

Nudging or social pressuring? The mixed influence of social norm nudges

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Abstract

Social norm nudges for promoting desirable behaviors are now widely used in the literature. Nevertheless, their effects are mixed and depend particularly on the part of the population that already practices the fostered behavior. In a previous paper, we presented the "Norm From The Top", a new social norm providing information based only on the most altruistic people. In an experimental framework, we reported that this norm increases the willingness to behave prosocially compared to the standard social norm. Here, we present the extended results of this experiment. Although the Norm From The Top leads to declarations of more prosocial behaviors, those actually performed are not significantly greater. Thus, the Norm From The Top produces an improvement in the willingness to act prosocially, but it is not consistent with the actions performed. Since the participants were first asked to choose their contribution, we interpret this norm as impacting their decisions before executing the task since they have no clearly defined preferences. However, this impact tends to disappear when they perform the behavior and could therefore shape their preferences gradually. We argue that these social norm nudges can be felt as social pressure since they provide feedback that is not based on preferences but instead creates social proof bias altering the decisions. This paper contributes to improving the understanding of nudge mechanisms, the type of influence exerted, and the persistence of their impact.

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1 Introduction

In the past fifteen years, social norm nudges have been extensively studied by researchers. Social norm nudges provide information to people about the behaviors practiced by their peers in similar situations in order to promote prosocial or pro-environmental behaviors. Prosocial behavior represents voluntary behavior intended to benefit other individuals or even society as a whole, comprising actions such as helping, volunteering, donating or sharing (Aronson et al., 2005, Eisenberg et al., 2007). Alternatively, "pro-environmental behavior can be defined as all possible actions aimed at avoiding harm to and/or safeguarding the environment, either performed in public, e.g., participation in environmental movements or private domains, e.g., recycling" (Balundé et al., 2019, p2). Thus, the combination of nudge and social norms has been used in several domains such as charity donation (Frey and Meier 2004), water saving (Goldstein et al., 2008), energy consumption (Allcott, 2011; Costa and Kahn, 2013), and healthy food (Goncalves et al., 2021). Nevertheless, nudges do have limitations (Sunstein, 2017). For instance, the effects of nudges can be significant in the short run and then decrease in the long run (Allcott and Rogers, 2014). Social norm nudges can also backfire in some situations (Schultz et al., 2007; Richter et al., 2018), leading to undesirable outcomes. In addition, it is not yet clear what type of influence is triggered by a social norm nudge and thus generates an improvement in attitude. Nudges aim to help people adopt behaviors they intend to have (Momsen and Stoerk, 2014) and when the nudge fulfills this role, it acts as a bridge that links the gap between intention and action (Torma et al., 2017, Taube and Vetter, 2019). On the other hand, it is possible a nudge could be felt as pressure rather than as an aid (Charlier et al., 2020). In particular, by setting up social norms nudges, which are based on a rebiasing approach, some interventions might be felt as social pressure. In the case of social norm nudges as social pressure, there is still the question about its effect on decisions and its consistency during the behavior. Identifying the type of influence exerted by the nudge could provide insight into how people modify their behavior and the persistence of those changes over time.

This paper presents the extended results of a previous study (Rouillé, 2022) where we analyzed the limited effects of social norm nudges on the intended contribution to prosocial behavior. Participants were nudged to freely complete additional surveys using several social norms, including the "Norm From The Top" (NFTT), built on the behaviors of the most significant contributors in the population. The results of that study showed that while the NFTT increased the average decision, a standard norm (based on behaviors

of the entire population) had no significant effect on the average behavior. However, after the study participants revealed their intended contribution, they were allowed to discontinue their participation at the end of each survey. Thus, participants were not committed to their previous declaration.

The focus of this paper is to investigate whether the effect of social norm nudges on actions is consistent with the impact on willingness. We also examine whether these potential consistency issues differ depending on the norm implemented.

The main results of this second analysis from Rouillé (2022) reveal that, contrary to the surveys chosen, the effect of social norms on the completed surveys is much lower, and in fact not significant. In this context, social norm nudges seem to act as a social pressure, which instantly has an impact, yet that impact disappears while people perform the behavior. This paper extends the knowledge on the persistence of nudges once individuals do not face the nudge anymore. We demonstrate that the persistence of social norm nudges is largely attenuated when the choice architecture is modified. We argue that this non-persistence is explained by a reduction of the uncertainty regarding prosocial behavior when the subjects are performing it, as well as by the structure of the social norm nudges, which relies on rebiasing rather than debiasing (see Section 2).

This paper is structured as follows. In the next section, we discuss the context, and provide an overview of the related literature. The design of the experiment is detailed in the third section, while the hypotheses are presented in the fourth section. Then, the methods of the experiment are described in the fifth section. The sixth section is dedicated to analyzing the results, and finally, we conclude the paper in the seventh and last section.

2 Context and related literature

Nudges have been shown to produce effects with unequal persistence over time. Ferraro et al. (2011) reported that social comparison interventions have a persistent effect over time, while standard interventions generate changes only in the short run. In the context of energy conservation, a meta-analysis from Brandon et al. (2017) – regrouping the results from 38 field experiments implementing social norm nudges – revealed that 35 to 55 percent of the reductions persist once treatments end. However, despite a persistent effect, the effects of social norm nudges often decrease once people no longer receive social

feedback (Frey and Rogers, 2014).

The setting of this study differs in two ways from previous literature. First, we do not measure the persistence over time of the impact generated by the nudges. Indeed, participants had to choose a number of surveys while nudged (except in the control group) and started to complete them immediately, so there was no time lag ¹. The literature documented that aside from time, other dimensions such as task difficulty (Drucker et al., 1998) or ambiguous incentives (Hogarth and Villeval, 2014) could alter the persistence of specific behaviors. Here, this choice architecture provided opportunities for the subjects to stop contributing easily while performing the prosocial behavior. Since it facilitates stopping the effort, we assume that participants would fill out fewer surveys than they chose. Hence, we should observe a lack of persistence between the effect of the nudges on the willingness and action, with choice architecture playing the role of time lag.

Second, in the case of studies investigating energy consumption, it could be interpreted that people had preferences towards low energy consumption. Based on this, nudges helped them to adopt an attitude consistent with those preferences, with an interest to maintain this new attitude over time. In other studies on nudges encouraging meat consumption reduction (Kurz, 2018) and plastic cup recycling (Cosic et al., 2018), these types of nudges that promote desirable behaviors by reinforcing already defined preferences were shown to persist at least partially over time. In our study, since the situation is new, participants had no preferences regarding the number of surveys to complete before being exposed to the experiment. The nudges do not strengthen the clearly defined preference but rather "are designed to activate a desired behavior or norm and influence a decision that an individual is indifferent or inattentive to" (Soman, 2017, p 162). As demonstrated in the experiment from Venema et al. (2020), when the situation is uncertain and people have no clear preferences, a social proof nudge provides information that removes a part of this uncertainty. Indeed, when people have no information about how to behave, they are more likely to follow the attitude of their peers (Smith et al., 2007). However, since the norm followed by people does not necessarily match their preferences, the question remains about the nudge persistence during the practice of the behavior. So if we generalize, social norm nudges belong to the rebiasing approach. Following Larrick (2004), "rebiasing refers to the use of a second bias to offset the effects of the original bias" (Soman and Liu, 2011, p4). The intention of social norm nudges is to steer people towards the right decision by creating a social proof bias instead of erasing

¹In addition, the average duration for participants to complete a single survey was 1 minute 43 seconds (1 minute 27 seconds without outliers), indicating a relatively short duration of the effort, which does not correspond to the time persistence discussed in the literature.

the initial bias (present bias, procrastination, inertia).

As far as we know, the literature has not explored the analysis of nudging persistence according to the structure of the nudge, i.e., whether it is based on a debiasing or rebiasing approach. The paper contributes to the literature by providing a better understanding of the influence of rebiasing nudges. For instance, we might be doubtful regarding the persistence of a nudge based on a rebiasing approach in the long run if it does not point in the same direction as individuals' preferences.

The second contribution of our paper is to provide insights into the mechanisms triggered by social norm nudges, both on willingness and on action, in a framework where people have no clear preferences. As discussed in the introduction, social norm nudges might act as social pressure. To the best of our knowledge, social norm nudging as pressures has only been briefly mentioned in the literature (Charlier et al., 2020). Nonetheless, social pressure affects individuals' behaviors in domains such as charity donation (DellaVigna et al., 2010) or voter turnout (Gerber et al., 2008; Rogers et al., 2017). We propose that social norm nudges can be interpreted as social pressure in our context since there is uncertainty about the exact proper behavior; this makes it difficult for a nudge to act as a bridge between willingness and action. Furthermore, these nudges increase willingness to behave prosocially, yet there are no significant effects on actual behaviors. We can interpret that people feel pressure while they are exposed to the social norm but then adopt a contribution according to their own preference. From this point of view, our results are in line with Rheynders and Bhalla (2013). In a charity donation study, the authors reported that disclosing information to people regarding the behavior of their peers improves the donations but decreases happiness, resulting in coercivity to give more money.

In addition, the relation between social pressure and non-persistent effects does not appear to have been studied in nudge theory. Although not a study specifically on nudge theory, Gallani (2017) revealed that peer pressure could produce a more persistent effect than monetary incentives in an organizational setting. In this sense, this study compares the persistence of social norm nudging according to different norms. As seen previously (Rouillé, 2022), the NFFT increases decisions towards prosocial behavior contrary to the standard norm when a large part of the group does not yet practice the targeted behavior. The results demonstrate that the standard norm has a more persistent impact than the NFFT.

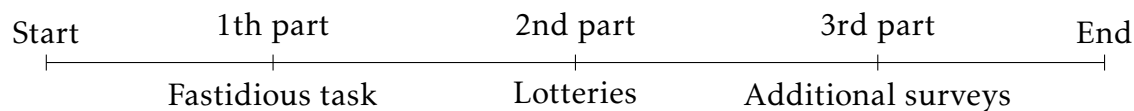
Finally, the results of this paper are also related to the study from Dur et al. (2021). In their experiment, the authors set up a social norm nudge to incite people to save more money. Their results demonstrated that the nudge increased the number of clicks on a link to the webpage where people could start an automatic saving plan. However, despite an

increase in the intended savings, they did not find significant effects on the actual savings. As a result, the authors suggested that while the nudges improved people’s intentions to save money, they were not able to convince people to change their behavior. Similar results have been documented regarding charity donations (Gaudeul and Kaczmarek, 2017).

3 Experimental Design

3.1 Design

Figure 1: Timeline of the experiment



The design and the database of the experiment is the same as in Rouillé (2022). The whole experiment was composed of two sessions, spaced by two weeks. This paper focuses on the second session, which is divided into three parts². The timeline of the session 1 is summarized in Figure 1 above. First, participants managed a fastidious task and played grids of lotteries. The fastidious task comes from a previous experiment in the literature (Levy-Garboua et al., 2009). This task avoids the “gambling with the house money” effect as discussed by Thaler and Johnson (1990) who stated that risk-seeking increases “in the presence of a prior gain” (Thaler and Johnson, 1990, p2). Thus, the participants were rewarded with a flat endowment at the end of the task. This endowment was then at stake during lotteries. After the first part, each participant faced four grids of lotteries. Two of the grids involved risk (Holt and Laury, 2002), and the other two involved ambiguity (Chakravarty and Roy, 2009). Each grid comprised 10 pairs of lottery choices with gradual trade-offs to elicit subjects’ attitudes towards risk or ambiguity. For each pair of lottery, there are two potential gains (Grids 1 and 3) or losses (Grids 2 and 4). Participants were informed that one lottery would be randomly chosen and drawn once the experiment was

²During the first session, the subjects had to complete personality scales. They must attend the two sessions to be remunerated. The results of the first session are discussed in another paper (Rouillé, 2023). The entire timeline is in Appendix A.

over. The outcome of this lottery was added or subtracted to the endowment received in the first part. The principal role of the lottery was to implement a game allowing participants to win money and distract them to the core of our study to avoid experimenter demand effects (Zizzo, 2010). The measures of attitudes towards risk and ambiguity are also discussed in another paper (Rouillé, 2023).

After lotteries and before drawing the results, we asked participants to fill out additional surveys at the end of the experiment without financial incentive. Participants were informed that these surveys concern environmental topics and that the data would be used for another study. The participants had to choose the number of surveys they desired to fill out (between 0 and 8).

We asked them for this service as a favor in order to trigger altruistic motivation. We followed a study from Mortensen et al. (2017) that implemented additional surveys as prosocial behavior. Environmental topics seem very suitable here since they should trigger pro-environmental motivation compared to other issues. Additionally, the literature has highlighted that pro-environmental behaviors tend to be plagued by gaps between willingness (or attitudes) and actions (Kollmuss and Agyeman, 2002). Here, each survey is related to an environmental topic³ and is made up of 8 questions. Participants were informed that a survey necessitates nearly one minute. Once they had chosen their number of surveys, participants who agreed to fill out surveys began to do it. Note that the subjects were not required to wait for other participants between each part of the study. In addition, since the experiment was online, their choice could not be influenced by other subjects leaving early or staying longer in the room.

3.2 Surveys chosen versus surveys completed

In this paper, the willingness to contribute was measured by the number of surveys chosen, but the key point is that participants were not committed to that number. Indeed, they could fill out fewer surveys than planned as they are allowed to quit at the end of each survey by clicking on a button "I stop answering", or they could fill out more by clicking on "I continue". The number of surveys actually filled out corresponds to the "action". This was added to observe whether the participants tended to stick more to their commitment when nudged.

Nonetheless, it is important to stress that our framework was not neutral. First, it was oriented to incite participants to complete surveys since participants had to move the

³Global environmental sensitivity, waste, waste composting, sustainable purchasing, reuse of electronic goods and devices, energy consumption, transports, consumption of non-reusable plastics.

gauge between zero and eight without a default setting of no contributing. Second, when participants ended a survey, they were asked whether they wanted to continue or stop completing surveys, creating decision points. People are more likely to stop a behavior when making an active choice than a default choice (Soman, 2017). Furthermore, participants were reminded of their commitment at the end of each survey.⁴

Thus, while the nudges aimed to influence willingness to contribute, the choice architecture influenced the questionnaires' completion. In that sense, we assumed the choice architecture set in prosocial behavior would induce a gap between willingness (surveys chosen) and action (surveys filled out) and, therefore, a lack of persistence in the impact generated by the nudges in the treatment groups.

Participants who chose not to answer any surveys went directly to the end of the experiment.

3.3 Treatments

There are four treatments in the study. The first treatment corresponds to our control group, in which participants received no information about others' contributions. Then, we used the data of this first group to build our three different feedback. Note that running the control group first did not prevent randomizing the allocation of treatments to the participants (the randomization process is detailed in the subpart 5.1).

In the second treatment, the participants were informed about the average behavior of their peers. This feedback is named the "standard norm" since it is the usual way to implement social norm nudging in the literature.

In the last two treatments, the feedback focused on the most significant contributors of the population, i.e., the Norm From The Top. In Treatment 3, the participants received a feedback on the number of surveys previously filled out; here we calculated the average based on the 50% participants who had completed the highest number of questionnaires. The feedback of the fourth treatment is made up of the NFFT with the addition of an injunctive norm dimension (i.e., what is ought to do). In this framework, the highest contributors were called "the most devoted participants".

Therefore, this feedback is comprised of the combination between a descriptive norm (i.e., what the others do) and an injunctive norm (i.e., what is socially approved).

⁴For instance, if a participant selected two surveys, they received the following message after the first survey: "This survey is over. You have 1 left". The participant could continue to fill out another survey or stop. If the participant completed two surveys, they received the following message: "Your 2 surveys are over. Do you agree to fill out another survey?". Illustrations are in the appendix.

4 Hypothesis

In contrast to Rouillé (2022), which focused on the impact of different nudges on the number of surveys chosen, we analyze the consistency between the surveys chosen and the surveys actually completed. As discussed earlier, we set up the framework of the experiment to easily stop completing surveys since participants must decide between continuing or stopping at the end of each survey. Although there are no significant time lags in the experiment, we assume that the framework's structure engenders a persistence issue. Thus, we expect to observe gaps between surveys chosen and surveys filled out, corresponding to the impact of the nudge treatments on the discrepancy between willingness to contribute and actual contribution, compared to the control group. Since no experimental framework currently exist for such a discrepancy, we first build the hypothesis on the social norm nudges literature, which has documented the persistence of effects through time (Ferraro et al., 2011; Brandon et al., 2017). Second, we rely on Gallani (2017), who demonstrated a persistent effect of peer pressure. Thus, we expect participants in the nudge treatment to feel more committed to completing the number of surveys they previously reported. The hypothesis is stated below.

Hypothesis: The participants who are exposed to social norm nudges (Treatments 2, 3 and 4) adopt a behavior that is closer to the declarations they make than the participants of the first group.

According to this hypothesis, social norm nudges fulfill, at least partially, its role as a bridge between willingness and actions.

5 Methods

5.1 Participants

We recruited 203 participants from Cirano (Montreal, Quebec). Cirano is an interuniversity center, multidisciplinary and intersectoral.⁵ The center allowed us to

⁵The center has conducted over 800 experimental economics with the participation of the students of

diffuse recruitment messages to their base of respondents. We first randomly sent the message to 25% of the base to recruit the respondents of the first treatment since the feedback of other treatments is built from the responses of the first group. We then sent the message to the rest of the base to compose the three other groups. Although a long interval between the two parts of the base may affect agents' decisions, especially if significant events tend to occur, we assume that the small interval between the first group and the other groups does not allow for such undesirable effects ⁶.

The sample is composed of 120 women and 83 men (Average age = 37.2 ; SD = 10.5). The most represented levels of education of the participants are bachelor (81 subjects) and master (76 subjects). The average level of education of the sample is higher than the average in Quebec ⁷. Participants obtained an endowment equal to 16\$ ⁸ for the fastidious task, then the payoffs increased (up to 32\$) or decreased (down to 0\$) according to the result of the lottery. The minimal remuneration was 5\$.

5.2 Materials and procedure

The experiment took place online. The 203 participants were randomly assigned to one of the four treatments:

- Control condition (T1 ; n=49): Participants had no information regarding other participants' actions.
- Standard norm (T2 ; n=51): Participants were informed that other participants filled out in average four surveys (based on the first treatment).
- Norm From The Top (T3 ; n=52): Participants were informed that the average of surveys filled out was above seven among the participants who had filled out the most surveys.
- Norm From The Top + injunctive norm (T4 ; n=51): Participants were informed that the most devoted participants filled out on average more than seven surveys.

environing Montreal universities.

⁶All sessions were conducted on weekdays. We checked for any effects potentially induced by the day and time of each session.

⁷In Quebec, 25.5% of people aged 25 to 64 had a bachelor's degree or higher in 2016 (*Statistics Canada*. 2017).

⁸\$ corresponds to Canadian dollars.

Recall that the feedback were based on the results of the first treatment. One participant of the control group did not finish the experiment, and therefore his data had to be removed from the sample. After the experiment, we checked the randomization of the four treatments according to the demographic variables (age, gender, education) and the elicited preferences (risk and ambiguity aversion).

6 Results

This section examines the results of the paper, divided into subsections. The results not only cover the validity of the hypothesis made before the experiment was conducted but also deal with supplementary results, following the findings in Rouillé (2022). To introduce the contrast between surveys chosen and surveys filled out, it is worth noting that almost half the participants (47%) completed a different number of surveys than they had previously declared ⁹. Table 1 and Figure 2 display the average number of surveys chosen and filled out per participant. First, we observed that the average number of surveys filled out is lower than the average number of surveys chosen in all treatments. In addition, the spreads of surveys filled out between treatments are tighter than those of surveys chosen. In particular, the number of surveys filled out when participants are exposed to a nudge (T2-T3-T4) is very close. The second treatment (i.e., standard norm) has the lowest spread between surveys chosen and filled out. Note also that the standard deviations are different. For surveys chosen, standard deviations are lower in T2 and T4 than in other treatments, resulting in a concentration of behaviors towards the value of the feedback received. By contrast, the standard deviations of the surveys filled out are roughly the same across treatments ¹⁰, meaning that feedback no longer plays its roles as a reference point.

Table 1: Average number of surveys per treatment

Table 1a: Surveys chosen				Table 1b: Surveys filled out			
	Observations	Mean	Stv.Dev		Observations	Mean	Stv.Dev
Treatment 1	48	4.73	3.28	Treatment 1	48	3.94	3.20
Treatment 2	51	4.84	2.58	Treatment 2	51	4.55	3.20
Treatment 3	52	5.65	2.98	Treatment 3	52	4.58	3.33
Treatment 4	51	6.06	2.60	Treatment 4	51	4.75	3.25

⁹30.2% of the participants filled out fewer surveys than declared, while 16.8% of them filled out more surveys than previously declared.

¹⁰A Levene test shows that the variance in the treatments groups is significantly different between surveys chosen and surveys filled out.

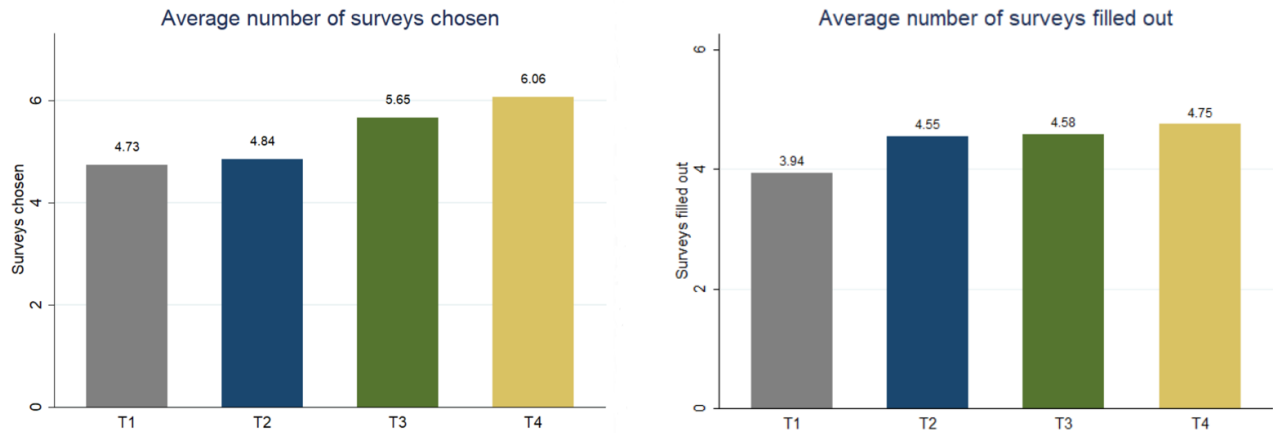


Figure 2: Average surveys per treatment

6.1 Within subjects: comparing willingness and action

Once we completed the descriptive statistics, we conducted statistical tests to detail the analysis. We performed non-parametric tests since the data are not normally distributed, possibly due to the small sizes of the samples. This subsection compares the number of surveys chosen versus filled out within groups. We already saw in Table 1 that participants tend to fill out fewer surveys than chosen. Testing enables us to observe whether these spreads are significant and, consequently, to test the validity of the hypothesis. To this end, we selected the Wilcoxon signed rank test¹¹. This test is adapted to the situation since we compare within-subjects data with samples that are matched, and it has already been used to compare pre-nudge and post-nudge periods (Peer et al., 2020; Barron and Nurminen, 2020).

Table 2 summarizes the results. First, Table 2 shows a significant difference between surveys chosen and surveys filled out in T1 ($z=1.908$, $p=0.0564$). In the same vein, we observe significant differences between surveys chosen and surveys filled out in T3 ($z=2.009$, $p=0.0445$) and T4 ($z=2.571$, $p=0.0102$). Thus, according to the results, a spread between the number of surveys chosen and the number of surveys filled out appears in the control group (T1), in the group of the NFFT (T3), and in the group of the NFFT combined to the injunctive norm (T4). Hence, our hypothesis is not confirmed for Treatments 3 and 4. Notice that the Wilcoxon signed rank test does not allow for comparing several results.

¹¹Non-parametric test that evaluates the null hypothesis that two related paired samples come from the same distribution.

Therefore, it is not possible to deduce whether the spreads between surveys chosen and filled out in T3 and T4 are greater than the spread in T1.

The only treatment without a significant difference between willingness and action is T2, which corresponds to the standard norm ($z=0.511$, $p=0.609$). Thus, the standard norm enables participants to adopt behaviors that are closer to their announcement than participants in the control group, confirming the hypothesis for T2.

Table 2: Analyse within subjects: Wilcoxon signed rank test

H0: Surveys chosen = Surveys filled out				
Treatment	T1	T2	T3	T4
z	1.908	0.511	2.009	2.571
Prob z	0.0564*	0.609	0.0445**	0.0102**

$$p^* < .10, p^{**} < .05, p^{***} < .01$$

6.2 Between subjects: comparing willingness and action

This subpart examines the impact of the different nudges on the number of surveys filled out, compared with the impact on the number of surveys chosen. First, as discussed in Rouillé (2022), there are significant differences regarding the surveys chosen between T1 and T4, between T2 and T3, and finally between T2 and T4. Thus, these results indicate a positive impact of the NFTT, combined with the injunctive norm, over the control group and the standard norm. This section investigates whether these differences are consistent with the number of surveys filled out. We used the Mann–Whitney U test ¹² to compare the population of two treatments.

The Mann-Whitney test demonstrates in Table 3 that there is no significant difference between T1 and T4 ($z=-1.241$, $p=0.2144$), T2 and T3 ($z=0.096$, $p=0.9237$), nor between T2 and T4 ($z=-0.374$, $p=0.7083$), despite the increase observed in the descriptive statistics (Figure 2). The impact of the NFTT studied on the number of surveys chosen is no longer significant on the number of surveys filled out.

¹²Non-parametric test of the null hypothesis that, for randomly selected values X and Y from two populations, the probability of X being greater than Y is equal to the probability of Y being greater than X. Also called the Wilcoxon rank-sum test, or Wilcoxon–Mann–Whitney test.

Table 3: Analyse between subjects: Mann-Whitney U test

Treatments	Surveys chosen		Surveys filled out	
	z	Prob z	z	Prob z
H0: T1 = T4	-1.649	0.0991*	-1.241	0.2144
H0: T2 = T3	-1.818	0.0690*	0.096	0.9237
H0: T2 = T4	-2.551	0.0107**	-0.374	0.7083

6.3 Distribution of the samples

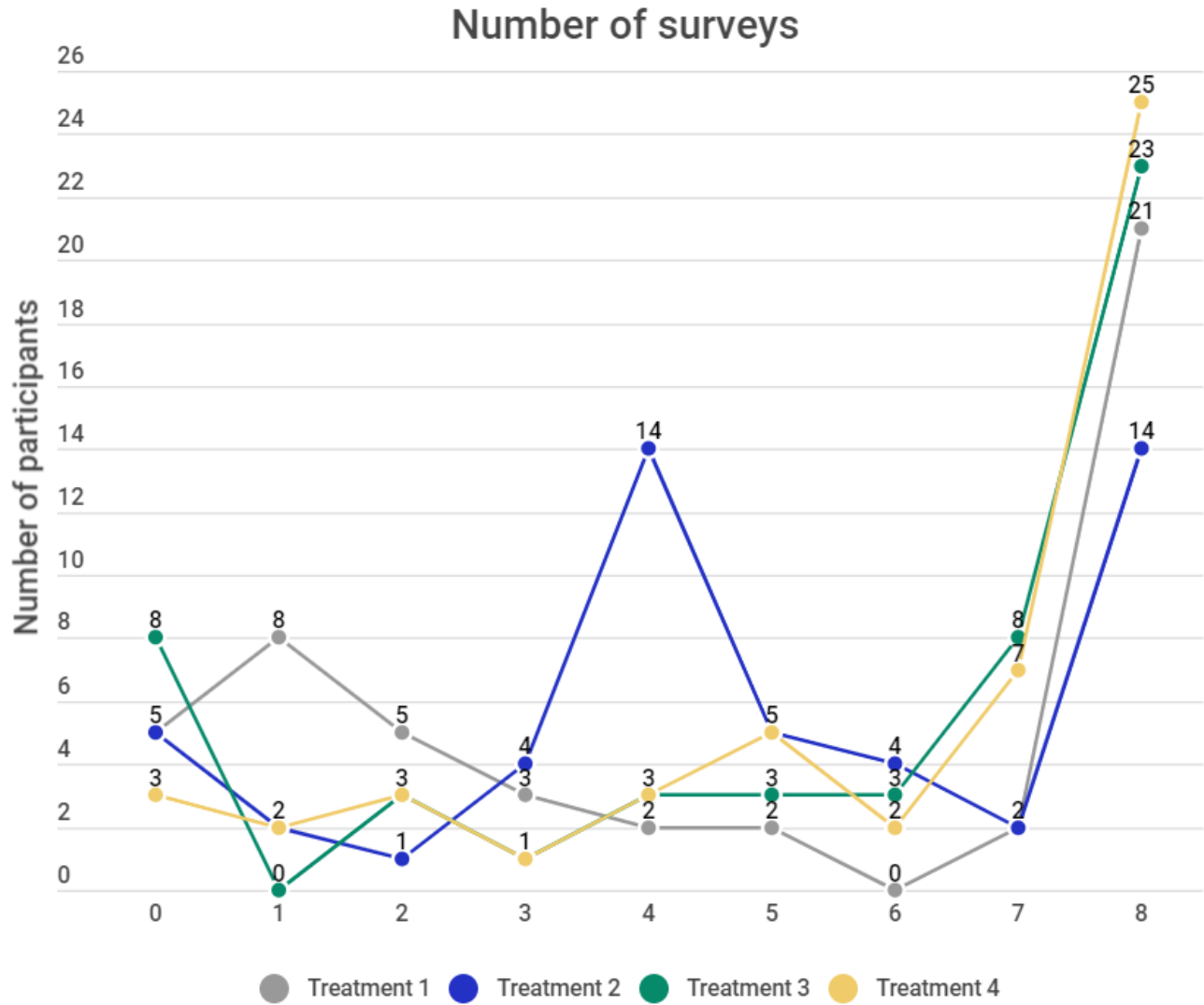
Figure 3 displays the distribution of the number of surveys chosen per treatment ¹³. We first observe that the modal answer is eight surveys, the maximum, for almost every treatment. Second, we notice a peak reached at four surveys in the second treatment (blue line). This peak is interesting since participants of this group were informed that the average decision was four surveys. Also, there are fewer participants in T2 who choose one, two, and eight surveys than in T1. It seems that people who would have selected one or two surveys modified their choice to meet the average behavior, while the reverse effect applied to a proportion of people who would have chosen all of the surveys. These phenomena result in a concentration of decisions towards the average. Moreover, the dwindling of high number of surveys chosen in T2 compared to T1 corresponds to the boomerang effect demonstrated in the literature (Schultz et al., 2007; Richter et al., 2018), meaning that individuals regress their behavior to the mean once they are informed that they are performing better than the average. In addition, we note that treatments 3 and 4 are the groups with the highest number of participants who chose seven surveys, the NFFT. Nevertheless, the fact that a large portion of people who chose eight surveys in T3 indicates no boomerang effect.

Figure 4 illustrates the distribution of the number of surveys filled out per treatment ¹⁴. Compared to Figure 3, it is more difficult to distinguish the distributions of the treatments from each other since their curves are very close. First, we observe that the peak reached at four surveys for the second treatment has disappeared and the boomerang effect generated by the standard norm on surveys chosen is no longer visible. Similarly, nearly no participants filled out seven surveys in Treatments 3 and 4. In addition, there is an increase in participants who completed one survey and then chose to stop. The last point is that the modal answer is unambiguously eight surveys for all treatments .

¹³More detailed charts are provided in Appendix C.

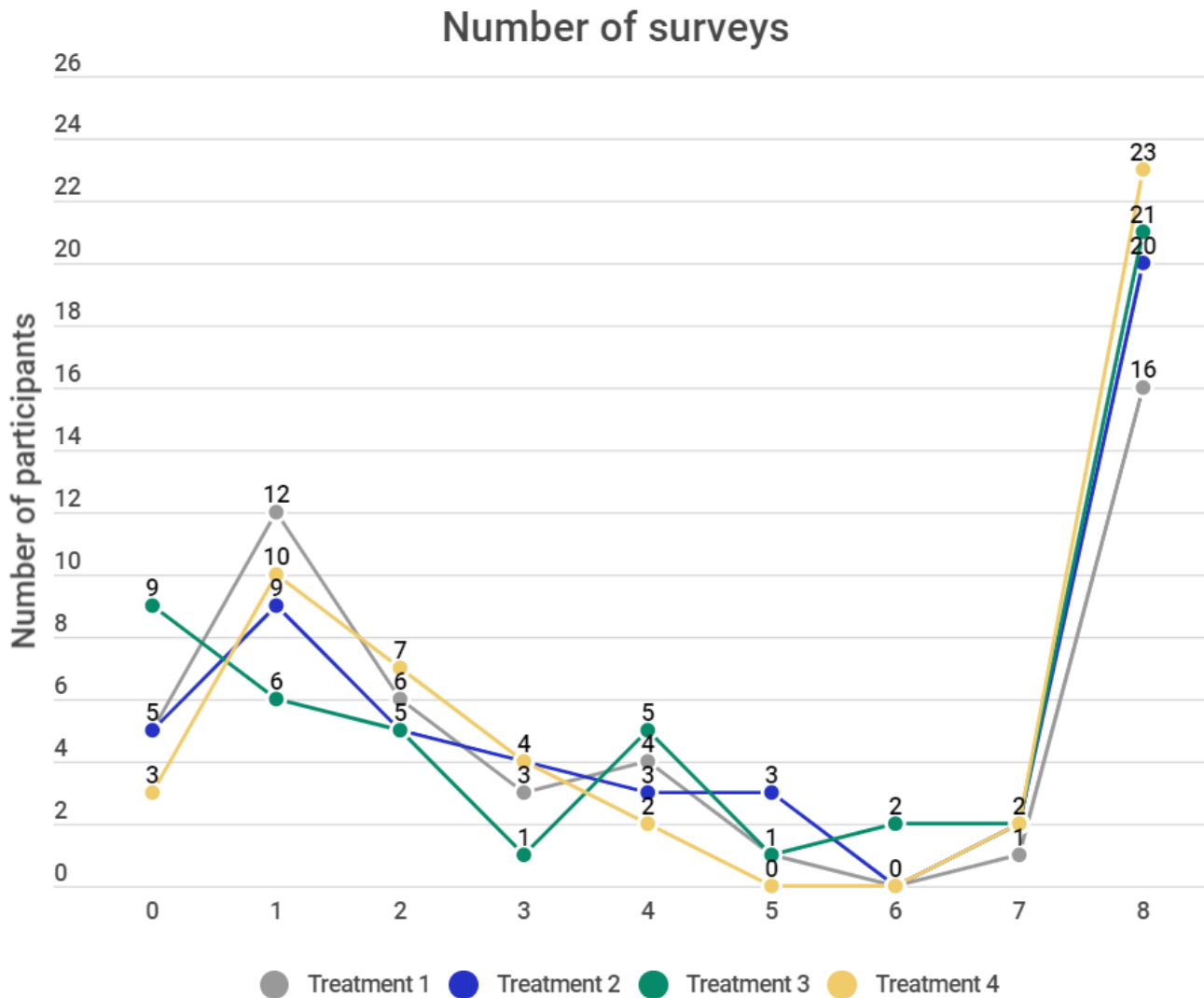
¹⁴More detailed charts in Appendix C.

Figure 3: Distribution of surveys chosen per treatment



Treatment / Surveys	0	1	2	3	4	5	6	7	8
Treatment 1	5	8	5	3	2	2	0	2	21
Treatment 2	5	2	1	4	14	5	4	2	14
Treatment 3	8	0	3	1	3	3	3	8	23
Treatment 4	3	2	3	1	3	5	2	7	25

Figure 4: Distribution of surveys filled out per treatment



Treatment / Surveys	0	1	2	3	4	5	6	7	8
Treatment 1	5	12	6	3	4	1	0	1	16
Treatment 2	5	9	5	4	3	3	0	2	20
Treatment 3	9	6	5	1	5	1	2	2	21
Treatment 4	3	10	7	4	2	0	0	2	23

6.3.1 Analysis between subjects

We conducted two-sample Kolmogorov-Smirnov tests to confirm the insights illustrated in Figures 3 and 4. This test is a non-parametric test that compares the cumulative

distributions of two data sets ¹⁵. It has been used in the nudge literature to analyze differences in the distributions of the treatments (Mol et al., 2021). By conducting two-sample KS tests on surveys chosen, Rouillé (2022) observed a significant difference between the distributions of T1 and T4, T2 and T3, and finally T2 and T4 (as for the Mann-Whitney test). We performed the same test on surveys filled out. Table 4 reveals no significant differences between treatments for surveys filled out, confirming the major impact of nudges on the number of surveys chosen and not on the number of surveys filled out.

Table 4: Analyse between subjects: Two-sample Kolmogorov Smirnov test

	Surveys chosen	Surveys filled out
Treatments	Exact p value	
H0: T1 = T4	0.055*	0.668
H0: T2 = T3	0.025**	0.994
H0: T2 = T4	0.012**	1.000

6.3.2 Analysis within subjects

We also performed two-sample KS tests to compare the results within subjects for each treatment. These comparisons allow us to observe whether there are differences in the distribution of populations between surveys chosen and surveys filled out, indicating if the impacts of the nudges are consistent with the distribution of populations at the individual level. Table 5 indicates a significant difference in T4 between surveys chosen and surveys filled out ($D=0.2941$, $p=0.024$). There is no significant difference between the distributions of other treatments.

Table 5: Analyse within subjects: Two-sample Kolmogorov-Smirnov test

H0: Surveys chosen = Surveys filled out				
Treatment	T1	T2	T3	T4
Exact p value	0.680	0.178	0.126	0.024**

¹⁵The two-sample Kolmogorov-Smirnov test does not assume that data are sampled from Gaussian distributions (or any other defined distributions) and is useful for testing whether two samples come from the same distribution.

6.4 Discussion

While the effect of the NFFT on the number of surveys chosen was quite clear, these results show that the norm's effect on the number of surveys filled out was much less evident. Indeed, we found no significant differences in surveys filled out between treatments, neither on the populations (Wilcoxon test) nor their distributions (two-sample KS test). Moreover, the results demonstrate significant differences within treatments between the number of surveys chosen and the number of surveys filled out for Treatments 1, 3, and 4. For these groups, this indicates that participants selected, on average more surveys than they completed. The effect of the NFFT on surveys chosen demonstrated in Rouillé (2022) is therefore inconsistent with the surveys filled out, and the hypothesis we made is not confirmed for Treatments 3 and 4. The higher number of surveys chosen in T3 and T4 might be due to social pressure generated by the NFFT in a situation of uncertainty. Indeed, this could be the case since the situation was new for participants, which implies that they had no clear preferences regarding the number of surveys they would have liked to complete. Participants followed the social proof and tended to choose initial contributions higher than their preferences.

By contrast, there was no significant spread in Treatment 2, revealing that participants exposed to the standard norm completed, on average, as many surveys as they previously selected. Thus, the hypothesis that social norm nudging allows people to adopt behaviors closer to their willingness is only validated for Treatment 2. However, although the two-sample KS test showed no significant difference in the distributions of surveys chosen versus filled out in T2, we have seen in Figure 4 that the boomerang effect found on surveys chosen was no longer observable on surveys filled out. Hence, despite a lower spread between surveys chosen and surveys filled out, the standard norm did not seem perfectly consistent, at least graphically. A replication study with larger sample sizes could be relevant for more insights into the consistency of the different nudges. This might confirm that, while the nudges had different effects on the number of surveys chosen, their effects were the same on the number of surveys completed. Thus, larger gaps between surveys chosen and surveys filled out in T3 and T4 would be explained by the number of surveys chosen that were on average higher than participants' preferences due to the social pressure generated by the NFFT.

In addition, we saw that the modal value regarding surveys completed is eight, clearly more than for the surveys chosen. We seem to observe a dichotomy between filling out all the surveys and filling out only a few. As mentioned by Rouillé (2022), we can interpret that some subjects exhibited a task completion bias. This bias corresponds to a tendency

to feel compelled to complete a task entirely once one has started it. In this framework, we assume that these people perceived their behavior as prosocial only if the task was fully completed. This might explain why only a few people completed five, six, or seven surveys. This effect of the task completion bias contrasts with the tendency to choose more surveys than were actually filled out, displayed by a portion of the subjects.

7 Conclusion

This study reports extended results of the online experiment discussed in Rouillé (2022). The experiment involved prosocial behavior (filling out surveys without monetary incentives) and implementing social norms that act as nudges, showing the efficiency of the Norm From The Top in that context. The NFTT removes the boomerang effect documented in the literature (Schultz et al., 2007; Richter et al., 2018) and thus increases the number of additional surveys chosen by the participants.

In this paper, we investigate whether the effects of these nudges are consistent between willingness (i.e., surveys chosen) and action (i.e., surveys filled out). The results come from the same study since the participants were not obliged to fill out the number of surveys previously chosen. At the end of each survey, participants could stop completing surveys and finish the experiment. Note that the framework of the experiment was oriented to incite participants to choose surveys and then leave the task easily, regardless of the number of surveys they had chosen. The literature has documented that people tend to perform fewer actions than they intend to (Allan et al., 2008; Sheeran and Webb, 2016). Therefore, we expected a discrepancy between the surveys chosen and the surveys completed in the control group. However, we expected nudges to reduce the spread between willingness and action by inducing a greater commitment to stay consistent in treatment groups. Globally, the results do not show a reduction in this spread, specifically for the NFTT. In treatments involving the NFTT, we interpret that participants adapted their initial contribution to an excessively high reference point compared to their preference. Hence, they ended up completing fewer surveys than planned. In this framework, the Norm From The Top might act as social pressure for some participants. Furthermore, the results indicate that the different nudges (standard norm, NFTT, NFTT + injunctive norm) have no significant effect on the surveys filled out compared to the control group. In addition, the concentration of decisions toward the average in the standard norm treatment, including the boomerang effect, no longer exists

on surveys filled out.

The findings of this study lead to a general result that is the non-persistent effect of the different nudges on the performed prosocial behavior. This lack of persistence might be related to the structure of these nudges, which are based on a rebiasing approach (Larrick, 2004). As discussed in the introduction, rebiasing corresponds to the creation of a second bias to cancel the non-desirable effect of the original bias. Social norm nudges can bridge the gap between intention and action, but indirectly, by creating a form of social pressure. Farrow et al. (2017) suggested that social norm interventions could lead to psychological costs, despite an improvement in the attitude towards the desirable behavior. Indeed, social norms provide feedback about how to behave, however, that feedback does not necessarily match people's preferences. Individuals adopt a behavior according to the feedback they receive and not directly to their preference. Then, once they are no longer exposed to that feedback, they may modify their choice, depending on their possibilities. We suspect this is what happened in this study. Likewise, the literature (Venema et al., 2020) showed that people tend to be more responsive to a social norm nudge when the situation is uncertain. In our study, participants had no prior hints about the number of surveys that matched their preferences, which can explain why they followed the nudges. Then, they shaped their preference while performing prosocial behavior and adjusted their attitude towards those preferences. This reasoning would explain why in our context, participants exposed to the NFFT chose more surveys than others and finally complete the same amount of them.

To conclude, this study contributes to the literature on nudges and, more particularly, improves the understanding of social norm nudges. Increasing this comprehension enables the design of better nudge policies that could guide people more effectively. When setting a nudge, we argue that the choice of the mechanism, i.e., rebiasing or debiasing, should include a consideration of the framework and whether people can modify their decision while executing the behavior. Other replication studies could observe the role of the framework and, in particular, the easiness of changing contributions towards prosocial behavior. In addition, the assimilation of social norm nudges to social pressure contributes to the debate on the ethics of nudges. In that vein, further research that studies the feeling of people after being exposed to these nudges could be relevant to improve our understanding of these policies.

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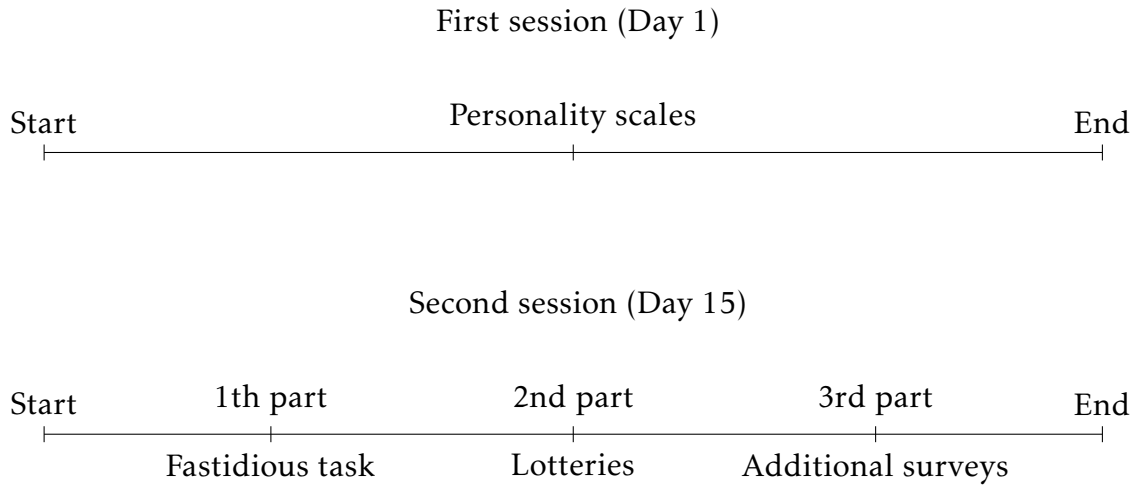
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Appendix A:



Appendix B:

1- Illustrations of treatments

Fin de l'expérimentation

Questionnaires additionnels

Combien de questionnaires souhaitez-vous remplir ?

0 8

Cliquez sur la barre pour faire apparaître le curseur

Valider

Figure 5: Treatment 1: no information regarding others' people behavior

Translation: "How many surveys do you want to complete?"

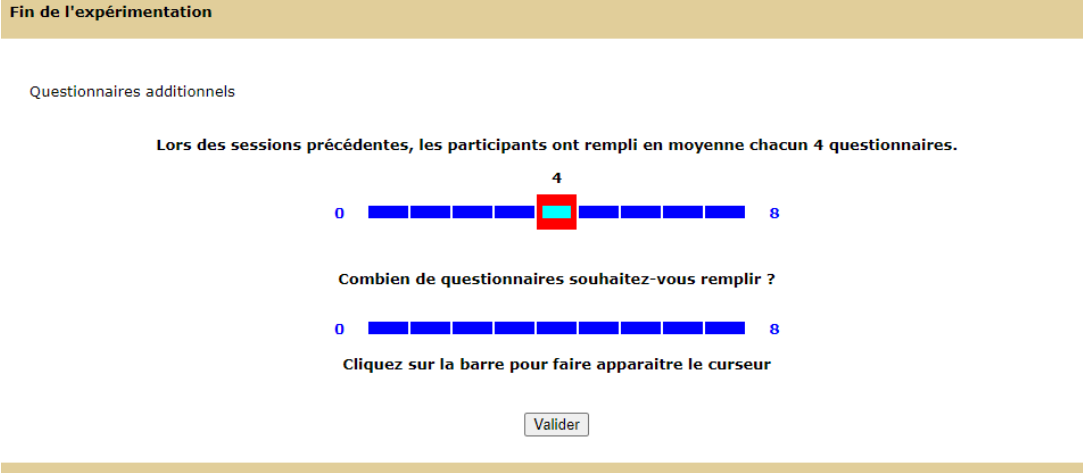


Figure 6: Treatment 2: standard social norm nudge

Translation: "During previous sessions, participants completed an average of four questionnaires.
How many surveys do you want to complete ?"

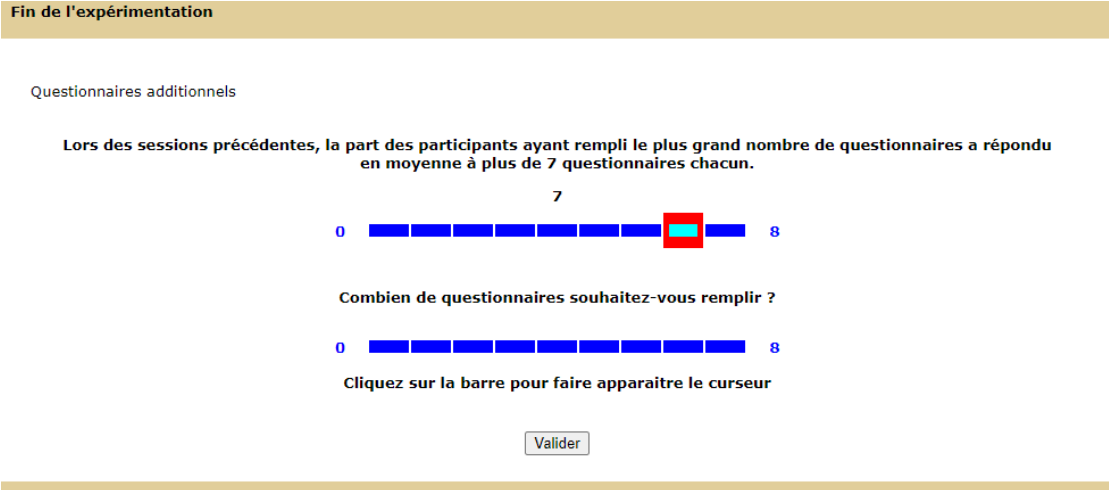


Figure 7: Treatment 3: Norm From The Top

Translation: "During previous sessions, the share of participants who completed the most questionnaires completed on average over seven questionnaires each.
How many surveys do you want to complete ?"

Fin de l'expérimentation

Questionnaires additionnels

Lors des sessions précédentes, les participants les plus dévoués ont répondu en moyenne à plus de 7 questionnaires chacun.



Combien de questionnaires souhaitez-vous remplir ?



Cliquez sur la barre pour faire apparaitre le curseur

Valider

Figure 8: Treatment 4: Norm From The Top and injunctive norm

Translation: "During previous sessions, the most devoted participants completed on average over seven questionnaires each.

How many surveys do you want to complete ?"

2- Authentic message received by the participants asking to fill out additional surveys (in french):

Fin de l'expérimentation

Suite à ce mail, vous serez invité à transmettre votre nom et adresse mail au CIRANO. L'adresse mail du CIRANO sera indiquée dans le message.

Avant de quitter l'expérimentation, nous vous serions reconnaissants de bien vouloir prendre un peu de temps pour répondre à des questionnaires supplémentaires.

Ces questionnaires portent sur l'environnement et sont sans rapport direct avec l'expérimentation à laquelle vous venez de vous livrer. De ce fait, vous ne percevrez pas de rémunération supplémentaire pour les avoir remplis.

Vous pouvez choisir le nombre de questionnaires (jusqu'à 8, chacun ne prenant qu'une minute) que vous souhaitez remplir.

Valider

Figure 9: Message introducing prosocial behavior

Translation: "Before finishing the experiment, we would be grateful if you could take some time to fill out additional surveys.

These surveys are related to the environment and are not linked with the experiment you have just carried out.

Therefore, you won't receive any reward for filling out it.

You can choose the number of surveys (up to eight, one minute each) you wish to fill out."

3- Authentic messages received by a participant after he completed surveys (while he selected an initial contribution of two surveys):

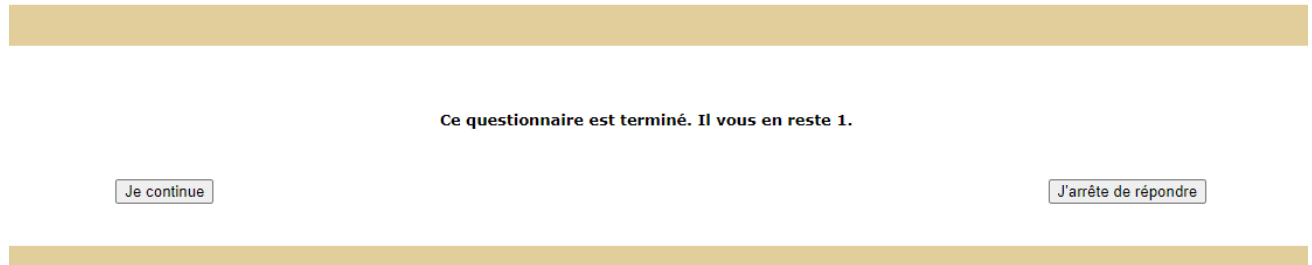


Figure 10: Message received after completing one survey

Translation: "This surveys is over. You have 1 left."
Left button: "I continue" Right button: "I stop answering"

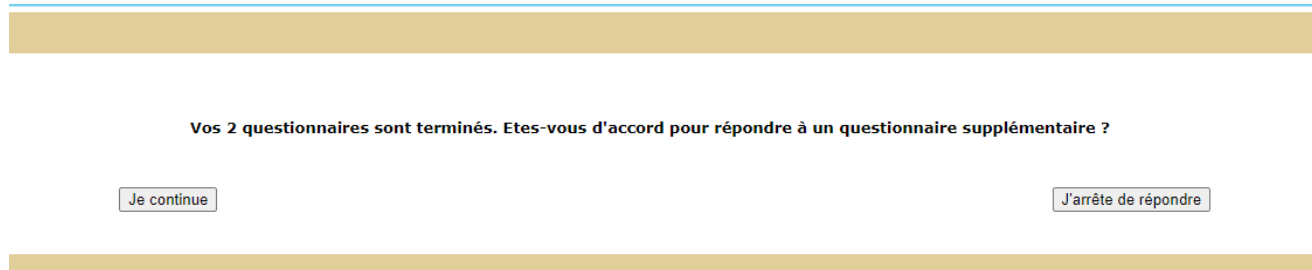


Figure 11: Message received after completing two surveys

Translation: "Your 2 surveys are over. Do you agree to fill out another survey ?"
Left button: "I continue" Right button: "I stop answering"

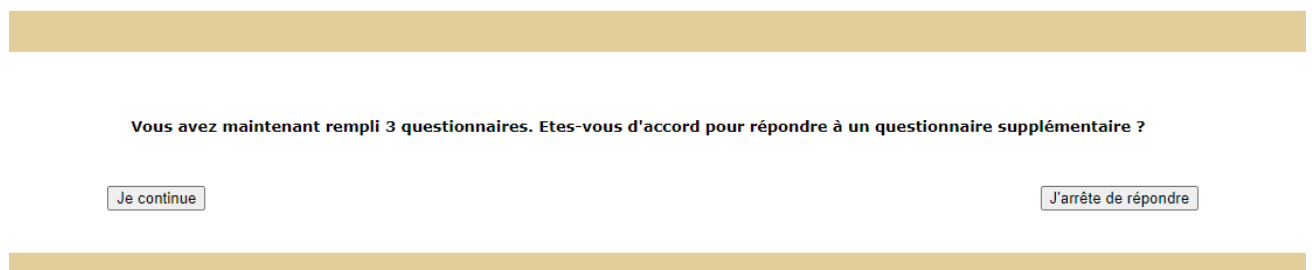


Figure 12: Message received after completing three surveys

Translation: "You have now completed 3 surveys. Do you agree to fill out another survey ?"
Left button: "I continue" Right button: "I stop answering"

Appendix C:

Analysis between and within subjects: distribution of the samples

Figure 13: Distribution of the number of surveys chosen per participant

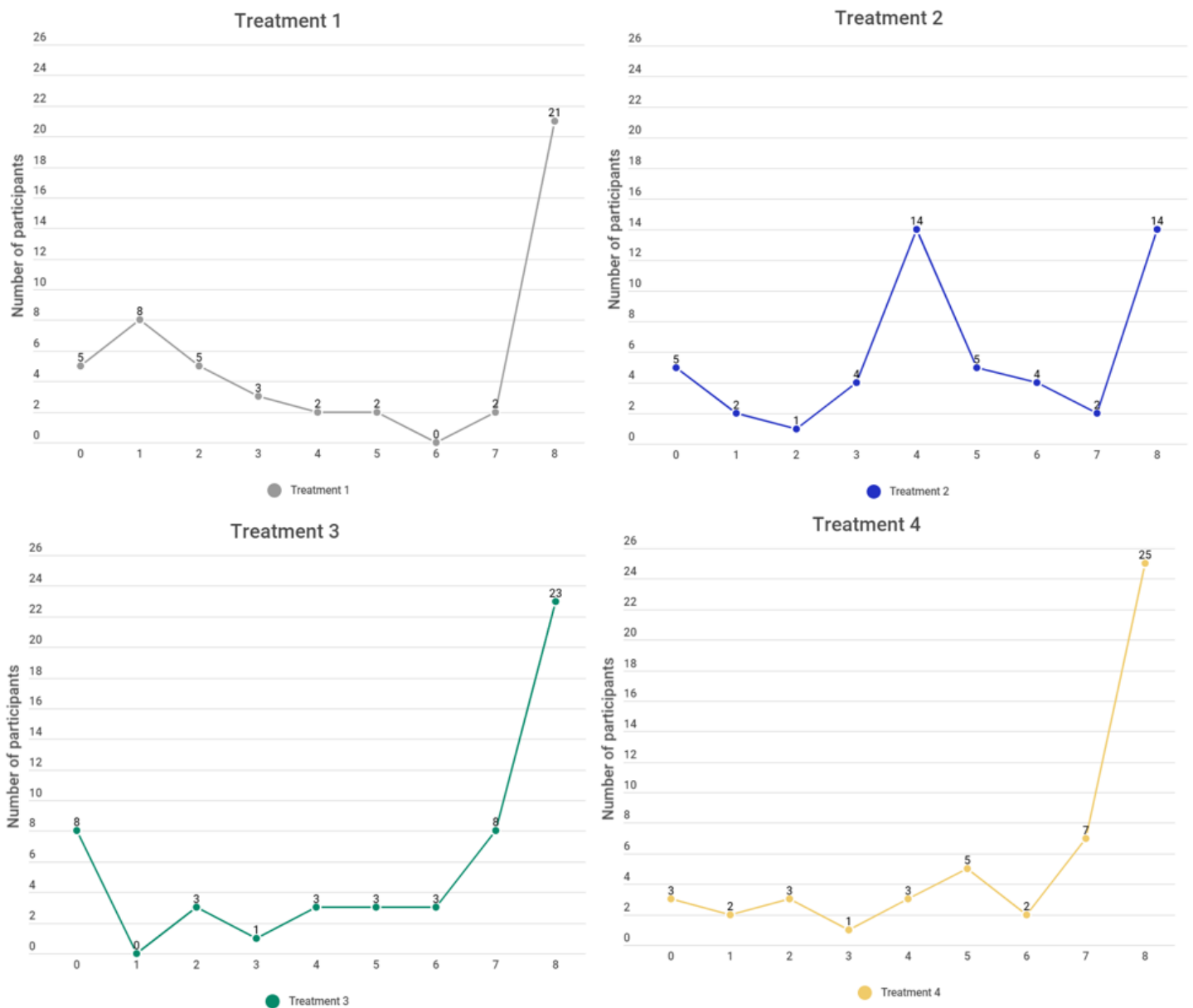


Figure 14: Distribution of the number of surveys filled out per participant

