Discussion Paper Series

IZA DP No. 18541

April 2026

Reviewed at Work, Restless at Night? Performance Appraisals and Sleep Satisfaction

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ISSN: 2365-9793

IZA DP No. 18541 April 2026

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Abstract

Performance appraisals are one of the most widely used human resource management practices. This study investigates the relationship between performance appraisals and sleep satisfaction using large-scale, representative data from the German Socio-Economic Panel (GSOEP). Sleep satisfaction is used as a comprehensive measure of perceived restfulness and sleep quality. The results show that performance appraisals are negatively associated with sleep satisfaction, even after controlling for a wide range of socio-demographic, work-related, and personality characteristics. This negative relationship is particularly pronounced when evaluations are tied to short-term financial outcomes. These findings highlight that performance evaluation processes may generate psychological pressure that undermines employee´s ability to rest and recover.

JEL classification

M5, J28, J81

Keywords

performance appraisals, sleep satisfaction, monetary incentives, German Socio-Economic Panel

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1. Introduction

Formal performance appraisals (PAs) conducted by supervisors are among the most established and widely applied human resource management practices (Murphy and Cleveland 1995). They are designed to identify training needs and to guide and motivate employees to improve their future performance (DeNisi and Pritchard 2006; Selvarajan and Cloninger 2012). The outcomes of these appraisals often serve as the basis for important personnel decisions such as promotions, dismissals, or career development opportunities (Grubb 2007). In many firms, performance appraisals also serve as the foundation for performance-related pay systems, which are intended to better align employee incentives with organizational goals by linking compensation to assessed performance (Milkovich and Newman 2004).

When properly designed and implemented, performance appraisals can positively influence both employee attitudes and organizational outcomes. Effective appraisal systems promote employee engagement (Anitha 2014) and contribute to higher levels of job satisfaction (Kampkötter 2017; Grund and Nießen 2025). Employees who perceive the appraisal process as fair and constructive tend to show stronger organizational commitment, while their intentions to leave and absenteeism rates decline (Kuvaas 2006; Brown *et al.* 2010).

However, a growing body of literature highlights that the appraisal process is not without drawbacks. The traditional appraisal model has been criticized for its stressful nature, which may increase anxiety and work-related strain. The anticipation of evaluation and fear of negative or consciousness of risky outcomes can generate psychological stress (Kuvaas 2006; Shvartsman and Beckmann 2015), with potential adverse consequences for both mental and physical health. Perceptions of unfairness or bias in evaluations may reinforce these negative effects (Goswami and Mishra 2024).

In addition, when performance appraisals are linked to financial outcomes, they can introduce additional pressures due to increased uncertainty and volatility in income (Sayre 2023). Research on performance-related pay demonstrates that tying compensation to performance evaluations can increase stress, emotional exhaustion, and mental health problems, including heightened risks of anxiety and depression (Baktash *et al.* 2022; Bender and Theodossiou 2014; Andelic et al. 2023). Other studies document adverse physical health effects, such as fatigue, headaches and a higher likelihood of workplace injuries (Bender *et al.* 2012; Sayre 2023; DeVaro and Heywood 2017).

One potential important detrimental side effect of the use of formal performance appraisals and pay for performance remains largely unexplored: sleep. Sleep is a central determinant of both short- and long-term well-being as well as workplace functioning. In the short-term, sleep

has implications for employees and organizations. For individuals, sufficient and good-quality sleep supports concentration, emotion regulation, and daily well-being (João *et al*. 2018; Scott and Judge 2006). Poor sleep, in contrast, is associated with irritability, negative affect, and reduced resilience (Baglioni *et al*. 2010). From an organizational perspective, insufficient sleep undermines cognitive performance (Durmer and Dinges 2005), work memory (Lim and Dinges 2010), increases error rates (Renn and Cote 2013), absenteeism (Godet-Cayré *et al*. 2006) and raises the risk of injuries at work (Uehli *et al*. 2014).

Beyond these short-term consequences, sleep disturbances also pose serious long-term risks. Chronic sleep problems are a well-established risk factor for the development of mental disorders, particularly depression and anxiety (Ford and Kamerow 1989; Baglioni *et al*. 2011). People with insufficient sleep are also more likely to report poor general health, frequent distress, pain, activity limitations, and they show higher prevalence of health-risk behaviours such as smoking, physical inactivity, obesity, and, among men, heavy drinking (Strine and Chapman 2005). In addition, sleep problems have been linked to long-term physical health outcomes such as cardiovascular disease (Wolk *et al*. 2005).

Given its essential role in both individual and organizational functioning, it is surprising that no study to date has systematically examined the relationship between performance appraisals or performance related pay and employees' sleep. The present study aims to fill this gap by analysing the association between performance appraisals and sleep satisfaction using large-scale, longitudinal representative data from the German Socio-Economic Panel (GSOEP). We focus on sleep satisfaction rather than other sleep-related measures, such as sleep duration, because it captures a broader and more integrative assessment of individual´s perceived restfulness and overall sleep experience (Ohayon *et al*. 2018; Protogerou *et al.* 2024).

Therefore, we aim to broaden the understanding of how performance appraisal systems relate to employee well-being. By distinguishing between appraisals with and without financial consequences, we further explore if the strength of this association depends on whether the evaluation is tied to financial outcomes. In doing so, this study contributes to the growing literature on performance appraisals and employee well-being by introducing sleep satisfaction as a novel outcome dimension and by providing the first large-scale empirical evidence on this relationship.

Our findings show that performance appraisals are associated with lower levels of employees' sleep satisfaction. This negative relationship holds for both appraisals with and without financial consequences. Moreover, the results indicate that appraisals tied to short-term financial outcomes are particularly detrimental, suggesting that immediate and highly salient consequences may intensify the strain associated with performance evaluations. These results suggest that while performance evaluations are intended to enhance motivation and

accountability, they may also create psychological strain that interferes with employees' ability to recover and rest.

The remainder of this paper is structured as follows: Section 2 presents the theoretical background and derives our hypotheses. Section 3 describes the data and empirical strategy. Section 4 reports the empirical results. Section 5 concludes with a discussion of practical implications and avenues for future research.

2. Theoretical Considerations and Hypotheses

2.1. Performance Appraisals and Sleep Satisfaction

Performance appraisals are a core component of organizational management and human resource practices. They generally refer to formalized processes through which supervisors evaluate employees' work performance, provide feedback, make decisions for single employees and between employees, and identify opportunities for improvement. The underlying goal of such evaluations is to ensure that individual performance aligns with organizational objectives while promoting professional development and accountability (Grubb 2007; Sudin 2011). Although performance appraisals are primarily designed to enhance motivation and performance, they can also generate unintended strain and pressure that may affect employees' psychological well-being (Kuvaas 2006; Shvartsman and Beckmann 2015).

Appraisal systems often involve complex social and evaluative dynamics that can generate stress and tension. For instance, when performance is assessed comparatively or competitively, employees may feel pressured to outperform colleagues, which can foster unhealthy competition and interpersonal conflict (Hartmann and Schreck 2018; Ibrahim and Madzoke 2024). Moreover, biased or inconsistent managerial judgments can result in perceptions of unfairness and distrust, leading to frustration and dissatisfaction (Brown *et al.* 2010). Employees may also hold overly positive views of their own performance and expect higher rewards than what managers deem appropriate, which can create friction and conflict in the appraisal process. In some cases, individuals may even engage in impression management to influence supervisors' perceptions, further intensifying social tension at work (Harris *et al*. 2007). Work conflicts have been found to increase negative off-job rumination (Kerman *et al*. 2022), which has been found to impair sleep (Demsky *et al*. 2019).

Beyond these interpersonal aspects, performance appraisals can contribute to work overload (Brown and Benson 2005). Appraisal systems often heighten awareness of performance demands, potentially leading employees to push themselves harder to meet expectations. This intensified workload can make it more difficult to mentally detach after work (Sandoval-

Reyes *et al.* 2021), which is linked to lower sleep quality, quantity and consistency (Barber and Jenkins 2014; Hülsheger *et al*. 2014).

Furthermore, several studies have found that appraisal processes, regardless of whether they are tied to financial consequences, are associated with elevated levels of work-related stress (Ismail and Gali 2017; Carter and Delahaye 2005; Baktash et al. 2022). Stress, in turn, is a well-established risk factor for sleep disturbances (Åkerstedt et al. 2002).

Taken together, these mechanisms suggest that performance appraisals, while designed to improve performance, can simultaneously create stress, social tension, and cognitive preoccupation that interfere with effective recovery and sleep.

Based on these theoretical considerations, we formulate our first hypothesis:

H1: The use of performance appraisals is negatively associated with employees' sleep satisfaction.

2.2. The Role of Financial Consequences

Previous research indicates that the impact of performance appraisals on employee well-being depends strongly on whether they are connected to monetary outcomes. Appraisals used mainly for administrative purposes, such as determining salary increases or promotions, are often perceived as less fair and more stressful because they create room for strategic behaviour by supervisors and raise concerns about bias or favouritism (Kuvaas 2006; Smither and London 2009). In contrast, appraisals that focus on development and feedback are generally viewed as more constructive and fairer, which can enhance satisfaction with both the appraisal process and the job itself (Nathan *et al.* 1991).

In addition, when appraisals are linked to financial rewards, the stakes of the evaluation increase. When performance is connected to income, this can lead to a monetization of employee´s time. (Pfeffer and Carney 2018; Dahl and Pierce 2020). This shift often results in longer working hours (Green and Heywood 2023), reducing the time available for essential recovery activities such as physical exercise and, ultimately, sleep.

Moreover, when performance appraisals influence income, they can increase employee´s uncertainty and volatility in income (Dahl and Pierce 2020), which may heighten psychological strain. Sayre (2023) provides compelling evidence from repeated surveys conducted among tipped workers, gig workers, and employees in sales and finance that volatile earnings induce a scarcity mindset, i.e., a cognitive state in which attention is focused

on urgent deficits (Mani et al. 2020), which subsequently impairs sleep quality and quantity, increases insomnia symptoms, and contributes to physical strain (Sayre 2023).

Taken together, these considerations suggest that the negative association between performance appraisals and sleep satisfaction should be even more pronounced when evaluations are directly linked to financial outcomes.

H2a: The negative relationship between performance appraisals and sleep satisfaction is more pronounced if appraisals are tied to financial consequences.

The mechanisms described above are likely to be particularly relevant when the financial implications of performance appraisals are short-term in nature. Compensation systems such as hourly performance-based pay, piece-rate pay, tips, commissions, or monthly bonuses make income fluctuate from day to day or month to month. As a result, employees may perceive performance pressure more immediately, and financial concerns may become more salient in daily life. This heightened immediacy can amplify rumination and reduce opportunities for psychological detachment after work, thereby intensifying the impact on sleep. In contrast, long-term consequences such as future promotions or salary increases are more closely tied to career development and broader professional goals. These evaluations may still generate pressure, but the associated strain might be less immediate and potentially balanced by feelings of progress or recognition.

Based on this reasoning, we expect that short-term financial consequences strengthen the negative relationship between performance appraisals and sleep satisfaction.

H2b: The negative relationship between performance appraisals and sleep satisfaction is more pronounced if appraisals are linked to short-term financial consequences than if they are linked to long-term financial consequences.

3. Data, Variables and Methodology

3.1. Data & Sample Selection

To examine the relationship between performance-related pay and sleep satisfaction, we use data from the German Socio-Economic Panel (GSOEP), a nationally wide-ranging representative longitudinal study of private households conducted annually since 1984. The GSOEP collects detailed information e.g., on individuals' employment situation, education, income, and well-being. An important advantage of the data is that the same people are surveyed repeatedly over time, which makes it possible to observe long-term changes in their economic, social, and psychological conditions (Goebel *et al*. 2019).

We analyse at the individual employee level. Due to the availability of the performance appraisal and sleep satisfaction variables, we use the survey years 2008, 2011, and 2016.

We impose some restrictions on the data set. Our analysis focuses on employees between 18 and 65 years of age in order to represent the core working population in Germany. We exclude self-employed, trainees, apprentices, seasonal workers, short-term contract workers, and family members who help with family business.

To ensure comparability in employment intensity, we exclude individuals working less than 17.5 hours per week and those earning less than € 640 gross per month, deflated by the consumer price index with 2016 as the reference year[1]. Finally, we exclude observations that have a missing value in a variable we use for our analysis. This results in a final unbalanced data set with 20,625 person observations and 15,855 different individuals. 30% of these individuals appear in two or three GSOEP years.

[1] This threshold corresponds approximately to the legal minimum wage in 2016 (€8.50 per hour) multiplied by the minimum required working time of 17.5 hours per week and an average of 4.3 weeks per month (8.50 × 17.5 × 4.3 ≈ €640).

3.2. Variables

Sleep satisfaction acts as our dependent variable and is measured on a eleven-point scale from 0 (complete dissatisfaction) to 10 (complete satisfaction) in the GSOEP by asking:

How satisfied are you with your sleep?

The distribution of corresponding answers is illustrated in Figure 1. The average sleep satisfaction is 6.9 points and about a quarter of individuals reports a low level of sleep satisfaction of at most 5.

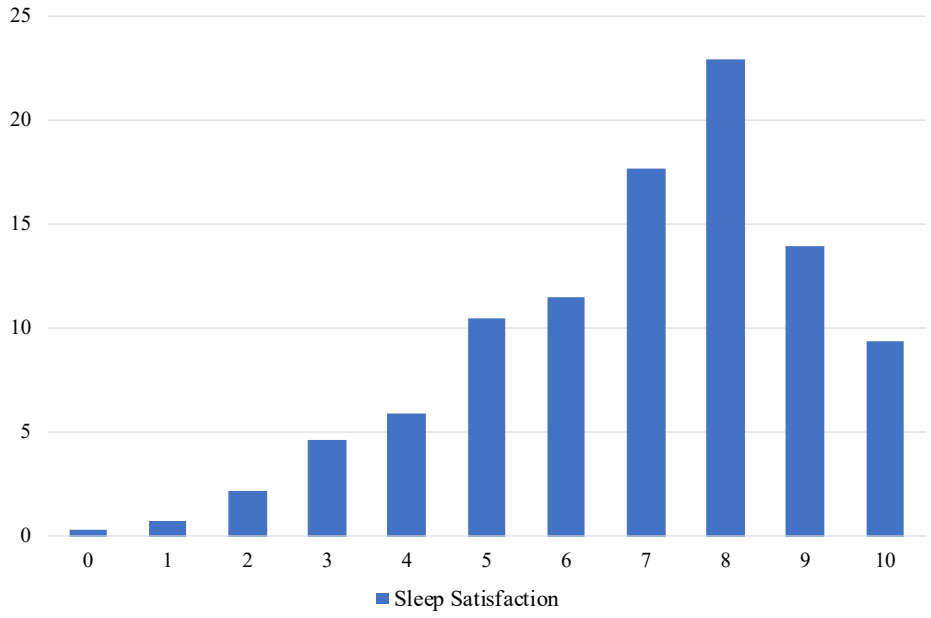

Figure 1: Distribution of sleep satisfaction

Information on performance appraisals is drawn from two questions in the GSOEP. First, respondents are asked whether their individual performance is regularly and formally assessed by a supervisor as part of an agreed procedure (0/1). As compared to surveys among managing directors of the firm, this question captures appraisals that have a continuous and structured character, thereby excluding occasional or informal feedback conversations. Because the question is asked directly to employees, we can be confident that respondents are aware of the appraisal process and consciously experience it in their work environment. This is an advantage over firm level data, which may record formal procedures that are not always implemented or perceived by workers. According to this measure, about 38% of employees in our sample are subject to formal performance appraisals.

To further distinguish between appraisals with and without monetary consequences, a follow-up question asks whether these assessments have any financial implications, specifically, whether they influence the respondent's monthly gross wage, annual bonus, future salary increases, or the likelihood of promotion. Using this information, we define two additional

binary indicators: one for performance appraisals with financial consequences, taking the value 1 if the respondent reports a formal assessment and at least one financial implication, and one for appraisals without financial consequences, taking the value 1 if the respondent is regularly assessed but no financial link exists. About 25 percent of all respondents report that their appraisal has financial consequences (about 65 % of all respondents receiving performance appraisal) while 13 percent are evaluated without any link between the appraisal and their pay. Figure 2 show the more detailed distribution of the different types of performance appraisals in Germany over time. The proportion of employees being subject to PAs increased from 35 % in 2008 to 39 % in 2016, which is equal to a growth rate of 11%. A similar trend can be found for PAs with financial consequences. Appraisals without financial consequences seem to play a minor role, with an average proportion of 13%.

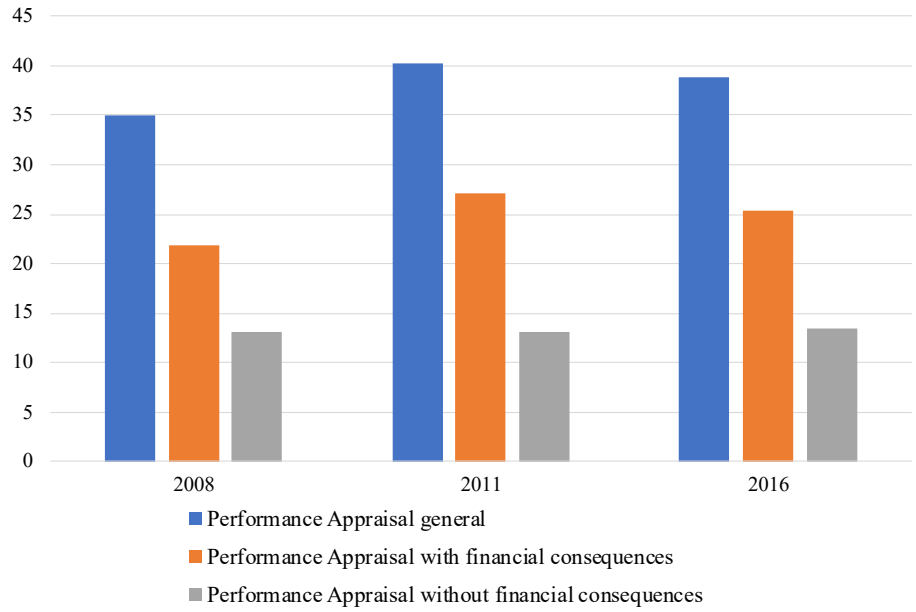

Figure 2: Distribution of performance appraisals over the years

To further differentiate between short- and long-term financial consequences, we follow Heywood and Nießen (2025). Respondents who indicate that their appraisal affects their monthly wage or annual bonus are classified as experiencing short-term financial consequences, whereas those whose evaluation influences future wage growth or promotion prospects are assigned to the long-term category. A third group includes employees whose appraisals carry both short- and long-term financial implications. Among all employees exposed to performance appraisals with financial consequences, 25 percent fall into the short-term category, 30 percent into the long-term category, and 45 percent report that their appraisals have both types of financial implications.

We also include various variables at individual and household level as well as work-related variables as control variables in our analysis. The exact definitions of all variables are

provided in Table A1. At the individual level, we control for age, gender, marital status, education, risk tolerance and disability status. These variables capture demographic and socio-economic characteristics that are systematically related to sleep outcomes. For example, age, disability and gender differences in sleep patterns are well documented (e.g., Ohayon *et al*. 2004; Burgard and Ailshire 2013; Krueger and Friedman 2009; Chien and Chen 2015). Education and marital status are also closely linked to sleep complaints, with married individuals reporting fewer and those with lower educational attainment reporting more (Grandner *et al*. 2010). We further account for the presence of young children in the household, which can directly affect sleep schedules (Venn *et al*. 2008).

Work-related characteristics are further considered through controls for weekly working hours, firm tenure, and gross income. Longer working hours have been repeatedly linked to poor sleep and reduced recovery (Virtanen *et al*. 2009;). Firm tenure is included to capture differences in job attachment and accumulated work experience, as evidence shows that it is systematically related to employee well-being (Bena *et al*. 2013; Valko *et al.* 2025). We also include a measure of concerns about job security, ranging from "no concerns at all" to "many concerns." Job insecurity is a well-known stressor and has been repeatedly associated with sleep problems and impaired recovery (Kim *et al.* 2021). Gross income, measured in 2016 consumer price index values, is also included as a control, as higher earnings have been found to be associated with less sleep complaints (Grandner *et al*. 2010). In addition, we account for alternating working days, which captures whether the number of days an individual works per week is fixed. Respondents who indicate that the number of working days is "not fixed" or "changes from week to week" are classified as having alternating working days. Such irregularity can negatively affect sleep, particularly when scheduling decisions lie with the employer (Harknett *et al.* 2020; Åkerstedt 2003). Finally, broader structural conditions are taken into account through dummies for occupation, industry, and survey year.

Table 1 provides descriptive statistics for all key variables. The average person in our sample is 44.3 years old. Nearly half of all observations are attributed to women. The majority of the survey participants is married or in registered relationships. In addition, 33% of respondents live with at least one child under the age of 14 in their household. In terms of professional characteristics, our sample shows that an observed person has been working for the same company for 12 years on average and 77% of the respondents have a full-time job. The descriptive statistics regarding industry and occupation can be found in Table A2.

Table 1: Descriptive statistics

	Mean/Share	Std. Dev.	Min	Max
Sleep satisfaction	6.9207	2.109	0	10
Performance appraisal (PA)	0.3803	0.4855	0	1
PA without monetary consequences	0.1331	0.3397	0	1
PA with monetary consequences	0.2471	0.4314	0	1
Short-term | monetary consequences	0.2482	0.432	0	1
Long-term | monetary consequences	0.2986	0.4577	0	1
Both | monetary consequences	0.4532	0.4979	0	1
Age	44.2708	10.3687	18	65
Sex *(1= female)*	0.4701	0.4991	0	1
Marital Status *(1= married)*	0.6299	0.4829	0	1
Disability *(1=yes)*	0.0529	0.2239	0	1
Years of Education	12.8923	2.723	7	18
Children under 14 in household *(1=yes)*	0.3286	0.4697	0	1
Risk Tolerance	4.8371	2.2099	0	10
Actual weekly working hours	40.2085	9.2396	17,5	80
Firm tenure *(years)*	12.1064	10.3699	0	50.25
Alternating number of weekly workdays *(1= yes)*	0.0755	0.2643	0	1
Gross wage	3113.685	2121.24	640	84441.63
Employment status *(1=fulltime)*	0.7769	0.4164	0	1
Survey Year				
2008	0.3301	0.4625	0	1
2011	0.2623	0.4399	0	1
2016	0.4276	0.4947	0	1
Concerns about job security				
0=not concerned	0.5677	0.4954	0	1
1=somewhat concerned	0.3391	0.4734	0	1
2=very concerned	0.0933	0.2908	0	1

Notes: Summary statistics based on 20,625 observations. Data comes from the GSOEP. Survey data from 2008, 2011 and 2016 is included.

3.3. Empirical Model

With the data collected, we estimate the following equation.

$$Sleep\ satisfaction_{it} = \beta_0 + \beta_1 PA_{it} + \gamma X'_{it} + \delta Z'_{it} + \alpha_t + \varepsilon_{it}$$

Sleep satisfaction of individual *i* in survey year *t* acts as our dependent variable. Our treatment variable is the corresponding incidence of *Performance Appraisals (PA)*. This binary variable indicates whether an individual in the survey reports having been exposed to formal performance evaluations in year *t*. The coefficient β_1 therefore captures the association between performance appraisals and employee i´s sleep satisfaction. X_{it} is a vector of relevant socioeconomic control variables, such as age, gender, risk tolerance or marital status. The vector Z_{it} contains various job-related control variables, like gross income, tenure or hours worked per week. Finally, α_t is a year dummy, ε_{it} represents the error term.

As a starting point, we estimate pooled OLS models of sleep satisfaction on performance appraisal and the set of control variables. However, pooled OLS does not account for unobserved heterogeneity at the individual level. To address this, we rely on random effects (RE) panel models, which assume that unobserved heterogeneity is constant over time and uncorrelated with the independent variables. The RE framework allows us to exploit the between-person variation in performance appraisal while retaining a large number of observations.

For comparison, we also estimate fixed effects (FE) models. A fixed effects specification could in principle account for endogeneity by taking into account time-invariant individual characteristics. However, this approach is less suitable in our setting for several reasons. First, our panel is highly unbalanced and contains a large share of singleton observations, i.e., individuals observed only once. These observations are dropped in a FE framework, which substantially reduces the sample size. Moreover, only 8.8 percent of the individuals in our data exhibit within-person variation in performance appraisals, which limits the informative value of a FE approach. Second, while FE models address unobserved time-invariant heterogeneity, they cannot correct for time-varying unobservable heterogeneity. In fact, Plümper and Troeger (2019) argue that dropping the between variation may aggravate bias due to omitted time-varying variables as dropping the between variation increases the influence of time-varying misspecification on parameter estimates. Given these limitations, and following the approach taken in related work (e.g., Baktash *et al*. 2022), we primarily focus on random effects estimates.

4. Results

4.1. Baseline Results

Table 2 reports the initial estimates from three regression models. Column (1) shows a pooled OLS estimation, column (2) a random effects estimation, and column (3) a person fixed effects panel estimation. Standard errors are clustered at the individual level throughout.[2]

The OLS (1) and random effects (2) results are largely consistent. Sleep satisfaction is lower among workers exposed to performance appraisals, by 0.1254 points in the OLS specification and 0.1068 points in the random effects model. In terms of magnitude, this difference is comparable to the significantly lower sleep satisfaction observed among parents of children under the age of 14. The role of performance appraisals is therefore far from negligible. This result supports Hypothesis 1, i.e., that the use of performance appraisals is negatively linked to sleep satisfaction.

Among the other controls, disability status shows the strongest association, carrying a large and highly significant negative coefficient. Women also report lower sleep satisfaction, whereas individuals with higher risk tolerance report higher sleep satisfaction. Work-related variables reveal that longer weekly hours, concerns about workplace safety and alternating workdays are negatively associated with sleep satisfaction, while gross wage is positively related to it. Compared to 2008, reported sleep satisfaction shows a significant decline in both 2011 and 2016, indicating an overall deterioration in sleep satisfaction over time. The full set of results is provided in Table A3.

The fixed effects results in column (3) does not exactly coincide with the previous estimates. Although the coefficient for performance appraisal remains negative, it is no longer statistically significant. As mentioned above, this outcome is supposed to be primarily driven by the high number of singletons and the limited within-person variation in performance pay. As a result, the fixed effects estimation is based on a substantially smaller and selective sample, limiting its interpretability.

[2] We are aware that our dependent variable, *sleep satisfaction*, is measured on an ordinal scale. In principle, more specific estimation methods such as ordered logit models would be appropriate in this case. We therefore re-estimated our models using a panel ordered logit specification (Stata command: *xtologit*). The results, which are reported in table A5, remain qualitatively consistent with our main findings. For ease of interpretation and comparability with prior research, we continue to rely on linear specifications in the remainder of the paper.

Table 2: Determinants of sleep satisfaction

	Pooled OLS (1)	RE (2)	FE (3)
Performance Appraisal	-0.1254*** (0.0343)	-0.1068*** (0.0309)	-0.0755 (0.0499)
Female	-0.2581*** (0.043)	-0.2879*** (0.0408)	-
Age	-0.0575*** (0.0125)	-0.0506*** (0.0117)	-0.0575** (0.0285)
Age squared	0.0004*** (0.0001)	0.0003** (0.0001)	0.000009 (0.0003)
Marital status	0.0368 (0.0401)	0.0476 (0.0379)	-0.0536 (0.0921)
Years of education	0.0048 (0.0086)	0.0009 (0.00822)	0.2052* (0.1171)
Children under 14 in household	-0.1192*** (0.0398)	-0.152*** (0.0364)	-0.2029*** (0.064)
Risk tolerance	0.0321*** (0.008)	0.0291*** (0.0073)	0.0221* (0.0132)
Disability	-0.9083*** (0.0832)	-0.8554*** (0.0801)	-0.5112*** (0.1699)
Actual weekly working hours	-0.0148*** (0.0022)	-0.0143*** (0.0021)	-0.0144*** (0.0044)
Gross monthly wage (in 1000€)	0.0466*** (0.0124)	0.0384*** 0.0116	0.0078 (0.0282)
Firm tenure	-0.0014 (0.0022)	-0.0015 (0.0021)	-0.0024 (0.0064)
Alternating workdays	-0.23*** (0.0622)	-0.1725*** (0.058)	-0.0462 (0.1004)
Year (reference: 2008)			
2011	-0.1656*** (0.0313)	-0.1477*** (0.0288)	-0.0253 (0.0275)
2016	-0.1434*** (0.0333)	-0.1747*** (0.0315)	-
Concerns about job security *(0=not concerned)*			
1=somewhat concerned	-0.3478*** (0.0343)	-0.3017*** (0.0313)	-0.1886*** (0.0492)
2=very concerned	-0.8394*** (0.0623)	-0.6738*** (0.0558)	-0.308*** (0.0877)
Constant	9.305*** (0.355)	9.2221*** (0.3349)	6.7344*** (1.6324)
R^2	0.0501	0.0491	0.0189
Observations	20,625	20,625	20,625
Persons in Sample	15,855	15,855	15,855
Persons with repeated survey participation	4,770	4,770	4,770
Persons with Variation in PA	1,394	1,394	1,394

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level. The estimations have additional controls for industry and occupation position.

4.2. Controlling for Personality Traits

To further strengthen our results, we extend the random effects specification by including information on the classical Big Five personality traits. The Big Five traits are commonly viewed as relatively stable over the life course during adulthood (Roberts and DelVecchio 2000; Cobb-Clark and Schurer 2012) and capture fundamental differences in attitudes and behaviour (e.g., Paunonen 2003; Whang and Atherton 2025). The Big Five are systematically related to sleep outcomes, with higher extraversion and lower neuroticism being associated with better sleep quality (Stephan *et al*. 2018). They have also been shown to play a consistent role in determining stress levels (Xin *et al*. 2017) and are linked to various work-related outcomes such as performance (Roberts and Woodman 2017) and job satisfaction (Bui 2017). Controlling for these relatively stable characteristics allows us to test whether the association between performance appraisals and sleep satisfaction persists once personality-related differences are taken into account.

The GSOEP provides validated measures of extraversion, agreeableness, conscientiousness, neuroticism, and openness, which are derived from respondents' answers to a short version of the Big Five Inventory (Schupp and Gerlitz 2008). Each of the Big Five personality traits is constructed as the average of three survey items measured on a seven-point Likert scale ranging from 1 ("does not apply to me at all") to 7 ("applies to me perfectly"). For example, the score for *neuroticism* is based on the items "I see myself as someone who worries a lot," "gets nervous easily," and "deals well with stress." The last item was inversed before averaging. Detailed information on the wording and operationalization of the remaining personality traits can be found in Table A4. It should be noted that the survey waves of 2008, 2011, and 2016 did not include questions on the Big Five personality traits. However, given the extensive evidence in the literature showing that personality traits remain highly stable over several years (Roberts and DelVecchio 2000; Cobb-Clark and Schurer 2012), we used the respective values from the nearest available waves in 2009, 2013, and 2017.[3] Since the time span between the first and the last year in our sample covers eight years, we decided against using a single constant average value across all three years and instead allowed for some variation in the responses. Consequently, the imputed values for 2008, 2011 and 2016 do not necessarily have to be identical. Due to the availability of the Big Five variables, the dataset is reduced to 17,748 person-observations with 12,140 different individuals.

Table 3 presents the estimated coefficients when the Big Five personality traits are added to the model. Column (1) first reports the random-effects estimation using the reduced sample

[3] We are aware that this approach implies using personality information measured after the outcome variable. However, this is unlikely to pose a serious concern, as personality traits are generally considered to be relatively stable over a time span of five to six years. Using alternative personality measures would have implied relying on information collected several years prior to the outcome, which we do not consider to be a superior approach.

for which personality information is available. This specification serves as a benchmark to ensure that restricting the sample does not alter our baseline findings. The coefficient on performance appraisals remains negative and statistically significant, indicating that the sample reduction itself does not drive the results. Column (2) then extends this specification by including the Big Five personality traits. Compared to the baseline specification, the inclusion of these variables increases the explanatory power, showing that personality accounts for additional variation in sleep satisfaction. The estimates also align with theoretical expectations. Neuroticism is strongly and negatively associated with sleep satisfaction, while agreeableness, conscientiousness, and openness show positive associations. Extraversion, in contrast, does not display a significant relationship.

These results confirm prior evidence that stable personality traits are systematically linked to sleep-related outcomes (e.g., Stephan *et al*. 2018; Mead *et al*. 2021). Most importantly, the inclusion of the Big Five do not change the results. Coefficients of performance-related pay become even somewhat larger in absolute terms once the Big Five are included. This indicates that the negative association between performance appraisals and sleep satisfaction is not explained by personality differences underlining the robustness of our findings.

Table 3: The role of the Big Five personality traits

	RE	RE
	(1)	(2)
Performance Appraisal	-0.114*** (0.0332)	-0.1271*** (0.0326)
Neuroticism	--	-0.3387*** (0.0148)
Agreeableness	--	0.1057*** (0.0179)
Conscientiousness	--	0.0584*** (0.02)
Openness	--	0.0391** (0.0155)
Extraversion	--	0.0111 (0.016)
Socio-Demographic Characteristics	**Yes**	**Yes**
Work-Related Characteristics	**Yes**	**Yes**
R^2	0.0499	0.1042
Observations	17,748	17,748
Persons in Sample	12,140	12,140
Persons with repeated survey participation	3,910	3,910
Persons with Variation in PA	1,158	1,158

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level. The estimations have additional controls for industry and occupation position.

4.3. Financial Consequences

We continue to examine whether the association between performance appraisals and sleep satisfaction differs depending on whether appraisals have financial consequences for employees. As described earlier, around 38 percent of employees in our sample are subject to formal performance appraisals, and among them, approximately 65 percent report that these evaluations influence at least one financial outcome.

In Table 4, we first compare the group of employees without PA to those whose PA is tied to some financial consequence (model 1) and to those PA is not linked to financial consequences (model 2). In model (3) we restrict the sample to only employees who are subject to formal performance appraisals and directly compare those whose evaluations with and without financial outcomes.

Table 4: Results for sleep satisfaction regarding financial consequences

	RE (1)	RE (2)	RE (3)
No PA	Reference	Reference	**---**
PA with financial consequences	-0.1291*** (0.038)	**---**	-0.0382 (0.0503)
PA without financial consequences	**---**	-0.1175** (0.0463)	Reference
Socio-Demographic Characteristics	**Yes**	**Yes**	**Yes**
Work-Related Characteristics	**Yes**	**Yes**	**Yes**
Big Five	**Yes**	**Yes**	**Yes**
R^2	0.1024	0.1074	0.1081
Observations	15,369	13,311	6,816

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level. The estimations have additional controls for industry and occupation position. In column (1) we exclude workers wo receive formal performance appraisals without any financial consequence. In column (2) we exclude those who receive performance appraisals with any form of financial consequence and in column (3), we exclude those without any performance appraisal.

Across the two first model specifications, the estimated coefficients are negative and statistically significant, indicating that both types of appraisals are associated with lower levels of sleep satisfaction. The results in column (3) reveal a negative but statistically insignificant coefficient, implying that the additional financial component does not

significantly increase the negative association between performance appraisals and sleep satisfaction.

Overall, these findings provide only limited support for Hypothesis 2a. While appraisals, irrespective of their financial implications, are linked to lower sleep satisfaction, the evidence does not clearly indicate that monetary consequences amplify this effect.

4.4. Short and Long-term Financial Consequences

We further explore whether the temporal dimension of financial outcomes matters by differentiating between short-term and long-term financial consequences of performance appraisals. Following Heywood and Nießen (2025), respondents who report that their evaluation affects their monthly wage or annual bonus are classified as experiencing short-term financial consequences, while those whose appraisal influences their future wage growth or promotion prospects are assigned to the long-term category. The third group includes employees whose appraisals have both short- and long-term implications. Among all employees exposed to performance appraisals with financial consequences, 25 percent fall into the short-term category, 30 percent into the long-term category, and 45 percent report that their appraisals have both short- and long-term financial implications.

Table 6 presents the results for performance appraisals with different types of outcomes. In column (1), we use employees without any performance appraisal as the reference group. The estimates show significant negative associations with sleep satisfaction for appraisals without financial consequences, appraisals with short-term financial consequences, and appraisals with both short- and long-term consequences. By contrast, appraisals linked only to long-term financial consequences do not differ significantly from cases without PA use. To further examine this relationship, column (2) restricts the sample to employees who are subject to any form of performance appraisal. Using performance appraisals without financial consequences as the reference category, the results of the RE estimation show that only short-term financial consequences are significantly related to lower sleep satisfaction. Neither long-term nor combined financial implications display significant associations once the sample is limited to employees who are evaluated.

These results provide support for Hypothesis 2b. Financial consequences can play a role in shaping the relationship between performance appraisals and sleep satisfaction, but only when the financial link is tied to short-term outcomes.

Table 5: Short- vs. long-term financial consequences

	RE (1)	RE (2)
No Performance Appraisal (PA)	Reference	**----**
PA with no financial consequences	-0.1067** (0.0445)	Reference
Short-term financial consequences	-0.2424*** (0.0611)	-0.149* (0.072)
Long-term financial consequences	-0.0582 (0.0574)	0.0487 (0.0676)
Long- and short-term financial consequences	-0.1312*** (0.0496)	-0.0206 (0.0615)
Socio-Demographic Characteristics	**Yes**	**Yes**
Work-Related Characteristics	**Yes**	**Yes**
Big Five	**Yes**	**Yes**
R^2	0.1045	0.1089
Observations	17,748	6,816

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level.

4.5. Robustness Checks

We conducted a series of robustness checks to assess the stability of our findings.

We first recognize that the estimated association between performance appraisals and sleep satisfaction may be affected by endogeneity. Despite the rich set of socio-demographic, work-related, and personality controls, unobserved factors may still jointly influence both employees' exposure to performance appraisals and their sleep satisfaction. If such unobserved factors influence performance appraisals and sleep satisfaction in the same direction, the estimated association would be underestimated; if they affect both in opposite directions, the association would be overestimated. To address these concerns, we conduct an instrumental-variable (IV) analysis as a robustness check. While IV estimations can account for both time-invariant and time-varying unobserved heterogeneity, they rely on exclusion restrictions that cannot be formally tested and must be justified on theoretical reasoning (Heckman, 2000; Keane, 2010). The IV results should therefore be interpreted with caution and are intended as exploratory evidence rather than definitive causal estimates Following Baktash *et al.* (2022) and Andelic *et al*. (2024), we employ two instruments. First, we use the share of employees subject to performance appraisals within four-digit occupation categories. The share of workers receiving a formal performance appraisal reflects the extent to which it is commonly used within a narrowly defined occupation. When calculating this share, we exclude the individual employee. Second, we include firm size categories as an additional instrument. Larger firms are more likely to implement formalized human resource practices,

including standardized performance appraisal systems, due to greater organizational complexity and more developed HR infrastructures. The first-stage results indicate that both instruments are statistically significantly related to the incidence of performance appraisals. In addition, the corresponding F-statistic rejects the presence of weak instruments, suggesting sufficient relevance of the instruments. The second-stage estimates show that performance appraisals remain negatively and significantly associated with sleep satisfaction. Overall, these results provide supportive evidence that the negative relationship between performance appraisals and sleep satisfaction is not solely driven by endogeneity concerns (Table A6).

We also address the possibility that the observed association between performance appraisals and sleep satisfaction may be influenced by recent job changes. Changing jobs is typically accompanied by new tasks, altered responsibilities, onboarding processes, and new social interactions. These factors could independently affect sleep satisfaction, thereby confounding the estimated relationship between appraisals and sleep. To account for this, we include a binary indicator for job change in the previous year in our baseline specifications, with around 11 percent of respondents reporting such a transition. The inclusion of this variable does not alter the main findings: performance appraisals remain negatively and significantly associated with sleep satisfaction in both the pooled OLS and random-effects models (Table A7). The coefficient for job change is small and statistically insignificant, suggesting that recent job transitions do not systematically affect sleep satisfaction. This supports the interpretation that performance appraisals, as a stable job characteristic rather than a by-product of employment transitions, are negatively related to employees' perceived sleep quality.

Third, we include additional controls for individual worries across various life domains, such as concerns about the environment, personal financial situation, economic development, health, crime, and peace. These subjective stressors have been linked to poorer sleep satisfaction and sleep quality in previous research (Takano *et al*. 2012; Lancee *et al.,* 2017). The inclusion of these variables leaves the main results virtually unchanged, indicating that the negative association between performance appraisals and sleep satisfaction is not driven by broader worry-related stress or individual differences in emotional reactivity (Table A8).

Finally, we conducted a set of subgroup analyses to examine whether the relationship between performance appraisals and sleep satisfaction varies across different demographic or job-related groups. We estimated separate models for younger (< 40 years) and older (≥ 40 years) employees, for men and women, and for full-time and part-time workers. While the overall negative association between performance appraisals and sleep satisfaction is persistent and significant in all subgroups, the specific appraisal types driving this relationship differ. Among older employees, short-term financial consequences appear to be particularly salient, showing a significant negative association with sleep satisfaction, whereas long-term consequences do not. This suggests that immediate income-related incentives may be more disruptive to

recovery at later stages of the working life. Gender differences also emerge. While the results for men largely mirror those of the full sample, among women only appraisals with short-term financial consequences are significantly associated with lower sleep satisfaction, indicating that the overall effects for non-financial and long-term appraisals are primarily driven by men. In addition, long-term financial consequences seem to matter especially for part-time workers, for whom they are significantly related to reduced sleep satisfaction, whereas this pattern is not observed among full-time employees (Table A9).

Taken together, these subgroup analyses indicate that performance appraisals can impair sleep satisfaction through different channels across employee groups. Although the specific appraisal types vary in significance, the broader pattern remains consistent. Therefore, performance evaluations, whether financial or not, have the potential to undermine employees' recovery across diverse segments of the workforce.

5. Conclusion

This contribution examines the relationship between performance appraisals and employees' sleep satisfaction using representative panel data from Germany. The results consistently show that performance appraisals are negatively associated with sleep satisfaction, even after controlling for a wide range of socio-demographic, job-related, and personality factors suggesting that formal evaluation processes may be a source of stress and cognitive strain. There is no general difference between the links between appraisals with and without financial consequences. Both groups show rather equally negative and significant associations with sleep satisfaction as compared to individuals whose performance is not formally assessed. However, the time horizon of financial consequences matters. We find support for the idea that short-term financial consequences may strengthen the negative association between performance appraisals and sleep satisfaction as compared to no financial or more long-term consequences.

Although our study benefits from a large and representative longitudinal dataset, some limitations remain. First, we lack information on the type and quality of performance appraisals. It is unclear whether evaluations in our sample are based on objective performance indicators, subjective judgments, or a combination of both. The nature of the appraisal systems can be highly relevant for understanding their effects. Unfortunately, the GSOEP only captures whether appraisals are present and whether they have financial implications, preventing us from differentiating between appraisal types or corresponding fairness perceptions. Moreover, the data do not include information on other potential outcomes or purposes of appraisals, such as training or development. As a result, we cannot assess how different appraisal uses may relate to employees' well-being. Future research should therefore explore how contextual

factors such as appraisal quality, supervisor behaviour, perceived recognition or the underlying purpose moderate the link between appraisals and sleep satisfaction.

Second, although our data allow for a temporal perspective, causal interpretations remain limited. Appraisals might not only affect sleep satisfaction but could also be more likely implemented in high-performance or high-pressure environments where sleep problems are already more common. Future research could benefit from experimental or quasi-experimental approaches, as well as from more detailed temporal data on evaluation cycles and sleep patterns.

Overall, our findings suggest that performance appraisals, an integral component of modern performance management, can have unintended side effects for employee well-being. Even non-financial appraisals, typically introduced to support feedback, development and communication, may impose psychological pressure on employees, leading to a sleep deterioration. From a managerial perspective, this suggests that appraisal systems should not only be evaluated based on their efficiency or motivational potential but also with regard to their potential effects on employee well-being. Organizations should be cautious about linking appraisals too strongly to short-term financial rewards, as this may amplify the negative effects on recovery and sleep. More broadly, appraisal systems should strive to balance accountability and development while minimizing stress and ensuring that employees feel supported rather than controlled.

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Appendix

A1: Definition of each variable

Variable	Definition
Sleep Satisfaction	The worker's sleep satisfaction ranging from 0 to 10.
Performance Appraisal	Dummy equals 1 if the worker faces a regular and formal performance appraisal.
PA with financial consequences	Dummy equals 1 if the worker faces a regular performance appraisal that has consequences for his or her earnings.
PA without financial consequences	Dummy equals 1 if the worker faces a regular performance appraisal that has no consequences for his or her earnings.
PA with short-term financial consequences	Dummy equals 1 if performance evaluation influences monthly salary or yearly bonus.
PA with long-term financial consequences	Dummy equals 1 if performance evaluation influences future salary increases or potential promotions.
PA with short- and long-term financial consequences	Dummy equals 1 if performance evaluation influences monthly salary or yearly bonus and future salary increases or potential promotions.
Age	The worker's age by years ranging from 18 to 65
Sex	Dummy equals 1 if the worker is a woman.
Marital Status	Dummy equals 1 if the worker is married or in a registered relationship.
Disability	Dummy equals 1 if the worker has a disability.
Years of Education	The worker's years of education ranging from 7 to 18 years.
Children under 14 in household	Dummy equals 1 if there are children under 14 years in the household.
Risk Tolerance	The worker's risk tolerance ranging from 0 to 10.
Actual weekly working time	The number of weekly hours the worker actually works including possible over-time.
Firm tenure	The number of years the worker is with their current firm.
Alternating number of weekly workdays	Dummy equals 1 if workdays are not fix or changing.
Gross income (inflation-adjusted)	Gross income received last month (inflation-adjusted to 2016)
Concerns about job security	Variable capturing concerns about its own job security taking the values 0 “not concerned”, 1 “somewhat concerned” and 2 “very concerned”.
Industry Dummies	Eight broad industry dummies for Energy, Mining, Manufacturing, Construction, Trade, Transport, Banking/Insurance and Services (reference group: agriculture)
Occupation Dummies	Thirteen broad two-digit occupation dummies for semi-skilled blue-collar, skilled blue-collar, blue-collar foreman/forewoman, blue- and white-collar master craftsperson, unskilled white collar, semi-skilled white-collar, skilled white-collar, highly skilled white-collar, white-collar with extensive managerial duties, lower-level civil servant middle-level civil servant, upper-level civil servant and executive-level civil servant (reference group: unskilled blue-collar).
Year Dummies	Two dummies for the years 2011 and 2016 (reference year: 2008).

A2: Descriptive Statistics of Industry and Occupation

Occupation	Freq.	Percent
Unskilled blue collar	407	1.97
Semi-skilled blue collar	1,701	8.25
Skilled blue collar	2,458	11.92
Blue collar foreman	412	2.00
Blue- and White-Collar Master Craftsperson	291	1.41
Unskilled white collar	767	3.72
Semi-skilled white collar	1,869	9.06
Skilled white collar	6,449	31.72
Highly skilled white collar	4,185	20.29
White collar with extensive managerial duties	458	2.22
Lower-level civil servant	42	0.20
Middle level civil servant	348	1.69
Upper-level civil servant	730	3.54
Executive level civil servant	508	2.46
Total	20,625	100

Industry	Freq.	Percent
Agriculture	249	1.21
Energy	266	1.29
Mining	42	0.20
Manufacturing	5,208	25.25
Construction	1,044	5.06
Trade	2,643	12.81
Transport	1,216	5.90
Bank, Insurance	891	4.32
Services	9,066	43.96
Total	20,625	100

A3: Detailed results

	Pooled OLS	RE	FE
Performance Appraisal	-0.1254*** (0.0343)	-0.1068*** (0.0309)	-0.0755 (0.0499)
Sex	-0.2581*** (0.043)	-0.2879*** (0.0408)	-
Age	-0.0575*** (0.0125)	-0.0506*** (0.0117)	-0.0575** (0.0285)
Age squared	0.0004*** (0.0001)	0.0003** (0.0001)	0.000009 (0.0003)
Marital status	0.0368 (0.0401)	0.0476 (0.0379)	-0.0536 (0.0921)
Years of education	0.0048 (0.0086)	0.0009 (0.00822)	0.2052* (0.1171)
Children under 14 in household	-0.1192*** (0.0398)	-0.152*** (0.0364)	-0.2029*** (0.064)
Risk tolerance	0.0321*** (0.008)	0.0291*** (0.0073)	0.0221* (0.0132)
Disability	-0.9083*** (0.0832)	-0.8554*** (0.0801)	-0.5112*** (0.1699)
Actual weekly working hours	-0.0148*** (0.0022)	-0.0143*** (0.0021)	-0.0144*** (0.0044)
Gross monthly wage (in 1000€)	0.0466*** (0.0124)	0.0384*** 0.0116	0.0078 (0.0282)
Firm tenure	-0.0014 (0.0022)	-0.0015 (0.0021)	-0.0024 (0.0064)
Alternating number of weekly workdays	-0.23*** (0.0622)	-0.1725*** (0.058)	-0.0462 (0.1004)
Year (reference: 2008)			
2011	-0.1656*** (0.0313)	-0.1477*** (0.0288)	-0.0253 (0.0275)
2016	-0.1434*** (0.0333)	-0.1747*** (0.0315)	-
Concerns about job security *(0=no concerns)*			
1=little concerns	-0.3478*** (0.0343)	-0.3017*** (0.0313)	-0.1886*** (0.0492)
2=many concerns	-0.8394*** (0.0623)	-0.6738*** (0.0558)	-0.308*** (0.0877)
Occupation Position (reference: unskilled blue collar)			
Semi-skilled blue-collar	0.1041 (0.1262)	0.1234 (0.1233)	0.2127 (0.2346)
Skilled blue-collar	0.1199 (0.1253)	0.1249 (0.1227)	0.3354 (0.2582)
Blue-collar foreman	0.0048 (0.1556)	0.0896 (0.1572)	0.5327* (0.3119)
Blue- and white-collar master craftsperson	0.3182* (0.1811)	0.2252 (0.1754)	0.2424 (0.3448)
Unskilled white-collar	0.2492* (0.1415)	0.2492* (0.1391)	0.2031 (0.2934)
Semi-skilled white-collar	0.1926 (0.1282)	0.2108* (0.1244)	0.463* (0.2656)
Skilled white-collar	0.2494** (0.1221)	0.3039** (0.1192)	0.5921** (0.2658)
Highly skilled white-collar	0.2326* (0.1301)	0.2922** (0.126)	0.4418 (0.274)
White collar with extensive managerial duties	0.1970 (0.1783)	0.3213* (0.1659)	0.7146** (0.3283)
Lowe-level civil servant	0.1089 (0.2858)	0.1226 (0.2722)	0.3652 (0.5296)
Middle-level civil servant	0.1972 (0.1834)	0.226 (0.1757)	0.5167 (0.479)
Upper-level civil servant	0.0222 (0.1598)	0.1333 (0.1539)	0.7243 (0.4453)
Executive-level civil servant	0.1642 (0.1735)	0.2338 (0.1666)	0.5332 (0.4356)
Industry (reference: agriculture)			
Energy	-0.024 (0.2285)	-0.0545 (0.2063)	0.6045 (0.4538)
Mining	-0.3844 (0.3636)	-0.2535 (0.3396)	0.4746 (0.5656)
Manufacturing	-0.0799 (0.1802)	-0.0759 (0.165)	0.4344 (0.399)
Construction	0.1094 (0.1892)	0.1006 (0.174)	0.3806 (0.4127)
Trade	-0.0717 (0.1829)	-0.0860 (0.1679)	0.29 (0.4039)
Transport	-0.0523 (0.19)	-0.0937 (0.1745)	0.4708 (0.4258)
Bank, Insurances	-0.1697 (0.1988)	-0.1822 (0.1821)	0.1007 (0.4435)
Services	-0.0864 (0.1808)	-0.0971 (0.1653)	0.3178 (0.3942)
Constant	9.305*** (0.355)	9.2221*** (0.3349)	6.7344*** (1.6324)
R^2	0.0501	0.0491	0.0189
Observations	20,625	20,625	20,625

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level.

A4: Operationalization of the Big Five Variables

Big Five Variables	Definition (M, SD)
Neuroticism	Score of neuroticism constructed from adding up three survey items measured on a seven-point Likert scale ranging from 1 “does not apply to me at all” to 7 “applies to me perfectly”. The sum of items is divided by 3. The items are: I see myself as someone who… “worries a lot”, “gets nervous easily”, “deals well with stress”. The last item was recoded in inverse order before adding up. (3.6836, 1.1933)
Agreeableness	Score of agreeableness constructed from adding up three survey items measured on a seven-point Likert scale ranging from 1 “does not apply to me at all” to 7 “applies to me perfectly”. The sum of items is divided by 3. The items are: I see myself as someone who… “is sometimes somewhat rude to others”, “has a forgiving nature”, “is considerate and kind to others”. The first item was recoded in inverse order before adding up. (5.299, 0.9499)
Conscientiousness	Score of conscientiousness constructed from adding up three survey items measured on a seven-point Likert scale ranging from 1 “does not apply to me at all” to 7 “applies to me perfectly”. The sum of items is divided by 3. The items are: I see myself as someone who… “does a thorough job”, “does things effectively and efficiently”, “tends to be lazy”. The last item was recoded in inverse order before adding up. (5.8616, 0.8639)
Openness	Score of openness constructed from adding up three survey items measured on a seven-point Likert scale ranging from 1 “does not apply to me at all” to 7 “applies to me perfectly”. The sum of items is divided by 3. The items are: I see myself as someone who… “is original”, "values artistic experiences”, “has an active imagination”. (4.521, 1.1393)
Extraversion	Score of extraversion constructed from adding up three survey items measured on a seven-point Likert scale ranging from 1 “does not apply to me at all” to 7 “applies to me perfectly”. The sum of items is divided by 3. The items are: I see myself as someone who… “is communicative”, “is sociable”, “is reserved”. The last item was recoded in inverse order before adding up. (4.8409, 1.1341)

Notes: Data based on 17,748 observations.

A5: Logit Regression Results

	xtologit	xtologit	xtologit	xtologit
Performance Appraisal	-0.0974** (0.0384)	-0.1164*** (0.039)	-0.1285*** (0.0402)	-0.1595*** (0.0426)
Socio-Demographic Characteristics	**No**	**Yes**	**Yes**	**Yes**
Work-Related Characteristics	**No**	**No**	**Yes**	**Yes**
Big Five	**No**	**No**	**No**	**Yes**
Observations	20,625	20,625	20,625	17,748
Performance Appraisal with financial consequences	-0.0647 (0.0448)	-0.1032** (0.0459)	-0.1376*** (0.0478)	-0.1698*** (0.0504)
Socio-Demographic Characteristics	**No**	**Yes**	**Yes**	**Yes**
Work-Related Characteristics	**No**	**No**	**Yes**	**Yes**
Big Five	**No**	**No**	**No**	**Yes**
Observations	17,879	17,879	17,879	15,369
Performance Appraisal without financial consequences	-0.1298** (0.0551)	-0.116** (0.0553)	-0.1097** (0.0557)	-0.1416** (0.0588)
Socio-Demographic Characteristics	**No**	**Yes**	**Yes**	**Yes**
Work-Related Characteristics	**No**	**No**	**Yes**	**Yes**
Big Five	**No**	**No**	**No**	**Yes**
Observations	15,528	15,528	15,528	13,311

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level.

A6: 2SLS and IV Analyses

	2SLS		RE IV	
	Performance Appraisal	**Sleep Satisfaction**	**Performance Appraisal**	**Sleep Satisfaction**
Performance Appraisals	---	-0.3395*** (0.1248)	---	-0.3292*** (0.1328)
Share of PA per Occupation	0.4603*** (0.0256)	---	0.4192*** (0.0248)	---
Company Size (Reference: <20)		---		---
20-200 workers	0.0979*** (0.0095)	---	0.0973*** (0.0094)	---
200-2000 workers	0.2174*** (0.0112)	---	0.2095*** (0.0109)	---
>2000 workers	0.3279*** (0.0113)	---	0.3039*** (0.0111)	---
R^2	0.2018	0.1032	0.2013	0.1020
Robust F-Test	388.065***	---	---	---
Observations	17,612	17,612	17,612	17,612
Individuals	12,058	12,058	12,058	12,058

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level.

A7: Controlling for Job Change

	RE	RE
Performance Appraisal	-0.1266*** (0.0327)	-0.1266*** (0.0327)
Job Change in Previous Year	--	-0.0246 (0.0494)
Socio-Demographic Characteristics	**Yes**	**Yes**
Work-Related Characteristics	**Yes**	**Yes**
Big Five	**Yes**	**Yes**
R^2	0.1038	0.1038
Observations	17,652	17,652
Performance Appraisal without Financial Consequences	-0.1041** (0.0447)	-0.1035** (0.0447)
Short-term Financial Consequences	-0.2458*** (0.0611)	-0.2457*** (0.0611)
Long-term Financial Consequences	-0.0599 (0.0575)	-0.0587 (0.0575)
Long- and Short-term Financial Consequences	-0.1319*** (0.0498)	-0.1315*** (0.0498)
Job Change in Previous Year	--	-0.0273 (0.0495)
Socio-Demographic Characteristics	**Yes**	**Yes**
Work-Related Characteristics	**Yes**	**Yes**
Big Five	**Yes**	**Yes**
R^2	0.1040	0.1040
Observations	17,652	17,652

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level.

A8: Controlling for Different Concerns

	RE	RE
Performance Appraisal	-0.1271*** (0.0327)	-0.1143*** (0.0321)
Concerns about own financial situation *(0=not concerned)*		
1=somewhat concerned	--	-0.1675*** (0.0362)
2=very concerned	--	-0.2794*** (0.0632)
Concerns about economic development *(0= not concerned)*		
1=somewhat concerned	--	-0.0351 (0.039)
2=very concerned	--	-0.1486*** (0.0572)
Concerns about ecology *(0= not concerned)*		
1=somewhat concerned	--	0.0805* (0.0467)
2=very concerned	--	0.1539*** (0.0561)
Concerns about own health *(0= not concerned)*		
1=somewhat concerned	--	-0.5721*** (0.0334)
2=very concerned	--	-1.2258*** (0.0642)
Concerns about peace *(0= not concerned)*		
1=somewhat concerned	--	0.0603 (0.0487)
2=very concerned	--	0.0712 (0.0569)
Concerns about crime *(0= not concerned)*		
1=somewhat concerned	--	-0.0705 (0.0435)
2=very concerned	--	-0.1133** (0.0517)
Concerns about peace *(0= not concerned)*		
1=somewhat concerned	--	
2=very concerned	--	
R^2	0.1044	0.1439
Observations	17,690	17,690
Performance Appraisal without Financial Consequences	-0.107** (0.0447)	-0.0925** (0.0438)
Short-term Financial Consequences	-0.2388*** (0.0612)	-0.2084*** (0.06083)
Long-term Financial Consequences	-0.0576 (0.0575)	-0.0598 (0.0562)
Long- and Short-term Financial Consequences	-0.1338*** (0.0496)	-0.1249** (0.0488)
Concerns about own financial situation *(0=not concerned)*		
1=somewhat concerned	--	-0.1681*** (0.0362)
2=very concerned	--	-0.279*** (0.0632)
Concerns about economic development *(0= not concerned)*		
1=somewhat concerned	--	-0.035 (0.039)
2=very concerned	--	-0.1489*** (0.0572)
Concerns about ecology *(0= not concerned)*		
1=somewhat concerned	--	0.0798* (0.0467)
2=very concerned	--	0.1538*** (0.0561)

Concerns about own health *(0= not concerned)*		
1=somewhat concerned	--	-0.5712*** (0.0334)
2=very concerned	--	-1.2247*** (0.0642)
Concerns about peace *(0= not concerned)*		
1=somewhat concerned	--	0.0597 (0.0487)
2=very concerned	--	0.0703 (0.0569)
Concerns about crime *(0= not concerned)*		
1=somewhat concerned	--	-0.0691 (0.0436)
2=very concerned	--	-0.1118** (0.0517)
Individual Characteristics	**Yes**	**Yes**
Work-Related Characteristics	**Yes**	**Yes**
Big Five	**Yes**	**Yes**
R^2	0.1046	0.1439
Observations	17,690	17,690

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level.

A9: Subgroup Analyses

	RE	RE
	Women	**Men**
Performance Appraisal	-0.1288*** (0.0494)	-0.1241*** (0.0429)
Socio-Demographic Characteristics	Yes	Yes
Work-Related Characteristics	Yes	Yes
Big Five	Yes	Yes
R^2	0.1001	0.1161
Observations	8,395	9,353
Performance Appraisal without Financial Consequences	-0.09 (0.0645)	-0.1289** (0.0609)
Short-term Financial Consequences	-0.3318*** (.0991)	-0.1765** (0.077)
Long-term Financial Consequences	-0.0543 (0.0895)	-0.0618 (0.0744)
Long- and Short-term Financial Consequences	-0.1233 (0.0838)	-0.1254** (0.0612)
Socio-Demographic Characteristics	Yes	Yes
Work-Related Characteristics	Yes	Yes
Big Five	Yes	Yes
R^2	0.1007	0.1161
Observations	8,395	9,353
	Fulltime	**Parttime**
Performance Appraisal	-0.1084*** (0.036)	-0.2357*** (0.077)
Socio-Demographic Characteristics	Yes	Yes
Work-Related Characteristics	Yes	Yes
Big Five	Yes	Yes
R^2	0.1133	0.0912
Observations	13,726	4,022
Performance Appraisal without Financial Consequences	-0.0896** (0.0502)	-0.22** (0.0988)
Short-term Financial Consequences	-0.2382*** (0.067)	-0.3155** (0.1472)
Long-term Financial Consequences	-0.0236 (0.062)	-0.2666* (0.1512)
Long- and Short-term Financial Consequences	-0.1094** (0.053)	-0.1802 (0.1374)
Socio-Demographic Characteristics	Yes	Yes
Work-Related Characteristics	Yes	Yes
Big Five	Yes	Yes
R^2	0.1137	0.0913
Observations	13,726	4,022

	Under 40	40 or older
Performance Appraisal	-0.1334** (0.0564)	-0.1136*** (0.04)
Socio-Demographic Characteristics	**Yes**	**Yes**
Work-Related Characteristics	**Yes**	**Yes**
Big Five	**Yes**	**Yes**
R^2	0.0876	0.1079
Observations	5,531	12,217
Performance Appraisal without Financial Consequences	-0.0801 (0.0773)	-0.1057* (0.0546)
Short-term Financial Consequences	-0.1889 (0.1235)	-0.2394*** (0.0712)
Long-term Financial Consequences	-0.1353 (0.0911)	-0.0023 (0.074)
Long- and Short-term Financial Consequences	-0.1821** (0.0879)	-0.0996 (0.0612)
Socio-Demographic Characteristics	**Yes**	**Yes**
Work-Related Characteristics	**Yes**	**Yes**
Big Five	**Yes**	**Yes**
R^2	0.0878	0.1083
Observations	5,531	12,217

Notes: The table indicates the estimated coefficients. Standard errors in parentheses are clustered at the individual level. * Statistically significant at the 10% level, ** at the 5% level; *** at the 1% level.