From the lab to the field: envelopes, dictators and manners

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02. March 2012

From the Lab to the Field: Envelopes, Dictators and Manners*

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March 2, 2012

Abstract

Results are reported of the first natural field experiment on the dictator game, where subjects are unaware that they participate in an experiment. In contrast to predictions of the standard economic model, dictators show a large degree of pro-social behavior. This paper builds a bridge from the laboratory to the field to explore how predictive findings from the laboratory are for the field. External validity is remarkably high. In all experiments, subjects display an equally high amount of pro-social behavior, whether they are students or not, participate in a laboratory or not, or are aware that they participate in an experiment or not.

Key words: altruism, natural field experiment, external validity.
JEL Classification: C70, C91, C93, D63, D64.

*I would like to thank Aurélien Baillon, Han Bleichrodt, Enrico Diecidue, Dennie van Dolder, Ido Erev, Emir Kamenica, John List, Steven Levitt, Wieland Müller, Charles Noussair, Drazen Prelec, Kirsten Rohde, Ingrid Rohde, and participants from seminars at the Erasmus University Rotterdam and the University of Chicago for their useful comments. Special thanks to Jan Potters and Peter Wakker for some significant contributions. Finally, I would like to thank Thibault van Heeswijk for his excellent research assistance.

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1 Introduction

One of the most influential experiments in economics is the dictator game (Kahneman et al. (1986), Forsythe et al. (1994)). A 'dictator' is endowed with an amount of money and is matched with an anonymous recipient. The task of the dictator is to determine how much money to give to the recipient. Conventional economic theory predicts that the dictator will give no money at all to the recipient, but empirically this prediction is often violated. Behavior in the dictator game therefore poses a fundamental challenge to the standard economic model. Given the simplicity of the experiment, confusion on the part of subjects cannot explain why conventional economic theory does not predict well. Behavior in this game is usually explained by altruism or a willingness to conform to social norms (the latter is also referred to as 'manners' (Camerer and Thaler (1995))). As a result, theorists have altered the standard economic model. Motivations such as altruism, fairness, inequity aversion and reciprocity have been incorporated into new models.[1]

All evidence regarding behavior in the dictator game has so far come from laboratory experiments. Critics have argued that laboratory experiments on pro-social preferences produce biased outcomes, because of scrutiny or obtrusiveness by the experimenter.[2] Some studies have indeed shown that pro-social behavior decreases when subjects are unaware of the presence of an experimenter (List (2006b), Benz and Meier (2008), see Bandiera et al. (2005) for a non-experimental study on monitoring). Whether experimenter scrutiny also affects behavior in the dictator game is as yet unexplored.

This paper reports the first results of a dictator game in a natural field experiment. A random sample of subjects in a Dutch city receive a transparent envelope with cash due to a supposed misdelivery. They are thus placed in the role of dictator, because they can decide to return part or all of the cash to the addressed recipient. In this experiment, the subjects are unaware that their behavior is recorded by an experimenter. Additional

[1] Classic references are Rabin (1993), Levine (1998), Fehr and Schmidt (1999), Bolton and Ockenfels (2000), Andreoni and Miller (2002), and Charness and Rabin (2002).

[2] See Levitt and List (2007a, 2007b, 2008), and List (2009), but see Falk and Heckman (2009), Camerer (2011), and Kessler and Vesterlund (2011).

experiments are conducted to identify possible differences between this naturally observed behavior and findings in the laboratory. These experiments are conducted with student subjects in a laboratory, and with subjects from the same Dutch city in either a laboratory or their home.

The results are that half of the subjects in the natural field experiment return the envelope. The other experiments show similar results. Therefore, standard economic theory is refuted in the field as much as it is in the laboratory. Furthermore, this paper shows that in some settings the predictive power of laboratory findings is supported.

2 Building a bridge

2.1 General description of the experiments

In all experiments in this paper, each subject receives one transparent envelope with a 'thank you' card and two notes of €5. From the outside of the envelope, the money is clearly visible, as well as the text written on the card. This text reads: 'To you and all others, thank you very much for your voluntary services.— Tilburg University'. Each transparent envelope is stamped and addressed to a volunteer of Tilburg University. The subjects are informed that Tilburg University intends to thank its volunteers by sending the envelope. The task that the subjects in the experiments face, is whether or not to send the card to one of Tilburg University's volunteers. All experiments are conducted in Tilburg, the Netherlands.

In four experiments, a bridge is constructed from the laboratory to the field that addresses the external validity of altruism, in agreement with the principles of Harrison and List (2004) and List (2006b). Table 1 gives an overview of the experiments.

StuLab is a conventional laboratory experiment: It is conducted in a laboratory with students as subjects. In CitLab, representative citizens rather than students, are invited into a laboratory. The CitLab experiment isolates differences in behavior between the student subject pool and the subjects in the natural field experiment. In CitHome, subjects take the instructions

Experiment Abbreviation	Type	Aim of Experiment: Measuring altruism with	Subjects
StuLab	Conventional Lab Experiment	students in a lab, aware of scrutiny	40
CitLab	Artefactual Field Experiment	citizens in a lab, aware of scrutiny	40
CitHome	Framed Field Experiment	citizens at home, aware of scrutiny	40
CitField	Natural Field Experiment	citizens at home, unaware of scrutiny	40

Table 1 Overview of the experiments.

with them at home, rather than conducting the experiment in a laboratory. Therefore, CitHome takes place in the same environment as the natural field experiment. A comparison of the CitLab and CitHome experiments isolates the influence of the physical environment in which the experiment is played. CitField is a natural field experiment. Rather than handing out instructions, a post-marked transparent envelope with a thank you card and two notes of €5 are slipped into someone's mailbox. The post-marked stamp makes it seem as though the envelope has arrived due to a misdelivery. The question to send the card back to the volunteer comes naturally. Since the subjects in this experiment are unaware that an experiment is taking place, comparing CitHome with CitField shows the effects of scrutiny on behavior.

2.2 Design of the StuLab, CitLab, and CitHome experiments

Establishing a bridge between the laboratory and the field comes with a number of challenges. The following describes in detail the information and conditions for the subjects in the StuLab, CitLab and CitHome experiments (the instructions can be found in Appendix A). The CitField experiment is taken as a benchmark.

First, the property rights of the card belong to the volunteer in the CitField experiment. It has been shown in previous research on dictator game giving that property rights have an impact on pro-social behavior: The party with the property rights gets the largest surplus (Fahr and Irlenbusch (2000), Cherry et al. (2002), Oxoby and Spraggon (2008), and Heinz et al. (2011)). Hence, the property rights in the three other experiments also belong to the volunteers. Each card in those experiments is explicitly addressed to a volunteer. Information on the type of voluntary work is not

provided to the subjects. In reality, the volunteers in this study all helped the Tilburg Sustainability Center of Tilburg University. They assisted with writing a report on planet Earth, or on how environmentally friendly the catering services at the campus of Tilburg University are.

Second, because the subjects in the CitField experiment are not aware that they participate in an experiment, they perceive themselves to be anonymous. For that reason, the subjects in all the other experiments have to be anonymous as well. It is known from previous research on social preferences that the degree of anonymity influences pro-social behavior. A higher degree of anonymity makes people more selfish (Hoffman et al. (1994), Laury et al. (1995), Hoffman et al. (1996), Johannesson and Persson (2000), Soetevent (2005)). Anonymity is ensured by implementing a double-blind procedure. Subjects are explicitly told that their name is not asked, and that more participants are recruited for the same experiment. The subjects are then explained that although the experimenter is able to observe the total number of envelopes that have arrived, no envelope can be linked to a subject personally.

Third, in the CitField experiment, someone who wants to return the envelope has to do an effort. A subject must either go physically to the address of the volunteer, or go to the nearest post office box to have the mail company return the envelope. To keep these costs equal in the other experiments, subjects in the StuLab, CitLab, and CitHome experiments have to mail or deliver the envelope themselves. It is not possible for subjects to give the envelope to the experimenter.

Fourth, subjects in the CitField experiment do not receive a show-up fee, for obvious reasons. Therefore, none of the subjects in the other experiments are given a show-up fee.

Fifth, in the CitField experiment, subjects are made to believe that the envelope is obtained randomly due to a misdelivery. The text on the card reveals that a card has been sent to 'all other' volunteers as well. Believing that a card has been delivered randomly, and that similar cards are sent to others, may affect pro-social behavior, although it is not clear in which way. In each of the StuLab, CitLab, and CitHome experiments, 40 subjects

randomly take their instructions and 'thank you' card from a pile of 45 envelopes. Subjects are explained that an unknown amount of envelopes will be left over after the last subject has taken its envelope, and that all of those envelopes will be sent out by the experimenter. With this procedure, the subjects have randomly received a card while knowing that similar cards are sent to other volunteers, comparable to the CitField experiment.

Sixth, in the StuLab experiment, students know that the money used in the experiment comes from a university. It may be the case that knowing who is funding the experiment influences behavior. Therefore, this information is explicitly provided to all participants in all experiments by signing the card by the university.

Seventh, in the CitField experiment only, the same name and address of one volunteer is used on all transparent envelopes. This volunteer has a Dutch last name, and an address close to the city center of Tilburg. The volunteer is male, although that information is not visible from the card. The information that the subjects have in CitField influences the experimental design of the three other experiments in three ways. The first way is that the volunteers used for these experiments also have to live close to the city center of Tilburg. Falk and Zehnder (2007) show that pro-social behavior may be influenced by the district of the recipient. The second way is that all the volunteers need to have a Dutch last name. Ethnicity of the receiver in social preference games may influence decisions (Buchan et al. (2006), Charness et al. (2007)). The third way is that all volunteers have to be male, although this information is not made available to the subjects. Previous research shows that giving to males or females may differ (Eckel and Grossman (2001), and Solnick (2001)).

Eighth, 88% of the citizens in Tilburg have the Dutch nationality (CBS (2010)). Therefore, the majority of subjects in the CitField experiment is Dutch as well. Previous research has shown that people from different cultures behave differently in social preference experiments (Fershtman and Gneezy (2001), Henrich et al. (2004), and Herrmann et al. (2008)). Only Dutch subjects are invited in the other three experiments. A subject is considered Dutch if he or she is able to read the Dutch instructions used for

the three experiments.

Ninth, the percentage of males living in Tilburg is 49.64% (CBS (2010)). Therefore, the division of subjects in the StuLab, CitLab, and CitHome experiments should be gender balanced (Andreoni and Vesterlund (2001)). The StuLab experiment has 21 males and 19 females, the other two experiments each have 20 males and 20 females.

2.3 Procedure of the StuLab, CitLab and CitHome experiments

Recruitment of subjects for the StuLab experiment was done at the campus square of Tilburg University. Here, students can be found on all the disciplines that the university offers: economics, law, the social sciences, humanities, and theology. The anonymity requirement does not allow gathering specific background information of the subjects. Starting from 10.00 a.m. and ending at 18.00 p.m., each hour six subjects were recruited. At the campus square, subjects were asked to participate in an experiment which lasted only a couple of minutes. No mention was made about any earnings the subjects could make, nor whether they would receive a show-up fee. Upon arriving at the lab, subjects were asked to randomly pick one opaque A4 sized envelope from a pile. Each opaque A4 sized envelope contained a set of instructions and a stamped transparent envelope addressed to a volunteer. Subjects then were directed to a private space, to read the instructions. After reading the instructions, the subjects were requested to leave, and take all that they had been given with them.

In the CitLab experiment, recruitment of subjects has been done in the downtown city hall area of Tilburg. Tilburg has three city halls, one for each of its districts. The city hall used for this experiment is the one in the center, the district where the CitField experiment is conducted, and where all the volunteers live. The city hall offers the advantage that representative citizens of Tilburg can be recruited. Only subjects are invited who have come to the city hall to extend their passport or identification card. By Dutch law, each citizen is required to have either one of those two. Therefore, there is

no selection effect of citizens visiting the city hall. The city hall is closed on weekends, and is opened daily from 10.00 a.m. until 6.00 p.m., with the exception of Thursdays, on which it closes at 8.00 p.m. Starting from 10.00 a.m. and ending at 8.00 p.m., each hour four subjects participated in the CitLab experiment. Subjects were first asked whether or not they had visited the city hall to extend their passport or identification card and then if they wanted to participate in an experiment. Eligible subjects who showed interest were then asked to randomly take an opaque A4 sized envelope from a pile, and were shown directions to a lab. This envelope contained a set of instructions and a stamped transparent envelope addressed to one of the volunteers. Once the subjects read the instructions in private, they were asked to leave the lab, and take all that they had been given with them.

The subjects of the CitHome experiment are recruited at the same city hall in Tilburg, using the same procedure. However, rather than directing these subjects to a lab, they were asked to take the opaque A4 sized envelope with them, and read it once they were at home.

The StuLab, CitLab, and CitHome experiments were conducted in May of 2011.

2.4 Procedure of the CitField experiment

In this experiment a post-marked transparent envelope with two notes of €5 is slipped into a subject's mailbox. Because the envelope shows a different address than the address of the subject, it seems as if a misdelivery has taken place. The following randomization procedure is used to determine the subjects for the CitField experiment. The volunteer's address ends with '... street 27'. Therefore, the envelope is slipped into a mailbox at an address in the center district of Tilburg that ends with '... street 27'. Only streets are used for which it is plausible that citizens living there would go to the same city hall as where the subjects are recruited for the CitLab and CitHome experiments. From a list with all streets of Tilburg, forty streets from the city center of Tilburg are randomly drawn.

Acquiring a postmark on the envelope is necessary to make a misdelivery

credible to the subjects. This is accomplished by sending the envelope to the volunteer's address first, before slipping it into a subject's mailbox. Note that the postmark on the envelope marks the date at which the envelope is processed. Therefore, the envelope is collected the same day from the volunteer's address and delivered at a subject's address. The delivery of the envelope is done around the same time as the regular mail company delivers mail, which is in the afternoon. The CitField experiment is conducted in the last week of April, in May, and the first week of June 2011.

2.5 Errors in the delivery process

In all four experiments, an envelope that is not returned to a volunteer can be at either of two places. It either is in the possession of a subject, or it can be lost in the delivery proces of the (monopolist) mail company if the subject decided to send the card by mail. From the data of the experiments, it is impossible to separate the two alternatives.

To learn about the magnitude of the noise that the mail company potentially adds, transparent envelopes with cash are sent to observe whether or not they arrive. Envelopes not arrived must be due to errors in the delivery process. To test for errors, 90 envelopes are sent with two notes of €5. In a pilot study, 58 envelopes are sent with a note of €10 and a note of €5. Table 2 gives an overview of the data on the errors in the delivery process.

	€10 envelope	€15 envelope
Number of transparent envelopes sent	90	58
Number of transparent envelopes received	88	58
Percentage of envelopes received	97.77	100

Table 2 Rate of errors in the delivery process.

Overall, the data shows that the mail company has a delivery rate of 98.65%, close to the rate of 98% it reports on its website. Since this rate is not 100% there is possibly some noise in the date presented in section 3. It must be stressed that losing an envelope is independent of the experiment. Identifying the causal effects of interest are not confounded by this noise.

2.6 Self-selection

In the StuLab, CitLab, and CitHome experiments, subjects are invited to participate in an experiment. In contrast, the subjects of the CitField experiment are exogenously chosen. If it is true that unobservable predispositions to participate in an experiment are correlated with altruistic behavior, then the self-selected laboratory subjects may behave differently than the subjects in the field.

Previous research, however, shows no evidence that self-selection effects have an impact on pro-social behavior. Using social preference experiments, Cleave et al. (2011) and Falk et al. (2010) test for participation biases within student subject pools, and find that self-selected subjects are as pro-social as non-self-selected subjects. Anderson et al. (2010) come to a similar conclusion, using a prisoner's dilemma game with truck drivers. Finally, and of particular interest to the current study, Bellemare and Kröger (2007) look for selection effects within a representative sample of the Dutch population. They find no correlation between unobservable random component underlying the decision to participate in an economic experiment (the trust game), and the unobservable random component underlying the decision to be pro-social.

3 Data analysis

Figure 1 shows the number of envelopes that have been returned to the volunteers in all four experiments. As can be seen, the difference in the number of envelopes returned by the subjects is small. Result 1 summarizes this finding:

Result 1 There is no difference in the number of envelopes returned by the subjects in each experiment. The subject pool, physical environment in which the experiment is conducted, and awareness of scrutiny have no effect on pro-social behavior.

Support for Result 1: A two-sided Kruskal-Wallis test on the number of envelopes returned that contain money cannot reject the hypothesis that the

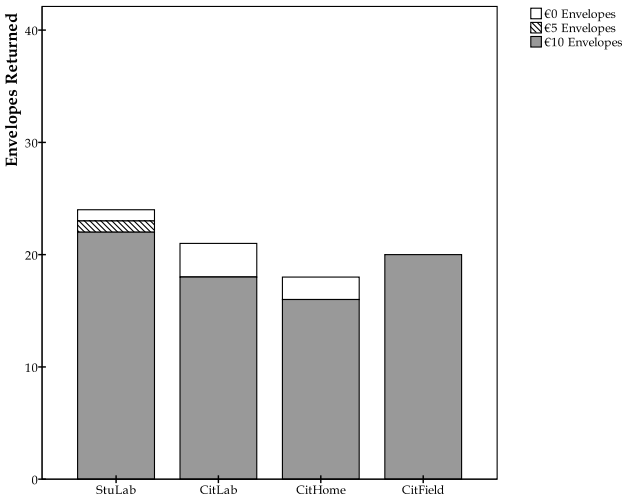

Figure 1 The number of envelopes returned in the StuLab, CitLab, CitHome and CitField experiments. In each experiment, forty subjects participated. '€10 Envelopes' are envelopes returned containing the full amount of €10, '€5 Envelopes' are envelopes of which €5 is taken out, '€0 Envelopes' are envelopes that are returned empty.

four experiments are equal ($N_1 = 40, N_2 = 40, N_3 = 40, N_4 = 40, p = 0.51$).

Also when comparing the experiments pairwise, no differences can be found. This is indicated by a series of two-sided Mann-Whitney tests, taking an independent observation at the subject level, yielding forty observations in each experiment. There are no differences in envelopes returned between StuLab and CitLab ($p = 0.32$), between CitLab and CitHome ($p = 0.65$), and between CitHome and CitField ($p = 0.37$). Likewise, comparing StuLab and CitField shows that there are no significant differences in envelopes returned ($p = 0.58$). The results are qualitatively the same when also the envelopes are included that are returned without money. ■

Because the main result is based on the acceptance of the null hypothesis, power analyses are carried out. A priori, a sample of 40 allows to detect an effect size of at least 57% with a significance level of five percent and a power of eighty percent (Faul et al., 2007). The differences in behavior reported in Figure 1 are so small that even if they were statistically significant, they

are economically insignificant. The StuLab and CitLab experiments show a difference with CitField of approximately five percent. To make such a difference statistically significant (with a significance level of five percent and a power of eighty percent), the number of observations in each experiment would have to be 1,296.

In appendix B more analyses are presented, with significant outcomes, that look at issues other than return rates between the experiments.

4 Discussion

The results reported here show that experimenter scrutiny has no effect on pro-social behavior, unlike other studies on the effects of monitoring (Bandiera et al. (2005), List (2006a), Benz and Meier (2008)). A number of reasons can be given for this difference.

First, two important features of the natural field experiment that may have an effect on pro-social behavior are the recipient's property rights and the effort on the part of pro-social dictators. These factors are uncommon in laboratory settings (and absent in the classical dictator game), and may be stronger than the effects of scrutiny.

Second, this study uses a double blind procedure in all experiments, while the other studies use single blind procedures in their laboratory experiments. Subjects in double blind experiments may act as if the experimenter is not present at all, which mitigates the effects of scrutiny.

Finally, the aforementioned three studies show a field setting where the effects of anti-social behavior are not directly observable by a selfish subject. In this study, to the contrary, a selfish dictator knows exactly what monetary losses the recipient suffers. Because of this transparency, subjects may be forced to think harder about their potential selfish behavior. If so, then the transparency of the experimental task may be an important factor for lab-field generalizability, like experimenter scrutiny. Disentangling these differences is a useful topic for future research.

5 Conclusion

This paper reports the first results of a dictator game in a natural field experiment. In the main experiment, a random sample in a Dutch city receives a transparent envelope with cash in their mailbox, due to a supposed misdelivery. These dictators can then choose to return part or all of the cash in the envelope to the addressed recipient, but are unaware that an experiment is taking place. Other experiments are carried out to build a bridge, step by step, from the laboratory to the field. The bridge starts in a laboratory with student subjects. They have to decide to send an envelope with cash to the person addressed on it. In the second step of the bridge, the student subjects in the laboratory are replaced by subjects from a Dutch city. In the third experiment, the laboratory is replaced for a subject's home, but the subject is still aware that behavior is monitored. The fourth and final experiment is the main one, as described before. This bridge of experiments identifies the influences of the subject pool (students versus citizens), physical environment (the laboratory versus home), and awareness of being part of an experiment.

The results show that behavior is the same in all four experiments: roughly half of the subjects in each experiment return the full amount of money. These findings are of importance to theorists, because the standard economic model is refuted in the field as much as it is in the laboratory. This finding motivates the need to model other-regarding preferences into economic theory. The results are also of importance to experimental economists, because the results support the relevance of findings in the laboratory for the field.

Appendix A: Experimental instructions of the StuLab, CitLab, and CitHome experiments

This appendix contains the instructions used in the StuLab, CitLab and CitHome experiments. The instructions are translated from Dutch. The sentences between curly brackets are omitted in the CitHome experiment.

Dear participant,

Welcome to this study of Tilburg University. Before the study begins, we want to tell you two things. First, your participation to this study is fully anonymous. At the start of this study, we did not ask your name. Also when the study ends, we will not ask your name. Second, it is not allowed for us as researchers to lie to participants in a study. These instructions are written truthfully.

- You have received a transparent envelope. The transparent envelope contains a card and two notes of €5.
- As you can see, the transparent envelope is addressed to someone else. A while ago, this person has performed voluntary services for Tilburg University. This envelope is a thank you for the volunteer.

The procedure

- You have randomly taken the transparent envelope in front of you from a pile of envelopes. All transparent envelopes in this pile are addressed to volunteers of Tilburg University.
- More participants participate in this study. All other participants of this study also randomly take a transparent envelope from this pile. However, the number of envelopes from this pile is greater than the total number of participants. Some envelopes will therefore be left over. These will be sent by Tilburg University to the addressed volunteers.

- {As soon as you finish reading these instructions carefully, take the transparent envelope with you from the laboratory.}

The experiment

- Make a decision whether or not you want to send the transparent envelope to the addressed volunteer.
- {When you have left the laboratory (with the transparent envelope),} execute your decision. (In case you want to send the envelope, you have to do that yourself. You can't let us do that.)

Anonymity

- We want to stress that your participation in this study is fully anonymous.
- We can verify the total number of transparent envelopes that has been sent by all participants of this study. However, in no way can we make a link between you personally and the transparent envelope which you have taken (randomly) from the pile.

{You are now kindly requested to leave the laboratory, with the transparent envelope. Thank you for your participation.}

Appendix B: Additional analyses

Appendix B.1: Time before an envelope arrives

For each experiment, it is recorded how many days it takes for an envelope to arrive at the address of a volunteer. The average and median number of days it takes for each experiment is displayed in the table below (only the envelopes that contained cash are reported).

	StuLab	CitLab	CitHome	CitField
Average days before an envelope is returned	3.13	4.41	3.67	4.65
Median days before an envelope is returned	1	2	2.5	3

Table 3 Days it takes before an envelope containing cash is returned in the StuLab, CitLab, CitHome, and CitField experiment.

Result B1 The number of days it takes before an envelope is returned differs between experiments.

Support for Result B1: A two-sided Kruskal-Wallis test rejects the hypothesis of an equal return time over the four experiments ($N_1 = 23, N_2 = 17, N_3 = 16, N_4 = 20, p = 0.06$). For this test, only envelopes are included that contain money. The difference in delivery time is driven by the difference between the StuLab and CitField experiment, as is shown by a two-sided Mann-Whitney test ($N_1 = 23, N_2 = 20, p = 0.05$). Mann-Whitney tests between other experiments show no significant results. Including all envelopes, also those returned without money, gives qualitatively similar results. ■

A reason for the longer delivery time of envelopes in the CitField experiment may be that subjects were not at home when an envelope was slipped in the mail box. Alternatively, it may be the case that knowingly participating in an experiment promotes a sense of urgency in the decision making process.

Appendix B.2: Returned envelopes in CitField

In the CitField experiment, the serial number on each of the two notes of €5 is recorded. Therefore, an envelope that is returned in this experiment can be linked to the street where it is 'misdelivered'. An interesting question is whether the propensity to return an envelope is influenced by the physical distance between the address of the subject and that of the volunteer.

Result B2 In the CitField experiment, there is no correlation between returning an envelope, and the physical distance between subject and volunteer.

Support for Result B2: A two-sided Spearman's correlation test between returning an envelope and physical distance has a value of -0.154, but is insignificant ($N = 40, p = 0.34$). ■

Subjects have two ways of returning an envelope to the volunteer: they can bring it back personally (perhaps by hoping to evoke the prospect of future interaction, see for example Leider et al. (2009)), or return it through the mail company. Out of the twenty envelopes that were returned in the CitField experiment, eleven were delivered personally and nine through mail. It is expected that subjects who live more closely to the volunteer's address are more likely to return the envelope personally. This is confirmed by result B3:

Result B3 Conditional on returning an envelope, there is a significant correlation between returning an envelope personally and physical distance between subject and volunteer.

Support for Result B3: A one-sided Spearman's correlation test between physical distance and returning an envelope personally has a value of -0.402, and is significant ($N = 20, p = 0.04$). ■

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