



Sick of Leading? Supervisory Responsibility and Its Consequences for Sickness Absenteeism and Sickness Presenteeism

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Abstract

This research examines the impact of leadership positions with supervisory responsibility on two labor-market related health behaviors—sickness absenteeism and sickness presenteeism, i.e., working while being sick. Drawing on the job demands-resources (JD-R) model, this study posits that supervisory responsibility, serving as both a job resource and a demand, reduces sickness absenteeism while concurrently increasing sickness presenteeism behavior. The study identifies permanent availability and time pressure as two key aspects of leadership positions with supervisory responsibility that mediate these relationships. Using German-linked employer-employee data, the empirical results suggested that having supervisory responsibility reduces sickness absenteeism while at the same time elevating the engagement in sickness presenteeism. Furthermore, these relationships are partially mediated by leaders' need for permanent availability and the time pressure inherent in positions with supervisory responsibility. This research advances our understanding of job characteristics of leadership positions by illustrating that job demands can yield favorable outcomes, offering valuable insights into the complex interplay between leadership positions and leaders' health behaviors.

Keywords Supervisory responsibility · Leadership · Sickness absenteeism · Sickness presenteeism · Job demands-resources model

Nowadays, many young professionals no longer aspire to attain leadership positions within their careers. This paradigmatic change can be attributed to the growing concern among potential leaders regarding the inherent demands associated with such positions that can have adverse health outcomes, like, for example, severe stress and high burnout rates (e.g., Fletcher & French, 2021; Guedes et al., 2017). As a result, it becomes increasingly hard for organizations to fill leadership positions. But does leading really make you sick? And is this caused by the expectation for leaders to be permanently available, coupled with time pressures inherent to such positions? As recognized by Fletcher and French (2021), although a transition into a leadership position with supervisory responsibility can be both fulfilling

and challenging, the relationship between leadership and health remains unclear. More research on leadership and health is needed, calling for deeper investigation into various aspects of leadership positions and their potential effects on health (Inceoglu et al., 2021; Wegge et al., 2014).

To shed more light on the relationship between a leadership position with supervisory responsibility and health, this study focuses on two labor-market related health behaviors: sickness absenteeism and sickness presenteeism, with sickness absenteeism referring to individuals missing work due to illness and sickness presenteeism occurring when individuals continue to work despite being sick. These health behaviors hold critical significance for organizations due to their economic costs, including productivity losses (Dietz & Zacher, 2022; Grinza & Rycx, 2020; Keloharju et al., 2023; Yang et al., 2022) and heightened sickness absenteeism among other employees (Dietz et al., 2020). Furthermore, sickness absenteeism and sickness presenteeism serve as good indicators of an individual's health (Gerich, 2015a) making them pertinent for both employees and society. Understanding the factors within leadership positions that influence these health behaviors is imperative. This

Additional supplementary materials may be found here by searching on article title <https://osf.io/collections/jbp/discover>.

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knowledge can assist organizations in providing support to their leaders, enabling them to effectively navigate the demands of their positions and retain qualified personnel. Thus, this study aims to investigate how leadership positions with supervisory responsibility impact an employee's sickness absenteeism and sickness presenteeism behavior, examining the role of the demands for permanent availability and time pressure.

Based on the job demands-resources (JD-R) model by Demerouti et al. (2001), this paper posits that supervisory responsibility can function as both a job resource and demand. More precisely, this study follows Crawford et al.'s (2010) differentiation of job demands and classifies supervisory responsibility as a challenge job demand due to the expectations of permanent availability and time pressure inherent to these positions: Supervisory responsibility acts as a job resource, fostering work engagement, while concurrently also serving as a challenge demand, promoting personal growth and motivation, and leading to higher work engagement as well. The increased work engagement reduces sickness absenteeism but raises presenteeism behavior. Thus, I argue that the characteristics of supervisory responsibility that categorize it as a challenge job demand—permanent availability and time pressure—are the driving factors explaining sickness absenteeism and presenteeism.

This research contributes to the literature in several ways. Although prior studies have explored leadership's influence on followers' health (see, e.g., physical health, Franke et al., 2014; Zwingmann et al., 2014; psychological health, Walsh et al., 2014; burnout, Schaufeli, 2015; sickness absenteeism, Dietz et al., 2020; K. Nielsen & Daniels, 2016; Rugulies et al., 2021), little attention has been given to leaders' own health. Studies on leadership positions with supervisory responsibility and related health outcomes have primarily focused on well-being (Fletcher & French, 2021; Li et al., 2018), mental health (Boyce & Oswald, 2012), emotional exhaustion (Debus et al., 2019), or health in general (Schieman & Reid, 2009), presenting mixed results and often overlooking sickness absenteeism. Despite some of these studies suggested that leadership positions with supervisory responsibility may lead to increased emotional exhaustion (see, e.g., Debus et al., 2019), others found no significant association, citing a balance between stress and resources at higher status levels (see, e.g., Schieman & Reid, 2009). Additionally, Fletcher and French (2021) disclosed that individuals experience a higher level of tension through supervisory responsibility in the short run but in the long run, a leader's emotional well-being is improved. Few studies have explored sickness absenteeism, and none has specifically investigated the phenomenon of supervisory responsibility in this context. Research by Kröger (2017), Nielsen et al. (2004), and Keloharju et al. (2023) has examined sickness absenteeism in higher job

levels, decision authority, and CEO positions, respectively, but did not delve into the unique attributes of leadership positions with supervisory responsibility.

This research marks the first attempt to quantify the influence of leadership positions with supervisory responsibility on sickness absenteeism. This study contributes to a better understanding of how supervisory responsibility might affect absenteeism rates in the workplace. This insight is particularly relevant for organizations because it sheds light on health-related and costly consequences of leadership positions. This understanding could potentially assist organizations in optimizing their leadership strategies to benefit overall organizational performance.

Although the literature indicates that supervisory responsibility induces sickness presenteeism (Arnold, 2016; Hansen & Andersen, 2008; Miraglia & Johns, 2016), this study extends existing research by distinguishing the effects of supervisory responsibility on sickness presenteeism and sickness absenteeism.

Finally, this study responds to Bakker and Demerouti's (2017) call to investigate challenge job demands more explicitly within the JD-R model. It extends the model's explanatory power by suggesting that the two challenge job demands, permanent availability and time pressure, partially mediate the relationship between leadership positions with supervisory responsibility and sickness absenteeism and presenteeism. Even though some studies have previously examined job demands like time pressure (Stiglbauer, 2017) and work cell phone use (Ragsdale & Hoover, 2016), their focus has been narrower, and they uncovered adverse effects on well-being and emotional exhaustion. Additionally, Nyberg et al. (2022) found that high job demands did not mediate the relationship between employment in the Swedish healthcare industry and sickness absenteeism. Thus, this research contributes by empirically quantifying that permanent availability and time pressure in leadership positions with supervisory responsibility partially mediate sickness absenteeism and presenteeism. This work adds a crucial layer to the limited body of literature exploring the association between job demands, job resources, and health consequences within the JD-R model and is relevant for organizations seeking to understand and mitigate the health-related consequences of leadership roles with supervisory responsibility.

Theoretical Background and Hypotheses Development

To develop the theoretical argument, I draw upon the JD-R model (Demerouti et al., 2001). Though it was originally formulated to identify the antecedents of engagement and burnout, it has also been widely used to explain other health-related

outcomes (see, e.g., well-being (Stiglbauer, 2017), sickness absenteeism (Schaufeli et al., 2009)). Accordingly, it embodies an excellent theoretical basis to investigate the relationship between a leadership position with supervisory responsibility, its job characteristics, and health-related outcomes, i.e., sickness absenteeism and sickness presenteeism.

The JD-R model states that the characteristics of any job can be classified into two general categories: job demands and job resources. Within the model, job demands refer to “physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs” (Demerouti et al., 2001, p. 501). These can be stressors such as noise, time and work pressure, or quantitative workload. Conversely, job resources can be described as those aspects of a job that reduce job demands, stimulate personal development, or are functional in achieving work goals (Demerouti et al., 2001).

The JD-R model implies two diverging processes: First, job resources activate a motivational process that leads to work engagement. Second, the model assumes that job demands cause constant overtaxing which results in exhaustion and disengagement. To explain why previous research has revealed inconsistent findings in the latter process, Crawford et al. (2010) refined the JD-R model. In their extension of the JD-R model, they claimed that although the effects of job resources on work engagement are consistent, the relationships between job demands and (dis)engagement highly depend on the nature of the demand. More precisely, the authors differentiated between challenge and hindrance job demands. Concerning hindrance demands, Crawford et al. (2010) argued that employees perceive these demands as stressful because they potentially constrain personal growth, learning, and goal attainment. They tend to trigger negative emotions and a passive style to cope with the demand because the effort expended on coping is not reasonable concerning the likelihood of dealing adequately with the demand. Therefore, individuals are less willing to invest effort which leads to little motivation to cope with the demand and consequently results in disengagement. Challenge demands, on the contrary, are controllable demands that have the potential to promote opportunities to learn, personal growth, or future gains. They trigger positive emotions and an active, problem-focused coping style. Individuals believe that this job demand can be met through a reasonable amount of effort and that the outcome is valued. This sense of goal achievement and the meaningfulness of the expended effort to cope with the demand lead to motivation, eagerness, and excitement which increases work engagement.

When I apply this model to the context of interest, supervisory responsibility seems to be an ambiguous job characteristic. On the one hand, supervisory responsibility can be seen as a job resource: While it implies a high

level of job control (Blom et al., 2016; Christie & Barling, 2009; Li et al., 2018), it also entails regular participation in decision-making (Debus et al., 2019). On the other hand, previous research has also perceived supervisory responsibility as a job demand (Blom et al., 2016; Lovelace et al., 2007) because a job with high responsibility is characterized by time pressure and a high workload (Debus et al., 2019; Kröger, 2017). However, these characteristics are not only aspects of job demands stated in the JD-R model but more explicitly, following Crawford et al. (2010) characteristics of a challenge demand because they potentially stimulate personal growth and evoke future gains.

This ambiguity of supervisory responsibility is also reflected in the two processes of the JD-R model. First, supervisory responsibility as a job resource motivates an employee and leads to work engagement. Second, supervisory responsibility can also be classified as a job demand, in particular a challenge demand. This also increases an employee’s motivation and effort, so that employees will be more engaged in their work. Both primarily ambiguous processes lead to higher work engagement. Considering that engagement is associated with lower levels of absenteeism (Soane et al., 2013), I put forward the following hypothesis:

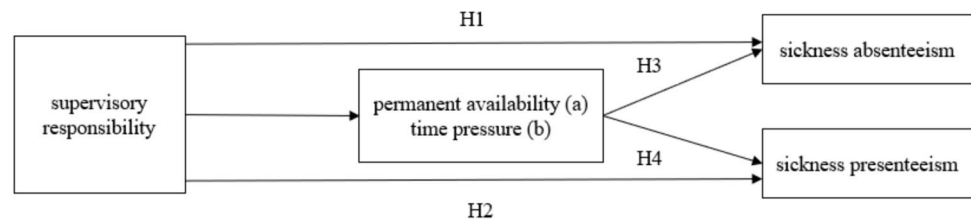
Hypothesis 1 (H1): Supervisory responsibility relates negatively to sickness absenteeism.

As argued above, supervisory responsibility being a job resource and a challenge demand leads to fewer sickness absenteeism days as a result of higher work engagement. However, work engagement as a consequence of supervisory responsibility not only reduces sickness absenteeism days per se but can also lead to working while being sick, i.e., engaging in sickness presenteeism (Miraglia & Johns, 2016). An engaged employee has positive feelings toward work and is overly motivated which stimulates sickness presenteeism behavior (Miraglia & Johns, 2016). To conclude, I expect supervisory responsibility to also have a positive effect on sickness presenteeism which leads to the following hypothesis:

Hypothesis 2 (H2): Supervisory responsibility relates positively to sickness presenteeism.

Following the call of Bakker and Demerouti (2017) to consider challenge job demands more explicitly and to test their causality within the JD-R model, I examine whether the aspects of supervisory responsibility that identify it as a challenge job demand are the causal mechanisms explaining sickness absenteeism and respectively sickness presenteeism. Leadership positions with supervisory responsibility are, among other things, characterized by

Fig. 1 Conceptual framework of the relation between supervisory responsibility, permanent availability, time pressure, and sickness absenteeism, respectively, sickness presenteeism



the need to be permanently available, e.g., to give support, answer questions, or solve upcoming problems (McDonald et al., 2009). Employees transitioning into a leadership position with supervisory responsibility are also confronted with an increased number of tasks and responsibilities where, at first, no problem-solving strategies are available. This challenges leaders' time-related resources and, therefore, induces time pressure (Debus et al., 2019; Rigotti et al., 2014).

Both of these aspects of a leadership position with supervisory responsibility follow the definition of a challenge demand according to the theoretical argumentation of Crawford et al. (2010). Permanent availability assumes that leaders react to work-related demands also in their leisure time (Müller et al., 2018; Steffensen et al., 2022). This gives the leader the feeling of being indispensable but also the opportunity to grow professionally and resolve upcoming problems. In line with this, time pressure, as an indicator of work intensity (Müller et al., 2018), gives the respective leader the feeling of having important tasks and responsibilities and of being essential to their organization. Accordingly, the need to be permanently available and the time pressure experienced in a leadership position with supervisory responsibility promote opportunities to learn and stimulate personal growth. This increases an employee's work engagement and, in consequence, reduces the number of sickness absenteeism days of an employee and increases the sickness presenteeism behavior as discussed above. Therefore, I advance the following hypotheses:

Hypothesis 3 (H3a/b): Permanent availability (a) and time pressure (b) mediate the relationship between supervisory responsibility and sickness absenteeism.

Hypothesis 4 (H4a/b): Permanent availability (a) and time pressure (b) mediate the relationship between supervisory responsibility and sickness presenteeism.

Figure 1 visualizes the conceptual framework of this study.

Methods

Sample

For the empirical analyses, this study used data from the Linked Personnel Panel (LPP) (Ruf et al., 2020b). This

is a unique employer-employee panel data set provided by the German Institute of Employment Research (IAB), representative of German private-sector establishments with at least 50 employees liable to social security (Mackeben et al., 2021). Additionally, I linked the LPP data to the administrative individual-level data from the Integrated Employment Biographies provided by the Federal Employment Agency (LPP-ADIAB). Furthermore, I matched the LPP data to the IAB Establishment Panel (Bellmann et al., 2021) to obtain more structural information on the establishments (e.g., industry, establishment size). These multiple sources are a major benefit of the data set that warrants its use: it links employee-level information (e.g., attitudes toward work, personality, job characteristics) with establishment-level information on management practices, corporate culture, and firm policies (Ruf et al., 2020a, 2020b). This allows a simultaneous consideration of employee and employer perspectives. Additionally, it entails copious details on job demands relevant to examine the mediating effects. Out of five waves, only the four waves from the years 2012/2013, 2014/2015, 2016/2017, and 2018/2019 can currently be linked to the administrative data. Consequently, the study used the first four waves for the empirical analyses.

For the analyses, I restricted the sample to employees aged 67 or younger following the statutory retirement age in Germany. The final sample considering *sickness absenteeism* as the dependent variable comprised 12,676 observations from 9179 employees, working in 1216 firms (sample I). Because information on the main variable *sickness presenteeism* is only observed from wave 3 onwards, the study only used waves 3 and 4 for the analyses considering *sickness presenteeism* as the dependent variable (sample II). Thus, the final sample II consisted of 4945 observations from 4262 individuals working for 768 employers.

Measures

Main Variables

In the analyses, the two dependent variables were *sickness absenteeism* and *sickness presenteeism*. The dependent variable *sickness absenteeism* was measured by the self-reported number of days an individual was unable to work in the last year due to illness. This explicitly included the total number

of days and not only the number of days with an official doctor's note. Considering that research has shown that self-reported days of sickness absenteeism are strongly associated with recorded sickness absenteeism days from employers' registers (Ferrie et al., 2005), they are a reliable predictor for sickness absenteeism. In addition, the effect of an employee working while being sick is captured by the variable *sickness presenteeism*, which relies on employee self-reported information of how many days they went to work albeit being sick within the last year. Following Gerich (2015b), this variable was calculated as the propensity of presenteeism days to the sum of presenteeism and absenteeism days.¹

The central independent variable was *supervisory responsibility*. It was operationalized as a binary variable that takes the value one if the individual is supervising other employees and zero otherwise. To examine the theoretically derived mediating effects of the job demands of being permanently available (a) and having time pressure at work (b), the study used *permanent availability* measured by the question "How often do you receive business phone calls during your leisure time or how often do you answer business e-mails?". The categorical single-item measure is operationalized with values from "never" (= 1) to "daily" (= 5) on a 5-point Likert scale. The categorical variable *time pressure* was quantified by the statement "I often have time pressure over a long period, or I have to deal with several important tasks at the same time" with answers ranging from "does not apply" (= 1) to "fully applies" (= 5) on a 5-point Likert scale.

Control Variables

Several other factors determine the number of sickness absenteeism days as well as sickness presenteeism behavior. Following the literature on sickness absenteeism and sickness presenteeism (Brborović et al., 2017; Gosselin et al., 2013), I controlled for three groups of explanatory factors: individual characteristics, job characteristics, and establishment characteristics. Factors on the individual level comprised whether an employee is *female* (Bekker et al., 2005; Lidwall & Marklund, 2006), their *age* (Gosselin et al., 2013), a subjective ranking of an individual's current *health status* measured on a 5-point Likert scale (Gosselin et al., 2013; Montani et al., 2020), and the *Big Five personality characteristics* in line with the literature that emphasizes an individual's personality in determining sickness absenteeism and presenteeism (Consiglio et al., 2013; Lu et al., 2013). Based on the vast amount of literature claiming the importance of an individual's socioeconomic status when

estimating sickness absenteeism and presenteeism (Bratberg et al., 2002; Kristensen et al., 2010; Marmot, 1994; Vahtera et al., 1996), the study included the variables of having a *partner that lives in the same household*, the *number of children* under the age of 14, the *size of the household*, and five dummy variables indicating an individual's *education level* as well as an individual's *gross income*.

Within the group of job characteristics, the study controlled for an individual's *tenure* with the current employer (Tompa et al., 2008) and their working time (Bernström, 2013), measured by the binary variable *part-time* and the number of *overtime hours*. In line with the JD-R model (Demerouti et al., 2001) and research that has examined the influence of job resources and job demands on sickness absenteeism and sickness presenteeism (Jacobsen & Fjeldbraaten, 2018; Johns, 2010; Pousette & Hanse, 2002; Schaufeli et al., 2009), the study further included the amount of supervisory responsibility captured by the *number of subordinates* an individual supervises, whether the individual can *work from home*, and measures for *physical exertion* and a *bad working environment*.

The last group assessed influencing factors on the establishment level and encompassed the *establishment size* as well as 15 *industry* dummy variables. Finally, the study included a dummy variable for each survey wave to correct for time effects.

Descriptive Statistics

Table 1 reports summary statistics and displays correlations of the main variables used in the analyses. As depicted in the first row, the average yearly number of sickness absenteeism days in the sample was 12.1, which only slightly exceeds the average number of registered sickness absenteeism days in Germany with 10.9 reported by the German Federal Statistical Office (2022) in 2019. Around 30% of the sample were in a leadership position with supervisory responsibility, and 27% were female. Although most individuals did not feel the need to be permanently available (2.0), they did experience high time pressure at work (3.6). Table 2 provides initial insights into the proposed relationships: as expected, the average number of sickness absenteeism days and the propensity of sickness presenteeism differed significantly if comparing supervisors to non-supervisors. Additionally, permanent availability and time pressure were both more common for supervisors than for non-supervisors.

Estimation Strategy

To test the predicted relationships of Hypotheses 1 and 2, I estimated two different model specifications. First, I ran a random-effects negative binomial regression to examine the relation

¹ It should be noted that this propensity is only computable for employees whose number of sickness absenteeism and sickness presenteeism days exceeds zero.

Table 1 Correlation matrix and descriptive statistics of the main variables

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)
(1) Sickness absenteeism	12.08	24.27	1.000					
(2) Sickness presenteeism ^a	0.454	0.346	−0.324*	1.000				
(3) Sickness presenteeism (binary) ^a	0.794	–	−0.071*	0.670*	1.000			
(4) Supervisory responsibility	0.295	–	−0.065*	0.103*	0.045*	1.000		
(5) Permanent availability	2.022	1.112	−0.082*	0.150*	0.082*	0.323*	1.000	
(6) Time pressure	3.570	1.194	−0.027*	0.142*	0.131*	0.196*	0.271*	1.000

Note. Correlations and descriptive statistics of the variables sickness absenteeism, supervisory responsibility, permanent availability, and time pressure are based on 12,676 individual-level observations from 9179 employees (sample I). Own calculations based on data from the LPP-ADIAB 2012–2019

* $p < .05$

^aCorrelations and descriptive statistics of the variables sickness presenteeism and sickness presenteeism (binary) are based on sample II (4495 observations from 4262 individuals)

Table 2 Descriptive statistics of the main variables by leadership position

Variable	Non-supervisors	Supervisors	Difference
Sickness absenteeism	13.105	9.623	3.481***
Sickness presenteeism ^a	0.433	0.514	−0.081***
Permanent availability	1.790	2.577	−0.786***
Time pressure	3.419	3.932	−0.513***

Note. Descriptive statistics of the variables sickness absenteeism, permanent availability and time pressure are based on sample I. Own calculations based on data from the LPP-ADIAB 2012–2019

* $p < .10$, ** $p < .05$, *** $p < .01$

^aDescriptive statistics of the variable sickness presenteeism are based on sample II

between supervisory responsibility and sickness absenteeism. Given that the dependent variable *sickness absenteeism* is a count variable and highly right-skewed, an ordinary least squares regression model is not suitable. Instead, a count data model should be favored. The commonly used model for the estimation of count data is the Poisson model, which assumes equidispersion, meaning that the (conditional) variance equals the (conditional) mean. However, a formal test of overdispersion revealed that the present data are significantly overdispersed.² In this case, a Poisson model would underestimate the dispersion in the outcome. A negative binomial regression model addresses this problem of the Poisson model by adding a parameter α that reflects unobserved heterogeneity among observations (Long & Freese, 2014, p. 243). Seeing that there is significant evidence of overdispersion in the present data, I followed the suggestions of Long and Freese (2014) and previous research on sickness absenteeism (Johns, 2011; Platts et al., 2020) and preferred a negative binomial model over a Poisson

model. When estimating *sickness presenteeism* (H2), I ran a linear random-effects model. Considering that the panel only comprises two waves, a random-effects model is preferred over a fixed-effects model.

To estimate the mediating effects of permanent availability and time pressure transmitting the effect of supervisory responsibility on the outcome variables sickness absenteeism and sickness presenteeism, I employed multiple mediation analyses. I ran two separate models for each dependent variable to test Hypotheses 3 (a/b) and 4 (a/b) as depicted in Fig. 1. For the calculation of the causal mediation effects, I followed the approach of Hicks and Tingley (2011), which produces identical results to the traditional approach by Baron and Kenny (1986) for continuous variables.³ Considering that this approach only allows the computation of OLS, probit, and logit models and no panel estimators, I estimated a pooled linear model for both *sickness absenteeism* and *sickness presenteeism*.

A plausible constraint of the empirical approach is the inability to entirely eliminate endogeneity from the analyses, necessitating a cautious interpretation of the empirical findings concerning causality. The uncertainty regarding causal order stems from the correlational nature of the data set. Nevertheless, to advance toward establishing a case for causality, I draw from studies that have identified causal effects with analogous constructs. I integrate insights from multiple studies that examine various facets related to this research because no single study has synthesized the entirety of these components. This integration unfolds across several steps. First, I have identified two studies that find causal relationships between job demands and work engagement.

In a two-wave design, with the explanatory variable being measured at time 1 and the exploratory variable at time 2,

² The test rejects the null hypothesis of equidispersion with $p < 0.001$ ($\chi^2 = 15.66$). This means that the (conditional) variance of the data exceeds the (conditional) mean (Cameron and Trivedi (2009, p. 561).

³ As suggested by Imai et al. (2010), I conduct sensitivity analyses of a potential violation of the key underlying assumption of sequential ignorability. The results are available in the [online supporting information](#).

Ragsdale and Hoover (2016) demonstrate that work-related cell phone use positively correlates with work engagement and shows no significant influence on emotional exhaustion. Their assessment of work-related cell phone use as a job demand is analogous to the measure of permanent availability in this study operationalized as receiving business emails or phone calls during leisure time. Barbier et al. (2013), in a three-wave study with 7–8-month time lags, utilize structural equation modeling to establish causal relationships between job demands and increased work engagement. They specifically focus on performance expectations as a job demand. They expound on the engagement-enhancing effect, aligning with my argument, by considering performance expectations as a challenge job demand capable of yielding positive engagement outcomes. The job demand of performance expectations is similar to the concepts of time pressure and permanent availability in this study because individuals experiencing pressure to excel often feel compelled to maintain constant accessibility to be perceived as responsive and visible, thus undertaking numerous tasks promptly, potentially leading to heightened time pressure. Although I recognize that these measures are not identical, they can be regarded as alike constructs. Additionally, Barbier et al. (2013) did not find an effect of work engagement on future changes in performance expectations, which reinforces their causal assertion.

Second, to causally link work engagement to sickness absenteeism, I draw upon the study of Schaufeli et al. (2009) who employ structural equation modeling in a two-wave study with a 1-year time difference with engagement being measured at time 1 and absence frequency as its difference between time 2 and time 1. They find that work engagement reduces sickness absence frequency, defined as the total days absent due to illness. The authors observe no reciprocal influence from sickness absenteeism to either work engagement or job demands, strengthening their argument for causality. Last, to come closer to establish a causal link between job demands and sickness presenteeism, I rely on the findings of Demerouti et al. (2009), who, through structural equation modeling, demonstrate an increase in presenteeism due to job demands. These job demands encompass factors such as time pressure and multitasking. Similarly, they do not identify a reverse path from presenteeism to job demands. Their data collection spans three time points with a 1-year and a half-year interval between the time points.

Results

Baseline Results

To test Hypothesis 1, I examined the results of the negative binomial regression, which are displayed in Table 3 (Model M1). Column 1 shows the regression coefficients, whereas

Column 2 gives deeper insights into the effect sizes by displaying average marginal effects and incidence rate ratios (IRR). The latter displays how the expected count changes for a unit change in the independent variable (Long & Freese, 2014). The statistically significant and negative coefficient of *supervisory responsibility* in the first column provides empirical support for Hypothesis 1. An individual in a leadership position with supervisory responsibility reported on average 1.7 fewer sickness absenteeism days ($p < 0.01$) respectively missed 13.0% less (IRR = 0.870; $p < 0.01$) due to sickness compared to an individual without supervisory responsibility (Column 2). This not only supports the postulated Hypothesis (H1) but also stresses the economic relevance of this result.

To quantify the relationship between supervisory responsibility and sickness presenteeism (H2), I examined the results of the random-effects regression, which are displayed in Table 3 (Model M2). Looking at the results of the variable *supervisory responsibility*, the coefficient is statistically significant and positive. Thus, Hypothesis 2, stating that supervisory responsibility increases sickness presenteeism, found support. The results suggest that for individuals in a leadership position with supervisory responsibility, the propensity of working while being sick is 6.2 percentage points higher ($p < 0.01$) than for individuals in a position without supervisory responsibility.

In the next step, I examined the results of the mediating effects of permanent availability and time pressure, which are displayed in Table 4.⁴ Looking at the results regarding the effect of supervisory responsibility on sickness absenteeism that is caused by the mediator permanent availability (H3a), the average causal mediation effect was statistically significant and negative (ACME = -0.352 , $p < 0.01$). The average direct effect of the treatment was statistically significant and negative as well (ADE = -1.530 , $p < 0.01$). In this case, the mediation, i.e., being permanently available, accounted for around 18.7% of the total effect of supervisory responsibility reducing sickness absenteeism (TE = -1.882 , $p < 0.01$). Thus, in the light of Hypothesis 3a, permanent availability partially mediated the effect of supervisory responsibility on sickness absenteeism. Concerning time pressure, I also identified a partial mediation with a statistically significant negative average causal treatment effect (ACME = -0.131 , $p < 0.1$). In detail, approximately 7.0% of the total effect of supervisory responsibility on sickness absenteeism ran through an employee experiencing time pressure.

⁴ For brevity, Table 4 only presents the results of the average direct and the average indirect mediation effects as well as the total effects. The results relating to the first step of the mediation analyses as well as to the control variables can be obtained from the author on request.

Table 3 Estimation of sickness absenteeism and sickness presenteeism

Variable	Sickness absenteeism (M1)		Sickness presenteeism (M2)
	Coefficient	Average marginal effect [IRR]	Coefficient
Supervisory responsibility	− 0.139*** (0.030)	− 1.654*** (0.352) [0.870***]	0.062*** (0.012)
Individual characteristics			
Female	0.130*** (0.033)	1.545*** (0.388) [1.139***]	0.009 (0.014)
Age	− 0.007*** (0.001)	− 0.087*** (0.018) [0.993***]	− 0.002*** (0.001)
Health status	− 0.387*** (0.014)	− 4.587*** (0.193) [0.679***]	0.002 (0.007)
Extraversion	0.094*** (0.018)	1.109*** (0.206) [1.098***]	− 0.005 (0.007)
Openness	0.072*** (0.022)	0.852*** (0.263) [1.075***]	− 0.004 (0.008)
Agreeableness	0.047* (0.025)	0.553* (0.299) [1.048**]	− 0.031*** (0.009)
Neuroticism	0.048*** (0.018)	0.569*** (0.214) [1.049***]	0.023*** (0.006)
Conscientiousness	− 0.105*** (0.033)	− 1.243*** (0.389) [0.900***]	0.057*** (0.010)
Partner in the same household	0.136*** (0.034)	1.611*** (0.407) [1.146***]	0.015 (0.014)
Number of children	0.078*** (0.018)	0.922*** (0.216) [1.081***]	− 0.003 (0.009)
Size of household	− 0.039*** (0.013)	− 0.460*** (0.155) [0.962***]	− 0.000 (0.006)
Education (reference: apprenticeship)			
Training college	0.021 (0.045)	0.245 (0.529) [1.021]	0.006 (0.020)
Technical college	− 0.035 (0.032)	− 0.415 (0.378) [0.966]	0.022* (0.013)
University degree	− 0.070** (0.035)	− 0.836** (0.420) [0.932**]	− 0.018 (0.014)
No/other education	− 0.029 (0.100)	− 0.346 (1.183) [0.971]	− 0.014 (0.035)

Table 3 (continued)

Variable	Sickness absenteeism (M1)		Sickness presenteeism (M2)
	Coefficient	Average marginal effect [IRR]	Coefficient
Income ^a	– 0.027 (0.098)	– 0.320 (1.167) [1.000]	– 0.029*** (0.010)
Job characteristics			
Tenure	– 0.001 (0.001)	– 0.014 (0.016) [0.999]	0.001*** (0.001)
Part-time	– 0.159*** (0.046)	– 1.885*** (0.549) [0.853***]	0.005 (0.017)
Overtime hours	– 0.013*** (0.003)	– 0.156*** (0.036) [0.987***]	0.007*** (0.002)
Number of subordinates	– 0.001 (0.001)	– 0.012 (0.010) [0.999]	0.000 (0.000)
Physical exertion	0.025** (0.011)	0.300** (0.133) [1.026**]	0.005 (0.005)
Bad working environment	0.060*** (0.009)	0.716*** (0.109) [1.062***]	– 0.003 (0.004)
Work from home	– 0.093*** (0.030)	– 1.103*** (0.351) [0.911***]	0.017 (0.014)
Establishment characteristics			
Establishment size (reference: small enterprises (10–49))			
Micro enterprises (less than 10)	– 0.408 (6.900)	– 4.206 (57.472) [0.665]	
Medium-sized enterprises (50–249)	– 0.073 (0.167)	– 0.885 (2.093) [0.929]	0.419*** (0.085)
Large enterprises (250 and more)	– 0.049 (0.170)	– 0.596 (2.131) [0.952]	0.024 (0.068)
Constant	0.513*** (0.239)		0.312*** (0.106)
Number of observations	12,676	12,676	4945
Number of individuals	9179	9179	4262
Number of establishments	1216	1216	768
Log (pseudo-)likelihood (m1)/R ² (m ²)	– 40,547.447		0.041

Note. Dummy variables for survey wave and industry included. Standard errors in parentheses (M1: bootstrapped standard errors with 200 resamples, M2: standard errors clustered at the establishment level). Incidence rate ratios in brackets. Own calculations based on data from the LPP-ADIAB 2012–2019

* $p < .10$, ** $p < .05$, *** $p < .01$

^aCoefficients and standard errors multiplied by 10,000

Table 4 Mediating effects of permanent availability and time pressure

Estimated relationship	Average direct effect (ADE)	Average indirect effect (ACME)	Total effect (TE)	% of TE mediated
H3a: Supervisory responsibility → permanent availability → sickness absenteeism	− 1.530*** (0.479)	− 0.352*** (0.102)	− 1.882*** (0.455)	18.719%
H3b: Supervisory responsibility → time pressure → sickness absenteeism	− 1.751*** (0.478)	− 0.131* (0.075)	− 1.882*** (0.457)	6.958%
H4a: Supervisory responsibility → permanent availability → sickness presenteeism	0.041* (0.013)	0.022*** (0.003)	0.063*** (0.012)	34.912%
H4b: Supervisory responsibility → time pressure → sickness presenteeism	0.051** (0.012)	0.012*** (0.002)	0.063*** (0.012)	19.074%

Note. Control variables as in Models M1 and M2 (Table 3). Standard errors clustered at the establishment level in parentheses. Own calculations based on data from the LPP-ADIAB 2012–2019

* $p < .10$, ** $p < .05$, *** $p < .01$

Further, I examined the results concerning sickness presenteeism. The average direct effect of supervisory responsibility on sickness presenteeism was statistically significant and positive when considering permanent availability as a mediator ($ADE = 0.041$, $p < 0.1$), and the average causal mediation effect was also statistically significant and positive ($ACME = 0.022$, $p < 0.01$). This infers empirical support for hypothesis H4a, i.e., that permanent availability transmits the effect of supervisory responsibility on sickness presenteeism, at least partially. In line with the theoretical expectations of Hypothesis 4b, the results also suggest that time pressure acts as a partial mediator of the effect of supervisory responsibility on sickness presenteeism ($ACME = 0.012$, $p < 0.01$).

The results suggest that the two challenge job demands, permanent availability and time pressure, partially explain why individuals in a leadership position with supervisory responsibility report fewer sickness absenteeism days and engage in sickness presenteeism more often than individuals without supervisory responsibility.

Testing the Mechanism

To provide suggestive evidence for the theoretical mechanism of the relation between supervisory responsibility and sickness absenteeism, I present two additional analyses. First, I want to disclose that the reduction in sickness absenteeism ascribed to supervisory responsibility was not attributable to supervisors engaging in sickness presenteeism, but rather to the improvement of an employee's health. Therefore, I ran a mediation model with an individual's current *health status* serving as the mediator transmitting the

effect of supervisory responsibility on sickness absenteeism. For brevity, Table 5 only presents the results of the average direct, the average indirect mediation effects, and the total effects.⁵ The results, which are displayed in Table 5, indicate that the average causal mediation effect (ACME), i.e., the effect of supervisory responsibility that is caused by an individual's current health status, was statistically significant and negative ($ACME = -0.450$, $p < 0.1$). The average direct effect (ADE) of the treatment, i.e., all other causal mechanisms linking supervisory responsibility to sickness absenteeism, was statistically significant and negative as well ($ADE = -1.901$, $p < 0.01$). The negative mediation effect of an individual's *health status* suggests that supervisory responsibility, indeed, might reduce the number of sickness absenteeism days partially through improving an employee's health.

Second, I estimated a mediation model with sickness presenteeism as the mediator between supervisory responsibility and sickness absenteeism (Table 5). The corresponding results indicate that the average causal mediation effect of sickness presenteeism was not statistically significant. This might infer that sickness presenteeism was not the causal mechanism for fewer sickness absenteeism days of supervisors. In sum, these results offer suggestive evidence supporting the hypothesized theoretical mechanism of supervisory responsibility reducing sickness absenteeism.

⁵ The results relating to the first step of the mediation analyses as well as to the control variables can be obtained from the author on request.

Table 5 Additional analyses regarding the causal mechanism between supervisory responsibility and sickness absenteeism

Estimated relationship	Average direct effect (ADE)	Average indirect effect (ACME)	Total effect (TE)	% of TE mediated
Supervisory responsibility → health status → sickness absenteeism	− 1.901*** (0.419)	− 0.450* (0.124)	− 2.350*** (0.436)	19.130%
Supervisory responsibility → sickness presenteeism (binary) ^a → sickness absenteeism	− 2.218*** (0.588)	− 0.018 (0.029)	− 2.236*** (0.601)	0.786%

Note. Control variables as in Models M1 and M2 (Table 3). Standard errors clustered at the establishment level in parentheses. Own calculations based on data from the LPP-ADIAB 2012–2019

* $p < .10$, ** $p < .05$, *** $p < .01$

^aSickness presenteeism is treated as a binary variable in this context, taking a value of one if an individual worked while being sick within the last year. This approach is favored because using the propensity of presenteeism, as a constructed measure of sickness absenteeism, is not suitable for explaining sickness absence within the mediation model, and following Demerouti et al. (2009), the absolute number of sickness presenteeism days might be biased due to response errors caused by retrospective recalling

Robustness Checks

To further support to the empirical results, I conducted several robustness tests. These address alternative model specifications, the hierarchical structure of the data, and the time structure of the data set. For brevity, Table 6 only presents the results relating to the main variables. The results concerning the control variables accorded with those from the main model and can be obtained from the author on request. Previous research applied (various) different empirical methods when estimating the number of sickness absenteeism days. Therefore, I showed that the results of this study are robust concerning alternative estimation methods. First, I display the results of a linear random-effects model in Model R1 (Table 6). Second, even though overdispersion is a problem in the present data, I nevertheless followed Leineweber et al. (2017), Nielsen et al. (2004), and Rugulies et al. (2007) and re-estimated the results of Model M1 from the main analyses using a Poisson model (Table 6, Model R2). All alternative model specifications did not change the results qualitatively.

The multi-source data set used in this study implies that employees are nested within establishments. It should be considered that corporate culture relating to attendance norms, values, and behaviors differs between establishments and can play an important role when determining sickness absenteeism and presenteeism (Ruhle & Süß, 2020). Therefore, to acknowledge the hierarchical structure of the data and the greater similarity within establishments than between them, I followed Steenbergen and Jones (2002) and conducted a multilevel model. This approach calculates inferences more precisely by acknowledging that observations are more similar within establishments than between them (Table 6, Models R3 and R4). The findings suggest robust results.

Lastly, sickness absenteeism and sickness presenteeism are measured retrospectively relating to the year leading up to the survey. To account for possible confoundings in the time-series information of the data, I re-estimated the results of the main analyses using one-period lags of all independent variables with the results staying qualitatively robust (Table 6, Models R5 and R6).

Discussion

As it becomes harder for employers to fill leadership positions, it is critical to address the concerns of employees about such positions. Contributing to the ongoing discussion of the literature on health-related outcomes of supervisory responsibility, the present results are informative for several reasons.

First, the results of this study suggest that a leadership position with supervisory responsibility reduces sickness absenteeism. This sheds light on the mixed results of previous research when considering health-related consequences of supervisory responsibility (Boyce & Oswald, 2012; Debus et al., 2019; Fletcher & French, 2021; Li et al., 2018; Schieman & Reid, 2009). This article further contributes to research on sickness absenteeism of supervisors by suggesting that engaging in sickness presenteeism is not the underlying mechanism why employees in a leadership position with supervisory responsibility report fewer sickness absenteeism days, but improved health might be.

Second, this research contributes to the application of the JD-R model (Demerouti et al., 2001) by inferring that supervisory responsibility, being a job demand and a job resource, reduces sickness absenteeism but increases sickness presenteeism. Moreover, I explicitly focus on the extension of the JD-R model by Crawford et al. (2010) and provide empirical

Table 6 Robustness checks

Dependent variable	R1	R2	R3	R4	R5	R6
Linear						
Sickness absenteeism		Sickness absenteeism	Sickness absenteeism	Sickness presenteeism	Sickness absenteeism _t	Sickness presenteeism _t
Supervisory responsibility	− 1.851*** (0.479)	− 0.071*** (0.019)	− 0.166*** (0.038)	0.062*** (0.012)	− 0.093* (0.053)	0.052*** (0.021)
Supervisory responsibility _{t-1}					Yes	Yes
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Job characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Establishment characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	12,676	12,676	12,676	4945	3497	1851
Number of individuals	9179	9179	9179	4262	2545	1513
Number of establishments	1216	1216	1216	768	623	440
R ² (for R1, R6)/log (pseudo)-likelihood	0.125	− 56,488.472	− 40,541.132	− 1,622.298	− 11,656.490	0.045

Note. Control variables as in Models M1 and M2 (Table 3). Standard errors in parentheses (R1, R5: bootstrapped standard errors with 200 resamples; R3, R4: robust standard errors; R6: standard errors clustered at the establishment level). In R5 and R6, the one-period lag of all control variables is included. Own calculations based on data from the LPP-ADIAB 2012–2019

* $p < .10$, ** $p < .05$, *** $p < .01$

insights into their theoretical differentiation of job demands into challenge and hindrance demands. I followed the call of Bakker and Demerouti (2017, p. 278) to “uncover the conditions under which job demands act as hindrances versus challenges.” Accordingly, this study illustrates that the two aspects that characterize supervisory responsibility as a challenge job demand, namely being permanently available and the time pressure experienced in the position, partially mediate the relationship of a leadership position with supervisory responsibility and sickness absenteeism respectively sickness presenteeism. Though there has been some discussion on whether time pressure functions as a challenge or a hindrance demand (Abbas & Raja, 2019; Schilbach et al., 2023), I refer to this discussion by showing that time pressure decreases sickness absenteeism but increases sickness presenteeism. Additionally, I relate to previous literature stating that permanent availability via email context acts as a job demand (Steffensen et al., 2022) by arguing that it acts as a challenge job demand. The results of this study reconcile with the theoretical assertions of Crawford et al. (2010) that challenge demands can also motivate and engage. This suggests that job demands are not necessarily negative but can also induce a motivational process through opportunities to grow and, therefore, reduce sickness absenteeism. This finding reinforces the importance of differentiating job demands into challenge and hindrance demands. Briefly, the empirical findings support the theoretical predictions and imply that it is relevant for employers to reflect if a job demand acts as a challenge or a hindrance demand before considering reducing job demands of certain positions because as the results suggest, job demands can also induce positive consequences.

The results of this research also have several practical implications. Considering that the costs of absenteeism and sickness presenteeism for organizations are high (Grinza & Rycx, 2020; Johns, 2011), it is relevant for employers to understand how to reduce this behavior. Therefore, this study infers that being in a leadership position with supervisory responsibility does not make employees sick. This is not just pertinent for leaders themselves but also for organizations because having unhealthy leaders can negatively affect an organization's performance (Keloharju et al., 2023; Sirén et al., 2018). Employers could, additionally, counteract the negative consequences of sickness presenteeism by reducing the need for permanent availability and the time pressure of supervisors. This may seem ambiguous because the aspects that lead to sickness presenteeism seem to reduce sickness absenteeism. However, this challenges employers to avoid sickness presenteeism among supervisors by not just reducing all job demands of a position but to encouraging their supervisors to be aware of the negative consequences of sickness presenteeism without lowering job demands. Another organization-driven JD-R intervention that is proposed by Bakker and Demerouti (2014) is to train

employees to better deal with job demands. Organizations could integrate such training into leadership development programs to improve their leaders' skills to operate under challenging job demands (Harms et al., 2017, p. 185).

Furthermore, despite the pre-pandemic nature of the data in this study, the shift to remote work prompted by the COVID-19 pandemic may make it more common that individuals work while being sick, given the ease of doing so from home. Employers need to acknowledge that this trend might exacerbate sickness presenteeism, making it increasingly imperative for them to implement targeted interventions to mitigate its effects. Future research could delve into the interplay among remote work, sickness presenteeism, and their enduring consequences for employers.

Finally, the findings from the mediation analysis of an individual's health status provide suggestive evidence that a leadership position with supervisory responsibility may indeed improve an individual's health and, in consequence, reduce sickness absenteeism. For employees, these results suggest that obtaining a leadership position with supervisory responsibility can reduce sickness absenteeism by improving their own health. This prospect of an improved health condition due to supervisory responsibility could make obtaining a leadership position more attractive to the younger workforce.

Moreover, the results of Table 3 suggest that personality strongly impacts the two studied health-related behaviors. Although extraversion, for example, increases the chances of obtaining a leadership position (Doornenbal et al., 2022), this Big Five personality characteristic also increases sickness absenteeism. Considering that the occupancy of leadership positions and the inherence of particular job demands might go along with differing personality types, exploring the interplay of these factors offers a promising area for future research.

Although this research makes several contributions to the literature, it has some shortcomings that need to be addressed. There is literature that argues that employees with fewer sickness absenteeism days, i.e., better health, are more prone to obtaining supervisory responsibility in the first place (Boyce & Oswald, 2012; Kröger, 2017). To counteract this problem, at least to a certain degree, this study controls for a vast number of individual characteristics, in particular an individual's current *health status*. This minimizes the possibility that the reported relationship is confounded by leaders having privileged health. Nevertheless, I cannot fully preclude endogeneity from the analyses, and the empirical results need to be interpreted cautiously with respect to causality. Concerning causal inference, future investigations in this area may benefit from a multi-wave approach, employing surveys to assess variables such as supervisory responsibility, job demands, work engagement, sickness absenteeism, and

presenteeism at different points in time. This methodological refinement would mitigate potential issues related to reciprocal effects and enhance the robustness of the findings of this study, thereby further contributing to the empirical application of the JD-R model.

Moreover, both health outcomes were assessed through self-reporting, which could introduce bias due to response error stemming from retrospective recalling. However, given the strong association found between self-reported sickness absenteeism and recorded absenteeism from employers' registers (Ferrie et al., 2005), along with the tendency of individuals to rather underestimate negative events when recalling retrospectively, this concern is likely to be mitigated in this study, and the results may even lean toward conservative estimates. To address potential biases associated with self-reported health measures, future research could explore the use of technology to monitor health behaviors directly, thereby minimizing this issue.

Another possible limitation might be that this study only focuses on the two challenge job demands, permanent availability and time pressure, of a leadership position with supervisory responsibility due to data availability. However, future research could investigate additional job demands of leadership positions with supervisory responsibility but specifically differentiate between challenge and hindrance demands. This article only focuses on job demands of leadership positions. I, therefore, encourage future research to also identify the effects of job resources that transmit the effect of supervisory responsibility on sickness absenteeism and sickness presenteeism. Future research could investigate various facets and more nuanced measures of leadership positions with supervisory responsibility. This inquiry could shed light on how factors beyond the mere possession, like the quantity or duration of having supervisory responsibility, might influence health outcomes. Finally, the measures of permanent availability and time pressure are both single-item measures, which I note as a constraint of using pre-existing data.

Conclusion

This article provides evidence that holding a leadership position with supervisory responsibility affects sickness absenteeism and sickness presenteeism through the partial mediation of permanent availability and time pressure. Even though a leadership position with supervisory responsibility reduces the number of sickness absenteeism days, it increases sickness presenteeism behavior. In summary, this study enriches our understanding of the demands of a leadership position with supervisory responsibility and their consequences for labor-market related health behaviors. Comprehending the importance of differentiating

job demands of a leadership position with supervisory responsibility into challenge and hindrance demands could help employers mitigate the current difficulty of recruiting and retaining supervisors.

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Declarations

Competing Interests The author declares no competing interests.

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