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Prosocial Bonuses Increase Employee Satisfaction and Team Performance

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Abstract

In three field studies, we explore the impact of providing employees and teammates with prosocial bonuses, a novel type of bonus spent on others rather than on oneself. In Experiment 1, we show that prosocial bonuses in the form of donations to charity lead to happier and more satisfied employees at an Australian bank. In Experiments 2a and 2b, we show that prosocial bonuses in the form of expenditures on teammates lead to better performance in both sports teams in Canada and pharmaceutical sales teams in Belgium. These results suggest that a minor adjustment to employee bonuses – shifting the focus from the self to others – can produce measurable benefits for employees and organizations.


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Introduction

A recent survey revealed that just 46% of Americans are satisfied with their jobs, the lowest level recorded by the Conference Board [1] in the past two decades. Yet over the same time frame, Americans have come to spend more and more of their time at work [2]. Taken together, this trend suggests that employees are becoming more and more unhappy more and more of the time at work, hardly a formula for a healthy and productive workplace. In this increasingly negative environment, how can employers incentivize their employees to increase their happiness, job satisfaction, and ultimately their job performance?

Certainly, designing effective incentive schemes is a central challenge for a wide range of organizations, from multi-national corporations to academic departments. In pursuit of identifying the most effective strategies, organizations have devised an impressive variety of such bonuses, from fixed salaries to pay-per-performance, from commissions to end-of-year bonuses. We suggest that the wide variety in such schemes masks a shared assumption: That the best way to motivate employees is to reward them with money that they then spend on themselves. We propose an alternative means of incentivizing employees – what we term “prosocial bonuses” – in which organizations provide employees with bonuses used to engage in prosocial actions towards charities and co-workers.

Below, we first review research exploring existing methods of increasing workplace performance, including individual-based and team-based bonus schemes, which tend to reveal both benefits and unexpected costs. We then briefly review the literature on the benefits of improving social life in the workplace, such as increasing employee citizenship behaviors. Next, we argue that prosocial bonuses mitigate some of the issues that arise with individual- and team-based compensation schemes, while retaining the benefits of improving employees' social lives in the workplace. Finally, we examine the impact of these prosocial bonuses on employee satisfaction and team performance, by reporting results from three “proof of concept” field experiments conducted in different countries.

Individual- and Team-Based Incentive Schemes

When asked why they work, individuals most commonly reply “money” [3]. But what is the effect of money on employees’ job satisfaction and performance? On one hand, monetary bonuses have been found to produce positive effects – increased productivity, effort, performance, and job satisfaction [4–9]. Individual bonuses increase job satisfaction in part because employees see their time and effort being rewarded [10–13]. From pay-per-performance to piece rate compensation schemes to profit sharing to bonuses, individual-based incentive schemes can lead to improved employee outcomes [8,14–18].

On the other hand, individual incentives – such as large bonuses – are often surprisingly ineffective in increasing employee morale and productivity [19–20]. Rewarding individual employees can produce negative outcomes by eroding workplace cohesion [21], as employees become reluctant to share information with others even at the expense of reduced output [22]. Relative comparisons at the individual level create competition which results in decreased trust, sharing and teamwork [23–25]; in Drago and Turnbull [26], for example, tournament-based compensation led to decreased helping behavior and increased the potential for sabotaging other workers.

In an effort to prevent such negative competitive dynamics that can result from individual-based bonuses, organizations often turn to incentivizing employees for their collective performance, encouraging cooperation and teamwork rather than competition [27–29]. Indeed, a growing body of research suggests that
interpersonal relationships enable employees to experience their work as important and meaningful [30–36]. Furthermore, evidence suggests that interpersonal relationships often enhance employees’ motivations, opportunities, and resources at work [37–40]. Positive interpersonal relationships with coworkers provide social support and a buffer from stressful events [41–43], which in turn predict team commitment [44], job engagement [45–46], and job satisfaction [47–49].

In some cases, team-based compensation schemes have been shown to raise this sense of cooperation and cohesiveness between team members [22,50], inducing them to exert additional effort toward helping one another [51–54]. Importantly, such increased cooperation due to interdependent rewards has been shown to improve team performance [55], suggesting that team-based bonuses may be an effective means of improving employee social life. As with individual-based bonuses, however, team-based bonuses offer important advantages but also potential drawbacks – such as free riding [56], motivational loss due to the perception of inequity [57], and suboptimization of team goals [58]. Thus while team-based bonuses have the potential to improve relationships between co-workers, they can also lead to “antisocial” behaviors – and decreased employee outcomes.

**Prosocial Bonuses**

We suggest that prosocial bonuses offer an alternative approach that has the potential to provide some of the same benefits as team-based compensation – increased social support, cohesion, and performance – while carrying fewer drawbacks. Research suggests that the desire to help others is a need deeply rooted in human nature [59–60], and that giving to others has a causal impact on increasing happiness and life satisfaction [61–62]. At the organizational level, previous correlational research suggests that prosocial behavior in the workplace – often termed citizenship behaviors – is linked to employee morale and performance [63]: the extent to which employees perceive themselves and their organizations as prosocial predicts organizational commitment [64–66]. We suggest that prosocial bonuses can have a causal impact on employee satisfaction and performance, such that providing employees with money to help others would have a greater organizational impact than providing employees with money to spend on themselves.

We note that we are not the first researchers to examine the interplay of incentives and prosocial behavior; indeed, several investigations point to the potential risk in mixing money with altruism [67]: paying children to collect money for charity decreases their efforts [68], publicly rewarding adults for earning money for charity also decreases effort [69], and paying friends to help with a move reduces the amount of help received [70]. Unlike these kinds of “prosocial incentives,” however, the prosocial bonuses we provide in the experiments below are not contingent upon or linked to any behavior – employees are simply given money by the firm to spend prosocially. In this sense, our investigation uses a version of a “reciprocity by proxy” strategy outlined by Goldstein, Griskevicius, and Cialdini [71]. In this investigation, guests who were informed that a hotel had already given a donation to an environmental cause were more likely to reuse their towels than those who were told the hotel would make a donation only if they reused their towels; their results showed that providing the prosocial bonus up front was more effective than linking the incentive directly to the behavior. Following this logic, we predicted that offering employees prosocial bonuses that were not linked to any current behavior or expectation of future behavior would be effective in increasing employee satisfaction.

**Overview of the Present Research**

We examine whether randomly assigning employees to engage in prosocial behavior – via prosocial bonuses – can have a causal impact on employee well-being, job satisfaction, and job performance. In our field studies, some employees and teammates are given non-contingent “prosocial bonuses” – money that they receive as a windfall that they are encouraged to spend in a prosocial manner. In Experiment 1, we give some employees of a company the opportunity to donate money to charity, examining the impact of this intervention on both employee well-being and job satisfaction. In Experiments 2a and 2b, we move beyond assessment of psychological constructs to behavioral measures; by comparing prosocial versus personal bonuses, we investigate their impact on team performance in the two different contexts of sales teams and sports teams.

**Materials and Methods**

**Ethics Statement**

Data collection for Experiment 1 was approved by the Harvard University Behavioral Research Ethics Board. Data collection for Experiment 2a was approved by the University of British Columbia’s Behavioral Research Ethics Board (B06-0557). Data collection for Experiment 2b was overseen by University of Liège. Written informed consent was obtained for all studies.

**Experiment 1**

In Experiment 1, we examine the impact of prosocial bonuses on the most widely studied attitude in the field of organizational behavior, job satisfaction – broadly defined, employees’ subjective evaluation of their work experience [72–73]. The large number of investigations examining factors that influence job satisfaction have tended to focus on two fundamental determinants: (1) aspects of employees, such as individual differences in self-esteem or education [74–78] and (2) aspects of the job itself, such as communicating clear task goals and giving feedback when those goals are achieved [79–84]. Adding a novel contribution to the literature on job satisfaction, we examine the impact of prosocial bonuses. To do so, we assigned some employees of a large bank to receive a prosocial bonus in the form of money from the company to donate to charity, and examined the impact of spending this bonus on job satisfaction, compared to employees not given this bonus.

**Participants.** A total of 300 employees at an Australian bank were invited by their employer to participate in an experiment; 121 of these employees did not respond to the initial email and were therefore not included in our sample. Of the 179 employees that did respond to the invitation, 46 employees completed only the Time 1 survey in which they reported their age, gender, salary, years at company as well as their happiness and job satisfaction. These 46 participants did not differ from our main sample in terms of age, gender, income or years at company, Time 1 happiness or job satisfaction ($t_{25} = 48$, $N_{25} = 41$, and $N_{25} = 44$) with a wide range of income, age, and years at the company (Table 1).

**Design and procedure.** On November 17, 2008, all employees received an email from their employer asking them to participate in a multi-stage experiment on workplace attitudes. Employees were assured that their participation was voluntary and that their responses would be anonymous. If employees followed a link indicating their willingness to participate, they were directed to the Time 1 survey. On the Time 1 survey, participants reported
Bonuses offer an additional approach to impacting job performance, research examining how aspects of the job itself can improve or enhance it. Individual differences (e.g., employees' general aptitude or conscientiousness) and their performance, and other company-specific factors are important predictors of job performance. Some studies have explored the impact of bonuses on employee performance, and others have examined the longer-term effects of providing prosocial bonuses. We have found that providing employees with the opportunity to spend prosocial bonuses can yield a range of benefits, including increased happiness and job satisfaction. Indeed, employees who donated $50 to charity on behalf of their company reported increased happiness and job satisfaction. Do the benefits of prosocial bonuses extend beyond employee well-being to team performance? As with job satisfaction, previous research has focused on two psychological benefits: increased happiness and job satisfaction. Indeed, theoretical models of job performance suggest that employees who feel happy and satisfied with their job are more likely to perform at their best. Therefore, it is crucial to understand the impact of prosocial bonuses on team performance.

Table 1. Employee demographics (Experiment 1).

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Income (£AUS)</th>
<th>Years at Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-29</td>
<td>$20,001-$50,000</td>
<td>10</td>
</tr>
<tr>
<td>30-39</td>
<td>$50,001-$100,000</td>
<td>42</td>
</tr>
<tr>
<td>40-49</td>
<td>$100,001-$150,000</td>
<td>34</td>
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<tr>
<td>50-59</td>
<td>$150,001-$200,000</td>
<td>11</td>
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<td>$200,001-$500,000</td>
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were team leaders were excluded as we wanted to examine giving among peers, rather than between employees and supervisors. The remaining 88 salespersons (50 percent male; \( M_{\text{sex}} = 36.0, SD = 6.9 \)) working in 14 teams (\( M_{\text{members}} = 6.3, SD = 3.0 \)) completed this experiment in exchange for a chance to win an iPod. Participants were assured that participation was voluntary and their responses would remain confidential.

**Design and Procedure.** The pharmaceutical salespersons worked in teams that were in charge of the same geographical region. Although each salesperson worked alone, team members would share strategic information about prospects (e.g., “You should go to that business because the owner doesn’t like me”). Each sales team was randomly assigned to the prosocial or personal bonuses condition. Because teams varied in size, we randomly selected approximately one-third of team members, and at a companywide event two weeks after the initial email, we gave randomly selected approximately one-third of team members, and personal bonuses condition. Because teams varied in size, we randomly selected approximately one-third of team members, and at a companywide event two weeks after the initial email, we gave these individuals $22 USD (15 Euros) to spend by the end of the week. Participants were informed that the funds were provided as part of a study conducted by independent researchers. On personal bonus teams, participants who received money were instructed to “spend it on a teammate” (as in [62]), whereas on prosocial bonus teams, participants who received money were instructed to “spend it on a teammate” who was randomly selected from the remaining team members and specified for each spender. All participants receiving funds to spend were asked to complete the spending by the end of the week. While one-third of the salespersons were assigned to be spenders (i.e. someone given money to spend on themselves or a coworker), the remaining participants were assigned as receivers (i.e. someone who received a gift from a coworker) or third-party observers (i.e. someone not assigned as a spender or receiver). Receivers were not informed that they would receive a gift from a co-worker. In order to avoid confusion at the companywide event, participants assigned to be receivers and third-party observers also received envelopes with a brief note thanking them for their participation in the study but they were not informed of the spending manipulation. Everyone was instructed to open the envelopes alone at home.

At the end of the week, spenders reported how they had used the money, and receivers were reported whether they had received any gifts, enabling us to confirm spenders’ reports. The twenty-four salespersons excluded from our study were not eligible to be spenders or receivers. We provided the company with the funds to be distributed to the salespersons, who were fully informed that the study was conducted only by independent researchers, and that the company would not have access to any of the data.

**Team performance.** Performance was assessed immediately before (Time 1) and one month after our spending intervention (Time 2). Pharmaceutical salespeople promote their product to physicians, pharmacies, and hospitals, rather than selling directly to customers. As such, the standard indicator of pharmaceutical sales team success is the total monthly sales collected by each pharmaceutical sales team (in Euros) in the geographical region under their purview. Therefore, we used monthly team sales as our measure of team performance.

**Results**

**Experiment 1**

**Happiness.** A preliminary ANOVA confirmed that there was no difference between conditions in Time 1 happiness, \( F(2, 130) = .12, p > .85, \eta^2_g = .02 \); we therefore entered experimental condition into an ANCOVA predicting Time 2 happiness, controlling for Time 1 happiness. We observed a significant main effect of condition, \( F(2, 129) = 5.85, p < .005, \eta^2_g = .08 \). Follow-up analyses showed that participants who received a $50 USD charity voucher reported being significantly happier, \( t(43) = 5.12, p < .001 \), whereas happiness levels were unchanged from Time 1 to Time 2 for those in the control and $25 USD conditions, \( t < 1 \) (Table 2).

**Job Satisfaction.** As with happiness, a preliminary ANOVA confirmed that there were no between-group differences in Time 1 job satisfaction, \( F(2, 130) = .54, p > .77, \eta^2_g = .004 \). Entering condition into an ANCOVA predicting Time 2 job satisfaction, controlling for Time 1 job satisfaction, revealed a significant main effect of condition, \( F(2, 129) = 3.14, p < .05, \eta^2_g = .05 \). As with happiness, participants who received a $50 USD charity voucher showed an increase in job satisfaction, \( t(43) = 2.46, p < .02 \), which was unchanged for those in the control and $25 USD conditions, \( t < 1.19 \) (Table 2).

**Experiment 2a**

**Spending examples.** Participants who received a personal or prosocial bonus were asked to report how they spent this money. On personal bonus teams, spenders reported buying items for themselves such as sportswear, small jewelry, CDs, food, and alcohol. On prosocial bonus teams, spenders reported buying items for others such as books, wine, a plant, a stuffed animal, a piñata and paying a teammate’s sports league fee.

**Spending condition and team performance.** To confirm that there were no significant differences in initial performance, we entered condition (personal bonus vs. prosocial bonus) into an ANOVA predicting Time 1 performance; this analysis revealed no significant effect, \( F(1, 10) = .10, p = .77 \). As in Experiment 1, therefore, we entered the same variables into an ANCOVA predicting Time 2 performance, controlling for Time 1 performance. We found a marginal main effect in the predicted direction, whereby prosocial bonus teams performed better than personal bonus teams, \( F(1, 8) = 3.75, p = .09, \eta^2_g = .32 \) (Table 3).

Next, we examined the impact of prosocial vs. personal bonuses on the change in performance from Time 1 to Time 2. In the prosocial bonuses condition, sports teams showed a large, but statistically marginally significant increase in performance,

| Table 2. Change in happiness and job satisfaction between Time 1 and Time 2 as a function of condition (Experiment 1). |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|
| Time 1                          | Happiness       | Job Satisfaction | Time 2          | Happiness       | Job Satisfaction |
| Control Condition (N = 48)      | 3.48 (.83)      | 5.15 (1.50)      | 3.56 (.80)      | 5.25 (1.35)     |
| $25 USD Condition (N = 41)      | 3.56 (.87)      | 5.37 (1.61)      | 3.51 (.95)      | 5.12 (1.35)     |
| $50 USD Condition (N = 44)      | 3.52 (.70)      | 5.23 (1.29)      | 3.98 (.51)      | 5.55 (1.07)     |

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Experiment 2b

**Spending examples.** The salespeople who received a personal or prosocial bonus were asked to report how they spent the allotted funds. On personal bonus teams, spenders reported buying items for themselves such as food, alcohol and groceries. On prosocial bonus teams, spenders reported buying items for others such as gift card, chocolate, wine, and treating a teammate to lunch.

**Spending condition and team performance.** As in Experiment 2a, to confirm that there were no significant differences in initial performance, we entered condition (personal bonus vs. prosocial bonus) into an ANOVA predicting Time 1 performance; this analysis revealed no significant effect, $F(1, 12) = .24, p = .63$. Therefore, we entered the same variables into an ANCOVA predicting Time 2 performance, controlling for Time 1 performance. As in Experiment 2b, we found a marginal main effect, whereby prosocial bonus teams performed better than personal bonus teams, $F(1, 11) = 2.31, p = .16, \eta^2 = .17$ (Table 3).

Although the simple effect should be interpreted with caution given the very small sample size, closer examination suggests that prosocial bonuses were effective in improving performance from Time 1 to Time 2. That is, in the prosocial bonus condition, sales teams showed a large and significant increase in performance from Time 1 to Time 2, $t(6) = 2.70, p < .04, d = 1.02$. Meanwhile, in the personal bonuses condition, there was no evidence for a performance improvement, $t(6) = 0.10, p = .92, d = .04$ (Table 3).

Once again, it is possible to conceptualize the effectiveness of these interventions by calculating the return on investment for prosocial and personal bonuses. On sales teams, for every $10 spent prosocially led to an 11% increase in winning percentage, whereas every $10 spent personally led to a two percent decrease in winning percentage.

**Discussion**

We offer initial evidence of the causal impact of increasing prosocial behavior via the provision of prosocial bonuses to employees at an Australian bank, members of dodge ball teams in Canada, and pharmaceutical salespeople in Belgium. Taken together, our studies show that when organizations give employees the opportunity to spend money on others – whether their coworkers or those in need – both the employees and the company can benefit, with increased happiness and job satisfaction and even improved team performance. Specifically, in Experiment 1, employees who had the opportunity to make a substantial donation to charity ($50 USD) on behalf of their company reported enhanced happiness and job satisfaction in the short term, compared to those in the control condition. In Experiments 2a and 2b, we extended these findings to team performance in the longer term, showing that teams performed better when participants were assigned to spend money on their fellow team members than when given a more standard bonus: money to spend on themselves. Across the studies, we show that prosocial bonuses can benefit both individuals and teams, on both psychological and “bottom line” indicators, in both the short and long-term. Unlike some research suggesting a weak link between factors that improve job satisfaction and those that improve job performance [102–104] our results suggest that prosocial bonuses have a meaningful impact on both metrics.

How might prosocial bonuses lead to increased happiness, job satisfaction and team performance? Because our studies were conducted in small sample sizes, the results were likely underpowered, and future studies with large sample sizes may explain why the effects are marginal in both experiments.
conducted in the field, we were unable to conduct extensive surveys assessing likely mediators of the impact of prosocial bonuses. While the beneficial impact of prosocial spending on happiness is well-established [62, 66], a key goal for future research is to explore underlying mechanisms of the prosocial bonus-performance link, with several clear possibilities worthy of investigation. First, prosocial bonuses may lead to the strengthening of existing relationships and even the formation of new relationships; such positive interpersonal relationships predict job engagement [45, 46] and job satisfaction [47–49]. Second, and relatedly, prosocial bonuses might lead to increased cooperation and cohesiveness between team members, which can improve team performance in part by encouraging helping behaviors [51–55]. Finally, prosocial spending may increase general feelings of reciprocity among members of organizations, leading both to greater cooperation and punishment of “shirkers” or “free riders” – those employees who are not contributing to the goals of the organization [105–110].

Along similar lines, future work should examine whether the impact of prosocial bonuses on team performance is driven by actions of the spenders, receivers, or a combination of the two. Since we were not able to measure individual performance in sales and sports teams, we could not pinpoint whether prosocial bonuses increased team performance by motivating individual-level contributions or team-level operations. Assessing individual level contributions would also allow researchers to examine how additional team members – who were neither spenders nor receivers – respond to this type of intervention. Future experiments that include both prosocial and personal bonuses while assessing these and other constructs will add to our understanding of the benefits of prosocial bonuses.

We note that Experiment 1 included a prosocial bonus condition and a control condition but not a personal bonus condition, whereas Experiments 2a and 2b included prosocial and personal bonus conditions but not a control condition; in addition, Experiment 1 included two levels of bonuses, whereas in Experiments 2a and 2b the bonus amount was kept constant. These decisions were driven by logistics. Our study sites were not interested in including a personal bonus in Experiment 1 but did allow us to include two levels of prosocial bonus; they were interested in including both personal and prosocial bonuses of a fixed amount but not a control condition in Experiments 2a and 2b. Of clear interest for future research is more systematic and comprehensive variation of all of these factors, crossing many bonus levels with both personal and prosocial bonuses. In addition, as we noted in Experiment 2, our observations at the team level are low in number (150 participants become just 25 teams across Experiments 2a and 2b); scaled-up experiments that utilized more teams would also build on the “proof of concept” experiments we present here.

It would be particularly interesting to examine employees’ sensitivity to bonus levels as a function of whether those bonuses are personal or prosocial. Receiving $10 or $20 for oneself is likely to lead only to the purchase of one or two additional coffees, and therefore seems unlikely to impact employee satisfaction or job performance. Buying a $20 gift for a coworker instead of a $10 gift, on the other hand, may encourage people to be even more creative and thoughtful in their gift choice, making the experience more impactful for both the giver and the receiver – and possibly leading to a bigger return on investment for the organization. More broadly, a $10 personal bonus from one’s organization may seem like a trifling or insufficient reward, leading to a decrease in motivation [71] – “I worked all year and they only gave me $10!” whereas our results suggest that the same small sum of money spent prosocially has a markedly different, and positive, effect.

Related to the above, $25 USD was not sufficient to increase employee satisfaction in Experiment 1, but the meta-analysis for Experiments 2a and 2b suggests that $20 USD may be able to increase team performance. We suggest that this difference is likely due to the different form that prosocial bonuses took in the two studies. Recent research suggests that face-to-face giving has a larger impact on happiness than giving at a distance: not only are people more likely to donate money to toward single individuals than to larger organizations [111–112], but the closer the link between giver and receiver, the bigger the happiness benefits: people who give money to others are happier when they give face-to-face rather than remotely, and spending money on close friends leads to more happiness than spending on more distant acquaintances [113–114]. As a result, it is not surprising that the same amount of money (~$20 USD) goes further in Experiments 2a and 2b than in Experiment 1, given the social nature of the team expenditure compared to the relatively impersonal donation to charity. Perhaps even more importantly, whereas in Experiment 1 employees were givers only, in Experiments 2a and 2b teammates were both givers and receivers; for every salesperson who gave a gift, there was a salesperson who received that gift, likely another contributor to the greater impact of prosocial bonuses in Experiments 2a and 2b. Importantly, the observed boost in employee satisfaction and happiness only for the $50 USD and not for the $25 USD in Study 1 helps rule out the possibility that our results are simply due to demand effects. Demand effects should have influenced both of the prosocial donation conditions (e.g., $25 USD and $50 USD) equally. Thus, if employees felt that they should be happy after giving, then the boost in happiness would have been observed across all prosocial spenders, not just for employees who gave $50.

Our experiments provide preliminary evidence for the potential utility of prosocial bonuses, though future research is needed. Given that existing incentive schemes have important drawbacks, it is worthwhile to consider creative new approaches to incentivizing employees. That said, we assume that prosocial bonuses may have drawbacks of their own, which future research should document. In particular, it seems likely that prosocial bonuses could backfire if they were introduced by companies as a replacement for more standard bonuses. Because many companies already allocate funds for charitable giving and employee entertainment, however, it may be possible for companies to reap the benefits of prosocial bonuses by providing some of these existing funds directly to employees, who can then use this money to make donations to charity or to benefit co-workers—potentially increasing job satisfaction and performance in the process. Relatedly, prosocial bonuses were unconditional in our experiments; future research could examine whether bonuses conditional on performance or based on competition would prove as effective in increasing job satisfaction and performance.

We opened by noting that recent surveys indicate that job satisfaction is at a twenty-year low in the United States even as Americans have come to spend more and more of their time at work. This additional time at work, of course, comes at the expense of devoting time to pursuits known to be linked to well-being, from forming social connections to engaging in prosocial acts such as volunteering [2, 115–116]. We suggest that rather than force employees to make a losing tradeoff between social life and work life, employers can focus instead on using prosocial bonuses to create a more altruistic, satisfying, and productive workplace.
Author Contributions
Conceived and designed the experiments: LA LBA MIN EWD JQ. Performed the experiments: LA LBA MIN EWD JQ. Analyzed the data: LA LBA MIN EWD JQ. Contributed reagents/materials/analysis tools: LA LBA MIN EWD JQ. Wrote the paper: LA LBA MIN EWD JQ.

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