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Performance Appraisals, Works Councils and Employees' Presenteeism Behaviour

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ABSTRACT

Presenteeism behaviour, that is, working despite illness, is a common phenomenon worldwide and can have severe consequences for employees and firms alike. In this study, we investigate the relationship between the use of company performance appraisals and employees' presenteeism behaviour. We use linked-employer–employee data (the German Linked Personnel Panel) and apply pooled Poisson as well as linear fixed effects panel estimations. We show that the use of performance appraisals is associated with significantly lower annual presenteeism days in the amount of half a day, which corresponds to a 10% difference from the base rate. The results are driven by performance appraisals that are linked to performance-related pay, in particular. In addition, the significantly negative relationships between performance appraisals or performance pay and presenteeism only emerge when a works council is present at the workplace. Our study contributes to the understanding of employment relation-specific behavioural consequences of management practices.

1 | Introduction

Presenteeism, the phenomenon that employees work when they are ill, as defined by Aronsson et al. (2000), occurs frequently in the workplace. According to the 2015 American Working Conditions Survey, 69% of Americans go to work while being sick at least once per year (Maestas et al. 2021). In Europe, around 40% of the workforce practices presenteeism (Eurofound 2017). In the short term, employers may benefit from employees working although being sick. An employee who works while sick avoids an accumulation of work and a transmission of the work tasks to colleagues who may already be working at full capacity (Caverley et al. 2007). Presenteeism could serve rush orders and peak demand, and circumvent potential hiring problems of the firm. If employees choose sickness absence instead of presenteeism, this has strong negative consequences for firm productivity, especially in industrial and small firms (Grinza and

Rycx 2020). However, in the long term, presenteeism can lead to poorer health, reduced productivity, higher rates of future sickness absences and lower job satisfaction of the respective worker (Gustafsson and Marklund 2011; Lu et al. 2013; Miraglia and Johns 2016; Collins et al. 2018). Furthermore, being at work despite having a viral disease can often lead to the infection of colleagues, who may subsequently be unable to work due to illness (Pichler and Ziebarth 2017; Webster et al. 2019). The total productivity losses per year incurred due to presenteeism are estimated to be three to six times higher than those associated with sickness-related absence (Iverson et al. 2010; Nagata et al. 2018). Hence, a deeper understanding of the antecedents of presenteeism behaviour is important from an individual, firm and societal perspective alike.

Previous research shows that (i) demographic factors such as age or gender (Allemann et al. 2019; Wynen et al. 2021) and (ii) job

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characteristics such as job type or job security play a role in an individual's decision to engage in presenteeism (Caverley et al. 2007; Gosselin et al. 2013). We argue that the use of management practices is likely to be relevant as well. Performance appraisals are used as a crucial management tool in many companies. Previous empirical studies have focused on the link between the use of performance appraisals and employees' job satisfaction, performance, turnover intention or organizational commitment (Kuvaas 2006; Kampkötter 2017; Capelli and Conyon 2018). We complement this strand of the literature by addressing the relation between the use of performance appraisals and employees' presenteeism behaviour.

The industrial relation context is likely to affect this relationship. Employee representative institutions, such as works councils, can play an important role, first of all, by affecting the implementation of some practices. Grund et al. (2020) show that employees more frequently receive formal performance appraisals in firms with a works council. We argue that by making use of their codetermination rights, works councils can notably affect the relationship between the use of performance appraisals and employees' presenteeism behaviour.

We, therefore, add to the literature by addressing the following two research questions: (1) To what extent is there a relation between the use of performance appraisals and employees' presenteeism behaviour? (2) Do works councils moderate the relation between performance appraisals and presenteeism?

We use a German-linked employer–employee dataset, namely the Linked Personnel Panel (LPP), containing full-time workers and covering the observation periods 2016, 2018 and 2020 and apply pooled Poisson and linear fixed effects estimations to demonstrate that the use of formal performance appraisals is negatively related to employees' presenteeism behaviour. The results appear to be driven in particular by appraisals that are linked to performance-related pay. Furthermore, we find this negative relationship to be statistically significant only in the presence of a works council and not in its absence. In contrast to the intuition, the use of performance appraisals can thus play a role in reducing presenteeism behaviour, especially if employee representation bodies such as works councils participate in its specific implementation.

The following Section 2 lays out relevant theoretical considerations. Section 3 describes the data and empirical strategy. Section 4 shows and discusses the results of our analyses. The last Section 5 summarizes our results.

2 | Theoretical Considerations

2.1 | Relationship Between Performance Appraisals and Presenteeism

Whether and how exactly employees respond to the existence of performance appraisals in terms of presenteeism is not obvious and has not been explored so far. Our theoretical considerations initially focus on the use of performance appraisals in general, so that our arguments apply regardless of the function or content of the appraisals. Some theoretical considerations suggest a positive

relationship between the usage of performance appraisals and the presence of presenteeism among employees. 'Positive' refers to an increased incidence of presenteeism in this context. According to *signalling theory*, visible activities can serve as a signal for less visible activities (Spence 1973). Not only employees, as it was originally the case in Spence's model, but also employers can send signals in the form of workplace characteristics to their own workers or potential job applicants (Backes-Gellner and Tuor 2010), who then see it as symbolic of general firm characteristics (Rynes et al. 1991). The use of performance appraisals could signal that the employer has high-performance expectations. Particularly when appraisals are linked to salary or career opportunities, this signals that high performance is important and necessary to progress professionally. In extreme cases, individuals identified as poor performers may be subject to employment termination. Therefore, employees are likely to work harder and to practice more presenteeism in the presence of performance appraisals in order to maintain and advance their careers. According to the *attendance model* of Steers and Rhodes (1978), incentive or reward systems in the organization, such as company performance appraisal systems, specifically symbolize a form of pressure. The model assumes that the attendance of a person at work depends on their ability and on the motivation to show up at work. The latter, in turn, depends on the job satisfaction and the pressure to show up. The model states that incentive or reward systems represent forms of pressure, which then leads to a higher motivation to be present and to an actual higher attendance. In this context, Steers and Rhodes (1978) indicate that workers need to be sure that their presence is actually beneficial for them. Then, performance appraisals should increase the likelihood of choosing presenteeism instead of sickness absence.

Indeed, studies suggest that employees benefit from a better evaluation when they come to work while being sick. Wang et al. (2022) show that presenteeism leads to better ratings in performance appraisals, especially in jobs with high work demands. Supervisors view working while sick as an expression of organizational commitment, so they may reward individuals who engage in presenteeism by giving them better ratings (Miraglia and Johns 2016; Wang et al. 2022). Lohaus and Habermann (2019) argue that the chances of career advancement increase with the practice of presenteeism because the respective employee is perceived as hard working. Thus, increased attendance at work seems to have a positive impact on performance ratings. In contrast, absences lead to significantly worse performance ratings as well as to fewer promotions and lower salary increases in the future (Judiesch and Lyness 1999). In line with *human capital theory* (Becker 1964), one reason for this could be that absent workers have a lower productivity than present workers due to a lack of on-the-job training and due to human capital depreciation. A worker who is more absent, thus receives inevitably fewer rewards, such as good evaluations (Becker 1964). In addition, frequent absences due to illness make it difficult to establish or maintain good social relationships with supervisors (Biron and Saksvik 2009), which may, however, be helpful for a good performance evaluation. Overall, employees might anticipate that practicing presenteeism instead of calling in sick will lead to a better evaluation, provided that a subjective assessment is possible. We assume that an employee wants to obtain a good performance rating because it is generally conducive to career

advancement. In the presence of performance appraisals, it is then likely that an employee is more prone to presenteeism rather than sickness absence during an illness in order to aim for a better rating.

On the other hand, a negative relationship between the use of performance appraisals and presenteeism is possible. Performance appraisals are used to set goals or expectations for employees, which they are supposed to fulfil within a specified time frame. Appraisals thus give employees a better idea of the work tasks they are expected to complete, so they can spend less time on other, non-relevant activities. In fact, persons often perform only those work tasks that are included in their evaluation (Grubb 2007). As a result, individuals may reduce their work scope and no longer need to work while being sick to complete various tasks. Especially with objective evaluation criteria, the employee's desire to impress supervisors or management by exercising extra 'face time' through presenteeism could decrease (Feldman 2002). If the appraisal is based on objectively measurable or subjectively assessed work outcomes, the hours worked are likely to be unimportant for the evaluation. As a result, performance appraisals can be informative and comprehensible to demonstrate to employees that presenteeism is not necessary. We will refer to this argument as the informative purpose of performance appraisals below. Another argument is that employees could basically avoid presenteeism in the presence of performance appraisals to prevent receiving bad ratings. They may not want to risk poor work or performance evaluations due to productivity losses caused by presenteeism.

Moreover, performance appraisals could lead to the feeling of having less control and less autonomy over work, as the tasks and perhaps even the ways of working are dictated. Studies show that a lack of control and autonomy over work predicts withdrawal behaviour (Dwyer and Ganster 1991; Bakker et al. 2003). In general, when persons perceive work circumstances such as performance appraisal systems as stressful or unsatisfactory, they are likely to engage in withdrawal behaviour in order to escape the stressful situation (Deery et al. 2002; Podsakoff et al. 2007) or as a form of protest against the discontents (Blau 1985; Sagie 1998). Statistics show that more than half of workers perceive performance appraisals as stressful, pointless and needless (Adobe 2017; MHR 2017). In addition, only about a third view them as fair and accurate (Wigert and Mann 2017). According to Gallup, only 20% of workers strongly agree that performance management motivates them to do outstanding work (McDonald 2018). All in all, due to a possible loss of control over work and a potential negative perception, performance appraisals may lead to withdrawal and thus more voluntary absences of employees. Then, they are also more likely to be unwilling to work when they are sick.

In light of the above discussion, it is difficult to establish *a priori* the overall relationship between performance appraisals and presenteeism, since this depends on which of the aforementioned channels prevail. We, therefore, abstain from formulating a directed hypothesis.

The previous arguments relate to the general existence or use of performance appraisals. However, the employee's reaction to appraisals could also depend on the design of the performance appraisal and its consequences for employees. In our subsequent

analyses, we thus distinguish between appraisals that are linked to performance pay and those that are not. If performance pay takes place, then the informative purpose of the associated appraisal, as argued above, can be reinforced, since employees know about the factors that influence performance-based pay. As a consequence, employees can then abstain from presenteeism behaviour if pure presence does not pay off. If, however, presence pays off at least in the short run, the relationship could also be reversed.

Therefore, from a theoretical perspective, it is unclear to what extent appraisals that are linked to performance pay lead to a different presenteeism reaction among employees compared to appraisals not linked to performance pay and we again abstain from a clear directed hypothesis. We will test this empirically in our analyses.

To the best of our knowledge, the relationship between performance appraisals and presenteeism has not been explicitly examined so far. At least somewhat related, presenteeism could be understood as a form of 'overwork', with working overtime hours being another main form of it (Cooper and Lu 2019).¹ Two recent articles show that performance-related pay leads to more overtime (Artz and Heywood 2022; DeVaro 2022). Artz and Heywood (2022), for example, observe U.S. workers, use fixed effects panel estimations and find that hours worked increase by 3 hours per week in the presence of performance-related pay. Besides, Haque et al. (2019) find in a cross-sectional study of 200 Australian workers that a rather broad measure of perceptions toward human resource management (HRM) strengths, which includes performance evaluation, compensation, talent management and training, is associated with fewer intentions to quit, which in turn is associated with less presenteeism. Ollo López and Nuñez (2024) show, based on cross-sectional data of a European survey, that performance-related pay in general is negatively related to presenteeism.

2.2 | Moderating Role of the Works Council

In many countries, there is some kind of formal employee co-determination on the firm level, such as unions in Anglo-Saxon countries or works councils in several continental European countries. In Germany, for example, the works council has far-reaching co-determination rights, which are generally used to represent and enforce the interests of employees. Previous evidence indicates that the presence of a works council is associated with a higher probability that the establishment applies family-friendly practices such as childcare (Jirjahn and Mohrenweiser 2020) and with a larger percentage of employees participating in training (Lammers et al. 2023). Codetermination rights also include the implementation and configuration of performance appraisals. Among other things, works councils have the right to review the company appraisal system with the associated appraisal criteria and the power to reject it on proper grounds (Section 94 of the German Works Constitution Act [WCA]).

As Grund et al. (2020) show, a works council can promote the use of performance appraisals in firms. Then it is natural that works councils do not only influence the pure incidence and use of performance appraisals, but also take into account employees'

reactions to them. In this sense, the works council can act as a moderator in the relationship between performance appraisals and presenteeism. Some arguments hint to the hypothesis that works councils act as a negative moderator (independent of whether the relation between appraisals and presenteeism is negative or positive).

If an employee representative body exists, then employees can generally rely on it to ensure that good working conditions prevail. For example, German works councils are legally responsible for ensuring that regulations in favour of employees are enforced (Section 80 of WCA). Also, the works council is explicitly permitted to co-determine the content and design of company performance appraisals, so that employees' preferences may be better taken into account (especially when performance pay is present) and appraisals are formulated more fairly and clearly, for example. Grund et al. (2024) demonstrate that works councils act as gatekeepers to safeguard employees' interests in the implementation of HRM practices. In this sense, when a works council exists, employees can expect that the performance appraisal system is appropriate and no inefficiently high efforts such as presenteeism will be necessary. Hence, employees are likely to respond to performance appraisals with less presenteeism when a works council is present.

Next to the safeguard function, employee representative bodies can serve as an information source. They can help to spread information about the legal rules regarding sickness absence and regarding performance evaluations. Hence, in the presence of a works council, employees will know in more detail about non-negative consequences of sickness-related absence, even if performance appraisals exist. Similarly, the works council represents a communication channel between employees and management. According to Jirjahn (2018), an employee representative body helps in reducing direct information asymmetries between management and the workforce. Without a works council, an individual employee might not ask their management about the appraisal system in fear of negative consequences. However, if there is a works council, employees can contact it to clarify what exactly is expected of them regarding the appraisal. In this respect, the works council can enhance the informative role of performance appraisals. Furthermore, works councils provide some protection for employees and could make it more difficult to dismiss them even in the case of poor performance detection (for instance, Sections 102 and 103 of WCA). This means that employees in firms with works councils, as opposed to those without them, are not forced to exert inefficiently high effort levels in the form of presenteeism despite having performance reviews.

Hence, we formulate the hypothesis that the relationship between the use of performance appraisals and employees' presenteeism is negatively moderated by the existence of an employee representative body such as a works council.

3 | Data, Variables and Empirical Strategy

3.1 | Data

We conduct our analyses on the basis of the German LPP provided by the Institute for Employment Research Germany (IAB).² At

the establishment level, the LPP is representative of private-sector firms in Germany with at least 50 employees. Our analyses focus on the level of the individual employee. We use the last three years of the LPP, that is, the 2016, 2018 and 2020 waves, since information on presenteeism is only available in these waves. From the IAB Establishment Panel, we additionally retrieve the information on whether a certain individual works in a firm with a works council in place.

We impose some restrictions on the dataset. We only consider full-time employees who have at least 35 contractual weekly working hours and who actually work at least 20 hours per week. We do not consider part-time employees, since we do not have information regarding the number of days they work per week (or over the year). That is why the number of presenteeism days is difficult to interpret for part-time employees. Moreover, we only consider observations of persons who are between 21 and 65 years old and have a monthly gross salary of at least €1000 in the respective survey wave, which accounts for the applicable minimum wage. Although the LPP should not include civil servants, self-employed persons, family workers or freelancers (Ruf et al. 2022b), individuals nevertheless indicate in rare cases that they belong to one of these categories. We therefore exclude these observations. In addition, it happens in rare cases that an employee indicates different years of birth in different survey years and we exclude those individuals. Also, we exclude observations that have a missing value in any of the variables used for the subsequent main estimations. This initially leads to a sample size of 8192 observations from 6675 different employees. Few observations show very high presenteeism or sickness-related absence values, some even over 200 days (of typically worked 230 days of full-time work). The corresponding persons can be classified as having frequent or chronic illnesses. They are likely to impose bias on the empirical results because they probably cannot actively decide for or against presenteeism or sickness absence. Therefore, we exclude observations if more than 30 presenteeism days or more than 30 sickness-related absence days per year are reported. We chose this threshold because, in Germany, a worker exceeding this limit is officially considered to be a frequently ill person.³ The last restriction leads to a loss of a few hundred observations, resulting in the final observation number of 7437. The unbalanced dataset contains 6131 individuals working in 1021 establishments. 82% of individuals are present in exactly one wave, 14.7% and 3.3% appear in two and three waves, respectively.

3.2 | Variables

3.2.1 | Dependent, Independent and Moderator Variables

Surveyed employees in the LPP answered in each of the last three waves the question of how many days they went to work in the corresponding entire survey year, although they should have called in sick due to their health status. The reported absolute number represents the dependent variable, *Presenteeism*. Employees are also asked how many working days they have called in sick in the corresponding year. We use this information likewise as a dependent variable called *Sickness Absence*. Since the sickness absence days are self-reported by the employee, it

is not possible to differentiate whether these are actually only absences due to illness or whether they also include motivational absences. We assume that these are actual absences due to illness.

Since the scope of presenteeism is restricted by sickness days, we additionally use the *Presenteeism Rate*, defined by the fraction of presenteeism days divided by total sick days (the sum of presenteeism and sickness absence days), as a complementing dependent variable. We multiply the value by 100 to obtain a percentage, indicating the proportion of cases in which an employee decides to go to work while being sick when given the opportunity to do so, that is, when the employee is sick. If a person has no total sick days, then the variable value of the *Presenteeism Rate* is 0. The rate takes into account the fact that employees have different strengths of immune systems and thus varying totals of sick days. Moreover, studies come to the conclusion that performance appraisals themselves cause more stress and exhaustion (Conway et al. 2015; Shvartsman and Beckmann 2015), which worsens health and increases sickness absence of the workers (Elstad and Vabø 2008). In addition to this, the *job demand control model* of Karasek (1979) states that a highly demanding job, which leaves the employee little control over work, promotes high stress levels and is detrimental to health. When a performance appraisal conveys the feeling of low control, employees may have more total sick days. Furthermore, performance pay can result in more sickness absence due to accidents at work and poorer health from overexertion (Artz and Heywood 2015; DeVaro and Heywood 2017; Andelic et al. 2024). On the other hand, some studies suggest a negative relation between performance appraisals or performance pay and sickness absence due to higher job satisfaction and performance incentives (Dale-Olsen 2012; Boon et al. 2014). Because these various factors can change the total number of sick days and because the original presenteeism and sickness absence levels together determine how the actual presenteeism rate changes, it may be misleading to rely on absolute presenteeism days alone to determine whether presenteeism has changed. By considering both the absolute level of presenteeism and the presenteeism rate, we gain a more accurate understanding of the underlying dynamics.

Performance Appraisal (PA) is our main independent variable and is reported by individuals as a binary variable in the LPP employee survey. Since the second LPP wave, employees are asked whether their own performance is regularly evaluated by a supervisor in a fixed procedure. If this is the case, *PA* takes the value 1 for the respective employee in the corresponding survey year. If the question is negated, *PA* takes the value 0. It may be that an employee receives performance appraisals in one period, but other employees in the same firm do not. *PA* is thus worker-specific. In addition, the binary variable *Performance Pay (PP)* indicates whether an employee receives any performance-related remuneration such as bonuses or extra payments in addition to their basic salary (1 = yes, 0 = no). This information can be used to specify whether an employee receives performance appraisals that are linked to performance pay or not.

The binary variable *Works Council*, which we investigate as a possible moderator, indicates the existence of a works council at the workplace of the interviewed employee in the corresponding

survey year (1 = yes, 0 = no). This information stems from the IAB Establishment Panel. In Germany, a works council can be founded on the initiative of the workers in a private company with at least five staff members (Sections 1 and 130 of WCA). The establishment of a works council is hence generally possible for the firms in our dataset.

3.2.2 | Control Variables

Many studies show that individual characteristics such as age, gender and educational attainment exert a significant influence on presenteeism (Allemann et al. 2019; Wynen et al. 2021). Also, job characteristics such as managerial role, increased job responsibilities (Gosselin et al. 2013), work environment (Arnold 2016), commitment (Miraglia and Johns 2016) or job security (Caverley et al. 2007; Allemann et al. 2019) influence presenteeism. Likewise, occupational differences seem to play a role (Aronsson et al. 2000). Therefore, we include such factors as control variables in our analyses. A description of them is given in Table A1. All of the control variables are available in waves 3 to 5 of the LPP. Many of them are expected to influence *PA* and thus should be included in the estimating equation in either case. For example, individual characteristics, such as education level or gender and firm characteristics, such as company size, are related to the use of performance appraisals (Brown and Heywood 2005; Addison and Belfield 2008; Jirjahn and Poutsma 2013).⁴

3.2.3 | Descriptive Statistics

Table 1 shows the means, standard deviations, minimum and maximum values of the variables used in the main analyses. Harman's one-factor test states that the total variance extracted by one factor with respect to all variables and also with respect to the variables stemming from the LPP employee survey is under 10%. This indicates that there are no severe problems with common method bias in our dataset. Table 1 shows that the average age of a respondent is 46.8 years. Almost all respondents are German. Female employees account for 18% of the total.⁵ In 84% of the cases, respondents are in a relationship. Apprenticeship is the most common highest training qualification, followed by a university degree and a technical school degree. Almost half of the respondents are white-collar workers, around a quarter are blue-collar workers and 30% are managers. Only a few people have a fixed-term employment contract. Employees report working from home at least occasionally in 38% of the cases. A large proportion claims that other work depends on their own work. In addition, about one in five respondents considers the work to be physically demanding and one in three expresses fears of losing the job. The dataset contains mainly larger, western German and collectively bargained companies from the metal, electrical, automotive industries or from the remaining processing sector (see Table 1).

The mean presenteeism days in the dataset are 5.2, with a standard deviation of 6.7 (see Table 1). The 95% confidence interval of the mean value of presenteeism ranges from 5 to 5.3 days. Some individuals report no presenteeism (38% of

TABLE 1 | Descriptive statistics.

Variable	Whole sample (n = 7437)				PA (n = 3922)	No PA (n = 3515)	Presenteeism > 0 (n = 4603)	No presenteeism (n = 2834)
	Mean/Share	SD	Min	Max	Mean/Share	Mean/Share	Mean/Share	Mean/Share
Individual characteristics								
Presenteeism	5.19	6.73	0	30	4.61	5.83	8.38	0
Presenteeism rate	37.55	36.92	0	100	36.24	39.02	60.67	0
Sickness absence	6.26	7.44	0	30	5.76	6.82	7.35	4.50
Performance appraisal	0.53		0	1	1	0	0.51	0.56
Performance pay	0.64		0	1	0.74	0.53	0.63	0.66
Age	46.75	10.63	21	65	46.26	47.29	46.22	47.61
Female	0.18		0	1	0.17	0.20	0.20	0.16
Foreigner	0.02		0	1	0.03	0.02	0.02	0.03
Partner	0.84		0	1	0.85	0.83	0.84	0.84
<u>Big 5 personality traits</u>								
Openness	3.63	0.62	1	5	3.65	3.61	3.63	3.62
Conscientiousness	4.31	0.50	2	5	4.30	4.32	4.30	4.32
Extraversion	3.56	0.77	1	5	3.61	3.51	3.57	3.55
Agreeableness	4.01	0.58	1.67	5	4.01	4	3.98	4.04
Neuroticism	2.64	0.76	1	5	2.61	2.67	2.72	2.50
<u>Vocational education</u>								
None	0.01		0	1	0.01	0.01	0.01	0.01
Apprenticeship	0.44		0	1	0.37	0.52	0.46	0.41
Technical school	0.22		0	1	0.23	0.21	0.23	0.20
University	0.33		0	1	0.39	0.25	0.30	0.37
Other	0.01		0	1	0.01	0.01	0.01	0.01
Job characteristics								
<u>Employment situation</u>								
Blue-collar	0.23		0	1	0.19	0.29	0.24	0.22
White-collar	0.46		0	1	0.51	0.41	0.45	0.49
Manager	0.30		0	1	0.30	0.30	0.31	0.29
Fixed term	0.02		0	1	0.02	0.03	0.03	0.02
Physical work	0.18		0	1	0.15	0.22	0.21	0.15
Working from home	0.38		0	1	0.46	0.28	0.34	0.43
Job security	0.32		0	1	0.32	0.33	0.36	0.26
Dependent work	0.70		0	1	0.71	0.69	0.70	0.70
Commitment	3.69	0.89	1	5	3.81	3.55	3.64	3.77
Firm characteristics								
Collective agreement	0.77		0	1	0.83	0.69	0.77	0.77
Works council	0.85 (n = 6621)		0	1	0.90 (n = 3342)	0.79 (n = 3279)	0.85 (n = 4100)	0.85 (n = 2521)

(Continues)

TABLE 1 | (Continued)

Variable	Whole sample (n = 7437)				PA (n = 3922)	No PA (n = 3515)	Presenteeism > 0 (n = 4603)	No presenteeism (n = 2834)
	Mean/Share	SD	Min	Max	Mean/Share	Mean/Share	Mean/Share	Mean/Share
<u>Industry</u>								
Processing industry	0.29		0	1	0.26	0.31	0.29	0.27
Metal, electrical, automotive	0.48		0	1	0.52	0.43	0.47	0.49
Commerce, traffic, communication	0.09		0	1	0.08	0.09	0.09	0.09
Financial services	0.09		0	1	0.10	0.08	0.08	0.10
Information and Communication Technology (ICT)	0.06		0	1	0.04	0.08	0.06	0.05
<u>Firm size (number of employees)</u>								
50–99	0.11		0	1	0.07	0.16	0.11	0.12
100–249	0.20		0	1	0.15	0.25	0.20	0.19
250–499	0.19		0	1	0.17	0.20	0.20	0.17
500+	0.50		0	1	0.61	0.39	0.49	0.52
East Germany	0.23		0	1	0.19	0.28	0.24	0.21

Note: The sum of shares for categorical variables does not always add up to 1 due to rounding errors. PA = Performance appraisal.

observations), which is why presenteeism days average 8.4 if only observations with positive days are taken into account (see Table 1). Statistics from other German surveys also show that only around 35% of employees never go to work while being sick within a year (German Trade Union Confederation 2016, 2019). 73% of the panel persons who initially report no presenteeism also report no presenteeism in the next wave. Likewise, 69% of the panel persons with positive presenteeism days report a presenteeism occurrence in the next wave. A large proportion of the observations, namely 87%, show a maximum of 10 days of presenteeism.

Table 1 shows that about half of the employees in the dataset report receiving performance appraisals. When only considering observations of individuals who receive appraisals, the average presenteeism days decrease to 4.6, and the average presenteeism rate decreases to 36.2%. When only observations with no performance appraisals are considered, these values increase to 5.8 days and 39% respectively. Additionally, the subsample with no presenteeism contains slightly more observations in percentage terms with existing performance appraisals than the subsample with positive presenteeism values (see Table 1). Overall, positive presenteeism days occur in 59% of the cases when performance appraisals are in place, compared to 65% when appraisals are absent. The point-biserial correlation between PA and *Presenteeism* is -0.0907 ($p = 0.0001$). The Pearson correlation between PA and the binary variable indicating whether there are positive presenteeism days is -0.0552 ($p = 0.0000$). These are the first signs of a possible negative relation between performance appraisals and presenteeism.

3.3 | Empirical Strategy

When the dependent variable is *Presenteeism* or *Sickness Absence*, we apply pooled Poisson models⁶:

$$E(\text{Presenteeism}_{it} | PA_{it}, x_{it}) = \exp(PA_{it}\beta + x'_{it}\gamma) \quad (1)$$

$$E(\text{Sickness Absence}_{it} | PA_{it}, x_{it}) = \exp(PA_{it}\beta + x'_{it}\gamma) \quad (2)$$

$i = 1, \dots, N$ represents the individuals and $t = 2016, 2018$ and 2020 the survey years. *Presenteeism*_{it} respectively *Sickness Absence*_{it} $\in \mathbb{N}_0$ describes the presenteeism days or sickness absence days of employee i in survey year t . PA_{it} represents the independent variable. x is a vector that includes the control variables. We use the same regressors for the dependent variable *Sickness Absence* as for *Presenteeism* and *Presenteeism Rate*, since the literature repeatedly shows that many of the factors influencing presenteeism also influence sickness absence and vice versa (Allebeck and Mastekaasa 2004; Boot et al. 2017). The vector of coefficients β and γ is estimated using the maximum likelihood method. We use robust standard errors clustered on the firm level and the Huber White sandwich estimator of the variance in all of our estimations to account for overdispersion. The Poisson model is more robust to misspecification compared to the negative binomial model. Poisson models produce consistent estimators of the mean parameters with any kind of variance-mean relationship, whereas negative binomial model estimates are inconsistent if the negative binomial assumption fails. We will refer to the robustness of our results regarding alternative estimators below.

When the dependent variable is the *Presenteeism Rate*, we apply individual fixed effects estimations:

$$\text{Presenteeism Rate}_{it} = PA_{it}\beta + x'_{it}\gamma + \alpha_i + \varepsilon_{it} \quad (3)$$

The estimates of the coefficients β and γ are now based on the within-estimator, which uses the ordinary least squares method. α_i represents the unobserved, individual-specific and time-constant heterogeneity. ε_{it} describes the error term for all unobserved variables that differ across time and individuals. We use clustered robust standard errors at the firm level to account for serial correlation, heteroscedasticity and firm differences. There is a sufficiently high rate of change in performance appraisal status for panel subjects (27% and 37% of subjects occurring in 2 and 3 waves, respectively, report a change).

In the moderation analysis, we interact *PA* in the main models with the *Works Council*:

$$\begin{aligned} \text{Presenteeism Rate}_{it} = & PA_{it}\beta + (PA_{it} \times \text{Works Council}_{it})\delta \\ & + x'_{it}\gamma + \alpha_i + \varepsilon_{it} \end{aligned} \quad (4)$$

$$\begin{aligned} E(\text{Presenteeism}_{it} | PA_{it}, \text{Works Council}_{it}, PA_{it} \times \text{Works Council}_{it}, x_{it}) \\ = \exp(PA_{it}\beta + \text{Works Council}_{it}\tau + (PA_{it} \times \text{Works Council}_{it})\delta + x'_{it}\gamma) \end{aligned} \quad (5)$$

$$\begin{aligned} E(\text{Sickness Absence}_{it} | PA_{it}, \text{Works Council}_{it}, PA_{it} \times \text{Works Council}_{it}, x_{it}) \\ = \exp(PA_{it}\beta + \text{Works Council}_{it}\tau + (PA_{it} \times \text{Works Council}_{it})\delta + x'_{it}\gamma) \end{aligned} \quad (6)$$

δ and τ are additional coefficients. To avoid biases in this analysis, we only consider individuals here for whom the works council status does not change over time. This is because works councils are often introduced when employees were previously worried about their jobs. After the introduction, employees are usually less worried (Kraft and Lang 2008; Grund and Schmitt 2011). Hence, before the introduction of a works council, the presenteeism level in the company might generally be high, as employees could fear losing their jobs if they are absent, while the level might be lower after the introduction. Also, a works council is often introduced after certain company events such as a change in ownership (Mohrenweiser et al. 2011) or in response to a poor earnings situation (Kraft and Lang 2008; Jirjahn 2009). These factors could similarly indicate different cultures of presenteeism in firms that change their works council status.

4 | Results

4.1 | Performance Appraisals and Presenteeism

Table 2 shows the results of our main estimates. The complete results can be found in Table A2. The pooled Poisson model 1 indicates that employees' annual presenteeism days are significantly lower by about 10% or half a day on average if performance appraisals are present, holding all else constant. The raw difference in the mean presenteeism days between

individuals whose performance is and is not assessed is 1.2 days (reported in Table 1 above). Hence, almost half of this raw difference is not explained by our controls. At the same time, the use of performance appraisals is not related to sickness absence (model 2). Arnold and de Pinto (2015) similarly show that most work-related factors only influence either presenteeism or sickness absence and that they are not necessarily substitutes.

As a consequence of the first two models, the individual fixed effects model indicates that the presenteeism rate is almost 5 percentage points lower on average if performance appraisals exist.⁷ Since individuals in the dataset choose to go to work while being sick for an average of 38% of total sick days, this represents a reduction of about 12%. Overall, we conclude that there is indeed a significantly negative relation between the use of performance appraisals and presenteeism. Table A2 further shows that younger persons, women and those with job worries engage in more presenteeism, which is a frequently shown result in the literature. The same is true for persons with higher education and commitment, where we find a reverse relation (Miraglia and Johns 2016; Allemann et al. 2019; Wynen et al. 2021; Ollo-López and Nuñez 2024).

The results are robust with respect to alternative estimators such as a negative binomial model (see Table A3). Since our observations often show 0 days of presenteeism, we also apply a zero-inflated Poisson and a zero-inflated negative binomial model (see Table A4). This takes into account the fact that some people are never sick and are therefore unable to choose either presentism or sickness absence. We still find a negative relation between performance appraisals and presenteeism. Furthermore, our results remain the same if we use linear models (with individual fixed effects) instead of a count data model (see Table A5).

The results are also robust to a number of sample issues. First, we argued above that it is sensible to restrict our main analysis to full-time employees. Our results remain robust, however, when we add part-time employees to the sample (see Table A6). Second, results are robust to the subsample of males (see Table A7). Third, we examine year effects. The third wave of the LPP data covers the pandemic year 2020. Many citizens were afraid of being infected with the virus or infecting others (Infratest dimap 2021). For some time, it was forbidden to go to work in Germany with a proven COVID-19 disease and there was strict advice to stay at home with cold symptoms (Federal Ministry of Health of Germany 2023). Indeed, Table A8 shows that the average presenteeism days and rates in our dataset for 2020 are lower than in the previous two survey years.⁸ We run our estimations without observations from 2020 as well as separately for 2020 to account for possible pandemic effects. However, results regarding the link between the use of performance appraisals and presenteeism behaviour are similar across years (see Table A9).

As argued above, the question arises whether the estimated negative relation between performance appraisals and presenteeism is actually due to the mere existence of performance appraisals or whether possible monetary consequences as the outcome of appraisals in terms of performance-related pay play a role. We add *PP* and the interaction term between *PA* and *PP* to our models (see Table 3). We find that the existence of performance appraisals

TABLE 2 | Main results.

	Presenteeism (1) Pooled Poisson	Sickness absence (2) Pooled Poisson	Presenteeism rate (3) Linear individual fixed effects
Performance appraisal	−0.0965*** (0.0309)	−0.0452 (0.0277)	−4.6253** (1.9860)
<i>Average marginal effect of performance appraisal</i>	−0.4996*** (0.1603)	−0.2830 (0.1727)	
Controls	Yes	Yes	Yes
Year dummies	Yes	Yes	No
McFadden pseudo R^2 / R^2 within	0.0998	0.0725	0.0673
Number of observations in the sample	7437	7437	7437 ^a
Number of persons in the sample	6131	6131	6131

Note: Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany. McFadden pseudo R^2 is shown for models 1 and 2. R^2 within is shown for model 3. Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 2411; persons with repeated survey participation: 1105; persons with variation in performance appraisals: 315.

**Significant at 5%,

***significant at 1%.

TABLE 3 | Additionally considering performance pay.

	Presenteeism (1) Pooled Poisson	Sickness absence (2) Pooled Poisson	Presenteeism rate (3) Linear individual fixed effects
Performance appraisal	−0.0235 (0.0504)	−0.0494 (0.0479)	−2.4913 (3.1124)
Performance pay	0.0501 (0.0442)	0.0301 (0.0367)	1.6478 (3.4740)
Performance appraisal x Performance pay	−0.1146* (0.0623)	0.0004 (0.0582)	−3.2872 (3.8642)
<i>Average marginal effect of performance appraisal if performance pay = 0</i>	−0.1314 (0.2804)	−0.3246 (0.3123)	−2.4913 (3.1124)
<i>Average marginal effect of performance appraisal if performance pay = 1</i>	−0.6907*** (0.1945)	−0.2981 (0.2047)	−5.7786** (2.5283)
Controls	Yes	Yes	Yes
Year dummies	Yes	Yes	No
McFadden pseudo R^2 / R^2 within	0.1002	0.0726	0.0677
Number of observations in the sample	7437	7437	7437 ^a
Number of persons in the sample	6131	6131	6131

Note: Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany. McFadden pseudo R^2 is shown for models 1 and 2. R^2 within is shown for model 3. Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 2411; persons with repeated survey participation: 1105; persons with variation in performance appraisals: 315.

*Significant at 10%,

**significant at 5%,

***significant at 1%.

only has a significantly negative relation with presenteeism days and rate when they are linked to performance pay (see marginal effects in models 1 and 3). The difference in the estimated marginal effect on presenteeism days between appraisals linked and not linked to performance pay is significant because the

interaction term in model 1 is marginally significant at the 10% level. Neither *PA* nor *PP* nor the combination shows a significant relationship with sickness absence, though. Overall, we conclude that the significantly negative relation between the use of performance appraisals and presenteeism is driven by

TABLE 4 | Work council moderation.

	Presenteeism (1) Pooled Poisson	Sickness absence (2) Pooled Poisson	Presenteeism rate (3) Linear individual fixed effects
Performance appraisal	0.0402 (0.0783)	−0.0525 (0.0801)	0.5021 (6.9996)
Works council	−0.0101 (0.0615)	0.0565 (0.0586)	
Performance appraisal × Works council	−0.1450* (0.0851)	0.0001 (0.0849)	−4.8377 (7.4203)
<i>Average marginal effect of performance appraisal if works council = 0</i>	<i>0.2544 (0.4982)</i>	<i>−0.3395 (0.5148)</i>	<i>0.5021 (6.9996)</i>
<i>Average marginal effect of performance appraisal if works council = 1</i>	<i>−0.5334*** (0.1779)</i>	<i>−0.3289* (0.1943)</i>	<i>−4.3356** (2.0922)</i>
Controls	Yes	Yes	Yes
Year dummies	Yes	Yes	No
Pseudo R^2 / R^2 within	0.1019	0.0715	0.0572
Number observations in the sample	6621	6621	6621 ^a
Number of persons in the sample	5432	5432	5432

Note: Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany. McFadden pseudo R^2 is shown for models 1 and 2. R^2 within is shown for model 3. Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 2206; persons with repeated survey participation: 1017; persons with variation in performance appraisals: 298.

*Significant at 10%,

**significant at 5%,

***significant at 1%.

associated performance-based rewards. Our results are therefore in line with our theoretical argumentation regarding the enhanced informative purpose of performance appraisals that are attached to performance pay.

The design of performance appraisal systems can not only differ regarding possible pay for performance elements but also with respect to other facets. The LPP data allow to control for the existence of feedback interviews (with or without target agreements) or a forced distribution system regarding performance ratings. Our results regarding the link between the use of performance appraisals and presenteeism behaviour remain unchanged (see Tables S2–S4).

One may argue that the results can be driven by selection effects. It could be that healthier individuals consciously choose jobs with performance appraisals and, in particular, with performance pay, since they know that they will not miss too many working days due to illness and can thus constantly perform well. We are convinced that selection effects do not play a major role, though, due to a number of arguments. First, we apply fixed effects models to control for unobserved, time-invariant effects of an individual, such as work morale or general health status. Second, results are robust to adding the health status of an employee as a further control variable (see Table S5). However, we decided not to include this as a regular control variable for a variety of reasons: (i) the health status is already reflected in the presenteeism rate. (ii) Health is subjectively assessed by employees on a five-point scale from ‘very good’ to ‘poor’, with most indicating ‘very good’

or ‘good’. Individuals often misjudge their health (Spitzer et al. 2022), which is why such a subjective assessment is problematic. (iii) Presenteeism can not only be influenced by health (Hirsch et al. 2017), but presenteeism itself can have an effect on health (Miraglia and Johns 2016), which could lead to endogeneity problems. Third, we performed propensity score matching as a complementing estimation, where we matched every person who receives performance appraisals, respectively performance pay, to a similar person who does not receive it, based on the other control variables. This attempts to make the groups comparable in terms of all observable characteristics in order to be able to consider the effect of the performance assessment in isolation. Here, possible selection biases are reduced, since matching pairs of units are created that have a similar probability of receiving the treatment. The results confirm the negative performance appraisal effect on presenteeism as well as the combined effect with performance pay on presenteeism (see Table S6).

4.2 | The Role of Works Councils

In the moderation analysis, the number of observations is reduced due to missing works council data and due to the exclusion of panel persons who are affected by the abolition or establishment of a works council. Table 4 shows the results when the interaction term between the *Works Council* and *PA* is included.⁹ We show not only the interaction term, but also the marginal effect of performance appraisals in the situation with and without a works council. The difference between those two marginal effects

is essentially the interaction effect. The use of performance appraisals is not related to presenteeism when a works council is not present, but it is significantly negatively related when a works council exists. When a works council is present at existing performance appraisals, an employee's annual presenteeism days are on average 13.5% ($e^{-0.145} - 1$) or 0.8 days lower compared to the situation without a works council, which is marginally significant at the 10% level (see model 1 in Table 4). Regarding sickness absence days, the interaction term is close to 0 and does not show a significant relation (see model 2). The works council itself is not significantly related to sickness absence, whereas Arnold et al. (2018) report a positive relationship. The point estimate, although not significant, of appraisals on the presenteeism rate is 5 percentage points lower when a works council is present compared to the situation without one (see model 3).

Our results show that there is only a significant link between performance appraisals and presenteeism when a works council is in place. We reconsider the role of performance pay, now distinguishing between the works council status. Here we concentrate on the Poisson estimates.¹⁰ Table A11 in model 1 shows that the negative interaction term between performance appraisals and performance pay in terms of presenteeism days remains when the focus is on the sample with existing works councils. If the sample without works councils is analysed, however, the interaction term does not significantly differ from 0. In both samples, there are no significant effects on sickness absence days.¹¹

In the moderation analysis, the *Works Council* is potentially endogenous. Therefore, we further apply an endogenous switching model (Maddala 1983). First, we run separate Poisson estimations for individuals with and without works councils and see that performance appraisals are associated with significantly less presenteeism for individuals with works councils (see Table A12.1). We then perform a probit estimation with the dependent variable *Works Council*. Here, we use the share of firms in the IAB Establishment Panel having a works council as a regressor, which we calculate dependent on the five industries, four firm size classes, and 3 years of the LPP. This share serves as an instrumental variable. The probit model shows that it has a significantly positive correlation with the actual existence of a works council at the respondent's workplace (see Table A12.2). We compute the inverse Mills ratio and use it as an additional control variable in the Poisson main models, again running separate estimations for persons with and without a works council. The results are similar to the original ones and the Mills ratios are not significant (see Table A12.3). Taking endogeneity into account, these additional estimations overall reconfirm our results of a significantly negative moderator effect of the works council.

Overall, we conclude that the negative relation between performance appraisals and presenteeism, as well as the negative moderation of performance pay, is particularly evident when a works council exists. As a legal representative of workers' interests, the works council presumably ensures that appraisal systems, especially those with relevance to salary, are adapted to employees' preferences. Employees are therefore more satisfied with these systems and perceive them as fair, which is why they feel less pressured to work while being sick. In addition, the information and protection role of the works council with regard to sickness absence and dismissal can be helpful in

preventing presenteeism. Moreover, the informative purpose of performance appraisals and performance pay could be more pronounced, as works councils reduce information asymmetries between employees and employers.¹²

5 | Conclusion

We present new evidence on the use of performance appraisals and presenteeism behaviour of employees. We show for the German case that the use of performance appraisals is related to 10% or half a day fewer days of presenteeism per year. This negative relation is evident when performance appraisals are linked to performance pay and when works councils exist.

In the German case, the employer has to continue to pay the full remuneration in the case of sick leave for up to six weeks. After that, public health insurance continues to pay about 70% of gross wages for a maximum of 72 weeks (Section 3 of the German Continued Remuneration Act). Additionally, German workers do not need a medical certificate for the first two days of each sickness absence (Section 5 of the German Continued Remuneration Act). In most other European Union member states, workers are likewise entitled to sick pay or sickness benefits if they are absent due to illness (Spasova et al. 2016). Overall, the necessity for presenteeism behaviour seems to be low as compared to the United States, for example, where there is no legal entitlement to paid sick leave and where it is applied locally in only 16 states (National Conference of State Legislatures 2022; U.S. Department of Labor n.d.). Also, an American employer can demand a doctor's note directly on the first day of absence. Therefore, in a non-European context, other relations might arise. Furthermore, in Germany, works councils have far-reaching genuine co-determination rights compared to employee representative bodies in other countries (Schnabel 2020). Therefore, it could be that our result of the works council playing a significant role in the negative relationship found between performance appraisals, respectively, performance pay and presenteeism, is more pronounced in Germany than in other countries due to the specific institutional conditions.

There are also some limitations regarding the specific variables of the underlying dataset (the German LPP). The perception of when someone is considered sick and when someone engages in presenteeism is subjective by nature and probably varies from person to person. Respondents also often overreport presenteeism (Lohaus and Habermann 2019). However, our individual fixed effects models take this kind of unobserved heterogeneity into account. Performance appraisals are covered rather broadly in the LPP. At least, we investigated them in combination with performance pay, feedback interview and forced distribution. We cannot distinguish between other characteristics of performance appraisal systems, though. The works council status is also a broad measure; we do not know the actual degree of participation in decision-making regarding the implementation of performance appraisal systems, for instance.

Future studies could investigate (i) the specific design of the performance appraisal, (ii) the employee's experience with the performance appraisal process and (iii) the embeddedness of works councils in more detail. Regarding the first point, it would

be helpful to consider to what extent subjective and objective goals are included and to what extent the assessment is focused on employee behaviour. With regard to the second point, it could be further investigated to what extent our results depend on actual appraisal results and on employee perceptions of the appraisal process. Negative or positive feedback can elicit a different employee response (Brown and Benson 2005). In addition, the perceived fairness of the appraisal process (Gupta and Kumar 2013) or the perceived supervisor behaviour in terms of, for example, trustworthiness or surveillance (Ollo-López and Nuñez 2024) influences employee attendance at work. Finally, regarding the third point, information about the participation degree of the works council and its activities could be helpful to understand its effectiveness in more depth.

Nonetheless, we can already derive meaningful implications from our results. Firms can both be concerned about high absence rates or presenteeism behaviour. Alfitian et al. (2024) examine this issue in the context of a retail chain where management perceived absence levels to be excessively high and refer to motivational conditioned absenteeism. Attempts to address the problem through monetary attendance bonuses, however, backfired. The study suggests that such incentives inadvertently normalize absence as an acceptable behaviour. On the other side, strict absence policies were shown to increase presenteeism (Miraglia and Johns 2016). For firms aiming to reduce presenteeism due to long-term costs, caution is equally warranted. Our findings highlight that performance appraisal systems with the sensible integration of performance-related pay can be effective in mitigating such behaviors. Employee representative bodies, such as works councils, play a crucial role in moderating the relationship between performance appraisals and presenteeism. In light of this, firms are well advised to actively involve employee representatives in the design and implementation of performance appraisal systems. In institutional contexts lacking legally mandated employee representation, firms might consider establishing informal committees and granting them significant participation rights in the collaboration between management and HR. In general, both sickness absence and presenteeism could be prevented by good occupational health management and by a trustworthy corporate culture with a fair approach to absence.

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Ethics Statement

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Endnotes

¹ According to another well-known definition of presenteeism by Simpson (1998), overtime work even belongs to presenteeism because, in Simpson's view, presenteeism means that the employee works more hours than scheduled, possibly even when being sick.

² The LPP is a linked-employer–employee dataset that provides a simultaneous view of the employer and employee perspective (Ruf et al. 2022a). With the years 2012, 2014, 2016, 2018 and 2020, the LPP currently comprises five survey waves. In each wave, approximately 1000 German private-sector companies with at least 50 employees and 7000 associated employees are included (Ruf et al. 2022b). The same managers of the companies and the same employees were often surveyed repeatedly, which is why not only cross-sectional but also longitudinal studies on personnel-related issues are possible. Persons are not tracked if they move to another company, so the repeated information of an individual always stems from the same company (Ruf et al. 2022b). Furthermore, the LPP can be linked to the IAB Establishment Panel, which is a representative annual employer survey of approximately 16000 German establishments (Bellmann et al. 2022). The sample of firms to be surveyed in the IAB Establishment Panel is drawn from the establishment database of the Federal Employment Agency Germany. In order to include firms of all sectors and sizes, the sample is drawn disproportionately stratified by sector, firm size and federal state. For the LPP, random samples are drawn from the IAB firms, which are also stratified by sector, firm size and region. Agricultural enterprises or non-profit organizations are not included in the LPP (Ruf et al. 2022b).

³ A company in Germany does not have to accept more than 30 days of sick leave from an employee and can principally terminate the person's employment due to excessively long illness (BAG 25.04.2018 - 2 AZR 6/18). Here, the days of sickness absence do not have to be consecutive, but can be dispersed throughout the year. Also, a German company only has to continue paying salary for a maximum of 30 working days in the event of ongoing, continuous sick leave. If an employee again suffers from the same illness within 12 months, the sickness absence days are added up until the 6 weeks are reached. The entitlement to a 6-week continued payment arises again if the employee has not been incapable of work due to the same illness within 6 months prior to the start of the renewed sickness absence. We obtain the same results, when we carry out our analyses with the threshold of 50 days (see Table S1).

⁴ We recode the data describing the Big 5 traits and commitment. First-time respondent employees answer questions about their Big 5 personality traits on a 5-point Likert scale, with the questions based on a 16-item version of the Big 5 Inventory short scale from the German Socio-Economic Panel (Lang et al. 2011). Confirmatory factor analyses reveal that the questions on each Big 5 dimension actually represent a single factor and are approximately equally weighted in our dataset. For descriptive statistics, we use the average score of the questions in a Big 5 category as related variable. In the estimations, we use a double standardized value to facilitate interpretation. This means that we first standardize each item of a category. We then sum up the standardized values in each category and standardize this new sum again. To measure commitment, employees rate six statements on a 5-point Likert scale, which are based on Meyer et al. (1993). For descriptive statistics, we use the average score of them as the *Commitment* variable, in the estimations we again use the double standardized value. Confirmatory factor analysis confirms that the factor loadings are approximately equal.

⁵ Around 35% of full-time workers in Germany are usually female (Federal Statistical Office Germany 2023). Females rather work in smaller firms (IAB 2017) and in the public sector, which are not part of the LPP and what can explain the lower fraction of females in our sample. Also, the proportion of foreign nationals in our dataset does not reflect Germany's actual share of foreign employees, which stood at 12.6% in 2020 (Federal Statistical Office Germany 2022). Hence, the dataset is not representative in terms of migration composition. The low proportion may be attributable to lower survey participation among individuals with a migration background, partly due to language barriers.

⁶ Poisson fixed effects estimations prove not to be appropriate. This estimator does not use observations from a panel person if their dependent variable is always 0. This would cause us to lose too many

observations (leaving only about 1800 in total) and would reduce the within variation of performance appraisals.

⁷For the linear fixed effects models, we do not use year dummies because they are too highly correlated with Age.

⁸Exceptional in 2020 is also the high share of persons working from home (see Table A8). In order to maintain a social distance, many employees were expected to work from home during the pandemic (Federal Ministry for Economic Affairs and Climate Action of Germany 2021). A survey of a German health insurance in 2022 finds that nearly half of the respondents believe working while being sick is more common when working from home (Techniker Krankenkasse 2022) because it is probably easier to implement. It is questionable whether employees who work from home actually state that they work while being sick. In the German survey version of the LPP, employees should namely indicate whether they physically go to work despite being ill. Due to this ambiguity, we do not focus on working from home in detail.

⁹Table A10 shows the main results for the sample where the works council information is available. The results remain the same, so that findings presented in Table 4 are not a result of a change in the sample size.

¹⁰We do not use fixed effects estimations here because the separation by works council status would result in the sample without works councils only containing 257 observations from 117 panel persons, with the performance appraisal status changing in only 32 cases.

¹¹The incidence of works councils can be related to higher firm tenure, which could be an additional reason for less presenteeism due to better firm insights and dismissal protection. Information about tenure is only available in 2018 and 2020 in the LPP. Since the LPP only contains individuals who have not changed establishments, an increase in age by one year corresponds exactly to an increase in tenure by one year in the fixed effects estimates. Nevertheless, as robustness check, we add tenure as additional control variable in the Poisson model when we investigate the moderating role of the works council. The marginal effect of performance appraisals on presenteeism days is still significantly negative when works councils are present and is still insignificant when they are missing. The interaction term between works council and appraisal is still negative (see Table S7).

¹²We also examine other moderators. For example, we interact PA with the average sickness absence days per staff member in the firm of the surveyed employee and find a significantly negative interaction term regarding presenteeism days (see Table S8). Significant interactions with for example gender or manager status do not exist (see Tables S9 and S10).

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Supporting File 1: bjir70006-sup-0001-SuppMat.docx

Appendices

TABLE A1 | Description of control variables.

Control variable	Definition
Individual characteristics	
Age	Age in years
Female	0 = Male, 1 = Female
Foreigner	0 = German citizen, 1 = No official German citizen
Partner	0 = In no relationship, 1 = In a relationship
<u>Big 5 personality traits</u>	Expression of five essential character traits (on a 5-point scale each): 1 = Does not apply at all, 5 = Fully applies
Openness	Openness to new experiences, open-mindedness
Conscientiousness	Perfectionism, self-discipline, determination
Extraversion	Sociability, extraversion, surgency
Agreeableness	Thoughtfulness, cooperativeness, empathy
Neuroticism	Emotional lability and vulnerability
<u>Vocational education</u>	Highest level of training qualification (categorical)
None	No official training qualification
Apprenticeship	Apprenticeship, vocational training
Technical school	Technical school, master's school
University	University (of applied science)
Other	Other training qualification
Job characteristics	
<u>Employment situation</u>	Occupational position in the company (categorical)
Blue-collar	Blue-collar worker
White-collar	White-collar worker
Manager	Employee with managerial/supervisor function (formal corresponding job title not necessary)
Fixed term	0 = Permanent employment contract, 1 = Fixed term contract
Physical work	0 = No real physical work effort, 1 = Physical work effort
Working from home	0 = No work from home, 1 = Work from home (also occasionally)
Job security	0 = No job loss concerns, 1 = Job loss concerns
Dependent work	0 = Other jobs do not depend on own job, 1 = Other jobs depend on own job
Commitment	Organizational commitment (5-point-scale): 1 = Does not apply at all, 5 = Fully applies
Firm characteristics	
Collective agreement	0 = No industrial/company collective agreement, 1 = Industrial/company collective agreement
<u>Industry</u>	Industrial sector (categorical)
Processing industry	Processing industry (without metal, electrical, automotive sectors)
Metal, electrical, automotive	Metal, electrical, automotive industry
Commerce, traffic, communication	Commerce, traffic, communication
Financial services	Financial services, company-related services
ICT	Information and communication technology, other services
<u>Firm size</u>	Employees subject to social insurance contributions (categorical)
50–99	50–99 employees
100–249	100–249 employees
250–499	250–499 employees
500+	500 or more employees
East Germany	0 = Main site in West Germany, 1 = Main site in East Germany

TABLE A2 | Full estimation results.

	Presenteeism (1) Pooled Poisson	Sickness absence (2) Pooled Poisson	Presenteeism rate (3) Linear individual fixed effects
Performance appraisal	−0.0965*** (0.0309)	−0.0452 (0.0277)	−4.6253** (1.9860)
<i>Average marginal effect of performance appraisal</i>	−0.4996*** (0.1602)	−0.2830 (0.1727)	
Age	0.0012 (0.0017)	0.0046*** (0.0015)	−3.3330*** (0.6431)
Female	0.1001** (0.0409)	0.1429*** (0.0349)	76.0869*** (7.6757)
Foreigner	0.1205 (0.0919)	−0.1102 (0.0971)	
Partner	0.0672 (0.0415)	0.1065*** (0.0367)	3.8500 (4.9815)
Big 5: Openness	0.0376** (0.0161)	0.0064 (0.0163)	
Big 5: Conscientiousness	0.0805*** (0.0171)	−0.0117 (0.0150)	
Big 5: Extraversion	0.0867*** (0.0167)	0.0795*** (0.0141)	
Big 5: Agreeableness	−0.0590*** (0.0163)	0.0112 (0.0144)	
Big 5: Neuroticism	0.1483*** (0.0159)	0.0946*** (0.0139)	
<u>Vocational education (Reference: Apprenticeship)</u>			
None	0.0759 (0.1494)	−0.1541 (0.1373)	
Technical school	−0.0239 (0.0409)	−0.0587 (0.0416)	
University	−0.2947*** (0.0440)	−0.1740*** (0.0393)	
Other	−0.2738 (0.2416)	0.3875** (0.1521)	
<u>Employment situation (Reference: Blue-collar)</u>			
White-collar	−0.0885* (0.0474)	−0.1740*** (0.0368)	−3.4884 (4.6368)
Manager	0.0637 (0.0498)	−0.2813*** (0.0430)	−2.1541 (4.1706)
Fixed term	0.1163 (0.0734)	0.0347 (0.0859)	5.6354 (7.1287)
Physical work	0.2531*** (0.0409)	0.2260*** (0.0376)	−1.4698 (3.3382)
Working from home	−0.0665* (0.0382)	−0.1893*** (0.0414)	−1.7329 (2.9630)
Job security	0.1704*** (0.0299)	0.0075 (0.0304)	8.0292*** (2.3125)
Dependent work	0.0262 (0.0334)	−0.0178 (0.0282)	−2.4897 (2.0693)
Commitment	−0.1282*** (0.0180)	−0.1020*** (0.0160)	−2.1080 (1.3564)
Collective agreement	−0.0126 (0.0432)	0.0702* (0.0375)	−6.6965 (9.0674)
<u>Industry (Reference: Processing industry)</u>			
Metal, electrical, automotive	−0.0243 (0.0396)	−0.0184 (0.0380)	56.7508*** (2.4008)
Commerce, traffic, communication	0.1215** (0.0563)	0.0129 (0.0557)	42.2499*** (11.5154)
Financial services	0.0494 (0.0660)	0.0666 (0.0633)	
ICT	0.0074 (0.0650)	0.0794 (0.0599)	
<u>Firm size (Reference: 50–99 employees)</u>			
100–249	0.1329** (0.0601)	0.0919* (0.0524)	−11.0289* (6.0303)
250–499	0.1992*** (0.0633)	0.1056* (0.0571)	4.2113 (9.8136)
500+	0.0968 (0.0672)	0.0933* (0.0557)	1.1689 (10.4262)
East Germany	0.1261*** (0.0383)	0.1105*** (0.0361)	51.3865*** (8.2402)
2018	−0.0615** (0.0308)	−0.0323 (0.0323)	
2020	−0.3912*** (0.0401)	−0.1963*** (0.0410)	
McFadden pseudo R^2 / R^2 within	0.0998	0.0725	0.0673
Number of observations in the sample	7437	7437	7437 ^a
Number of persons	6131	6131	6131

Note: Clustered robust standard errors at the firm level are given in parentheses. McFadden pseudo R^2 is shown for models 1 and 2. R^2 within is shown for model 3. Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 2411; Persons with repeated survey participation: 1105; Persons with variation in performance appraisals: 315.

*Significant at 10%.

**significant at 5%.

***significant at 1%.

TABLE A3 | Negative binomial model.

	(1) Presenteeism	(2) Sickness absence
Performance appraisal	−0.1102*** (0.0305)	−0.0537* (0.0289)
<i>Average marginal effect of performance appraisal</i>	−0.5777*** (0.1600)	−0.0537* (0.0289)
Age	0.0003 (0.0018)	0.0049*** (0.0015)
Female	0.1015** (0.0432)	0.1537*** (0.0359)
Foreigner	0.0557 (0.0976)	−0.1049 (0.0946)
Partner	0.0549 (0.0416)	0.1241*** (0.0381)
Big 5: Openness	0.0302* (0.0159)	0.0054 (0.0151)
Big 5: Conscientiousness	0.0885*** (0.0173)	−0.0034 (0.0157)
Big 5: Extraversion	0.0975 (0.0173)***	0.0704*** (0.0143)
Big 5: Agreeableness	−0.0577*** (0.0195)	0.0076 (0.0150)
Big 5: Neuroticism	0.1799*** (0.0168)	0.1106*** (0.0154)
<u>Vocational education (Reference: Apprenticeship)</u>		
None	0.1924 (0.1629)	−0.1504 (0.1482)
Technical school	−0.0026 (0.0434)	−0.0848** (0.0417)
University	−0.3084*** (0.0451)	−0.2114*** (0.0404)
Other	−0.3684 (0.2540)	0.3619** (0.1479)
<u>Employment situation (Reference: Blue-collar)</u>		
White-collar	−0.1172** (0.0516)	−0.1680*** (0.0387)
Manager	0.0507 (0.0536)	−0.2953*** (0.0410)
Fixed term	0.0811 (0.0810)	0.0804 (0.0936)
Physical work	0.2741*** (0.0458)	0.2410*** (0.0395)
Working from home	−0.0764* (0.0404)	−0.1814*** (0.0424)
Job security	0.1747*** (0.0314)	−0.0065 (0.0314)
Dependent work	0.0195 (0.0353)	−0.0195 (0.0285)
Commitment	−0.1381*** (0.0196)	−0.0963*** (0.0182)
Collective agreement	−0.0041 (0.0492)	0.0625 (0.0392)
<u>Industry (Reference: Processing industry)</u>		
Metal, electrical, automotive	−0.0259 (0.0426)	−0.0372 (0.0395)
Commerce, traffic, communication	0.1141** (0.0575)	−0.0276 (0.0573)
Financial services	0.0433 (0.0709)	0.0261 (0.0652)
ICT	0.0149 (0.0636)	0.0575 (0.0612)
<u>Firm size (Reference: 50–99 employees)</u>		
100–249	0.0969 (0.0636)	0.0898* (0.0540)
250–499	0.1454** (0.0672)	0.0735 (0.0571)
500+	0.0262 (0.0705)	0.0595 (0.0554)
East Germany	0.1403*** (0.0393)	0.1147*** (0.0369)
2018	−0.0519 (0.0331)	−0.0275 (0.0329)
2020	−0.4390*** (0.042)	−0.2167*** (0.0419)
McFadden pseudo R^2	0.0174	0.0114
Number of observations in the sample	7437	7437
Number of persons in the sample	6131	6131

Note: Clustered robust standard errors at the firm level are given in parentheses.

*Significant at 10%,

**significant at 5%,

***significant at 1%.

TABLE A4 | Zero-inflated models.

	Presenteeism		Sickness absence	
	(1)	(2)	(3)	(4)
	Zero-inflated Poisson	Zero-inflated negative binomial	Zero-inflated Poisson	Zero-inflated negative binomial
Performance appraisal	−0.0400 (0.0247)	−0.0508* (0.0261)	0.0009 (0.0222)	0.0029 (0.0234)
Age	0.0062*** (0.0013)	0.0063*** (0.0013)	0.0066*** (0.0011)	0.0073*** (0.0012)
Female	0.0468 (0.0337)	0.0495 (0.0372)	0.0701** (0.0276)	0.0824*** (0.0302)
Foreigner	0.1744*** (0.0605)	0.1613** (0.0632)	−0.0178 (0.0789)	−0.0306 (0.0821)
Partner	−0.0046 (0.0303)	−0.0114 (0.0318)	0.0240 (0.0281)	0.0320 (0.0312)
Big 5: Openness	0.0338*** (0.0126)	0.0390*** (0.0132)	−0.0009 (0.0115)	0.0003 (0.0118)
Big 5: Conscientiousness	0.0875*** (0.0136)	0.0914*** (0.0144)	0.0102 (0.0124)	0.0142 (0.0135)
Big 5: Extraversion	0.0637*** (0.0129)	0.0708*** (0.0138)	0.0549*** (0.0120)	0.0559*** (0.0129)
Big 5: Agreeableness	−0.0372*** (0.0118)	−0.0392*** (0.0140)	0.0052 (0.0118)	0.0035 (0.0122)
Big 5: Neuroticism	0.0619*** (0.0127)	0.0733*** (0.0140)	0.0456*** (0.0105)	0.0565*** (0.0115)
<u>Vocational education</u>				
<u>(Reference: Apprenticeship)</u>				
None	−0.0220 (0.1118)	0.0102 (0.1254)	−0.0731 (0.1015)	−0.0575 (0.1081)
Technical school	−0.0542* (0.0325)	−0.0459 (0.0351)	−0.0350 (0.0334)	−0.0518 (0.0357)
University	−0.2310*** (0.0332)	−0.2453*** (0.0361)	−0.1500*** (0.0329)	−0.1737*** (0.0351)
Other	0.1043 (0.1517)	0.0987 (0.1647)	0.2138* (0.1249)	0.1946 (0.1309)
<u>Employment situation</u>				
<u>(Reference: Blue-collar)</u>				
White-collar	−0.1114*** (0.0361)	−0.1328*** (0.0393)	−0.1932*** (0.0299)	−0.2049*** (0.0318)
Manager	−0.0312 (0.0388)	−0.0378 (0.0422)	−0.2004*** (0.0346)	−0.2275*** (0.0357)
Fixed term	0.0428 (0.0626)	0.0162 (0.0659)	0.0342 (0.0700)	0.0551 (0.0723)
Physical work	0.1822 (0.0325)***	0.2084*** (0.0354)	0.1548*** (0.0288)	0.1642*** (0.0303)
Working from home	−0.0501 (0.0299)*	−0.0465 (0.0326)	−0.1407*** (0.0319)	−0.1473*** (0.0342)
Job security	0.0379 (0.0246)	0.0430 (0.0264)	0.0043 (0.0246)	−0.0036 (0.0260)
Dependent work	0.0180 (0.0260)	0.0166 (0.0276)	−0.0181 (0.0224)	−0.0119 (0.0239)
Commitment	−0.0934*** (0.0153)	−0.0986*** (0.0164)	−0.0559*** (0.013)	−0.0560*** (0.0147)
Collective agreement	−0.0153 (0.0342)	−0.0153 (0.0381)	0.0453 (0.0301)	0.0419 (0.0323)
<u>Industry (Reference: Processing industry)</u>				
Metal, electrical, automotive	0.0122 (0.0298)	0.0149 (0.0319)	−0.0159 (0.0264)	−0.0310 (0.0286)
Commerce, traffic, communication	0.1266*** (0.0447)	0.1326*** (0.0482)	0.0431 (0.0434)	0.0256 (0.0474)
Financial services	0.1029** (0.0478)	0.1015* (0.0535)	0.0014 (0.0535)	−0.0242 (0.0582)
ICT	−0.0519 (0.0494)	−0.0518 (0.0510)	0.0306 (0.0510)	0.0105 (0.052)
<u>Firm size (Reference: 50–99 employees)</u>				
100–249	0.0878* (0.0461)	0.0791 (0.0488)	0.0906** (0.0409)	0.1117*** (0.0451)
250–499	0.1008** (0.0498)	0.0852 (0.0525)	0.0755* (0.0439)	0.0804* (0.0478)
500+	0.0429 (0.0497)	0.0137 (0.0523)	0.0561 (0.0434)	0.0558 (0.0472)

(Continues)

TABLE A4 | (Continued)

	Presenteeism		Sickness absence	
	(1)	(2)	(3)	(4)
	Zero-inflated Poisson	Zero-inflated negative binomial	Zero-inflated Poisson	Zero-inflated negative binomial
East Germany	0.1354*** (0.0301)	0.1476*** (0.0316)	0.1371*** (0.0281)	0.1521*** (0.0303)
2018	−0.0498* (0.0267)	−0.0469 (0.0301)	0.0069 (0.0256)	0.0015 (0.0270)
2020	−0.0442 (0.0305)	−0.0477 (0.0319)	−0.0221 (0.0331)	−0.0284 (0.0359)
Performance appraisal	0.0944*** (0.0308)	0.0938*** (0.0332)	0.0848** (0.0339)	0.0951** (0.0373)
Age	0.0091*** (0.0016)	0.0105*** (0.0017)	0.0044** (0.0017)	0.0058*** (0.0018)
Female	−0.1197*** (0.0445)	−0.1186** (0.0486)	−0.1581*** (0.0422)	−0.1628*** (0.0470)
Foreigner	0.1019 (0.1129)	0.1273 (0.1172)	0.1632 (0.1078)	0.1720 (0.1176)
Partner	−0.1269*** (0.0451)	−0.1387*** (0.0482)	−0.1841*** (0.0439)	−0.1921*** (0.0484)
Big 5: Openness	−0.0092 (0.0172)	−0.0044 (0.0188)	−0.0186 (0.0203)	−0.0195 (0.0223)
Big 5: Conscientiousness	0.0041 (0.0182)	0.0142 (0.0198)	0.0396** (0.0173)	0.0445** (0.0192)
Big 5: Extraversion	−0.0404** (0.0187)	−0.0356* (0.0204)	−0.0367** (0.0162)	−0.0333* (0.0180)
Big 5: Agreeableness	0.0366** (0.0175)	0.0346* (0.0186)	−0.0148 (0.0176)	−0.0159 (0.0192)
Big 5: Neuroticism	−0.1746*** (0.0174)	−0.1795*** (0.0191)	−0.1103*** (0.0179)	−0.1118*** (0.0194)
<u>Vocational education</u>				
<u>(Reference: Apprenticeship)</u>				
None	−0.1973 (0.1827)	−0.2176 (0.1983)	0.1657 (0.1590)	0.1711 (0.1682)
Technical school	−0.0584 (0.0475)	−0.0674 (0.0514)	0.0580 (0.0492)	0.0559 (0.0535)
University	0.1240*** (0.0452)	0.1037** (0.0488)	0.0648 (0.0490)	0.0461 (0.0543)
Other	0.5435*** (0.1868)	0.5728*** (0.1905)	−0.2992 (0.2247)	−0.3441 (0.2660)
<u>Employment situation</u>				
<u>(Reference: Blue-collar)</u>				
White-collar	−0.0314 (0.0522)	−0.0500 (0.0558)	−0.0424 (0.0467)	−0.0711 (0.0507)
Manager	−0.1664*** (0.0542)	−0.1798*** (0.0579)	0.1458*** (0.0482)	0.1316** (0.0517)
Fixed term	−0.2082** (0.0968)	−0.2130** (0.1064)	−0.0152 (0.0970)	−0.0075 (0.1050)
Physical work	−0.1321*** (0.0439)	−0.1192** (0.0468)	−0.1504*** (0.0500)	−0.1465*** (0.0537)
Working from home	0.0166 (0.0423)	0.0168 (0.0452)	0.0877** (0.0388)	0.0757* (0.0419)
Job security	−0.2313*** (0.0352)	−0.2456*** (0.0386)	0.0070 (0.0305)	0.0053 (0.0332)
Dependent work	−0.0166 (0.0338)	−0.0156 (0.0363)	0.0101 (0.0351)	0.0086 (0.0384)
Commitment	0.0675*** (0.0155)	0.0622*** (0.0168)	0.0974*** (0.0171)	0.0994*** (0.0186)
Collective agreement	−0.0200 (0.0469)	−0.0208 (0.0499)	−0.0473 (0.0441)	−0.0466 (0.0478)
<u>Industry (Reference: Processing industry)</u>				
Metal, electrical, automotive	0.0702* (0.0407)	0.0757* (0.0438)	0.0140 (0.0445)	0.0086 (0.0468)
Commerce, traffic, communication	−0.0159 (0.0680)	0.0007 (0.0729)	0.0770 (0.0649)	0.0837 (0.0699)
Financial services	0.0982 (0.0643)	0.1151* (0.0677)	−0.1193* (0.0621)	−0.1331* (0.0684)
ICT	−0.1013 (0.0764)	−0.1181 (0.0843)	−0.1188 (0.0773)	−0.1316 (0.0868)

(Continues)

TABLE A4 | (Continued)

	Presenteeism		Sickness absence	
	(1)	(2)	(3)	(4)
	Zero-inflated Poisson	Zero-inflated negative binomial	Zero-inflated Poisson	Zero-inflated negative binomial
<u>Firm size (Reference: 50–99 employees)</u>				
100–249	–0.0565 (0.0664)	–0.0527 (0.0706)	0.0260 (0.0598)	0.0431 (0.065)
250–499	–0.1545** (0.0684)	–0.1553** (0.0728)	–0.0302 (0.0625)	–0.0194 (0.0678)
500+	–0.0738 (0.0697)	–0.0798 (0.0737)	–0.0325 (0.0636)	–0.0297 (0.0694)
East Germany	–0.0092 (0.0427)	0.0072 (0.0458)	0.0589 (0.0416)	0.0822* (0.0446)
2018	0.0314 (0.0339)	0.0248 (0.0374)	0.0772* (0.0358)	0.0847** (0.0388)
2020	0.6103*** (0.0440)	0.6391*** (0.0470)	0.3662*** (0.0392)	0.3888*** (0.0425)
<i>Overall average marginal effect of performance appraisal</i>	<i>–0.4729*** (0.1559)</i>	<i>–0.5098*** (0.1553)</i>	<i>–0.2547 (0.1690)</i>	<i>–0.2512 (0.1693)</i>
McFadden pseudo R ²	0.085	0.038	0.064	0.023
Number of observations in the sample	7437	7437	7437	7437
Number of persons in the sample	6131	6131	6131	6131

Note: Clustered robust standard errors at the firm level are given in parentheses. The upper half of the table shows the Poisson part of the estimate, the lower half shows the probit part of the estimate. The probit estimates indicate the probability of obtaining a structural 0.

*Significant at 10%,

**significant at 5%,

***significant at 1%.

TABLE A5 | Linear models.

	Presenteeism		Sickness absence		Presenteeism rate
	(1)	(2)	(3)	(4)	
	Pooled OLS	Individual fixed effects	Pooled OLS	Individual fixed effects	Pooled OLS
Performance appraisal	–0.4633*** (0.1631)	–0.9583*** (0.3439)	–0.2618 (0.1727)	–0.0965 (0.4397)	–1.7520** (0.8527)
Age	0.0091 (0.0085)	–0.3192*** (0.0730)	0.0306*** (0.0092)	0.0613 (0.1038)	–0.1409*** (0.0409)
Female	0.5280** (0.2317)	–1.6789 (1.0846)	0.9619*** (0.2408)	–12.4612*** (1.5008)	–0.0368 (1.1590)
Foreigner	0.6268 (0.5720)		–0.8243 (0.5809)		0.4974 (3.1189)
Partner	0.3809* (0.2207)	–1.3171** (0.6649)	0.6806*** (0.2343)	–1.5637** (0.7271)	2.0433* (1.1836)
Big 5: Openness	0.2170*** (0.0824)		0.0393 (0.1038)		0.2536 (0.4206)
Big 5: Conscientiousness	0.4620*** (0.0868)		–0.0447 (0.0935)		1.4269*** (0.4812)
Big 5: Extraversion	0.4633*** (0.0849)		0.5055*** (0.0883)		0.9309* (0.4713)
Big 5: Agreeableness	–0.3212*** (0.0931)		0.0771 (0.0924)		–1.7112*** (0.4946)
Big 5: Neuroticism	0.8214*** (0.0856)		0.6197*** (0.0911)		3.6550*** (0.4500)

(Continues)

TABLE A5 | (Continued)

	Presenteeism		Sickness absence		Presenteeism rate
	(1)	(2)	(3)	(4)	(5)
	Pooled OLS	Individual fixed effects	Pooled OLS	Individual fixed effects	Pooled OLS
<u>Vocational education</u>					
(Reference: Apprenticeship)					
None	0.5267 (1.0721)		−1.1219 (0.9229)		7.6280 (5.3060)
Technical school	−0.1756 (0.2258)		−0.3829 (0.2625)		2.3583* (1.2061)
University	−1.3493*** (0.2052)		−0.9474*** (0.2312)		−3.1128*** (1.1753)
Other	−1.3914 (1.0164)		2.8530** (1.4145)		−15.8277*** (3.7493)
<u>Employment situation</u>					
(Reference: Blue-collar)					
White-collar	−0.4381 (0.2789)	−0.0268 (0.8151)	−1.4086*** (0.2657)	0.7002 (0.7981)	0.5036 (1.4073)
Manager	0.2646 (0.2969)	−0.5353 (0.8894)	−2.0189*** (0.2985)	0.5872 (0.8398)	7.6189*** (1.4598)
Fixed term	0.7371 (0.5096)	0.0634 (0.9835)	0.2198 (0.6035)	−1.6743 (1.4720)	5.8448** (2.4063)
Physical work	1.7610*** (0.2756)	−0.3353 (0.5752)	1.7966*** (0.3006)	0.8069 (0.6979)	1.3950 (1.2466)
Working from home	−0.1630 (0.1817)	−0.4361 (0.4001)	−0.9030*** (0.2232)	−1.2682** (0.5011)	1.3219 (1.1541)
Job security	0.9113*** (0.1600)	0.4539 (0.4002)	0.0333 (0.1950)	−0.9822** (0.4447)	6.1897*** (0.9769)
Dependent work	0.1839 (0.1689)	−0.3070 (0.2862)	−0.0758 (0.1791)	−0.6682* (0.3688)	0.5987 (0.9566)
Commitment	−0.7471*** (0.1003)	−0.3968 (0.2628)	−0.6893*** (0.1070)	0.0206 (0.2997)	−1.0140** (0.4910)
Collective agreement	−0.0678 (0.2484)	−0.0936 (2.0567)	0.4340* (0.2447)	4.5794** (1.9520)	−0.1816 (1.2696)
<u>Industry (Reference: Processing industry)</u>					
Metal, electrical, automotive	−0.1154 (0.2022)	1.5250*** (0.2689)	−0.0937 (0.2356)	−0.4241 (0.3752)	−0.5005 (1.1159)
Commerce, traffic, communication	0.6602** (0.3286)	−5.8429** (2.4296)	0.0876 (0.3512)	−18.3900*** (3.0648)	2.2570 (1.9413)
Financial services	0.1546 (0.3452)		0.3913 (0.4210)		−2.4067 (1.8539)
ICT	−0.0449 (0.3407)		0.4838 (0.4072)		0.6149 (1.8159)
<u>Firm size (Reference: 50–99 employees)</u>					
100–249	0.7115** (0.3377)	3.2333 (2.0803)	0.5618 (0.3479)	4.9311** (2.0799)	1.4412 (1.7901)
250–499	1.0258*** (0.3546)	5.2942** (2.4207)	0.6006 (0.3693)	5.4110** (2.6802)	3.3013* (1.8201)
500+	0.4863 (0.3610)	6.0912** (2.4080)	0.4998 (0.3551)	8.2109*** (2.9431)	0.4685 (1.8751)
East Germany	0.7354*** (0.2212)	9.8153*** (1.3328)	0.7341*** (0.2532)	−2.9692 (1.8391)	0.5747 (1.1052)
2018	−0.3800** (0.1795)		−0.2320 (0.2193)		−0.9622 (0.9530)
2020	−1.9446*** (0.200)		−1.2064*** (0.2489)		−12.2906*** (1.1982)
R ² (within)	0.1204	0.0481	0.0936	0.0318	0.0622
Number of observations in the sample	7437	7437 ^a	7437	7437 ^a	7437
Number of persons in the sample	6131	6131	6131	6131	6131

Note: Clustered robust standard errors at the firm level are given in parentheses. R² within is shown for models 2 and 4.

Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 2411; Persons with repeated survey participation: 1105; Persons with variation in performance appraisals: 315.

*Significant at 10%,

**significant at 5%,

***significant at 1%.

TABLE A6 | Base Estimations with full-time and part-time employees.

	Presenteeism (1)	Sickness absence (2)	Presenteeism rate (3)
	Pooled Poisson	Pooled Poisson	Linear individual fixed effects
Performance appraisal	−0.0625** (0.0279)	−0.0356 (0.0263)	−4.6843** (1.8596)
<i>Average marginal effect of performance appraisal</i>	−0.3307** (0.1475)	−0.2250 (0.1656)	
Controls	yes	yes	yes
Year dummies	yes	yes	no
McFadden pseudo R^2 / R^2 within	0.0956	0.0636	0.0533
Number of observations in the sample	8859	8859	8859 ^a
Number of persons in the sample	7264	7264	7264

Note: Persons earning < 450€ gross per month are excluded because they were ‘minijobbers’ during the observed time period. Persons who stated that they have 0 contractual weekly working hours or 0 actual weekly working hours are excluded. Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany. McFadden pseudo R^2 is shown for models 1 and 2. R^2 within is shown for model 3. Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 2950; Persons with repeated survey participation: 1355; Persons with variation in performance appraisals: 395.

**Significant at 5%.

TABLE A7 | Base Estimations with male persons.

	Presenteeism (1)	Sickness absence (2)	Presenteeism rate (3)
	Pooled Poisson	Pooled Poisson	Linear individual fixed effects
Performance appraisal	−0.0659* (0.0361)	−0.0192 (0.0310)	−4.2645* (2.3243)
<i>Average marginal effect of performance appraisal</i>	−0.3306* (0.1812)	−0.1165 (0.1873)	
Controls	yes	yes	yes
Year dummies	yes	yes	no
McFadden pseudo R^2 / R^2 within	0.1002	0.0735	0.0579
Number of observations in the sample	6076	6076	6076 ^a
Number of persons in the sample	4967	4967	4967

Note: Clustered robust standard errors at the firm level are given in parentheses. Controls: age, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany. McFadden pseudo R^2 is shown for models 1 and 2. R^2 within is shown for model 3. Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 2047; Persons with repeated survey participation: 938; Persons with variation in performance appraisals: 258.

*Significant at 10%.

TABLE A8 | Descriptive statistics per year.

Variable	2016 (n = 2714)	2018 (n = 2385)	2020 (n = 2338)
Individual characteristics			
Presenteeism	6.26 (7.14)	5.26 (6.49)	3.87 (6.23)
Presenteeism rate	42.23 (36.05)	40.01 (36.30)	29.62 (37.27)
Sickness absence	7.09 (7.74)	6.33 (7.34)	5.24 (7.07)
Performance appraisal	0.50	0.56	0.53
Performance pay	0.62	0.69	0.61
Age	47.63 (10.36)	46.51 (10.50)	45.96 (11.01)
Female	0.19	0.17	0.20
Foreigner	0.02	0.02	0.03
Partner	0.84	0.84	0.85
Big 5 personality traits			
Openness	3.65 (0.61)	3.62 (0.63)	3.62 (0.63)
Conscientiousness	4.34 (0.47)	4.29 (0.51)	4.30 (0.51)
Extraversion	3.65 (0.73)	3.52 (0.79)	3.50 (0.79)
Agreeableness	4.04 (0.56)	3.98 (0.59)	3.99 (0.58)
Neuroticism	2.64 (0.75)	2.61 (0.76)	2.66 (0.77)
Vocational education			
None	0.01	0.01	0.01
Apprenticeship	0.51	0.39	0.41
Technical school	0.22	0.22	0.21
University	0.26	0.38	0.35
Other	0.01	0.01	0.01
Job characteristics			
Employment situation			
Blue-collar	0.26	0.24	0.19
White-collar	0.39	0.48	0.53
Manager	0.35	0.27	0.28
Fixed term	0.03	0.02	0.02
Physical work	0.22	0.16	0.16
Working from home	0.23	0.38	0.54
Job security	0.31	0.34	0.32
Dependent work	0.71	0.68	0.70
Commitment	3.74 (0.87)	3.66 (0.89)	3.65 (0.90)
Firm characteristics			
Collective agreement	0.75	0.83	0.72
Works council	0.83 (n = 2572)	0.90 (n = 1896)	0.83 (n = 2153)
Industry			
Processing industry	0.35	0.23	0.27
Metal, electrical, automotive	0.41	0.60	0.43
Commerce, traffic, communication	0.08	0.06	0.12
Financial services	0.10	0.07	0.10
ICT	0.06	0.04	0.08
Firm size (number of employees)			
50–99	0.13	0.07	0.13
100–249	0.25	0.13	0.21
250–499	0.20	0.15	0.20
500+	0.42	0.64	0.46
East Germany	0.29	0.17	0.22
Number of persons/firms	2714/619	2385/437	2338/451

Note: Mean/share displayed. Standard deviation are given in parentheses. The sum of shares for categorical variables does not always add up to 1 due to rounding errors.

TABLE A9 | Estimation results per year.

	2016 and 2018			Only 2020	
	(1)	(2)	(3)	(4)	(5)
	Presenteeism	Sickness absence	Presenteeism rate	Presenteeism	Sickness absence
Performance appraisal	−0.0869** (0.0356)	−0.0160 (0.0318)	−2.2542 (2.4984)	−0.1400** (0.0662)	−0.1417** (0.0600)
<i>Average marginal effect of performance appraisal</i>	−0.5034** (0.2067)	−0.1077 (0.2136)		−0.5418** (0.2560)	−0.7399** (0.3077)
Controls	yes	yes	yes	yes	yes
Year dummies	yes	yes	no	no	no
McFadden pseudo R^2 / R^2 within	0.0818	0.0660	0.0342	0.1051	0.0808
Number of observations in the sample	5099	5099	5099 ^a	2338	2338
Number of persons in the sample	4384	4384	4384	2338	2338

Note: Linear individual fixed effects estimation in model 3, else pooled Poisson estimations. Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany. McFadden pseudo R^2 is shown for models 1, 2, 4, and 5. R^2 within is shown for model 3.

Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 1430; Persons with repeated survey participation: 715; Persons with variation in performance appraisals: 190.

**Significant at 5%.

TABLE A10 | Base estimations for sample with existing works council information.

	Presenteeism	Sickness absence	Presenteeism rate
	(1)	(2)	(3)
	Pooled Poisson	Pooled Poisson	Linear individual fixed effects
Performance appraisal	−0.0835** (0.0324)	−0.0506* (0.0295)	−3.8201* (1.9604)
<i>Average marginal effect of performance appraisal</i>	−0.4390** (0.1700)	−0.3190* (0.1844)	
Controls	Yes	Yes	Yes
Year dummies	Yes	Yes	No
McFadden pseudo R^2 / R^2 within	0.1014	0.0714	0.0569
Number of observations in the sample	6621	6621	6621 ^a
Number of persons in the sample	5432	5432	5432

Note: Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany. McFadden pseudo R^2 are shown for models 1 and 2. R^2 within is shown for model 3. Presenteeism rate = Presenteeism days / (Presenteeism days + Sickness absence days).

^aObservations of persons with repeated survey participation: 2206; Persons with repeated survey participation: 1017; Persons with variation in performance appraisals: 298.

*Significant at 10%.

**significant at 5%.

TABLE A11 | Performance pay moderation for works council samples.

	WC = 1	WC = 1	WC = 0	WC = 0
	(1)	(2)	(3)	(4)
	Presenteeism	Sickness absence	Presenteeism	Sickness absence
Performance appraisal	0.0054 (0.0581)	−0.0877 (0.0543)	−0.0141 (0.1238)	0.0428 (0.1176)
Performance pay	0.1057** (0.0511)	−0.0268 (0.0428)	−0.1796* (0.0943)	0.2139** (0.0831)
Performance appraisal × Performance pay	−0.1689** (0.0712)	0.0470 (0.0674)	0.1253 (0.1543)	−0.1277 (0.1475)
<i>Average marginal effect of performance appraisal if performance pay = 0</i>	<i>0.0290 (0.3105)</i>	<i>−0.5815 (0.3550)</i>	<i>−0.0966 (0.8447)</i>	<i>0.2751 (0.7631)</i>
<i>Average marginal effect of performance appraisal if performance pay = 1</i>	<i>−0.8170*** (0.2186)</i>	<i>−0.2464 (0.2366)</i>	<i>0.6484 (0.6009)</i>	<i>−0.5611 (0.6386)</i>
Controls	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
McFadden pseudo R ²	0.1093	0.0774	0.0850	0.0707
Number of observations in the sample	5617	5617	1004	1004
Number of persons in the sample	4568	4568	864	864

Note: Pooled Poisson Estimations. WC = works council. Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany.

*Significant at 10%,

**significant at 5%,

***significant at 1%.

TABLE A12.1 | Exogenous switching.

	Without the works council		With the works council	
	(1)	(2)	(3)	(4)
	Presenteeism	Sickness absence	Presenteeism	Sickness absence
Performance appraisal	0.0348 (0.0808)	−0.0086 (0.0822)	−0.0984*** (0.0351)	−0.0589* (0.0314)
<i>Average marginal effect of performance appraisal</i>	<i>0.2184 (0.5060)</i>	<i>−0.0560 (0.5371)</i>	<i>−0.5008*** (0.1794)</i>	<i>−0.3694* (0.1952)</i>
Controls	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
McFadden pseudo R ²	0.0822	0.0662	0.1084	0.0774
Number of observations in the sample	1004	1004	5617	5617
Number of persons in the sample	864	864	4568	4568

Note: Pooled Poisson estimations. Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany.

*Significant at 10%,

***significant at 1%.

TABLE A12.2 | Probit model.

	Works council
Works council share	0.0214*** (0.0079)
Performance appraisal	0.3002*** (0.0807)
Controls	Yes
Year dummies	Yes
McFadden pseudo R^2	0.3906
Number of observations in the sample	6621
Number of persons in the sample	5432

Note: Works Council as dependent variable. Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany.

***Significant at 1%.

TABLE A12.3 | Endogenous switching.

	Without the works council		With the works council	
	(1)	(2)	(3)	(4)
	Presenteeism	Sickness absence	Presenteeism	Sickness absence
Performance appraisal	0.0893 (0.1086)	−0.0747 (0.1029)	−0.0969*** (0.0352)	−0.0489 (0.0332)
Average marginal effect of performance appraisal	0.5606 (0.6786)	−0.4875 (0.6744)	−0.4934 (0.1799)	−0.3068 (0.2065)
Inverse Mills ratio	0.3198 (0.3691)	−0.3962 (0.3358)	0.0280 (0.1955)	0.2026 (0.1757)
Controls	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
McFadden pseudo R^2	0.0827	0.0670	0.1084	0.0776
Number of observations in the sample	1004	1004	5617	5617
Number of persons in the sample	864	864	4568	4568

Note: Pooled Poisson estimations. Clustered robust standard errors at the firm level are given in parentheses. Controls: age, female, foreigner, partner, Big 5 traits, vocational education, employment situation, fixed-term, physical work, working from home, job security, dependent work, commitment, collective agreement, industry, firm size and East Germany.

***Significant at 1%.