













	AVE	SC			
		1.	2.	3.	4.
1. Engagement	0.88	–			
2. Working Compulsively	0.39	0.02	–		
3. Working Excessively	0.43	0.02	0.74	–	
4. Work-Home-Facilitation	0.41	0.29	0.07	0.01	–
5. Work-Home-Conflict	0.51	0.13	0.51	0.33	0.17

**Table 2** Average variance extracted (AVE) and Squared correlations of latent variables (SC) ( $n = 5341$ ).

measurement model [ $\chi^2(282) = 6630.11$ ,  $p > .05$ ; CFI = 0.91; TLI = 0.90; RMSEA = 0.07; SRMR = 0.08].

### TESTING DIRECT AND INDIRECT EFFECTS

The SEM model with direct and mediating effects fitted the data acceptably well [ $\chi^2(366) = 7508.12$ ,  $p > .05$ ; CFI = 0.91; TLI = 0.90; RMSEA = 0.06; SRMR = 0.08] and accounted for a significant amount of variance in the outcome variables of positive work-related health ( $R^2 = 50.88\%$ ), and negative work-related health ( $R^2 = 57.35\%$ ).

The SEM model did not support a direct relationship between working excessively or working compulsively and positive or negative work-related health (Table 3). However, work engagement was positively related to positive work-related health ( $\beta = .08$ ,  $p < .001$ ) and negatively related to negative work-related health ( $\beta = -.09$ ,  $p < .001$ ). Work-home conflict mediated a negative relationship between working compulsively and positive work-related health ( $\beta = -.22$ ,  $p < .001$ ) and a positive relationship between working compulsively and negative work-related health ( $\beta = .42$ ,  $p < .001$ ). Since no direct relationship was found between working compulsively and work-related health, this implies an indirect-only mediation (Zhao et al. 2010). No mediation effect of work-home facilitation was found between the two dimensions of workaholism and work-related health.

The model suggested that work-home conflict mediated a positive relationship between engagement and positive work-related health ( $\beta = .10$ ,  $p < .001$ ) and a negative relationship between engagement and negative work-related health ( $\beta = -.20$ ,  $p < .001$ ). Similarly, work-home facilitation mediated a positive relationship between engagement and positive work-related health ( $\beta = .22$ ,  $p < .001$ ) and a negative relationship between engagement and negative work-related health ( $\beta = -.06$ ,  $p < .001$ ). Because the direct effects from work engagement to positive and negative work-related health were significant, this mediation can be classified as a complementary mediation (Zhao, Lynch, & Chen, 2010). Figure 2 provides a visualization of the direct effects found in the SEM model.

## DISCUSSION

The present study illuminates the contradictory relationship between two forms of heavy investment and passion at work (workaholism and work engagement) and positive/negative work-related health by examining the mediating role of WHI. In contrast to previous findings linking workaholism to mental and physical health (i.e., Ng et al., 2007; Shimazu et al., 2015) and health in general (Schaufeli et al., 2006), the direct effect of workaholism on the respondent's perception that work influences their health positively or negatively was not supported in the present analyses (Hypothesis 1a and 1b). Although the study performed by Schaufeli et al. (2006) also assessed health by one item (e.g., «Generally speaking, do you feel healthy? »), it differs from the present study by being context free. As suggested by Ng, Sørensen, & Feldman (2007) a lack of self-determination in the compulsive activities performed by workaholics and a potential denial of the seriousness of workaholism and how work can negative influence their health, might have provided the non-significant relationship in the present study. This potential denial of the seriousness of workaholism among workaholics should be explored further.

Hypothesis 3 was partly substantiated as the model supported an indirect-only mediating effect of work-home conflict between working compulsively and positive/negative work-related health. However, a mediating effect of the work-home facilitation was not found in this association. This is in line with Hakanen and Peeters' (2015) study suggesting that workaholism was related to work-family conflict, but not enrichment, over time. Thus, it seems that it is not the hard work itself that impairs health, but how a heavy work investment negatively interferes with family life. In fact, the mediating effect of work-home conflict between working compulsively and negative work-related health was among the strongest relationship found in the proposed model, suggesting a “battle for resources” between two common desired resources; work and family (Hobfoll, 2011). This agree with a study by Di Stefano and Gaudiino (2018) suggesting workaholism to be more strongly related





*relax when I'm not working*" and *"I feel guilty when I take time off work"*) it is easy to see overlapping themes with work-home conflict, but also with working excessively (*"I spend more time working than on socializing with friends, on hobbies, or on leisure activities"*). Time spent working at the expense of other important life roles has been one of the key elements in most definitions of workaholism (see Ng, Sørensen, & Feldman, 2007 for a review). Thus, future studies should aim to find solutions to differentiate between workaholism and work-home conflict in a better way. Nevertheless, the inverse relationship of workaholism and work engagement with WHI and health suggest that these are different constructs with different correlates and outcomes. Whereas workaholism represents a harmful way of working hard, the joy and resources provided by the hard work conducted by an engaged employee interacts positively with their family life and boosts health. Awareness of these differences is important for leaders and organizations to identify who is at a risk and should be targeted for interventions.

## WEAKNESSES AND STRENGTHS

The current study enhances the theoretical grounding of the relationships between workaholism and engagement with work-related health by suggesting a mediating role of work-home interaction. The study findings are supported by a large and homogenous sample of academic workers, and the use of advanced statistical analyses controlling for measurement errors providing a stronger test of the assumed relationships. The study is also timely, given the changing nature of work: longer working hours, high work demand, new technologies blurring work and home life, and an increased prevalence of workaholism (Andreassen et al., 2014; Ng, Sørensen, & Feldman, 2007). Nevertheless, there are some concerns that needs to be addressed.

Issues relate to the use of a cross-sectional sample and self-reported data to test mediational effects that may be subjected to common method/source variance, one of the main sources of measurement error (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). However, in the present study the data was analyzed by Structural Equation Modelling (SEM) in Stata controlling for measurement error to minimize this issue. Nevertheless, it should be noted that the causal language talking about "mediation effect" is a statistical expression as our results do not have a valid basis for making causal inferences about our variables. Although our findings are basically consistent with the assumed model (*Figure 1*), there may be several other models that are consistent with our pattern of covariances that we could not rule out. This is a drawback of performing mediation analysis on cross sectional or non-experimental research design (Stone-Romero & Rosopa, 2008). In general, the cross-sectional nature of the data precludes any assumptions of causal inference. Although the assumption that work-

related health would affect workaholism is less likely, longitudinal data provides a stronger test for causal relationships.

As with most self-reported surveys, this study also runs the risk of response bias. Although DUWAS was found to be strongly correlated with peer-reports of workaholism (Littman-Ovadia, Balducci, & Ben-Moshe 2014), the negative emotions found among workaholics versus the positive emotions found among engaged workers (Clark et al., 2014) can produce a systematic difference in the reporting style (e.g., pessimistic people have poor appraisals of both their health and their work-home experiences). Moreover, work-related health is assessed by a subjective measure of how the respondents think that work influences their health positively or negatively. There could be some sort of norm built into questions of self-reported health (e.g., compared to others, or previously). Moreover, the outcome variable of negative/positive work-related health has an "built-in" relation in the wording of the question that suggests that work is affecting the person negatively or positively. Thus, there could be a risk that the concept of negative work-related health overlapped somewhat with work-home conflict, and positive work-related health overlapped with work-home facilitation. Objective measures could overcome these methodological challenges. A single-question self-rating on health is judged to be appropriate for use in population surveys in general and when used as an outcome variable to avoid overlap with different multi-item predictors (Bowling, 2005). Although single-item measures have proven to be a reliable measure for health (DeSalvo et al., 2006), multi-item measures are less prone to sociopsychological biases (Bowling, 2005), and the results must be interpreted with this in mind.

Finally, although the present study uses a large, homogenous sample of academic workers in Norway, it should be noted that the generalizability of the findings might be subject to knowledge workers in Norway. Hobfoll, Halbesleben, Neveu, & Westman (2018) highlight the need to consider resources within the framework of their cultural context. As different resources such as time for family and/or work are valued or ranked differently in individualistic versus collectivist versus familial cultures, the strength of the relationships tested in the present study might vary across cultures. In a recent meta-analysis on workaholism and work engagement, Di Stefano and Gaudiino (2019) found nationality to have a significant moderating effect on the correlations. However, due to many differences in both the direction and magnitude of the correlations, any single, coherent conclusion about the way in which nationality modifies such correlations could not be achieved. As Norway was not included in this comprehensive meta-analysis, the present study adds to the lack of knowledge on workaholism and work engagement in a Norwegian setting. Moreover, previous studies have suggested that

private-sector employees work more hours per week than public-sector employees and that Japanese work more hours per week than all other nationalities (Snir & Harpaz, 2006). The possible influence of such cultural and sectoral differences on the proposed relationships in the present study remains to be explored.

## CONCLUSION

The present study makes an important contribution to the literature as this is the first study to provide a comprehensive examination of the contradictory relationship between two forms of heavy investment and passion at work and work-related health by examining the mediating role of WHI. In general, the present study expands previous studies by including two facets of hard work (work engagement and workaholism), two facets of work-home interaction (conflict and facilitation), and last, two facets of work-related health (positive and negative). Our study provides support for the propositions that workaholism dimensions can be differentiated from work engagement by performing discriminant validity tests and revealing different relationships with correlates and outcomes. Overall, this study suggests that workaholism represents a harmful way of working hard, whereas the joy and resources produced by hard work conducted by an engaged employee interact positively with their family life and boost health. Given the mediating role of work-home interaction found on work related health, university leaders, human resources personnel, employee representatives and occupational health services should pay attention and greater focus on the boundary-less work life prevalent among academics. To do so, they should focus on how to facilitate for a work-family friendly climate as a start. As supported by an intervention study by Hammer et al. (2016) a work-family friendly climate is determining for whether supporting initiatives are utilized or not, and hence the key issues for any work-family/home intervention success. Moreover, given the direct relationship between work engagement and both positive/negative work-related health we urge practitioners and leaders to identify ways to increase the employee's work engagement. In a systematic review and meta-analysis investigating the effectiveness of work engagement interventions, Knight, Patterson, & Dawson (2017) demonstrated a medium to large effect of group interventions, highlighting the benefit of working in groups for increasing resources. Overall, we encourage future researchers to test the longitudinal effect the intensification of academic work in combination with high passion, academic freedom and autonomy which might interfere with academics' home life and health. We hope the results of the present study will stimulate future research in this area.

## COMPETING INTERESTS

The authors have no competing interests to declare.

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