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Motivational Spillovers from Awards: Crowding Out in a Multitasking Environment

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This paper uses data from an attendance award program implemented at one of five industrial laundry plants to show the complex costs of corporate awards previously ignored in the literature. We show that although the attendance award had direct, positive effects on employees who previously had punctuality problems, it also led to strategic gaming behavior centered on the specific eligibility criteria for the award. The award program temporarily changed behavior in award-eligible workers but did not habituate improved attendance. Furthermore, we show that the extrinsic reward from the award program crowded out the internal motivation of those employees who had previously demonstrated excellent attendance, generating worse punctuality during periods of ineligibility. Most novelly, we show that the attendance award program also crowded out internal motivation and performance in tasks not included in the award program. Workers with above average pre-program attendance lost 8% efficiency in daily laundry tasks after the program's introduction. We argue that these motivational spillovers result from the perceived inequity of internally motivated workers' previously unrewarded superior attendance contributions. Our paper suggests that even purely symbolic awards can generate gaming and crowding out costs that may spill over to other important tasks.

Keywords: motivation awards; compensation; strategic human resource management; organizational economics; behavioral economics

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Introduction

A large literature in management, social psychology, and economics has focused on how monetary reward policies, such as pay for performance, motivate employee productivity (Prendergast 1999, Gerhart et al. 2009, Larkin et al. 2012). Although monetary rewards indeed motivate productivity (Eisenberger et al. 1999, Prendergast 1999, Lazear 2000), they also can generate dysfunctional consequences (Lepper and Green 1978, Gneezy et al. 2011). Multitasking theory, for example, holds that rewarding workers for one task can reduce attention toward and productivity in others (Milgrom and Roberts 1991). Similarly, workers' strategic gaming of reward systems to increase pay can harm the organization (Kerr 1975, Obloj and Sengul 2012, Larkin 2014). The introduction of monetary rewards, which increase extrinsic motivation for a task (Amabile 1993), may also "crowd out" intrinsic or other nonreward-based motivation (Deci et al. 1999).

These and other costs of monetary rewards are one reason managers use nonmonetary but still extrinsic rewards such as awards (Silverman 2004). Corporate award programs are one of the most common nonmonetary extrinsic rewards in firms (Frey 2007). Over 80% of corporations use awards such as "employee of the month," "top sales club," and awards for innovative ideas

(Garr 2012). Academics have only recently studied such programs, with new work arguing that awards motivate employees through mechanisms such as status-based competition and social comparison (Moldovanu et al. 2007, Kosfeld and Neckermann 2011), increased self-esteem (Kuhnen and Tymula 2010), and strengthened employer identification (Neckermann et al. 2014). Consistent with practitioner claims (Davidson 1999), this research argues that award programs extrinsically motivate in ways fundamentally different from monetary compensation (Frey 2007, Besley and Ghatak 2008, Blanes i Vidal and Nossol 2011), thus avoiding the psychological and financial costs of monetary rewards by habituating positive behavior (Frey and Neckermann 2008, Neckermann et al. 2014).

In this paper we use unique field data from a corporate attendance award program to provide the first evidence that awards carry substantial costs beyond the simple prize money and implementation costs assumed in prior work. We use insights from agency theory to argue that although the "reward-motivated" employees who are mainly driven by extrinsic rewards will indeed positively respond to awards, they will game program rules in the same way as a compensation system, acting purely to maintain award eligibility and reverting to weak performance when eligibility is lost. Applying insights from social

psychology and behavioral economics, we also argue that awards crowd out intrinsic and prosocial motivation in what we call “internally motivated” employees (Grant 2007, Sauermann and Cohen 2010)—those employees who performed highly in the absence of rewards.

More novelly, we build new theory on potential *negative motivational spillovers* from the introduction of an award for a given task on other tasks. Multitasking theory typically holds that two tasks must share an effort constraint for rewards on one task to reduce performance on other nonrewarded tasks. We argue that even absent a common effort constraint, a new award can decrease motivation and productivity in unrelated tasks because it induces perceived unfairness and inequity among workers who were already highly performing the now-awarded task. This unfairness stems from long-term unrewarded contributions of internally motivated workers juxtaposed against the newly rewarded contributions of reward-motivated employees.

We empirically test these arguments using data from an attendance award program implemented at an industrial laundry plant in the Midwestern United States. In March 2011, the managers at one of the company’s five plants independently—but systematically and carefully—implemented a monthly award that recognized all employees with perfect attendance and gave one such employee a \$75 gift card through a random drawing. Perfect attendance was defined by both punctuality and a lack of unexcused absences. The independent implementation of the award at a single plant allows us to investigate its effect in a quasi-experimental way, using employees at the other four plants as a quasi-control group for the “treated” plant.

In line with previous literature, we find that the award improved the attendance of employees with previously poor attendance. We present clear evidence, however, that these employees gamed the system to maintain award eligibility, even when this was costly to the employer. Furthermore, once an employee was disqualified for the award in a given month, the employee immediately reverted to pre-award attendance and punctuality levels, suggesting that the award did not increase baseline motivation for good attendance. Most importantly, we find evidence that employees who were internally motivated for attendance before the program suffered from crowding out once it was introduced, both directly on attendance and in motivational spillovers to work efficiency. In total, our results suggest that the award program cost the treated plant 1.4% of daily productivity, suggesting that awards can be much more costly than currently recognized by the academic literature.

Theoretical Motivation

We next provide theoretical predictions for the organizational effect of award programs. We first establish that existing research almost uniformly represents awards as a

costless method for motivating employees, and how these conclusions ignore potential multitasking and crowding costs common in financial rewards. We highlight individual differences in reward-based and internal motivation that shape the relative values of specific award program costs and benefits. We then provide new theory that an award for one task can reduce internal motivation for another task through *negative motivational spillovers*, even when the tasks are functionally unrelated.

Corporate Awards as Extrinsic Rewards

Corporate awards programs have been vastly understudied by academic researchers despite their widespread use (Frey and Neckermann 2008). Although no standard definition exists for “award,” scholars note that corporate awards contain four fundamental traits: they involve a formal program set up by management; they involve public recognition to winners; they involve the formal bestowal of something tangible, such as money or a certificate or trophy; and they involve scarcity or competition, such that not everyone can win (Frey and Neckermann 2008). Although theoretical and empirical research on awards is growing, this work focuses almost exclusively on the potential benefits of award programs, considering the costs to be negligible. This focus is based on a critical underlying assumption in the literature—that awards, despite representing extrinsic rewards, avoid the deleterious economic and psychological mechanisms known to haunt monetary rewards.

Theoretical and empirical research (Huberman et al. 2004, Frey 2006, Kosfeld and Neckermann 2011) argues that peer recognition is the primary mechanism by which awards improve employee motivation and performance. Although other motivational mechanisms such as higher organizational loyalty (Neckermann et al. 2014), improved purpose or meaning (Kosfeld et al. 2014), and competition for scarce rewards (Frey 2007, Larkin 2010) are also important, a recent field experiment by Ashraf et al. (2014) found that employer and peer recognition primarily drive award-based performance. Related evidence in economics (Mas and Moretti 2009) and management (Blanes i Vidal and Nossol 2011) shows that workers improve when observed by peers.

Scholars recognize that existing awards studies are silent, however, on the mechanisms through which corporate awards might produce substantial costs to a firm. Both Neckermann and Frey (2013) and Gallus and Frey (2015) cite the present manuscript as the only study to examine negative effects. Existing research instead explicitly considers only two competing hypotheses on awards and motivation: increased motivation and no effect. Kosfeld and Neckermann’s (2011) influential experimental study highlights this costless model of awards with the title “Getting More Work for Nothing?” using a formal model that contains only two predictions for different employee types: one type will be positively motivated, whereas the other will be unaffected. Blanes i Vidal and

Nossol (2011) similarly promote this view in an important study of peer recognition of performance, stating in the abstract that “we find that merely providing this information [on peer performance] leads to a large and long-lasting increase in productivity that is *costless* to the firm” (p. 1721; emphasis in the original).

Existing empirical studies consistently focus only on award benefits, finding that awards increase the motivation and/or task performance of at least some workers. These results hold across many empirical settings, including employee surveys (Neckermann and Frey 2013), short-term motivation experiments with students (Kosfeld and Neckermann 2011), and field experiments with corporate (Neckermann et al. 2014) and nonprofit (Ashraf et al. 2014) employees. Larkin (2010) shows that a sales award carrying significant prestige and visibility, but no monetary reward, motivates salespeople to sacrifice nearly 5% of their compensation to win. Critically, studies have found that awards can improve not only core productivity tasks (Bradler et al. 2016) but also important ancillary tasks such as attendance (Scott and Markham 1982, Markham et al. 2002).

The underlying assumption in this costless awards model is that nonpecuniary rewards avoid most of the economic and psychological problems associated with money. Frey’s (2007) seminal paper on awards lists multiple ways in which awards fundamentally differ from monetary compensation, including low monetary costs, the establishment of a “special relationship” (p. 7) between employees and employers, and less chance of crowding out intrinsic motivation. Yet new evidence suggests that nonmonetary rewards may indeed generate many of the same behavioral responses as money. Foundational neuroscience studies using functional magnetic resonance imaging (fMRI) show that monetary rewards and social comparison stimuli activate common areas of the human brain (Fliessbach et al. 2007, Lin et al. 2012). Larkin (2010) also showed that software salespeople explicitly and consciously trade financial rewards for the social recognition of an award.

We argue that if instead, awards function more like pecuniary rewards, they can produce additional costs not recognized by existing awards research but well understood in existing economics and social psychology theory. In the following section, we apply established insights from these fields to awards.

Extending Incentive Theory to Awards

Awards provide extrinsic motivation: A fundamental tenet of agency theory holds that agents prefer shirking to working, and that compensation helps motivate effort (Hölmstrom 1979). Social psychologists have instead argued that some employees will exert their highest effort even absent formal rewards (Deci and Ryan 1985). As discussed, the empirical awards literature universally finds that awards increase performance for at least some

employees. Logically, this implies that the employees who improved their performance were not motivated to perform at their highest level absent the award; if this were not the case, and the agents were exerting their maximal effort, then no improvement could be observed.

Our first insight from agency theory, then, is that any identified performance improvement on the now-awarded task depends on what we call “reward-motivated” employees—workers who lack the intrinsic or prosocial motivation to perform highly on the task without an external reward. In contrast, “internally motivated” employees—those who perform highly absent direct rewards—will see little or no improvement, simply because they were already working at or near maximal levels. We note that internal motivators include pure intrinsic motivation, or the value from enjoying the task itself (Amabile et al. 1994), but also extrinsic social factors such as prosocial motivation, peer image, social pressure, and gratitude (Deci 1971, Benabou and Tirole 2006, Grant 2007, Grant and Gino 2010, Wrzesniewski et al. 2014). Empirical studies usually cannot distinguish between pure intrinsic motivation and extrinsic social factors (Larkin et al. 2012). However, absent a formal corporate reward for a task, both of these motivators stem from nonreward factors. Because we study the introduction of a formal corporate reward, whether “reward-motivated” employees are truly intrinsically motivated or are motivated by extrinsic social factors is not key to our argument or analysis.

A vast literature on employee motivation in psychology (Locke et al. 1981) and economics (Lazear 2000) commonly uses task performance to proxy for employee motivation (Lawler 1971). Employee intrinsic motivation is also commonly proxied by performance absent reward (Deci and Ryan 1985). We follow these conventions, while recognizing that performance is an imperfect (but the best available) measure of motivation. Therefore, in our setting, we identify “internally motivated” employees as those with high task performance in the absence of formal rewards. We deem those with low task performance as “reward motivated.” As we note in the empirical section, our setting importantly lacks long-term career-based rewards such as promotion that might extrinsically motivate high performance even without short-term formal rewards.

As a formal program, any corporate award program has rules for determining winners; these rules are almost always disclosed to employees (Frey 2007). Furthermore, most corporate awards carry specific titles such as “Sales Excellence Award,” giving employees a clear notion of the corporate goal of the award. For reward-motivated employees—those with low internal motivation toward a task absent formal rewards—the rules determining winners specify how eligibility will be measured and are thus the dominant motivator. Our extension of agency theory to the awards setting thus predicts the following:

HYPOTHESIS 1 (H1). *The introduction of an award program for a previously unrewarded task improves*

reward-motivated employee performance on the elements used by the program to determine award allocation.

Existing research primarily focuses on this single prediction, which we use as a baseline to corroborate the burgeoning evidence that awards increase performance on the targeted task for some employees.

Awards induce gaming: A second tenet of agency theory holds that employees care only about their own rewards and not the goals of the principal or broader organization (Hölmstrom 1979). Because the link between individual employee action and broader corporate goals is tenuous, rewards almost never perfectly motivate desired behavior (Kerr 1975). A large empirical literature shows that even when employees understand the corporate goal desired by managers, they will take advantage of the specific rules governing their reward allocation even when doing so goes against the broader corporate goal. This “gaming” behavior is extremely costly to firms (Oyer 1998, Larkin 2014, Frank and Obloj 2014).

Because award programs specify explicit eligibility rules, they incentivize reward-motivated employees to focus primarily on those elements of the awarded task that are directly measured and rewarded in the program. Performance on unmeasured and unrewarded elements may consequently suffer, particularly if employees discover how to improve their chance of winning at the expense of the unrewarded elements. This strategic drive of reward-motivated employees to “game” the award program is powerful enough to supersede the explicit corporate goals specified by the program, potentially even producing worse overall task performance than in the pre-award period. This leads to our next hypothesis:

HYPOTHESIS 2 (H2). *The introduction of an award program for a previously unrewarded task reduces reward-motivated employee performance on those task elements that do not determine eligibility, even when those reductions hurt the explicit corporate goals of the program.*

Award ineligibility leads to reversion in motivation: Agency theory holds that rewards motivate only so long as employees have the possibility of earning them (Prendergast 1999). This view contrasts with recent literature on “nudges” that suggests small rewards sometimes lead to habituation of desired behavior even when the reward is removed (Acland and Levy 2015, Allcott and Rogers 2014).

If awards act more like monetary rewards, as we argue, then the loss of award eligibility will cause a *motivation reversion* that returns employees to pre-award levels of motivation and performance. The reward-motivated employee will revert to her preexisting preference to avoid maximal effort after losing the chance of winning the award, even if the award program is still in place.

Specifically,

HYPOTHESIS 3 (H3). *Reward-motivated employees who respond to an award with increased performance will revert to their lower pre-award performance once ineligible for the award.*

Awards crowd out internal motivation: Many psychologists and behavioral economists argue that adding extrinsic rewards can reduce—or crowd out—intrinsic motivation through several mechanisms (Deci and Ryan 1985, Frey and Oberholzer-Gee 1997). Desire for competence, for example, can be crowded out as external rewards shift a behavior from signaling competence to signaling reward responsiveness (Gneezy and Rustichini 2000a, Deci and Ryan 2002). Later research has focused on image (Ariely et al. 2009, Benabou and Tirole 2006, Grant and Mayer 2009, Lacetera and Macis 2010), where external rewards such as awards shift external perceptions of a worker’s motives for prosocial behavior from “a desire to be a ‘good’ employee” to “a desire to win the social recognition of an award.” Despite extensive laboratory and field evidence on crowding out, only a few recent papers provide evidence from firms (Holmas et al. 2010, Bareket-Bojmel et al. 2014, Hossain and Li 2014).

Although the effect of reward introduction on total motivation is ambiguous because it depends on the relative magnitudes of extrinsic motivation gains versus intrinsic motivation losses (Gneezy and Rustichini 2000b), crowding out theory cleanly predicts reduced motivation and performance for internally motivated employees once a reward is introduced and then removed (Deci et al. 1999). Loss of award eligibility represents the removal of the reward opportunity, which crowding out theory predicts reduced motivation below pre-program levels for employees with high levels of pre-program internal motivation. Therefore, we predict the following:

HYPOTHESIS 4 (H4). *Performance on the now-awarded task by internally motivated employees will be lower after eligibility loss than pre-award performance.*

New Theory: Negative Motivational Spillovers

Although existing research on incentives yields predictions about how award programs can have both positive and negative effects on the awarded task, the literature says almost nothing about the impact on other tasks. Neckermann et al. (2014) is the only paper, to our knowledge, that considers such spillovers across tasks. In a field study on an award for prosocial behavior among call center representatives, the paper shows positive spillovers to employee performance on the core task of answering calls. Their paper proposes several theories consistent with the results, including peer effects, self image, and increased intrinsic motivation.

We hold that task-specific awards can also introduce *negative motivational spillovers* to other tasks that cannot

be explained by multitasking theory. Multitasking theory (Hölmstrom and Milgrom 1991) predicts extrinsic rewards such as awards reduce effort and performance on other tasks only when an effort or attention trade-off exists across tasks, with no predicted spillovers in the absence of such trade-offs. Our theory of negative motivational spillovers focuses precisely on this case, proposing that employee internal motivation is linked across tasks. Consequently, an award introduced for one task will reduce motivation and performance on a second task in those employees who are internally motivated on the now-awarded task. We base our theory on two well-established foundations of social psychology: equity theory and social comparison theory.

The large literature on equity theory shows that employees are highly motivated by equity considerations (Adams 1965) derived from social comparison with others (Festinger 1954). Equity theory holds that employees actively compare the ratio of their rewards to contributions with the ratios of others. Empirical research has demonstrated that workers who perceive inequity and unfairness in a reward system decrease productivity and increase counterproductive behavior such as cheating and dishonesty (e.g., Gino and Pierce 2009, 2010; John et al. 2014; Edelman and Larkin 2014). These counterproductive behaviors often occur outside the task that generates the inequity; pay inequality has been linked to theft (Greenberg 1990), reduced citizenship (Moorman 1991), and resistance to managerial delegation (Folger and Skarlicki 1999). The theory and empirical evidence on equity theory clearly indicates that perceived unfairness in one dimension can spill over and negatively influence motivation in a separate dimension.

Although a new award program may appear to be weakly Pareto improving—benefiting some employees while hurting no one—equity theory holds that these expected gains may matter less to an employee than the costs from perceived inequity. Even if the award equitably rewards future behavior, it may still be viewed as inequitable by internally motivated employees who perceive the inequity of contributions to rewards *across* periods. As Adams (1965, p. 280) emphasized, when an employee compares his own reward equity with a referent other, “he might compare his present and past outcomes and inputs and determine whether or not the exchange with his employer, present or past, was equitable.” In evaluating their own superior past contributions, internally motivated employees may feel that the new ratio of rewards to effort accruing to them is far too small given their high effort before award introduction. Consequently, even awards that improve future reward-contribution ratios for all workers can generate perceived inequity and unfairness by changing relative reward-contribution ratios across periods. These intertemporal equity concerns are core to motivational loss predictions from psychological contracts (Robinson et al. 1994). Internally motivated employees

may even understand that reward-motivated employees achieve some rewards through gaming (Hypothesis 2), which would only deepen feelings of inequity; we note, however, that our theory does not rest on this fact.

This idea, which we term *negative motivational spillovers*, is summarized in the following hypothesis:

HYPOTHESIS 5 (H5). *Introducing an award for a task will cause employees who are internally motivated for that task to perform other tasks less well than they did in the pre-award period, even absent a common effort or attention constraint.*

Crucially, the unrelated task to which the spillover occurs need not be purely intrinsically motivated. Social psychologists (Deci and Ryan 1985) and economists (Benabou and Tirole 2003) have long recognized that task motivation is a mix of extrinsic and intrinsic factors. Our theory holds that so long as employee motivation stems at least in part from intrinsic or other nonreward factors, overall task motivation may be reduced.

Our theory also provides one clear empirical test of alternative explanations. Negative motivational spillovers should happen immediately upon award introduction because they do not depend on award ineligibility. The mere introduction of the award will reduce motivation on the unrelated task for internally motivated employees, even when an employee remains eligible. Empirically, we must distinguish this reduced performance from the more standard multitasking argument; in the next section we discuss how our two tasks do not involve the effort trade-off necessary for a multitasking explanation. Our theory does not propose negative spillovers for reward-motivated employees because the task-based award does not generate perceptions of inequity or unfairness.

Empirical Setting

Our setting is an industrial laundry cleaning company in the Midwestern United States, which we will refer to as “LaundryCo.” LaundryCo is a leading regional provider of work uniforms, professional work apparel, and commercial laundry cleaning services. Their services primarily include the selling, cleaning, and repairing of work uniforms and small workplace items such as mats, towels, and mop heads. Nearly all of the cleaning services occur at five plants, which are similar in layout, machinery, staffing positions, and products.

The production process at LaundryCo (see Figure A1 in the appendix (available as supplemental material at <http://dx.doi.org/10.1287/orsc.2016.1047>)) is complex. Each day, route-service representatives return soiled uniforms to go through a complex cleaning process with many interdependent tasks before returning them to customers. The process involves sorting garments by type and soil level, washing with a specific temperature and chemical mix, drying and pressing, identifying and fixing

missing buttons or other problems, and sorting for the quick loading of clean garments to return to customers. Nonuniform items undergo a similar process, but extra steps are often involved, such as rolling laundered floor mats or folding and bundling hand towels. Workers are cross-trained on many tasks but tend to specialize in a few, among which they alternate throughout each day. As with most labor-intensive service operations, LaundryCo is highly dependent on worker efficiency, which they measure as task-adjusted output per minute. Inefficiency results both from mistakes, such as incorrect sorting, and when unproductive upstream workers leave downstream workers idle.

Each plant of approximately 35 workers is supervised by two managers who focus on worker efficiency and overall plant productivity. These managers enjoy substantial autonomy in policy implementation. To facilitate garment transfer through each stage of the cleaning process, LaundryCo gives each plant an open and uncluttered layout. One consequence of this layout is that employees can clearly observe each other's behavior. They can see, for example, who is late or absent, and they interact frequently as they switch between tasks. In addition to formal work interactions, LaundryCo also puts significant effort into building a "friendly" workplace through programs such as birthday recognition, company barbecues, fundraisers, and "alumni" reunions.

LaundryCo measures individual efficiency by comparing worker garment processing output to the expected amount given the precise time spent on each task. The company bases this expectation on each task's company-wide time-studied rate, and normalizes output such that a score of 100 exactly reflects expected performance. For example, the time-studied rate for pressing dress shirts is 50.4 seconds, meaning an employee would need to press 71 shirts per hour to earn a score of 100. For each worker, the system computes a metric we term "overall daily efficiency," equal to the weighted average (by time spent) of the worker's efficiency scores on each task that day. For example, a worker who spent two hours pressing dress shirts with an efficiency score of 80, two hours rolling mats with a score of 140, and four hours sorting cleaned clothes with a score of 160 would have a final daily efficiency score of 135. Employees had no way to track efficiency during the day. A computer in a break room allowed workers to look up efficiency from previous days, but interviews suggest they rarely did so and only observed daily efficiency totals when they received their biweekly paycheck.

LaundryCo workers are paid a guaranteed base hourly rate and hourly wage bonuses for daily efficiency scores above 100 to a maximum bonus at 140. The average employee received about 25% of total pay from bonuses and 75% from base wages. The bonus system differs slightly across plants. The treatment plant uses a linear wage increase as efficiency increases from 100 to 140. The

four other plants have discrete wage increases at 120 and 140. Interviews with management suggest that because workers do not know precise efficiency scores while working, the two systems are similar in their incentive effects; employees are incentivized to work harder at the margin but do not make detailed effort-reward calculations on an hourly or even daily basis. Daily efficiency is normally distributed around a mean of about 120, with high performers in the 130–150 range and low performers between 80 and 100 (see Figure A2). Interestingly, over 50% of employee days in the pretreatment period involve productivity either below 100 or well above 140, meaning that an efficiency reduction from the observed level would *not* reduce the employee's bonus or total pay.

Externalities in the plant's upstream-downstream design make consistent and on-time arrival essential to plant productivity. Tardiness and unexpected absences hinder plant productivity because one plant section may be understaffed. Even if the manager finds a substitute for that section, the substitute must leave another task and will likely be less productive than the missing worker. Therefore, LaundryCo has detailed tardiness and attendance policies. Repeated tardiness first precipitates a written warning from the plant manager. The third warning in a year results in suspension and the fourth, termination. However, LaundryCo leaves administration of this policy to individual plant managers, who are usually lenient toward slight or occasional tardiness. The difficulty and cost of finding and training replacements discourages managers from firing such employees.

Attendance policies allow workers to take excused absences for sickness or vacation. To be counted as excused, an absence must be scheduled with the company. Sickness is considered excused if the employee notifies the manager even a few minutes before the start of the shift. Each employee is given a fixed number of paid time-off (PTO) days each year that can be used for any absence, excused or unexcused. Although the nature of the absence does not affect the use of PTO days, LaundryCo does track unexcused absences, and plant managers may issue formal warnings and eventually terminate employees with many unexcused absences. Interviews with management revealed that employees often call in right before their shift to excuse an absence.

Attendance Award Program

In an effort to encourage fewer unexcused absences and less tardiness, the general and plant managers at one LaundryCo plant (hereafter called "Plant 1" or "treatment plant") implemented an award program that recognized employees with perfect attendance in a given month and randomly awarded one of them a \$75 gift card to a local restaurant or store. Perfect attendance was defined as having no unexcused absences and no "tardies." An unexcused absence was defined as an absence where the employee did not notify the plant management in advance;

a “tardy” was defined as being more than five minutes late for a shift. The names of all award-eligible employees in a given month—those with perfect attendance according to the rules—were announced at a monthly plant-wide meeting early in the following month. The previous winner of the gift card randomly selected the new card winner by drawing a name out of a hat.

The plant manager announced the program in mid-February 2011, and it began on March 1. It lasted 10 months and was terminated by corporate headquarters, with the last award given for December 2011. In an average month, 20 employees were eligible (see Figure A3), meaning that the expected monetary value of the award was negligible—less than \$4 or the equivalent of 20 minutes of work.

We interviewed LaundryCo managers about the attendance award program. The treatment plant managers stated that they introduced the award because certain employees’ punctuality and attendance problems were hurting plant productivity and because they “hadn’t really tried out awards as incentives too much.” Crucially, the managers stated that they did not feel that their plant’s punctuality, attendance, or performance differed from other plants. We corroborated this by interviewing control plant managers. Plant 1 managers did not discuss plans with other plant managers or the LaundryCo executive team. They believed the award would be a cost-effective way to improve attendance and punctuality, expecting workers to be positively motivated to win the award because of the close-knit plant culture and shared work history of many employees. The managers felt that even if the plan failed, the maximum cost of the program (beyond minimal managerial effort) would be the \$75 gift cards. Senior executives at LaundryCo told us that although they believe in the motivational benefits of awards, they do not believe that “employees should be rewarded for something they are supposed to be doing anyways [punctuality/attendance].” Therefore, they ended the program in December 2011 after discovering it during a company human resource meeting.

Methods

Empirical Strategy

The introduction of the award at one plant and the existence of four similar “untreated” plants represent a type of quasi-experiment that is frequently used to estimate policy effects (Gertler et al. 2011). We use a difference-in-differences (DiD) design to assess the impact of the award on worker punctuality, attendance, and efficiency using LaundryCo’s untreated plants as a quasi-control group. The DiD strategy “differences out” fixed differences between Plant 1 and the control group plants and uses post-treatment changes at the control group plants as a counterfactual for what would have happened at Plant 1 had it not introduced the award.

Data

We use a 21-month panel of daily worker-level data spanning 2 periods: the 12-month “pre-award period” before Plant 1 introduced the award, and the 9-month “award period” when the Plant 1 award program was in place. The data include punctuality and attendance measures, as well as daily worker efficiency measures for 218 workers in 5 plants between March 1, 2010, and November 30, 2011. The typical worker-day observation details clock-in and clock-out times, times and efficiency ratings for each task, overall daily efficiency, if the employee was absent, and demographics such as tenure, age, gender, and marital status.

Employees generally had set shift times, with occasional changes based on seasonal demand. We could not access LaundryCo’s employee schedules and therefore inferred a worker’s shift from her observed clock-in and clock-out times and the list of actual shift times. We shared our coding with managers at Plant 1, and they agreed our manual coding was both appropriate and accurate for normal weekday shifts. Since our manual coding was less accurate on days when the worker arranged to come in late, switched shifts with other workers, or worked extra hours, we restricted our analysis to weekdays, dropped observations where employees worked less than 7.5 hours of an 8.5 hour shift, and dropped observations where workers were more than an hour early or late for a shift. This affected less than 1% of our sample. Whereas the coefficient estimates are similar when including these observations, the standard errors are larger. Consequently, support for Hypotheses 1, 3, and 4 falls just outside conventional significance levels. Hypotheses 2 and 5 retain strong support in all cases.

Dependent Variables

We use five main dependent variables. The first three (*tardy*, *minutes late*, *absent*) are metrics that the plant managers hoped to improve through the award program. *Tardy* is a dummy variable indicating that a worker arrived more than five minutes late on a given day and is one metric for disqualification in the award program; the other disqualifying event is an unexcused absence. *Minutes late* is a continuous measure of the minutes and seconds late an employee arrived at work; it is negative if the worker clocked in and started working early. *Absent* is a dummy variable indicating that the worker was absent for reasons other than public holidays, worker compensation, suspension, family medical leave, or funerals. However, we do not observe whether an absence was excused or unexcused. *Single absence* is a dummy variable indicating that an employee was absent on a given day but not absent the previous or following workday. The last dependent variable, *overall daily efficiency* (which we abbreviate as “efficiency”), is the worker’s average efficiency across all tasks on a given day, as explained above. We winsorized this variable to two standard deviations from the mean

Table 1 Descriptive Statistics at Worker/Day Level

Variable	Pre-award					Award period				
	Obs	Mean	Sd	Min	Max	Obs	Mean	Sd	Min	Max
Treatment										
Tardy	7,126	0.04	0.20	0.0	1.0	5,742	0.03	0.16	0.0	1.0
Minutes late	7,126	−1.73	5.37	−59.7	54.0	5,737	−2.19	5.10	−49.0	58.2
Total absences	7,846	0.04	0.19	0.0	1.0	6,318	0.05	0.21	0.0	1.0
Single absences	7,846	0.01	0.07	0.0	1.0	6,318	0.01	0.11	0.0	1.0
Daily efficiency	6,576	125.60	32.40	54.5	218.0	5,669	124.70	36.20	54.5	218.0
Late	7,126	0.15	0.35	0.0	1.0	5,742	0.10	0.29	0.0	1.0
Monthly absences	7,861	0.79	1.65	0.0	8.0	6,339	1.03	1.80	0.0	10.0
Total hrs worked	7,861	8.25	1.64	0.0	23.7	6,339	8.17	1.69	0.0	13.1
Tenure	7,861	3,373	2,681	176	9,262	6,339	3,186	2,708	176	9,262
Age	7,861	43.51	10.05	21.0	62.0	6,339	43.63	9.84	21.0	62.0
Male	7,861	0.43	0.50	0.0	1.0	6,339	0.43	0.49	0.0	1.0
Base salary	7,861	25,695	845	19,240	28,600	6,339	25,495	1,363	19,240	28,600
Control										
Tardy	23,600	0.03	0.17	0.0	1.0	14,081	0.02	0.15	0.0	1.00
Minutes late	23,600	−2.12	4.73	−59.4	59.0	14,081	−1.88	5.07	−59.0	59.0
Total absences	27,449	0.05	0.22	0.0	1.0	16,300	0.05	0.22	0.0	1.00
Single absences	27,449	0.02	0.13	0.0	1.0	16,300	0.02	0.12	0.0	1.00
Daily efficiency	22,320	120.30	34.70	54.5	218.0	14,148	125.30	35.60	54.5	218.00
Late	23,600	0.17	0.38	0.0	1.0	14,081	0.14	0.34	0.0	1.00
Monthly absences	27,684	1.06	1.76	0.0	15.0	16,474	1.13	1.78	0.0	12.00
Total hrs worked	27,684	8.01	1.38	0.0	44.0	16,474	8.09	1.25	0.0	16.37
Tenure	27,684	1,720	1,920	4.0	8,566	16,474	1,754	1,992	60.0	8,566
Age	27,684	39.36	12.88	18.0	69.0	16,474	39.87	12.79	19.0	69.00
Male	27,684	0.34	0.47	0.0	1.0	16,474	0.32	0.47	0.0	1.00
Base salary	27,522	19,850	4,899	8,320	48,526	16,474	19,734	5,167	8,320	48,526

Note. The number of observations in the post period control group is reduced from employee turnover.

because managers suggested severe outliers were likely errors. Using nonwinsorized data does not significantly change our results.

Validity of Difference-in-Differences Approach

DiD models do not require treatment and control groups to be the same, and they are designed to allow comparison of treatment and control groups that differ in observable ways (Gertler et al. 2011). Any difference in the groups that does not change contemporaneously with the treatment event does not affect the statistical treatment estimates. In our case, however, the treatment and control plants are similar on most dimensions. All five plants have the same tasks, use the same production technology, and share a common floor layout. Also, two of the control group plants are geographically proximate to Plant 1 (32 and 34 miles), thereby controlling for local shocks such as weather, that might affect tardiness. All five plants had the same attendance policies.

The biggest difference is that Plant 1 is unionized, which creates some cross-group differences shown in Table 1 (see Table A1 for worker-level statistics). Although both groups have similar ages, Plant 1 has higher tenure and wages and more males. However, Plant 1 workers had tardiness and attendance levels similar to control plant workers. In our case, there is no evidence of differential time trends in employee tenure, wages, human resource

policies, or other key variables during our sample that might bias results (Gertler et al. 2011), nor were there unusual instances of turnover in Plant 1 during the award period. Whereas the treatment plant experienced lower turnover from unionization, this is unlikely to bias our results. Because of worker fixed effects, bias would occur only if higher turnover in control plants disproportionately occurred in workers with nonrepresentative attendance or efficiency *trends*—not *levels*. Our interviews and data reveal no such trends. Restricting our analysis to employees employed for the full sample also does not change our results. Thus, any preexisting differences in treatment and control plants appear stable and therefore do not bias our estimates.

For example, consider tardiness caused by exogenous personal issues such as a commute or family concerns. Individual fixed effects mean that any identified tardiness change was relative to the same baseline set of exogenous factors. An employee might improve attendance despite a long commute, but this improvement represents a change in motivation, not the baseline factor itself. For improvement to be observed, the worker must have been performing below her potential given her exogenous personal issues. We find it implausible that an employee would react to the award by changing her exogenous constraints, such as moving closer to the plant or changing her diet to improve health. Therefore, the use of individual

fixed effects crucially identifies changes to motivation, controlling for each employee’s personal situations that affect attendance.

Empirical Specification

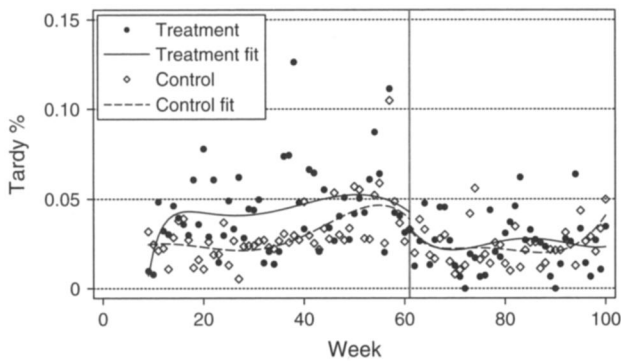
We use a standard DiD specification to estimate the impact of the award on the dependent variables:

$$Y_{it} = \alpha_i + \beta_1 * TREAT_GRP_i + \beta_2 * POSTTREAT_t + \beta_3 * TREAT_GRP_i * POSTTREAT_t + \Upsilon_t + \varepsilon_{it},$$

where Y_{it} is the dependent variable, $TREAT_GRP$ is a dummy variable equal to 1 if the worker is in the treatment group and 0 otherwise, $POSTTREAT$ is a dummy variable equal to 1 for dates after award program introduction and 0 otherwise, and $TREAT_GRP * POSTTREAT$ is the interaction of the two previous variables. The interaction coefficient (β_3) estimates the treatment effect; to conserve space, we simply label this variable as *treatment* in results tables. Our specification exploits the panel nature of the data with workerfixed effects (α_i), which account for unobserved worker heterogeneity, and time fixed effects (Υ_t), which account for time trends across months, days in the month, and days of the week. In specifications with worker fixed effects, the $TREAT_GRP$ variable is absorbed. Similarly, $POSTTREAT$ is absorbed by time fixed effects.

All reported regressions were estimated using ordinary least squares (OLS). We block-bootstrapped standard errors based on 218 workers to address concerns that DiD models underestimate standard errors regardless of specification (Bertrand et al. 2004). In block bootstrapping, data are randomly sampled across blocks (in our case workers) because of data interdependence within blocks (Lahiri 2003). Block bootstrapping is commonly used in DiD and other panel models with repeat observations for individuals, since data are not independent and identically distributed (Hounkannounon 2011). Whereas three of the five dependent variables are binary, OLS is less computationally intensive to bootstrap and easier to interpret. Moreover, OLS specifications result in unbiased coefficient estimates, even as events become rare (Stewart

Figure 1 (Color online) Monthly Treatment Effect on Tardiness



Note. Fit lines estimated using 4th degree polynomials

2013). Our results are robust to using logistic models. Table 2 presents correlations for the main variables used in our analyses.

Results

Basic Treatment Effects

DiD models require graphical investigation of pre-trends in the data. Figure 1 plots average tardiness for treatment and control plants during our data period. The two lines for each group show a fourth-degree flexible spline for pre- and post-treatment periods. Whereas average treatment plant tardiness is higher, consistent with summary statistics in Table 1, the pretreatment tardiness difference is largely constant. There is a slight uptick near the March program start for control plants, which interviews suggest is from the holiday season, but the DiD estimator considers the entire pretreatment period, not only the window just before treatment. There is a clear, immediate reduction in treatment plant tardiness after award introduction, whereas control plant tardiness is unchanged. The graph strongly suggests that the treatment event, and not different pretreatment trends, led to the observed tardiness reduction in the treatment group. Again, the higher pretreatment tardiness in Plant 1 is not in itself a concern, because the statistical estimator “differences out” preexisting differences.

We next provide regression results. Table 3 shows average treatment effects for the five dependent variables.

Table 2 Correlations of Primary Variables

	Tardy	Minutes late	Absence	Single absence	Efficiency	Continuous month
Tardy	1					
Minutes late	0.498	1				
Absence	0.005	0.002	1			
Single absence	0.007	0.002	0.845	1		
Efficiency	−0.015	−0.034	−0.003	−0.002	1	
Continuous month	−0.002	−0.002	−0.002	−0.001	0.027	1

Notes. Correlations presented for primary variables at the daily worker level, using the efficiency sample. Individual fixed effects result in variables constant over time being dropped from the analyses. Correlations are similar to using the main attendance sample.

Table 3 Basic Treatment Effect

Dependent variable:	(1) Tardy	(2) Minutes late	(3) Absent	(4) Single absence	(5) Efficiency
Treatment	−0.015** (0.006)	−0.801* (0.343)	0.007 (0.006)	0.006** (0.002)	−1.992 (3.193)
Constant	0.020*** (0.006)	−2.057*** (0.214)	0.051*** (0.009)	0.023*** (0.005)	117.353*** (9.036)
Time controls	Y	Y	Y	Y	Y
Worker FE	Y	Y	Y	Y	Y
R ²	0.053	0.127	0.019	0.013	0.513
# of employees	218	218	218	218	206
Observations	50,549	50,544	57,913	57,913	48,713

Notes. Standard errors presented in parentheses are block bootstrapped with 400 repetitions. The variable *treatment* is the interaction of the treatment group and post award introduction dummies, and represents the estimated effect of the introduction of the award. The post award introduction dummy is coded as missing for observations after the award was removed.

Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The award caused substantial improvement on two of the three performance metrics that the managers attempted to influence (*tardy*, *minutes late*, and *absent*). There was a 1.5-percentage-point reduction in tardiness at Plant 1, or a 45% reduction from the pre-award baseline of 3.3%. In addition, the average worker clocked in nearly a minute earlier, a reduction in minutes late of about 39% from the pre-award baseline of −2.03. We do not observe a statistically significant treatment effect on absences, although the use of *single absences* increased by nearly 40% from a baseline of 1.5%, a result we discuss later. Finally, the award did not lead to overall changes in laundry task efficiency, although additional time worked yields productivity gains.

We dispel false positive concerns due to serial correlation (Bertrand et al. 2004) through placebo tests presented in Table A2. We address two other typical confounds in DiD models in Figure 2, which shows monthly treatment effects. The large and precise treatment effect in the first month casts doubts on an unobserved contemporaneous change or simple mean reversion. Whereas it is impossible in field studies to completely disprove such confounds, observing the plotted effect sizes over time alleviates

concerns (Gertler et al. 2011). Finally, to ensure that our results do not depend on changes at a specific control plant, we repeated each regression four times with one control plant excluded. All results remain consistent, with the exception of the *minutes late* result when excluding Plant 3. We note that our theory provides no prediction for this result, since any change in *minutes late* would combine conflicting effects from improved tardiness and potential gaming, and because the award is only based on tardiness and attendance, not *minutes late*.

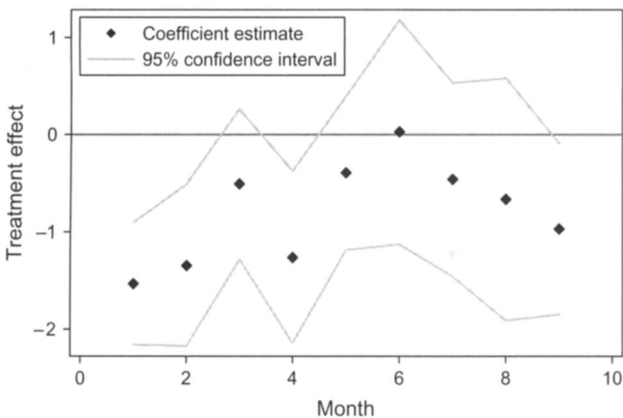
Heterogeneous Employee Response

Since our theoretical hypotheses all involve heterogeneous responses by employees based on their pre-award motivation, we split all workers into groups based on their propensity for tardiness in the 12 months before the award was put in place. Nearly 32% of workers had no tardies during that period, whereas 20% were tardy once a month or more. Between these extremes, just over 10% were tardy once every six months or less, 12% were tardy once every four to six months, and 26% were tardy every month to three months.

We split the sample into “low tardy” and “high tardy” groups at the median level of pre-award tardiness—one tardy every four months. This yields 116 “low tardy” and 102 “high tardy” workers. The “low tardy” group corresponds to our “internally motivated” employee designation, since they exhibited high punctuality performance before any formal reward for this task. The “high tardy” group corresponds to the “reward-motivated” group with frequent pre-award tardiness. Our results are robust to models using alternative “low tardy” definitions that include every possible cutoff from no pre-award tardies up to the median, as well as to splitting the sample into three “no tardy,” “low tardy,” and “high tardy” groups.

The use of tardy groupings to proxy for internally and reward-motivated employees is admittedly imperfect. Some “high tardy” workers may be performing at their potential on attendance, given personal constraints such as

Figure 2 (Color online) Monthly Treatment Effect on Minutes Late



commute, family, and health. By our definition, since these employees were performing as well as they could, they should be classified as “internally motivated.” It is also true that some “low tardy” workers may simply face very low costs for being on time, and are not internally motivated. We note, however, that were this proxy invalid, the award would not differentially affect high and low tardy workers, and thus the bias would go against our predicted effects. Lacking data on personal lives, we believe pre-award tardiness levels is the best available proxy for pre-award attendance motivation; indeed, performance is widely used to proxy for motivation in the economics and social psychology literature (Locke et al. 1981, Lazear 2000).

There are two equivalent methods for comparing heterogeneous treatment effects in DiD models (Fink et al. 2014): interaction effects and subsample analysis. We report subsample analyses to avoid difficulty in interpretation from triple interactions (Gelman and Pardoe 2007). These subsample analyses, like all models in this paper, are relative to the relevant control group of employees. A subsample analysis focusing on, for example, the effect on “low tardy” employees compares the behavior of “low tardy” employees at the treatment plant with “low tardy” employees at control plants.

Improvement by Reward-Motivated Employees

We first turn to H1, which argues that reward-motivated employees will improve performance on award-related measures after award introduction. As noted, managers used *tardy* and *absence* to determine award eligibility, so we first examine the impact of the award introduction on these variables. Table 4 shows that the “high tardy” group decreases its rate of *tardiness* by two percentage points, or about 36% from a baseline of 5.6%. Absences fall by 2.1 percentage points, a reduction from the baseline level of over 50%. There were no changes in tardiness or absences in the “low tardy” group, which is not surprising since this group had near perfect pretreatment attendance. However,

increases (or decreases) in these variables are possible even for the “low tardy” group, since our tests are relative to the control group of “low tardy” employees, who do not all have near perfect posttreatment attendance. Our results, therefore, are highly consistent with Hypothesis 1.

Gaming

Table 5 examines employee response to attendance-related variables *not* explicitly made part of the reward program—*minutes late* and *single absence*. The very small and insignificant coefficient on *minutes late* provides initial evidence for Proposition 2—that reward-motivated employees game award eligibility rules by clocking in less than five minutes late to avoid being tardy, rather than by truly improving average punctuality.

This effect can be seen clearly in Figure 3, which shows the percentage change or “high tardy” workers in the treatment and control plants at all values of *minutes late*. The treatment plant has a large reduction in employees clocking in seven or more minutes late, but nearly all of the change appears in the mass of employees clocking in between four and five minutes late. Employees in the treatment plant are over 50% more likely to clock in just before this five-minute cutoff compared to the control group after award introduction. There are no other improvements in *minutes late* when compared to the control group.

The results on *single absences* also support Hypothesis 2. The positive and significant results for both “high tardy” and “low tardy” employees suggests both groups were significantly more likely to take an isolated day off. Our interviews suggest this result was caused by employees calling in sick on days they otherwise would have arrived late. It is inconceivable that the award caused employees to become briefly sick more often, but it is consistent with agency theory predictions that employees would call in sick to maintain award eligibility.

Table 4 Subsample Analysis on “Tardy” and “Absence”

Dependent variable:	(1) Tardy	(2) Tardy	(3) Absence	(4) Absence
Sample:	Low tardy	High tardy	Low tardy	High tardy
Treatment	0.001 (0.004)	−0.020** (0.008)	0.021** (0.008)	0.000 (0.008)
Constant	0.002 (0.004)	0.035*** (0.010)	0.050*** (0.013)	0.051*** (0.012)
Time controls	Y	Y	Y	Y
Worker FE	Y	Y	Y	Y
R ²	0.015	0.046	0.024	0.017
# of employees	116	102	116	102
Observations	23,502	27,047	27,114	30,799

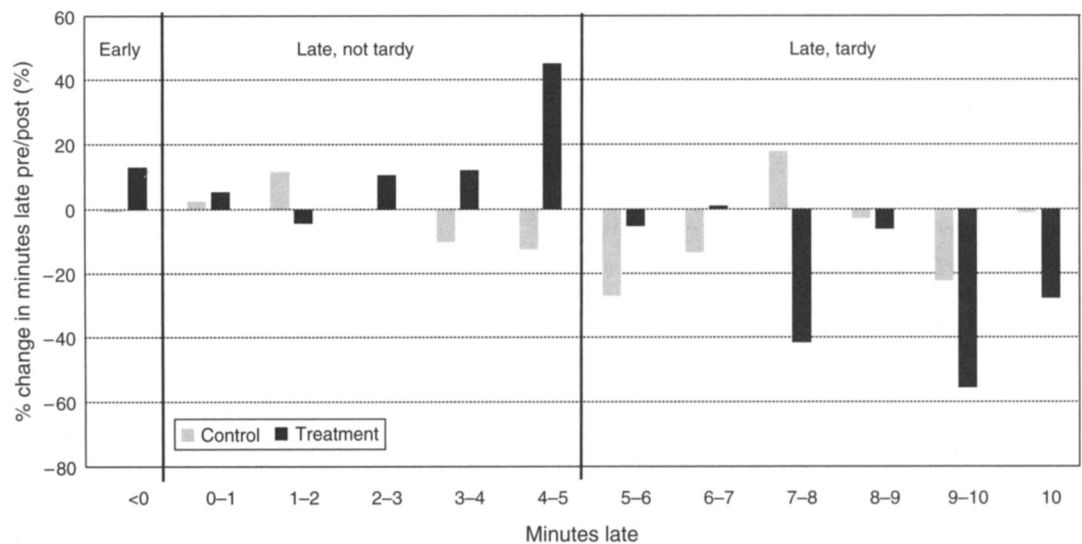
Note. Standard errors presented in parentheses are block bootstrapped with 400 repetitions.
Significance levels: **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

Table 5 Subsample Analysis on “Minutes Late” and “Single Absence”

Dependent variable:	(1) Minutes late	(2) Minutes late	(3) Single absence	(4) Single absence
Sample:	Low tardy	High tardy	Low tardy	High tardy
Treatment	−1.144 (0.730)	−0.319 (0.341)	0.006** (0.003)	0.006** (0.002)
Constant	−2.872*** (0.301)	−1.348*** (0.261)	0.026*** (0.007)	0.020*** (0.006)
Time controls	Y	Y	Y	Y
Worker FE	Y	Y	Y	Y
R ²	0.184	0.089	0.014	0.013
# of employees	116	102	116	102
Observations	23,502	27,042	27,114	30,799

Note. Standard errors presented in parentheses are block bootstrapped with 400 repetitions.
Significance levels: **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

Figure 3 Change in Minutes Late After Award Implementation for “High Tardy” Group



Note. Percentage changes represent changes from the initial baseline clock-in frequency for each minute interval.

We note that our evidence of manipulation by the “low tardy” workers suggests that the award may crowd out internal motivation, thereby supporting Hypothesis 4. Whereas the overall performance for the “low tardy” group on *tardy* and *minutes late* did not change, the award appears to shift internally motivated employees toward a reward-oriented lens that motivates gaming. Table 4 also suggests that low tardy employees are more likely to be absent overall after the award is introduced. Although there are several potential mechanisms for this result, our interviews suggest that the award caused “low tardy” workers to more carefully consider their paid time off time for plannable events such as vacations and nonurgent medical and dental appointments.

Reversion in Performance Once Ineligible

We next test Hypothesis 3 from agency theory that eligibility loss causes reward-motivated employees to revert to their previous poor performance. To do so, we split the *treatment* dummy variable into two separate indicators based on the employee’s status when clocking in on a given day: a *pre-fail* dummy indicating that she was award-eligible and a *post-fail* dummy that she was already disqualified for the current month. For each treatment day, one or the other of these variables equals 1.

The results for the *tardy* dependent variable are shown in Table 6. The “high tardy” group reduces its level of tardiness while eligible for the award (as shown by the negative and significant coefficient on the *pre-fail* dummy). However, because the *post-fail* coefficient is not significantly different from zero, it is also not significantly different from the *pre-fail* coefficient (*T*-test *p*-value = 0.64), so we cannot reject either the possibility of habituation or of reversion to pre-award levels. The inconclusive evidence on motivation reversion (Hypothesis 3) may simply reflect insufficient sample size, especially given

the relatively low number of workers who are disqualified from the award in a given month (approximately one-third).

In sum, the subsample analysis strongly supports Hypotheses 1 and 2 and provides inconclusive evidence of Hypothesis 3. Reward-motivated employees improve on the awarded task, but they also game program rules through single absences and barely avoiding tardies. Therefore, our results corroborate existing research on the benefits of awards in motivating certain workers but also suggest that awards generate gaming behavior consistent with responses to monetary rewards.

Crowding Out Internal Motivation

Table 6 also provides direct evidence for Hypothesis 4—that the extrinsic award crowds out internal motivation.

Table 6 Effect of Losing Award Eligibility on Tardiness

Dependent variable:	(1) Tardy	(2) Tardy	(3) Tardy
Sample:	All	Low tardy	High tardy
Pre-fail treatment	−0.017** (0.006)	−0.002 (0.003)	−0.021* (0.009)
Post-fail treatment	−0.010 (0.009)	0.045* (0.021)	−0.016 (0.010)
Constant	0.020*** (0.006)	0.002 (0.004)	0.035*** (0.010)
Time controls	Y	Y	Y
Worker FE	Y	Y	Y
R ²	0.053	0.017	0.046
# of employees	218	116	102
Observations	50,549	23,502	27,047

Note. Standard errors presented in parentheses are block bootstrapped with 400 repetitions.

Significance: **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

The positive and significant coefficient on *post-fail* for the “low tardy” group suggests that once a “low tardy” employee is disqualified for the month’s award, she is 5.5 times more likely than “low tardy” control employees to have a second attendance or punctuality failure (p -value < 0.05). The non-effect in the pre-fail period also supports our argument that extrinsic rewards provide an ambiguous prediction of an internally motivated employee’s performance while still eligible for the award. We note, however, that the already high performance of “low tardy” workers limits (but does not eliminate) potential for improvement.

Negative Motivational Spillovers on Nonawarded Tasks

We next examine the award’s effect on performance in a separate task domain—efficiency. Since the daily efficiency measure of LaundryCo employees is based on precise working time, their performance, and thus their hourly pay, is unaffected by punctuality or attendance. This is especially true because exact punctuality on a given day generally does not affect take-home pay; employees clocking in seven or less minutes late are paid as if they started on time. In only 1.8% of observations do employees clock in eight or more minutes late. Our results are not affected by using only the 98.2% of observations in which an employee is no more than seven minutes late. Therefore, any increased effort or attention to punctuality will not in itself reduce efficiency through an overall effort constraint. The two tasks are simply not linked in any way.

We first analyze whether the award introduction affected employee efficiency on laundry tasks. The results in columns 1 and 2 of Table 7 show that internally motivated “low tardy” employees suffer an efficiency drop of over nine points, an 8% reduction. In contrast, the efficiency of “high tardy” workers does not change, consistent with reward-motivated employees not finding the award to be inequitable or unfair. This result also suggests that alternative explanations for the reduced efficiency, such as workers interpreting the award as a signal from managers about relative task importance, are unlikely, since only the low tardy group was affected.

We next address another alternative explanation. If, as we argue, internally motivated workers are truly upset about the award itself, then negative spillovers to efficiency should occur immediately. Alternatively, if motivation for this second, unrelated task decreases because of lost eligibility, we would see the effect only after eligibility is lost. Columns 3 and 4 of Table 7 show results broken down by eligibility. As Hypothesis 5 predicts, the efficiency reduction appears larger while the “low tardy” employee is still eligible; the result on the *post-fail* dummy is also positive, but with a p -value of only 0.17, likely because there are few employee-days for the “low tardy” group in the *post-fail* cell. The coefficients for *pre-* and *post-fail*

Table 7 Treatment Effects on Efficiency by Employee Type

Dependent variable:	(1) Efficiency	(2) Efficiency	(3) Efficiency	(4) Efficiency
Sample:	Low tardy	High tardy	Low tardy	High tardy
Treatment	−9.551** (3.273)	2.052 (4.415)		
Pre-fail treatment			−9.815** (3.431)	2.018 (4.535)
Post-fail treatment			−9.327 (6.735)	3.152 (4.011)
Constant	97.725*** (22.685)	125.307*** (8.822)	118.871*** (3.016)	127.393*** (3.388)
Time controls	Y	Y	Y	Y
Worker FE	Y	Y	Y	Y
R ²	0.547	0.495	0.549	0.506
# of employees	109	97	109	97
Observations	22,450	26,263	21,303	24,822

Note. Standard errors presented in parentheses are block bootstrapped with 400 repetitions.
Significance: * p < 0.05, ** p < 0.01, *** p < 0.001.

are nearly identical (T -test p -value = 0.94). Consistent with our theory, the reduced efficiency occurs immediately and is not from eligibility loss.

A final alternative explanation is that “low tardy” workers, whom we argue are internally motivated, are instead more reward motivated to achieve bonus pay. With this explanation, “low tardy” workers should also have high efficiency. Yet Table 2 shows a small negative correlation between the two variables; “low tardy” and “high tardy” workers have similar average pre-award efficiency (121.16 versus 121.76). Furthermore, splitting the “low tardy” group into high- and low-efficiency subsamples shows no response difference by groups: “low tardy” workers with low efficiency have similar award responses to “low tardy” workers with high efficiency.

Considering this evidence, we do not believe reward-based motivation can explain differences in pre-award attendance behavior. Consistent with our theory of negative spillovers resulting from reduced internal motivation, we see immediate, sustained decreases in efficiency only for the “low tardy” employees who had high pre-award internal motivation toward attendance.

Award Removal

In theory, several of our hypotheses could be further tested by examining attendance behavior after LaundryCo removed the award. Existing research suggests that long-term costs from demotivation following program termination may be even greater than the short-term gains from the award introduction (Meier 2007). However, managers at Plant 1 revealed in interviews that once they were forced to stop the award program, they increased management attention to tardiness issues through more frequent warnings, formal write-ups, and communication

Table 8(a) Effect of Removing Award by Pre-Award Level of Tardiness

Dependent variable:	(1) Tardy	(2) Tardy	(3) Minutes late	(4) Minutes late
Sample:	Low tardy	High tardy	Low tardy	High tardy
Treatment	0.001 (0.004)	−0.020** (0.008)	−1.068 (0.723)	−0.322 (0.338)
Post-removal treatment	−0.003 (0.005)	−0.034** (0.012)	−0.002 (1.195)	−0.896* (0.432)
Constant	0.004 (0.005)	0.033*** (0.009)	−2.888*** (0.317)	−1.480*** (0.258)
Time controls	Y	Y	Y	Y
Worker FE	Y	Y	Y	Y
R ²	0.004	0.007	0.018	0.008
# of employees	116	102	116	102
Observations	28,270	32,388	28,270	32,383

Note. Standard errors presented in parentheses are block bootstrapped with 400 repetitions.

Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 8(b) Effect of Removing Award on Efficiency

Dependent variable:	(1) Efficiency	(2) Efficiency
Sample:	Low tardy	High tardy
Treatment	−9.099** (3.222)	2.527 (4.055)
Post-removal treatment	−15.477* (6.285)	−6.718 (6.762)
Constant	98.142*** (23.105)	124.969*** (8.548)
Time controls	Y	Y
Worker FE	Y	Y
R ²	0.016	0.025
# of employees	109	97
Observations	26,419	31,454

Note. Standard errors presented in parentheses are block bootstrapped with 400 repetitions.

Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

to workers about the importance of punctuality. This means that estimates of the effect of eliminating the award program are confounded with increased management attention to tardiness.

Still, our estimates of award removal on the two employee groups, shown in Tables 8(a) and 8(b), show interesting results. High tardy employees continue to reduce their tardiness, but also increase their timeliness, as shown in the negative and significant coefficient on *minutes late* for the “post-removal” treatment variable in the “high tardy” group. This result suggests that management scrutiny results in the same effect as the award, but without the gaming. Perhaps more interestingly, the lower efficiency for the “high tardy” group remains, suggesting that award removal did not cause this group to

revert to pre-award levels of beneficial productivity. This finding is similar in spirit to the well-known result of the introduction and removal of a fine for tardiness at an Israeli day care center leading to permanent increases in tardiness (Gneezy and Rustichini 2000a).

Site Interviews on Empirical Results

We presented our results to the LaundryCo executive team and to the Plant 1 managers. They were unsurprised by the improvement in punctuality and attendance exclusively in workers with previous problems and by the gaming behavior. They were surprised by the productivity decrease, despite having heard fairness concerns about the award program from some workers. One manager noted: “We did hear some grumbling. The ones that were showing up on time [before the award was introduced] were wondering why everyone was now being rewarded for something they were already doing . . . [These individuals were saying] ‘we have been doing this all along, but haven’t got anything special.’” Another manager noted: “Employees were divided about the program. It was about 50/50 on who seemed to like the program.” The plant managers also heard “low tardy” employees express optimistic expectations of winning the drawings: “These were the people that usually came on time anyways, and so were always in the hunt [to win].” However, most gift card winners were “high tardy” workers, which may have deepened feelings of unfairness among internally motivated “low tardy” workers. The senior corporate management took our results as confirmation of their belief that employees shouldn’t be rewarded for things that they are expected to do anyways, as it creates fairness problems among workers.

Empirical Limitations

Like similar studies, ours has limitations. First, worker assignment to treatment and control groups was not random, and there were group differences such as the unionized treatment plant. These fixed differences are “differenced out” by the DiD methodology, but this approach does assume common time trends across groups. Our interviews revealed that except for an annual health screening initiated for control plant employees in April 2011,¹ managers reported no policy or management changes near the award introduction.

We cannot definitively prove the mechanism by which the attendance award reduced some workers’ efficiency, but our crowding out explanation is theoretically appealing given strong laboratory evidence on this mechanism. Several alternative explanations exist besides intrinsic motivation, such as prosocial tendencies or individual differences in response to social pressure. As discussed above, our empirical results are inconsistent with these alternatives. However, as in most field studies, our interpretation is speculative, since we cannot directly measure the intrinsic motivation that might have caused high

pre-award attendance. Our results do show, however, that whatever the motivational mechanism was, the award reduced it for some employees.

Discussion and Conclusion

This study shows awards can carry substantial costs stemming from three factors: gaming the program rules, crowding out the motivation of workers already internally motivated toward the task, and most crucially, negative motivational spillovers to other important yet independent tasks. We found that although reward-motivated employees responded positively to the award by improving punctuality, this improvement did not persist once eligibility was lost, and that these employees frequently maintained eligibility though gaming behaviors that included absences and arriving just before the five-minute tardy cutoff. We also found that internally motivated employees experienced increased tardiness after losing award eligibility, and significantly decreased laundry-task efficiency after award implementation. Taken together, our results contrast with the burgeoning literature showing purely beneficial effects from awards and other programs that promote social recognition of high performers. Although our results corroborate many award benefits, these gains were driven entirely by the subset of reward-motivated workers who lack internal motivation for consistent attendance and punctuality. In contrast, the costs of the award program came from all workers.

The negative motivational spillovers and other award program costs had large financial implications for LaundryCo. The managers anticipated the direct award cost of \$75 per month (gift card) to easily “pay for itself” as better attendance reduced bottlenecks and improved productivity. However, aggregating our coefficient estimates suggests minimum monthly program costs between \$1,497 and \$3,302—at least 1.4% of total labor costs. Most of this cost came from reduced worker efficiency of 1.4 to 3.1% and increased single absences that reduced overall output by 0.6%. Although these absences may replace future PTO days, managers noted that any absence without advance notice is costly. These costs dwarfed both the \$75 monthly gift card cost and the 0.12% worker output increase from additional working minutes from the award, with the award costing at least 20 times more than management anticipated. Given that a 1% plant efficiency decrease is equivalent to losing one-third of a worker, these results demonstrate significant costs to firms that fail to implement awards wisely.

Our negative motivational spillover results complement the important study by Neckermann et al. (2014) that shows positive spillovers from an award program. Comparing the two studies highlights why more nuanced and comprehensive theory on awards is needed. The awards in their setting were for positive behavior identified by managers, with criteria revealed to workers after the

award was given. Thus, reward-motivated employees could not change behavior in order to win. Also, the positive spillovers they document may simply have been employees inferring what behaviors managers would choose to reward next. In our study, the criteria for winning were known in advance. Both types of awards—those that ex-post recognize undisclosed behavior and those governed by established ex-ante rules—are widely used (Larkin 2010, Garr 2012). As with monetary incentives, award programs vary on many dimensions. As award types vary, so too will costs and benefits. Therefore, we caution in applying our results to all award types. The major takeaway of this paper is not that awards are universally negative, just as the existing literature is wrong to imply that awards are universally positive. Rather, our results point to the need to carefully consider the benefits *and* costs of awards programs.

One major contribution of this study is to combine the careful cost-benefit approach of economics with social psychology’s attention to nonmonetary motivational factors to inform broader firm policy and strategy (Larkin et al. 2012, Nickerson and Zenger 2008). In contrast to prior work, our results suggest that awards act more like monetary incentives than subtle nudges. The fact that awards rarely carry great monetary value does not mean they only subtly influence worker behavior. A corporate award is, after all, a formal program designed by management to provide extrinsic rewards and not simply a small difference in framing. This study provides further evidence for combining the strengths of both approaches: the holistic, cost-benefit lens of economics and the realistic biased and emotional model of human behavior from social psychology.

We hope that this paper helps scholars and practitioners design award programs more systematically. Many corporate award programs do not recognize heterogeneous employee motivation, multiple tasks, nor that beginning to formally recognize future performance on a task may seem unfair to those who previously performed it well. Our results suggest future work must define critical award parameters that generate both benefits and costs. Motivational responses to the goals inherent in award programs, for example, are likely to be important yet complex factors (Shapira 1989). Future work must also follow Gallus and Frey (2015) in exploring how award efficacy depends on production technology and other organizational design elements.

Although our study does not directly show crowding out, it does suggest that employees who previously performed well without explicit reward or compensation—showing up consistently on time—reduced this behavior after award introduction. Crowding out is usually applied to monetary rewards, with recent work suggesting that nonmonetary rewards do not, for example, reduce prosocial blood donations (Goette and Stutzer 2008, Lacetera et al. 2012). In contrast, our results suggest that crowding out may

also apply to extrinsic but nonmonetary rewards such as corporate awards. In addition, crowding out usually is studied for the now-compensated task. Our results suggest that compensating one task can also crowd out completely different tasks, the first evidence of such negative motivational spillovers of which we are aware.

Finally, our study suggests that antecedents of negative motivational spillovers require further research. Awards are rarely used for workers' primary tasks, which are typically rewarded through monetary compensation (Garr 2012). In our setting, the less-important awarded task was attendance, whereas the primary efficiency task was financially compensated. Our theory and empirical results suggest that even without a common effort or attention constraint, a reward introduced for a less important task may spill over to the primary task. Future work must unpack the mechanisms underlying negative motivational spillovers because, as our study shows, the economic costs to individual and organizational performance can be substantial.

Supplemental Material

Supplemental material to this paper is available at <http://dx.doi.org/10.1287/orsc.2016.1047>.

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Endnotes

¹See Gubler and Pierce (2014) for details on the wellness program.

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