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DISCUSSION PAPER SERIES

IZA DP No. 16042

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ISSN: 2365-9793

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ABSTRACT

Monetary Rewards, Hierarchy Level and Working Hours as Drivers of Employees' Self-Evaluations

In this study, we explore the relation between job characteristics and employees' self-evaluations of performance in comparison to their colleagues' performance. Making use of unique individual panel data of ten large firms in Germany's chemical industry, we focus on monetary rewards (bonus payments and wage increases), level of hierarchy and weekly working hours as well as interactions with gender and tenure as possible drivers of self-evaluations. Our results hint for particular relevance of working hours, and some extent of hierarchy levels and monetary rewards. We find less evidence for our hypotheses regarding interaction effects of gender and tenure.

JEL Classification: J3, M5

Keywords: self-evaluations, bonus payments, wage increases, level of hierarchy, working hours

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Monetary Rewards, Hierarchy Level and Working Hours as Drivers of Employees' Self-Evaluations

1 Introduction

Do you consider yourself to be among the worse half of car drivers in your community? Most likely, your answer will be "no". Individuals often evaluate their own performance in a very positive way. The "better-than-average effect" expresses how the majority of people evaluate their own performance in a specific task or domain as better than the performance of half of the population (Benoît & Dubra, 2011). For some people, a high self-evaluation is justified if it represents their actual high performance accurately. But for some people this is not the case. The self-serving bias leads to perceiving oneself as having higher abilities than other people (Fiedler, 1996). Individuals already derive utility from this perception (Bénabou & Tirole, 2002). This phenomenon can also be relevant in employment relationships if the majority of employees report above average self-evaluations regarding work performance which by definition cannot coincide with the performance distribution in total. Employees' whose self-evaluations are higher than appraisals made by others, e.g. supervisors, can have negative consequences for organizations. Yammarino and Atwater (1997) reveal insufficient willingness to participate in training activities and high absenteeism rates, for instance. Additionally, Brett and Atwater (2001) find those employees to be less receptive to feedback.

Bearing these possible negative outcomes in mind, an understanding of the factors influencing self-evaluations in the job context is of great importance. Past research partly focused on individual factors and analyzes characteristics such as age or gender for explaining self-evaluations (e.g. Beyer, 1990; Ostroff et al., 2004; Sturm et al., 2014; Vecchio & Anderson, 2009). With regard to job characteristics, scholars have often focused on the relation of task difficulty or tenure and self-evaluations (e.g. Lane & Herriot, 1990; Moore & Healy, 2008).

Self-evaluations can either be reported in absolute terms by referring to having a high performance in general or in relative terms by taking possible reference points into account. For example, Moore and Healy (2008) and Burks et al. (2013) conduct experiments in which participants have to evaluate their own performance and that of a random other participant of

the experiment before and after completing a specific task. In the employment context in practice, the perceived performance of colleagues can act as an obvious reference point.

We contribute to the literature in two ways: First, we analyze factors influencing self-evaluations in comparison to colleagues' performance. Clark and Senik (2010) find that colleagues are the most important reference group when rating one's own performance in comparison to others, which underlines the relevance of our research. Many decisions within firms are relative as well. For example, decisions about promotions or the amount of pay are made by distinguishing between different individuals. Second, we will make use of a real-life setting instead of experimental designs which are dominating in previous research. We focus on job-related factors, an area which has not been extensively addressed so far. Therefore, we are looking at monetary rewards (bonus payments and wage increases), hierarchy level and working hours. In the context of a longitudinal view, changes in the hierarchical level of an individual can be interpreted as a promotion.

An analysis of these factors is important from our point of view: The amount of bonus payments or fixed salaries and promotions can ex ante act as incentives for employee motivation. Ex post employees will interpret those factors as rewards for own individual performance.

In contrast to the rewards provided by the firm, employees can decide on their (extra) working hours to some extent by themselves. This can result in meaningful interrelations with self-evaluations, evaluations of supervisors and monetary rewards resulting in severe problems due to biased decision making (Malmendier & Tate, 2005; Thoma, 2016). Thus, our research aim is to identify drivers of employees' self-evaluations in comparison to colleagues' performance in the job context.

To accomplish this aim, we make use of unique panel data from a yearly income survey in the German chemical sector. Participants had to evaluate their own performance in comparison to that of their colleagues. We take a closer look at the aforementioned monetary rewards as well as at hierarchy level and weekly working hours and derive hypotheses for the positive relations to self-evaluations, respectively: First, the amount of monetary rewards can, at least to some extent, usually be influenced by performance appraisals of supervisors. We therefore consider these rewards as indicators for performance appraisals made by supervisors. Second, differences in the amount of feedback for individuals across hierarchies are supposed to be relevant. Third, working hours of employees can be perceived as signals for effort choices.

We also consider firm tenure and gender. Previous research has hinted at mixed results regarding tenure (Lane & Herriot, 1990; Lindeman et al., 1995) and gender (Beyer, 1990;

Lindeman et al., 1995; Vecchio & Anderson, 2009). We extend the literature by focusing on interaction effects with hierarchy level and the two mentioned facets of monetary rewards. As we do not have any data on the actual performance evaluations made by supervisors, we use the amount of monetary rewards as indirect measures of these evaluations. Our assumption is that the amount of bonus payments and wage increases could act as signals about performance appraisals made by supervisors and therefore could influence employees' self-evaluations. We take additional determinants of self-evaluation as controls into account which have been revealed by previous empirical research.

The paper proceeds as follows: In section 2, we refer to theoretical considerations and derive our hypotheses. We describe the data, our variables, and our empirical methodology in section 3. The empirical results are presented in section 4. Section 5 includes a discussion of the results, describes limitations as well as ideas for future research, and concludes.

2 Theoretical considerations and hypotheses

In his work about the self-concept, Gecas (1982) describes how individuals process self-evaluative information and consequently evaluate themselves based on three parts: (i) reflected appraisals, (ii) social comparisons and (iii) self-perceptions. *Reflected appraisals* refer to individuals reflecting and incorporating appraisals other individuals make about them to obtain self-relevant information. *Social comparisons* relate to individuals' usage of comparisons with a reference group as a source of self-relevant information and assessments of own abilities. Similarly, Bandura (1978) states that individuals evaluate their performance by comparing it to a personal standard as well as to the performance of others. Comparison groups could be one particular individual or a reference group that the person interacts with on a regular basis. Festinger (1954) already formulates this mechanism in his theory of social comparison and stated that individuals look at people who are similar to themselves, which can obviously be colleagues in the job context. *Self-perception* refers to the fact that individuals learn about themselves by observing their own behavior (Bem, 1972). The self-concept is a meaningful base for understanding self-evaluations and provides the conceptual overarching framework for the present study.

As mentioned before, we aim to shed light on factors influencing self-evaluations in the job context. In particular, we derive hypotheses for relationships between self-evaluations of performance and received monetary rewards as well as hierarchy level and working hours. Past

research has already examined higher self-evaluations for males than among females and mixed results regarding firm tenure (see Lane & Herriot, 1990; Lindeman et al., 1995). We complement our analysis with interaction effects to analyze possible influences of tenure and gender on the relationship between (i) monetary rewards and self-evaluations and (ii) hierarchy level and self-evaluations.

Positive or high evaluations of own performance may partly be caused by some signals sent by the (organizational) environment. Received monetary rewards can be relevant for reflected appraisals as part of the self-concept here. Employees can use these rewards as signals to infer conclusions about a supervisor's appraisal regarding their performance. Higher monetary rewards signal higher performance evaluations made by supervisors, whereas lower rewards signal the opposite. Our conjecture, therefore, is that there is a positive relation between monetary rewards and self-evaluations. The strength of this relationship may depend on the pay policy of firms, though. Companies may differ regarding the dispersion of individuals' wage increases (Grund & Westergaard-Nielsen, 2008). If there is a meaningful heterogeneity of wage increases, employees can possibly interpret their particular large increases as positive signals about performance appraisals made by their supervisors. Furthermore, there may be differences regarding contingent pay such as bonus payments (Grund & Hofmann, 2019). It depends on the transparency of these differences whether a higher than expected or an average reward may influence self-evaluations of one's performance. We, therefore, formulate:

Hypothesis 1 a: The amount of received monetary rewards is positively related to employees' self-evaluations.

This relation may be positive in general but can differ across subgroups of individuals. Lindeman et al. (1995) found gender differences regarding self-evaluations in the sense that men in particular overestimate their performance. There are two possible explanations for gender differences regarding self-evaluations: First, there are personality differences between men and women: Burks et al. (2013) identify the desire to dominate others as a reason for overly high self-evaluations, and Luxen (2005) reveals that the trait of dominance is more present among men than among women. Further, Tang et al. (2000) show that males are more achievement-oriented than females. Receiving high monetary rewards as signals about positive performance appraisals could be interpreted as achievement. Therefore, these reflected appraisals could be used to generate self-evaluative information which will be more relevant

for males. In this vein, the difference regarding dominance and achievement-orientation could indicate that men will have higher self-evaluations than women.

Second, gender differences in socialization are relevant: Lindeman et al. (1995) find that people who tend to overrate themselves have a high self-esteem. Females are taught by society to rather underestimate their abilities and to be modest.[1] Males instead are educated to be more self-confident (Beyer, 1990; Ludwig et al., 2017). Already at a young age, men have a higher self-esteem than women (Wimmer-Puchinger et al., 2016). As self-esteem is part of a dominant personality (Gough et al., 1951), the way in which males are nurtured may even enhance their dominant personality and in turn their self-evaluations.

Gender specific socialization is also relevant with regard to general attitudes towards money so that the implications of the former argument are supposed to be more relevant for males. Males show higher aspirations regarding their remuneration and place greater importance on money overall (Desmarais & Curtis, 1997). Women instead tend to value non-monetary factors, such as interpersonal relationships (Crosby, 1982). This means that bonus payments and salary increases will probably be less important for women's self-evaluations than they are for men's.

Our assumption is that differences in both personality and socialization will possibly lead to higher self-evaluations by men while women will have more accurate self-evaluations. We presume that gender differences play a particular role when monetary rewards are high because of men's higher preference for money. Therefore, we derive the following hypothesis:

Hypothesis 1 b: The positive relation between the amount of monetary rewards and employees' self-evaluations is particularly relevant for males.

Monetary rewards could be seen as positive signals about one's value for the company (Gardner et al., 2004). The informational value of these signals is higher in companies which considerably differentiate monetary rewards for employees, for example on the basis of subjective performance evaluations by supervisors. In organizations using company-wide measures for setting wages – such as company success – the amount of monetary rewards will possibly be a less informative signal about performance appraisals made by supervisors. It can be argued that firm tenure moderates the above described relation between monetary rewards and self-evaluations. As aforementioned, empirical results regarding firm tenure and self-

[1] This tendency towards "femininity" is dependent on national cultures, though (Hofstede, 2011).

evaluations are mixed: Lindeman et al. (1995) find no effect of firm tenure on self-evaluations. In contrast, Lane and Herriot (1990) find that organizational tenure is positively correlated with self-evaluations. Experience with performance evaluations plays an important role for subordinates' trust in the accuracy of supervisors' performance appraisals, which in turn will determine the amount of monetary rewards (Fulk et al., 1985). Firm tenure can be seen as a proxy for trust, as an employee's relationship with the organization is developing over time (Gibbs et al., 2004). Through trust, acceptance of subjective performance evaluations is increasing. Acceptance refers to employees' belief that the feedback accurately represents their actual performance (Ilgen et al., 1979). As contingent pay is often positively correlated with subjective performance evaluations (Frederiksen et al., 2017), we assume that the amount of monetary rewards can be seen as a more reliable signal about employees' performance appraisal if trust, measured through tenure, is high. High tenure then will lead to employees being better able to interpret their monetary rewards as signals about the value supervisors ascribe to them. Hence, these employees will probably have more accurate self-evaluations in comparison to colleagues with lower tenure, who are not able to interpret these signals accurately and therefore might have (distorted) higher self-evaluations.

In addition to little knowledge about their company's reward system in general, low tenure employees also have less knowledge about the job as a whole and its requirements. In particular, they may also lack information about colleagues with whom they might compare themselves (Kulik & Ambrose, 1992; Mumford, 1983). This lack of information could also imply missing reference points for salaries and bonus pay, impeding the generation of self-evaluative information through social comparisons. Similarly, Bertoni et al. (2020) state that making evaluations of relative performance is difficult when the comparison group is not known. For instance, employees new to a company do not know much about their own probability of receiving a pay increment (Luft, 1994). With increasing tenure, employees will know the job requirements better (Kolz et al., 1998). For that reason, they will be better able to assess their own reward probabilities (Luft, 1994). Furthermore, high tenure employees will have more information about their colleagues (Kulik & Ambrose, 1992). In consequence, increased experience leads to employees who are better able to evaluate their own performance (Paloniemi, 2006).

On basis of the enhanced experience with the reward system as a whole and the ability to better evaluate one's own and others' amount of monetary rewards for high tenure employees, we derive the following hypothesis:

Hypothesis 1 c: The positive relation between the amount of monetary rewards and employees' self-evaluations is decreasing with firm tenure.

It is important to note that monetary rewards can differ both across and within levels of the hierarchy (Grund & Hofmann, 2019). Taking the role of monetary rewards into account, the employees' level of hierarchy may itself also be related to self-evaluations. Feedback can play a role here in two regards: (i) spillover effects of previous positive feedback on lower levels of the hierarchy and (ii) lack of feedback on higher levels.

Employees who have climbed up the hierarchy of a firm received recognition in the past. This could have been given directly, for example through direct praise by supervisors. It also could have been indirect, through the level of hierarchy itself: Promotions and related higher pay lead to increased perceived career success (Turban & Dougherty, 1994). This is because employees interpret achieving a higher hierarchy level as positive feedback about their abilities (Ostroff et al., 2004). We assume that employees will have the perception of being enabled to fulfill the requirements at the next highest job position because of their former promotion, which has led to positive self-evaluative information in the sense of the self-concept by Gecas (1982). However, decisions about a promotion are usually made based on an employee's past performance and not fully on the basis of considering whether the employee can fulfill the requirements at the higher position (Kaiser et al., 2011). Nevertheless, we presume that a promotion's positive signal for having a high performance will continue to have an effect at the next highest hierarchy level. Relying on the (direct and indirect) recognitions that employees have received through one or several promotions in the past could lead to high self-evaluations.

A complementing aspect is that feedback intensity is likely to differ across levels of the hierarchy. In general, feedback increases the accuracy of self-evaluations (Ashford & Cummings, 1983). Employees use feedback for their self-perceptions as it helps to gain information about their performance (Williams & Johnson, 2000). Those who do not receive feedback will have inaccurate self-perceptions (Yammarino & Atwater, 1997). Sala (2003) states that employees at higher levels have few opportunities to receive feedback. The author mentions as possible reasons that there are no employees in the hierarchy level above who could provide feedback or that those who are are too busy to do so. In addition, research has found that employees at higher hierarchy levels seek less feedback than those at lower levels (Ashford et al., 2003). A possible reason is that employees in senior positions in particular fear negative feedback (Morrison & Milliken, 2000). The lack of feedback about one's actual

performance at the higher hierarchy level could result in particularly high self-evaluations. This lack of feedback may even enhance the tendency towards high self-evaluations which stem from positive self-perceptions through previous promotions, leading us to:

Hypothesis 2 a: The level of the hierarchy is positively related to employees' self-evaluations.

Gender differences may not only be relevant regarding the link between self-evaluations and monetary rewards but also regarding the employees' level of hierarchy. Women tend to be more anxious, to be less confident, and to worry more than men (Fletcher, 1999). Owing to this, women have the need to receive affirmation (Sturm et al., 2014). Sherman et al. (1997) state that women's locus of control lies more externally than men's. Therefore, they seek more external feedback than men do (Fletcher, 1999). To satisfy this need, females presumably use information from reflected appraisals more than males do and use relationships with others to obtain self-evaluative information. Because feedback is less frequent at higher hierarchy levels (Sala, 2003; van der Rijt et al., 2013), women's demand for external feedback cannot always be fulfilled. This could possibly result in lower self-evaluations by females. In contrast, men are more internally focused when evaluating their own performance (Schwalbe & Staples, 1991). They rely more on their self-perceptions, which will probably lead to high self-evaluations (Josephs et al., 1992). This emerging gap between the sexes in their self-evaluations would become smaller if there were more feedback, such that women's need for it could be satisfied. Related to that, research has shown that self- and other-ratings are more congruent when employees receive feedback about their performance (Hazucha et al., 1993). Besides, men are more focused on achievements than women, as described above (Tang et al., 2000). As a promotion can be perceived as career success (Turban & Dougherty, 1994), reaching a higher hierarchy level will be more relevant for men's self-evaluative information than for females', leading to higher self-evaluations of men compared to women.

Additional relevant gender differences can stem from the trait of dominance, which is more present for males than it is for females (Luxen, 2005). Contexts that give power to an individual, such as belonging to a high hierarchy level (Brass & Burkhardt, 1993), increase the probability of showing dominant behavior (Hossiep & Ringelband, 2014). Employees on high hierarchy levels are better able to influence and control others (Maner & Case, 2016). Influencing and controlling others both characterize a dominant personality (Gough et al., 1951). Accordingly, Hossiep and Ringelband (2014) found top-managers to be more dominant and status-oriented. One explanation could be that holding a high social rank is accompanied

by greater respect being paid (Maner & Case, 2016). For the employee at the higher rank, this increased respect results in enhanced opportunities to dominate others (Maner, 2017). Consequently, if men reach a higher hierarchy level, their already dominant behavior will likely be reinforced, which can lead to even higher self-evaluations (Burks et al., 2013). Together with the fact that men rely on their self-perceptions about their performance while women need external feedback to obtain self-evaluative information, the following hypothesis is derived:

Hypothesis 2 b: The positive relation between the level of the hierarchy and employees' self-evaluations is particularly relevant for males.

Similar to our reasoning regarding monetary rewards, we presume that firm tenure can moderate the relation between employees' hierarchy level and self-evaluations. As mentioned before, we expect self-evaluations to be higher at higher levels of the hierarchy due to direct and indirect positive feedback that employees have received in the past and the lack of feedback at higher levels. High tenure employees, though, have already received more feedback regarding their job during their time working for the organization. Therefore, we presume that the hypothesized positive relationship between higher hierarchy level and self-evaluations is particularly relevant for low tenure employees, as they rely solely on former (in-)direct positive feedback, possibly leading to overly positive self-perceptions. In contrast, high tenure employees' self-evaluations will be more accurate due to the higher amount of feedback they can use to adjust their performance evaluations. We derive the following hypothesis:

Hypothesis 2 c: The positive relation between the level of the hierarchy and employees' self-evaluations is decreasing with firm tenure.

Already Tachibanaki (1982) has hinted for interrelations between monetary rewards, level of the hierarchy and employees' working hours. If the latter two are correlated, part of an observed relation between level of the hierarchy and self-evaluations may be explained by longer working hours at higher levels of the hierarchy. Longer working hours may also lead to better performance appraisals by supervisors (Lewis, 1999), resulting in higher monetary rewards, which again can be used to obtain self-evaluative information in the sense of the self-concept by Gecas (1982). Additionally, own and co-workers' working hours can be used by employees to generate relevant information about one's relative performance. Indeed, working hours are sometimes used as a proxy for individual effort in empirical studies (e.g. Ahituv & Lerman,

2007; Rupietta & Beckmann, 2018). There is also empirical evidence that working hours and performance are positively related. However, Collewet and Sauermann (2017) reveal for the case of call center agents that marginal increases in output are decreasing in working hours so that productivity per hour decreases. Insufficient recovery from work after long working hours can then lead to future productivity losses (Pencavel, 2016) and an increasing rate of workplace injuries or accidents (Wagstaff & Lie, 2011). Employees may anticipate the possible use of working hours as a criterion to make decisions regarding performance appraisals or promotions by the management. In consequence, employees will react accordingly and work longer hours, possibly to an inefficient extent, to signal high performance (Sousa-Poza & Ziegler, 2003). This will probably result in higher self-evaluations. This relation is supposed to extend the effect that is driven by the performance evaluations of others which is expressed in the amount of monetary rewards as argued above. We, therefore, formulate the following hypothesis:

Hypothesis 3: Working hours are positively related to employees' self-evaluations.

Revisiting the arguments of the interaction hypotheses above, we tend to argue in the direction of a moderating effect of gender (negative for females) and firm tenure (negative) regarding working hours. However, the possible reasoning seems to lose in our view to derive explicit hypotheses here.

3 Data, variables, and methodology

3.1 Dataset

The sample is based on data of a yearly income survey among professionals and managers from the chemical sector in Germany. It is conducted in collaboration with the German Association of Employed Academics and Executives in the Chemical Industry (Verband angestellter Akademiker und leitender Angesteller der Chemischen Industrie e.V. (VAA)). The questionnaire is sent on an annual basis to all of the approximately 18,000 members of the VAA. The survey period starts at the beginning of February and ends by the end of April of each year. The response rate is between 0.21 to 0.23 in every year. Since 2020, the survey contains a question about self-evaluation of one's performance in comparison to colleagues' performance.

As the information regarding self-evaluations acts as our dependent variable, we are using data from the survey years 2020 to 2022, during which the question about self-evaluation was part of the questionnaire. Since the data are collected retrospectively, we have data for the years 2019, 2020, and 2021 with dependent and independent variables each originating from the survey year. We are looking at employees of ten large companies with each more than 100 observations in the sample. HR relevant mechanisms differ across companies. By applying firm fixed effects, we avoid major parts of unobserved heterogeneity, which is oftentimes a problem of rather broad surveys. To make use of a homogenous sample, we only consider employees with a STEM university degree in western Germany who work fulltime[2]. We excluded top managers (level 1), since they have very different compensation contracts than middle managers (level 2-4) and often do not have many colleagues to whom they might compare their performance. We exclude employees who do not receive any bonus payment in a particular year. In addition, we deleted few observations with an unreasonable increase of more than 60% in fixed salaries between two consecutive observation years, which are most probably caused by input errors (e.g. reporting monthly instead of yearly compensation). We eliminated observations of participants who have changed their employer in the previous year or who have tenure of less than one year. This is because we assume that income components of these subjects are less comparable to those who have worked throughout an entire year. This leads to an unbalanced panel with a sample size of 2,599 observations from 1,663 individuals.

3.2 Variables

Self-evaluation of employees' job performance in comparison to the performance of their colleagues represents our dependent variable. The question in the survey is "How would you rate your work performance in [year] compared to your colleagues?". It is queried by an ordinal variable with five categories: *much lower* (1), *somewhat lower* (2), *similar* (3), *somewhat higher* (4) and *much higher* (5). This categorization refers to the social comparison component of the self-concept by Gecas (1982) and the theory of social comparison by Festinger (1954) as explained above. We cannot control or observe exactly with which group of colleagues the participants of the survey are comparing their performance. Bandura (1978) states that people with whom one interacts with on a regular basis are relevant for setting a

[2] Therefore, we excluded participants who are older than 67 years, as this is the current statutory retirement age in Germany.

reference standard. For example, comparisons of wages are found to be made with similar colleagues who work at the same firm (Godechot & Senik, 2015). Therefore, we assume that participants are comparing themselves with colleagues at the same firm and at the same hierarchy level.

Figure 1 shows the distribution of employees' self-evaluations regarding their performance. Only a very small share assess themselves as having a much lower or somewhat lower performance than colleagues (3 percent). In contrast, more than half of the employees consider themselves to perform better than their colleagues: 38 percent report having a somewhat higher performance and an additional 16 percent a much higher performance. 42 percent of participants assess their performance similarly to those of their colleagues.

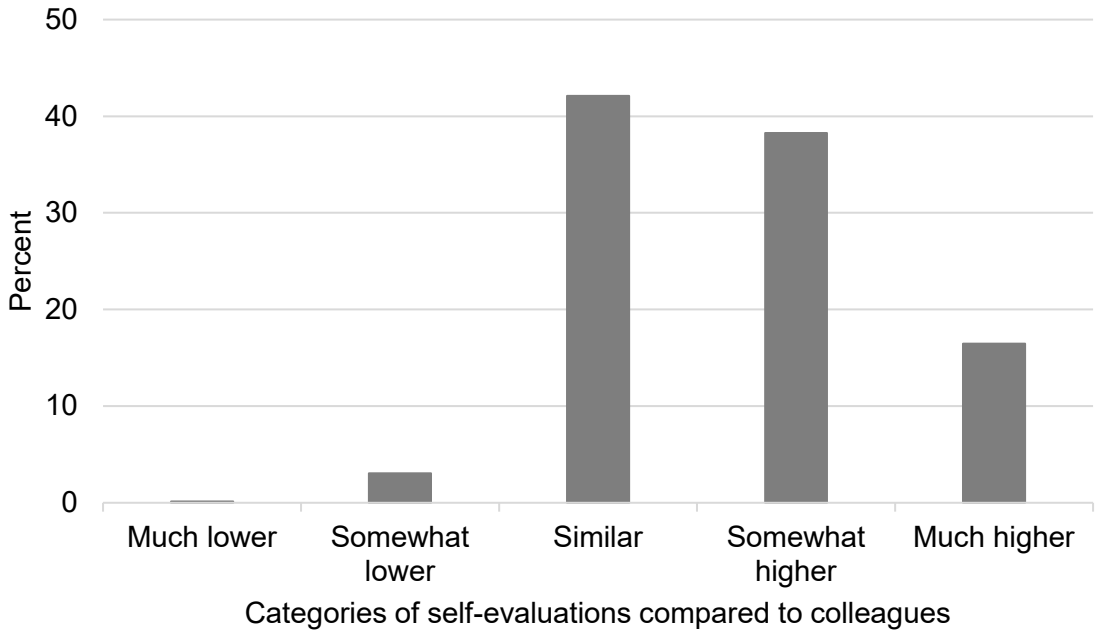

Fig. 1 Distribution of Self-Evaluations (N=2,599)

For some part of our analysis, we aggregate employees with somewhat higher and much higher self-evaluations compared to colleagues' performances and refer to these employees as "High-Performance-Self-Evaluation-employees" (HPSE-employees). We use the variable for HPSE-employees to get an impression about particularly high self-evaluations and to be able to interpret regression results in a more convenient way.

The present data do not include information about employees' actual performance evaluations made by their supervisors. As described above, we consider two dimensions of monetary rewards as possible signals for performance evaluations: Bonus payment and wage

increases. More precisely, we will use bonus share residuals and relative increases in fixed salary for our estimations and will explain both of them in the following.

Compensation of employees in our sample consists of fixed salaries (about 81 percent), bonus payments (about 16 percent), and other compensation components (e.g. compensations for inventions, stocks and stock options, or supplementary payments for anniversaries; about 3 percent) on average. Although all firms in our sample have collective wage agreements for regular employees, there is much more scope for individual adaptions regarding managers addressed by our study.

First, we use relative increases in fixed salaries between two observation periods *t* and *t-1* expressed by

$$\left[\frac{fixed\ salary_{i,t} - fixed\ salary_{i,t-1}}{fixed\ salary_{i,t-1}}\right] * 100.$$

In each year *t* of the survey, fixed salary are queried for both t and the previous year $t-1$. Therefore, we have information on both points of time for each observation in the sample.

Second, we consider bonus shares as calculated as the individual bonus payment divided by total compensation. Previous research has revealed that bonus shares can considerably depend on job-related characteristics such as hierarchy level, tenure, and the functional area of the job (Grund & Kräkel, 2012). We consider these factors by first running an estimation in which bonus share acts as the dependent variable and the aforementioned factors as independent variables in addition to year dummies.

As we want to ensure that our results are not biased by heterogeneity between different firms, we run these estimations for each firm. We then use the individual residual of these estimations as our second dimension of monetary rewards (bonus share residual). A positive residual can be interpreted as a higher bonus share than expected, given the considered job characteristics of employees. Therefore, we perform the explained procedure for the ten largest firms in our sample separately. A positive residual then expresses a higher bonus share than expected for a particular individual with corresponding job characteristics in a certain firm. The more that self-evaluations and bonus share residuals are correlated, the more self-evaluations are consistent with evaluations made by others.

We consider these two monetary rewards as possible signals induced by firms for employees about their performance, which in turn could influence their self-evaluations: A relative increase in fixed salary could be interpreted as a reward for high performance in the past. For bonus share residuals, the informative value of the signal depends on the bonus system

that the company is using. If it has a bonus system based on employees' individual performance, the bonus share residual can be seen as an approximation for employees' performance evaluations made by their supervisors: If the estimated coefficient of the residual is positive (negative), the bonus share is higher (lower) than expected, which the employee could interpret as signal for high (low) past performance appraisals. The quality of this signal will be lower if companies are using bonus systems which rely less on employees' and more on firm performance.

Furthermore, we will consider hierarchy level as another possible factor that influences self-evaluations. In the survey, participants were asked to rank themselves into one of four hierarchy levels: We exclude the top management (level 1) and focus on level 4 (lowest management level) to level 2 (senior management). As aforementioned, level 1 is excluded here to ensure a homogenous sample. Additional explanations in the survey ensure that firm size categories are comparable at least across large firms which are part of this study.

In addition, we consider employees' working hours as being possibly related to self-evaluations. Participants report their actual average weekly working hours in the survey.

We will extend our estimation by additionally interacting monetary rewards and hierarchy level with both gender and firm tenure. Firm tenure is measured by counting the years that the individual has been employed by a company. It is the time spent with a company, regardless of the job position held. A dummy for having gained a doctoral degree, field of study as well as company and year dummies act as control variables.

Table 1 shows descriptive statistics for our independent variables. The fixed salary is 117,787€ on average. Relative increases in fixed salary are about 3.2 percent. Bonus payments account for 16 percent of total compensation and are 25,500€ on average. Most participants work at level 3 (59 percent). Weekly working hours are 45 on average. The sample is male-dominated with 88 percent males. Tenure is 19 years on average expressing the dominating long-term employment relationships in the sector. Most of the employees have a degree in chemistry (50 percent), followed by engineering (32 percent). 71 percent of the sample hold a doctoral degree.

Table 1 Descriptive statistics for independent variables

Variable	Mean (Standard Deviation) / Share
Monetary rewards	
Fixed salary [in €]	117,787 (27,739)
Fixed salary increase	0.032 (0.043)
Bonus [in €]	25,500 (20,344)
Bonus share of total compensation	0.159 (0.071)
Bonus share residual	0.000 (0.041)
Level of hierarchy	
Level 2	0.052
Level 3	0.591
Level 4	0.357
Weekly working hours	44.8 (5.079)
Female	0.125
Tenure (years)	19.2 (9.530)
Field of study	
Chemistry	0.499
Engineering	0.318
Biology	0.044
Physics	0.027
Medical science	0.019
Pharmaceutics	0.056
Other natural science	0.037
Doctoral degree	0.711
Companies	
Company A	0.298
Company B	0.184
Company C	0.129
Company D	0.076
Company E	0.076
Company F	0.066
Company G	0.044
Company H	0.043
Company I	0.043
Company J	0.041
Year	
2019	0.389
2020	0.324
2021	0.287
Number of observations	2,599

First bivariate analyses show that there is a low, but positive (Spearman rank) correlation between self-evaluations and fixed salary increases ($\rho = 0.056$, p-value = 0.004) as well as bonus share residuals ($\rho = 0.054$, p-value = 0.006). Self-evaluations increase with the level of the hierarchy: The share of HPSE-employees is more than 63 percent at level 2, whereas at level 4, the share is ten percentage points lower. Weekly working hours show a strong positive correlation to self-evaluations ($\rho = 0.331$, p-value < 0.001). Regarding gender, males report slightly higher self-evaluation than females (0.55 vs. 0.52 of HPSE-employees).

Previous studies (e.g. Beyer, 1990; Lindeman et al., 1995) have reported much higher differences regarding gender. We have to take into account the specific selection of individuals with a STEM degree self-selecting in the male-dominated German chemical industry, though. Tenure is slightly negatively correlated with self-evaluations (ρ = -0.046, p-value = 0.020). Table A in the appendix shows these and other patterns.

3.3 Empirical methodology

In our empirical analysis, we apply both cross sectional and individual fixed effects panel estimations. We first run cross-sectional estimations in order to explore relations across participants. Because of the ordinal nature of our dependent variable, we start with ordered probit estimations. We complement these estimations with corresponding OLS estimations in order to have a link to the following fixed effects estimations, as there does not exist a fixed effects model for ordered probit estimations. We also look at binary probit estimations for the HPSE-employee variable to analyze which variables are responsible for especially high self-evaluations.

The cross-section analyses do not account for unobserved heterogeneity. We cannot consider personality traits of individuals or differences in organizational culture, for example. We therefore take these kinds of unobserved heterogeneity into account by estimating individual fixed effects panel models (also including firm fixed effects) in a second step. Doing this, we analyze how changes in our explanatory variables relate to within-person changes of self-evaluations. We will refer to our hypotheses when reporting the corresponding fixed effects estimation results.

4 Results

4.1 Cross-sectional results

We start our empirical analysis with ordered probit estimations on self-evaluations of performance in Table 2. In model (1), we include part of our independent variables, namely increases in fixed salary, bonus share residual, hierarchy level, gender, and tenure. As controls, we add doctoral degree, dummies for field of study, and company dummies. Year dummies are included in all models.

There is a positive relation of both monetary rewards and level of the hierarchy and self-evaluations. Firm tenure is negatively associated with evaluations, evaluations become more positive over years, and there is no significant relation for gender.

The latter result is worth further explanation: On the one hand, prior research found males' self-evaluations to be higher than those of females (Beyer, 1990; Lindeman et al., 1995). On the other hand, several studies did not find gender differences regarding self-evaluations (Ostroff et al., 2004; Sturm et al., 2014; Vecchio & Anderson, 2009). A reason for the lack of gender differences in our sample may be self-selection by women in the STEM area and in the traditionally male-dominated German chemical industry. Hardies et al. (2013) find that self-selection can make gender differences disappear, so that women working in male industries have traits similar to those of males. This could explain the rather non-existing gender differences in our sample.

In model (2), we add weekly working hours in order to reveal possible mediating effects. Working hours are highly positively related to self-evaluations. And indeed, part of the relation of monetary rewards in model (1) has been captured by differences in working hours, since both coefficient sizes and their significances become smaller. Similarly, the coefficients for hierarchy levels differ between models (1) and (2). Indeed, individuals at level 2 work considerably longer hours (50.0 on average) than their colleagues at levels 3 and 4 (45.7 and 42.6, respectively). Therefore, high working hours seem to be a reason for increased self-evaluations at higher hierarchical levels across participants rather than the higher level itself. As a result of the Covid-19 pandemic, many employees have been working from home since then (Naumann et al., 2020). This can blur the boundaries between work and private life (Grant et al., 2013). Therefore, participants might overestimate their working hours, which could be a reason for the positive relation between working hours and self-evaluations. However, this phenomenon would rather become relevant across than within participants.

Models (3) and (4) in Table 2 present the results of corresponding OLS estimations, which are robust compared to the ordered probit estimations.

Lastly, the reported average marginal effects of the binary probit estimations using the HPSE-employee variable in models (5) and (6) produce rather similar results to those found in the ordered probit and OLS estimations as well. For example, an increase of fixed salary by 1 percent increases the probability of being an HPSE-employee by 0.4 percentage points, even after controlling for weekly working hours. Again, weekly working hours are strongly related to the likelihood of being an HPSE-employee with the probability rising by about 3 percentage

Table 2 Cross-sectional estimations on self-evaluation

	Ordered probit		OLS		Binary probit[a]	
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Fixed salary increase	0.0096*	0.0087*	0.0071*	0.0061*	0.0042*	0.0037*
	(0.0053)	(0.0052)	(0.0037)	(0.0034)	(0.0024)	(0.0022)
Bonus share residual	1.3723**	0.4633	0.9990**	0.3318	0.7934***	0.4043
	(0.5530)	(0.5610)	(0.3954)	(0.3700)	(0.2525)	(0.2497)
Level of hierarchy (base: level 3)						
Level 2	0.2555**	-0.1240	0.1829**	-0.0747	0.1000**	-0.0309
	(0.1152)	(0.1246)	(0.0829)	(0.0829)	(0.0492)	(0.0521)
Level 4	-0.1208*	0.1344**	-0.0825*	0.0913**	-0.0566**	0.0386
	(0.0625)	(0.0647)	(0.0447)	(0.0428)	(0.0275)	(0.0262)
Weekly working hours		0.0883***		0.0580***		0.0319***
		(0.0065)		(0.0039)		(0.0023)
Female (1=yes)	-0.0400	-0.0215	-0.0369	-0.0232	-0.0159	-0.00838
	(0.0694)	(0.0749)	(0.0500)	(0.0501)	(0.0336)	(0.0326)
Tenure	-0.0061**	-0.0080***	-0.0042*	-0.0052***	-0.0041***	-0.0045***
	(0.0030)	(0.0030)	(0.0022)	(0.0020)	(0.0014)	(0.0013)
Doctoral degree (1=yes)	0.1223	0.0622	0.0899*	0.0462	0.0305	0.0057
	(0.0755)	(0.0736)	(0.0544)	(0.0492)	(0.0333)	(0.0307)
Field of study dummies (7)	Yes	Yes	Yes	Yes	Yes	Yes
Company dummies (10)	Yes	Yes	Yes	Yes	Yes	Yes
2020	0.0293	0.0465	0.0253	0.0355	0.0029	0.0086
	(0.0432)	(0.0446)	(0.0309)	(0.0295)	(0.0203)	(0.0198)
2021	0.1406***	0.1754***	0.1052***	0.1200***	0.0494**	0.0564***
	(0.0472)	(0.0485)	(0.0338)	(0.0322)	(0.0213)	(0.0206)
Intercept	-	-	3.6856***	1.1006***	-	-
	-	-	(0.0890)	(0.1936)	-	-
R^2	0.0099	0.0652	0.0226	0.1390	0.0178	0.0813
Number of observations	2,599	2,599	2,599	2,599	2,599	2,599

Notes: Robust standard errors clustered at the individual level (in parentheses). For the ordered probit and binary probit models, Pseudo R^2 is shown. For the OLS model, R^2 is shown. [a]Average marginal effects for the binary variable indicating HPSE-employees. *** p<0.01, ** p<0.05, * p<0.1.

points for every additional hour worked. By contrast, an additional year of firm tenure decreases the probability to be an HPSE-employee by 0.5 percent.

4.2 Individual fixed effects panel estimations

In the next step, we take a look at fixed effects estimations to analyze changes *within* individuals. In contrast to the cross-sectional estimations, time-invariant variables (namely, gender, doctoral degree, field of study and company dummies) are omitted, leading to the results shown in model (1) of Table 3.[3] To analyze our independent variables in more detail, we include interaction terms. As described above, we assume a moderating effect of gender and tenure on the relation between (i) monetary rewards and self-evaluations and (ii) hierarchy level and self-evaluations. Model (2) in Table 3 shows the results of the corresponding estimations including the interaction terms.[4]

4.2.1 Monetary rewards and the moderating role of gender and tenure

First, we are looking at our hypotheses 1a-c regarding the relation between monetary rewards and self-evaluations as well as the former's interactions with gender and tenure. Hypothesis 1a states that employees' self-evaluations are positively related to the amount of monetary rewards. This relation has indeed already been shown in the cross-section analysis as described above. It is partly mediated by differences in working hours, though. The results of panel estimations are similar (model 1): The coefficient for salary increases is positive, though not significant (p=0.128). Bonus share residuals are (weakly) significantly related to self-evaluations in a positive way. Hypothesis 1a can therefore only be partly confirmed. In general, there are only slight hints for the conjecture that monetary rewards provoke some signals about performance appraisals that affect individuals' self-evaluations.

Hypothesis 1b presumes that the positive relation between the amount of monetary rewards and employees' self-evaluations is more important for males than it is for females.

[3] Random-effects ordered probit and random-effects binary probit models confirm the results from our cross-sectional estimations as shown above.

[4] We re-estimated our model from Table 3 using panel logit estimations with individual fixed effects and received qualitatively similar results. In addition, we did fixed effects estimations with the bonus share itself instead of the bonus share residual and received quite similar results as well (available by the authors upon request).

Table 3 Individual fixed effects panel estimations on self-evaluation (including interaction terms with gender and tenure)

Variables	**(1)**	**(2)**
Fixed salary increase	0.0072	0.0069
	(0.0047)	(0.0088)
Bonus share residual	0.8070*	0.8900
	(0.4697)	(1.0901)
Level of hierarchy (base: level 3)		
Level 2	0.2744*	0.1915
	(0.1522)	(0.0421)
Level 4	-0.0008	0.0409
	(0.1046)	(0.1976)
Weekly working hours	0.0365***	0.0363***
	(0.0086)	(0.0086)
Tenure	-0.0122	-0.0114
	(0.0111)	(0.0129)
Fixed salary increase*Female		-0.0054
		(0.0095)
Bonus share residual*Female		4.9473**
		(2.4387)
Fixed salary increase*Tenure		0.0002
		(0.0004)
Bonus share residual*Tenure		-0.0163
		(0.0470)
Level 2*Female		-0.5356***
		(0.1960)
Level 4*Female		-0.4414
		(0.3253)
Level 2*Tenure		0.0047
		(0.0172)
Level 4*Tenure		-0.0004
		(0.0078)
2020	0.0576*	0.0557*
	(0.0330)	(0.0331)
2021	0.1349***	0.1331***
	(0.0412)	(0.0416)
Intercept	2.1811***	2.1923***
	(0.4326)	(0.4561)
R^2 (overall)	0.1033	0.0869
Number of observations	2,599	2,599

Notes: Robust standard errors clustered at the individual level (in parentheses). *** p<0.01, ** p<0.05, * p<0.1.

The evidence does not support our hypothesis (model 2): While the coefficient of the corresponding interaction term regarding salary increase is at least negative as expected (though not significantly), the interaction with the bonus share residual is even significantly positive. In contrast to our hypothesis, women's self-evaluations are particularly affected by receiving unexpected amounts of bonus payments.

Hypothesis 1c cannot be confirmed, either. Firm tenure does not moderate the relation between the amount of monetary rewards and employees' self-evaluations, since the corresponding interaction terms are far from significant.

4.2.2 Hierarchy level and the moderating role of gender and tenure

Next, we consider the hypothesized relations between self-evaluations and hierarchy level plus its interactions with gender and tenure (hypotheses 2a-c). As coefficients in panel fixed effects estimations are identified by within-person changes in our independent variables and self-evaluations, results regarding hierarchy levels can be interpreted as the role of promotions. Hypothesis 2a states that level of the hierarchy is positively related to employees' self-evaluations. Indeed, model (1) of Table 3 shows that individuals promoted to level 2 have weakly significantly higher self-evaluations. The coefficient remains significant even after controlling for weekly working hours, thus indicating that the promotion itself is the reason for a higher self-evaluation and not adaptions in working hours per week. Therefore, this result is in line with hypothesis 2a. Though, our result is in contrast to the cross-sectional estimation results in Table 2 where we could not find a positive relation between hierarchy level and self-evaluations when controlling for weekly working hours. This implies that the impact of higher hierarchy levels on self-evaluations plays a minor role across participants.

Hypothesis 2b assumes that the positive relation between hierarchy level and employees' self-evaluations will be more pronounced for males. This can be confirmed by the estimation results in model (2): Indeed, the corresponding interaction effect for level 2 is highly significant. According to our theoretical considerations, the possibility of expressing a pronounced trait of dominance and to rely solely on one's own perceptions seems particularly relevant at this senior management level.

Last, we analyze the role that tenure has on the link between hierarchy level and self-evaluations. In hypothesis 2c, we assumed a negative relation. Model (2) shows that this is seemingly not the case for participants at level 2, as the coefficient of the interaction term is

positive. Although not significant, this result is contrary to our expectations. Thus, we cannot confirm hypothesis 2c.

4.2.3 Weekly working hours and self-evaluations

In agreement with the results found in the cross-sectional estimations, model (1) shows that weekly working hours and self-evaluations are positively related ($p<0.01$). Indeed, self-evaluations seem to be driven by working hours in a very pronounced way, confirming our hypothesis 3. Notably, this result is present even after controlling for monetary rewards which are affected by supervisors' performance evaluations.[5]

Regarding our control variables, self-evaluations become more positive every year, with the highly significant coefficients in 2021 being more than two times as large as those in 2020. The same has been found across participants.

5 Discussion, limitations and conclusion

We have used panel data from a longitudinal yearly income survey with employees in the German chemical sector to explore the potential relation of three job characteristics on employees' self-evaluations of performance, i.e. the amount of monetary rewards, the employees' level of hierarchy and weekly working hours. We also have taken possible interaction effects of gender and firm tenure into account.

Accounting for unobserved heterogeneity by using individual fixed effects panel estimations, we present evidence for a positive relation of working hours, level of the hierarchy as well as monetary rewards and self-evaluations of own performance relative to others.

Hereby, *weekly working hours* are positively related to employees' self-evaluations in a very pronounced way. We have to keep in mind that this occurs even when controlling for monetary rewards (which are at least to some extent affected by the results of performance appraisals) and the hierarchy level (which is itself positively correlated with working hours). Future research may try to explore in detail whether employees overestimate the link between working hours and performance and exhibit ineffective or inefficient long working hours.

[5] In additional estimations we checked possible interaction effects of working hours and both gender (female dummy) and firm tenure. Coefficients are negative, but not significant.

The employees' *level of the hierarchy* is also positively related to employees' self-evaluations. Employees probably receive feedback directly and indirectly through a promotion to a higher level. In addition, results hint for a particular relation for males in senior management positions.

We have used two variables to capture *monetary rewards*, i.e. increases of fixed salaries and bonus share residuals and have revealed partial evidence for a positive relation to self-evaluations. In this sense we have only found weak evidence for our conjecture that employees interpret these rewards as signals about performance appraisals made by supervisors. In practice, the informativeness of these measures as signals of performance appraisals can be firm and context specific. Both measures can also depend on other factors, such as tenure or firm performance. One advantage of our approach is that – in contrast to more broad surveys – we can control for firm effects. However, bonus policy of firms or the regularities to adapt wages can change even within firms. Bonus policies do indeed differ across firms (see also Grund & Hofmann, 2019).[6]

We find less evidence for our interaction hypotheses: We try to find explanations by hinting for limitations of our data and possible biases in evaluations in the following.

Assuming that monetary rewards play a greater role for generating self-relevant information for men than for women when making self-evaluations, the result that the influence of bonus share residuals is larger for women than for men is contrary to our expectations (results regarding salary increases are far from being significant). This may occur for several reasons: First, as we have argued in the beginning, bonus payments may not only be perceived as a monetary reward but also as general feedback in terms of a positive appraisal (e.g. Fuchs, 2015). This can be relevant for women in particular, as they seek external feedback more than men do. Second, we have argued above that differences in personality and socialization of males and females could be reasons for higher self-evaluations by males in particular. We have a specific selection of employees in our sample, though. Nekby et al. (2008) find women in male-dominated environments to have personality traits similar to those of men, which is also likely to be relevant in our sample of employees with STEM-degrees in the usually male-dominated German chemical industry. In consequence, gender differences will not come out so much or may even be reversed. A limitation of our study is that we do not have any information about the trait of dominance in our data. This makes it difficult to verify this

[6] We have also estimated firm-wise estimations based on our sample (available from the authors upon request). These estimations do not provide any additional insights, though.

possible explanation and calls for further research on this topic. However, personality differences regarding gender seemingly come to light at higher hierarchy levels, as our results show that the link between a higher hierarchy level and self-evaluations is stronger for males.

In our empirical analysis, we do not find meaningful results regarding a moderating role of tenure on the relationship between monetary rewards or the hierarchy level and self-evaluations. Regarding monetary rewards, our reasoning of a positive relation of (firm) tenure and the ability to evaluate monetary rewards for oneself and one's colleagues may therefore not come to light to the extent that we had assumed. Sørensen (2000) states that an employee's attachment to a group changes over time. Accordingly, attachment will be lower when group composition changes often. Then, comparisons with colleagues and hence, accurate self-evaluations relative to others, are difficult even for employees with many years of tenure. Regarding the moderating role of tenure on the relation between hierarchy level and self-evaluations, we argued that tenure negatively influences the link between higher hierarchy levels and self-evaluations, as employees with high tenure had received a higher amount of feedback. Due to that, their self-evaluations should become more accurate. Accordingly, Mabe & West (1982) describe that the ability to make accurate self-evaluations improves with practice. We do not find evidence for this assumption in our data. One explanation could be that climbing up the hierarchy is often accompanied by higher task complexity (Zhou, 2013) and more responsibilities (Kaiser et al., 2011). As a result, employees at higher levels cannot necessarily rely on previously received feedback because it might concern tasks which are no longer in their area of responsibility. Hence, it might not be useful for evaluating one's current performance accurately. Even when employees possess much relevant information, they often neglect or do not consider it (Dunning et al., 2004). In addition, we argued that the amount of past feedback is important for accurate self-evaluations and that employees at higher hierarchy levels receive less feedback than it is the case at lower levels. However, we lack information about the frequency and amount of feedback in our data. This information would be helpful to check our reasoning for the corresponding hypotheses. Thus, future research could consider the amount and frequency of feedback that employees receive, as this could be a relevant factor for self-evaluations.

For both interactions of (i) monetary rewards with tenure and (ii) hierarchy level with tenure, our arguments of increased trust in the accuracy of performance evaluations and higher amounts of feedback at higher levels seem not to be relevant to the extent that we have expected. First, this may be due to the relevance of long-term relationships in the German chemical sector. The average firm tenure of individuals in our sample is almost 20 years and

we have only few observations of employees with only few years of hitherto firm tenure. Our considerations could be particularly relevant for employees who have just started their career with a company and less for those who have been working there for a longer period of time because of decreasing marginal effects of receiving feedback on self-evaluations. A second possible reason for the result concerning monetary rewards could be that it is not trust in an organization, but rather trust in the specific supervisor, that is important for increasing employees' beliefs that performance evaluations are a reliable signal of their performance. Indeed, Bol (2011) and Duarte et al. (1994) find that length of the relationship between supervisor and subordinate is relevant for supervisors' performance evaluations. Concerning feedback differences across hierarchy levels, its reliability rather than its pure amount might be more relevant. Accordingly, the supervisor-subordinate relationship is supposed to be important here as well. We do not have information about the length of the supervisor-subordinate-relationship in our data. Future research could try to explore its relevance in more detail by considering the role of job tenure and/or the duration of the supervisor-employee-relationship in our context.

Considering the possible negative consequences that overly high self-evaluations can have for an organization, reaching from employees' unwillingness to join training activities (Yammarino & Atwater, 1997) to lack of receptiveness to feedback (Brett & Atwater, 2001) or biased decision-making (Malmendier and Tate, 2005; Thoma, 2016), results of this study regarding factors influencing employees' self-evaluations can be applied to generate further conclusions which then could be used to derive implications for human resource practices.

Festinger (1954) states that if individuals' performance improved, their aspiration level increases. As we have found a positive relation of monetary rewards and self-evaluations to some extent, employees interpret monetary rewards as signals for performance improvements. Therefore, the aspiration level of employees towards future monetary rewards is likely to be increasing with self-evaluations. It is a demanding challenge for companies to implement incentive systems which provide employees with ongoing rewards. In addition, we described that supervisors are at least in part responsible for setting the amount of bonus payments. Our result that bonus payments can to some extent be a driver of self-evaluations and seemingly act as signals of employees' performance appraisals made by supervisors might therefore serve as a call for caution when determining bonus payments: Possible biases in performance evaluations made by supervisors might result in even more distorted self-evaluations by employees, if they misinterpret signals sent through the amount of bonus payments.

Consequently, supervisors should be made aware of these potential misinterpretations in order to prevent negative consequences related to distorted self-evaluations.

Related thereto, carefulness in interpreting the results of our study is advised due to possible interrelations of biases in self-evaluations and those made by the supervisor. Bonus payments may suffer from rater biases in performance evaluations, as bonus payments are significantly correlated with subjective performance evaluations (Frederiksen et al., 2017). For example, evaluations could be distorted due to the likeability bias which means that evaluations are shifted upwards or downwards, depending on social ties between subordinates and supervisors (Bauch et al., 2021; Breuer et al., 2013). In addition, employees who have performed well in the past are likely to receive positive evaluations again in the future, even if they do not perform accordingly (Bauch et al., 2021). Furthermore, Grund and Przemeck (2012) show in their theoretical results that leniency and centrality bias play a role in performance appraisals. Indeed, there is evidence in practice for the occurrence of these biases (e.g. Bol, 2011; Trapp & Trapp, 2019) so that the link between bonus payments and performance can then be disrupted (Prendergast, 1999). These could lead to problems, if employees misinterpret the signals sent through the performance evaluations. There are first hints that leniency bias is particularly relevant when ratings are used to allocate bonus payments (Kusterer & Sliwka, 2022). Exploring possible interdependencies between biases in self-evaluations and those of subjective performance appraisals by supervisors can be a challenging, but promising task for future research.

Another aspect which needs to be considered when interpreting the results of this study is the impact of the COVID-19 pandemic. In the first quarter of 2020, the pandemic reached Germany. Since then, many employers have enabled their employees to work from home (Naumann et al., 2020). In consequence, remote work has become relevant for a large part of survey participants. Therefore, possible influences of the pandemic on the outcomes of the survey might occur in the observation years 2020 and 2021. Working from home hampers social interaction with colleagues. Face-to-face interaction is important for building social connections with colleagues. In addition, working from home hinders employees from informal learning or sharing and receiving work-related information (Cooper & Kurland, 2002). Because of the necessity to work from home for many employees due to the COVID-19 pandemic, it is conceivable that participants' self-evaluations in our sample are distorted due to a lack of opportunities and information to compare their own performance with those of their colleagues. Related to that, Chambers et al. (2003) state that individuals tend to overvalue information that they have about themselves and to undervalue information that they have about others.

Moreover, Grant et al. (2013) reveal in their qualitative study that employees evaluate their own productivity as having increased since working from home. Reasons are working without being interrupted and better concentration, for example. Such factors could be relevant for participants in our sample as well, possibly leading to higher self-evaluations for those who primarily work from home. We cannot control for the relevance of remote work, but the highly significant dummy for the year 2021 hints at the relevance of this consideration. Future research could therefore explore whether the amount of individuals' usage of remote work is an influencing factor for self-evaluations.

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Appendix

Table A Descriptive statistics for independent variables with mean self-evaluations and share of HPSE-employees (N = 2,599)

Variable	(1) Mean (Standard Deviation)/Share	(2) Share of HPSE-employees[b]	(3) Spearman Rank Correlation to Self-Evaluations (p-value)
Full sample		0.547	
Monetary rewards			
Fixed salary [in €]	117,787 (27,739)		0.017 (0.399)
Fixed salary increase	0.032 (0.043)		0.056 (0.004)
Bonus [in €]	25,500 (20,344)		0.020 (0.306)
Bonus share of total compensation	0.159 (0.071)		0.009 (0.644)
Bonus share residual	0.000 (0.041)		0.054 (0.006)
Level of hierarchy			
Level 2	0.052	0.632	
Level 3	0.591	0.552	
Level 4	0.357	0.526	
Weekly working hours	44.8 (5.079)		0.331 (0.000)
Gender			
Female	0.125	0.520	
Male	0.875	0.551	
Tenure (years)	19.2 (9.530)		-0.046 (0.020)
Field of study			
Chemistry	0.499	0.554	
Engineering	0.318	0.563	
Biology	0.044	0.544	
Physics	0.027	0.443	
Medical science	0.019	0.375	
Pharmaceutics	0.056	0.510	
Other natural science	0.037	0.536	
Doctoral degree	0.711	0.553	
No doctoral degree	0.289	0.533	
Companies			
Company A	0.298	0.566	
Company B	0.184	0.542	
Company C	0.129	0.516	
Company D	0.076	0.535	
Company E	0.076	0.629	
Company F	0.066	0.503	
Company G	0.044	0.544	
Company H	0.043	0.522	
Company I	0.043	0.473	
Company J	0.041	0.579	
Year			
2019	0.389	0.532	
2020	0.324	0.536	
2021	0.287	0.580	

Notes: [b]HPSE-employees = High-Performance-Self-Evaluation-employees