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With or against others? Pay-for-Performance activates aggressive aspects of competitiveness

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ABSTRACT

While paying employees for performance (PfP) has been shown to elicit increased motivation by way of competitive processes, the present paper investigates whether the same competitive processes inherent in PfP can also encourage aggressiveness. We tested our hypothesis in three studies that conceptually build on each other: First, in a word completion experiment (N = 104), we find that PfP triggers the implicit activation of the fighting and defeating facets of competitiveness. Second, in a multi-source field study (N = 94), co-workers reported more interpersonal deviance from colleagues when the latter received a performance bonus than when they did not. In our final field study (N = 286), we tested the full model, assessing the effect of PfP and interpersonal deviance mediated by competitiveness: Employees with a bonus self-reported higher interpersonal deviance towards their co-workers, which was mediated by individual competitiveness. These findings underscore that PfP can entail powerful yet widely unstudied collateral effects.

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Pay-for-performance (PfP) is generally considered an integral part of economic theories of compensation, specifically in tournament theory (Lazear & Rosen, 1981) and principal-agent theory (M. C. Jensen & Meckling, 1976), as well as in conceptualizations of high-performance work systems (Huselid, 1995). In its simplest form, which is used by over 80% of companies, PfP means paying out financial incentives after performance goals have been met (Gerhart et al., 2009; Hewitt, 2010). While all of these accounts highlight the motivational benefits of financially incentivized competition amongst teams and individuals, the downsides are often overlooked. Indeed, research on aggressive competitiveness in organizations is still sparse (Swab & Johnson, 2019).

In a recent review, To et al. (2020) defined interpersonal competition as a situation in which "an individual desires, and directs behavior toward, attaining relative superiority over others on a particular dimension" (p. 911). They argue that competition may evoke feelings of challenge as well as threat, and that threat in particular gives rise to negative interpersonal behaviour (Kouchaki & Desai, 2015; To et al., 2020). Indeed, as an individual psychological variable, competitiveness has two sides: In one sense, embodied in the view of Helmreich and Spence (1978) and intended by PfP, individual competitiveness is a positive, unproblematic enjoyment of competing *with* others; the emphasis is on comparing oneself with others and improving one's skills as a path to success. In another sense and unintended by PfP, competitiveness can invite hostile and aggressive feelings as people seek to compete *against* others by denigrating and defeating them (Ryckman et al., 1994).

To better understand the negative behavioural effects of PfP, we take an implicit decisions perspective (Bargh & Chartrand, 1999; Strack & Deutsch, 2004). This perspective holds that decisions are led by implicit associations – that is, associations between related concepts – that are activated before, and independent from, conscious awareness or deliberate reasoning. These associations form the basis for interpretation, judgement, and behaviour in any given situation where said associations belong (Reynolds et al., 2010). We argue that the presence of a PfP programme could shape perception and interpretation in a competitive way, eventually evoking more aggressive behaviour by employees towards their colleagues.

Research on PfP often revolves around the variety of forms and compositions of PfP designs, that is, the differences in individual vs. team vs. organizational PfP. However, that research shows remarkably few consistent effects (see Nyberg et al., 2018 for a meta-analysis). Instead of investigating different forms of PfP, we take a simplified view on PfP to be able to investigate its effect on competition: We only differentiate between contexts where there is financial incentivization (i.e., where there is a PfP system in place) versus those where there is none (cf., McNabb & Whitfield, 2007). Essentially, we argue that the PfP cue itself, regardless of form, is enough to affect people's information processing and subsequent behavioural choices.

In our effort to research the implicitly triggered competitive elements in PfP, we designed three complementary studies that conceptually replicate our hypothesized effects. We set out to test whether PfP a) activates aggressive competitiveness and whether, by extension, b) PfP also manifests itself in the

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form of interpersonal deviance against colleagues at the workplace because of c) activated competitiveness in the work context. In doing so, we seek to make three contributions to the literature:

First, we deepen our understanding of how PfP can fuel interpersonal deviance amongst colleagues (Gläser et al., 2017) by exploring whether PfP activates not only comparison aspects of competitiveness (competing *with*), but also its aggressive and harmful facets (competing *against*). Thereby, we also add nuance to the literature about PfP, which is still primarily focused on the positive outcome effects of PfP on employee performance (e.g., Durham & Bartol, 2009; Gerhart & Fang, 2014; Gerhart et al., 2009; Locke, 2004) and has not properly considered how PfP can also influence counterproductive work behaviours such as interpersonal deviance (Robinson & Bennett, 1995). Furthermore, we contrast our approach with earlier research relating goal setting with unethical behaviour (Schweitzer et al., 2004). While studies on goal setting suggest that competitiveness can be a deliberate approach to cope with goal discrepancies or dissatisfaction (cf., Berry et al., 2007; Schweitzer et al., 2004), we focus instead on interpersonal deviance that results from the implicit activation of aggressive competitiveness. In doing so, we also contribute to ongoing research linking the incentive part of PfP with reduced cooperative behaviour (Burks et al., 2009; Lombardi et al., 2020). Notably, while other PfP research usually investigates questions of different PfP design features (e.g., individual vs. team bonuses, e.g., Barnes et al., 2011), we focus on the general presence of PfP cues in an organization.

Second, we add to the limited and disconnected research on competition and competitiveness in organizations (Ryckman et al., 1994; Swab & Johnson, 2019; To et al., 2020). Specifically, we show that PfP may spur aggressive competition with downstream effects such as deviant behaviour. So far, studies have established relationships between PfP and unhealthy comparisons (Larkin et al., 2012), or perceived threat and unethical behaviour (Kouchaki & Desai, 2015); however, this research stream has remained largely disconnected from competition within organizations (To et al., 2020).

Third, by combining research about the psychological effects of PfP (Gläser et al., 2017; Larkin et al., 2012) with research about implicit cognition (Bargh & Chartrand, 1999; Johnson & Steinman, 2009; Strack & Deutsch, 2004), we add to the sparse empirical examination into how organizational reward programmes shape employees' implicit cognition (see George, 2009; Reynolds et al., 2010, for exceptions). In this way, we contribute to a deeper understanding of how employee cognitions inform their perceptions of the workplace and shape the resulting behaviours. In our approach, we have taken care to develop an experimental setup suited to capturing the relevant implicit cognitive effects with a high internal validity, while also conducting field studies that establish the external validity with more complex real-world phenotypes of PfP.

PfP and competitive behaviour

A cornerstone of theorizing in personnel economics is that employees respond to incentives (Lazear, 2000, p. 1346). Thus, it comes as no surprise when surveys (Aon Hewitt, 2010) indicate that over 80% of companies use variable, performance-based pay plans, and more than 50% use some form of collective PfP plans (Nyberg et al., 2018). Such plans either permanently increase employee salaries in form of merit pay or, more often, they reward performance by paying out a financial bonus if individual employees, teams, or the organization as a whole meet previously established objectives or other performance criteria in a defined time period. These performance goals can be quantitative, specific (e.g., KPIs, key performance indicators) or rather non-specific and qualitative (e.g., behaviour change in a certain domain; for a detailed review and overview of different PfP designs, see, Gerhart et al., 2009). In contrast to traditional merit pay plans (where salary levels increase permanently), these variable (i.e., non-permanent) PfP bonus plans imply that employees and teams need to compete for the bonus in every period. This ongoing challenge explains the motivational force of PfP systems, especially for individual performance (Gerhart & Fang, 2014). However, it also implies an ongoing pressure to measure goal attainment and performance levels and push employees and teams to meet those standards.

From research on competition and social comparison, we know that comparison between individuals is stronger when one person compares themselves to someone who is more similar, personally closer, and when the task is important to self-perception (Festinger, 1954; Garcia et al., 2013). All of those criteria are present when comparing oneself to peers in their own team or another at the workplace. Importantly, simply feeling motivated to achieve relative superiority over another is sufficient to qualify as competition (To et al., 2020). Thus, a competitive response to PfP does not need to depend on a structural competition over limited resources (such as when an overall sum is divided up into bonuses), but might be a response to the ongoing comparison cues inspired by the PfP program, specifically for highly competitive individuals (Gläser et al., 2017). While competition may arise among individuals striving for a similar goal, our particular interest is in the added self-relevance of performance induced by PfP specifically, and its results on individual competitiveness.

Research on different types of PfP schemes has shown contradictory effects (see, Nyberg et al., 2018 for a meta-analysis). On the one hand, a study by Barnes et al. (2011) showed that, compared to participants in the group incentive condition, participants in the mixed incentive condition worked harder, but with more errors, concentrated more on their own tasks and showed less support behaviour for the team, suggesting beneficial effects of group incentives. On the other hand, some studies show a better effect for either individual or collective PfP schemes, and a recent economics-focused paper did not find differences in performance between individual- and group-level PfP (Bortolotti et al., 2016). In addition, McNabb and Whitfield (2007) found that any form of PfP has a better result than no PfP, while the study does not find differences between individual and team PfP. Given the inconsistency of these findings, the current study simply focuses on the mere presence vs. absence of PfP schemes as the underlying cue for competitiveness.

How individuals compete can take two forms – the first one being based on comparisons *with* others, i.e., enjoying the competition with others in sports or at work, and ultimately

gaining information about one's own level of performance in order to learn and improve (Brown et al., 1998; Fletcher et al., 2008; Helmreich & Spence, 1978). However, competing can also bring out the worst in people if it inspires them to turn *against* each other, i.e., trying to weaken the opponent by unfair means in order to improve one's own place in the competition (Garcia et al., 2013; G. J. Kilduff et al., 2016; Ryckman et al., 1994). It thus seems natural that PfP can inspire both positively connotated feelings of personal challenge, as well as negatively connotated feelings of threat, simultaneously and independently of each other, while both might be functional in the perceived competition (Landkammer & Sassenberg, 2016; To et al., 2020). While this seems common for individual performance bonuses, bonuses that are given for team or organizational performance can also lead to more interpersonal aggression. So far, this has been explained as a form of punishment, with team members trying to prevent others from free riding or social loafing (Beersma et al., 2003). We propose that aggressive behaviour against members of other teams might also have a functional appeal.

Notably, our focus is not about deliberate, conscious processes of active will control, but rather the competitive impulse of PfP (i.e., "if you achieve this, you will get that") that may also inform implicit associations around competitiveness. In contrast to effortful, elaborate reasoning, implicit processes are based on associative and unintentional processes that are relatively effortless (for reviews, see, Bargh & Chartrand, 1999; George, 2009; Haines & Sumner, 2013; Smith & DeCoster, 2000). Given the limited capacity of conscious (working-) memory, the human brain facilitates information processing by categorizing cues into certain knowledge structures, which are then situationally activated in order to interpret the behaviour(s) of others (cf., Bargh & Chartrand, 1999) and determine the most appropriate response. Importantly, automatic processes strongly impact cognition and behaviour in all situations of a certain context, while elaborate reasoning only concerns the specific situation. This effect becomes pronounced in ambiguous or poorly structured situations (Reynolds et al., 2010). Thus, if PfP evokes threat, and implicitly activates aggressive competitive thinking, then it increases the overall salience of aggressive competitiveness and the perception of situations as competitive, regardless of the actual reference point of the PfP system (individual, team, or organization performance). In line with Reynolds et al.'s (2010) analysis of moral decision making, we want to test whether PfP inspires implicit cognition, and specifically, the two facets of competitiveness (comparing and fighting/ defeating). This leads us to Hypothesis 1 a and b:

Hypothesis 1 (a and b): PfP increases the automatic activation of comparing facets (1a) and of aggressive facets (1b) of competitiveness.

PfP and aggressive behaviour in organizations

If PfP inspires not only comparing, but also aggressive associations of competitiveness, employees should subsequently interpret more situations in that regard and accordingly show behavioural preferences that might give them a competitive advantage. The first evidence for this suggestion comes from research suggesting that incentives lead to less cooperative behaviour (Burks et al., 2009) or knowledge-sharing among employees (Lombardi et al., 2020). In addition, goal setting (which is strongly related to PfP, see above) has been linked to unethical behaviour (Schweitzer et al., 2004): Participants of an experiment cheated more and overstated their performance when they were given a goal and were close to attaining it, thus showing behaviour that promised them an advantage over their peers. Schweitzer et al. (2004) hypothesized that the participants cheated in a deliberate decision to reduce the psychological costs of not reaching the goal.

Building on this research and a recent study relating PfP to interpersonal deviance (Gläser et al., 2017), we set out to explore the relationship between PfP, competitiveness and interpersonal deviance in more depth. We deviate from earlier studies by treating competitiveness as an implicitly activated psychological mechanism (one tied to the PfP setup), rather than as a conscious coping mechanism for possible underachievement. We posit that aggressive associations that follow PfP cues evoke higher levels of aggressive behaviour among colleagues – so-called interpersonal deviance.

Interpersonal deviance (Robinson & Bennett, 1995) is defined as voluntary, aggressive behaviour towards coworkers, which can consist of incivility, workplace bullying, violence, (sexual or ethnic) harassment, and other harming behaviours. As such, interpersonal deviance has significant negative consequences: not only for individuals in the form of increased stress, higher job withdrawal, and reduced psychological well-being and work satisfaction (Cortina et al., 2001), but also for the organization in the form of lower overall performance due to the strain on employees' cognitive, social, and emotional resources (Andersson & Pearson, 1999; Hershcovis & Barling, 2010). In fact, some estimates place the organizational cost of such deviant behaviour at more than $20 billion per year (Litzky et al., 2006). To our knowledge, only a few studies have investigated the potential effect of high-performance reward systems as antecedents of this specific type of counterproductive behaviour (e.g., Arthur, 2011; Shamsudin et al., 2014); even fewer have connected PfP and interpersonal deviance (Gläser et al., 2017). This lack of attention is surprising, given that Meyer (1975) already introduced the "The Pay-for-Performance Dilemma" where he argued that PfP (in the form of merit pay plans) might evoke competition, hostility, and negatively distorted perceptions among employees. To address this, we designed our experiment and field studies to investigate the mechanisms behind the relationship between PfP and interpersonal deviance. Formally, this leads us to a main effect hypothesis:

Hypothesis 2: PfP is positively correlated with higher levels of interpersonal deviance in organizations.

As argued above, PfP constantly confronts employees with the expectation and message that performance is measured and compared (J. M. Jensen et al., 2011) – and that the outcome of this evaluation and comparison process determines the

financial reward received (Gerhart et al., 1995). As introduced above, this constant confrontation – even if unintended by the organization or triggered by minor cues – activates automatic cognitive patterns of competition that heighten the salience of competitiveness. In turn, this heightened salience will influence employees' interpretation of any situation in the work context (cf., Reynolds et al., 2010) and will thus motivate them to perceive the need to compete in the work context. Ultimately, we argue that these partially automatic cognitive processes will lead to more unethical workplace behaviour. Thus, building on research by Mitchell et al. (2018), who contend that employees under performance pressure cheat more in an effort for self-protection, we argue that the reaction to such constant evaluation and comparison processes naturally extends to the social sphere, i.e., employees would turn against their colleagues under the competitive threat (Gläser et al., 2017). As reflected in the social comparison (Festinger, 1954) perspective on competition, people may become aggressive in order to defend their position against others (Garcia et al., 2013). Importantly, in social comparison, personal challenge and threat effects can be activated simultaneously (Landkammer & Sassenberg, 2016) and do not exclude each other (To et al., 2020). Nor, would we argue, do they occur in a distinct order or in connection with a specific fear of not attaining a goal. Thus, if PfP inspires comparing *and* fighting associations of competitiveness, both in an automatic and a deliberate way (as suggested in H1), more aggressive behaviour against co-workers should be the behavioural outcome of PfP systems. Hence, we hypothesize:

Hypothesis 3: Competitiveness will mediate the relationship between Pay-for-Performance (PfP) and interpersonal deviance in organizations.

The present research

Our research involves three studies that complement each other, where each provides evidence for crucial parts of our overall model. Through our set of studies, we combine empirical research that helps establish the relationship between PfP and the activation of implicit cognitive patterns of competitiveness (Study 1), as well as ecological validity through field data and evidence for the explicit expression of competitiveness (Studies 2 and 3). The purpose of the first, experimental study was to test if and how PfP will affect implicit cognitive processes, and by that, establish causality for the implicit elements of our hypotheses. Specifically, we investigated whether PfP activates not only comparing (*Hypothesis 1a*), but also fighting/defeating aspects of competitiveness (*Hypothesis 1b*). We did this by developing an implicit word completion task in which we experimentally manipulated PfP in order to measure whether participants with PfP make more comparing and aggressive/fighting associations. In the second study, we extended our model and tested our hypothesis in a multi-source cross-sectional survey by examining whether employees in a PfP system show more interpersonal deviance (*Hypothesis 2*). Specifically, we measured PfP for focal employees and matched those with co-worker ratings of interpersonal deviance. In the third study, we established the mediating effect of competitiveness (i.e., perceiving the self as competitive) in the relationship between PfP and interpersonal deviance (*Hypothesis 3*). This study integrates the implicit effect established in Study 1, as well as the direct effect established in Study 2, by showing relationships among PfP, competitiveness and interpersonal deviance. In addition, the third study used a sample of working adults from the finance industry, which is widely recognized for its PfP implementation and collaterals (Senate of the United States, 2011).

Study 1

In Study 1, we tested the hypothesis that PfP implicitly induces not only comparison behaviours, but also the aggressive/fighting facets of competitiveness. In order to tap automatic, cognitive processes, we used an implicit measure that could avoid triggering deliberate, and perhaps biased, responses (Uhlmann et al., 2012). Specifically, we asked participants to fill out a word completion task. Word completion tasks are increasingly administered in organizational behaviour research to measure person-based phenomena that are difficult to access by means of self-report (Johnson & Steinman, 2009). If carefully developed, these word completion tasks allow for valid and reliable tests of individual mental processes (Kay et al., 2004; Koopman et al., 2013).

In a word completion task, participants can complete word fragments with either neutral or target words. However, participants for whom the focal construct is highly cognitively salient should be more likely to create words that reflect the target construct when confronted with a word fragment (Koopman et al., 2013). In our case, based on our hypothesis that PfP triggers an aggressive, competitive mental framework, we would expect that participants in a word completion task will offer more comparing and fighting words when they are in a PfP condition.

We implemented the word completion task in an online survey, as there are several advantages to using computer-administered word completion tasks (e.g., being able to set automatic time limits per word fragment, which is important for preventing participants from deliberate thinking). To be successful, word completion tasks need to be carefully developed and pre-tested. Following the approach of Koopman et al. (2013), we conducted three pilot studies, whose details are described in Appendix A.

The first pilot study (N = 19, 58% female, M_{age} = 32.0) specifically tested whether a first list of potential target words reflected the target constructs "comparing competitiveness" or "fighting competitiveness" without too strongly activating other constructs. After pilot study 1, we selected 15 target words (winner, lose, game, competitive, compare, better, best, compete, contest, victory, rival, fight, kill, clash, battle). For these target words, we developed word fragments that could also be completed by alternative (i.e., non-comparing/non-fighting) words. Examples include "win_ _ _" (target: "winner"; alternative: "winter") or "_ _ctory" (target: "victory"; alternative: "factory").

Subsequently, these different fragments were compared in another set of pilot studies (sample 2a: N = 51, 55% female, M_{age} = 32.1, SD_{age} = 10.4; sample 2b: N = 51, 55% male, M_{age} = 28.9, SD_{age} = 8.0) to find out which fragment would work best

in terms of variance and difficulty. Furthermore, in these pilot studies we tested our final setup for the actual experiment, including time-limit per word, language proficiency cut-off, and presentation in random order with neutral filler words. For pilot studies 2a and 2b, we wanted the conditions for the pilot testing to largely match those for the main study. Thus, we derived our samples from the same source – namely, the panel provider Prolific. Prolific is an online-based service for recruiting participants for scientific surveys. We chose this platform because it features a high percentage of native English speakers (Woods et al., 2015) and effectively allowed us to prevent pilot study participants from returning for the main study.

In the end, 11 fragments demonstrated enough variance and difficulty to be used for the final instrument. These included seven comparing-competitive words (winner, lose, competitive, best, compete, contest, victory), and four fighting-competitive words (fight, kill, clash, battle). As in the pilot studies, the main study utilized five neutral filler words (hotel, enter, paper, fence, rice) for a total of 16 words. As stated before, the detailed approach to the pilot studies can be found in Appendix A.

Main experiment

In the main experiment for Study 1, we manipulated whether participants received just the base compensation for taking the survey (control condition), or the base salary plus a pay-for-performance bonus.

Method

Participants

As indicated, we used Prolific Academic to recruit participants, ensuring that those who partook in the pilot studies were unable to participate in the main study. All participants completed the task voluntarily in return for a small reward. To ensure data quality, we used an instructional manipulation check (IMC) to identify and screen out participants who did not carefully read the items (Oppenheimer et al., 2009). Three participants were screened out due to incorrect answers, while 115 participants passed the IMC and finished the experiment. We excluded another 11 participants who did not meet our strict language proficiency criteria. Lastly, after the word completion task, we asked all participants if they had used any help (e.g., from other people, software, etc.) while doing the task. All participants indicated that they did not use any assistance and could thus remain in the sample. In the end, 104 participants were included in the analysis. The average age was 31.4 years (SD = 10.8) and 51.9% of the participants were male.

Design and procedure

The participants were randomly assigned to a single-factor (control vs. PfP) between-subjects design. After answering demographic questions, including their language proficiency, participants read instructions for the word completion task that featured a graphical example. This was followed by a trial section of two word fragments. In addition, we gave clear instructions that participants could not go back in the survey, could not pause nor repeat the task once started, and should enter the first word that comes to mind without deliberately searching for a word. The pilot studies indicated that a maximum time frame of 8 seconds per word fragment was enough time for participants to enter the words, while also keeping them from using other means (Internet, dictionary, etc.) to find possible words. We made one exception for the word "competitive": Here, we set the display time to 12 seconds due to the greater amount of letters (i.e., 11) relative to the other target words (i.e., four to eight letters). After the allotted time, the screen automatically switched to the next word. After participants completed the two trial runs, they saw their results and were once again reminded to only start the actual task when they could perform it without interruptions.

For the main study, the survey software recorded participants' inputs as they completed the 16 word fragments, which were displayed in random order. After seeing a results screen with their answers, participants answered filler and control questions. After that, participants were thanked, debriefed, and redirected to the Prolific Academic homepage. The performance bonuses were paid out after the data collection process.

Experimental manipulation

The PfP manipulation was included on the screen that directly preceded the actual word completion task. Participants in both the control and PfP groups received the primary task of creating correct English words for the presented fragments, along with further instructions (to complete the survey in one go, etc.; see above). Participants in the PfP condition also read that they would gain a bonus of 1.00 GBP on top of the regular 1.30 GBP participation fee (which would be paid out after data collection was complete) if they were able to find the correct completion words for 12 (or more) of the 16 fragments.

Coding

To code the participants' results, we pre-programmed an automatic coding syntax in SPSS, which we then manually checked to ensure correct coding.[1] We decided to code the results in a conservative way, excluding words with spelling or typing errors. The one exception was the target word "competitive" (and its non-target alternative, "cooperative"; see above), for which we counted responses with minor spelling mistakes when the intended word was clear (Koopman et al., 2013).

Measures

Comparison competitiveness activation. We measured the number of correct comparison-competitiveness target words as a measure of a participant's comparison-competitive activation.

Fighting competitiveness activation. We measured the number of correct fighting-competitiveness target words as a measure of a participant's fighting-competitive activation.

Results

Test of hypotheses

To test the effect of PfP on the comparing- and fighting-competitive concept activation predicted in Hypothesis 1 a and b, we conducted a MANOVA. This allowed us to test the effect on both types of competitiveness simultaneously and account for the interrelatedness of the dependent variables. Moreover, as our sample was relatively small, we calculated bootstrapped confidence intervals for the pairwise contrasts, based on 5,000

bootstraps. The results showed a significant effect of PfP condition on competitiveness, Pillai's trace = 0.08, F (2, 102) = 4.47, p = .014, ηp^2 = .08. Subsequent univariate tests showed that the difference between the control condition and the PfP condition on comparing-competitiveness was not significant, F (1, 103) = 2.84, p = .095, ηp^2 = .03. Thus, Hypothesis 1a was not confirmed. However, the difference for fighting-competitiveness activation score was significant, F (1, 103) = 4.67, p = .012, ηp^2 = .06. Bootstrapped pairwise contrasts for the effect of condition on fighting competitiveness revealed that the effect for the control group (M = 1.06, SD = 0.81, N = 51) was smaller (B = −.42, SE = 0.17, p = .014, Bootstrapped 95% CI −0.75 to −0.10) than for the PfP group (M = 1.48, SD = 0.88, N = 53). Thus, Hypothesis 1b was confirmed.

Discussion

In confirming Hypothesis 1b, Study 1 showed that experimentally manipulated PfP induced implicit fighting-competitive concept activation in participants, while the effect was not as pronounced for the comparing-competitive aspects (Hypothesis 1a). This confirms our hypothesis that PfP has an effect on individual cognition beyond individuals' deliberation or awareness. Participants who received a PfP bonus had more fighting associations, which could affect later interpretation and decision-making in ambiguous situations. The artificial setting of the experiment, coupled with participants' possible awareness of the study's goal, may be perceived as limitations to Study 1. However, the point of an implicit test like the word completion task in Study 1 is that it can detect concept activation even without the participant's conscious awareness (cf., Koopman et al., 2013). Thus, we did not check for participants' awareness of the experimental goals. Future research could include a funnelled debriefing to check for suspicions.

To test whether aggressive competitiveness also manifests in actual interpersonal deviance against colleagues at real workplaces, we conducted two field studies to conceptually replicate the findings from the implicit measure experiment in the context of actual organizations. Specifically, if PfP activates implicit networks of competitiveness and aggression, employees in a PfP system should show more interpersonal deviance towards their colleagues.

Study 2

Study 2 tested the hypothesis that PfP would be positively related to interpersonal deviance. This cross-sectional field study used a self-assessment of PfP as the independent variable, and a co-worker rating of interpersonal deviance as the dependent variable.

Method

Sample and procedures

We invited members of a German research panel who worked full-time or part-time. Participants filled out an online questionnaire and were asked to forward an invitation to a co-worker; the invitation contained a link to the online survey and a unique identification number, so that the focal employee and co-worker ratings could be matched afterwards (for a similar approach see, e.g., Moore et al., 2012). All respondents were assured that their responses would remain confidential and would only be used for research purposes. After matching the focal and co-worker surveys, a total of 94 dyads remained for analysis.

We took a number of steps to bolster data quality. In the sections before and after the survey questions, we emphasized the importance of integrity for the research process. In this vein, we ended the survey with a question asking participants to indicate whether or not they completed the questionnaire correctly and if their data could be used for scientific research. Additionally, we used an instructional manipulation check (IMC) to identify and automatically screen out participants who did not read all questions properly (Oppenheimer et al., 2009). We removed those participants who failed to pass the IMC, as well as those who indicated that their data should not be used for our research. In the matched dataset of completed questionnaires, this process only led to the removal of one dyad.

In our sample, the average participant was 39.5 years old (SD = 10.59). Fifty-four percent of the focal employees were female. Eighty percent of focal employees worked full time and 20% worked part time. The focal employees had 10 years of tenure on average (SD = 9.87). The average co-working tenure of the focal employee and co-worker was five years (SD = 5.18). Participants worked for different kinds of organizations: 12% worked in public services/ administration, 11% in NGOs/ social institutions, 8% in business consulting, 7% in universities/ research facilities, 7% in tourism/ hotels/ hospitality, and 55% in other industries.

Measures

In order to keep the intent of our research opaque, we measured participants' *Pay-for-Performance Bonus* (PfP) using a set of items that were presented in a list containing other demographic variables (Gläser et al., 2017). Participants were asked if they received an annual, performance-contingent, and variable bonus payment on top of their regular, fixed salary. In order to obtain more information about the PfP design, we also asked about the PfP bonus size compared to the fixed salary. Granted, there is immense variety in organizations' PfP plans (Gerhart et al., 2009; Park & Sturman, 2016). PfP includes individual-, team-, or organization-based pay schemes, often used simultaneously and in different percentages (Gläser et al., 2017). Employees can receive PfP in the form of merit pay or as lump sum bonus payments, and those can be paid as financial bonuses or other tangible rewards. Most organizations use several forms of PfP simultaneously (Park & Sturman, 2016). To assess our proposed effect on aggressive behaviour, and to make research questions comparable across field and experimental settings, we decided to use a dichotomous PfP bonus variable: a financial bonus that is paid if employees (participants) reach certain targets over a defined period of time.

Interpersonal deviance was reported by the co-worker of each focal employee. To gather this data, we used Bennett and Robinson's (2000) original seven-item subscale for interpersonal deviance and rephrased it for other-report. Example items are "How often has your colleague within the last year acted rudely toward someone at work" or "How often

has your colleague within the last year publicly embarrassed someone at work" (1 = "never" to 7 = "very often"). All scales were carefully translated to and administered in German.

Controls

Following Bernerth and Aguinis (2016), we considered several control variables for our study: While age and tenure are negatively correlated with interpersonal deviance, men show higher levels of interpersonal deviance (Berry et al., 2007). In addition, the size of the financial bonus might have an impact, as higher bonuses have a stronger relevance for the individual. However, testing the model with demographic control variables, organizational tenure, or the bonus size did not alter the results.

Results

Table 1 displays the means, standard deviations, Cronbach's alphas and correlations between all variables.

Forty-three participants reported receiving PfP payments, while the remaining 50 participants did not. Analysing the data as a quasi-experiment, we compared those two groups in terms of their deviance score. Before doing so, we observed that there were no correlations between the PfP variable and the demographic variables of age, tenure, and education – however, there was a correlation between gender and PfP. Thus, we established that the two groups were demographically similar, with the exception of there being more men receiving PfP payments. Using age, education, gender, tenure, and bonus size as covariates did not affect the effect of the dichotomous PfP bonus variable on interpersonal deviance, F (1, 86) = 6.080, p = .016. None of the covariates had an effect on interpersonal deviance.

Testing hypothesis 2 showed that participants who received PfP payments had an average interpersonal deviance score of 1.73 (SD = 0.82), while participants without PfP had an interpersonal deviance score of 1.36 (SD = 0.39). Levene's test for equality of variances was found to be violated for the present analysis, F(1, 91) = 12.06, p < .01. There was a significant difference of −0.37 (SE = 0.14, *95% CI* −0.64 to −0.09) in the interpersonal deviance score between control group and PfP group, F_{Welch} (1, 58.43) = 7.26, p = .009, d = −0.57. Therefore, Hypothesis 2 was confirmed.

Discussion

Study 2 confirmed our hypothesis that PfP is positively related to interpersonal deviance in organizations: Co-Workers indicated that focal employees who received a PfP bonus as part of their salary showed more interpersonal deviance over the last 12 months. Thus, we replicated earlier findings that PfP can lead to interpersonal deviance (Gläser et al., 2017). We also extended the findings of Study 1 to show that PfP not only evokes the psychological effects of competitiveness, but may also galvanize interpersonally deviant behaviour. However, we did not measure participants' competitiveness in this study. To investigate whether competitiveness is the mediating process between PfP and interpersonal deviance, we conducted another field study (Study 3). Furthermore, Study 3 collected more information about participants' PfP setup; however, for the sake of comparability, and to stay in line with our theoretical argument, we still used a dichotomous PfP variable (see below).

Study 3

In Study 3, we aimed to test the full model of PfP, competitiveness, and interpersonal deviance. We used a sample of working adults from the finance sector so as to test our hypothesis in an environment that is known for both PfP implementation and collaterals (Senate of the United States, 2011).

Method

Sample and procedures

We tested our hypotheses in a field setting using a sample of employees from different financial sector organizations in Germany. Through GMI, a German commercial online panel provider, we invited a panel of people who were working either full- or part-time in the finance industry. We asked additional questions (e.g., organizational tenure) in order to ensure that participants were actually employed in organizations. The respondents voluntarily participated in the survey in return for a small reward within the panel system, which they could later use to purchase goods. As in Study 2, we used an instructional manipulation check (IMC) to identify and automatically screen out participants who did not read all questions properly (Oppenheimer et al., 2009). Seventy-eight participants were screened out due to incorrect answers, while 289 participants passed the IMC and finished the survey. Of these, one participant was excluded because the company/ sector he indicated was clearly not related to finance. Another two participants were removed from the sample because they solely entered non-words into all of the survey's free text boxes. In the end, the analysis encompassed 286 participants. Of these participants, 44% worked in a bank, 42% in the insurance sector, and 14% for other financial service providers. The average age

Table 1. Means, standard deviations, Cronbach's Alpha and correlations of all variables, Study 2.

		M	*SD*	1.	2.	3.	4.	5.	6.
1.	PfP	0.46	0.50						
2.	Interpersonal deviance	1.53	0.65	.28**	(.80)				
3.	PfP size[A]	2.81	1.70	.33*	−.04				
4.	Tenure	10.04	9.87	.06	−.02	.07			
5.	Age	39.48	10.59	.11	−.04	.33*	.57**		
6.	Education	6.22	1.40	.09	.17	.17	−.13	−.05	
7.	Gender	1.46	0.50	.31**	.11	.09	.20	.29**	.09

N = 93. [A] N_{Bonus} = 47. PfP Size: 1 = 1–5%, 2 = 5–10%, 3 = 10–20%, 4 = 20–30% of fixed salary. Cronbach's Alphas are presented between brackets on the main diagonal where applicable; PfP: 1 = no, 2 = yes; Gender: 1 = female, 2 = male; ** p < .01; * p < .05

in our sample was 44.6 years (*SD* = 10.43) and 50.3% of the participants were male. Participants worked for an average of 35.7 hours per week (defined in their contracts).

Measures. We measured participants' *PfP Bonus* using a set of items that were presented in a list containing other demographic variables, as described in Study 2 (Gläser et al., 2017). Participants were asked if they received an annual, performance-contingent, and variable bonus payment on top of a regular, fixed salary. As in Studies 1 and 2, we used a dichotomous PfP variable as the independent variable in our calculations.

Competitiveness was measured with the five-item scale of individual competitiveness (Brown et al., 1998; Fletcher et al., 2008; Helmreich & Spence, 1978). Example items include "I enjoy working in situations involving competition with others" and "It is important to me to perform better than others on a task". All responses were given on 7-point Likert scales (1 = "completely disagree", 7 = "completely agree").

Interpersonal deviance was measured with Bennett and Robinson's (2000) seven-item scale for interpersonal deviance. Example items include "How often have you within the last year acted rudely toward someone at work?" or "How often have you within the last year publicly embarrassed someone at work?" (1 = "never" to 7 = "always").

Controls. Although gender was correlated with competitiveness and PfP bonus, entering the demographic control variables, tenure, or PfP bonus size in the model did not alter the shape of the mediation effect.[2] Table 2 displays the bivariate correlations among all constructs and other variables.

In order to better understand the composition of PfP designs for each of the participants, we asked them to indicate the extent to which their bonuses were individual-, team-, or organization-based. As can be observed in Appendix B, the combinations of the different PfP designs (individual, team, or organizational bonuses and the various combinations of these) are too manifold to treat them as individual orthogonal constructs in our research design. Thus, we did not analyse the data based on these designs, but rather used the dichotomous measure presented in Study 2.

Results

Table 2 displays the means, standard deviations, Cronbach's alphas, and correlations between all constructs. Participants who received PfP payments had an average competitiveness score of 4.28 (*SD* = 1.06) and an interpersonal deviance score of 1.68 (*SD* = 0.58), while participants without PfP had a competitive score of 3.98 (*SD* = 1.17) and an interpersonal deviance score of 1.66 (*SD* = 0.60).

The highest intercorrelation of our main variables was *r* = .14 between competitiveness and interpersonal deviance. In addition, a confirmatory factor analysis demonstrated that the measured constructs were sufficiently distinct, and that a three-factor model (PfP bonus, competitiveness, and interpersonal deviance) fit the data reasonably well χ^2 = 121.731 (*df* = 63), *p* < .01, CFI = .961, RMSEA = .061 (*95% CI* 0.045 to 0.077).

We then tested Hypothesis 2 by regressing interpersonal deviance on the dichotomous score for PfP. Contrary to the results of Study 2, this analysis uncovered no evidence that PfP influenced interpersonal deviance independent of its intermediary effect on individual competitiveness (*b* = −0.01, *SE* = 0.07, *p* = .9109).

A mediation analysis using ordinary least squares regression showed that participants receiving PfP payments as part of their salary described themselves as more competitive (*b* = .30, *SE* = .13, *p* = .0274). Further, participants who reported more competitiveness showed more interpersonal deviance (*b* = .07, *SE* = .03, *p* = .0203). Overall, PfP indirectly influenced interpersonal deviance through its effect on competitiveness. Using bias-corrected bootstrapping procedures with 5,000 bootstrap samples (Hayes, 2013), we found the confidence interval for the indirect effect to be above zero (*b* = .02, *SE* = .01, *95% CI* 0.002 to 0.061), confirming Hypothesis 3. The model coefficients for the mediation analysis are displayed in Table 3.

Supplementary analyses

We conducted supplementary post-hoc analyses by comparing employees with different PfP systems. These analyses contrast one condition pairing all participants with any form of individual PfP structure to participants with only team or organizational PfP or combinations of the two. The comparisons did not yield any significant results for interpersonal deviance (M_{ind} = 1.63, SD_{ind} = .48, M_{coll} = 1.69, SD_{coll} = .61; t(124) = −0.48, p = .64), nor for perceived competitiveness (M_{ind} = 4.18, SD_{ind} = .99, M_{coll} = 4.32, SD_{coll} = 1.09; t(124) = −0.72, p = .47). Notably, group sizes are very uneven in this case. Nonetheless, these findings support our theoretical idea that the difference in effect is contingent on the presence vs. absence of PfP, rather than the different types of PfP per se.

Table 2. Means, standard deviations, Cronbach's Alpha and correlations of all variables, Study 3.

		M	*SD*	1.	2.	3.	4.	5.	6.	7.
1.	PfP	1.50	0.50							
2.	Competitiveness	4.11	1.14	.11†	(.83)					
3.	Interpersonal deviance	1.67	0.59	.05	.14*	(.78)				
4.	PfP size (%)[A]	30.4	47.85	n/a	.05	−.05				
5.	Tenure	14.77	10.95	.03	−.08	−.04	−.12			
6.	Age	44.58	10.43	.06	−.01	−.11†	.12	.53**		
7.	Education	4.18	1.26	.10	.07	.04	.08	−.12*	.11†	
8.	Gender	1.50	0.50	.17**	.14*	.02	.16†	.08	.18**	.32**

N = 286; [A] N_{Bonus} = 126. PfP size: % of fixed annual salary. Cronbach's Alphas are presented between brackets on the main diagonal where applicable; PfP: 1 = no, 2 = yes; Gender: 1 = female, 2 = male; ** *p* < .01; * *p* < .05; † *p* < .10

Table 3. Model coefficients for Study 3,.

	Competitiveness			Interpersonal Deviance		
	b	*SE*	*p*	*b*	*SE*	*p*
PfP	0.298	0.134	.0274	−0.008	0.070	.9101
Competitiveness	-	-	-	0.072	0.031	.0203
Constant	3.683	0.205	.0000	1.385	0.156	.0000
	$R^2 = 0.017$ F (1, 284) = 4.917, p = .0274			$R^2 = 0.019$ F (2, 283) = 2.743, p = .066		
Indirect effect from PfP on interpersonal deviance, via competitiveness	Coeff. 0.021		*SE* 0.014	*95% CI* *(0.002, 0.061)*		

N = 286. Table presents unstandardized regression coefficients

Discussion

Confirming Hypothesis 3, competitiveness accounted for the effect of PfP on interpersonal deviance. Importantly, the original conceptualization that we used (Helmreich & Spence, 1978; see, also Brown et al., 1998) describes a preference for and interpretation of competition that focuses more on comparison than on fighting. However, by measuring subsequent aggressive behaviour (interpersonal deviance), we can infer that the competitiveness entailed aggressive aspects. Notably, our supplementary analyses did not show differences between participants with an individual bonus vis-a-vis those with a team or organizational bonus, supporting our theoretical focus on the presence versus absence of PfP as the driver of the effect. Lastly, and contrary to Study 2, we could not replicate the direct effect of PfP on interpersonal deviance in this study.

General discussion

We conducted three complementary studies focusing on the relationship between PfP and cognitive frameworks related to competitiveness. We found that PfP created more implicit cognitions of aggressive aspects of competitiveness (Study 1), that PfP was positively related to interpersonal deviance in organizations (Study 2), and that the effect of PfP on interpersonal deviance was mediated by competitiveness (Study 3). By measuring aggressive competitiveness via an implicit word completion measure (Study 1) and an explicit self-perception measure (Study 3), we demonstrate that PfP has an effect on implicit cognition, and also influences perceptions of the self in the work environment. To our knowledge, this study is the first to use an implicit measure to investigate the consequences of PfP on implicit cognition. Thus, our study additionally answers calls to use more implicit measurements in OB research to complement traditional survey measures, which can fall victim to deliberate or socially desirable answer choices (Uhlmann et al., 2012).

Furthermore, through our set of studies, we are able to contribute to earlier studies showing that increased competitiveness is a psychological mechanism that generally links competition and unethical behaviour (Kouchaki & Desai, 2015; To et al., 2020). We extend this stream by elucidating the relationship between PfP and undesirable outcomes like interpersonal deviance (Gläser et al., 2017). Aside from extending the work of Gläser et al. (2017), we were also able to show that PfP relates to the cognitive activation of aggressive, *fighting/ defeating aspects* of competitiveness, which might be the mediating link between PfP and interpersonal deviance. In this way, our studies counter and extend the existing PfP literature by suggesting that the competitiveness triggered by PfP contains aggressive elements that go beyond the motivational aspects (e.g., Gerhart & Fang, 2014). Moreover, we show that the negative effects of PfP might not only encompass momentary choices for negative behaviour, but a substantial cognitive reappraisal of the situation and the appropriate behaviour in response to it.

Theoretical implications

Our findings provide several implications for research on PfP. First, we investigated a possible psychological mechanism behind the negative effects of PfP: namely, the cognitive activation of competitiveness' aggressive facets. Thereby, we support the hypothesis that PfP triggers not only individuals' motivation to compare and compete *with* others, but also an aggressive, hostile tendency to fight *against* others. Aggressive competitiveness in itself is an under-researched phenomenon in psychological/ organizational research: Only a few studies have tried to measure the effects of a competitive work atmosphere or individual competitiveness (Brown et al., 1998; Fletcher et al., 2008). In this vein, our study supports a social-psychological perspective on the effects of competition and competitiveness (e.g., Garcia et al., 2013; Jones et al., 2017). This perspective complements the traditional economic idea that individuals are rational utility maximizers who will be motivated to increase their performance in the face of internal competition (e.g., Connelly et al., 2013; DeVaro, 2006; Lazear & Rosen, 1981). Moreover, we help illuminate the underlying implicit mechanisms that may hint at the activation of aggressive competition per se, even outside of conscious deliberation or regulation of goal achievement (cf., Schweitzer et al., 2004).

Our research also investigated competitiveness as a mediator of PfP and interpersonal deviance. In this way, we corroborated the perspective that competition is a potentially problematic quality for organizations (Garcia et al., 2013; G. J. Kilduff et al., 2016), as it gives rise to aggressive cognitions that may even exist alongside positive cooperative motives (G. Kilduff et al., 2010; Landkammer & Sassenberg, 2016; To et al., 2020). As we show in our studies, aggressive competition, or even the idea of competition, can be one of the cognitive links leading to aggressive behaviour against co-workers. Indeed, competition has been criticized as a "number one obsession"

(Kohn, 1992) that permeates society and organizational cultures. Other research has shown that employees are only highly engaged in competitive work environments when their own competitive nature matches that of the organization (Brown et al., 1998; Jones et al., 2017). By showing that competitiveness can be induced by organizational variables and lead to interpersonal deviance, our findings extend the discussion about the interpretation and consequences of workplace competition (Garcia et al., 2013).

Related to the above, our research also explores a widely ignored topic: the potential "dark sides" of paying employees for performance (Burks et al., 2009; Gläser et al., 2017). Usually, PfP is considered a useful tool for increasing individual and organizational performance (e.g., Gerhart & Fang, 2014; Shaw & Gupta, 2015), that, as a real-world phenomenon, may be closely related to goal setting. However, our investigation into the collateral context of performance increases offers a more complete picture of PfP in organizations. Building on findings that PfP might impair pro-social and cooperative behaviour, we discovered that the over-aggressiveness promoted by PfP is indeed represented in a higher level of aggressive behaviour towards co-workers. Furthermore, our implicit measure in Study 1 revealed that parts of these effects might occur before conscious awareness, thereby substantiating a cognitive view on human behaviour in organizations. We can thus conclude that PfP might affect human perception, interpretation, and behaviour in a way that has not yet been accounted for.

Finally, we add to the literature about interpersonal deviance in organizations. Rarely have researchers investigated specific structural organizational variables like PfP in order to understand interpersonal deviance (usually focusing instead on general situational or interpersonal factors – e.g., Martinko et al., 2002; Spector et al., 2006). Our research highlights that so-called high-performance work systems, like the design of compensation systems, can affect interpersonal deviance. Furthermore, our studies contribute to a nascent cognitive perspective in the deviance literature. Thus far, interpersonal deviance – and more generally, counterproductive work behaviours – have been considered largely volitional, i.e., supposing an underlying will and conscious decision to actively harm others (Bennett & Robinson, 2000; Spector et al., 2006). However, our results suggest that parts of deviant behaviour might also be based on automatic reactions to triggering stimuli.

Practical implications

Our research has several managerial implications. First of all, our results show that employees can perceive PfP as an aggressive-competitive stimulus. Competition can lead to severe individual, and even psychopathological, consequences (Gilbert et al., 2009). Aggressive behaviour is likely to lead to impaired knowledge transfer and more conflict within and between teams (Deutsch, 1949). Eventually, workplace aggression can lead to increased turnover (Hershcovis & Barling, 2010). For those who preside over compensation policies, this means that PfP – and the internal competition or competitiveness it compels – should be considered with increased scrutiny. Our research shows that PfP is a potential source for perceived competitiveness, i.e., employees might perceive a competitive situation even if the PfP system does not entail employees or teams competing for a limited number of bonuses. A few famous companies (e.g., Adobe, PwC, Accenture) have begun abandoning annual performance reviews and compensation talks (Cappelli & Tavis, 2016), but it remains to be seen whether this is feasible for the 80% of companies that still use variable pay designs (Aon Hewitt, 2010). However, as we cannot derive implications for the harmfulness of specific elements of PfP (e.g., individual or zero-sum PfP more than team PfP; see the discussion of limitations, below), we call for future research to disentangle the effects of specific PfP plans.

Obviously, the more embedded PfP is in an organizational culture, the more problems it may cause. The finance sector provides a poignant example: It is perhaps the most accustomed to PfP systems, and fittingly, it features the most apparent examples of a high-risk PfP and bonus culture producing negative consequences (e.g., Morgenson & Story, 2011; Senate of the United States, 2011). Our second field study, which featured employees from the financial services industry, indicates that PfP might be one factor that leads to more competitiveness, and by extension, interpersonal deviance against co-workers. This finding supplements research by Cohn and colleagues who showed that the prevailing business culture in the finance industry seems to undermine honesty norms (Cohn et al., 2014). Importantly, however, the fact that we replicated our findings with general population samples in Study 1 and 2 suggests that the associations between PfP and aggressive competitiveness are not limited to the finance sector in itself. In this vein, our research could add to the conversation about how to use incentives for employee motivation without inspiring collateral damages.

Strengths, limitations, and future directions

We designed our studies to build upon each other, and at the same time compensate for the others' limitations. For example, the experimental setup of Study 1 helped to establish causality for the effect of PfP on implicit activation of competitiveness, while the field Studies 2 and 3 lend external validity to our results and establish the relationships between PfP, interpersonal deviance, and the mediation by competitiveness. We also consider the carefully designed and pre-tested word completion task in Study 1 to be a strength of our paper. We closely followed recommendations on designing such implicit tests (Koopman et al., 2013) and created a rather unique design for researching PfP. As a result, we were able to experimentally confirm our hypothesis in a way that bypassed participants' social desirability bias or even conscious awareness. Furthermore, while Study 3 related PfP to interpersonal deviance in a single-source setting, Study 2 used co-worker ratings of interpersonal deviance.

Of course, like any research, our set of studies comes with some limitations. First, because our goal was to investigate a cognitive effect of the sheer presence of PfP cues on employees' mindset, our studies applied a simplified, dichotomous measure of PfP, in line with previous research in this domain (Gläser et al., 2017). Research comparing individual with team bonuses or different versions of collective bonuses come to different conclusions about the effectiveness: While Barnes et al. (2011) suggest increased social motivation driving

positive effects of collective PfP on performance, others have discussed the opposite effect, suggesting that collective PfP motivates social loafing (Beersma et al., 2003). The cognitive effect we propose would happen irrespective of the manifold and specific design features of PfP programs. Disentangling the effects of the different types of collective PfP is challenging, as studies show a large heterogeneity in types of PfP, including gain sharing, stock options, purely collective vs. hybrid compositions, etc. (Nyberg et al., 2018), suggesting that there might not be one type of collective PfP that we could identify in our study. The manifold combination of PfP design elements in our sample of Study 3 (see Appendix B) displays this heterogeneity well. Due to our design, we cannot distinguish the type of collective PfP, employee participation, or the relative weight of individual vs. collective PfP, whether for those with an organizational bonus only or those who have organizational bonuses paired with other types of PfP. In addition, we cannot distinguish those factors for participants receiving team-based, mixed, or hybrid PfP. Despite the fact that there do not seem to be differences between those with collective PfP vs. other types of PfP in the post-hoc analyses, we believe the lack of differentiation may be a limitation for both the theoretical and practical implications of our research. In future studies, should the sample sizes allow it, researchers may want to incorporate more differentiation in the PfP designs (e.g., team vs. individual vs. hybrid bonuses; Pearsall et al., 2010) to tease out more of the potential differences.

In addition, our simplified PfP design did not allow us to conceptually differentiate between the effects of goal setting and the isolated effect of PfP above and beyond the goal setting elements – as PfP necessarily and by definition entails goals and performance indicators. Aligning PfP and goals may have bolstered the study's external validity, albeit at the cost of some internal validity. While experiments are always abstractions of a real-world phenomenon, we consider this a limitation to our study.

Furthermore, we did not replicate the main effect of PfP on interpersonal deviance in Study 3. It might be that the more homogeneous sample in Study 3 did not provide enough variation, which would make it harder to find significant main effects. This might be exacerbated by the fact that interpersonal deviance is a rarely occurring, low base rate phenomenon, as can be seen in our field studies as well as in other field studies that measure the construct (e.g., Ferguson & Barry, 2011). In Study 2, the data collection method (using co-workers of the focus person) might furthermore explain the rather low absolute value for interpersonal deviance, as the focus persons might have forwarded the survey link to colleagues they have a good relationship with. We see the theoretical contribution of our research less in the main effect of PfP, but in the dynamic with competitiveness and its different facets. Despite smaller samples and effect sizes in Study 1 and 2, the conceptual replication of the effect across three different studies with different methodological approaches speaks for the robustness of the effect. For a new experimental design such as the one used for Study 1, it was hard to pre-estimate effect sizes and power, even after pilot testing. Therefore, we suggest that the results presented here should be taken as a starting point and possibly replicated with larger samples.

In the present research, implicit associations of aggressive competitiveness were more pronounced than comparing aspects. While our design does not allow us to establish the potential order of occurrence, or the relative strength of these associations, other studies have already argued for the possible co-occurrence of different cognitive associations of competition (Landkammer & Sassenberg, 2016; To et al., 2020). Furthermore, scholars have criticized the assessment of mediation through cross-sectional designs (Götz et al., 2021; MacKinnon et al., 2007) and suggested longitudinal designs as a replacement. However, this study investigated cognitive mechanisms that should be cognitively salient at the same time, or activated shortly after each other. Choosing an appropriate time separation, although arguably a methodological improvement, could be rather difficult and potentially arbitrary (see, also Shipp & Cole, 2015; Gabriel et al., 2019, for an elaborate discussion of timing in dynamic designs). Nonetheless, future research could disentangle whether those constructs occur simultaneously or sequentially, particularly by conducting studies that separate the PfP scheme, perceived competitiveness, and interpersonal deviance over time. In addition, future research could investigate how other control variables and covariates affect the interplay of PfP and competitiveness, e.g., work climate, ethical leadership, or employees' moral awareness.

Overall, the research presented in this paper indicates that PfP can inspire aggressive facets of competitiveness, thereby linking PfP and interpersonal deviance – behaviours that harm others at the workplace and lead to long-term issues for the whole organization. With our research, we hope to inspire more inquiries about PfP and aggressive competition in organizations.

Notes

1. We wrote a syntax that would identify if a correct target or non-target word was entered. We pre-programmed our syntax so that it covered all common and possible non-target words. After each pilot study, we added other non-target words to the original syntax so that it would "learn" to analyse the participants' inputs automatically. Of course, we repeated the manual control steps in the final study to ensure that any other possible words were covered.
2. Gender has an effect on competitiveness (b =.29, SE =.14, p = .042) that is separate from the effect of PfP on competitiveness (b =.26, SE =.14, p = .056). Furthermore, age has a small effect in the mediation model (b =–.01, SE =.00, p = .069), but the effect of competitiveness on interpersonal deviance remains (b =.07, SE =.03, p = .028). Tenure has no effect on competitiveness or interpersonal deviance. PfP bonus size has no effect on competitiveness or interpersonal deviance, and does not change the shape of the indirect mediating effect.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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References

Abosch, Ken, Malague, Marilu. (2010). *Getting it right — Paying for performance through variable pay* Total Rewards, WorldatWork Conference & Exhibition. Hewitt.com. Retrieved May 2, 2017, from www.aon.com/attachments/thought-leadership/GettingItRight.pdf

Andersson, L. M., & Pearson, C. M. (1999). Tit for tat? The spiraling effect of incivility in the workplace. *Academy of Management Review*, *24*(3), 452–471. https://doi.org/10.2307/259136

Arthur, J. B. (2011). Do HR system characteristics affect the frequency of interpersonal deviance in organizations? The role of team autonomy and internal labor market practices. *Industrial Relations*, *50*(1), 30–56. https://doi.org/10.1111/j.1468-232X.2010.00624.x

Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automacity of being. *American Psychologist*, *54*(7), 462–479. https://doi.org/10.1037/0003-066X.54.7.462

Barnes, C. M., Hollenbeck, J. R., Jundt, D. K., DeRue, D. S., & Harmon, S. J. (2011). Mixing individual incentives and group incentives: Best of both worlds or social dilemma? *Journal of Management*, *37*(6), 1611–1635. https://doi.org/10.1177/0149206309360845

Beersma, B., Hollenbeck, J. R., Humphrey, S. E., Moon, H., Conlon, D. E., & Ilgen, D. R. (2003). Cooperation, competition, and team performance: Toward a contingency approach. *Academy of Management Journal*, *46*(5), 572–590. https://doi.org/10.5465/30040650

Bennett, R. J., & Robinson, S. L. (2000). Development of a measure of workplace deviance. *Journal of Applied Psychology*, *85*(3), 349–360. https://doi.org/10.1037/0021-9010.85.3.349

Bernerth, J. B., & Aguinis, H. (2016). A critical review and best-practice recommendations for control variable usage. *Personnel Psychology*, *69*(1), 229–283. https://doi.org/10.1111/peps.12103

Berry, C. M., Ones, D. S., & Sackett, P. R. (2007). Interpersonal deviance, organizational deviance, and their common correlates: A review and meta-analysis. *Journal of Applied Psychology*, *92*(2), 410. https://doi.org/10.1037/0021-9010.92.2.410

Bortolotti, S., Devetag, G., & Ortmann, A. (2016). Group incentives or individual incentives? A real-effort weak-link experiment. *Journal of Economic Psychology*, *56*, 60–73. https://doi.org/10.1016/j.joep.2016.05.004

Brown, S., Cron, W., & Slocum, J. (1998). Effects of trait competitiveness and perceived intraorganizational competition on salesperson goal setting and performance. *The Journal of Marketing*, *62*(4), 88–98. https://doi.org/10.1177/002224299806200407

Burks, S., Carpenter, J., & Goette, L. (2009). Performance pay and worker cooperation: Evidence from an artefactual field experiment. *Journal of Economic Behavior & Organization*, *70*(3), 458–469. https://doi.org/10.1016/j.jebo.2008.02.012

Cappelli, P., & Tavis, A. (2016). The performance management revolution. *Harvard Business Review*, *94*(10), 58–67. https://www.academia.edu/download/52227804/The_Future_of_Performance_Reviews.pdf

Cohn, A., Fehr, E., & Maréchal, M. A. (2014). Business culture and dishonesty in the banking industry. *Nature*, *516*(7529), 86–89. https://doi.org/10.1038/nature13977

Connelly, B. L., Tihanyi, L., Crook, T. R., & Gangloff, K. A. (2013). Tournament theory: Thirty years of contests and competitions. *Journal of Management*, *40*(1), 16–47. https://doi.org/10.1177/0149206313498902

Cortina, L., Magley, V., Williams, J. H., & Langhout, R. D. (2001). Incivility in the workplace: Incidence and impact. *Journal of Occupational Health Psychology*, *6*(1), 64–80. https://doi.org/10.1037/1076-8998.6.1.64

Deutsch, M. (1949). An experimental study of the effects of cooperation and competition upon group process. *Human Relations*, *2*(3), 199–231. https://doi.org/10.1177/001872674900200301

DeVaro, J. (2006). Internal promotion competitions in firms. *The RAND Journal of Economics*, *37*(3), 521–542. https://doi.org/10.1111/j.1756-2171.2006.tb00029.x

Durham, C. C., & Bartol, K. M. (2009). Pay for performance. In E. A. Locke (Ed.), *Handbook of principles of organizational behavior* (2nd ed., pp. 651). John Wiley & Sons, Ltd.

Ferguson, M., & Barry, B. (2011). I know what you did: The effects of interpersonal deviance on bystanders. *Journal of Occupational Health Psychology*, *16*(1), 80–94. https://doi.org/10.1037/a0021708

Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*(2), 117–140. https://doi.org/10.1177/001872675400700202

Fletcher, T. D., Major, D., & Davis, D. (2008). The interactive relationship of competitive climate and trait competitiveness with workplace attitudes, stress, and performance. *Journal of Organizational Behavior*, *922*(7), 899–922. https://doi.org/10.1002/job.503

Gabriel, A. S., Podsakoff, N. P., Beal, D. J., Scott, B. A., Sonnentag, S., Trougakos, J. P., & Butts, M. M. (2019). Experience sampling methods: A discussion of critical trends and considerations for scholarly advancement. *Organizational Research Methods*, *22*(4), 969–1006. https://doi.org/10.1177/1094428118802626

Garcia, S. M., Tor, A., & Schiff, T. M. (2013). The psychology of competition: A social comparison perspective. *Perspectives on Psychological Science*, *8*(6), 634–650. https://doi.org/10.1177/1745691613504114

George, J. M. (2009). The illusion of will in organizational behavior research: Nonconscious processes and job design. *Journal of Management*, *35*(6), 1318–1339. https://doi.org/10.1177/0149206309346337

Gerhart, B., & Fang, M. (2014). Pay for (individual) performance: Issues, claims, evidence and the role of sorting effects. *Human Resource Management Review*, *24*(1), 41–52. https://doi.org/10.1016/j.hrmr.2013.08.010

Gerhart, B., Minkoff, H., & Olsen, R. (1995). Employee compensation: Theory, practice, and evidence (CAHRS Working Paper #95-04). (47). Ithaca, NY: Cornell University.

Gerhart, B., Rynes, S. L., & Fulmer, I. S. (2009). Pay and performance: Individuals, groups, and executives. *The Academy of Management Annals*, *3*(1), 251–315. https://doi.org/10.5465/19416520903047269

Gilbert, P., McEwan, K., Bellew, R., Mills, A., & Gale, C. (2009). The dark side of competition: How competitive behaviour and striving to avoid inferiority are linked to depression, anxiety, stress and self-harm. *Psychology and Psychotherapy*, *82*(2), 123–136. https://doi.org/10.1348/147608308X379806

Gläser, D., van Gils, S., & Van Quaquebeke, N. (2017). Pay-for-Performance and interpersonal deviance: Competitiveness as the match that lights the fire. *Journal of Personnel Psychology*, *16*(2), 77–90. https://doi.org/10.1027/1866-5888/a000181

Götz, M., O'Boyle, E. H., Gonzalez-Mulé, E., Banks, G. C., & Bollmann, S. S. (2021). The "Goldilocks Zone":(Too) many confidence intervals in tests of mediation just exclude zero. *Psychological Bulletin*, *147*(1), 95. https://doi.org/10.1037/bul0000315

Haines, E. L., & Sumner, K. E. (2013). Digging deeper or piling it higher? Implicit measurement in organizational behavior and human resource management. *Human Resource Management Review*, *23*(3), 229–241. https://doi.org/10.1016/j.hrmr.2012.12.004

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. The Guilford Press.

Helmreich, R. L., & Spence, J. T. (1978). The work and family orientation questionnaire: An objective instrument to assess components of achievement motivation and attitudes toward family and career. *American Psycholog. Ass., Journal Suppl. Abstract Service*, *35*(8).

Hershcovis, M. S., & Barling, J. (2010). Towards a multi-foci approach to workplace aggression: A meta-analytic review of outcomes from different perpetrators. *Journal of Organizational Behavior*, *31*(1), 24–44. https://doi.org/10.1002/job.621

Houston, J. M., McIntire, S. A., Kinnie, J., & Terry, C. (2002). A factorial analysis of scales measuring competitiveness. *Educational and Psychological Measurement*, *62*(2), 284–298. https://doi.org/10.1177/0013164402062002006

Huselid, Mark A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, *38*(3), 635–672. https://doi.org/10.5465/256741

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Jensen, J. M., Patel, P. C., & Messersmith, J. G. (2011). High-performance work systems and job control: Consequences for anxiety, role overload, and turnover intentions. *Journal of Management*, *39*(6), 1699–1724. https://doi.org/10.1177/0149206311419663

Johnson, R. E., & Steinman, L. (2009). Use of implicit measures for organizational research: An empirical example. *Canadian Journal of Behavioural Science/Revue Canadienne Des Sciences Du Comportement*, *41*(4), 202–212. https://doi.org/10.1037/a0015164

Jones, J. L., Davis, W. D., & Thomas, C. H. (2017). Is competition engaging? examining the interactive effects of goal orientation and competitive work environment on engagement. *Human Resource Management*, *56* (3), 389–405. https://doi.org/10.1002/hrm.21773

Kay, A. C., Wheeler, S. C., Bargh, J. A., & Ross, L. (2004). Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice. *Organizational Behavior and Human Decision Processes*, *95*(1), 83–96. https://doi.org/10.1016/j.obhdp.2004.06.003

Kilduff, G., Elfenbein, H., & Staw, B. (2010). The psychology of rivalry: A relationally dependent analysis of competition. *Academy of Management Journal*, *53*(5), 943–969. https://doi.org/10.5465/amj.2010.54533171

Kilduff, G. J., Galinsky, A. D., Gallo, E., & Reade, J. J. (2016). Whatever it takes to win: Rivalry increases unethical behavior. *Academy of Management Journal*, *59*(5), 1508–1534. https://doi.org/10.5465/amj.2014.0545

Kohn, A. (1992). *No contest - the case against competition*. Houghton Mifflin Harcourt.

Koopman, J., Howe, M., Johnson, R. E., Tan, J. A., & Chang, C. H. (2013). A framework for developing word fragment completion tasks. *Human Resource Management Review*, *23*(3), 242–253. https://doi.org/10.1016/j.hrmr.2012.12.005

Kouchaki, M., & Desai, S. D. (2015). Anxious, threatened, and also unethical: How anxiety makes individuals feel threatened and commit unethical acts. *Journal of Applied Psychology*, *100*(2), 360–375. https://doi.org/10.1037/a0037796

Landkammer, F., & Sassenberg, K. (2016). Competing while cooperating with the same others: The consequences of conflicting demands in co-opetition. *Journal of Experimental Psychology: General*, *145*(12), 1670–1686. https://doi.org/10.1037/xge0000232

Larkin, I., Pierce, L., & Gino, F. (2012). The psychological costs of pay-for-performance: Implications for the strategic compensation of employees. *Strategic Management Journal*, *1214*(10), 1194–1214. https://doi.org/10.1002/smj.1974

Lazear, E. P. (2000). Performance pay and productivity. *The American Economic Review*, *90*(5), 1346–1361. https://doi.org/10.1257/aer.90.5.1346

Lazear, E. P., & Rosen, S. (1981). Rank-order tournaments as optimum labor contracts. *Journal of Political Economy*, *89*(5), 841–864. https://doi.org/10.1086/261010

Litzky, B. E., Eddleston, K. A., & Kidder, D. L. (2006). The good, the bad, and the misguided: How managers inadvertently encourage deviant behaviors. *The Academy of Management Perspectives*, *20*(1), 91–103. https://doi.org/10.5465/amp.2006.19873411

Locke, E. A. (2004). Linking goals to monetary incentives. *Academy of Management Executive*, *18*(4), 130–133 https://doi.org/10.5465/ame.2004.15268732.

Lombardi, S., Cavaliere, V., Giustiniano, L., & Cipollini, F. (2020). What money cannot buy: The detrimental effect of rewards on knowledge sharing. *European Management Review*, *17*(1), 153–170. https://doi.org/10.1111/emre.12346

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology*, *58*(1), 593–614. https://doi.org/10.1146/annurev.psych.58.110405.085542

Martinko, M. J., Gundlach, M. J., & Douglas, S. C. (2002). Toward an integrative theory of counterproductive workplace behavior: A causal reasoning perspective. *International Journal of Selection and Assessment*, *10*(1&2), 36–50. https://doi.org/10.1111/1468-2389.00192

McNabb, R., & Whitfield, K. (2007). The impact of varying types of performance-related pay and employee participation on earnings. *The International Journal of Human Resource Management*, *18*(6), 1004–1025. https://doi.org/10.1080/09585190701321542

Meyer, H. H. (1975). The pay-for-performance dilemma. *Organizational Dynamics*, *3*(3), 39–50. https://doi.org/10.1016/0090-2616(75)90029-7

Mitchell, M. S., Baer, M. D., Ambrose, M. L., Folger, R., & Palmer, N. F. (2018). Cheating under pressure: A self-protection model of workplace cheating behavior. *Journal of Applied Psychology*, *103*(1), 54–73. https://doi.org/10.1037/apl0000254

Moore, C., Detert, J. R., Treviño, L. K., Baker, V. L., & Mayer, D. M. (2012). Why employees do bad things: Moral disengagement and unethical organizational behavior. *Personnel Psychology*, *65*(1), 1–48. https://doi.org/10.1111/j.1744-6570.2011.01237.x

Morgenson, G., & Story, L. (2011). *Naming culprits in the financial crisis*. The New York Times. http://www.nytimes.com/2011/04/14/business/14crisis.html?_r=2&pagewanted=all&

Nyberg, A. J., Maltarich, M. A., Abdulsalam, D., Essman, S. M., & Cragun, O. (2018). Collective pay for performance: A cross-disciplinary review and meta-analysis. *Journal of Management*, *44*(6), 2433–2472. https://doi.org/10.1177/0149206318770732

Oppenheimer, D. M., Meyvis, T., & Davidenko, N. (2009). Instructional manipulation checks: Detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology*, *45*(4), 867–872. https://doi.org/10.1016/j.jesp.2009.03.009

Park, S., & Sturman, M. C. (2016). Evaluating form and functionality of pay-for-performance plans: The relative incentive and sorting effects of merit pay, bonuses, and long-term incentives. *Human Resource Management*, *55*(4), 697–719. https://doi.org/10.1002/hrm.21740

Pearsall, M. J., Christian, M. S., & Ellis, A. P. (2010). Motivating interdependent teams: Individual rewards, shared rewards, or something in between? *Journal of Applied Psychology*, *95*(1), 183–191. https://doi.org/10.1037/a0017593

Reynolds, S. J., Leavitt, K., & DeCelles, K. A. (2010). Automatic ethics: The effects of implicit assumptions and contextual cues on moral behavior. *Journal of Applied Psychology*, *95*(4), 752–760. https://doi.org/10.1037/a0019411

Robinson, S. L., & Bennett, R. J. (1995). A typology of deviant workplace behaviors: A multidimensional scaling study. *Academy of Management Journal*, *38*(2), 555–572. https://doi.org/10.5465/256693

Ryckman, R., Thornton, B., & Butler, J. (1994). Personality attitudes of the hypercompetitive attitude scale: Validity tests of horney's theory of neurosis. *Journal of Personality Assessment*, *62*(1), 84–94. https://doi.org/10.1207/s15327752jpa6201_8

Schweitzer, M. E., Ordóñez, L., & Douma, B. (2004). Goal setting as a motivator of unethical behavior. *Academy of Management Journal*, *47* (3), 422–432. https://doi.org/10.5465/20159591

Senate of the United States. (2011). *Wall street and the financial crisis: Anatomy of a financial collapse*. Permanent Subcommittee On Investigations, United States Senate.

Shamsudin, F. M., Subramaniam, C., & Sri Ramalu, S. (2014). The influence of HR practices and job satisfaction on interpersonal deviance in the workplace. *Journal of Management and Organization*, *20*(5), 691–709. https://doi.org/10.1017/jmo.2014.50

Shaw, J. D., & Gupta, N. (2015). Let the evidence speak again! Financial incentives are more effective than we thought. *Human Resource Management Journal*, *25*(3), 281–293. https://doi.org/10.1111/1748-8583.12080

Shipp, A. J., & Cole, M. S. (2015). Time in individual-level organizational studies: What is it, how is it used, and why isn't it exploited more often? *Annual Review of Organizational Psychology and Organizational Behavior*, *2*(1), 237–260. https://doi.org/10.1146/annurev-orgpsych-032414-111245

Smith, E. R., & DeCoster, J. (2000). Dual-process models in social and cognitive psychology: Conceptual integration and links to underlying memory systems. *Personality and Social Psychology Review*, *4*(2), 108–131. https://doi.org/10.1207/S15327957PSPR0402_01

Spector, P. E., Fox, S., Penney, L. M., Bruursema, K., Goh, A., & Kessler, S. (2006). The dimensionality of counterproductivity: Are all counterproductive behaviors created equal? *Journal of Vocational Behavior*, *68*(3), 446–460. https://doi.org/10.1016/j.jvb.2005.10.005

Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, *8*(3), 220–247. https://doi.org/10.1207/s15327957pspr0803_1

Swab, R. G., & Johnson, P. D. (2019). Steel sharpens steel: A review of multilevel competition and competitiveness in organizations. *Journal of Organizational Behavior*, *40*(2), 147–165. https://doi.org/10.1002/job.2340

To, C., Kilduff, G., & Rosikiewicz, B. (2020). When Interpersonal Competition Helps and When It Harms: An Integration via Challenge and. *Threat. Academy of Management Annals*, *14*(2), 908–934. https://doi.org/10.5465/annals.2016.0145

Uhlmann, E. L., Leavitt, K., Menges, J. I., Koopman, J., Howe, M., & Johnson, R. E. (2012). Getting explicit about the implicit: A taxonomy of implicit measures and guide for their use in organizational research. *Organizational Research Methods*, *15*(4), 553–601. https://doi.org/10.1177/1094428112442750

Woods, A. T., Velasco, C., Levitan, C. A., Wan, X., & Spence, C. (2015). Conducting perception research over the internet: A tutorial review. *PeerJ*, *3*, e1058. https://doi.org/10.7717/peerj.1058

Appendix A: Developing Word Completion Material through Pilot Studies

We conducted three pilot studies to develop the material for Study 1. First of all, we created a list of potential target words using interviews with subject matter experts, dictionary definitions of "competition" and "aggression", and the scales of related constructs (e.g., individual competitiveness; Houston et al., 2002). Extending the approach of similar studies that have used a word completion task (Kay et al., 2004), we carefully selected words that are unambiguously related to "comparing competitiveness" and "fighting competitiveness". Thus, we did not use words that can relate to multiple constructs – e.g., "beat" or "score", which have a competitive connotation, but also evoke "music". The first pilot study specifically tested whether the chosen target words reflected the target constructs "comparing competitiveness" or "fighting competitiveness" without too strongly activating other constructs. The participants in our sample (N = 19, 58% female, M_{age} = 32.0) were asked to either assign the target words to one of the categories – namely, "Competition", "Collaboration/ Cooperation", "Aggression/ Hostility", "Individual Focus/ Me-focus" – or to indicate a more appropriate category if none seemed like a match. For the final experiment, we only used target words for which 70% of the raters agreed on the primary category, or where the difference between the primary category and the second category was bigger than 40% (Koopman et al., 2013). From the initial list of 25 potential target words, we ultimately selected 15 (winner, lose, game, competitive, compare, better, best, compete, contest, victory, rival, fight, kill, clash, battle).

Subsequently, we developed word fragments that could also be completed by alternative (i.e., non-comparing/non-fighting) words. We followed Koopman et al. (2013) advice that word fragments should be moderately difficult (in order to ensure enough variance in the overall measure of target construct activation) and have at least one alternative solution that parallels the target word's lexical frequency (in order to create enough variance per item). Examples include "win_ _ _" (target: "winner"; alternative: "winter") or "_ _ctory" (target: "victory"; alternative: "factory").

In pilot studies 2a and 2b, we sought to compare different versions of fragments for the same target word. In order to avoid priming participants with prior presentations of a word, we conducted two separate studies to find out which fragment per target word would work best for the final experiment. For the target word "winner", for instance, we tested "win_ _ _" in pilot study 2a and "_inn _ r" in pilot study 2b. In order to minimize possible priming effects in the direction of target constructs, we added five neutral filler words to the list of 15 target words and presented all 20 items in random order. In order to test the setup for the main experiment, we also included a time limit per word, as well as applied a very strict language proficiency cut-off (Koopman et al., 2013): We excluded 9 participants (Sample 2a) and 12 participants (Sample 2b) who indicated that their English skills were below excellent in a control question at the beginning of the survey. For both pilot studies, the final item analysis encompassed data from 51 participants (Sample 2a: N = 51, 55% female, M_{age} = 32.1, SD_{age} = 10.4; Sample 2b: N = 51, 55% male, M_{age} = 28.9, SD_{age} = 8.0).

After these pilot studies, we calculated the variance of each fragment: (sum of correct target words)/(correct target words + correct non-target words). Ideally, 50% of the correctly offered words would be the target word. Koopman et al. (2013) suggest a range of 25–75% for target words against non-target words. Furthermore, to assess the difficulty of a fragment, we divided the sum of correct target words and correct non-target words by N. In the end, 11 fragments demonstrated enough variance and difficulty to be used for the final instrument. These included seven comparing-competitive words (winner, lose, competitive, best, compete, contest, victory), and four fighting-competitive words (fight, kill, clash, battle). As in the pilot studies, the main study utilized five neutral filler words (hotel, enter, paper, fence, rice) for a total of 16 words.

Appendix B. PfP design details of participants, Study 3

	Combination of PfP bonuses			
Bonus type	One type only	Combination with Individual	Combination with Team	All three types
Individual	36			
Team	9	9		
Organizational	14	25	3	
Total	59	34	3	29

N_{Bonus} = 126. One participant did not provide further details about their bonuses.