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Social Distance and Reciprocity: The Internet vs. the Laboratory

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Abstract: We explore the effects of social distance on reciprocal behavior in an experiment conducted over the Internet on three continents and in classroom laboratory sessions conducted in Israel and Spain. Our design elicits individual behavior profiles over a range of contingencies, enabling us to identify heterogeneity among our participants. We find that many people show regard for others, even with the apparent social distance inherent with Internet interaction. Even in a virtual experiment, about 28% of the population demonstrate what appears to be positive reciprocity. The classroom laboratory sessions minimize (anonymous) social distance. While the rate of positive reciprocity is higher (43%) with less social distance, the patterns in behavior are surprisingly similar across treatments. To the extent that reciprocity could be a feature of virtual international business, perhaps cooperative behavior is sustainable.

Key words: Internet Experiments, Lost-wallet Game, Reciprocity, Social Distance

JEL classification: A13, B49, C70, C91, C99, D63

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1. INTRODUCTION

According to most theories of reciprocity, many people would choose a favorable response for intentional actions perceived to be favorable (*positive reciprocity*) and an unfavorable response for intentional actions perceived to be unfavorable (*negative reciprocity*). These responses may be costly for the individual, but perhaps serve to enforce social norms (Hoffman, McCabe, and Smith 1998, Fehr and Gächter 1998, Brandts and Charness 1999). Fehr and Gächter (2000) present a strong case that reciprocal behavior "has powerful implications for many economic domains" (p. 160).

Participants in laboratory experiments have been observed to sacrifice money in an apparently purposeful manner.[1] Recently, there have been several attempts (e.g., Fehr and Schmidt 1999, Bolton and Ockenfels 2000, Charness and Rabin 2000) to model deviations from pure material self-interest as reflecting some form of *social preferences*. It is true that whether these deviations reflect reciprocity or some other form of preference is still a matter of some controversy, but some patterns are nevertheless manifest. Can we also observe this behavior in an environment characterized by much greater social distance? In the typical laboratory setting, participants can see each other before and after (and even during) an experiment, share common traits (e.g., school, age group, nationality), and may well be friends or acquaintances. Perhaps the willingness to sacrifice money to affect someone else's material reward is an artifact of the physical and emotional proximity of the experimental subject pools.

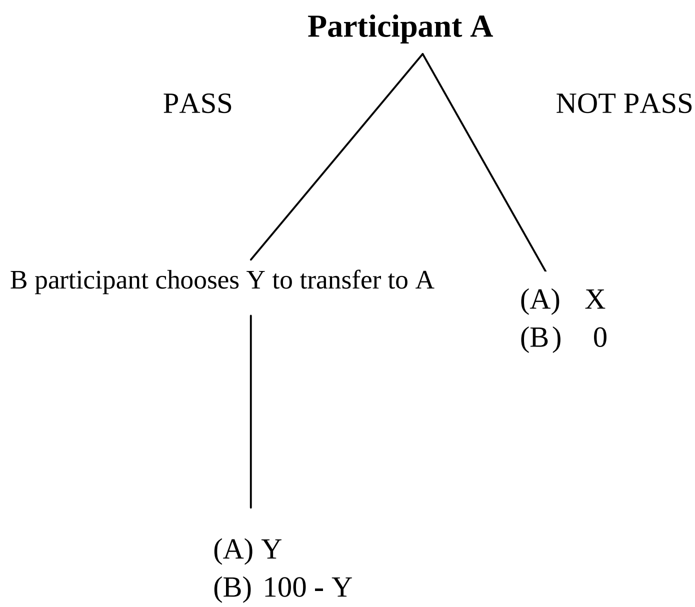
[1] Early demonstrations of this include the ultimatum game (Güth, Schmittberger & Shwarze 1982) and the dictator game (Forsythe, Horowitz, Savin & Sefton 1994). In the ultimatum game, people reject lopsided proposals; in the dictator game, people voluntarily give away money to a helpless other person.

We feel it is valuable to investigate social norms in a virtual environment, since the Internet has become a major force in contemporary life. From an economic perspective, the volume of Internet business is rapidly increasing and virtual markets are becoming more prominent. For researchers, the Internet would appear to offer various advantages over computer-based laboratory experiments. Since people can participate at their convenience, it is feasible to involve non-students and so experiments can be conducted over a broader population base. The experimenter can automate most tasks, and the convenience of participation also reduces or eliminates the need for fees paid purely for participation.

We test for positive reciprocity in an Internet experiment, comparing our results with those from our parallel classroom laboratory sessions. People on three continents participated in the Internet experiment, without any physical meetings among participants and experimenters. It seems natural to expect that the motivational strength of social preferences will be greatest for local, rather than distant, relations. Feelings seem much stronger for comparisons and reactions to our immediate associates than for people who are distant in place or time. Moreover, "fairness" and "equity" (both usually discussed in abstract, philosophical terms) are closely linked to the concept of local status (see Frank 1985).

The game chosen is the "Lost-wallet Game," described in Dufwenberg and Gneezy (2000; henceforth DG). They motivate the game as follows: You find a wallet, which has more value to its owner than to you. If you turn it in at a police station your information will be recorded, so that the owner would have the option to compensate you for your consideration and trouble. The value of the wallet to the owner is normalized to 100 and to you it is $0 \leq X \leq 100$.[2] The game is shown in Figure 1:

Figure 1. The Lost Wallet Game



The value of the wallet to the finder (X) was drawn by Nature from {0,10,20, … ,100}. The first mover was asked to specify whether she would STAY or PASS for each value of X. The second mover was asked to specify which Y from [0,100] he would choose for each value of X, assuming that the first mover chooses to PASS at that value.[3] This *strategy method* (Selten, 1967) enables us to observe the chosen Y for each X and

[2] In DG's version of the game, the responder divides 20 units with a PASS, and an $X \in \{4, 7, 10, 13, 16\}$ is chosen for each session.

[3] Throughout this paper, we refer to the first mover as female and to the second mover as male. The actual assignment to roles was of course gender-blind.

facilitates an identification of individual profiles of behavior across a number of contingencies.[4]

Theories of social distance would predict substantially different behavior over a disembodied and far-flung network than with close physical and emotional proximity.[5] There is a large social psychology literature on ingroup and outgroup behavior. A seminal work by Tajfel, Billig, Bundy, and Flament (1970) finds that subjects strongly favor members of their experimental ingroup, even in a situation devoid of the usual trappings of ingroup membership.

Buchan, Croson & Johnson (2001) study the influence of country, cultural orientation, and social distance on social preferences in three East Asian countries and the U.S. They measure social distance in terms of in-group and out-group, and find that cultural orientation is the strongest factor, considerably stronger than the country of origin. However, overall they find only mixed support for a presumed negative relationship between social distance and the strength of social preferences.

Since participants in our Internet experiment were aware that the environment was multi-national, it seems unlikely that other participants would be viewed as members of one's ingroup. In this sense, this arena should provide a conservative test for reciprocity motives. At the same time, since participants in our classroom laboratory sessions were

[4] While Roth (1995) correctly points out that forcing people to think about every information set could affect behavior, we feel that this argument has more bite in complex games. In any event, tests in simple games (e.g., Brandts and Charness 2000) have not found behavior induced by the strategy method to be significantly different than behavior induced by the conventional direct-response method. This elicitation method has been used in a number of previous studies (e.g., Mitzkewitz and Nagel 1993, Cason and Mui 1998, Bolton, Brandts, and Katok 2000, Charness and Rabin 2000, 2001). The lost-wallet design of DG used the strategy method as well.

[5] Lamoreaux (1986) contends that kinship networks made private banking feasible in New England.

peers and quite proximate (although still mutually anonymous in the pairings), the difference between these extremes allows us to examine the effects of more physically-oriented social distance on behavior.

2. BACKGROUND

2.1 The Internet and Marketing Research

In recent years, the Internet has come to play a major role in marketing research, with new online tools, sampling methods, and web applications gaining in popularity among researchers and practitioners. Unlike traditional survey methods, the Internet allows researchers to intercept shoppers as they visit a particular web site, thus enabling more efficient and targeted sampling (see Grossnickle and Raskin 2001, for recent advances in online marketing research). Proponents of Internet surveys also point to the decline in telephone survey response rates as one reason why Internet surveys are the wave of the future (Gorman 2000). Opponents of Internet surveys argue, however, that Internet users may not be representative of the shopper population as a whole and as such may lead to biased findings (Furmansky 2000).

Internet marketing experiments are also gaining prominence, though due to control considerations often the subjects are logged on to the web from a monitored computer laboratory. Examples include an investigation of multiattribute weighting (Poyhonen and Hamalainen 2001), the effect of search costs on price-competition on the Web (Lynch and Ariely 2001), and tolerance for waiting on the Internet (Dellaert and Kahn 1999).

Aside from being a promising research tool, the Internet is one of the fastest growing and most promising retail channels and as such receives a great deal of attention from marketing researchers and practitioners. The Internet facilitates cheaper communication, lower menu costs (Brynjolfsson and Smith, 2000), lower distribution costs (or not, see Lal and Sarvary 1999, for a discussion), and lower barriers to entry. From the buyers' perspective, lower search costs (Bakos 1997), comparison ability, and greater access to some information (see Lal and Sarvary 1999 for a distinction between digital and nondigital attributes) make the Internet attractive.

2.2 Economics Experiments on the Internet

The Internet is considered an efficient tool for economic and psychological experimentation (Birnbaum 2000, Reips 2000, Schmidt and Jacobson 2000). The major advantages and disadvantages of Internet experimentation are summarized in Table 1:

Table 1 - Pros and Cons of Internet Experiments

	Arguments against Internet Experiments	Arguments for Internet Experiments
1.	Not everyone has Internet access	More diverse populations can be reached relative to lab experiments (generalizability)
2.	Selection-effect: Internet subjects are likely to be different from laboratory subjects	Demographics of Internet users approach those of the general population
3.	Loss of control over the physical environment of the experiment	Lower administrative costs. Some administrative advantages (reduced experimenter effects)
4.	Subjects appear less attentive in Internet experiments (Anderhub et al. 2000)	No discernable differences in levels of rationality (Nagel et al. 1999)
5.	More noise and higher variance (Krantz et al. 1997, Anderhub et al. 2000, Shavit et al. 2001)	

Economists and psychologists typically use students as subjects. As cited by Reips (2000) "80% of all psychological studies are conducted with students, while only about 3% of the population are students." Kehoe and Pitkow (1995) and Reips (2000) mention that the demographics of Internet users are expected to rapidly approach those of the general population. By loading the experiment on the Web however the experimenter can reach many other segments of society.[6]

The ability to reach diverse types of subjects might contribute to the "generalizability" (Reips, 2000) of the observed results. Yet, it may also create a serious

[6] For example, Birnbaum (2000) uses three different types of subject pools to perform experimental tests of violations of stochastic dominance (and other basic axioms of choice). These variations were: Standard experiments conducted in a computerized laboratory on campus, an Internet experiment with professional subjects (members of the Society for Judgment and Decision Making), and a Web-based experiment where subjects were recruited by posting announcements on sites that list contests with prizes.

control problem as the experimenter loses control over the population-base of the experiment and self-selection may affect the composition of participating subjects. These problems may be mitigated by attentively controlling the pool of participants. While Birnbaum (2000) reports that subjects on the Web were less likely to violate stochastic dominance than are classroom subjects, the differences might be explained by demographic differences between the two groups.

Shavit, Sonsino & Benzion (2001) show that students offered higher prices for given lotteries in a Web-experiment than in a (pen and pencil) class experiment. This may suggest that the medium *per se* may affect the behavior of a given pool of subjects.

Schmidt and Jacobsen (2000) discuss the administrative advantages of Web experimentation. They suggest that Internet experiments may be much less costly, thus facilitating higher participation rates and increasing the power of statistical tests. On the other hand, the experimenter loses control over the physical environment of the experiment, potentially leading to problems.[7] The heterogeneity in the specific experimental environments may contaminate the data and increase the noise across subjects. Indeed, Anderhub, Muller & Schmidt (2000) and Shavit et al. (2001) report significantly higher standard deviations on the Web.

Another interesting issue is the relative "rationality" of Internet participants. Anderhub et al. (2000) show that in an optimal consumption experiment conducted on the Web, subjects behave less attentively than in a corresponding class experiment. In particular, 22% of the participants in the Web experiment failed to spend all their

[7] Some people may make group decisions, rather than individual ones; other subjects may participate several times, sometimes masking their "multiple submissions" by using different email addresses (Reips, 2000). Participants may access the Internet from quiet private residences, while others may do so from a noisy office or computer laboratory (Krantz, Ballard & Scher 1997).

remaining income in the last consumption period, compared to only 3% in a computerized laboratory experiment. On the other hand, the study by Nagel et al. (1999) casts doubt on the view that performance is poorer on the Web, since guessing game results in this medium are quite similar to those obtained in a laboratory. In any event, since our design is rather simple conceptually, we suspect that mental agility will not be much of a factor in the game we study. Thus, we believe that the observed differences reflect the effect of social distance on reciprocal behavior.

2.3 Social Preferences and Motivation

Despite the growing importance of the Internet, little is known about buyer and seller behavior, motives, and incentives on the Internet, though in recent years, major advances have been made (e.g., Novak, Hoffman & Yung 2000, Bakos 1997, Alba et al. 1997). In the field of marketing, the prominent works of Corfman and Lehman (1993) and Lehman (2001) argue that, in competitive situations, competing firms place a weight on fairness. In Lehman (2001), individuals placed in the role of a manager were asked to report satisfaction with various combinations of sales figures for their own firm, as well as for a competing firm. Attention to fairness was found to be a significant factor. The author derives a parsimonious explanation for the exponential pattern of market shares in mature markets, as well as an outline of the strategic role of cooperative behavior in competitive settings in the presence of altruism, reciprocity, and spite.

In management, the roles of equity and reciprocity can be instrumental in determining an organization’s structure (e.g., Maitland, Bryson & Van de Ven 1985). Williamson's (1975) markets and hierarchies paradigm has been viewed as a promising general theory on the development of organizations. In Williamson's view, organizations come into existence to regulate individuals' opportunistic tendencies.

Ouchi (1980) extended Williamson's paradigm to explain why organizations adopt different structures, suggesting that individuals are equitable and reciprocal if contributions are clearly defined. Hence, the role of the organization is to identify the contributions made by the parties to a transaction and placing a value on those contributions, as in the case of teamwork.[8] In other words, organizations come into existence and adopt particular structures to establish sufficient conditions for cooperation by establishing mechanisms for the equitable allocation of tasks and rewards.

In the field, repeated interactions may be affected by expectations of future material benefits from reciprocal responses. While laboratory experiments are designed to minimize repeated game considerations, participants may nevertheless consider that they are playing a supergame, particularly in locations where experiments are frequently conducted. This possibility is virtually eliminated in an Internet experiment, so that this approach may induce behavior that reflects only the underlying social preferences.

Recent models of these social preferences differ on their views of the underlying motivation for reciprocal behavior, but they all predict that many responders will choose $Y > 0$. One possibility is that such behavior is induced purely by concerns about the distribution of outcome-payoffs (e.g., Bolton and Ockenfels 2000, Fehr and Schmidt 1999). On the other hand, preferences may depend not only on the outcomes that follow from certain choices, but also on inferences about the intentions behind observed actions.

[8] Ouchi cites, for example, an integrated steelmaking process in which it is nearly impossible to isolate the value of the contribution made by one worker, making it difficult to compensate him or her accordingly.

If the responder feels that a first-mover who foregoes a larger X is being kinder, positive reciprocity would intuitively suggest a positive correlation between X and Y. However, current models of positive reciprocity (e.g., Rabin 1993, Dufwenberg and Kirchsteiger 1998, Falk and Fischbacher 1999) do not specifically predict such a correlation.

While there are several experiments (e.g., Blount 1995, Charness 1996, Offerman 1998) that control for intentions and demonstrate negative reciprocity in the laboratory, few studies offer unconfounded evidence for positive reciprocity in this environment.[9] Many studies (e.g., Bolton, Brandts & Ockenfels 1998, Charness and Rabin 2000, Cox 2000, and Morrison and Rutström 1999) test for positive reciprocity, but do not find it.[10] While Offerman (1998) and Brandts and Charness (1999) do observe some degree of positive reciprocity, the effect is either not statistically significant or relatively rare. Obtaining a complete profile for each individual allows us to examine preferences without the potential masking effect from aggregating across the entire population.

3. METHODS

3.1 The Internet Experiment

Each participant was directed to either the first-mover role or the second-mover role, so that the sample remained balanced. The game was explained in a simple, yet thorough, manner and also presented graphically as in Figure 1 (see Appendix B for the

[9] The behavior observed in trust games (e.g., Berg, Dickhaut & McCabe 1995) and gift exchange games (e.g, Fehr, Kirchsteiger & Riedl 1993) may represent a form of positive reciprocity. However, since the observed behavior can also be explained by models in which people simply have preferences over distribution *per se*, the interpretation is unclear. See Charness and Rabin (2001) for a more detailed discussion.

instructions).[11] In addition to the eleven choices (for each X={0,10.. 100}), each participant was asked to provide his or her country of residence, gender, age, years of education, and average number of hours spent on the Internet per week. Subjects were told that at the end of the experiment, they would be randomly matched into pairs, X would be randomly chosen and payoffs would be determined for each pair according to the rules of the game. Payments were made in U.S. dollars, at the rate of 5 units to $1. See the instructions for further details. [12]

The Internet version of the experiment was set up as a Web page (http://iew3.technion.ac.il:8080/~haruvy/exp.html) on the Technion server in Israel. The page mentioned that researchers from Israel and the U.S. were performing the study and gave a name, phone number, and address, so that any prospective participant could verify that the experiment was bona fide. Students at the Technion, the University of California at Berkeley, and the Universitat Pompeu Fabra in Barcelona were notified by signs posted around campus and announcements in classes about the Web site and were invited to participate. The word spread, and people at Stanford University and as far as Berlin and Tokyo also participated. In all, we received 128 responses for the Web experiment—64 first movers and 64 second movers. Upon careful inspection of the data, it was observed that four of the first mover choices were participants who re-entered using a slightly

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[10] However, Charness and Rabin (2001) find that cheap talk about first-mover preferences affects responses and seems to elicit positive reciprocity.

[11] Instructions for the first and second movers, in their original format, can be viewed at http://iew3.technion.ac.il:8080/~haruvy/fm.html and http://iew3.technion.ac.il:8080/~haruvy/sm.html, respectively.

[12] The same conversion ratio was used in the class experiment in Barcelona. In the class experiment in Israel we paid subjects 1 Israeli Shekel for each 5 points. Nevertheless, we do not find evidence of any statistically significant difference between the Barcelona and the Haifa classroom groups. For example, a Chi-square test of Y choices (divided in 10 sub-ranges) in the two groups yields $\chi^2(9) = 9.648$, $p = .38$.

modified name or a different address. After screening out these data points, we have an unbalanced sample of 60 first movers and 64 second movers.[13]

The makeup of the population is displayed below:

Table 2 – Internet Demographics

	First Movers	Second Movers
Germany	1	3
Israel	3	16
Spain	0	8
Japan	1	0
U.S.	55	37
Female	27	25
Male	33	39
10 or more hours of Internet use per week	20	19
12-17 years of education	54	57

3.2 The Laboratory Experiment

To test for the effect of social distance, we duplicated these conditions as much as possible in classroom laboratory sessions in Haifa and Barcelona. In all, we had 96 students in the first mover role and 82 students in the second mover role. Participants (classmates) could see the other people in the session though they were warned, with the threat of dismissal from the experiment, not to talk or look at others' responses. As always, no participant ever knew the identity of the other person in his or her pair. The double-blind design was explained to the students, so that it was understood that we could not link responses to individuals (see the instructions). Subjects were asked to complete a form identical to that shown on the Web, and no time constraints were imposed. At the

[13] Problems such as these are indicative of the reduced experimental control mentioned earlier.

conclusion of the session, X was drawn in front of the room and payments were made.[14] The Haifa participants were all introductory finance students from different departments at the Technion. The Barcelona participants (including one American and two German students) were economics or business majors.

4. RESULTS

The behavior of most participants (both first and second movers) in both the Internet and classroom laboratory experiments violates the strong assumptions of the standard economic model of self-interest. In the Internet treatment, 80% (48 of 60) of first-movers chose to PASS for some positive values of X. All but two first movers followed a cutoff rule, choosing to PASS for this value of X and below, but to NOT PASS otherwise. The median cutoff X was 25, and the mean was 28.97.[15] In the classroom laboratory, 87 of 96 first movers (91%) chose to PASS for some positive value of X, and all but 8 first movers followed a cutoff rule. The median cutoff value was 40; however, the mean cutoff value was 34.83, only 20% higher than the mean value in the Internet experiment.

Table 3 shows the cutoff values chosen in the Internet and laboratory experiments:

Table 3 –First-Mover Choices

Cutoff Value*	% Choosing this Value	
	Internet	Laboratory
0	21%	10%

[14] A deck of cards containing all possible values of X was shown to the group and shuffled. A card was then drawn at random.

[15] We use a cutoff value of 100 for those people that always chose PASS.

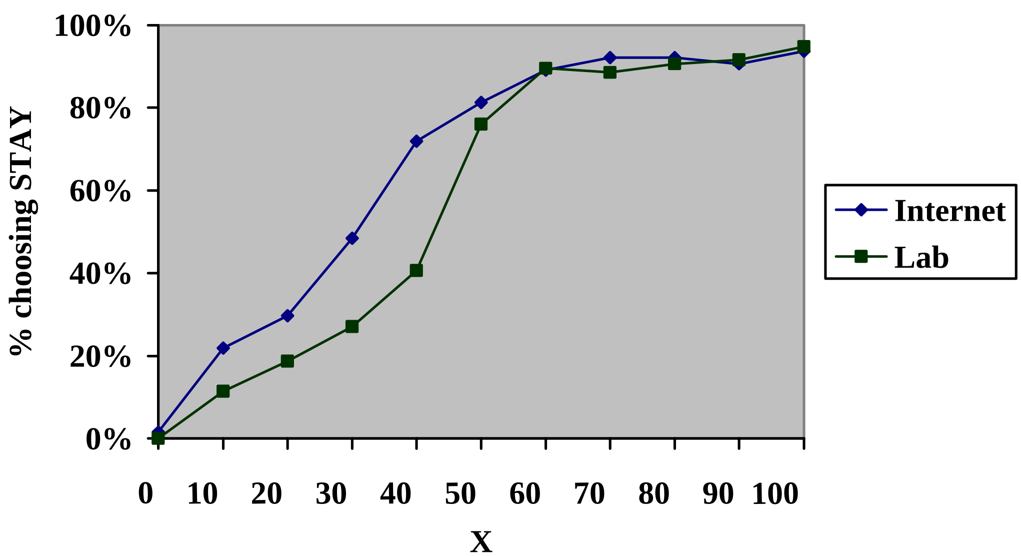
10	7%	6%
20	22%	8%
30	19%	17%
40	12%	38%
50	8%	14%
60	3%	2%
70	0%	1%
80	0%	1%
90	0%	0%
100	7%	2%

*PASS if X ≤ Cutoff Value

We see a definite shift toward higher first-mover cutoff values in the laboratory sessions. A Kolmogorov-Smirnov test (see Siegel and Castellan 1988) for differences in cumulative distributions gives $\chi^2 = 15.0$ (two degrees of freedom), $p < 0.001$.

Another approach is to consider the proportion of first movers that would NOT PASS at any given X. This is illustrated below:

Figure 2



As can be seen, the greatest difference in first mover choices occurs when X is 30 or 40. At these values, an additional 20-30% of the first movers chooses PASS in the laboratory sessions, compared to choices in the Internet experiment. Otherwise, first-mover behavior is rather similar across treatments.

Responder play perhaps reflects a greater concern for social preferences:

Table 4 –Second-Mover Choices

Category	Internet	Laboratory
Fixed Y = 0	23 (36%)	18 (22%)
Fixed Y = 50	8 (13%)	11 (13%)
Other fixed Y	6 (9%)	0 (0%)
Weakly monotonically increasing	18 (28%)	35 (43%)
Weakly monotonically decreasing	4 (6%)	7 (8%)
Other patterns	5 (8%)	11 (13%)

Percentages may not total to 100% due to rounding.

One issue of immediate interest is how frequently the choice of Y was sensitive to the value of X, since this offers evidence on whether non-outcome information (the foregone X) matters to the responder. In the Internet experiment, 37 responders chose a fixed Y (including the 23 who always chose 0), and the other 27 people allowed Y to vary. Thus, nearly two-thirds (27/41) of those Internet responders who sometimes chose a positive Y considered non-outcome information to be relevant.

In both treatments, regressing Y against X shows substantial heterogeneity in individual intercepts and slopes. The null hypothesis of no heterogeneity in slopes is rejected at $p < 0.001$, as is the null hypothesis of no heterogeneity in intercepts, for the Internet group as well as for the laboratory group. The number of responders with significant positive slopes is 32 out of 82 in the laboratory sessions, and 18 out of 64 on the Internet.

It is instructive to consider the pattern by which Y varied with X, wherever it does. In the Internet experiment, Y was weakly positively monotonic with respect to X (increasing in some ranges of X, and at least non-decreasing for all other ranges) in 18 of the 27 cases where a second mover allowed Y to vary. We interpret this as indicating positive reciprocity.[16] As expected, the results from the classroom laboratory show a somewhat higher tendency for Y to increase with X. X was weakly positively monotonic with respect to Y for 43% (35 of 82) of all responders and for 66% (35 of 53) of all people who chose a variable Y. Interestingly, the proportion of participants who chose a fixed Y = 50 was very similar in the two experiments (8/64 vs. 11/82, Z = 0.16, n.s.), suggesting that strong egalitarian preferences are unaffected by social distance.

Most comparisons across individual responder behavior in the two treatments show significant differences. With respect to differences in rates of positive reciprocity (18/64 vs. 35/82), the test of the difference in proportions (see Glasnapp and Poggio 1985) gives Z = 1.82 (p = 0.03, one-tailed test). The number of individual responders with positive slopes significantly different from zero is 18/64 (28%) in the Internet experiment and 32/82 (39%) in the classroom experiments (Z = 1.38, p = 0.08). A comparison of the prevalence of pure money-maximizers (Y = 0 for all X) across treatments yields Z = 1.87 (p = 0.03, one-tailed test). In this respect, our results would seem to contradict those of Anderhub et al. (2000).

With respect to first-mover behavior, we can identify the highest X for which a PASS would materially benefit the first mover:

Table 5 – Highest X for profitable PASS, by individual

[16] To conclude that the observed behavior represents positive reciprocity and cannot be explained by distributional means one may think of a control treatment in which it is randomly determined whether the play is passed to the responder (see Charness 1996 and Cox 2000 for similar tests). Since, however, in the current application, the relative endowments for the two players (after a PASS) are independent of X, we see no distributional explanation for the observed sensitivity.

Highest X	# in Internet Experiment	# in Laboratory Experiment
0	35 (55%)	25 (30%)
10	2 (3%)	6 (7%)
20	2 (3%)	4 (5%)
30	2 (3%)	4 (5%)
40	2 (3%)	1 (1%)
50	11 (17%)	25 (30%)
60	1 (2%)	0 (0%)
70	1 (2%)	3 (4%)
80	1 (2%)	1 (1%)
90	5 (8%)	8 (10%)
100	2 (3%)	5 (6%)

Percentages may not total to 100% due to rounding.

A one-tailed Kolmogorov-Smirnov test finds that the cumulative distributions differ significantly (p = 0.02). Also, note the first-order stochastic dominance across treatments. *Ex post*, a first mover matched with the median responder in the Internet experiment has no reason to PASS even if X = 0, from the perspective of material self-interest. In the laboratory treatment, a purely pecuniary first mover matched with the median responder could PASS without loss even at X = 50.[17]

From the standpoint of efficiency, any PASS leads to an efficient outcome. On the presumption that first movers only care about their own money and believe that responders care only about their own money, we would expect a PASS only when X = 0, for an overall PASS rate of about 9.1%.[18] In the Internet treatment, however we observe a PASS rate of 35.2%. By comparison, we see a PASS rate of 42.7% in the classroom sessions. While the difference between our treatments is substantial, the difference between the Internet behavior and that predicted by pure self-interest is far greater.

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[17] More carefully, note that the Table refers to the *highest x*; there are some weakly decreasing X/Y profiles, so that the profitability of playing PASS is lower.

[18] X = 0 with probability 1/11.

If we aggregate the data, the pattern of positive reciprocity is diminished. Table 6 shows the average response to a PASS at any given X:

Table 6 - Average Y for each X

X	0	10	20	30	40	50	60	70	80	90	100
Internet Y	15.0	16.4	16.6	19.1	20.2	23.0	23.2	26.2	26.2	27.6	25.8
Classroom Y	16.4	18.5	21.6	25.6	28.7	31.5	33.4	34.7	35.6	37.9	33.4

While Y is definitely increasing with X in most of the range, the rate of increase is modest in the aggregate. It is apparent that the differential in rates is greater in the classroom laboratory, suggesting a larger role for positive reciprocity. In both cases, regressions on aggregated data show a positive slope that is statistically significant, but not large.[19]

Table 7 – Parameter Regressions for aggregated data regressions

Variable	Estimate	Standard Deviation	t-statistic
α_{LAB}	18.30	1.62	11.30
α_{INT}	15.39	1.83	8.40
β_{LAB}	0.21	0.27	7.66
β_{INT}	0.13	0.03	4.17

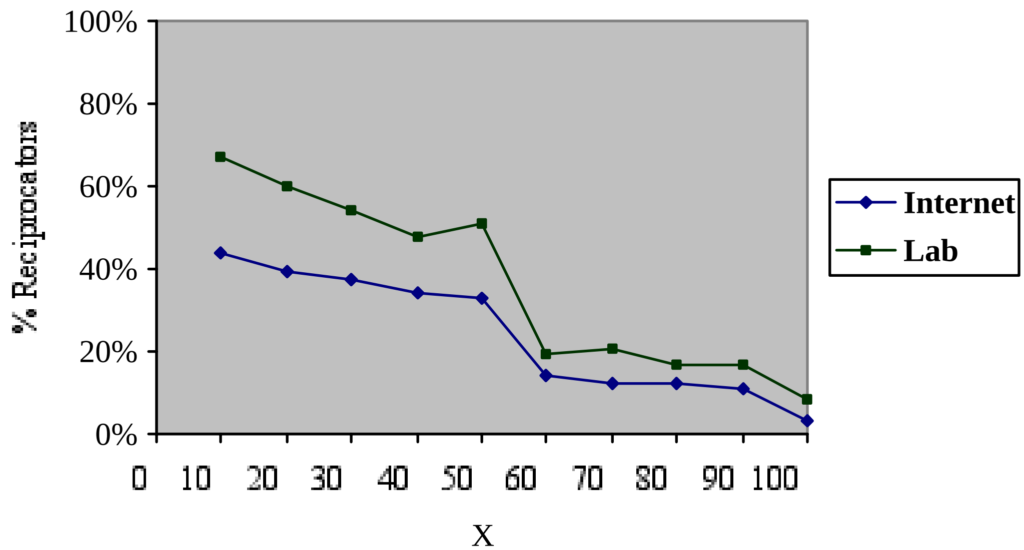
$Y_s = \alpha_s + \beta_s X \qquad s \in \{LAB, INT\}$

A Wilcoxon-Mann-Whitney non parametric test also shows significant differences in Y across treatments, for every value of X. The smallest test statistic (when X = 0) is Z = 4.69, with $p < 0.0001$.

[19] However, the t-statistics may be overstated, as the multiple observations for each individual are not likely to be independent.

In conformance with previous usage, one may also wish to define a "reciprocator" as one who chooses $Y \geq X$. Naturally, a responder may be classified as a reciprocator for some values of X, but not others. Figure 3 shows the proportion of reciprocators in each treatment for each value of X.[20]

Figure 3



While the levels differ somewhat for the two treatments, the patterns are quite similar; 30-60% of responders qualify as reciprocators for $X \leq 50$, slightly higher than the proportion observed in Berg, Dickhaut & McCabe (1995). In both treatments, there is a sharp break when $X > 50$; few people are willing to award more than half of the pie to someone else, regardless of the value of X.

Table 8 compares the aggregated level of responder play in DG and our classroom sessions, which should represent similar social distances:

[20] We do not include the case of X = 0, since each responder automatically qualifies as a reciprocator.

Table 8 – Elicitation Method and Average Y Chosen

X*	DG	Classroom Exp.
20%	37%	22%
35%	24%	27%
50%	38%	32%
65%	31%	34%
80%	39%	36%

*The values of X and Y are compared to the total amount to be divided with PASS. As we do not have 35% and 65% categories in our sessions, our figures average the results for neighboring values of X.

While DG do not find a positive correlation between X and Y, they do find a positive correlation between Y and the responder's expectation of the first mover's expectation of Y. They suggest that responders are motivated by an aversion to "letting down" a player who has passed X. One's belief about the first mover's intentions or expectations is the critical link. To the extent that a higher Y is expected for a higher foregone X, letting-down aversion and positive reciprocity make the same behavioral predictions. One must measure beliefs to distinguish between these motivations.[21]

[21] Yet positive reciprocity can clearly exist without such expectations. In a real life example, one of the authors allowed a clearly frustrated driver in front of him in a long line at a bridge's toll plaza. When he offered the toll to the attendant, he was surprised to learn that the grateful driver had paid his toll. This is hardly the social norm, and it is difficult to believe that the driver felt this was expected of her.

5. DISCUSSION

Social distance theories assert that one is less concerned with the well-being of others when they are not in one's own cohort. We test for reciprocal behavior in an Internet experiment and in classroom laboratories, using a simple sequential game. We do so by (1) obtaining a full range of choices for each individual, and (2) accounting for heterogeneity in individual choices. If "other-regarding behavior" is a by-product of social proximity and potentially repeated interactions, we might expect that people in an Internet experiment behave largely by maximizing their own monetary reward.

However, many participants do have some regard for others, even when these others are distant and disembodied strangers. Nearly 30% of all Internet responders chose a profile in which Y increases with a foregone X. While we do not know how many first movers chose to PASS even when they expected to receive lower material payoff by doing so, we suspect that this was not uncommon. DG provides rather solid evidence on this point.[22] At minimum, it is possible that those people who chose PASS when $X > 50$ (roughly 10% of first-movers) did not expect a response of $Y > X$.[23]

The Internet methodology increases the social distance to a high degree, whereas our classroom laboratory experiments minimize this factor. We do find significant differences in behavior across these treatments, as reducing social distance leads to an increase in the chance of PASS for any given X. Nevertheless, we were surprised at how little difference we observed between the treatments, particularly since our classroom

[22] Many first movers PASS even when they expect $Y < X$, and almost nobody expects $Y > 10$.

[23] Of course, a first mover may be motivated to PASS by some combination of distributional preferences and (possibly incorrect) expectations about the likely response. In accord with models of altruism or quasi-maximin preferences, a person choosing PASS when $X = 70$ might expect $Y = 50$ and prefer (50,50) to (70,0).

experiments are nearly the polar opposite with respect to social distance. Reciprocity appears to be a factor, even in a virtual experiment. To the extent that reciprocity could be a feature of virtual international business, perhaps cooperative behavior is sustainable.

One area of future research is to investigate the various components of social distance. The perception of one's "in-group" or "kinship network" may depend on a variety of factors, such as race, religion, profession, etc. We find more of an effect for social distance than in Buchan, Croson & Johnson (2001), but our "measures" differ substantially. Dufwenberg and Muren (2001) find that dictator game behavior in a classroom experiment is sensitive to the anticipation of being awarded one's prize in front of the large class, suggesting at least one other dimension to social distance.[24] This area seems rich in implications for both marketing researchers and economists.

[24] Only a few of all choices were chosen at random for public payment.

APPENDIX A

RESPONSES TO X – INTERNET EXPERIMENT

Y	X										
	0	10	20	30	40	50	60	70	80	90	100
0	38	30	30	27	27	26	25	24	25	27	29
5	3	6	2	5	4	4	3	4	4	2	2
10	5	7	7	4	3	4	6	6	4	6	6
15	0	3	0	3	1	0	2	0	1	1	0
20	2	1	6	0	5	2	0	3	2	1	1
25	0	0	3	1	1	3	0	0	1	0	0
30	1	2	0	6	0	2	7	1	2	1	0
35	1	1	2	4	1	1	1	4	2	1	2
40	0	1	2	2	7	1	1	0	4	2	0
45	0	0	0	0	3	0	0	0	0	3	1
50	11	10	10	9	11	15	10	10	9	9	15
55	0	0	0	0	0	3	0	1	0	0	0
60	1	0	0	1	0	1	5	3	2	1	1
65	0	0	0	0	0	0	3	0	0	0	0
70	0	1	1	0	0	0	0	4	0	1	0
75	0	0	0	0	0	0	0	2	0	1	0
80	1	1	0	1	0	0	0	0	4	1	2
85	0	0	0	0	0	0	0	0	3	0	0
90	0	0	0	0	0	1	0	0	0	5	2
95	0	0	0	0	0	0	0	0	0	1	1
100	1	1	1	1	1	1	1	2	1	1	2

RESPONSES TO X – CLASSROOM EXPERIMENT

Y	X										
	0	10	20	30	40	50	60	70	80	90	100
0	44	21	20	20	20	21	20	22	22	22	32
5	3	6	1	1	2	3	3	3	2	2	0
10	11	18	9	7	3	2	2	2	3	4	4
15	0	7	3	4	2	2	1	2	0	0	0
20	3	8	21	4	9	4	6	3	9	7	4
25	1	0	6	1	0	3	0	0	0	1	0
30	1	4	4	17	5	3	7	5	4	3	2
35	0	1	0	6	2	1	1	3	0	0	0
40	1	1	2	5	12	1	2	2	4	1	1
45	0	1	0	0	7	0	0	1	1	3	0
50	15	14	15	14	17	36	23	22	21	21	26
55	0	0	0	0	0	4	0	0	0	0	0
60	0	0	0	1	1	1	10	0	0	2	1
65	0	0	0	0	0	0	5	0	0	0	0
70	0	0	0	1	1	0	1	12	2	0	0
75	0	0	0	0	0	0	0	2	0	0	0
80	0	0	1	1	1	0	0	3	9	2	0
85	0	0	0	0	0	0	0	0	2	0	0
90	1	1	0	0	0	0	1	0	2	10	4
95	0	0	0	0	0	0	0	0	0	3	1

100	2	0	0	0	0	1	0	0	1	1	7

Distribution of Y

Y	Laboratory Experiment	Internet Experiment
0	264 (29%)	308 (44%)
5	26 (3%)	39 (6%)
10	65 (7%)	58 (8%)
15	21 (2%)	11 (2%)
20	78 (9%)	23 (3%)
25	12 (1%)	9 (1%)
30	55 (6%)	22 (3%)
35	14 (2%)	20 (3%)
40	32 (4%)	20 (3%)
45	13 (1%)	7 (1%)
50	224 (25%)	119 (17%)
55	4 (0%)	4 (1%)
60	16 (2%)	15 (2%)
65	5 (1%)	3 (0%)
70	17 (2%)	7 (1%)
75	2 (0%)	3 (0%)
80	17 (2%)	10 (1%)
85	2 (0%)	3 (0%)
90	19 (2%)	8 (1%)
95	4 (0%)	2 (0%)
100	12 (1%)	13 (2%)
Total	902	704

Y	Laboratory Experiment	Internet Experiment
0	264 (29%)	308 (44%)
5-20	190 (21%)	131 (19%)
25-45	126 (14%)	78 (11%)
50	224 (25%)	119 (17%)
55-100	98 (11%)	68 (10%)

$\chi^2(4) = 39.3, p < .001$

APPENDIX B - Instructions to the Subjects

General Instructions

We thank you in advance for your participation. This is an experiment in decision making.

Any talk or otherwise disruptive sound will disqualify you from participation and you will be asked to leave the room for the duration of the experiment. Furthermore, any attempt to look at what your neighbor is writing will be treated with the utmost severity.

At the bottom of the first page, in either corner, you will find a number. Tear off the right corner. This has your identification number for this experiment. Don't show it to anyone. Put the number in your pocket or a safe place so that your neighbors will not be able to see it. Keep this number. It will be necessary to receive payment. All payments will be dispersed discreetly in sealed envelopes.

Please fill in your age, year of study, and number of hours you spend on the Internet each week. Please be careful not to provide your name or other personal information.

Age ____________________________
Year of study _____________________
Number of hours surfed (spent on the Internet) per week __________________

Participants in this experiment will be divided into two groups – A and B.

Instructions for A participants

Every A participant will be matched with a participant from group B. Your decision will determine only the payments for you and your matched B participant.

You start with an initial sum of x points, where x can take on values of 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, or 100. The number x will be drawn at the end of the experiment in front of the class, using a random number mechanism.

[At this point we showed them eleven cards and explained that one person from the class would choose a card from the deck after verifying that all numbers are there; we kept our promise of course]

Every participant, of either group, will be asked to state 11 different choices, one for each possible value of x. For the x that is drawn at the end of the experiment, we will match the decisions of each pair only for that value to determine the payoffs.

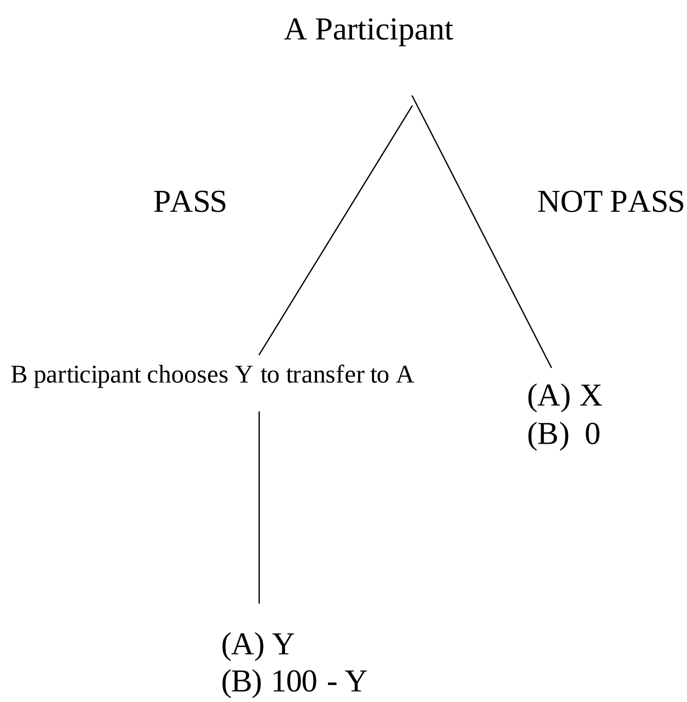
Since you are an A participant, your choices are “PASS” and “NOT PASS” for each value of x. If you pass, your matched B player will receive 100 points (5 points = 1 NIS) and he in turn will determine how many points of his 100 points to transfer to you (0 to 100). If you selected NOT PASS, you will get the entire x pie and your matched participant will get nothing.

The figure on the next page gives your decision tree.

Next to the payment in points (5 points = 1 US$) for each option you will see the letters A and B. Your payment is always the one next to A. Your matched B player’s payoff is the amount next to B.

Remember: There is no way your match will find out your identity or that you will find out his.

<u>Please indicate your choice for the following decision problems:</u> You are participant A. Choose between PASS and NOT PASS. If you choose PASS, your matched B player will determine your payoff Y (a number from 0 to 100) and he will receive 100 - Y. If you choose NOT PASS, his choice will not have any effect: the payoffs will be the ones under the NOT PASS branch, namely x for you and nothing for him.



1. **If x = 0, I would like to PASS / NOT PASS (circle your choice).**
2. **If x = 10, I would like to PASS / NOT PASS (circle your choice).**
3. **If x = 20, I would like to PASS / NOT PASS (circle your choice).**
4. **If x = 30, I would like to PASS / NOT PASS (circle your choice).**
5. **If x = 40, I would like to PASS / NOT PASS (circle your choice).**
6. **If x = 50, I would like to PASS / NOT PASS (circle your choice).**
7. **If x = 60, I would like to PASS / NOT PASS (circle your choice).**
8. **If x = 70, I would like to PASS / NOT PASS (circle your choice).**
9. **If x = 80, I would like to PASS / NOT PASS (circle your choice).**
10. **If x = 90, I would like to PASS / NOT PASS (circle your choice).**
11. **If x = 100, I would like to PASS / NOT PASS (circle your choice).**

Instructions for B participants

Every B participant will be matched with a participant from group A. Your decision will determine only the payments for you and your matched A participant.

Participant A starts with an initial sum of x points, where x can take on values of 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, or 100. The number x will be drawn at the end of the experiment in front of the class, using a random number mechanism.

[At this point we showed them eleven cards and explained that one person from the class would choose a card from the deck after verifying that all numbers are there; we kept our promise of course]

Every participant, of either group, will be asked to state 11 different choices, one for each possible value of x. For the x that is drawn at the end of the experiment, we will match the decisions of each pair only for that value to determine the payoffs.

The A participant you are matched against has to choose between "PASS" and "NOT PASS" for each value of x.

Your choice will affect payoffs if and only if he selects PASS.

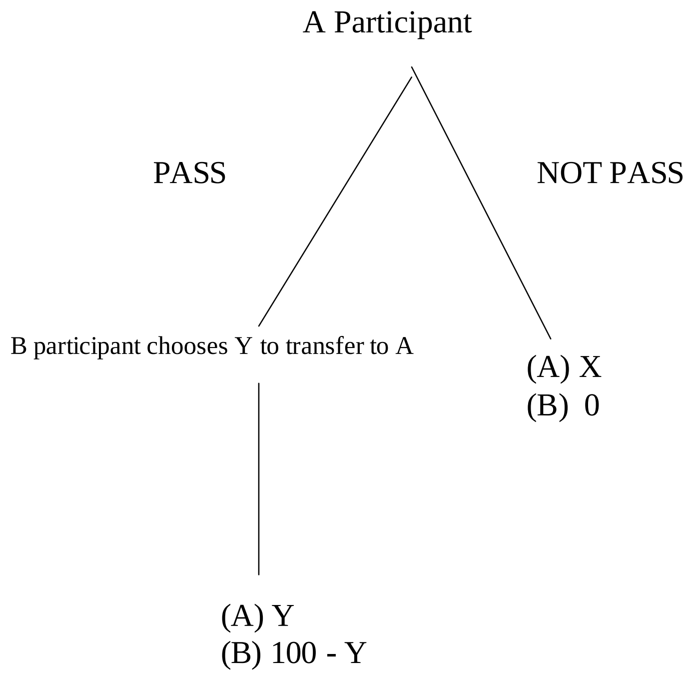
For any value of x, if he chose PASS, you will get 100 points (5 points = 1 US$). However, at this stage you choose how many points to transfer to him out of your 100 (0 to 100 points). This amount will be his payoff but will be subtracted from your 100 points.

The figure on the next page gives your decision tree.

Next to the payment in points (5 points = 1 US$) for each option you will see the letters A and B. Your payment is always the one next to B. Your matched A player's payoff is the amount next to A.

Remember: There is no way your match will find out your identity or that you will find out his.

Please indicate your choice for the following decision problems: You are participant B. Choose Y to transfer to Participant A, if he chose PASS. If he chose PASS, you will receive 100 – Y and he will receive Y. If he chose NOT PASS, your choice will not have any effect: the payoffs will be the ones under the NOT PASS branch, namely x for him and nothing for you.



1. If the A player I am matched against chose PASS and x = 0, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
2. If the A player I am matched against chose PASS and x = 10, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
3. If the A player I am matched against chose PASS and x = 20, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
4. If the A player I am matched against chose PASS and x = 30, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
5. If the A player I am matched against chose PASS and x = 40, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
6. If the A player I am matched against chose PASS and x = 50, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
7. If the A player I am matched against chose PASS and x = 60, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
8. If the A player I am matched against chose PASS and x = 70, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
9. If the A player I am matched against chose PASS and x = 80, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).
10. If the A player I am matched against chose PASS and x = 90, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).

If the A player I am matched against chose PASS and x = 100, I would like to transfer to him ________ points of my payoff (a number from 0 to 100).

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