

# Are Non-Contingent Incentives More Effective in Motivating New Behavior? Evidence from the Field

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## Abstract

Organizations and policymakers increasingly rely on economic incentives to prompt participation in activities amongst those who were previously not engaged. We ran a field experiment with a recycling program to examine incentives' effectiveness to motivate new behavior—i.e., attract non-recyclers. We compared standard contingent incentives (payment contingent on recycling) to non-contingent incentives (upfront unconditional payment) of different sizes. A high contingent incentive was as effective as a non-contingent incentive (of any size) in attracting people to the program, but this masked differences in *who* participated. Across incentive sizes, people who had never recycled were 5.8 times more likely to begin recycling with the program when given a non-contingent incentive (20.2%) than when offered a contingent one (3.5%). A second experiment conceptually replicated this effect in an online job market, showing that non-contingent incentives were substantially more effective in attracting previous non-compliers.

*JEL classification:* C93, D02, D90

**Keywords:** non-contingent incentives, heterogeneity, prosocial behavior, recycling, sorting, selection, behavior change

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## 1. Introduction

The use of economic incentives, commonly a financial incentive contingent on compliance or performance, have been used to encourage a variety of behaviors, from blood donation (Lacetera, Macis, and Slonim 2014) and school attendance (Martorell et al. 2016), to increased performance in non-routine analytical team tasks (Englmaier et al. 2018). Research in psychology and behavioral economics has shown that an incentive's effectiveness also depends on the context and how they are delivered (Kamenica 2012). For example, monetary incentives can even backfire when promoting prosocial behavior in public (Ariely, Bracha, and Meier 2009) or when they crowd out people's intrinsic motivation (Gneezy and Rustichini 2000; Schwartz, Loewenstein, and Agüero 2020).

Much of the research on incentives has focused on the average behavioral response (Gneezy, Meier, and Rey-Biel 2011). For example, studies have examined how average performance under standard incentives – where payment is contingent on output – compares to performance when payment is interdependent of output (Fehr, Kirchsteiger, and Riedl 1998; Gneezy and List 2006), or when payment is donated to charitable causes (Imas 2014; Schwartz et al. 2021). However, the average response may mask disparities in how different segments of the targeted group respond to offered incentives; in many cases, the question of *who* responds to a particular incentive may be even more important than the average effect.

For example, a firm committed to shrinking its carbon footprint invites employees to participate in recycling programs and provides incentives to do so.<sup>2</sup> Naturally, some employees had already been recycling, while others have not recycled in the past. In order to judge the incentive program as “effective,” it must either increase recycling in the former group—a difficult feat—or prompt the latter to begin to do so. Likewise, companies that offer wellness programs seeking to incentivize people to adopt a healthier lifestyle or undergo preventative care confront a similar issue.<sup>3</sup> Some individuals had been exercising and seeking preventative care before the program. The effectiveness of incentives is therefore largely a function of whether they prompt individuals who had not previously engaged in the targeted

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<sup>2</sup> Increased recycling is one of the main channels through which firms pursue greater sustainability. See, for example, <https://www.forbes.com/sites/blakemorgan/2019/08/26/101-companies-committed-to-reducing-their-carbon-footprint/#c442a40260ba>.

<sup>3</sup> See Jones et al. (2019) for a review of the literature on workplace wellness programs, as well as for experimental evidence on their effectiveness.

activity to begin doing so. These situations share the important feature common to many settings: the capacity of incentives to generate behavior change depends on whether they motivate people on the extensive margin, compelling previous non-compliers—those who were not interested in an activity before—to begin complying. Additionally, firms must consider costs against the benefits: if an incentive program brings the company closer to the goal (e.g., a certain participation rate) but does so at great expense relative to a nearby alternative, then the latter option may be preferred to the former.

This paper shows that the type of incentive offered has substantial consequences on increasing the participation of people who were not motivated to participate in an activity or program in the past. We consider two types of incentives: payments that depend on performance for a given task (contingent incentives, which provide payment conditional on compliance) and those that do not (non-contingent incentives, which provide an upfront unconditional payment).

Why would these two types of incentives attract different types of people? We build on the framework developed by Cox, Friedman, and Gjerstad (2007) to show why non-contingent incentives may be more effective in attracting previous non-compliers than contingent ones (see Web Appendix for the formal model). In the framework, a manager offers employees an incentive to comply with an activity; for example, a company pays employees to exercise and benefits when they comply due to lower health insurance costs. The employee values the monetary incentive and experiences both intrinsic benefits and costs from complying with the activity. Additionally, following the literature on reciprocity in economics (e.g., Falk 2007), we assume that non-contingent incentives are more likely to activate the employees' reciprocity motive than contingent ones. Therefore, if the employee perceives the manager's actions to be kind, she will be more likely to make choices that benefit the manager. Three main results obtain. First, a proportion of employees will engage in the activity regardless of the incentive because their intrinsic benefits outweigh the costs—we refer to this group as the already-compliers. Second, contingent incentives will only change the behavior of non-compliers if they are high enough to overcome their net intrinsic costs. Thus, new behavior will be responsive to the size of the incentive. Third, non-contingent incentives will attract previous non-compliers for whom the reciprocity motive outweighs the net intrinsic costs. Moreover, the number of new compliers is not predicted to

depend on the size of the non-contingent incentive. As a result, the effectiveness of contingent versus non-contingent incentives in spurring behavioral change will depend on the size of the former but not the latter: At lower levels, non-contingent incentives will be more effective than contingent ones, but there is a point at which the contingent incentive will be high enough to attract more non-compliers than the same sized non-contingent incentive.

To test this idea, we conducted two field experiments examining behavior change—specifically, the level of engagement amongst previous non-compliers—under contingent and non-contingent incentives. The first employs a unique setting that allows us to study who responds to the incentives; the second demonstrates the generality of our initial findings by replicating the effects in a different context. In the first experiment, residents in several neighborhoods were surveyed to elicit their baseline levels of recycling, amongst other measures. They were then given the opportunity to take part in a recycling program. Some residents were told that they would be paid upon bringing their recyclables to the appropriate location (contingent incentives); others received the payment up-front and were encouraged to bring their recyclables to the location (non-contingent incentives). Additionally, the incentives differed in size from lower stakes to higher stakes. This generates four experimental conditions, which vary by incentive type and incentive size.

Several results were obtained. First, non-contingent incentives resulted in greater participation in the recycling program than the contingent incentives. This was largely driven by the low-stakes contingent incentive, which produced the lowest participation rate; the other three conditions produced similar participation rates. Second, based on responses to the baseline survey, the non-contingent incentives attracted substantially more previous non-compliers, i.e., those who had never recycled before; in contrast, nearly all the residents who participated in the contingent incentive conditions reported to have been recycling. The difference in behavior change is dramatic: less than 15% of participants recycled with the program under contingent incentives had not been recycling before, compared to over 50% under non-contingent incentives. Across both incentive levels, non-contingent incentives were 5.8 times more likely to attract new recyclers than contingent incentives (the participation rate of non-compliers was 20.2% versus 3.5% under non-contingent and contingent incentives, respectively). Consistent with the theoretical motivation outlined

above, the number of new recyclers was similar for low and high non-contingent incentives (19.5% and 20.8%, respectively). Third, a cost-effectiveness analysis reveals that a low non-contingent incentive was the most cost-effective incentive. Lastly, results from a follow-up survey provide suggestive evidence that the behavior change prompted by non-contingent incentives was persistent.

Our second study aimed to conceptually replicate the first in a different context, using a large online crowdsourcing platform where we asked workers for their help on a research job. Workers were randomly offered a contingent incentive conditional on completing a captcha-transcribing job, and others were told that the payment was already deposited in their account (non-contingent incentive) before they did the job. Workers' responses to a previously paid task offered one day before the experiment allowed us to observe sorting based on whether non-contingent incentives can attract previous non-compliers—similar to new recyclers in Study 1— or whether they attract participants who were already predisposed to engage in the activity. Similar to the first study, we find that non-contingent incentives were effective in motivating previous non-compliers; in contrast, the vast majority of those who responded in the contingent incentive condition were already motivated to complete it in the past. Here, non-contingent incentives were almost *twice* as effective in generating behavior change as contingent incentives.

Together, our results highlight the efficacy of non-contingent incentives in prompting behavior change amongst previous non-compliers—those who would not have been motivated to complete a task sans incentive, or in the case of Study 2, when a standard incentive was already in place. These findings are important for managers and policymakers aiming to design incentive schemes that motivate effort and performance amongst those who would have otherwise not been engaged using standard incentives. In particular, our cost-effectiveness analyses indicate that if an organization is concerned with shifting behavior or generating a large participation rate, non-contingent incentives appear to be a promising tool, especially if it is possible to target individuals based on past behavior (e.g., propensity to recycle or exercise).

Our findings contribute to two broad literatures on incentives. The first line of work studies the efficacy of different incentive schemes, such as contingent versus non-contingent incentives, in motivating performance or task completion. Research has examined the

relative efficacies of prosocial (Charness, Cobo-Reyes, and Sánchez 2016) and mission-based incentives (Cassar 2019), as well as symbolic rewards in the form of awards and recognition (Gallus 2016; Gallus, Jung, and Lakhani 2019), typically in comparison to standard performance pay. The literature on non-contingent incentives has mainly focused on their efficacy in generating survey responses. Based on the Tailored Design Method, a small non-contingent incentive (generally, cash inside an envelope with a mail survey) has been shown to significantly decrease non-response rates compared to a standard incentive contingent on responding to the survey (Dillman, Smyth, and Christian 2014). This result changes when increasing the stakes. Gneezy and Rey-Biel (2014) examined the relative effects of contingent and non-contingent incentives in spurring survey responses, finding that the latter (former) is more motivating at low (high) stakes.<sup>4</sup> While the authors' setup did not allow them to examine sorting directly, they concluded that "a possible interpretation of our results is that different types of people may respond differently to different incentives." Our findings contribute to this literature by showing that contingent versus non-contingent incentives are differentially motivating on the extensive margin, specifically in attracting previous non-compliers. We also demonstrate the efficacy of non-contingent incentives in a field domain very different from mail survey research: recycling behavior and an online crowdsourcing marketplace.<sup>5</sup>

The second line of research considers the sorting effects of incentives. The majority of this work has concentrated on the introduction of performance pay to already existing contracts to encourage productivity-based sorting (Lazear 1986; Dohmen and Falk 2011). Studies have also examined sorting based on other-regarding preferences (Lazear, Malmendier, and Weber 2012; Eriksson and Villeval 2008; Ashraf, Bandiera, and Lee 2019). In a paper closest to ours, Charness and Gneezy (2009) examined the effects of standard contingent incentives in motivating gym attendance. They found that a standard contingent

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<sup>4</sup> A related line of work looks at "gift-exchange" in principal-agent interactions. Here, a principal offers the agent an incentive that is higher than some minimum threshold, and the agent reciprocates by putting in a higher effort. This literature has found mixed evidence for "gift exchange," with laboratory findings largely supportive of the hypothesis (Fehr, Kirchsteiger, and Riedl 1998) while field evidence is not (Gneezy and List 2006; Esteves-Sorenson 2018). In gift exchange experiments, cash rewards are usually delivered after people comply (if they do), regardless of performance.

<sup>5</sup> While some papers use non-contingent incentives as a control relative to standard incentives, e.g., providing money or a lottery without requesting anything in return (Johnson and Geller 1984), others, especially in neuroscience, use them as a fixed payment for mandatory work (e.g., Fröber and Dreisbach 2014). We follow the definition used in the literature on survey research (Dillman, Smyth, and Christian 2014).

incentive increased gym attendance and that this effect was almost entirely driven by first-time attendees. However, the authors did not compare the relative effects of different incentive schemes and hence cannot study whether a non-contingent incentive may have been more effective in spurring behavior change.

The rest of the paper proceeds as follows. Sections 2 and 3 present findings from the two field experiments, respectively. Section 4 discusses our results and concludes.

## 2 Study 1

### 2.1 *Design and procedure*

We conducted a survey near two recycling collection points. Passers-by were asked if they wanted to answer a 5-minute survey about their neighborhood. People who were 18 years or older and said to live in the neighborhood were asked demographic questions such as age, type of housing and educational level, and their recycling habits (see details in the Web Appendix). They were also asked if they would like to provide their email address for future studies. In the end, they were invited to participate in a recycling program: “to participate, people have to bring their recycling to (location) on (date). We will be located next to the recycling collection point with a large banner and weigh the recycling people bring.”<sup>6</sup> No incentive was mentioned. The study began at this point, focusing on those who agreed to participate.<sup>7</sup>

Four hundred and three participants (female: 63.3%, mean age = 38.0) participated in the study.<sup>8</sup> The surveyor (a research assistant) took a sealed envelope from a group of envelopes that were randomly ordered before the study started. In the envelope was an invitation to the recycling program that indicated the place and date of the recycling, in addition to examples of things people could recycle, such as glass and paper. Importantly,

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<sup>6</sup> These instructions, as well as those that follow, were translated from the original Spanish, as neighborhoods were located in Chile. The original instructions can be found in the Web Appendix.

<sup>7</sup> The most common reason to not participate and finish the study was that people said that they would be out of town (the study was conducted in the middle of the summer). The Web Appendix shows the characteristics of people who agreed and those who did not agree to participate, which are very similar in demographics and their opinions about recycling. Both groups have a larger fraction of females and are more likely to have a college degree than the general population, and both consider recycling to be very important. Therefore, people who go to parks and are willing to answer surveys may be more interested in recycling than the general population.

<sup>8</sup> This number excludes 2 participants. One person tried to participate again, and received the same incentive twice. Another participant asked to be excluded from the recycling program after she agreed to participate.

we randomly varied one of the sentences in the letter in a 2 (incentive type: contingent vs. non-contingent) × 2 (incentive size: low vs. high) between-subject design. Those in the contingent condition were offered a cash reward only if they recycled (“In gratitude, when you deliver your recyclables you will receive \$2.5 [\$12] in cash”). Those in the non-contingent condition received the reward with the invitation letter (“In gratitude for your recycling, enclosed please find \$2.5 [\$12]”).<sup>9</sup> In addition, envelopes included a refrigerator magnet and a flyer with a map indicating when and where they should take their recycling (see Appendix A).<sup>10</sup>

In order to measure participation and recycling weight, letters indicated that workers facilitating the program would be located next to the collection point with a program banner. In addition, research assistants associated the number of each letter (which had an ID number) with the name of the participant. Recruitment was conducted, on average, 7.5 days (SD = 2.04) before the recycling dates indicated in the letter. On the day of recycling, research assistants weighed recycled waste and gave participants a sealed envelope with the corresponding money in the case of the contingent condition. Finally, about two months later, participants were emailed a survey requesting their “help for a study on recycling by R-Cicla [name of the recycling program],” to measure spillover effects of the incentives. In this survey, we asked whether participants had recycled in the last four weeks (all questions and material are in the Web Appendix).

## 2.2 Results

*Baseline survey.* Before randomly assigning participants to any experimental condition, most participants (51%) reported that they had never recycled before, 9% once or twice every three months, 9% once every month, 11% every two weeks, and 20% every week (i.e., nearly half the people reported having recycled in the past).<sup>11</sup> This recycling rate is consistent with

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<sup>9</sup> The materials used the local currency (Chilean pesos), but we show it in USD, using conversion rates at the time of the experiment adjusted by the Purchasing Power Parity. We selected the “low” and “high” values based on Schwartz et al. (2021). As references, the “high” amount represented about 20% of a monthly electricity bill or 1.7 times a movie ticket.

<sup>10</sup> One concern might be that participants communicate with each other. However, this is highly unlikely as research assistants surveyed passers-by in different locations (small parks) on several days in an area with a high population density.

<sup>11</sup> Three people did not provide their recycling frequency (these boxes were blank in the answer sheet filled in by the surveyor). Therefore, we had 400 observations for the analysis of this variable. In addition, we compared survey responses from people who had never recycled with those who had recycled, finding that the

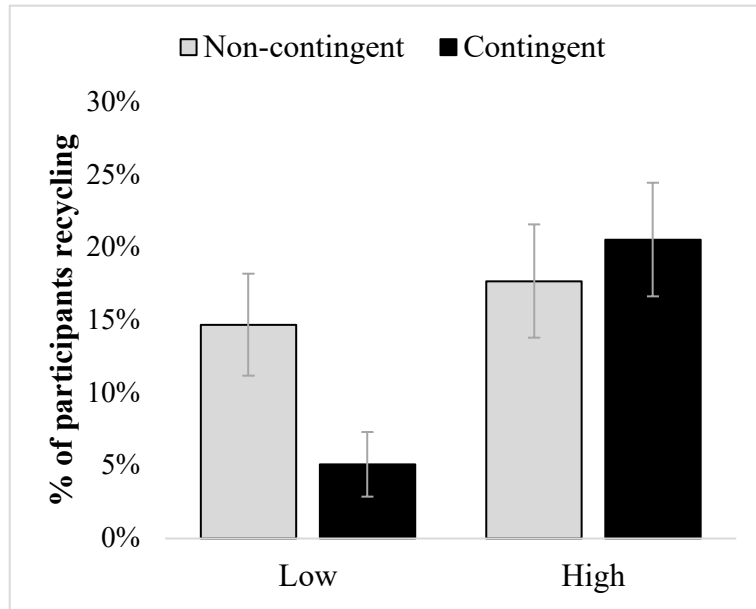


recycling rates found in previous studies (Pacto Global 2015). Additionally, there was no door-to-door collection in this township at the time of the experiment, so households had to take their recycling to specific collection points. In total, 76.9% of participants provided an email address (email addresses were also requested before the invitation to the program).

*Participation rate.* As shown in Figure 1, more participants recycled when they were offered a high contingent incentive (20.6%) compared to a low contingent incentive (5.1%),  $p < 0.01$ . This difference was much smaller for the non-contingent case when comparing low and high amounts, 14.7% and 17.7% ( $p = 0.57$ ), respectively. In addition, both low and high non-contingent incentives were more effective than the low contingent incentive ( $p = 0.02$  and  $p < 0.01$ , respectively), and neither was significantly different from the largest contingent incentive ( $p = 0.27$  and  $p = 0.61$ , respectively). For robustness, Table 1 shows very similar results using logistic and linear probability models and controlling for people's characteristics, previous recycling behavior, and the time between recruitment and recycling. Despite the different context, and type of decision and effort, this result is remarkably consistent with previous research done with mail surveys (Gneezy and Rey-Biel 2014).

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former have very similar demographics and opinions about recycling but reported more barriers to recycling (not enough space at home, or it takes too much time, for example).



**Figure 1.** Recycling rates. Error bars represent +/- 1 standard error.

	I (all)	II (all)	III (all)	IV (New Recyclers)	V (Recycled before)
Contingent - High	1.572*** (0.518) <i>0.002</i>	1.578*** (0.527) <i>0.003</i>	0.147*** (0.045) <i>0.001</i>	0.066 (0.041) <i>0.105</i>	0.213** (0.09) <i>0.018</i>
Non-contingent - Low	1.165** (0.538) <i>0.030</i>	1.118** (0.548) <i>0.041</i>	0.085* (0.045) <i>0.060</i>	0.184*** (0.058) <i>0.002</i>	-0.008 (0.077) <i>0.916</i>
Non-contingent - High	1.387*** (0.531) <i>0.009</i>	1.432*** (0.543) <i>0.008</i>	0.124*** (0.047) <i>0.009</i>	0.216*** (0.06) <i>&lt;0.001</i>	0.031 (0.082) <i>0.707</i>
Constant	-2.923*** (0.459) <i>&lt;0.001</i>	-1.225 (1.021) <i>0.230</i>	0.262** (0.116) <i>0.024</i>	0.086 (0.126) <i>0.497</i>	0.319* (0.182) <i>0.082</i>
Controls	No	Yes	Yes	Yes	Yes
<i>p-values</i>					
CHigh_vs_NCLow	<i>0.270</i>	<i>0.222</i>	<i>0.254</i>	<i>0.091</i>	<i>0.005</i>
CHigh_vs_NCHigh	<i>0.607</i>	<i>0.692</i>	<i>0.679</i>	<i>0.040</i>	<i>0.029</i>
NCLow vs NCHigh	<i>0.567</i>	<i>0.429</i>	<i>0.46</i>	<i>0.697</i>	<i>0.563</i>
Log-likelihood	-161.5	-154.6	-141	-39.4	-85.7
N	403	400	400	203	197

\*\*\*  $p < 0.01$  \*\*  $p < 0.05$  \*  $p < 0.1$ . Standard errors between parenthesis and p-values in italics.

Note: The dependent variable is whether the person recycled in the program (=1, 0 if not). The baseline condition is the low contingent incentive. Columns 1 and 2 are from a logit model, and Columns 3 to 5 are from a linear probability model. Controls include age, gender and education, days between the program and recruitment, and whether the person recycled before the program (the latter was included in the first three models).

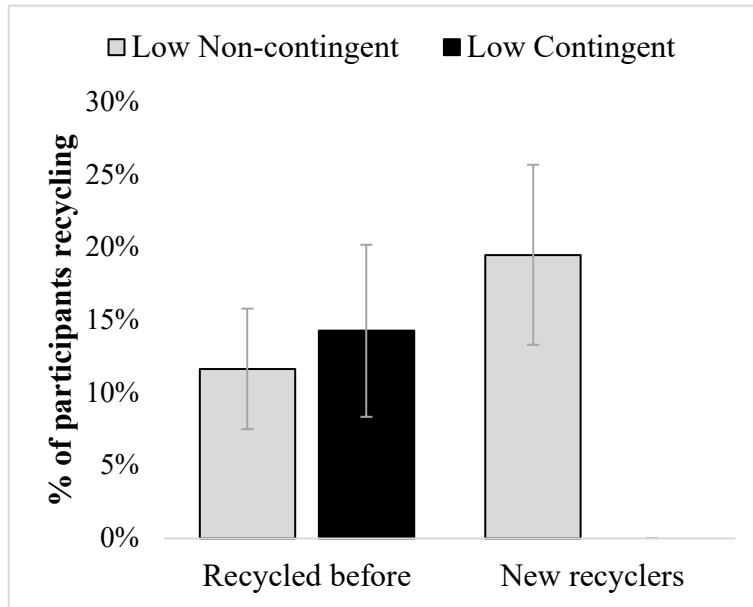
**Table 1.** Program participation and sorting as a function of previous recycling behavior.

*Behavior change.* Even though contingent and non-contingent incentives may lead to differences in recycling rates as a function of stake size, the type of incentive may have motivated different people to participate. In particular, we examined whether the type of incentive could differentially motivate people to *start* recycling—whether previous non-compliers would be prompted to participate. This extensive margin decision is particularly important because starting an activity such as recycling can overcome many of the main barriers to adopting this type of behavior over the long term (Macey and Brown 1983). For example, once people recycle for the first time, they learn where to take their recycling and

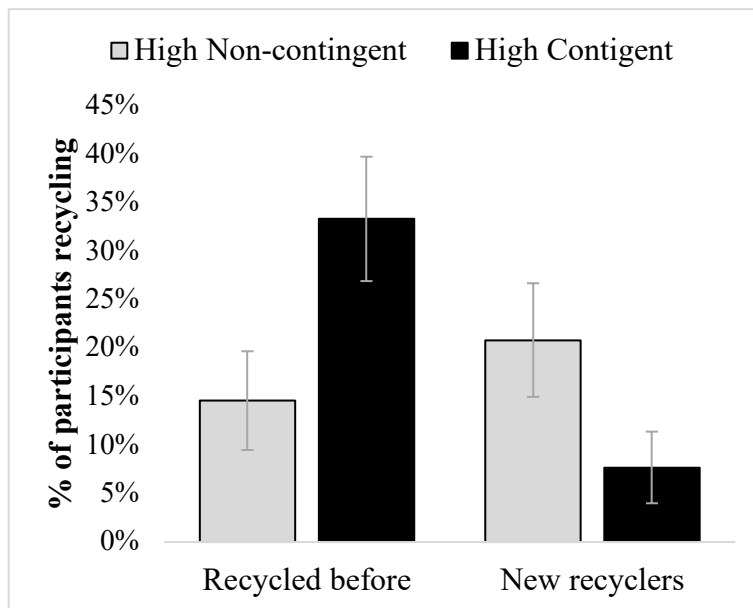
are more likely to continue to do so. By prompting people to overcome initial fixed costs, incentives that motivate non-compliers to recycle could generate persistent long-term behavioral change in this group.

As shown in Figure 2, when incentives were high, those who were recycling before the program were much more likely to participate when they were offered a contingent incentive (33.3%) than when they received a non-contingent incentive (14.6%,  $p = 0.03$ ). This result was very different when considering those who are recycling for the first time (“new recyclers”). They were more likely to recycle with the program when they received a non-contingent incentive (20.8%) than when offered a contingent one (7.7%,  $p = 0.05$ ). When the stakes were low, people who had recycled in the past had similar participation rates regardless of whether they received a non-contingent or contingent offer: 11.7% and 14.3%, respectively ( $p = 0.711$ ). A very different pattern emerges if we consider “new recyclers”: they were much more likely to be motivated by non-contingent incentives (19.5%) than by contingent ones (0%,  $p < 0.01$ ). Table 1 shows these results using linear probability models. Looking across both incentive sizes, “new recyclers” were 5.8 times more likely to begin recycling with the program when given a non-contingent incentive (20.2%) than when offered a contingent one (3.5%),  $p < 0.01$ . That is, very few people who had not recycled in the past were prompted to do so by the contingent incentive; in contrast, a substantial fraction began recycling when offered a non-contingent incentive.

Another way to examine the data is to ask, conditional on recycling, how many participants would have been recycling without the provided incentives? Contingent incentives did not appear to change behavior: of those who brought recycling in the contingent incentive conditions, the vast majority (85.2%) were previous compliers, reporting that they had recycled in the previous three months (the 14.8% of new recyclers were all in the high contingent treatment, as shown in Appendix B). In contrast, non-contingent incentives were effective in motivating previous non-compliers, with 56.3% of those bringing recycling doing so for first time ( $p < 0.01$ ).



(Panel A) Low-size Incentive



(Panel B) High-size Incentive

**Figure 2.** Recycling rates based on past recycling behavior. Panel A (top): Low-size incentive. Panel B (bottom): High-size incentive. Error bars represent +/- 1 standard error.

*Cost-effectiveness.* The total amount recycled (in lbs.) was relatively similar in the two non-contingent conditions (Low: 184.2 lbs. and High: 169.1 lbs.), while the difference between the two contingent conditions was large because of the low participation rate at low stakes

(Low: 44.3 lbs. and High: 181.5 lbs.).<sup>12</sup> Additionally, conditional on recycling, on average, people brought more recycling when the incentive was non-contingent (Low: 12.3 lbs. and High: 10.0 lbs.) than when the incentive was contingent on participation (Low: 8.9 lbs. and High: 8.3 lbs.). Appendix C shows the average amount recycled in each treatment, both conditional and unconditional on participating in the program. Given that the non-contingent incentive is paid regardless of participation, the cost of the program was the highest when the size of this incentive was high (\$6.81 per lb.), which is inefficient since people did not increase recycling compared to when the non-contingent incentive was low (\$1.38 per lb.). For contingent incentives, the cost was substantially lower at low stakes (\$0.28 per lb.) than at high stakes (\$1.45 per lb.). However, these values do not consider *who* was recycling. For contingent incentives, most people reported that they were already recycling before the program. In turn, despite the relatively small cost, the low contingent incentive yielded no benefits because it attracted zero “new recyclers.” Of those participating under high contingent incentives, only 18% were “new recyclers.” On the other hand, 59% and 53% of those participating under low and high non-contingent incentives, respectively, were “new recyclers.” Considering this, the low non-contingent incentive appears to be most cost-effective. For example, assuming that the program is designed to only encourage recycling that would have not otherwise taken place, i.e., attracting previous non-recyclers, then the cost of the low non-contingent incentive program is the lowest: \$1.52 per lb. compared to \$8.46 and \$1.57 in the high non-contingent and high contingent conditions, respectively.<sup>13</sup> There were no new recyclers in the low contingent incentive condition, making it the least cost-effective. Furthermore, a cost-benefit analysis should consider the potential long-term effects of recycling for the first time and the intended benefits of recycling (US EPA 2020). We explored the potential long-term effects using the follow-up survey.

*Follow-up survey.* Out of those who provided their email before any invitation to recycle and random assignment (76.9% of people), 43.2% responded to the follow-up survey (N = 134).<sup>14</sup>

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<sup>12</sup> One person in the low contingent condition did not weigh their recycling. For the analysis, we assumed the mean weight for this person.

<sup>13</sup> For this analysis, we use the median weight to account for the small number of observations of new recyclers in the high contingent condition.

<sup>14</sup> Five more people answered the survey but did not answer the question about recycling in the last 4 weeks.

Of that number, 79.9% reported having recycled in the last month (i.e., at least one month after the program). Conditional on answering the survey, we found no difference across conditions as to whether people reported having recycled in the last four weeks ( $\chi^2(3) = 1.18$ ,  $p = 0.76$ ). Importantly, however, of those who had not recycled before the experiment, 67.7% reported having recycled after the program. Given the substantially larger fraction of “new recyclers” in the non-contingent conditions, the lack of difference in ex-post behavior may actually reflect a significant difference in persistent behavioral change. That being said, there were substantial differences in response rates between conditions: those who received a low contingent incentive were much less likely to answer the survey compared to those who received any other incentive (26.0% vs. 50.0%, 41.7%, and 56.3%, and in the high contingent, low non-contingent, and high non-contingent incentives, respectively). Given these differences in the propensity to respond, the results from the follow-up survey should be taken as suggestive.

The study that follows was designed as conceptual replication. Additionally, it will examine whether the documented results on the effects of contingent versus non-contingent incentives for motivating behavioral change extend to situations where a standard contingent incentive is already in place using an online crowdsourcing platform.

### **3 Study 2**

#### *3.1 Design and procedure*

Study 2 is a conceptual replication of Study 1, applying non-contingent incentives in the context of an online job market. We posted an advertisement for a job in Prolific Academic (Peer et al. 2017) to check a database of captchas that we needed for research purposes, offering a flat fee of £0.34 for a less-than-four-minute job. In addition, applicants were told that the captchas were designed to distinguish a person from a machine and that they were intentionally blurred but readable (we provided an example for those who were not familiar with this). Participants were asked to provide their email for this job. All materials are available in the Web Appendix.

Participants ( $N = 593$ ; Age: 35.6 years old; 70.8% Female) checked 30 captchas, for which they had to answer whether the transcription was correct or incorrect. Finally, participants answered a few demographic questions. The requested job ended at this point,

and participants could receive their payment (a code was provided). All participants then read the following: “Now, we would like to ask if you want to participate in a bonus task, in which you have to transcribe captchas and improve our database.” Participants were informed that this new job, hereafter “bonus job,” was “completely optional.” They were then asked whether they would be willing to transcribe 20 captchas for £0.05 (a 4-minute task) and that this amount would be paid as an additional bonus. This was a relatively low-paying job compared to the task that participants had just finished. Participants who agreed to do the bonus job received an email with a link, where they were asked to transcribe the 20 captchas. They had one hour to do this job before the link became unavailable. Those who completed the bonus job received payment in a couple of hours. We used participation in this bonus job to identify participants who would be willing to complete the task even at relatively low incentives – analogous to individuals who were recycling even before the program in Study 1 was introduced. This allows us to examine whether people who may not be very motivated to do the job—previous non-compliers—can be prompted to complete it through non-contingent incentives.

Our target behavior was the completion of a new task sent exactly 24 hours after participants finished the main job posted on Prolific. All participants received the following email: “We are asking participants to help us with an additional optional task by transcribing 40 captchas for our research (it will take approximately 8 minutes).” We randomly varied the type of incentive participants were offered:

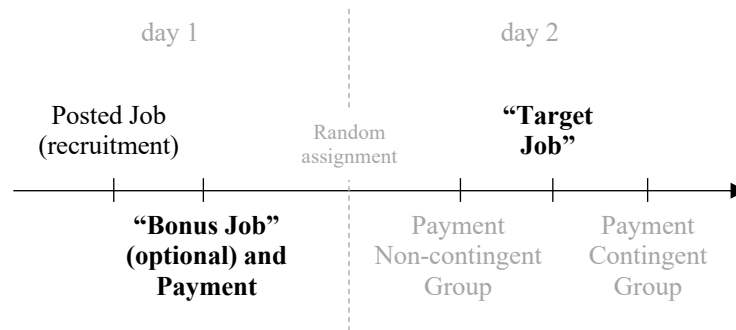
*Non-contingent incentive:* “As a thank you in advance for transcribing these captchas, we have already added £0.10 to your Prolific Academic account. You can check this bonus in your account if you want. There will not be any additional benefit other than this bonus.”

*Contingent incentive:* “As a thank you, if you transcribe these captchas, we will add £0.10 to your Prolific Academic account. You can check this bonus in your account if you want. There will not be any additional benefit other than this bonus.”

For both types of incentives, the size of the payment (£0.10) was low compared to the first advertised job and the same (given the completion time) as the bonus job. The email indicated that the link for this follow-up job, hereafter “target job,” would be available for 24 hours.



For the non-contingent condition, payment was added to participants' accounts just before they received the target job email.<sup>15</sup> For the contingent condition, participants received payment if they completed the target job. Figure 3 summarizes the whole experimental procedure.



**Figure 3.** Procedure of the experimental design in Study 2.

### 3.2 Results

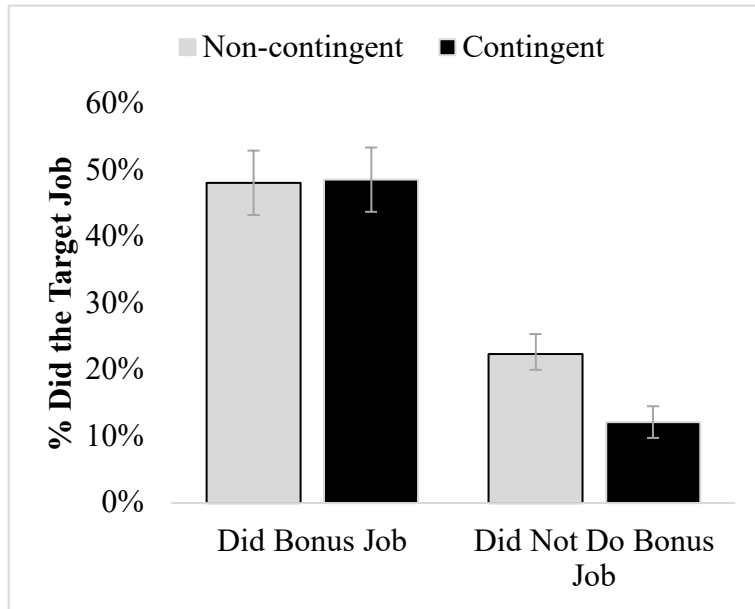
Table 2 presents results from logit and linear probability models comparing completion of the target job by incentive type. Participants were more likely to complete the target job (31.7%) under non-contingent incentives than under contingent ones (25.3%), though the difference was marginally significant without the inclusion of controls ( $p = 0.09$ ;  $p < 0.05$  when control variables were added).

As a measure of job quality, conditional on finishing the target job, we found no difference in the number of correctly transcribed captchas across conditions (Contingent: 32.3 and Non-contingent: 32.5,  $p = 0.89$ ). Considering the whole sample (intention to treat), there was no sizable difference between conditions either (Contingent: 8.8 and Non-contingent: 10.3,  $p = 0.15$ ). Since there was little difference in the number of correct captchas, the non-contingent incentive yielded a larger number of total captchas (3,056 vs. 2,594 in the contingent condition), but it was less cost-effective than the contingent incentive (three times more expensive per correct captcha).

<sup>15</sup> The platform allows for the payment of bonuses, and participants receive a notification when this bonus payment is received.

*Behavior change.* We now ask whether the type of incentive differentially attracted people who were not willing to complete the first “bonus job”—i.e., previous non-compliers. More than one-third of participants (35.9%) completed the first “bonus job.” As shown in Figure 4, participants who completed the “bonus job” (previous compliers) were equally likely to perform the target job whether they were offered a contingent incentive or received a non-contingent incentive (48.6% and 48.1%, respectively,  $p = 0.94$ ), suggesting that the non-contingent incentive did not crowd out initial motivation (similar to Study 1 at low stakes). A very different picture emerged when looking at those who did not complete the “bonus job”: they were much more likely to complete the “target job” under non-contingent incentives (22.5%) than under contingent incentives (12.2%),  $p < 0.01$ . This result is analogous to the finding in Study 1, wherein the low stakes condition, the non-contingent incentive attracted substantially more previous non-compliers. We can also look at, amongst those who completed the target job, how many people were previous non-compliers. Similar to Study 1, we found that 45.7% of participants under non-contingent incentives were previously unwilling to do the bonus job, compared to 30.7% of non-compliers under contingent incentive,  $p = 0.046$  (see Figure in Appendix D).

The findings again demonstrate sorting based on previous participation as a function of incentive type: contingent and non-contingent incentives had a similar effect on attracting previous compliers, but non-contingent incentives were more effective in motivating new participants.



**Figure 4.** Worked the target job based on whether the person did the bonus job. Error bars represent +/- 1 standard error.

	I	II	III	IV	V
	(all)	(all)	(all)	(did not respond to bonus)	(responded to bonus)
Contingent	-0.311* (0.183) <i>0.089</i>	-0.385** (0.196) <i>0.049</i>	-0.068* (0.035) <i>0.052</i>	-0.104*** (0.039) <i>0.008</i>	0.004 (0.068) <i>0.957</i>
Constant	-0.770*** (0.125) <i>&lt;0.001</i>	-1.144** (0.508) <i>0.024</i>	0.294*** (0.089) <i>&lt;0.001</i>	0.134 (0.090) <i>0.138</i>	0.033 (0.172) <i>0.850</i>
Controls	No	Yes	Yes	Yes	Yes
Log-likelihood	-352.9	-317.0	-329.9	-164.1	-150.7
N	593	593	593	380	213

\*\*\*  $p < 0.01$  \*\*  $p < 0.05$  \*  $p < 0.1$ . Standard errors between parenthesis and p-values in italics.

Note: The dependent variable is whether the person did the target job (=1, 0 if not). The baseline condition is the non-contingent incentive. Columns 1 and 2 are from a logit model, and Columns 3 to 5 are from a linear probability model. Controls include age and gender, education, and whether the person undertook the bonus job (the latter was included in the first three models).<sup>16</sup>

**Table 2.** Completion of the target job and sorting as a function of completing bonus task.

#### 4 Discussion

The use of economic incentives can be a powerful tool in motivating behavior change. Our paper shows that the type of incentive is critical to determining its effectiveness in motivating previous non-compliers. We show that the incentive structure—whether or not incentives are contingent on task completion—has a large effect on motivating “new” behavior. These results are particularly important for programs that aim to encourage behavior change rather than task completion per se; for example, wellness programs that aim to prompt people to adopt new, healthier habits rather than pay people for healthy habits they already had. Furthermore, several nudge studies and behavioral change programs depend on whether previous non-compliers modify their behavior, especially in cases when there is a need for a larger part of the population to comply, such as to overcome disparities in cancer test screenings for underserved groups (Purnell et al. 2015), acquiring new food consumption behaviors (Araya et al. 2018; Guthrie, Mancino, and Lin 2015), opting in saving programs

<sup>16</sup> When we add income and occupation, the results are very similar, but the sample size is smaller because some people did not answer these questions.

or adopting the use of reusable bags that may also affect norm perceptions encouraging more people to follow (Borg, Curtis, and Lindsay 2020; Dur et al. 2021; Romano and Sotis 2021).

Our results also suggest that non-contingent incentives can be a cost-effective tool to attract a target population in contexts with low participation rates. In the case of recycling, our Study 1 showed that in a setting with relatively low baseline recycling, non-contingent incentives were substantially more effective in motivating “new recyclers” to begin recycling. The follow-up survey suggests that these effects may have been persistent at least for some time, with people who participated in the program reporting to recycle up to two months later. This may be due to first-time recyclers learning what to do to recycle (e.g., locate the recycle collation point), just as people who attend the gym for the first time can overcome initial informational barriers (Charness and Gneezy 2009). However, there are also reasons to question a longer-run lasting behavioral change. Previous research has shown, for example, that a rise in flat economic incentive increased productivity partly due to a behavioral response (e.g., based on reciprocity) but then vanished after a few weeks (Jayaraman, Ray, and de Véricourt 2016), and attention to a novel situation has also shown to have a short-term effect (Adams et al. 2018; Schwartz et al. 2013). Thus, people may need a persistent intervention to create a habit (e.g., Allcott and Rogers 2014) or implement a commitment device at the beginning of a given task (e.g., Schwartz and Loewenstein 2017). Future research should explore the long-term persistence of behavioral change spurred by different incentive types.

Our theoretical motivation (see Web Appendix) built on prior work arguing that non-contingent incentives are likely to spur positive reciprocity. Consistently, drawing from Fiske’s relational theory (1992), Heyman and Ariely (2004) posit that the relationship between incentives and motivation is partly determined by the type of market the individual perceives themselves to be in: monetary or social. Incentives in monetary markets attract people who value the monetary reward over the opportunity cost of performing the task; if the reward is not large enough, it can actually crowd out intrinsic motivation. By contrast, incentives in social markets are attractive due to non-pecuniary factors such as reciprocity or signaling motives (e.g., Bénabou and Tirole 2006). One reason non-contingent incentives may be more effective in activating a reciprocity motive is that they are categorized as part

of a social market rather than a monetary one. For example, a friend's gift at a housewarming party is not contingent on the recipient helping them move a few months later.

It is also important to note that the reciprocity motive may break down when people perceive an entity's choice of incentive—whether it be contingent or non-contingent—to be purely self interested (Netzer and Schmutzler 2014). This is not likely to be the case in our settings; for example, residents likely consider the recycling program coordinators to be concerned about their community and social welfare more broadly.<sup>17</sup> Future research should explore how perceptions of market type and agents' perceptions of the principal interact with people's motivations to engage in reciprocal behavior with non-contingent incentives.

Regarding non-contingent incentives, one potential concern is that this type of incentive may lead to higher participation rates amongst previous non-compliers, but that actual effort will still be very low (i.e., effort on the extensive versus intensive margin). Our investigation was focused on task completion in the extensive margin—particularly, participation. The studies were not designed to examine differences in the intensive margin. That being said, we found few differences in the amount of actual recycling (Study 1) and the number of captchas completed correctly (Study2), conditional on participating. Comparing how these measures differed as a function of incentive type revealed similar outcomes: despite the fact that participants had already been paid in the non-contingent incentive condition, they did not bring less recycling than people who were offered a contingent incentive, nor did they transcribe fewer captchas correctly. Previous research on prosocial incentives—where the reward goes to a charity rather than the person—has shown a similar pattern when comparing effort on the extensive versus intensive margin (Schwartz et al. 2021). Survey research has similarly found no significant differences in the quality of responses when using non-contingent cash incentives (Singer and Ye 2013).

Previous work has shown that the way that non-contingent incentives are delivered may be important. For example, James et al. (2011) found that contingent and non-contingent checks are much less effective in motivating survey responses than non-contingent cash. One explanation is that checks involve two decisions: whether to fulfill the request and whether to charge the surveyor by cashing the check; some participants may be discouraged by the

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<sup>17</sup> Kindness has an important role in modeling preferences for reciprocity (Dufwenberg and Kirchsteiger 2004; 2019; Rabin, 1993; Isoni and Sugden 2019).

latter prospect, and as a result, fail to respond. Study 1 provided potential participants with cash when they were invited to take part in the program. That is, people were paid even if they decided not to recycle. Our conceptual replication with an online crowdsourcing platform (Study 2) demonstrates the possibility that non-contingent incentives may be used effectively in online settings. Based on our results, providing the money electronically in advance can work to increase participation, although the effect may be smaller compared to receiving cash.<sup>18</sup> This is consistent with the literature suggesting that non-contingent incentives work better when people cannot opt-out from the reward. For example, receiving upfront cash being more effective than a gift card that may not be redeemed (e.g., Birnholtz et al. 2016; Mehta et al. 2019).

Lastly, prior research has shown that the structure of incentives can interact with the size of the incentive in important ways (Gneezy and Rey-Biel 2014). Consistent with that literature and our theoretical framework, we found that the average participation rates under non-contingent incentives were not sensitive to the amount, while standard contingent incentives were. The prior work also shows that at high stakes, contingent incentives can outperform non-contingent incentives. However, when sorting based on previous non-compliance is taken into account, we observed that new recyclers were more likely to recycle under non-contingent (vs. contingent) incentives even at high stakes. At the same time, as our theoretical framework suggests, the greater sensitivity to stake size under contingent incentives implies an inflection point at which contingent incentives will dominate non-contingent ones in attracting previous non-compliers. Future studies should explore a this potential inflection point when sorting is taken into account. That is, whether offering even higher contingent incentives – with "high" being context-dependent – can encourage more previous non-compliers to participate compared to non-contingent incentives.

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<sup>18</sup> An electronic deposit is not as tangible as cash in hand. See Imas and Loewenstein (2018) for a discussion on how tangibility affects effort under different incentive schemes.

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**Web Appendix.** Supplementary material to accompany: Are Non-Contingent Incentives More Effective in Motivating New Behavior? Evidence from the Field. This Web Appendix contains the illustrative model mentioned in the main text, as well as the experimental instructions and the lists of variables collected in each study.



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## APPENDICES

### Appendix A: Flyers Experiment 1 (with translation)



Upper part of the four flyers:

“We will wait for you at [place].

[Information and schedule]”

“In gratitude, when you deliver your recyclables, you will receive CLP\$1,000 in cash for use as you wish”

In gratitude, when you deliver your recyclables, you will receive CLP\$5,000 in cash for use as you wish”

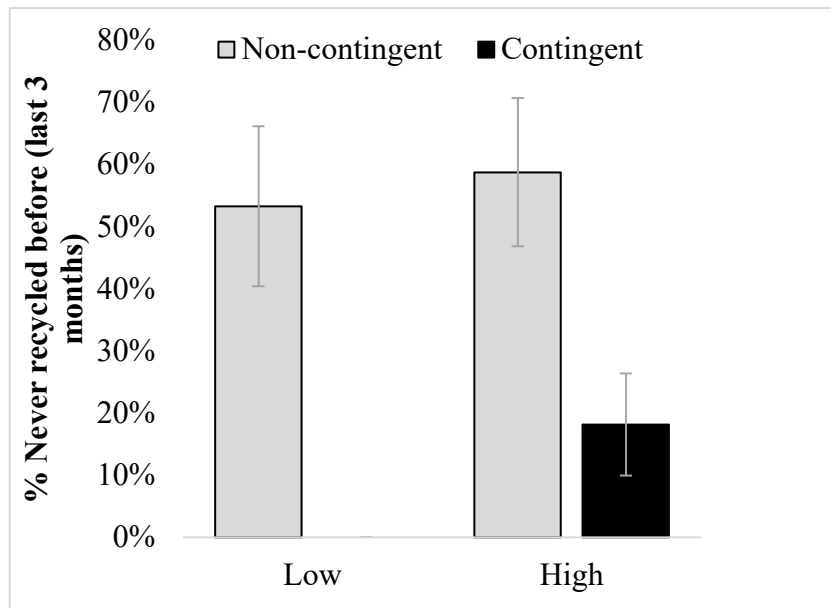
“In gratitude, you have received CLP\$1,000 for use as you wish”

“In gratitude, you have received CLP\$5,000 for use as you wish”

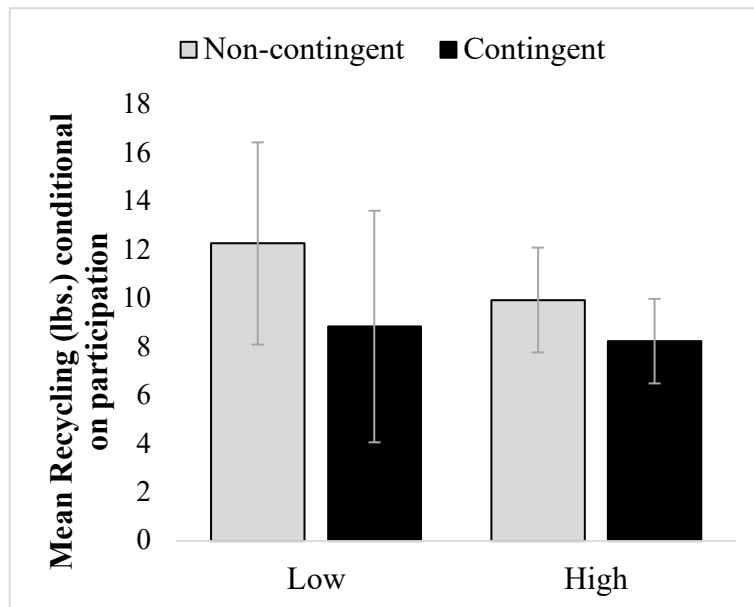
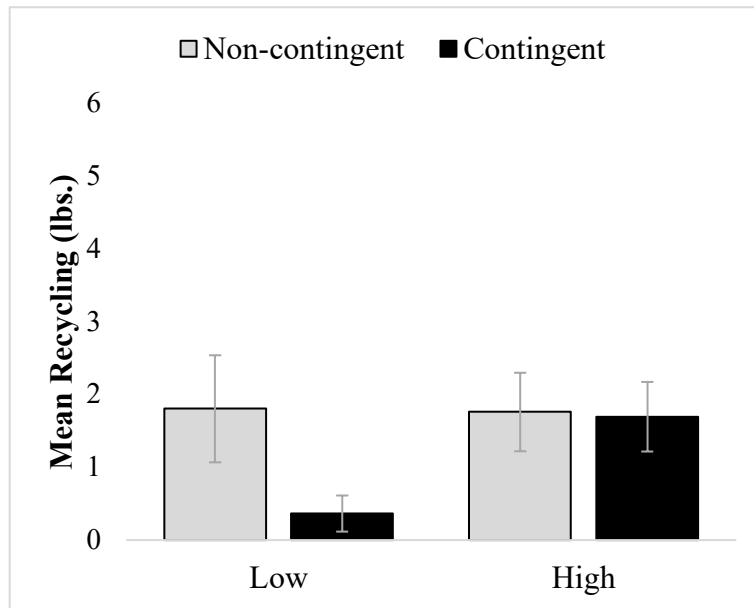
Bottom part of the four flyers:

“This amount is for selected households, and it can be received only once”  
[Types of recycling]

**Appendix B.** Sorting conditional on recycling with the program. Error bars represent +/- 1 standard error.



**Appendix C:** Recycling weight for all participants (top) and conditional on recycling (bottom).



**Appendix D:** Sorting conditional on doing the target job. Error bars represent +/- 1 standard error.

