

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 had 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 motivation spillovers result from the 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.

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 and productivity toward 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 non-reward based motivation (Deci et al. 1999).

These and other costs of monetary rewards are one reason managers use nonmonetary but still extrinsically oriented rewards, such as status and prestige from award programs (Silverman 2004). Corporate award programs are one of the most common nonmonetary extrinsic rewards in firms (Frey 2007), with over 80% of corporations using award programs such as "employee of the month," "top sales club," and awards for innovative ideas (Garr 2012). Academics have only recently studied such programs (Frey and Neckermann 2008), with new work arguing that awards motivate employees through mechanisms that include 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 long-running practitioner claims (Davidson 1999), this literature argues that corporate 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 program implementation costs typically assumed in prior work. Using insights from agency theory, we argue that although the "reward-motivated" employees who are primarily driven by extrinsic rewards will indeed positively respond to awards, they will game the program rules in the same way they would a compensation system, acting purely to

maintain eligibility and reverting to weak performance when eligibility is lost. Applying insights from social psychology and behavioral economics, we additionally argue that awards will crowd out intrinsic and prosocial motivation in “internally-motivated” employees (Grant 2007; Saueremann and Cohen 2010)—which are those employees who performed highly even 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 in an organization. Multitasking theory typically holds that two tasks must share an effort constraint in order for rewards on one task to reduce performance on the other nonrewarded task. We argue that even absent a common effort constraint, motivation and productivity in a non-awarded task can be reduced by the introduction of an award, due to the award program violating a psychological contract between the firm and its internally motivated employees based on equity and reciprocity. The award program, by providing the same reward to externally-motivated employees who previously paid little attention to the now-awarded task, insufficiently acknowledges the prior unrewarded contributions of employees who had already been doing the task well for non-reward based reasons.

We empirically test these arguments using data from an attendance award program implemented in 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 attendance award program that recognized all employees with perfect attendance, and awarded one such employee, randomly selected from all those with perfect attendance in that month, a \$75 gift card. Perfect attendance was defined to cover both punctuality and a lack of unexcused absences. The independent implementation of the award at only one 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 single “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 employees took actions to stay eligible for the award, even when those actions ran contrary to the spirit of the award. Furthermore, once an employee became disqualified for the award in a given month, she immediately reverted to her pre-award level of attendance and punctuality, suggesting that the award did not increase baseline motivation for good attendance.

Most importantly, we find significant evidence that employees who were previously 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 implemented at the treatment plant cost the 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 commonly seen in financial rewards. We highlight individual differences in reward-based and internal motivation levels that shape the relative importance 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 these 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.

Both theoretical and empirical research (Huberman et al. 2004; Frey 2006; 2007; Kosfeld and Neckermann 2011) argues peer recognition to be the primary mechanism by which awards improve employee motivation and performance. Although other motivational mechanisms such as increased 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 strong evidence that employer and peer recognition primarily drive award-based performance effects. This is consistent with evidence from economics (Mas and Moretti 2009) and management (Blanes i Vidal and Nossol 2011) that workers improve when observed by peers. It is difficult, however, to unpack the exact mechanisms by which awards influence behavior because they often present similar empirical predictions.

Existing studies of awards are quiet, however, on the mechanisms through which corporate awards might produce substantial costs to a firm, a fact recognized by scholars. Both Neckermann and Frey (2013) and Gallus and Frey (2015), for example, cite the present manuscript as the only study to examine negative effects. Existing research instead explicitly considers only two competing hypotheses on the effect of awards on motivation: increased motivation and no effect. Kosfeld and Neckermann's influential experimental study (2011) 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 while 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 are consistent with this exclusive focus on award benefits, finding that awards positively affect the motivation and/or task performance of at least some workers. These results hold across many empirical settings, including surveys of corporate employees (Neckermann and Frey 2013), short-term motivation experiments with students (Kosfeld and Neckermann 2011), and field experiments with corporate (Neckermann et al. 2014) and non-profit (Ashraf et al. 2014) employees. One study suggests that a sales award carrying significant prestige and visibility, but no monetary reward, motivates salespeople to sacrifice nearly 5% of their compensation to win (Larkin 2010). Critically, studies have found that awards can improve not only core productivity tasks (Bradler et al. 2014), but also important ancillary tasks such as attendance (Scott and Markham 1982; Markham et al. 2002).

The underlying assumption driving this costless awards model is that non-pecuniary rewards avoid most of the economic and psychological problems associated with money. Frey (2007), in a seminal paper on awards, lists a number of ways in which awards fundamentally differ from monetary compensation, including their low monetary costs, their establishment of a “special relationship” (p. 7) between employees and employers (unlike money), and their lower likelihood of crowding out intrinsic motivation. Yet there is growing evidence that non-monetary rewards may indeed generate many of the same behavioral responses as money. Foundational neuroscience studies using functional magnetic resonance imaging (fMRI) have shown monetary rewards and social comparison stimuli to activate common areas of the human brain (Fliebsbach et al. 2007; Lin et al. 2012). Larkin’s (2010) study of software salespeople also showed that they 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 the existence of what we will call “reward-motivated” employees—those workers who lack the intrinsic or prosocial motivation to perform highly on the task without a 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 their maximal level. 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; Mas and Moretti 2009; Grant and Gino 2010; Wrzesniewski et al. 2014). Empirical studies usually find it impossible to distinguish between pure intrinsic motivation and extrinsic social factors (Larkin et al. 2012). However, absent a formal corporate reward for an activity, both of these motivators stem from non-reward factors. In this research, we study the introduction of a formal corporate reward. Consequently, whether “reward-motivated” employees are truly intrinsically motivated or are motivated by extrinsic social factors is not key to our argument or analysis.

The vast literature on employee motivation commonly uses task performance as a proxy for employee motivation (Lawler 1973). An employee’s intrinsic motivation is commonly proxied by performance absent any reward (Deci and Ryan 1985). The effect of rewards on motivation are similarly measured using performance changes following adjustments to incentive elements such as goals (Locke et al. 1981) and monetary rewards (Lazear 2000). We follow this convention in our study, although we recognize that performance is an imperfect (but likely 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, an important component of our setting is the absence of long-term career-based rewards such as promotion, which might extrinsically motivate high performance even without short-term formal rewards.

Thus, for reward-motivated employees – those with low internal motivation towards a task absent formal rewards – our extension of agency theory to the awards setting predicts:

Prediction 1: *The introduction of an award program for a previously unrewarded task improves reward-motivated employee performance on that task.*

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). Theory and empirical evidence

find that employees openly act in ways contrary to the principal's interest, and against the spirit of the reward system, if their rewards increase by doing so—a behavior called “gaming” (Oyer 1998; Prendergast 1999). Widespread evidence shows that gaming behavior is common in monetary reward systems, and can be extremely costly to firms (Kerr 1975; Oyer 1998; Frank and Obloj 2014). For example, Larkin (2014) demonstrates that salespeople will offer price cuts to customers that directly cost their employer 6-8% revenue, if the customers agree to shift the purchase timing in order to increase the salesperson's commission.

Because prior work has clearly demonstrated that awards influence the motivation of at least some employees, the changed behavior will likely be at least partly strategic in nature. As a formal program, any corporate award has rules for determining winners; these rules may not be fully disclosed to employees, but almost always are to some extent (Frey 2007). If employees at least partially respond to awards rationally and strategically, agency theory would predict employees to manipulate rules to improve their chance of winning.

Prediction 2: *Employees who respond to an award with increased performance will achieve some of this increase by manipulating the rules of the system in ways costly to the employer.*

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). For example, tournament-based compensation systems can strongly demotivate low performers once their likelihood of winning approaches zero (Carpenter et al. 2010; Casas-Arce and Martínez-Jerez, 2009; Boudreau et al. 2011), which 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 2012; Allcott and Rogers 2014).

The awards literature is largely silent on motivation after eligibility loss, although some work speculates that motivation from awards might endure due to increased organizational loyalty (Neckermann et al. 2014). If instead awards act more like monetary rewards, as we argue, then the likely or certain loss of award eligibility will cause a *motivation reversion* that returns employees to pre-award levels of motivation and performance. Even in the many awards systems that instead of a tournament, grant the award to any qualifying worker (Garr 2012), program rules may make employees ineligible to win long before the award period is over. Consequently, motivation reversion is also expected in the many awards based on absolute performance such as the one in

our setting. The reward-motivated employee will revert to her pre-existing preference to avoid maximal effort after losing the chance of winning the award, even if the award program is still in place.

Prediction 3: *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 the introduction of extrinsic rewards can reduce—or crowd out—intrinsic motivation through a number of mechanisms (Deci and Ryan 1985; Frey and Oberholzer-Gee 1997). Desire for competence on the job, for example, can be crowded out as an external reward shifts a behavior from signaling competence to signaling reward responsiveness (Gneezy and Rustichini 2000a; Deci and Ryan 2002). Later research has focused on the mechanism of image (Ariely et al. 2009; Benabou and Tirole 2006; Grant and Mayer 2009; Lacetera and Macis 2010), where an external reward such as an award can shift the external perception 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.”

Laboratory and field evidence on crowding out abounds, yet only a few recent papers provide evidence from firms (Holmas et al. 2010; Bareket-Bojmel et al. 2015; Hossain and Li 2014). In some ways, this is unsurprising: firms more often track performance data for tasks that they reward than for nonrewarded tasks. Also, previous research has not examined the introduction of a reward for an unrewarded activity and the subsequent removal of it. Even if crowding out exists, the effect of the reward introduction on overall motivation is ambiguous because it depends on the relative magnitudes of the gain in extrinsic motivation and the drop in intrinsic motivation (Gneezy and Rustichini 2000b). While the award is in place, these employees will have increased extrinsic but decreased intrinsic motivation, yielding an ambiguous overall effect.

However, crowding out theory unambiguously 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 would predict eligibility loss to lead to lower motivation than existed before the award program for employees with previously high levels of internal motivation. We therefore predict:

Prediction 4: *Performance on the non-awarded task by internally-motivated employees will be lower than*

pre-award performance after eligibility loss.

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, they find 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 will reduce effort and performance on other tasks only when a tradeoff in effort or attention exists across the two tasks, providing no prediction of spillovers in the absence of such effort tradeoffs. Our theory of negative motivational spillovers focuses precisely on this case, proposing that the internal motivation of employees is linked across tasks. Consequently, an award introduction for one task will reduce motivation and performance on another task specifically for those employees who are internally-motivated on the awarded task.

Why might internal motivations for two tasks be related? The theory of psychological contracts holds that employees form an implicit exchange agreement with employers that governs their overall relationship and influences their individual day-to-day actions (Rousseau 1990; Rousseau and Greller 1994). Notably, some employee actions are governed by reward-based transactional considerations such as the exchange of compensation for productive effort. However, employee actions are also often relational, and are governed not only by explicit rewards, but by a more complex implicit contract involving loyalty, reciprocity, and shared values (MacNeil 1985; Robinson and Rousseau 1994). An abrogation by the employer of a part of this implicit contract can reduce overall job motivation for those employees who value the affected part of the contract. The introduction of an extrinsic award may be seen as a violation of the contract, and in turn could affect the performance of the awarded task as well as other tasks governed by the relational contract.

Perceptions of fairness and equity are critical to the maintenance of implicit contracts (Robinson and Rousseau 1994). The crucial insight from equity theory (Adams 1965) is that individuals compare the ratio of their rewards to their contributions with the ratios of others (Festinger 1954). Consequently, even if an award is Pareto improving for all workers, it can generate perceptions of inequity and unfairness by changing the relative reward-contribution ratios. If, as in Prediction 1, reward-motivated employees increase performance on the awarded task and match the prior high performance of internally-motivated employees, this will equalize the ratio of expected rewards and effort in that period across the two employee types. Yet internally-motivated employees will be keenly aware of the inequity of contributions to rewards *across* periods. The implementation of the award program creates feelings of inequity by failing to recognize and reward *prior* unrewarded contributions by internally-motivated workers. Furthermore, the award introduction would reclassify high performance as transactional rather than relational (Rousseau 1990), by introducing formal recognition for strong performance. Taken together, this increase in rewards will violate the psychological contract of employees who believed positive behavior in the awarded task to be part of the implicit contract.

Perceptions of inequity and unfairness have significant negative consequences for employee performance, both through decreased productivity and increased counterproductive behavior such as cheating and dishonesty (e.g., Greenberg 1990; Gino and Pierce 2009; John et al. 2014; Edelman and Larkin 2014). These counterproductive behaviors often occur outside the task that directly causes the inequity; indeed, the literature on psychological contracts suggests that contract breach leads to reductions in job attitudes such as loyalty, commitment, and overall job motivation that broadly affect many work behaviors (Cullinane and Dundon 2006). An employee's relational contract with the employer is complex and governs all nontransactional noncompensated portions of her work (Rousseau and Parks 1993).

Collectively, this implies that transactionalizing a task with an award will, in reducing loyalty, commitment, and overall motivation, reduce an employee's internal motivation for other tasks with relational components. The impact of this breach on internal motivation—and thereby on task performance—will occur only for internally-motivated employees who were highly motivated for the awarded task. This idea, which we term *negative motivational spillovers*, presents the following prediction:

Prediction 5: *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 non-awarded task to which a negative motivational spillover occurs need not be one for which motivation is purely intrinsic. Social psychologists (e.g., Deci and Ryan 1985) and economists (e.g., Benabou and Tirole 2003) have long recognized that employee task motivation is comprised of a mix of extrinsic and intrinsic factors. Our theory holds that as long as the employee's motivation stems at least in part from intrinsic or other non-reward factors, overall task motivation may be reduced.

Our theory also provides one clear empirical test versus other alternative explanations: negative motivational spillovers should happen immediately upon award introduction. This is because negative motivational spillovers from an award do not depend on award ineligibility. The mere introduction of the award will reduce motivation on the non-awarded 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 the two tasks in our study do not involve the effort tradeoff necessary for a pure multitasking explanation. In contrast to our prediction for internally-motivated employees, our theory does not propose negative spillovers for reward-motivated employees. This is because the task-based award does not violate an existing relational contract between these employees and the firm.

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* is complex. Each day, route-service representatives return soiled uniforms to go through a complex 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, inspecting to ensure that garments with missing buttons or other

problems are fixed, and sorting for the quick loading of clean garments to return to customers. Non-uniform 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, amongst 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* give 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 barbeques, 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 using a bonus system, with a guaranteed base hourly rate and hourly wage

bonuses for daily efficiency scores above 100, up 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 study's treatment plant uses a linear wage increase as efficiency increases from 100 to 140. The four other plants give employees 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 appendix). Interestingly, over 50% of employee-days in the pre-treatment 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.

Given the externalities generated by the plant's upstream-downstream nature, arriving consistently and on time is essential to plant productivity. Tardiness and unexpected absences both hinder plant productivity, since one plant section may be understaffed. Even if the plant manager finds a substitute for that section, the substitute must abandon another task and will likely be less productive in the job than the missing worker. *LaundryCo* therefore has relatively detailed policies on tardiness and attendance. Repeated tardiness first precipitates a written warning from the plant manager. The third warning in a year results in suspension from work, and the fourth termination. However, *LaundryCo* leaves the administration of this policy to individual plant managers, who are usually lenient towards slight or occasional tardiness. The difficulty and cost of finding and training replacements discourages managers from terminating 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 referred to as “Plant 1” or “the treatment plant”) implemented an award program that recognized employees with perfect attendance in a given month and awarded one of them, randomly selected, 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, meaning that the expected value of the award was less than \$4, the equivalent of about 20 minutes of work. The expected monetary value of the award is therefore negligible.

As part of our research, we interviewed *LaundryCo* managers about the attendance award program.¹ The managers at the treatment plant stated that they introduced the award because certain employees’ punctuality and attendance problems were affecting 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 problems differed from other plants. Interviews with managers at other plants corroborate that the treatment plant did not differ on attendance and punctuality.

Treatment plant managers did not discuss their plan with the executive team at *LaundryCo* or with managers of other plants. They believed the award would be a cost-effective way to improve attendance and punctuality, expecting that the close-knit plant culture and the shared work history of many employees would make the competition and the chance for any employee with perfect attendance to win motivational. In short,

¹ The appendix contains more details from our interviews and managers’ interpretation of our study’s results.

the managers felt that even if the plan failed, \$75 in gift cards per month was a small investment and the maximum expected cost of the program (apart from the minimal managerial time needed to run the program).

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 [coming on time to work each day].” They therefore terminated the award program after hearing about it in a company human resource meeting in early December 2011. The treatment plant managers were disappointed when the program was ended, and while they understood top management’s objections, they also felt that many employees liked the program and that it had improved attendance and punctuality. They did admit that while they had heard some “grumblings” from employees about the fairness of the award program, they hadn’t considered the negative impact this discontent might have on motivation or efficiency.

Methods

Empirical Strategy

The introduction of the award at one plant and the existence of several similar plants without awards 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 attendance award on the punctuality, attendance, and efficiency of Plant 1’s workers. The DiD design treats *LaundryCo*’s other four 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 that spans two periods: the period before Plant 1 introduced the award, which we call the “pre-award” period (12 months), and the period when Plant 1 had the award program in place, which we call the “award period” (9 months). These data include punctuality and attendance measures, as well as daily worker efficiency measures for 218 workers in five 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, whether the employee was absent or not, and

demographic variables such as tenure, age, gender, and marital status.

Employees generally had set shift times, but these sometimes changed slightly due to seasonal demand. We did not have access to *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 the plant manager at Plant 1, and he agreed that 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 in which an employee worked less than 7.5 hours of an 8.5 hour shift, and dropped observations that indicated a worker was more than an hour early or late for a shift. This affected less than 1% of the weekday observations, and our results are highly similar when including these observations.

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 attendance award program. *Tardy* is a dummy variable indicating that a given worker showed up 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 showed up to work; it has a negative value if the employee clocked in and started working early. *Absent* is a dummy variable indicating that the worker was absent from work 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 because managers suggested severe outliers were likely errors. Using nonwinsorized data does not significantly change our results.

Validity of Difference-in-Differences Approach

DiD strategies do not require that treatment and control groups be the same, and are explicitly designed to

allow comparison of treatment and control groups differ in observable ways (Gertler et al. 2011). Any difference in the two groups that does not change contemporaneously with the treatment event does not affect the statistical estimates of treatment. In our case, however, the treatment and control plants are very similar on most dimensions. All five plants work on the same range of 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), and therefore help control for local shocks, such as weather, that might affect tardiness. All five plants had the same attendance policies and enforcement procedures.

The biggest difference between Plant 1 and the control plants is that Plant 1 is unionized. This creates some differences between the two groups, as seen in Table 1 (see appendix for employee-level statistics). Although employees in both groups have similar ages, those at Plant 1 have higher tenure and wages, and include more males. However, Plant 1 employees had tardiness and attendance levels similar to those of control plant workers. Since DiD studies “difference out” fixed differences between treatment and control groups, only differences which change across time can bias results (Gertler et al. 2011). 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 period. Finally, there were no unusual instances of turnover in Plant 1 during the award period that might impact our results. Although the treatment plant experienced lower turnover because of unionization, this is unlikely to bias our results. Because we will use individual worker fixed effects in our model, bias would occur only if higher turnover in the other plants disproportionately occurred among workers whose attendance or efficiency *trends* were nonrepresentative – not if *levels* of attendance or efficiency were different. Our interviews and the data reveal no such trends. Moreover, restricting our analysis to employees who are employed for the full sample does not change the study’s results. Thus, any pre-existing differences in treatment and control plants appear stable and 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.

-----INSERT TABLE 1 HERE-----

Empirical Specification

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

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

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 the award program went into effect and 0 otherwise, and $TREAT_GRP*POSTTREAT$ is the interaction of the two previous variables. The coefficient on this interaction (β_3) estimates the treatment effect; to conserve space, we simply label this variable as *treatment* in the results tables. Our specification takes advantage of the panel nature of the data by introducing a full set of fixed effects, including worker fixed effects (α_i), which account for unobserved worker heterogeneity, and time fixed effects (γ_t), which account for time trends across months, days in the month, and days of the week. In specifications with worker fixed effects, the variable $TREAT_GRP$ is absorbed. Similarly, $POSTTREAT$ is absorbed by the 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) due to 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). While 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 2009). Our results are robust to using logistic models. Table 2 presents correlations for the main variables used in our analyses.

-----INSERT TABLE 2 HERE-----

Results

Basic Treatment Effects

It is critical in DiD models to graphically investigate whether pre-trends in the data appear similar. Figure 1 plots average tardiness for treatment and control plants during our data period. The two lines for each group show a 4th-degree flexible spline for both pre- and post-treatment periods. While average tardiness is higher in the treatment plant, consistent with summary statistics in Table 1, the pre-treatment tardiness difference is largely constant. There is a slight uptick in tardiness near the March program start in the control plants, which our interviews suggest come from the holiday season, but the DiD estimator considers the entire pre-treatment period, not only the window just before treatment. After the award is introduced, there is an immediate, discernable reduction in tardiness at the treatment plant, while the control plant tardiness appears unchanged. The graph strongly suggests that the treatment event, and not different pre-treatment trends, led to the observed tardiness reduction in the treatment group. Again, the higher pre-treatment tardiness in Plant 1 is not in itself a concern, because the statistical estimator “differences out” this pre-existing difference.

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

-----INSERT TABLE 3 HERE-----

We dispel concerns of false positives due to serial correlation issues (Bertrand et al. 2004) through placebo tests, which we present in Table A3 of the appendix. We address two other typical confounds in DiD models in Figure 2, which shows monthly treatment effects from the award program. The large and precise treatment effect in the first month casts doubt that either an unobserved contemporaneous change or simple

mean reversion led to the identified effects. While it is impossible in field studies to definitively disprove such confounds, observing the plotted effect sizes over time helps alleviate concerns (Gertler et al. 2011). Finally, to ensure that our results did not depend on changes at a specific control plant, we repeated each regression four times, excluding one control plant from the analysis each time. All results remain highly consistent, with the exception of the *minutes late* result when excluding Plant 3. We note that our theory provides no prediction for this regression, since any change in *minutes late* would combine conflicting effects from improved tardiness and potential gaming, and because the award program is only based on tardiness and attendance, not *minutes late*.

-----INSERT FIGURE 2 HERE-----

Heterogeneous Employee Response

Since our theoretical predictions 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 twelve months *before* the award was put in place. Nearly 32% of workers had no tardies during that period, while 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 that exhibited frequent tardiness pre-award. We also repeated our models using alternative “low tardy” definitions that include every possible cutoff up to one tardy every four months as well as only those employees with no pre-award tardies. Our results are also robust to splitting the sample into three “no tardy,” “low tardy,” and “high tardy” groups.

The use of the tardy groupings to proxy for internally- and reward-motivated employees is admittedly imperfect. Some “high tardy” employees may be performing at their highest possible level on the attendance dimension, given constraints outside of work such as commute, family, and health. By our definition, since these employees were performing as well as they could, they should be classified as “internally-motivated.” However, lacking data on external constraints, we believe pre-award tardiness levels is the best available proxy

for pre-reward attendance motivation. We also note that should this proxy be invalid, the award should not differentially affect high and low tardy workers, and the bias therefore goes against our predicted effect.

There are two equivalent methods for comparing heterogeneous treatment effects in DiD models (Fink et al. 2012): 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 employees with perfect pre-award attendance compares the behavior of perfect employees at the treatment plant with perfect ones at control plants.

The effect of the award on *tardy* and *minutes late* is shown in Table 4. The “high tardy” group decreases its rate of *tardiness* by 2 percentage points, or about 36% from a baseline of 5.6%, supporting Prediction 1. While there is no corresponding reduction in *minutes late*, this non-result does not contradict Prediction 1, because *minutes late* was not part of the award program; only tardiness and absences were rewarded. In fact, the significant result for *tardiness* and non-result for *minutes late* provides initial evidence for Proposition 2—that reward-motivated employees game award eligibility rules by clocking in less than five minutes late, rather than by truly improving average punctuality. This effect can be seen clearly in Figure 3, which shows the percentage change for “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.

-----INSERT TABLE 4 AND FIGURE 3 HERE-----

Table 5, which shows the treatment effect on the *absence* and *single absence* variables, contains further evidence supporting Prediction 2. The positive and significant results on *single absence* 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 is consistent with agency theory predictions that employees would call in sick to maintain award eligibility.

-----INSERT TABLE 5 HERE-----

We note that our evidence of manipulation by the “low tardy” workers suggests that the award may crowd out internal motivation, thereby supporting Prediction 4. While 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 5 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 non-urgent medical and dental appointments.

We next test Prediction 3 from agency theory that eligibility loss would cause 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 (Prediction 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 1/3).

-----INSERT TABLE 6 HERE-----

In sum, the subsample analysis strongly supports Predictions 1 and 2, and provides inconclusive evidence of Prediction 3. Reward-motivated employees improve on the awarded task, but also game program rules through single absences and barely avoiding tardies. Our results therefore 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 Prediction 4—that the extrinsic award crowds out internal motivation. 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 ($p\text{-value} < 0.05$). The non-effect in the pre-fail period is also consistent with our argument that extrinsic rewards provide an ambiguous prediction of an internally-motivated employee’s performance so long as she is still eligible for the award. We note, however, that the already high-performance of “low tardy” employees mechanically limits their 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 their precise working time, their performance measure, and thus their hourly pay, is not affected 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 employees’ efficiency on their assigned laundry tasks. The results, shown in columns 1 and 2 of Table 7, show that internally-motivated “low tardy” employees suffer a drop in efficiency of over 9 points, a reduction of over 8%. In contrast, the efficiency of “high tardy” employees does not change, consistent with our argument that reward-motivated employees would not feel that the award violated their psychological contract. This result also suggests that alternative explanations for the reduced efficiency, such as workers interpreting the award as a signal from managers about the relative importance of tasks, are unlikely, since only the low tardy group was affected.

We next address another alternative explanation. If, as we argue, internally-motivated employees are truly upset about the attendance award itself, then the negative emotional spillover on efficiency should occur immediately. Alternatively, if they lose motivation for this second, unrelated task because of lost award

eligibility, we would not see the effect until eligibility is lost. Columns 3 and 4 of Table 7 show the same results broken down by award eligibility. As expected from Prediction 5, the efficiency reduction appears larger while the “low tardy” employee is still eligible for the award; 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 the *pre-* and *post-fail* dummies are nearly identical (T-test p-value=0.94). Consistent with our theory, the reduced laundry task efficiency occurs immediately and is not from award eligibility loss.

A final alternative explanation is that the “low-tardy” workers, which we argue are internally-motivated, are instead more reward-motivated to achieve bonus pay. Under this explanation, low tardy employees should also have high efficiency. Yet Table 2 shows a very small negative correlation between the two variables; in fact, “low tardy” and “high tardy” workers have similar average efficiency prior to the award (121.16 vs. 121.76). Furthermore, when splitting the “low tardy” group into high- and low-efficiency sub-samples, we see no distinguishable difference in response by the two groups; “low tardy” employees with low efficiency appeared to have a similar response to the award as “low tardy” employees with high efficiency.

Considering all 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.

-----INSERT TABLE 7 HERE-----

Empirical Limitations

Like many similar studies, ours has limitations. First, worker assignment to treatment and control groups was not random, and there were group differences such as the non-union status of the four control plants. These fixed differences, along with others, are “differenced out” by the DiD methodology, but this approach does assume common time trends across groups. We interviewed managers at the treatment and control plants and, except for an annual health screening offered to control plant employees in April 2011,² managers reported no policy or management changes near the award introduction. We also note that the monthly treatment model (Figure 2) shows the largest effects to occur in the month after treatment. This suggests that neither the health

² See Gubler and Pierce (2014).

intervention nor any other unobserved change not exactly correlated with treatment could explain our results.

It could also be that our results are due to poor planning or program administration and not the program itself. But interviews suggest that the managers carefully considered and administered the program. Interviews with corporate management also reflected high confidence in the competence of the Plant 1 managers. Still, in studies like ours, it is impossible to completely separate the effect of the program design, which has large external validity, from the effect of the management or implementation.

Finally, we cannot definitively prove the mechanism by which the attendance award negatively affected some workers' efficiency. Our explanation that the award crowded out intrinsic motivation is theoretically appealing, especially given strong laboratory evidence on crowding out. Also, as discussed above, our empirical results are inconsistent with at least two major alternative explanations. However, as in most field studies, this interpretation is speculative, since we cannot directly measure intrinsic motivation nor what motivated high pre-award attendance performance. Several other alternative explanations exist besides intrinsic motivation, such as prosocial tendencies or individual differences in response to social pressure. 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 award system's rules, crowding out motivation of those who were previously internally motivated towards the awarded task, and most crucially the motivation reduction for other important yet independent tasks. Our results stand in contrast to the burgeoning set of studies 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 costs from the award program had large financial implications for *LaundryCo.* The managers anticipated that the direct award cost of \$75 per month (the gift card) would easily “pay for itself” as better attendance reduced bottlenecks, thus improving productivity. However, aggregating our coefficient estimates allows us to estimate a minimum monthly program cost of

between \$1,497 and \$3,302—at least 1.4% of total monthly labor costs. The majority of this cost came from reduced overall worker efficiency of 1.4 to 3.1%, plus increased single absences that reduced overall worker output by 0.6%. Although these absences may simply replace future PTO days, managers noted that any absence without advance notice is costly. These costs dwarfed the \$75 monthly cost of the gift card, as well as the 0.12% increase in worker output from additional working minutes motivated by the award. At minimum, the award was thus at least 20 times more costly than anticipated by management. Given that a 1% plant efficiency decrease is equivalent to losing 1/3 of a worker, these results clearly indicate that awards can carry significant costs for firms that fail to implement them wisely.

The significant award costs identified in this study were predicted by integrating theory from economics and social psychology. Prior work has assumed that awards carry few if any of the costs of monetary rewards. However, our results suggest that awards act more like monetary incentives than subtle nudges. The fact that awards usually do not carry great monetary value does not mean they are only a subtle influence on 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.

Our negative motivational spillover results complement Neckermann et al.'s (2014) important study 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 announced to workers only after the award was given. Thus, reward-motivated employees could not change their 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, however, the criteria for winning were known in advance. As noted by Larkin (2010) and Garr (2012), both types of awards—those that ex-post recognize undisclosed behavior and those governed by established ex-ante rules—are widely used. As with monetary incentives, there are many dimensions on which award programs vary. As these award types vary, so too will their costs and benefits. We therefore caution readers in applying our results to all award types. The major takeaway of this paper is not that awards are universally negative, just as we believe that 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 attention to non-monetary factors that affect motivation. Economists have only recently considered the psychological effects of incentive programs. On the other hand, social psychologists have typically focused on individual responses to incentive programs, rather than on how behavioral responses impact broader firm policy (Nickerson and Zenger 2008; Larkin et al. 2012). This study provides further evidence that scholars must incorporate the strengths of both approaches: the holistic, cost-benefit lens of economics and the realistic model of human behavior, with biases and emotions, from social psychology.

We hope that another contribution of this paper is to help scholars and practitioners design award programs more systematically. Many corporate award programs do not account for heterogeneity in employee motivation or for multiple employee tasks. Nor do they consider that beginning to formally recognize future performance on a specific task may seem unfair to employees who had previously performed it well. Our results suggest future work must begin to define the critical award parameters that generate both benefits and costs. It must also explore how the efficacy of award types depends on production technology and other organizational design elements, important work recently begun by Gallus and Frey (2015).

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 for their shift—reduced this behavior after award introduction. The notion of 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 is usually focused on reduced motivation for actions that are compensated. Our results suggest that compensating one action can also lead to crowding out in a completely different realm, the first evidence of such negative motivational spillovers of which we are aware.

Existing research further suggests that the long-term costs from demotivation, particularly following program termination, may be even greater than the short-term gains that come from the introduction of an

award (Meier 2007). We obtained data from *LaundryCo* on attendance and efficiency after Plant 1 removed the attendance award; however, because the plant managers responded to the award removal with both increased emphasis on attendance and more strict application of existing disciplinary rules, we cannot unpack the effect of the award removal from this shift in managerial attention. Interestingly, our analysis of the post-removal data (results available on request) does show that the negative motivational spillovers to the efficiency of “low tardy” workers persisted even after award removal. This is consistent with Gneezy and Rustichini’s (2000a) study of Israeli daycare, where the introduction and then removal of a monetary fine led to long-term reductions in parent punctuality.

Finally, our study suggests that the antecedents of negative motivational spillovers require further research. Awards are rarely used for workers’ primary tasks, which are typically rewarded with monetary compensation (Garr 2012). In our setting, the less-important awarded task was attendance, while 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.

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Table 1: Descriptive Statistics at Worker/Day Level

TREATMENT Variable	<i>Pre-Award</i>					<i>Award Period</i>				
	Obs	Mean	Sd	Min	Max	Obs	Mean	Sd	Min	Max
Tardy	7126	0.04	0.20	0.0	1.0	5742	0.03	0.16	0.0	1.0
Minutes late	7126	-1.73	5.37	-59.7	54.0	5737	-2.19	5.10	-49.0	58.2
Total absences	7846	0.04	0.19	0.0	1.0	6318	0.05	0.21	0.0	1.0
Single absences	7846	0.01	0.07	0.0	1.0	6318	0.01	0.11	0.0	1.0
Daily efficiency	6576	125.6	32.4	54.5	218.0	5669	124.7	36.2	54.5	218.0
Late	7126	0.15	0.35	0.0	1.0	5742	0.10	0.29	0.0	1.0
Monthly absences	7861	0.79	1.65	0.0	8.0	6339	1.03	1.80	0.0	10.0
Total hrs worked	7861	8.25	1.64	0.0	23.7	6339	8.17	1.69	0.0	13.1
Tenure	7861	3373	2681	176	9262	6339	3186	2708	176	9262
Age	7861	43.51	10.05	21.0	62.0	6339	43.63	9.84	21.0	62.0
Male	7861	0.43	0.50	0.0	1.0	6339	0.43	0.49	0.0	1.0
Base salary	7861	25695	845	19240	28600	6339	25495	1363	19240	28600

CONTROL Variable	<i>Pre-Award</i>					<i>Award Period</i>				
	Obs	Mean	Sd	Min	Max	Obs	Mean	Sd	Min	Max
Tardy	23600	0.03	0.17	0.0	1.0	14081	0.02	0.15	0.0	1.0
Minutes late	23600	-2.12	4.73	-59.4	59	14081	-1.88	5.07	-59	59
Total absences	27449	0.05	0.22	0.0	1.0	16300	0.05	0.22	0.0	1.0
Single absences	27449	0.02	0.13	0.0	1.0	16300	0.02	0.12	0.0	1.0
Daily efficiency	22320	120.3	34.7	54.5	218.0	14148	125.3	35.6	54.5	218.0
Late	23600	0.17	0.38	0.0	1.0	14081	0.14	0.34	0.0	1.0
Monthly absences	27684	1.06	1.76	0.0	15.0	16474	1.13	1.78	0.0	12.0
Total hrs worked	27684	8.01	1.38	0.0	44.0	16474	8.09	1.25	0.0	16.37
Tenure	27684	1720	1920	4.0	8566	16474	1754	1992	60	8566
Age	27684	39.36	12.88	18.0	69.0	16474	39.87	12.79	19.0	69.0
Male	27684	0.34	0.47	0.0	1.0	16474	0.32	0.47	0.0	1.0
Base salary	27522	19850	4899	8320	48526	16474	197334	5167	8320	48526

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

Note: 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

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	Tardy	Minutes Late	Absent	Single Absence	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

Note: Standard errors presented in parentheses are block bootstrapped with 400 repetitions. Significance levels: * p<0.10, ** p<0.05, *** p<0.01. 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.

Table 4: Sub-sample Analysis on “Tardy” and “Minutes Late”

	(1)	(2)	(3)	(4)
Dependent Variable:	Tardy	Tardy	Minutes Late	Minutes Late
Sample:	Low Tardy	High Tardy	Low Tardy	High Tardy
Treatment	0.001 (0.004)	-0.020*** (0.008)	-1.144 (0.730)	-0.319 (0.341)
Constant	0.002 (0.004)	0.035*** (0.010)	-2.872*** (0.301)	-1.348*** (0.261)
Time controls	Y	Y	Y	Y
Worker FE	Y	Y	Y	Y
R ²	0.015	0.046	0.184	0.089
# of employees	116	102	116	102
Observations	23,502	27,047	23,502	27,042

Note: Standard errors presented in parentheses are block bootstrapped with 400 repetitions. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 5: Sub-sample Analysis on “Absence” and “Single Absence”

	(1)	(2)	(3)	(4)
Dependent Variable:	Absence	Absence	Single Absence	Single Absence
Sample:	Low Tardy	High Tardy	Low Tardy	High Tardy
Treatment	0.021*** (0.008)	0.000 (0.008)	0.006** (0.003)	0.006** (0.002)
Constant	0.050*** (0.013)	0.051*** (0.012)	0.026*** (0.007)	0.020*** (0.006)
Time controls	Y	Y	Y	Y
Worker FE	Y	Y	Y	Y
R ²	0.024	0.017	0.014	0.013
# of employees	116	102	116	102
Observations	27,114	30,799	27,114	30,799

Note: Standard errors presented in parentheses are block bootstrapped with 400 repetitions. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 6: Effect of Losing Award Eligibility on Tardiness

	(1)	(2)	(3)
Dependent Variable:	Tardy	Tardy	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

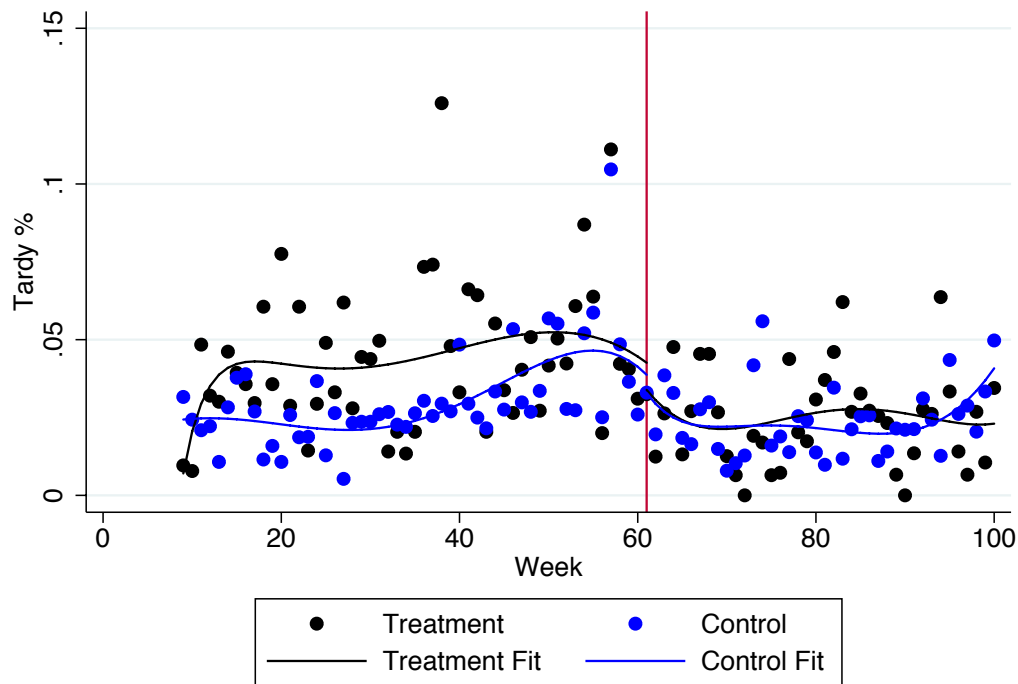
Note: Standard errors presented in parentheses are block bootstrapped with 400 repetitions. Significance: * p<0.10, ** p<0.05, *** p<0.01.

Table 7: Treatment Effects on Efficiency by Employee Type

	(1)	(2)	(3)	(4)
Dependent Variable:	Efficiency	Efficiency	Efficiency	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<0.10, ** p<0.05, *** p<0.01

Figure 1: Monthly Treatment Effect on Tardiness



Note: Fit lines estimated using 4th degree polynomials

Figure 2: Monthly Treatment Effect on Minutes Late

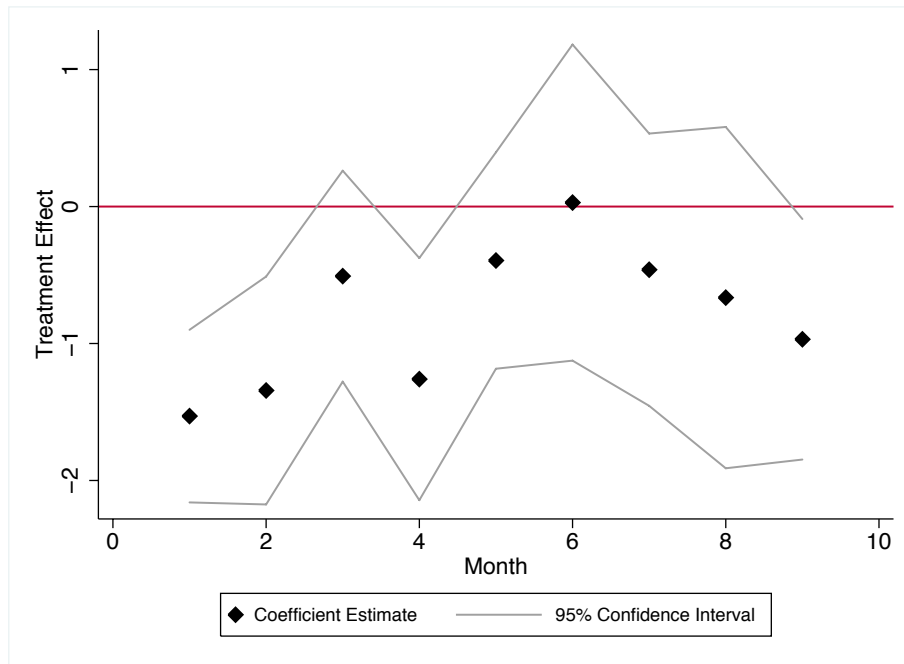
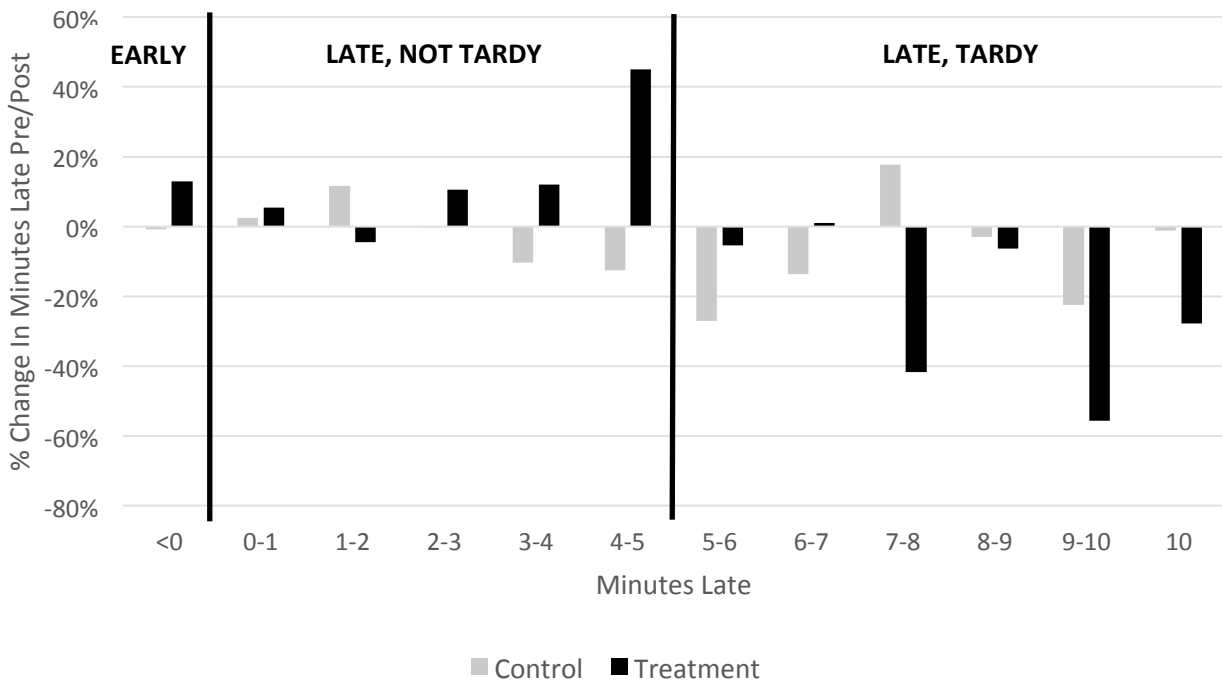


Figure 3: Change in Minutes Late After Award Implementation for “High Tardy” Group



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

Online Appendix

Site Interviews on Empirical Results

After analyzing the productivity and attendance data, we presented our results to the executive team at *Laundry Co* and to the managers of Plant 1. They found many of our results unsurprising, including the improvement in punctuality and attendance from the award program. They were not surprised at the use of single absences to retain eligibility. They told us they had suspicions that employees might be using absences strategically, as they seemed to notice many calls right before shift start times from employees during the period of the award. Neither were they surprised that it was primarily the workers with previous punctuality problems who drove the improvements in punctuality and attendance.

They were surprised by the disqualification results, but noted that they had observed some changes in employee behavior based on whether or not the employee was still eligible for the award. One manager observed: “There seemed to be this feeling among employees that once you are disqualified, ‘what the heck, might as well revert back to what I was doing, and then I’ll try again next time.’” They noted that the need for perfect punctuality and attendance was difficult for many employees, but that “quite a few employees were able to go six months or more without being disqualified.”

What surprised them was the productivity decrease, which they had not linked to the fairness concerns they had heard. 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 increased 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 winners were members of the “high tardy” group, which may have deepened feelings of unfairness among internally motivated “low tardy” workers. The senior corporate management took our results as a confirmation of their feeling that employees shouldn’t be rewarded for things that they are expected to do anyways, as it creates fairness problems amongst workers.

Table A1: Descriptive Statistics at the Worker/Month Level

TREATMENT										
Variable	Obs	<i>Pre-Award</i>				<i>Award Period</i>				
		Mean	Sd	Min	Max	Obs	Mean	Sd	Min	Max
% time tardy per month	33	0.07	0.08	0.0	0.37	33	0.06	0.06	0.0	0.19
# minutes late per month	33	-2.64	3.17	-11.4	3.74	33	-3.63	2.91	-9.67	0.21
% time late per month	33	0.20	0.17	0.0	0.59	33	0.16	0.15	0.0	0.47
% time absent per month	33	0.02	0.02	0.0	0.08	33	0.06	0.03	0.02	0.11
% time single absent per month	33	0.01	0.01	0.0	0.03	33	0.03	0.02	0.0	0.11
Average efficiency	32	122.1	22.4	87.5	168.0	32	122.9	25.8	75.0	169.4

CONTROL										
Variable	Obs	<i>Pre-Award</i>				<i>Award Period</i>				
		Mean	Sd	Min	Max	Obs	Mean	Sd	Min	Max
% time tardy per month	185	0.04	0.06	0.0	0.33	106	0.05	0.11	0.0	1.0
# minutes late per month	185	-2.09	2.19	-13.33	5.4	106	-1.51	2.45	-10.5	8.31
% time late per month	185	0.20	0.22	0.0	0.95	106	0.24	0.20	0.0	1.0
% time absent per month	185	0.05	0.08	0.0	0.50	106	0.06	0.06	0.0	0.42
% time single absent per month	185	0.03	0.05	0.0	0.50	106	0.03	0.03	0.0	0.11
Average efficiency	174	110.0	30.3	54.5	217.8	99	122.3	29.5	66.9	218.0

Table A2: Correlation Table for Dependent Variables

	Tardy	Minutes Late	Absent	Single Absence	Efficiency
Tardy	1.000				
Minutes Late	0.498	1.000			
Absent	0.005	0.002	1.000		
Single Absence	0.007	0.002	0.845	1.000	
Efficiency	-0.015	-0.034	-0.003	-0.002	1.000

Table A3: Placebo Tests

Variable	Random Treatment Group (50)			Random Treatment Group and Date (50)		
	Mean			Mean		
	Coefficient	p < 0.1	p < 0.05	Coefficient	p < 0.1	p < 0.05
Tardy	-0.0006	6%	4%	-0.0003	14%	6%
Minutes late	-0.1182	2%	2%	-0.0969	12%	4%
Single absence	0.0015	6%	4%	0.0025	12%	8%

Note: The average results of the placebo tests are shown above. For both types of placebos, the mean coefficient is both close to zero and significantly smaller than the corresponding coefficient from Table 3. Also, across the placebos the results are significant at close to the expected rate. We present the point estimate and 95% confidence intervals for each placebo regression of *minutes late* in Figure A1, which show that our point estimate has the smallest standard error of any of the individual placebos. Placebo regressions for our other models produced similar results. Overall, the placebo test results suggest that the treatment effects shown in Table 3 were actually a result of the treatment. The award program encouraged improved attendance behavior for workers in Plant 1, supporting Hypothesis 1. Standard errors in parentheses are clustered at the employee level. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A4: Pre- and Post-Fail Results for Minutes Late

Dependent Variable:	(1) Minutes late	(2) Minutes late	(3) Minutes late
Sample:	ALL	Low Tardy	High Tardy
Pre-fail treatment	-0.883** (0.357)	-1.165 (0.755)	-0.453 (0.327)
Post-fail treatment	-0.469 (0.357)	-0.872 (0.969)	0.061 (0.422)
Constant	-2.046*** (0.215)	-2.870*** (0.303)	-1.326*** (0.262)
Time controls	Y	Y	Y
Worker FE	Y	Y	Y
R ²	0.127	0.185	0.089
# of employees	218	116	102
Observations	50,544	23,502	27,042

Note: Standard errors presented in parentheses are block bootstrapped with 400 repetitions. Significance: * p<0.10, ** p<0.05, *** p<0.01.

Figure A1: Histogram of Daily Efficiency for All Workers

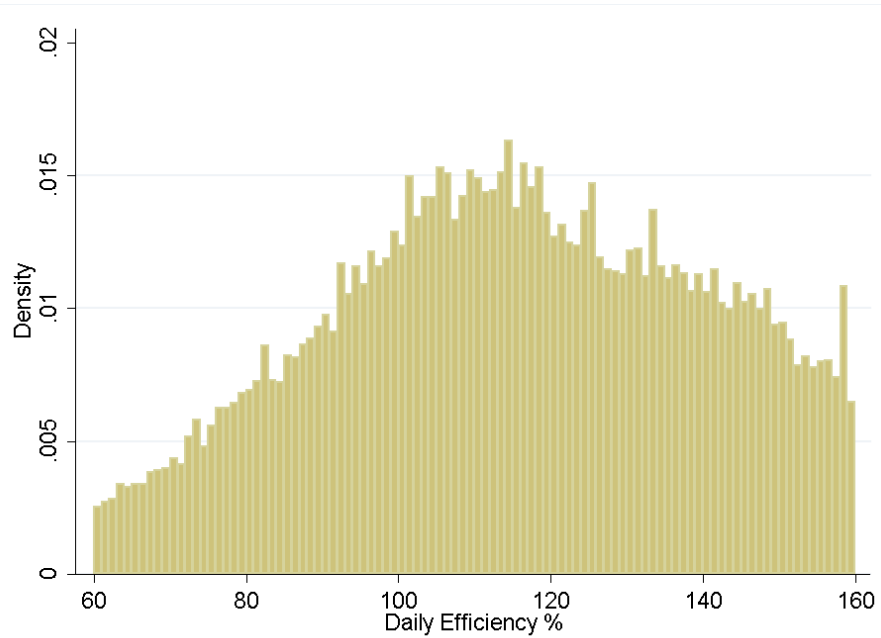


Figure A2: Plant Process Flow Chart

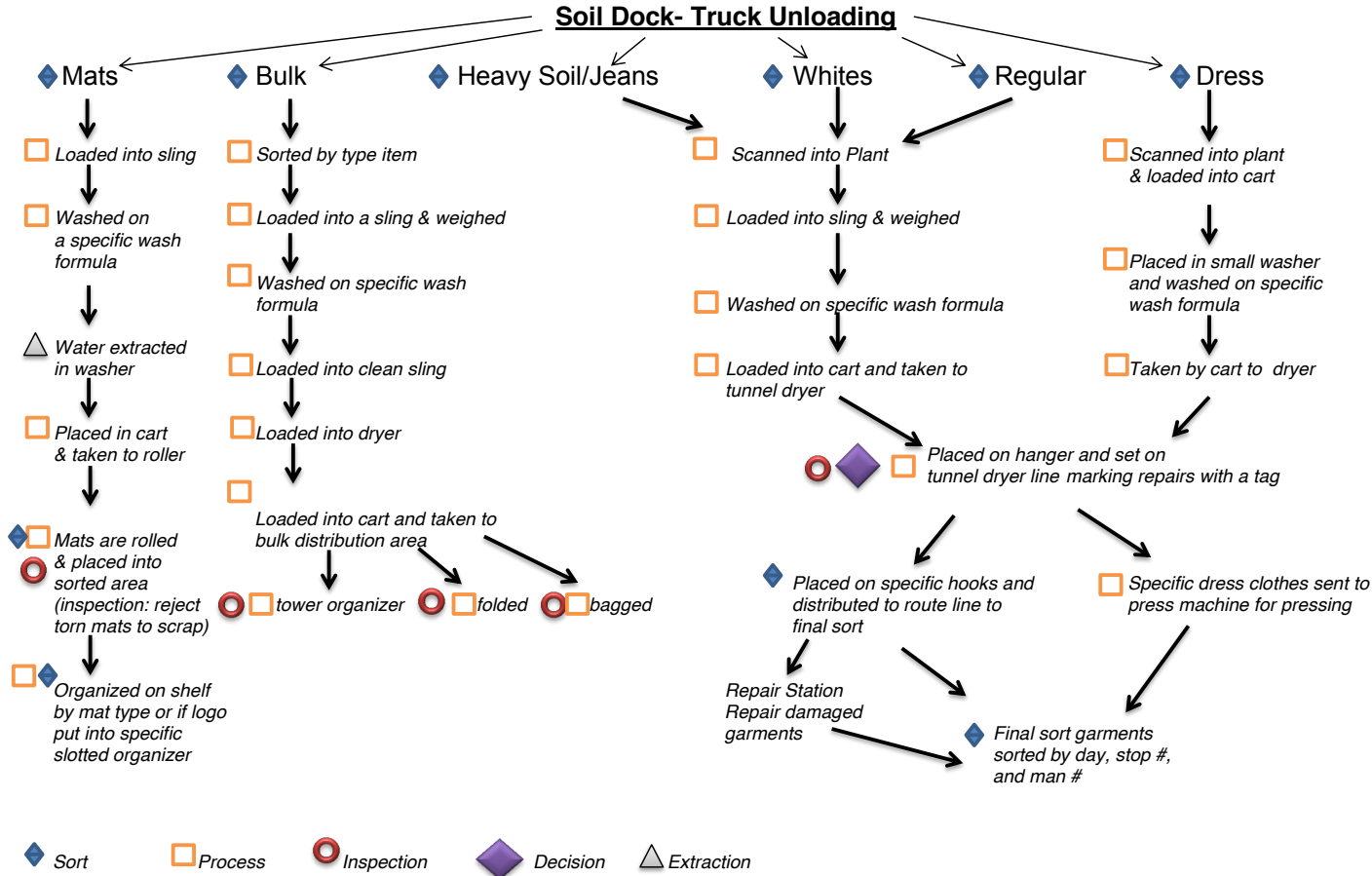


Figure A3: Eligible Months by Worker

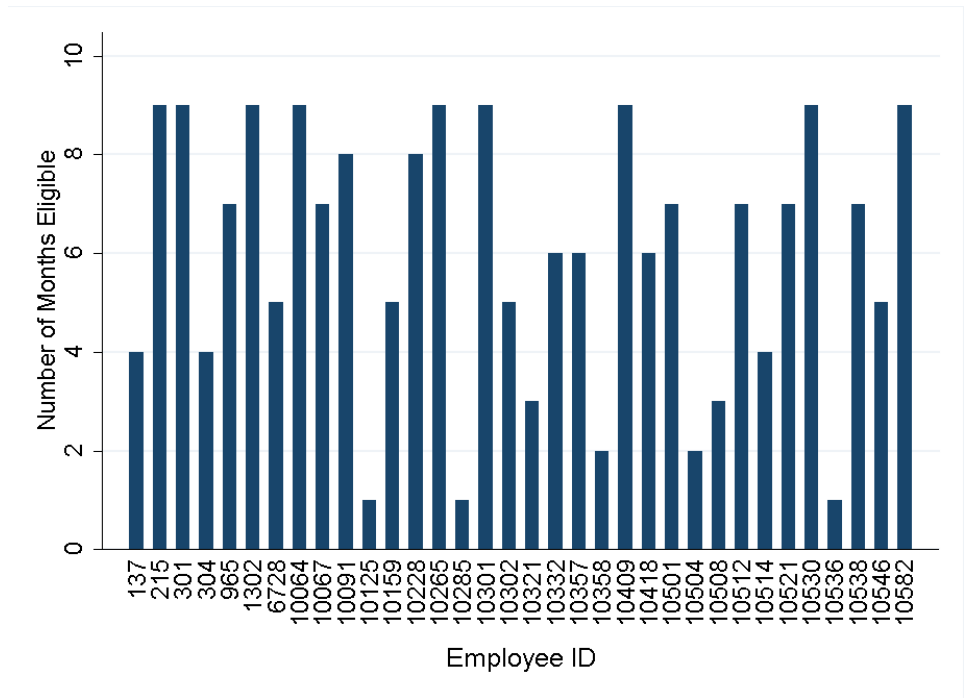
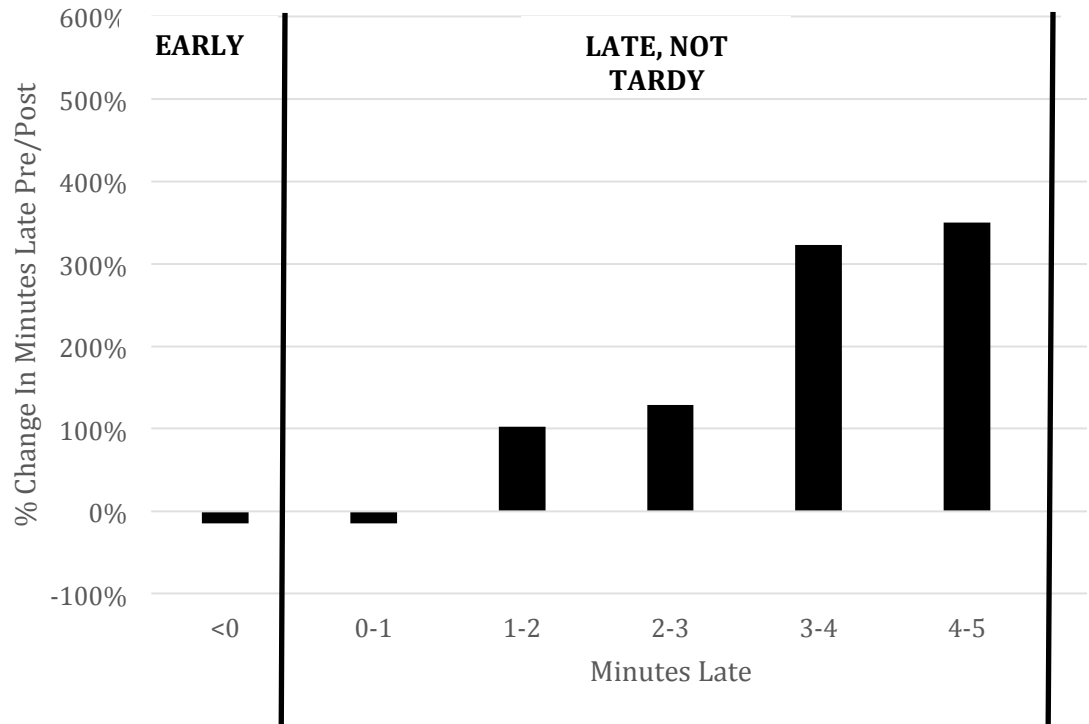


Figure A4: Change in Minutes Late After Award Disqualification



Note: Percentage changes represent changes from the initial baseline clock-in frequency for each minute interval. Val above bars indicate the baseline frequency for prefail clock-ins.