3				.751	.111			.423
Dedication								
Item 1				.812		.360		.210
Item 2				.839		.296		.209
Item 3				.667		.204		.513
Absorption								
Item 1				.622			.125	.598
Item 2				.517			.736	.191
Item 3				.502			.778	.142
ω				.930	.597	.442	.743	

Note. G: Global factor estimated as part of a bifactor model; S: Specific factor estimated as part of a bifactor model; λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; W: Workaholism; WE: Working excessively; WC: Working compulsively; E: Work engagement; V: Vigor; D: Dedication; A: Absorption; Non-significant parameters ($p \geq .05$) are marked in italics.

Table S5

Standardized Factor Loadings (λ) and Uniquenesses (δ) for the M6' Solution (Partial Latent Means Invariance with Partial Strict and Partial Strong Invariance) for Study 3

Items	G-W λ	S-WE λ	S-WC λ	G-E λ	S-V λ	S-D λ	S-A λ	δ
Working Excessively								
Item 1	.482	.428						.585
Item 2	.442	.419						.629
Item 3	.504	.492						.504
Item 4	.580	.233						.609
Item 5	.537	.368						.575
Working Compulsively								
Item 1	.628		.189					.570
Item 2	.560		*-.049*					.684
Item 3	.840		*.474*					*.070*
Item 4	.686		*-.312*					.432
Item 5	.641		*-.243*					.530
ω	.870	.565	.413					
Vigor								
Item 1				.683	.723			.011
Item 2				.744	.407			.281
Item 3				.751	.111			.423
Dedication								
Item 1				.812		.360		.210
Item 2				.839		.296		.209
Item 3				.667		.204		.513
Absorption								
Item 1				.622			.125	.598
Item 2				.517			.736	.191
Item 3				.502			.778	.142
ω				.936	.683	.442	.743	

Note. G: Global factor estimated as part of a bifactor model; S: Specific factor estimated as part of a bifactor model; λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; W: Workaholism; WE: Working excessively; WC: Working compulsively; E: Work engagement; V: Vigor; D: Dedication; A: Absorption; Non-significant parameters ($p \geq .05$) are marked in italics.

Table S6

Standardized Factor Loadings (λ) and Uniquenesses (δ) for the Outcome Variables (Study 1)

Items	SD λ	WFC λ	B λ	δ
Sleeping Difficulties				
Item 1	.760			.422
Item 2	.866			.251
Item 3	.865			.251
Item 4	.704			.504
ω	.877			
Work-Family Conflicts				
Item 1		.833		.306
Item 2		.676		.543
Item 3		.856		.267
ω		.834		
Burnout				
Item 1			.876	.233
Item 2			.844	.287
Item 3			.898	.193
Item 4			.930	.135
Item 5			.760	.422
ω			.936	

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; SD: Sleeping difficulties; WFC: Work-family conflicts; B: Burnout.

Table S7

Latent Correlations between Variables (Study 1)

Variable	1	2	3	4	5	6
1. Work Engagement†	-					
2. Workaholism†	-.176*	-				
3. Sleeping Difficulties†	-.164	.473**	-			
4. Work-Family Conflicts†	-.292**	.734**	.553**	-		
5. Burnout†	-.507**	.650**	.539**	.643**	-	
6. Work Performance	.441**	-.275**	-.303**	-.303**	-.404**	-

Note. * $p < .05$; ** $p < .01$; †: Factor scores from preliminary models with a mean of 0 and standard deviation of 1.

Table S8

Standardized Factor Loadings (λ) and Uniquenesses (δ) for the Covariables (Study 2, Sample 1)

Items	W λ	SD λ	WFC λ	B λ	δ
Workload					
Item 1	.617				.619
Item 2	.713				.491
Item 3	.792				.372
Item 4	.666				.557
Item 5	.674				.546
ω	.823				
Sleeping Difficulties					
Item 1		.651			.576
Item 2		.854			.271
Item 3		.894			.201
Item 4		.558			.689
ω		.834			
Work-Family Conflicts					
Item 1			.818		.330
Item 2			.859		.262
Item 3			.769		.409
ω			.857		
Burnout					
Item 1				.770	.407
Item 2				.817	.332
Item 3				.806	.351
Item 4				.858	.264
Item 5				.536	.713
ω				.874	

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; W: Workload; SD: Sleeping difficulties; WFC: Work-family conflicts; B: Burnout.

Table S9

Correlations between Variables (Study 2, Sample 1)

Variable	1	2	3	4	5	6	7	8	9
1. Work Engagement†	-								
2. Workaholism†	-.071	-							
3. Sleeping Difficulties†	-.127*	.395**	-						
4. Work-Family Conflicts†	-.140*	.584**	.429**	-					
5. Burnout†	-.381**	.537**	.446**	.605**	-				
6. Work Performance	.333**	-.036	-.174**	-.178**	-.289**	-			
7. Sex	-.048	-.186**	-.124*	-.111*	-.053	-.049	-		
8. Tenure	-.092	-.157**	-.006	-.018	-.032	.086	-.066	-	
9. Workload†	-.153**	.595**	.260**	.589**	.686**	-.142*	-.058	-.075	-

Note. * $p < .05$; ** $p < .01$; †: Factor scores from preliminary models with a mean of 0 and standard deviation of 1; Sex is coded 0 for females and 1 for males.

Table S10

Standardized Factor Loadings (λ) and Uniquenesses (δ) for the Covariables (Study 2, Sample 2)

Items	W λ	OS λ	SS λ	CS λ	SD λ	WFC λ	B λ	δ
Workload								
Item 1	.806							.350
Item 2	.825							.319
Item 3	.841							.293
Item 4	.722							.479
Item 5	.645							.584
ω	.879							
Organizational Support								
Item 1		.853						.245
Item 2		.284						.623
Item 3		.781						.341
Item 4		.339						.093
ω		.796						
Supervisor Support								
Item 1			.888					.167
Item 2			.630					.357
Item 3			.814					.303
Item 4			.633					.466
ω			.872					
Colleagues Support								
Item 1				.863				.253
Item 2				.613				.154
Item 3				.784				.382
Item 4				.715				.461
ω				.876				
Sleeping Difficulties								
Item 1					.806			.351
Item 2					.897			.196
Item 3					.894			.200
Item 4					.678			.540
ω					.893			
Work-Family Conflicts								
Item 1						.866		.249
Item 2						.932		.131
Item 3						.783		.388
ω						.897		
Burnout								
Item 1							.792	.373
Item 2							.758	.426
Item 3							.852	.274
Item 4							.880	.225
Item 5							.641	.589
ω							.891	

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; W: Workload; OS: Organizational support; SS: Supervisor support; CS: Colleagues support; SD: Sleeping difficulties; WFC: Work-family conflicts; B: Burnout.

Table S11

Correlations between Variables (Study 2, Sample 2)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Work Engagement†	-											
2. Workaholism†	-.219**	-										
3. Sleeping Difficulties†	-.234**	.406**	-									
4. Work-Family Conflicts†	-.212**	.467**	.412**	-								
5. Burnout†	-.439**	.538**	.582**	.548**	-							
6. Work Performance	.386**	-.205**	-.225**	-.159**	-.330**	-						
7. Sex	.021	-.049	-.063	.000	-.102	.067	-					
8. Tenure	-.054	-.173**	.012	-.105	-.063	.015	.028	-				
9. Workload†	-.158**	.528**	.348**	.399**	.544**	-.148**	-.084	-.242**	-			
10. Organizational Support†	.074	-.178**	-.164**	-.266**	-.239**	.017	-.023	.081	-.495**	-		
11. Supervisor Support†	.140*	-.112*	-.201**	-.180**	-.180**	.080	.056	.017	-.296**	.582**	-	
12. Colleagues Support†	.304**	-.178**	-.213**	-.271**	-.271**	.135*	.034	-.095	-.149**	.050	.186**	-

Note. * $p < .05$; ** $p < .01$; †: Factor scores from preliminary models with a mean of 0 and standard deviation of 1; Sex is coded 0 for females and 1 for males.

Table S12

Detailed Results from the Final Latent Profile Solution (Study 2, Sample 1)

	Profile 1 M [CI]	Profile 2 M [CI]	Profile 3 M [CI]	Profile 4 M [CI]
Workaholism	-1.078 [-1.296; -0.860]	-1.539 [-2.153; -0.925]	0.534 [0.394; 0.673]	0.775 [0.489; 1.061]
Work Engagement	0.316 [0.145; 0.487]	-2.772[-3.169; -2.376]	0.364 [0.164; 0.565]	-1.171 [-1.472; -0.871]

Note. M: Mean; CI: 95% confidence interval; Profile 1: Engaged; Profile 2: Disengaged; Profile 3: Engaged-Workaholic; Profile 4: Workaholic.

Table S13

Statistical Significance of the Between Profile Differences in Outcome Levels (Study 2, Sample 1)

	Δ1-2 (s.e.)	Δ1-3 (s.e.)	Δ1-4 (s.e.)	Δ2-3 (s.e.)	Δ2-4 (s.e.)	Δ3-4 (s.e.)
Sleeping Difficulties	-.812 (.403)*	-.960 (.122)**	-1.396 (.160)**	-.148 (.418)	-.584 (.431)	-.436 (.161)**
Work-Family Conflicts	.351 (.367)	-1.232 (.155)**	-1.675 (.198)**	-1.583 (.348)**	-2.026 (.365)**	-.443 (.147)**
Burnout	-.979 (.230)**	-1.212 (.123)**	-1.986 (.139)**	-.233 (.215)	-1.007 (.219)**	-.774 (.109)**
Performance	.040 (.793)	.227 (.170)	1.690 (.406)**	.187 (.791)	1.650 (.839)*	1.463 (.449)**

Note. Δ: Between-profile difference calculated using the multivariate delta method; s.e.: Standard error of the difference; * $p \leq .05$; ** $p \leq .01$.

Table S14

Detailed Results from the Final Latent Profile Solution (Study 2, Sample 2)

	Profile 1 M [CI]	Profile 2 M [CI]	Profile 3 M [CI]	Profile 4 M [CI]
Workaholism	-0.975 [-1.104; -0.846]	-1.414 [-2.101; -0.727]	0.498 [0.395; 0.602]	0.628 [0.474; 0.781]
Work Engagement	0.315 [0.217; 0.412]	-2.621 [-3.042; -2.200]	0.259 [0.132; 0.386]	-1.195 [-1.395; -0.996]

Note. M: Mean; CI: 95% confidence interval; Profile 1: Engaged; Profile 2: Disengaged; Profile 3: Engaged-Workaholic; Profile 4: Workaholic.

Table S15

Associations between Profile Membership and the Outcomes (Explanatory Similarity Study 2)

	Profile 1 M [CI]	Profile 2 M [CI]	Profile 3 M [CI]	Profile 4 M [CI]	Summary of Significant Differences
Sleeping Difficulties	-.778 [-.906; -.650]	.054 [-.690; .798]	.243 [.133; .352]	.587 [.427; .748]	4 > 3 >1; 2 >1; 2 = 3; 2 = 4
Work-Family Conflicts	-0.865 [-1.022; -.709]	-1.360 [-1.815; -.904]	.322 [.230; .413]	.609 [.474; .745]	4 > 3 > 1 > 2
Burnout	-.996 [-1.120; -.873]	.215 [-.269; .699]	0.238 [.140; .337]	.923 [.824; 1.023]	4 > 2 = 3 > 1
Performance	7.328 [7.182; 7.474]	7.117 [5.972; 8.261]	7.169 [7.052; 7.285]	5.218 [4.699; 5.738]	1 = 2 = 3 > 4

Note. M: Mean; CI: 95% confidence interval; Indicators of sleeping difficulties, work-family conflicts, and burnout are estimated from factor scores with a mean of 0 and a standard deviation of 1; Profile 1: Engaged; Profile 2: Disengaged; Profile 3: Engaged-Workaholic; Profile 4: Workaholic.

Table S16

Statistical Significance of the Between Profile Differences in Outcome Levels (Explanatory Similarity Study 2)

	Δ1-2 (s.e.)	Δ1-3 (s.e.)	Δ1-4 (s.e.)	Δ2-3 (s.e.)	Δ2-4 (s.e.)	Δ3-4 (s.e.)
Sleeping Difficulties	-.832 (.386)*	-1.021 (.085)**	-1.366 (.108)**	-.189 (.383)	-.533 (.389)	-.345 (.105)**
Work-Family Conflicts	.494 (.245)	-1.187 (.091)**	-1.475 (.110)**	-1.682 (.238)**	-1.969 (.241)**	-.288 (.086)**
Burnout	-1.211 (.255)**	-1.235 (.075)**	-1.919 (.083)**	-.023 (.252)	-.708 (.251)**	-.685 (.072)**
Performance	.211 (.589)	.160 (.095)	2.110 (.277)**	-.052 (.587)	1.899 (.635)**	1.950 (.277)**

Note. Δ: Between-profile difference calculated using the multivariate delta method; s.e.: Standard error of the difference; * $p \leq .05$; ** $p \leq .01$.

Table S17

Results from Multinomial Logistic Regressions for the Effects of the Demographic Predictors and Workload on Profile Membership (Predictive Similarity Study 2)

	Profile 1 vs. Profile 4		Profile 2 vs. Profile 4		Profile 3 vs. Profile 4	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Sex	.648 (.337)	1.911	2.293 (1.164)*	9.901	-.135 (.485)	.874
Tenure	-.002 (.025)	.998	.075 (.053)	1.077	-.080 (.023)**	.924
Workload	-2.422 (.337)**	.089	-2.810 (.517)**	.060	-.812 (.290)**	.444
	Profile 1 vs. Profile 3		Profile 2 vs. Profile 3		Profile 1 vs. Profile 2	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Sex	.782 (.431)*	2.187	2.427 (1.121)*	11.329	-1.645 (1.057)	.193
Tenure	.078 (.026)**	1.081	.154 (.053)**	1.167	-.077 (.047)	.926
Workload	-1.610 (.256)**	.200	-1.998 (.479)**	.136	.387 (.417)	1.473

Note. * $p < .05$; ** $p < .01$; SE: Standard error of the coefficient; OR: Odds ratio; The coefficients and OR reflects the effects of the predictors on the likelihood of membership into the first listed profile relative to the second listed profile; Workload is estimated from factor scores with a mean of 0 and a standard deviation of 1; Profile 1: Engaged; Profile 2: Disengaged; Profile 3: Engaged-Workaholic; Profile 4: Workaholic.

Table S18

Standardized Factor Loadings (λ) and Uniquenesses (δ) for the Covariables (Study 3)

Items	W λ	SD λ	WFC λ	δ
Workload				
Item 1	.715			.488
Item 2	.856			.267
Item 3	.736			.459
Item 4	.719			.483
Item 5	.617			.619
ω	.851			
Sleeping Difficulties				
Item 1		.750		.437
Item 2		.883		.221
Item 3		.917		.159
Item 4		.725		.475
ω		.892		
Work-Family Conflicts				
Item 1			.907	.177
Item 2			.868	.247
Item 3			.860	.260
ω			.910	

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; W: Workload; SD: Sleeping difficulties; WFC: Work-family conflicts.

Table S19

Correlations between Variables (Study 3)

Variable	1	2	3	4	5	6	7
1. Work Engagement†	-						
2. Workaholism†	-.027	-					
3. Sleeping Difficulties†	-.156*	.347*	-				
4. Work-Family Conflicts†	-.073	.618*	.449*	-			
5. Sex	-.073	.052	-.102	.043	-		
6. Tenure	.043	.012	.098	.084	.063	-	
7. Workload†	.067	.551*	.386*	.555*	-.003	.105	-

Note. * $p < .05$; ** $p < .01$; †: Factor scores from preliminary models with a mean of 0 and standard deviation of 1; Sex is coded 0 for females and 1 for males.

Table S20

Within-Profile Mean Levels of Workaholism and Work Engagement from the Final Mixture Regression Model Estimated in Study 3

	Profile 1 M [CI]	Profile 2 M [CI]	Profile 3 M [CI]
Workaholism	-0.378 [-0.523; -0.232]	0.432 [-0.003; 0.867]	0.058 [-0.121; 0.237]
Work Engagement	0.265 [0.085; 0.444]	-0.525 [-1.122; 0.072]	0.247 [0.066; 0.428]

Note. M: Mean; CI: 95% confidence interval; Profile 1: Engaged; Profile 2: Workaholic; Profile 3: Engaged-Workaholic.

Table S21

Detailed Parameter Estimates from Within-Profile Regressions Estimated in Study 3

	Profile 1			Profile 2			Profile 3		
	a (s.e.) [CI]	b (s.e.) [CI]	β (s.e) [CI]	a (s.e.) [CI]	b (s.e.) [CI]	β (s.e) [CI]	a (s.e.) [CI]	b (s.e.) [CI]	β (s.e) [CI]
Workaholism –> Sleeping Difficulties	-.760 (.074) [-.882; -.639]	**.108** (.051)* [.024; .192]	**.244** (.121)* [.045; .442]	1.477 (.119) [1.282; 1.672]	.131 (.076) [.006; .256]	.287 (.171) [.005; .569]	.368 (.136) [.145; .591]	-.145 (.176) [-.435; .145]	-.293 (.257) [-.717; .130]
Engagement –> Sleeping Difficulties	-.760 (.074) [-.882; -.639]	.009 (.039) [-.055; .074]	.023 (.095) [-.133; .180]	1.477 (.119) [1.282; 1.672]	.064 (.069) [-.050; .178]	.155 (.154) [-.099; .408]	.368 (.136) [.145; .591]	.187 (.211) [-.161; .534]	.417 (.316) [-.103; .936]
Workaholism –> Work-Family Conflicts	-.152 (.117) [-.344; .040]	**.558** (.088)** [.413; .703]	**.550** (.059)** [.452; .648]	.630 (.331) [.085; 1.175]	**.414** (.173)* [.130; .698]	**.440** (.153)* [.189; .692]	.068 (.118) [-.127; .262]	**.604** (.127)** [.395; .812]	**.582** (.097)** [.422; .741]
Engagement –> Work-Family Conflicts	-.152 (.117) [-.344; .040]	.038 (.077) [-.090; .165]	.041 (.086) [-.100; .182]	.630 (.331) [.085; 1.175]	.004 (.206) [-.335; .342]	.004 (.241) [-.393; .401]	.068 (.118) [-.127; .262]	-.014 (.161) [-.279; .251]	-.015 (.171) [-.296; .266]

Note. * $p < .05$; ** $p < .01$; a: Intercept; b: Unstandardized regression coefficient; β: Standardized regression coefficient; s.e.: Standard error of the coefficient; CI: 95% confidence interval; Profile 1: Engaged; Profile 2: Workaholic; Profile 3: Engaged-Workaholic.