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Brother, can you spare a dime? Peer pressure in charitable solicitation[☆]

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ABSTRACT

While the effects of peer pressure in charitable giving have been of considerable interest to social scientists, there is little empirical evidence on the magnitude of these effects. A correlation between giving or volunteering by one's peers and one's own giving can be driven by self-selection into groups, common shocks that inspire both the solicitor to ask and the individual to give, or social influence. Using data from a university, this paper analyzes whether alumni are more likely to give and give larger amounts when they are solicited by someone with whom they have social ties. Freshman year roommate assignments and the structure of the university's giving campaigns are used to overcome problems of selection and common shocks. Social ties play a strong causal role in the decision to donate and the average gift size. Additionally, a solicitor's request is much more effective if he or she shares characteristics, such as race, with the alumnus being solicited.

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1. Introduction

The effects of peers on charitable giving have been of considerable interest to social scientists. This interest is motivated by two considerations. First, the underprovision of public goods due to free-riding is a potentially serious problem. Behavioral norms may develop within groups to dissuade such behavior—that is, those who do not contribute their perceived fair share may be ostracized. If free-riding is considered socially unacceptable and enforced with social pressure, then underprovision may be reduced. Second, peer pressure may distort giving between charities. If this type of pressure (rather than providing information) shifts an individual's giving from his or her desired level, certain public goods may receive more funding at the expense of others. To the extent that donations to different charities are substitutes, this may lead to suboptimal allocation of funding.¹ The strength of these social influences implies that charities supported by those with large social networks or a strong ability to leverage these connections will attract more funding than they otherwise would, while those charities with weaker connections will suffer, irrespective of their merit or individuals' true valuation. For instance, universities can rely on networks of alumni volunteers to solicit their friends,

while a lesser-known charity may be unable to reach as many people. Charitable organizations put great stock in the notion that personal solicitation by acquaintances is effective, “often design[ing] their campaigns to leverage the power of social influences” (Carman, 2004). With an estimated \$306 billion donated in the United States in 2007 (Giving USA Foundation, 2008), these effects may be quite large.

Unfortunately, there is scant empirical evidence on the magnitude of peer pressure in charitable solicitation; a New York Times Magazine article argued that charities “go by nothing more than a few rules of thumb, some of which may be profoundly insightful and others a good deal less so” (Leonhardt, 2008). A recent article in the Chronicle of Higher Education detailed aggressive fundraising efforts at Dartmouth and Cornell Universities, focusing on using “students to solicit senior gifts within their tight social networks,” with one student explaining that “this peer-to-peer contact made her more comfortable donating money, because it was someone she knew” (Ensign, 2010). That there is a correlation between solicitation by a known person and giving is undeniable (see, for example, Bekkers, 2004), but that relationship does not shed any light on causality.

The absence of hard evidence concerning peer solicitation is unsurprising in light of the challenges associated with the estimation of peer effects. Manski (1993) explains some of the factors that can confound estimation. First, there are correlated effects, in which similar characteristics or experiences affect donations. For instance, individuals may give more when they are solicited by a friend because they share similar beliefs; these shared beliefs manifest themselves in the solicitor's volunteerism and the individual's giving, leading to a correlation that is unrelated to social pressure. Another reason for similar behavior in a group are contextual effects, in which peers' exogenous characteristics affect the individual's giving. For instance, an individual may be reminded to donate to a charity fighting a certain disease if he or she has a friend with that disease. Finally, Manski notes

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¹ Reinstein (2006) finds that charities, for the most part, are substitutes for each other.

the possibility of endogenous effects, in which the individual's giving is affected by peers' giving. Taken together, these effects make it quite difficult to identify the independent impact of personal solicitation. This paper uses a unique data set to isolate the incremental effect of being solicited by a familiar person over a stranger. Additionally, we investigate whether shared characteristics between the solicitor and the donor, such as race, are important.

The data set used in this paper, described in greater detail below, has a number of features which allow us to measure the true effect of personal solicitation. The data come from a selective research university, henceforth referred to as Anon U, and contain information about each alumnus's annual donations, along with detailed demographic information. In particular, we know whether the alumnus volunteered for the university and in what capacity. Additionally, we have information regarding freshman year room assignments, which provide an avenue through which to isolate the effect of being asked to donate by a peer—defined, for the purposes of this paper, as someone with whom the individual has a social relationship. As noted below, at Anon U freshman year rooms are not sorted on any unobservable characteristics that can plausibly affect giving. One might be concerned that roommates have similar experiences in college, and these correlated effects drive giving. We address this possibility in two ways. First, we examine different facets of volunteering. Specifically, because those with high affinity for the school may choose to volunteer in different ways, many of which do not involve fundraising, we can determine whether having a former roommate who is a fundraiser has a greater effect than having a former roommate who is some other type of volunteer. The type of volunteerism is unrelated to the size of a volunteers' gift when he or she is not volunteering; therefore, these non-soliciting volunteers provide a control for shared affinity for the university. Second, estimates with donor fixed effects, which compare giving in years in which the alumnus is and is not solicited by an acquaintance, control for any time-invariant individual effects, such as shared experience or affinity. Fixed effects estimation also addresses possible concerns about contextual effects. While every alumnus has had, at minimum, the same basic experience of attending Anon U, it is possible that certain characteristics of a freshman year roommate are associated with both that roommate's volunteering and the alumnus's affinity for the school. For instance, having a gregarious freshman year roommate may lead the individual to have a better experience and therefore higher affinity; that same characteristic may make the roommate more likely to be a volunteer—specifically, a solicitor. This mechanism seems unlikely to have a large confounding effect on the results; if so, models including donor fixed effects, which account for such relationships, will be dramatically different from models that do not include fixed effects.

Thus, we have addressed the concerns discussed above, leaving only the true incremental effect of personal solicitation. However, the channels by which solicitation works may yet be unclear. DellaVigna and Gentzkow (2009) describe two types of persuasion effects: through changing receivers' underlying beliefs or by affecting behavior independent of beliefs. Examples of the former effect include being given information about a charity's activities and discovering a previously unknown affinity, while the latter includes direct social pressure, in-group bias or directed altruism (Leider et al., 2009), and group identity (Chen and Li, 2009). Favoring one's acquaintances, as in the work by Leider et al. and Chen and Li, is unlikely to be the cause of the results in this paper. After all, the funds are being raised for a charity with whom all of the prospective donors are familiar—in essence, the alumni are all part of the same group and the donation is not being directed towards friends. It is certainly plausible that an acquaintance raises more funds because he or she is more effective or even puts in more effort, but these factors are also part of social influence. Similarly, information provision may be more effective when coming from a peer, but this still reflects social influence, namely, that

information coming from a peer is more trustworthy or must be attended to more thoroughly than that coming from a stranger.² As explained in Section 4.1, though, the estimates of pressure in this framework are likely to be lower bounds; the true effect may be larger.

Section 2 reviews some pertinent literature, with particular attention to prior attempts to quantify the importance of social pressure and solicitation. Section 3 describes the data set, while Section 4 presents results. We distinguish between the probability of making a gift and the amount of the gift, conditional on giving. We find evidence that personal solicitation exerts a powerful influence on the probability of making a gift and on the overall amount of the gift; the inclinations of charities to try to exploit social networks seem justified. Further, we find that the effects of solicitation are strongest when both parties are of the same race. The effect of a match in social attitudes, as proxied by membership in one of Anon U's fraternities or sororities, or in academic achievement, as proxied by academic honors, is also substantial, though less strong. Athletic status does not seem to affect the efficacy of solicitation. Section 5 concludes with a summary and suggestions for future research.

2. Previous literature

There is a voluminous literature on interdependence of preferences, particularly in charitable giving (for two thorough surveys, see Vesterlund, 2006 or Andreoni, 2006). Becker (1974), in developing a theory of interpersonal interactions, notes that “apparent ‘charitable’ behavior can also be motivated by a desire to avoid the scorn of others or to receive social acclaim.” Bernheim's (1994) model of conformity assumes that individuals care about how others perceive them and strive to behave within social norms, and Harbaugh (1998) posits that prestige is a driving factor in donations. Examining the effect of giving by reference groups, such as people with similar incomes, Feldstein and Clotfelter (1976) include average giving by these groups as an explanatory variable for an individual's giving. They find “no support for the view that the total amount that an individual contributes is a function of the amount given by others,” but Andreoni and Scholz (1998), examining socio-demographic reference groups, do find evidence of interdependent preferences. It is important to note, however, that people in these groups are unlikely to know each other, and defining reference groups is inherently difficult.

Social comparisons have also been shown to play a role. Frey and Meier (2004) and Shang and Croson (2004) design field experiments manipulating information given to a prospective donor on the proportion of his or her peers who have already donated and the amount a previous donor gave, respectively. Frey and Meier find that, when donors' previous giving history is taken into account, the participation comparison exerts a small influence on the decision of whether or not to give. Shang and Croson find that a relatively high comparison amount is associated with an increase of approximately 12% in the donor's gift. Alpizar et al. (2008), who manipulate anonymity and reciprocity in addition to social reference points, find that a high social reference point tends to increase gifts slightly, but a low social reference actually decreases gifts. While these social reference experiments provide valuable insight to how individuals compare themselves to others, they do not shed light on how these donors are directly influenced by those they know.

² Our sample involves a single charity, with whom all of those solicited are familiar. The Communications and Development offices provide frequent updates regarding campus activities, so all alumni should have some degree of familiarity with current events at the university. Informal discussions with a number of Anon U alumni indicated that they are almost never given information of which they were not aware during these solicitation calls. The Development Office periodically surveys alumni in a more scientific manner; it is our hope that questions such as these will be included on the next survey.

Experimental results indicate that social distance—the degree of familiarity with others—is important to solicitation response. In lab experiments of linear public goods games, Andreoni and Petrie (2001, 2004) find that revealing photographs of the other participants has a positive effect on contributions that is even larger than revealing the distribution of group contributions; they conclude that “fears that social effects could interfere with the strict economic incentives are indeed well justified.” Leider et al. (2009) decompose giving into baseline altruism, directed altruism, and enforced reciprocity using a series of online experiments that take advantage of social networks. They find that “generosity... decreased with social distance” and, importantly, “friends sort by baseline altruism,” indicating that estimates of social pressure are likely to be tainted by selection bias. Interestingly, Landry et al.’s (2007) field experiment finds that door-to-door solicitation is far more effective at yielding a high participation rate than mailing, but conditional on responding, households contacted by mail donate far more. One presumes that it is far more difficult to say ‘no’ to a solicitor on one’s doorstep than it is to ignore a letter. DellaVigna et al. (2010) test for the presence of altruism and social pressure by conducting a field experiment in which prospective donors have the opportunity to avoid contact with solicitors. They find that “both altruism and social pressure are important determinants of giving... with stronger evidence for the role of social pressure.” Since their solicitors are not individuals known to the potential donors, the pressure that they are measuring is similar to that examined by Landry et al.—that is, whether the physical presence of a solicitor affects giving. Since it is quite difficult to construct an experiment in which an individual is solicited randomly by either a friend or stranger, the scope of these experiments is limited. In a similar vein, Schervish and Havens (1997) use survey data to conclude that “the method of direct contact may be as important as just contact... higher levels of contribution involve a personal contact by a previously known individual.” Long (1976) also finds that personal solicitations are more effective, particularly when the request comes from a person that the individual knows. Bekkers (2004) examines giving in the Netherlands and concludes that “solicitations to contribute are more often successful when they are made by a person with a stronger relationship to the potential donor or volunteer because a refusal to contribute will endanger the relationship with the solicitor.” However, much of this conclusion is based on responses to hypothetical scenarios; Bekkers concedes that “intentions are usually more positive than actual behavior... [and] the scenarios elicited socially desirable responses.” Moreover, none of these studies addresses the factors which confound estimation of the effects of personal solicitation.

A further topic of interest is the potential interaction between solicitor and donor characteristics. In the economics literature, Landry et al. (2007) find that the physical attractiveness of a female solicitor has an effect on the likelihood that a male subject makes a gift. Shang et al. (2004) find that donations are substantially higher when the reference amount provided to a prospective donor refers to a previous donor who is of the same gender. List and Price (2009) use matches on race and gender to proxy for social distance and find limited evidence of the importance of these connections, though their sample size is relatively small. In a larger sense, these papers fall into the literature on homophily, which posits that individuals form closer bonds with those who are like themselves (for a survey, see McPherson et al., 2001). Psychologists have used experiments to study these interactions as well. Bryan and Test (1967) find that whites are less likely to make a donation to the Salvation Army if the solicitor is black. Yinnon and Sharon (1985) find that secular subjects are influenced by whether their religious views coincide with the solicitor. Sole et al. (1975) examine opinion similarity in a series of experiments and find that “the absence of disagreement about important matters is the most critical determinant of promotive social relationships.” It seems evident that these interactions do exert an effect on both the

formation of relationships and, more specifically, giving behavior. See Bekkers and Wiepking (2007) for a thorough overview of the pertinent literature.

One recent study that thoroughly examines peer effects in charitable giving using empirical data is Carman (2004). She is able to identify non-self-selected groups of people who are likely to know each other using workplace mail codes and team assignments and shows that increased mean giving within a group leads to higher individual contributions. Her data also contain the identity of the team captain, who is responsible for encouraging team members to participate, and she posits that the strong correlations in intra-team giving behavior are due in part to unobservable characteristics of this leader, which “should be interpreted as social influences.” However, she focuses on identifying how changes in the group’s behavior affect the individual, rather than how one individual directly affects another.

3. Data

Our data are extracted from the administrative archives of Anon U’s Development Office, which contain information on all alumni donations from 1983 to 2007. The data are proprietary and sensitive, and individuals’ names were stripped from the records before being made available to us. Our unit of observation is a yearly giving opportunity. For example, if an individual has been an alumna for 5 years, she accounts for 5 giving opportunities in our analysis, starting in the first fiscal year after graduation. Multiple gifts in the same year are summed together. The Development Office data also include information on academic major, extracurricular activities when the alumnus was an undergraduate, post graduate education, occupation, residence, whether he or she is married to another graduate of Anon U, several variables that can be considered as proxies for affinity (such as payment of class dues), as well as information on the alumnus’s volunteer activities³ and freshman year roommates. Anon U’s Registrar supplemented these data with information on SAT scores, academic honors, ethnicity, type of high school, summary evaluations made by the Admissions Office during the application process, and grade point average. The Registrar’s data are available only for the classes of 1972 to 2005, so we restrict our analysis to this group of individuals, 35,583 alumni totaling 583,496 observations. However, roommate information is unavailable for the classes of 1993, 1994, and 1996, and start- and stop-dates for volunteer spells are sparse prior to the year 1992. Dropping those observations, along with others’ missing roommate information and other covariates and those individuals who lived in singles during their freshman year leaves 259,642 observations from 1992 to 2007, of which 155,807 are associated with a gift. As described below, we will further restrict our attention to those who did not give in the first 11 months of each annual giving campaign. This leaves 139,869 observations on 18,060 alumni; 25.8% of these opportunities result in a gift. The mean positive gift is \$614.62, while the median positive gift is \$72.73.

The construction of the sample is guided by the practices of Anon U’s development office. The fundraising year begins on July 1. Every alumnus receives at least two mailings and, in recent years, several emails, during the first eleven months of the giving cycle. In general, few personal solicitations are made during this 11-month period, excepting a small number of very large donors, and the solicitations

³ 11,065 relevant volunteer spells with complete start- and stop-dates are observed. Entry of these dates into the database fell to the Development Office (i.e. they are not self-reported), and there is no reason to believe that the missing data is not missing-at-random. An imputation method is used to bring the total number of spells to 12,845. When those imputed spells are not used, the results are very similar both qualitatively and quantitatively.

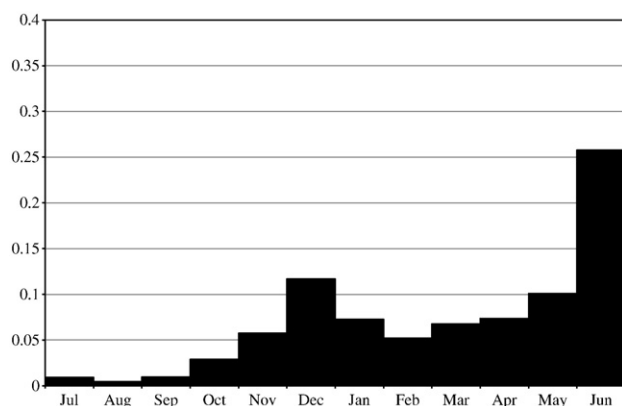


Fig. 1. Probability of giving in month conditional on no prior gift.

come from the development office. Many individuals respond to these solicitations, with 46.1% of observations in our sample associated with a gift in the first 11 months of the giving year (and 76.9% of all gifts given). Fig. 1 shows the probability of making a gift in a given month, conditional on not having given before during that fundraising year. In June, the strategy shifts. Lead solicitors for each class provide volunteer members of that class⁴ with a list of those who have not yet contributed (alumni who have made gifts during the previous 11 months are not subject to further solicitation), from which those volunteers select individuals to contact. They are also assigned others to contact, with that number depending on the number of unassigned prospects and the number of other volunteers in the class.⁵ These volunteers make personal solicitations, generally by telephone. The number of volunteer solicitors varies by graduating class and giving year, with as few as 8 or 9 for off-years for certain classes to as many as 50 or 60 individuals (about 5 or 6% of a class) participating during reunion years, though the first few years after graduation often have more solicitors.⁶ In general, no incentives are provided for performance and, in the words of one former lead solicitor stated, “the primary goal is almost always to attain the highest participation rate possible” by contacting all members of the class who have yet to donate.

Our analysis sample focuses on the alumni who are contacted in June. In effect, these are the marginal givers who are subject to the treatment of personal solicitation. Although an attempt is made to reach each alumnus, our data do not indicate whether personal solicitation actually occurred; given the structure of this process, though, direct solicitation is very likely to have taken place when the volunteer and the alumnus know each other. A potential concern is that the solicitors' choice of whether or not to contact a particular alumnus is correlated with that individual's year-specific error term and therefore endogenous. Our variable, however, is whether or not the alumnus's former freshman year roommate has *chosen* to be a

solicitor; it seems unlikely that the solicitor's decision to volunteer near the beginning of the giving year is affected by the idiosyncratic shock to his or her former roommate's giving towards the end of the year. This is particularly true in the specifications in Section 4.2, which include donor fixed effects. This misclassification error and its potential effects on the findings are discussed in Section 4.1. Serial correlation of the individual's error terms may affect the standard errors, but it can only bias the point estimates if those errors are correlated with the former roommate's decision to become a solicitor. It is possible, though implausible, that a positive shock to the individual's giving behavior affects the former roommate's volunteering decision in the *following* year. We address this issue in Section 4.6 and find no evidence to suggest that it is affecting our findings.

Identification of the effect of direct solicitation requires that relationships are not self-sorted and that one can account for the effects of joint experience. Merely observing that those who have a relationship with a solicitor tend to give more does not mean that solicitation is at work; people sort into groups based on interests that are likely to be related to affinity for the university, such as athletics, social clubs, and other extracurricular activities. Affinity for the university will, of course, be a primary determinant of giving. In order to avoid this confounding factor, we look at relationships based on freshman year room assignments.⁷ At Anon U, freshman roommates are not randomly assigned; however, the matching is unlikely to have an effect in this context. Matriculating students are randomly sorted into a residential living unit. Each unit's staff then assigns rooms based on both factors that we observe as well as a preference form filled out by the incoming student. An Anon U administrator explained that they “try to do as much mixing as [they] consciously can,” negatively sorting on characteristics such as geographic origin, race, academic interests, athletics and other activities. Fortunately, we observe and include all of these factors as covariates. In addition, preferences such as smoking, sleeping, and cleanliness habits are taken into account. While these data are not available, it seems implausible that such factors might affect affinity or giving behavior in a meaningful way, except possibly in extreme cases; if this is indeed an issue, fixed effects estimates will account for them. Importantly, Anon U administrators never honor roommate requests. All in all, freshman year rooms offer a peer group that can reasonably be classified as untainted by self-selection, conditional on observed characteristics.

A second potentially confounding factor is shared experience. A freshman who goes on to become a solicitor for Anon U presumably had good experiences there. It stands to reason that her roommate would be more likely to have had a good experience as well, leading to higher giving that is unrelated to solicitation. However, if this mechanism is driving our results, then we would expect to see a solicitor effect on giving in every month, not just in June when most personal solicitations are made. The results in Fig. 2, discussed in greater detail in Section 4.1, provide strong evidence that shared experience is not driving this correlation.

Moreover, alumni can do volunteer work for the university in a number of ways, many of which do not involve solicitation. We group volunteers into four groups: solicitors; reunion volunteers; university volunteers, and regional volunteers; alumni can volunteer in different roles at the same time. The role of the solicitors is clear, while reunion volunteers organize and promote Anon U's reunions for their class. University volunteers include class leaders, trustees, advisory councils, and alumni councils. Finally, regional volunteers include regional leaders who organize activities for local alumni as well as alumni who interview prospective students. The latter three groups are not

⁴ Informal discussions with a number of Anonymous University solicitors indicate that the primary motivation for volunteering is love of the school, with some mention of “a sense of duty or obligation.”

⁵ The organization of volunteers generally begins a few months into the giving cycle, though the bulk of their work is towards the end of the giving year. Solicitors, though, may start encouraging their friends to give earlier in the year, either directly or simply by discussing their volunteer activities.

⁶ We perform a number of robustness checks to see if this variation affects our findings. Including graduating-class-by-year effects (rather than graduating class and year effects separately) to account for the composition of the solicitor group and its leadership has little effect on the results. Dropping the first three years after graduation, in case those larger solicitor groups are affecting the results, similarly makes a negligible difference. Finally, controlling for the total number of solicitors in an individual's graduating class each year has no effect on the results in any specification. Full results of these exercises are available upon request.

⁷ College roommate assignments have been exploited to measure peer effects on academic outcomes and other choices, such as alcohol use; see, for instance, Sacerdote (2001), Kremer and Levy (2003), Zimmerman (2003), and Stinebrickner and Stinebrickner (2006).

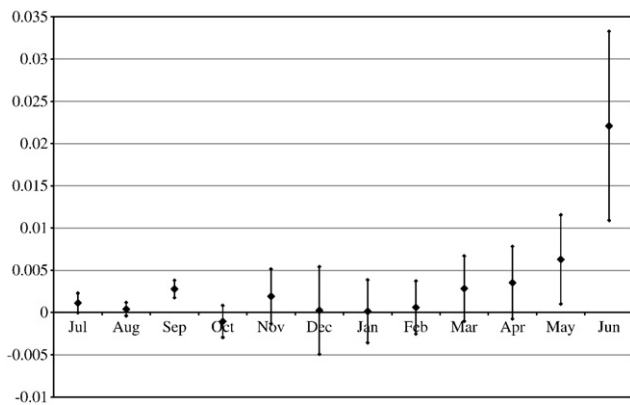


Fig. 2. Solicitor roommate effect by month probability of giving.

involved in solicitation. As above, if shared experience is the primary driver for higher giving, then all facets of volunteering will have a significant effect on giving, since they will proxy for these correlated effects. If we assume that those who have a strong affinity for the school do not systematically select into being solicitors rather than other brands of volunteerism and solicitation is truly at work, only the variable corresponding to having a freshman roommate who is now a solicitor will have an effect. In essence, the other volunteer types serve as a diagnostic for whether the solicitor roommate effect is driven by shared experience. However, the assumption mentioned above is crucial to the identification strategy and warrants further investigation, though there is no reason to suppose that alumni with high affinity are more likely to be solicitors than other types of volunteers.⁸ The best measure of affinity available is gift giving, so we compare giving among the different volunteer types.⁹ Further, it stands to reason that solicitors, who are more aware of the university's financial needs and are involved in the process of raising funds, would be larger givers. With that in mind, it may make more sense to look at these individuals' giving in the years in which they are not volunteers. Table 1 shows summary statistics for different types of volunteers in non-volunteer years. While solicitors are slightly more likely to give in non-volunteer years, the differences are not substantial, and the means for giving for reunion and university volunteers are very similar to those of solicitors, while those for regional volunteers are somewhat lower. Medians for solicitors, reunion volunteers, and university volunteers are nearly identical: \$126.17, \$122.07, and \$125.00, respectively; regional volunteers have a median gift of \$103. Altogether, it seems unlikely that there is sorting on affinity among the different facets of volunteering; regardless, it is evident that being a volunteer is a proxy for high affinity for Anon U. Taken together with the extensive set of controls and the nature of the roommate

⁸ Even given the same high levels of affinity, alumni of a different type may be more likely to become solicitors, which could confound estimates if the attributes that lead individuals to become solicitors are correlated with positive shared experience. For instance, an extroverted freshman year roommate may cause the alumnus to have a better experience and therefore higher affinity; that same characteristic may make the roommate more likely to become a solicitor rather than some other type of volunteer. If this sort of contextual effect is indeed important, then models including fixed effects, which account for such relationships, will be dramatically different from models that do not include fixed effects. The results in Section 4.2 indicate that they are not, so we conclude that these types of contextual effects are not of great importance in this framework.

⁹ We also examine the effect of being a volunteer on likelihood of being current on class dues, as well as having never paid class dues. While there are some differences between the four facets of volunteering on both measures, none are particularly large. The full results of these exercises are available upon request.

assignment discussed above, we are confident that the solicitor roommate coefficient has a causal interpretation: the incremental effect of being solicited by a known person.

Each variable of interest is defined dichotomously: 1 if one or more of the alumnus's freshman year roommates is a volunteer of that type in a given year. Individuals often transition into and out of volunteering; for instance, conditional on being a solicitor in a given year, approximately 44% of alumni are not solicitors in the following year. 2846 alumni serve as solicitors who have former roommates in the June sample, for an average total of 2.56 years over the course of the sample. These are associated with 10,735 observations on 4137 former roommates of these solicitors in the June sample. In the years in which an alumnus or alumna has a former roommate who is now a solicitor, his or her probability of giving in June is 29.5%, with a mean positive gift of \$745 and a median gift of \$100. By contrast, in those years in which there is no solicitor roommate, the probability of giving is 25.4%, with a mean positive gift of \$602 and a median gift of \$73. Dropping the top 1% of gifts, the means are \$349 and \$264, respectively. In raw terms, at least, having a roommate who is a solicitor is related to giving.

Table A1 provides definitions and summary statistics for the variables used in this study.

4. Econometric model and results

Social pressure may have different effects on the extensive and intensive margins. Variables such as economic resources (James and Sharpe, 2007), household income and employment type (Smith et al., 1995), matching and lead donor treatments (Huck and Rasul, 2007), and likelihood of being contacted by phone rather than by mail (Meer and Rosen, forthcoming), have been found to have different effects on the probability of giving and the amount of giving. Landry et al. (2007) find that direct social pressure (in their case, in the form of in-person door-to-door solicitation) leads to relatively high participation rates, but low gift sizes. These results suggest that the econometric model should allow the effects of a given variable on the extensive and intensive margins to differ.

The first variable of interest, therefore, is the probability of making a gift, which we model with a probit. It takes the form

$$\text{Prob}[Y_{it} > 0] = \text{Prob}[\varepsilon_{it} > -(SR_{it}\beta_1 + VOL_{it}\beta_2 + X_{it}\beta_3 + YEAR_t\beta_4 + LOC_{it}\beta_5 + CLASS_i\beta_6)] \quad (1)$$

where SR_{it} is an indicator signifying that alumnus i has a former roommate who is a solicitor in year t , VOL_{it} are the other roommate volunteer variables for alumnus i in year t , X_{it} is the vector of covariates described in Table A1, including race; gender; years since graduation and its quadratic; type of secondary school; SAT scores; admissions office ranking on academic and non-academic factors; whether the individual played a club sport, was a varsity athlete, joined a social club, or received academic honors; academic major and minor; advanced degrees; a set of affinity proxies, such as whether the individual pays class dues; whether the individual's spouse also attended Anon U; and whether it is a reunion year (multiple of 5 years since graduation). $YEAR_t$ is a set of time effects, LOC_{it} is a set of location effects (state or foreign country of residence), and $CLASS_i$ is a set of class effects (equal to one if the alumnus graduated in a given year and zero otherwise). The year and class effects help control for correlated effects—they account for common influences within a cohort or a year that may lead to both increased volunteering and increased giving. The error term ε_{it} is normally distributed, leading to the probit model. Since nearly all alumni in the sample are contacted by a classmate, the coefficient β_1 can be interpreted as the increase in the likelihood of giving due to being contacted by a known person

Table 1
Giving in non-volunteer years.

	(1) Proportion gave	(2) Median Conditional on giving	(3) Mean Conditional on giving	(4) Mean Dropping top 1% Conditional on giving
Solicitors	0.826	\$126.17	\$2679.30 (\$203,297)	\$644.25 (\$1905.33)
Reunions volunteers	0.696	\$122.07	\$2978.80 (\$40,798)	\$644.82 (\$2438.08)
University volunteers	0.787	\$125.00	\$2023.66 (\$18,960)	\$752.75 (\$2546.07)
Regional volunteers	0.735	\$103.30	\$710.43 (\$8045.48)	\$323.69 (\$837.77)
Non-volunteers	0.516	\$64.48	\$381.93 (\$5348.77)	\$187.22 (\$411.47)

Each column shows the respective summary statistic for individuals who ever served as each volunteer type, in years in which individuals did not serve as that volunteer type. For comparison, summary statistics for those who never volunteered in any capacity are listed as well. Standard deviations, where appropriate, are listed in parentheses.

rather than a stranger. In essence, then, this is the effect of social pressure applied by a friend or acquaintance.

We also estimate the amount of giving, conditional on making a gift. We take the logarithm of the amount to account for the long right tail on the distribution of giving.¹⁰ Assuming that gifts are distributed log normal, conditional on a gift being given, we use the OLS estimator using nonzero observations¹¹:

$$\log(Y_{it}) = SR_{it}\gamma_1 + VOL_{it}\gamma_2 + X_{it}\gamma_3 + YEAR_t\gamma_4 + LOC_{it}\gamma_5 + CLASS_{it}\gamma_6 + \mu_{it} \text{ if } Y_{it} > 0 \quad (2)$$

The coefficient γ_1 measures the difference in the conditional means of giving for those who give for those who do and do not have a solicitor roommate in year t . It is simple, further, to combine the estimates in Eqs. (1) and (2) to calculate marginal effects on the mean of giving, conditional on the controls, with standard errors estimated using the delta method. These estimates measure the incremental increase in the average gift associated with peer solicitation. It is important to note, though, that in order to make causal inferences using Eq. (2), the error term must be distributed with a mean of 0, conditional on making a gift. This assumption is the primary difference between this model and the two-step selection model. There is a surprising amount of controversy in the literature about which model is superior in what situations (see Leung and Yu, 1996 for a thorough discussion of the issues). Without exclusionary restrictions—that is, variables that affect the probability of making a gift but not the amount given—the selection model's performance is suspect. However, when we estimate this model in the two-step framework, the marginal effects are quite similar to those in Table 1; for instance, the peer solicitation effect on the overall amount of giving is 9.7% (s.e. = 1.6%), which is comparable to the equivalent effect in Column (3) of Table 1, 10.2%. It therefore seems that this assumption is unlikely to be driving our results.

4.1. Basic model

We begin by examining the effect of peer solicitation on giving throughout the entire year. As discussed above, solicitors may be causing their friends to give, through direct requests or indirect discussions about volunteering, even before the personal solicitations

begin in June. Moreover, if the solicitor roommate effect is merely proxying for shared experience, we would expect to see an effect throughout the entire year, and that effect should be proportional to the probabilities of giving in Fig. 1. Fig. 2 plots the solicitor roommate effect on the probability of giving in month t , conditional on not having given prior to that month. It is evident that the giving effect spikes in June.¹² Note, in particular, that while the overall probability of giving in December from Fig. 1 is relatively high (presumably for tax planning purposes), there is no corresponding increase in the solicitor roommate effect. These findings provide further evidence that the peer solicitation effect is not spurious.¹³

We therefore focus on June, the month in which nearly all personal solicitations are made, whether by a peer or a stranger. The results in Column (1) of Table 2 show the results for the probability of making a gift, as in Eq. (1) above. In addition to the variables listed, the model includes the other covariates mentioned in Section 3 and described in Table A1, along with year, class, and location effects; these coefficients are not reported for brevity.¹⁴ The peer solicitation effect is positive and significant; having a freshman roommate who is a solicitor in a given year is associated with a 2.2 percentage point higher probability of giving in June. Off of a baseline of approximately 26%, this is a fairly large effect. Taken together with the size of the effect during the rest of the year, shown in Fig. 2, we feel confident that this result is not due to shared experience. Further, the other, non-solicitation aspects of volunteering are small and insignificant. This is also consistent with the notion that peer solicitation exerts a substantial effect on the decision to make a gift and that our results are not driven by shared experience. The results in Column (2) show the effect on the log amount of giving, conditional on making a gift. The coefficients are neither statistically significant nor are they particularly large, indicating that there does not seem to be much of an effect on the size of the gift, conditional on making one; this is consistent with models in which the mere act of making a gift alleviates the social pressure, but making a larger gift has no effect. Using the results from Eqs. (1) and (2) to calculate the marginal effect on mean giving yields the effect on the average size of a gift for each alumnus. We see in Column (3) that the peer solicitation has a positive and significant effect of 10.2% (s.e. = 2.7%) on the average gift. The other aspects of

¹⁰ In addition, we re-estimate a model with the top 1% of gifts dropped. The results are qualitatively unchanged, though of course the baseline amount is different.

¹¹ Imbens and Wooldridge (2008) argue that estimates using OLS can be biased if the linearity assumption does not hold globally. They suggest examining normalized differences of means of covariates for the two samples being compared (in this case, those with and without solicitor roommates). They suggest that if these differences exceed 0.25, then linear regressions may not be appropriate. None of the covariates in X , $YEAR$, LOC , or $CLASS$ differs by more than 0.14 in the June sample, and most have a normalized difference of less than 0.05.

¹² There is a small but statistically significant effect seen in September. Solicitors are frequently recruited and organized at that time. This result is most likely due to those individuals reaching out to friends at that time, though we cannot discount other explanations.

¹³ A similar exercise with fixed effects models, as in Section 4.2, yields very similar results. Those figures, available on request, indicate that shared experience unique to one point in time are unlikely to be driving our results. Though unobserved affinity and fixed shared experience are controlled, it is possible that, for instance, some change at the university that affects some individuals in particular leads one person to become a solicitor and his or her roommate to be a donor. However, we would still expect to see a solicitor effect in every month, not merely in June.

¹⁴ The full results are provided in Table A2.

Table 2
Basic model.

	(1) Probability of making a gift Probit model	(2) Log amount Conditional on giving OLS	(3) Total effect on giving
Roommate is a solicitor	0.0221** (0.00571)	0.0412 (0.0329)	0.102** (0.0265)
Roommate is a reunion volunteer	−0.0151 (0.0120)	0.0404 (0.105)	−0.0574 (0.0545)
Roommate is a university volunteer	−0.00757 (0.00752)	0.0190 (0.0491)	−0.0288 (0.0345)
Roommate is a regional volunteer	0.00195 (0.00546)	0.0138 (0.0355)	0.0109 (0.0250)

Column (1) shows the incremental effects on the probability of making a gift in a given year, based on a probit model and using 139,869 observations. Column (2) shows the incremental effects on the amount of the gift, conditional on making gift, using ordinary least squares and using observations with a positive gift in the month of June, a total of 36,039 observations. Column (3) combines these, and shows the marginal effects on total giving. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include year, location, and class effects, as well as a constant, which are not reported for brevity. Full results are available in Table A2.

Table 3
Donor fixed effects.

	(1) Probability of making a gift OLS with fixed effects	(2) Log amount Conditional on giving OLS with fixed effects	(3) Total effect on giving
Roommate is a solicitor	0.0128** (0.00443)	0.0247 (0.0256)	0.0641** (0.0171)
Roommate is a reunion volunteer	−0.00056 (0.0113)	0.0459 (0.0683)	0.0093 (0.0406)
Roommate is a university volunteer	−0.00246 (0.00685)	−0.0239 (0.0434)	−0.0172 (0.0298)
Roommate is a regional volunteer	0.00638 (0.00440)	0.0118 (0.0264)	0.0318 (0.0193)

Column (1) shows the incremental effects on the probability of making a gift in a given year, OLS with fixed effects and using 139,869 observations. Column (2) shows the incremental effects on the amount of the gift, conditional on making gift, using OLS with fixed effects and using observations with a positive gift in the month of June, a total of 36,039 observations. Column (3) combines these, and shows the marginal effects on total giving. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include years since graduation and its quadratic, an indicator for reunion year, as well as time and location effects. Full results are available upon request.

volunteering are still insignificant and relatively small, so we conclude that peer solicitation has a strong and direct effect on both the probability of giving and the average gift.¹⁵

It is important to note, though, that if we view the solicitor roommate variable as representing peer pressure in charitable solicitation, there are two ways in which it can be misclassified. First, there may be a false positive, in which the individual was not actually solicited by the listed roommate. Second, there may be a false negative, in which a person without a solicitor roommate was solicited by a friend with some other relationship. The reference group is those who do not have a freshman roommate who is now a solicitor, which is composed of a mix of those who are familiar with their solicitor in some other way and those who do not know the solicitor at all. If the effect of being solicited by a familiar person for those in the false positive case above is greater than zero,¹⁶ this will bias the measured effect downward. The same is true for the false negative effect, assuming that the peer solicitor effect in those cases is positive as well. This suggests that the true effect of being solicited by a familiar person is larger. Given sufficiently strong assumptions, it is possible to place an upper bound on this effect, even without instrumental variables. Frazis and Loewenstein (2003) present formulas for finding the upper bounds on binary variables with misclassification;

¹⁵ One concern is that roommate connections represent relatively weak ties. Examining ties based on athletic team or social organization also show significant effects of peer solicitation. However, some of the other, non-solicitation aspects of volunteering are also often positive and significant. This indicates that the peer solicitation effect may be proxying for shared experience. Moreover, in some cases, peer solicitation effects were found for giving before June—when most of the personal solicitations are made. Fixed effects estimates, which control for time-invariant shared experience, are qualitatively similar—indicating that the likely mechanism is that solicitors are contacting those with whom they have stronger ties earlier in the year, outside of the usual process. It is quite difficult, therefore, to isolate the true effect of peer solicitation in these cases.

¹⁶ It may be, however, that the solicitor deliberately does not contact a former roommate if they have a poor relationship. In that case, the solicitor effect for those interactions may be zero or even negative; however, since we are interested in the effect of being solicited by a person with whom one has a positive relationship, this is not a concern.

however, these formulas require that the misclassification error be uncorrelated with both the alumnus's exogenous characteristics and the alumnus's unobserved error. These strict conditions that seem unlikely to hold in this case—for instance, it would require that the probability that an alumnus is solicited by a friend be uncorrelated with their participation in activities such as varsity athletics or their choice of major.¹⁷

4.2. Fixed effects

While our model controls for a large number of potentially confounding variables, it is still possible that unobserved heterogeneity is driving our results. For example, our covariates may not fully capture permanent income, affinity for Anon U, or shared experience. In order to better account for these effects, we estimate our model including individual fixed effects in an ordinary least squares framework. Transitions into and out of volunteering by the solicitors ensure that individuals' giving histories contain a mix of years in which their roommates were and were not solicitors. The results are reported in Table 3. These estimates capture all of the alumnus's time-invariant attributes, including any freshman-room-level effects. Therefore, if our results are actually driven by correlated effects and common shocks to freshman year roommates, the solicitor effect should disappear.

¹⁷ It was not possible to survey alumni to ascertain the probability of actually being contacted by former roommate, but an informal survey of solicitors indicates that a reasonable estimate for the probability of being contacted by a non-roommate with whom the prospective donor has a social relationship is 0.3. Assume that the strict conditions necessitated by the Frazis and Loewenstein framework do, in fact, hold. Given the assumption of a false positive probability, conditional on having a solicitor roommate, of 0.3 and a false negative probability, conditional on not having a solicitor roommate, of 0.3, the upper bound on the effect of peer solicitation on the probability of making a gift is 2.0 times the estimated coefficient. The upper bound on the effect of a solicitor roommate on the amount of the gift, conditional on making one, is 2.7 times the estimated coefficient.

Table 4
Shared characteristics.

	(1) Probability of making a gift Probit model	(2) Log amount of gift Conditional on giving Ordinary least squares	(3) Total effect on giving
Roommate is a fully-matched solicitor	0.0477** (0.0108)	0.175** (0.0579)	0.244** (0.0521)
Roommate is a reunion volunteer	−0.0149 (0.0120)	0.0411 (0.105)	−0.0564 (0.0546)
Roommate is a university volunteer	−0.00812 (0.00752)	0.0150 (0.0491)	−0.0319 (0.0344)
Roommate is a regional volunteer	0.00189 (0.00546)	0.0144 (0.0354)	0.0107 (0.0250)
Individual and solicitor are different race	−0.0264** (0.0124)	−0.196** (0.0710)	−0.139** (0.0487)
Individual and solicitor have different fraternity/sorority status	−0.0171 (0.0113)	−0.0686 (0.0667)	−0.0825* (0.0476)
Individual and solicitor have different academic honors status	−0.0175* (0.0103)	−0.109* (0.0631)	−0.0908** (0.0429)
Individual and solicitor have different athletic status	−0.00774 (0.0102)	−0.0595 (0.0625)	−0.0431 (0.0444)

Column (1) shows the incremental effects on the probability of making a gift in June of a given year, based on a probit model. These results are based on 139,869 observations on gift-giving in June from 1992 to 2007. Column (2) shows the incremental effects on the amount of the gift made in June, conditional on making gift, using ordinary least squares, based on 36,039 observations on gifts made from 1992 to 2007. Column (3) combines these, and shows the marginal effects on total giving. The first row shows the effect of having a solicitor roommate in a given year, conditional on being matched on the four characteristics shown in the last four rows. Each of those four rows shows the effect on being mismatched on that attribute, but no other. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **; those significant at the 10% level are marked with *. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include the covariates listed in Appendix A, as well as year, location, and class effects, which are not reported for brevity. Full results are available upon request.

Since estimating a fixed effects probit is cumbersome, Column (1) uses a linear probability model with donor fixed effects for the probability of making a gift in June; Column (2) estimates ordinary least squares with fixed effects for the amount of the gift, conditional on making one. The results are consistent with the findings discussed in Section 4.1. The effect of having a roommate who is currently a solicitor is still positive and significant, though smaller than in the basic model; the probability of making a gift increases by 1.3 percentage points (s.e. = 0.44 percentage points).¹⁸ The effect is about two-thirds the size of the one in Section 4.1, though an increase of about 5% in participation is not inconsiderable. The other aspects of volunteering are extremely small and insignificant; for instance, the effect of having a roommate who is currently a reunion volunteer decreases the probability of giving by 0.056 percentage points (s.e. = 1.1 percentage points).¹⁹ The results in Column (2) are also similar to those in Section 4.1. There appears to be no effect on the intensive margin of having a roommate who is currently a solicitor. Finally, Column (3) combines the estimates and reports marginal effects on the average gift; again, while the effect (6.4%, s.e. = 1.7%) is somewhat smaller than that in Table 1, it is still relatively large, statistically significant, and much larger than the effect of the other aspects of volunteering. On the basis of these results, it would be difficult to argue that unobserved heterogeneity is driving our results. Further, taking these results in conjunction with those in Section 4.1, we feel confident that the effects measured by the solicitor roommate variable in June represent peer solicitation.

4.3. Shared characteristics

An important question is whether there are certain characteristics shared by the solicitor and the potential donor that change the effectiveness of solicitation. To that end, we create a series of variables which equal one if the solicitor and the individual do not share that attribute.²⁰ Again, we do not know for certain whether solicitation

actually occurred when an individual's roommate is now a solicitor, just that it is likely to have happened. We focus on race, as defined in Table A1, along with whether the individuals were athletes, whether they joined one of Anon U's fraternities or sororities, and whether they received academic honors.²¹ It is important to note that these latter two attributes are realized after these individuals lived together. Students at Anon U do not join a social organization until their sophomore year, and, of course, academic honors are not received until graduation.²² In essence, then, these variables serve as proxies for attitudes towards socializing and academics. The results, shown in Table 4, are striking. If the solicitor and his or her former roommate share all four characteristics, the effect on the probability of giving is 4.8 percentage points, more than twice as large as the effect in Section 4.1. But if the two are of different races, the effect on the probability of making a gift is significantly lower—to the point that the combined effect is insignificantly different than zero ($p=0.176$). Different social club status has a smaller effect that is significant only at the 0.129 level, and different academic honors is significant at the 0.091 level; the coefficients are large, representing about a third of the main effect, though the combined effect is still significantly different from zero. Different athletic status does not seem to have an effect and is relatively small.

The results are also interesting for the amount of the gift, conditional on giving. Column (2) shows that the mean gift conditional on giving for those who have a roommate who is a solicitor is 17.5% higher (s.e. = 5.8%) than for those who do not—but only if both the individual and the solicitor are matched in the four characteristics. The race mismatch effect is negative, significant, and of the same magnitude as the main effect. Different athletic and social club status do not significantly reduce the main effect, though the coefficients are relatively large, about a third of the size of the main effect, albeit with large standard errors.

Column (3), in turn, shows the results on the overall amount of giving. The peer solicitation effect for individuals who are fully matched is quite large, 24.4% (s.e. = 5.2%). Mismatches on race (−13.9%, s.e. = 4.9%), social club (−8.3%, s.e. = 4.8%), and academic honors (−9.1%, s.e. = 4.3%) cut down peer solicitation effect dramatically. However, only the race mismatch reduces the solicitor effect to

¹⁸ For a more direct comparison, we also estimated the model in Eq. (1) of Section 4 by ordinary least squares. The result is similar to that in Section 4.1, with a solicitor effect of 2.1 percentage (s.e. = 0.55 percentage points). Only eight observations out of nearly 140,000 have a predicted probability less than zero; none are greater than one.

¹⁹ Another possible approach is to estimate a probit including the mean for the individual of each covariate as additional controls. Using the June sample, the marginal effect for the solicitor roommate variable in this model is quite close to that from the linear probability model with fixed effects—1.33 percentage points (s.e. = 0.52 percentage points); the coefficients on other variables are similarly close in magnitude.

²⁰ In the few cases in which a suite has more than one solicitor, the average of their characteristics is taken.

²¹ Summary statistics for these variables are available in Table A1. Approximately 25% of the solicitor-roommate observations are associated with different-race matches, along with 34% of the observations being different social club matches, 47% being different academic matches, and 44% being different athletic matches. Approximately 17% of the solicitor-roommate observations are matched on all four characteristics.

²² Redefining the academic mismatch using the admissions office's academic rating, which is defined prior to arrival at Anon U, yields very similar results.

Table 5
Shared characteristics with donor fixed effects.

	(1) Probability of making a gift OLS with fixed effects	(2) Log amount Conditional on giving OLS with fixed effects	(3) Total effect on giving
Roommate is a fully-matched solicitor	0.0236** (0.0080)	0.0969** (0.0457)	0.134** (0.0318)
Roommate is a reunion volunteer	−0.00039 (0.0113)	0.0458 (0.0683)	0.0100 (0.0406)
Roommate is a university volunteer	−0.0025 (0.0068)	−0.0239 (0.0434)	−0.0174 (0.0298)
Roommate is a regional volunteer	0.0064 (0.0044)	0.0112 (0.0264)	0.0319 (0.0193)
Individual and solicitor are different race	−0.0024 (0.0100)	−0.0347 (0.0585)	−0.0197 (0.0376)
Individual and solicitor have different fraternity/sorority status	−0.0171* (0.0090)	0.0010 (0.0549)	−0.0770** (0.0339)
Individual and solicitor have different academic honors status	−0.0132 (0.0086)	−0.0915* (0.0490)	−0.0821** (0.0322)
Individual and solicitor have different athletic status	0.0039 (0.0086)	−0.0587 (0.0485)	0.0022 (0.0325)

Column (1) shows the incremental effects on the probability of making a gift in a given year, OLS with fixed effects and using 139,869 observations. Column (2) shows the incremental effects on the amount of the gift, conditional on making gift, using OLS with fixed effects and using observations with a positive gift in the month of June, a total of 36,039 observations. Column (3) combines these, and shows the marginal effects on total giving. The first row shows the effect of having a solicitor roommate in a given year, conditional on being matched on the four characteristics shown in the last four rows. Each of those four rows shows the effect on being mismatched on that attribute, but no other. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **; those significant at the 10% level are marked with *. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include years since graduation and its quadratic, an indicator for reunion year, as well as time and location effects. Full results are available upon request.

one that is insignificantly different from zero. Adding several mismatch effects to the main effect can yield a prediction that is negative and significantly different from zero. This may occur because donors feel obligated to give when called by a former roommate with whom they have little in common, but they give a very small amount; however, it is difficult to be certain of the means through which this effect arises. These findings seem consistent with the findings from the psychology literature mentioned previously, that individuals are more likely to donate when asked by those who are similar to them. Or perhaps roommates who have similar attributes form a closer relationship; if mismatched individuals are not friends at all, the solicitor may not even contact the individual. Then the observed result is explained by a lack of solicitation, not ineffective solicitation. Alternatively, a closer relationship allows the solicitor to apply more pressure years later.

Observing the overall effect of these mismatches is quite interesting. But it is also interesting to hold the alumnus's unobservable attitudes fixed—covariates for race, academic honors, social club, and athletics will account for some of these time-invariant attitudes, but fixed effects should control for them entirely. These specifications control for the experience of living in that particular freshman year room, including the formation of friendships. The results including donor fixed effects, shown in Table 5, differ from those in Table 4 in several important ways. For the decision of whether or not to make a gift, using a linear probability model, the solicitor roommate effect for those who are matched on all four dimensions is still positive and significant (2.4 percentage points, s.e.=0.80 percentage points), but the race mismatch is very small and insignificant (−0.25 percentage points, s.e.=1.0 percentage points). The athlete mismatch is similarly

small, while mismatches in social club status are relatively large (−1.7 percentage points, s.e.=0.90 percentage points), as are mismatches in academic honors (−1.3 percentage points, s.e.=0.86 percentage points). For the size of the gift, conditional on giving, the fully-matched effect is still large and significant (9.7 percent, s.e.=4.6 percent). Race mismatches are, as for the extensive margin, relatively small and insignificant (−3.5%, s.e.=5.8%). However, unlike the extensive margin, athlete mismatches are sizable, though statistically insignificant (−5.9%, s.e.=4.8%) and social club mismatches are small and insignificant (0.10%, s.e.=5.5%). Academic honors mismatches have the largest effect (−9.1%, s.e.=4.9%). Turning to the effects on the average size of the gift, we see that race (−2.0%, s.e.=3.8%) and athletic mismatches (0.24%, s.e.=3.3%) are small and insignificant, while social club (−7.7%, s.e.=3.4%) and academic honors mismatches (−8.3%, s.e.=3.3%) are large and statistically significant. The difference in the race mismatch between the estimates with and without fixed effects indicates that the race mismatch effect is due to something about the experience of having a freshman year roommate of a different race. This seems to imply that friendship is less likely to form or forms less strongly between individuals of different race, but conditional on the level of friendship, there is no difference in the peer solicitor's influence. On the other hand, since the social and academic mismatches are still present after controlling for that freshman year experience, those aspects seem to operate on a different dimension. Even conditioning on a certain level of friendship formation, the solicitor is less able to influence his or her former roommate years later. These results provide some evidence for the manner in which the potential for social influence forms, though of course these results may not generalize to other cases.

Table 6
Lagged solicitor roommate with donor fixed effects.

	(1) Probability of making a gift OLS with fixed effects	(2) Log amount Conditional on giving OLS with fixed effects	(3) Total effect on giving
Roommate is a solicitor	0.0133** (0.00499)	0.0242 (0.0271)	0.0675** (0.0240)
Roommate was a solicitor last year	0.00134 (0.00479)	−0.00165 (0.0253)	0.00571 (0.0228)
Roommate is a reunion volunteer	0.00096 (0.0118)	0.0326 (0.0699)	0.00129 (0.0574)
Roommate is a university volunteer	−0.00081 (0.00847)	−0.0383 (0.0488)	−0.0137 (0.0404)
Roommate is a regional volunteer	0.00522 (0.00532)	0.0201 (0.0296)	0.0259 (0.0193)

Column (1) shows the incremental effects on the probability of making a gift in a given year, OLS with fixed effects and using 128,912 observations. Column (2) shows the incremental effects on the amount of the gift, conditional on making gift, using OLS with fixed effects and using observations with a positive gift in the month of June, a total of 33,662 observations. Column (3) combines these, and shows the marginal effects on total giving. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with ** Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include years since graduation and its quadratic, an indicator for reunion year, as well as time and location effects. Full results are available upon request.

Table 7
Gender.

	(1) Probability of making a gift Probit model	(2) Log amount of gift Conditional on giving Ordinary least squares	(3) Total effect on giving
Roommate is a solicitor	0.0188** (0.00919)	0.0260 (0.0515)	0.0854** (0.0423)
Male x Roommate is a solicitor	0.00449 (0.0117)	0.0242 (0.0671)	0.0264 (0.0535)
Roommate is a reunion volunteer	−0.0150 (0.0120)	0.0409 (0.105)	−0.0572 (0.0545)
Roommate is a university volunteer	−0.00762 (0.00752)	0.0188 (0.0491)	−0.0291 (0.0344)
Roommate is a regional volunteer	0.00193 (0.00546)	0.0137 (0.0355)	0.0108 (0.0250)

Column (1) shows the incremental effects on the probability of making a gift in June of a given year, based on a probit model. These results are based on 139,869 observations on gift-giving in June from 1992 to 2007. Column (2) shows the incremental effects on the amount of the gift made in June, conditional on making gift, using ordinary least squares, based on 36,039 observations on gifts made from 1992 to 2007. Column (3) combines these, and shows the marginal effects on total giving. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include the covariates listed in Appendix A, as well as year, location, and class effects, which are not reported for brevity. Full results are available upon request.

4.4. Intertemporal substitution of giving

One concern about the interpretation of this effect is that it merely reflects a reallocation of a fixed amount across time rather than an actual increase in giving. If this is the case, then specifications that include an indicator for whether an individual's former roommate was a solicitor in the *previous* year would have a negative and statistically significant effect, suggesting that individuals reduce their giving in the year following a solicitation from someone with whom they have a social relationship. However, this is not the case. In particular, specifications similar to those in Table 3, which control for donor fixed effects—and thus any unobserved time-invariant affinity—indicate that the solicitor roommate effect is limited to the year in which the roommate is actually a solicitor. The coefficient on the lagged variable, reported in Table 6, is an extremely small 0.0013 (s.e.=0.0048), while the contemporaneous solicitor roommate indicator coefficient remains similar in size to that in Table 3. These results are robust to a number of different specifications, such as ones that recreate Table 2, include multiple lags, condition on having a solicitor roommate in the previous year, or include interactions. The full results of these exercises are provided upon request. Given this evidence, we are confident that our results do not merely reflect a shift in the timing of giving.

We also run specifications that include indicators for whether the individual's former freshman year roommate is a solicitor in the *next* year in addition to the contemporaneous effect. It seems unlikely that individuals can systematically predict whether their former freshman year roommates will be solicitors in the following year, so if those coefficients are statistically significant, it would indicate that our results are still tainted by shared experience or some other unobservable confounding factor. For instance, one could argue that an individual who gives a large amount in one year makes his or her roommate more likely to be a solicitor in the next year, leading to spurious correlation. This coefficient is never large or statistically significant; for instance, in the specification corresponding to Column 1 in Table 2, the solicitor roommate lead effect is 0.0043 (s.e.=0.0055). This result lends more support to our assertion that the solicitor roommate variable is isolating a causal effect.

4.5. Gender

There is extensive evidence that men and women approach philanthropy in different ways (see, for example, Andreoni and Vesterlund, 2001 and Meer and Rosen, 2009). While there are no mixed-gender rooms, which makes it impossible to examine reactions to solicitation by a peer of a different gender, we can examine whether

Table 8
Gender and shared characteristics.

	(1) Probability of making a gift Probit model	(2) Log amount of gift Conditional on giving Ordinary least squares	(3) Total effect on giving
Roommate is a fully-matched solicitor	0.0551** (0.0181)	0.148 (0.0952)	0.270** (0.0862)
Male x roommate is a fully-matched solicitor	−0.0144 (0.0226)	0.0421 (0.121)	−0.0403 (0.0869)
Roommate is a reunion volunteer	−0.0148 (0.0120)	0.0369 (0.105)	−0.0567 (0.0545)
Roommate is a university volunteer	−0.00811 (0.00751)	0.0127 (0.0491)	−0.0323 (0.0343)
Roommate is a regional volunteer	0.00194 (0.00546)	0.0154 (0.0354)	0.0111 (0.0250)
Individual and solicitor are different race	−0.0362** (0.0136)	−0.187* (0.0968)	−0.207** (0.0800)
Male x different race	0.0258 (0.0249)	−0.00922 (0.139)	0.0530 (0.0955)
Individual and solicitor have different fraternity/sorority status	−0.00956 (0.0169)	0.0851 (0.104)	−0.0236 (0.0789)
Male x different fraternity/sorority status	−0.0118 (0.0231)	−0.251* (0.134)	−0.110 (0.0880)
Individual and solicitor have different academic honors status	−0.0243* (0.0144)	−0.255** (0.0932)	−0.158** (0.0745)
Male x different academic honors status	0.0142 (0.0217)	0.227* (0.125)	0.0677 (0.0806)
Individual and solicitor have different athletic status	−0.0156 (0.0155)	0.0180 (0.0953)	−0.0637 (0.0748)
Male x different athletic status	0.0133 (0.0216)	−0.124 (0.145)	0.0115 (0.0801)

Column (1) shows the incremental effects on the probability of making a gift in June of a given year, based on a probit model. These results are based on 139,869 observations on gift-giving in June from 1992 to 2007. Column (2) shows the incremental effects on the amount of the gift made in June, conditional on making gift, using ordinary least squares, based on 36,039 observations on gifts made from 1992 to 2007. Column (3) combines these, and shows the marginal effects on total giving. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include the covariates listed in Appendix A, as well as year, location, and class effects, which are not reported for brevity. Full results are available upon request.

Table 9
Geographic proximity.

	(1) Probability of making a gift Probit model	(2) Log amount of gift Conditional on giving Ordinary least squares	(3) Total effect on giving
Roommate is a solicitor	0.0244** (0.0060)	0.0475 (0.0344)	0.113** (0.0279)
Roommate is a solicitor and lives in same two-digit ZIP code area	−0.0212 (0.0190)	−0.0351 (0.0958)	−0.0881 (0.0833)
Roommate is a reunion volunteer	−0.0162 (0.0124)	0.0324 (0.105)	−0.0632 (0.0561)
Roommate is a university volunteer	−0.00507 (0.00788)	0.0159 (0.0504)	−0.0182 (0.0361)
Roommate is a regional volunteer	0.00211 (0.00564)	0.0137 (0.0361)	0.0122 (0.0259)

Column (1) shows the incremental effects on the probability of making a gift in June of a given year, based on a probit model. These results are based on 131,828 observations on gift-giving in June from 1992 to 2007. Column (2) shows the incremental effects on the amount of the gift made in June, conditional on making gift, using ordinary least squares, based on 34,380 observations on gifts made from 1992 to 2007. Column (3) combines these, and shows the marginal effects on total giving. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include the covariates listed in Appendix A, as well as year, location, and class effects, which are not reported for brevity. Full results are available upon request.

men or women are more sensitive to peer solicitation. To investigate these differences, we re-estimate the models from Table 2 including an interaction term between the male indicator and the solicitor roommate indicator. The results, reported in Table 7, show a negligible gender effect. The additional effect of the interaction term is just 0.4 percentage points (s.e. = 1.2 percentage points). Examining the intensive margin, the effect for women is 2.6% (s.e. = 5.2%), while the effect for men is 5.0% (s.e. = 4.3%). While the relative difference between the two is fairly large, it is insignificant, as shown by the coefficient on the indicator. These results carry through to Column (3), which shows an insignificant difference between the genders on the incremental effect of peer solicitation.

To compare how shared characteristics, as in Section 4.3, affect each gender, we re-estimate the model interacting the mismatch indicators with the gender dummy. The results are reported in Table 8. For the decision of whether to make a gift, the effect of having a solicitor roommate who shares similar characteristics for women is quite large, about 5.5 percentage points (s.e. = 1.8 percentage points). It is slightly smaller for men, though the difference is not statistically significant. Turning to the mismatch variables, different race seems to be more important for women than for men, with the effect for women being large and significant: −3.6 percentage points (s.e. = 1.4 percentage points). Summing the main effect, gender interactions, and race mismatch variables for men, we find a smaller effect (−1.5 percentage points, s.e. = 1.5 percentage points) that is insignificantly different from zero. For women, the effect of a mismatch on academic honors status is statistically significant and fairly large (−2.4 percentage points, s.e. = 1.4 percentage points), while for men, the effect of a mismatch on social club status is significantly different from zero at $p = 0.11$ (−2.0 percentage points, s.e. = 1.2 percentage points). It is apparent that shared characteristics affect the solicitor's ability to influence the decision of whether or not to give—though, as stated in Section 4.3, the precise causes of this relationship are unclear.

There are some interesting effects on the amount of the gift, conditional on giving. It seems that the large negative social club mismatch effect is limited to men; conversely, the large negative academic mismatch effect is limited to women, as is the race mismatch effect. While it is statistically insignificant, there is a fairly large negative athletic mismatch effect that is also limited to men. Without making too much of it, it does seem that men and women react differently to different characteristics.

The effects are somewhat clearer for the overall amount of the gift, in Column (3), though they vary widely and are, for the most part, imprecisely estimated. Having a solicitor roommate who is fully matched on these characteristics increases an alumna's giving by 27.0 percent (s.e. = 8.6%); the difference with a fully matched alumnus is not statistically significant. For both men and women, having a race mismatch reduces giving by a large amount, equal or greater to the

effect for being fully matched. For women, the other shared characteristics that seem to matter most are academic honors status, while for men, shared fraternity and athletic status exert the largest effects. It is important to note, though, that the standard errors on most of these mismatch variables are relatively large.

To summarize, both genders are far more likely to donate a larger gift in a given year if they are solicited by a former roommate with whom they share all four of the characteristics included in Table 5. However, men seem more responsive to a former roommate who shares their attitudes on socializing, while women seem more responsive to a former roommate who shares their attitudes towards academics, at least as proxied by the variables described above. Ultimately, though, it is difficult to speculate as to the underlying causes of these gender differences.

4.6. Geographical proximity

It may be that solicitor roommates are more able to apply their influence if they live close to their former roommate; then again, modern telecommunications mean that geographical closeness may not be relevant at all. We create a term that equals 1 if the alumnus has a roommate who is a solicitor and lives in the same area, as defined by the first two digits of their ZIP codes.²³ Alumni listed as living abroad are dropped, leaving 131,828 potential gift opportunities, of which 34,380 are taken.

Only 7.1% of those with a solicitor roommate live in the same two-digit ZIP code area as that roommate; this small number is probably responsible for the imprecision on the match coefficients seen in Table 9. For both the probability of making a gift and the amount given, conditional on giving, the match coefficient is similar in size to the main effect, though it is negative—a finding that contradicts the hypothesis that roommates who live relatively closer may be better able to apply their influence. We also repeated this exercise with geographic proximity defined by state or foreign country; while there are more matches in this situation, the results are quite imprecise as well. It is difficult to draw conclusions, therefore, about the effects of geographic proximity.²⁴

²³ The first two digits of a ZIP code cover a broad area (see http://en.wikipedia.org/wiki/Image:ZIP_Code_zones.svg for a map). Using more precise measures, though, led to a negligible number of matches.

²⁴ Information about geographic region of origin is not available for all classes. We use this limited sample, with 44,089 observations (10,661 associated with a gift), and define a region of origin match in a variety of ways, but no significant or consistent results emerged from the exercise.

Table 10
Solicitor giving.

	(1) Probability of making a gift Probit model	(2) Log amount of gift Conditional on giving Ordinary least squares	(3) Total effect on giving
Roommate is a solicitor	0.0222** (0.00572)	0.0375 (0.0330)	0.104** (0.0266)
Solicitor's giving, in dollars	-9.58×10^{-8} (1.62×10^{-7})	1.24×10^{-6} (1.39×10^{-6})	-1.80×10^{-7} (7.32×10^{-7})
Solicitor's giving squared	-1.27×10^{-14} (4.80×10^{-14})	-1.62×10^{-12} (1.45×10^{-12})	-3.51×10^{-13} (3.33×10^{-13})
Roommate is a reunion volunteer	-0.0149 (0.0120)	0.0369 (0.105)	-0.0571 (0.0545)
Roommate is a university volunteer	-0.00746 (0.00753)	0.0181 (0.0491)	-0.0285 (0.0345)
Roommate is a regional volunteer	0.00191 (0.00546)	0.0140 (0.0355)	0.0107 (0.0250)

Column (1) shows the incremental effects on the probability of making a gift in June of a given year, based on a probit model. These results are based on 139,869 observations on gift-giving in June from 1992 to 2007. Column (2) shows the incremental effects on the amount of the gift made in June, conditional on making gift, using ordinary least squares, based on 36,039 observations on gifts made from 1992 to 2007. Column (3) combines these, and shows the marginal effects on total giving. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include the covariates listed in Appendix A, as well as year, location, and class effects, which are not reported for brevity. Full results are available upon request.

4.7. Solicitor's giving

The amount given by the solicitor him- or herself may affect the alumnus's gift in several ways.²⁵ First, it may proxy for the solicitor's own affinity, thus providing an additional control for shared experience. It may further signify the intensity and energy he or she brings to the process. Second, given the literature on social comparisons, the solicitor may point to his or her own gift as an example. This second possibility seems less likely, given that many potential donors may view discussing the solicitor's own gift as uncouth.

In any case, the effect, shown in Table 10, is tiny. Including the solicitor's giving (in dollars) and its quadratic yields infinitesimally small coefficients. For example, the marginal effect of solicitor's giving on the probability of giving, evaluated at the mean, is about -9.58×10^{-8} ; the effect on the intensive margin is similarly small and insignificant—about 1.24×10^{-6} . The effect on overall giving is about -1.8×10^{-7} , implying that an increase of about \$50,000 in the size of the solicitor's gift is associated with a decrease of 1% in the donor's gift. It is safe to say, then, that the amount of the solicitor's giving has no effect on the alumnus's giving.

5. Conclusions

Using a unique data set on alumni donations to a selective research university, we have estimated the effect of personal solicitation on charitable donations. Our data allow us to account for self-selection into groups, shared experiences, and a host of other potentially confounding factors, leaving only the incremental effect of being asked to give by an acquaintance rather than a stranger. We find that this effect is fairly strong, confirming the intuition of professional fundraisers and providing evidence for peer pressure effects. Personal solicitation has an effect on both the decision to make a gift and the average size of the gift, with our estimates likely to be a lower bound. However, matches between the solicitor and his or her former roommate on several dimensions exert a strong influence on the effect of personal solicitation. When the alumnus and the solicitor are matched on these dimensions, the peer solicitation effect is much larger; however, mismatches reduce this effect substantially. The means by which those solicitors with closer matches to their former roommates are better able to influence these donors is unclear, but it is evident that similarity between the solicitor and the donor is quite important. Comparing specifications that include donor fixed effects,

²⁵ The mean gift associated with a solicitor roommate, conditional on having one, is \$5420, with a median of \$223. Note that multiple individuals with the same solicitor roommate will have the same value for that solicitor's gift.

which control for time-invariant experiences like the formation of the friendship, provides some guidance on the avenues of influence. Some characteristics, like race, seem to affect influence entirely through their effect on friendship formation, while others, such as academic or social similarities, alter the ability of the solicitor to influence the prospective donor later in life, perhaps through differing depreciation of the relationship.

A further question is whether it is worthwhile to arrange for personal solicitation whenever possible. More than 92% of the sample does not have a solicitor roommate, and these alumni have a mean gift of \$153, including nongivers. It is difficult to put an exact figure on the potential increase in gifts, since, as discussed in Section 4.1, misclassification error means that estimate is a lower bound; moreover, the existence of false negatives means that some alumni are already receiving personal solicitation. Further, those who choose to be solicitors are likely to be more effective than those who do not, so enlisting more solicitors may not yield the same quality of solicitation. But with about 10,000 giving opportunities per year, it seems evident that a shift to personal solicitation could increase the university's fundraising substantially. Whether that is a worthwhile use of resources depends on amount of time and effort it would take to link each alumnus with a solicitor he or she knows. Every individual is already contacted. Excluding the time spent linking alumni and solicitors, there would not be an increase in the overall amount of time spent—merely a shift of the burden to new solicitors who are familiar with alumni currently contacted by a stranger. Given the large sums at stake, it seems that the effort involved in making sure that each alumnus is solicited by an acquaintance seems worthwhile. This is particularly true if there is habit forming in giving; there is some evidence to suggest that is the case (see Meer, 2010). More intense efforts to use peers to solicit individuals may therefore have larger long-term effects.

In a larger context, this paper provides evidence that some behaviors are driven by social motives—specifically, social pressure. This outcome emphasizes the importance of accounting for these motives in studies of charitable giving. Further, leveraging such social influences can affect the allocation of public goods—to the extent that personal solicitation applies pressure and distorts decisions, donations may be misdirected.

The results are also informative for fundraisers, who may want to modify their solicitation strategy so that solicitors focus on the people who are most like them. There are implications for the distribution of solicitor effort; if the primary effect is on the extensive margin, lower-intensity solicitation of more people may result in more gifts. Alternatively, fundraisers may choose to focus their efforts on large givers, for whom additional solicitation intensity is much more likely to yield more giving. Future research, given appropriate data, can focus on these questions.

Appendix A

Table A1

Variable definitions and summary statistics.

Variable	Description	Mean	Standard deviation
TotalYear	Total giving for year (2007 dollars) conditional on making a gift	614.62	7807.94
LogTotalYear	Log of giving for year (2007 dollars) conditional on making a gift	4.51	1.50
Didgive	1 if any donation given in year	0.258	0.437
RoomSolicitor	1 if any freshman year roommate is a solicitor in year t	0.0767	0.266
RoomReunion	1 if any freshman year roommate is a reunion volunteer in year t	0.0081	0.0896
RoomUniversity	1 if any freshman year roommate is a university volunteer in year t	0.0586	0.235
RoomRegional	1 if any freshman year roommate is a regional volunteer in year t	0.0982	0.298
NoMatchRace ^a	1 if the individual and the freshman year roommate, a solicitor in year t, are of different race	0.0184	0.134
NoMatchSocial ^a	1 if the individual and the freshman year roommate, a solicitor in year t, have different fraternity/sorority status	0.0261	0.158
NoMatchAcademic ^a	1 if the individual and the freshman year roommate, a solicitor in year t, have different academic honors status	0.0360	0.184
NoMatchAthletic ^a	1 if the individual and the freshman year roommate, a solicitor in year t, have different athletic status	0.0336	0.178
Yearssince	Number of years since graduation	14.46	7.96
Yearssince2	Number of years since graduation, squared	272.62	252.46
Spouseisalumn	1 if the spouse is an alumnus	0.104	0.305
Male	1 if the alumnus is male	0.662	0.473
<i>Race/ethnicity</i>			
White	Omitted category: 1 if the alumnus is White	0.799	0.401
Amerind	1 if the alumnus is a Native American	0.00372	0.0609
Black	1 if the alumnus is Black	0.0766	0.266
Hispanic	1 if the alumnus is Hispanic	0.0444	0.206
Asian	1 if the alumnus is Asian	0.0767	0.266
<i>Secondary schooling</i>			
Public	Omitted category: 1 if the alumnus attended public school	0.587	0.492
Boarding	1 if the alumnus attended boarding school	0.132	0.339
Private	1 if the alumnus attended private school	0.264	0.441
School—Other	1 if the alumnus attended another type of school	0.0161	0.126
SATmath	SAT math score. Scores prior to 1996 are adjusted to reflect recentering of the scoring scale.	702	76.4
SATverbal	SAT verbal score. Scores prior to 1996 are adjusted to reflect recentering of the scoring scale.	701	76.6
<i>Admissions office “non-academic” ranking</i>			
A	Omitted category: 1 if the alumnus received the highest non-academic ranking from the admissions office	0.0288	0.167
B	1 if the alumnus received the second highest non-academic ranking from the admissions office	0.485	0.500
C	1 if the alumnus received the third highest non-academic ranking from the admissions office	0.410	0.492
D	1 if the alumnus received the fourth highest non-academic ranking from the admissions office	0.0721	0.259
E	1 if the alumnus received the fifth highest non-academic ranking from the admissions office	0.0035	0.0591
<i>Admissions office “academic” ranking</i>			
A	Omitted category: 1 if the alumnus received the highest academic ranking from the admissions office	0.151	0.358
B	1 if the alumnus received the second highest academic ranking from the admissions office	0.415	0.493
C	1 if the alumnus received the third highest academic ranking from the admissions office	0.277	0.448
D	1 if the alumnus received the fourth highest academic ranking from the admissions office	0.150	0.357
E	1 if the alumnus received the fifth highest academic ranking from the admissions office	0.0063	0.0792
Clubsport	1 if the alumnus played on a club team	0.126	0.331
Honors	1 if the alumnus graduated <i>magna, summa, or cum laude</i>	0.433	0.496
Greek	1 if the alumnus was a member of a fraternity or sorority	0.688	0.463
Athlete	1 if the alumnus played a varsity sport	0.330	0.470
<i>Major</i>			
Molbio	Omitted category: 1 if the alumnus majored in molecular biology	0.0254	0.157
Small Social Science	1 if the alumnus majored in Anthropology, Urban Studies, or Sociology.	0.0285	0.167
English	1 if the alumnus majored in English	0.114	0.318
Economics	1 if the alumnus majored in Economics	0.0769	0.266
Public Policy	1 if the alumnus majored in Public Policy	0.0583	0.234
Political Science	1 if the alumnus majored in Political Science	0.0898	0.286
Psychology	1 if the alumnus majored in Psychology	0.0476	0.213
History	1 if the alumnus majored in History	0.120	0.325
MAE	1 if the alumnus majored in Mechanical/Aerospace Engineering	0.0353	0.184
EE/CS	1 if the alumnus majored in Electrical Engineering or Computer Science	0.0584	0.234
Arch & Civ	1 if the alumnus majored in Architecture or Civil Engineering	0.0673	0.251
Small Humanities	1 if the alumnus majored in Art, Art History, Classics, East Asian Studies, Linguistics, Music, Near Eastern Studies, Philosophy, Religion, or Languages and Literature departments	0.113	0.317
Small Engineering	1 if the alumnus majored in “Engineering”, Operations Research and Financial Engineering, or Chemical Engineering	0.0301	0.171
Small Sciences	1 if the alumnus majored in Applied Mathematics, Astrophysics, Biochemistry, Biology, Chemistry, Ecology and Evolutionary Biology, Geology, Mathematics, Physics, or Statistics	0.135	0.342
<i>Minor</i>			
No Minor	Omitted category: 1 if the alumnus received no minor	0.774	0.418
African/African-American Studies	1 if the alumnus received a minor in African or African-American Studies	0.0247	0.155

(continued on next page)

Table A1 (continued)

Variable	Description	Mean	Standard deviation
American Studies	1 if the alumnus received a minor in American Studies	0.0231	0.150
Latin	1 if the alumnus received a minor in Latin	0.0023	0.0476
Finance	1 if the alumnus received a minor in Finance	0.00423	0.0649
Theater	1 if the alumnus received a minor in Theater	0.0143	0.119
Public Policy	1 if the alumnus received a minor in Public Policy	0.0506	0.219
Other Engineering	1 if the alumnus received a minor in Architecture, Basic Engineering, Bioengineering, Electrical Engineering, Geological Engineering, Management, Materials Sciences, or Robotics.	0.0180	0.133
Other Sciences	1 if the alumnus received a minor in Applied and Computational Mathematics, Biophysics, Cognitive Studies, Environmental Studies, Science in Human Affairs, or Neuroscience.	0.0263	0.160
Other Humanities	1 if the alumnus received a minor in a humanities field	0.0563	0.230
Teaching	1 if the alumnus received a teaching certificate	0.0195	0.138
Reunion	1 if the year after graduation is some multiple of 5	0.181	0.385
Magazine	1 if the alumnus receives the alumni magazine	0.951	0.216
AC Mailable	1 if the alumnus permits mailings from the alumni council	0.983	0.129
AG Mailable	1 if the alumnus permits mailings from alumni giving	0.551	0.497
AG Phonable	1 if the alumnus permits phone calls from alumni giving	0.892	0.311
No Solicit	1 if the alumnus is on a no-solicit list	0.0693	0.254
Reduce Solicit	1 if the alumnus is on a reduced solicitation list	0.322	0.467
SP Participant	1 if the alumnus was a participant in the senior class gift	0.410	0.492
No Dues	1 if the alumnus has never paid class dues	0.371	0.483
Current Dues	1 if the alumnus is current on class dues	0.417	0.493
<i>Post baccalaureate education</i>			
No Advanced	Omitted category: 1 if the alumnus has no advanced degree	0.663	0.473
PhD	1 if the alumnus has a Ph.D. or equivalent degree	0.0593	0.236
Masters	1 if the alumnus has a masters	0.120	0.325
JD	1 if the alumnus has a JD	0.0878	0.283
MD/DDS	1 if the alumnus has a medical degree	0.0500	0.212
MBA	1 if the alumnus has an MBA	0.0726	0.259

Figures are based on 139,869 observations on gift-giving in June from 1992 to 2007. 18,060 alumni who graduated from 1972 to 2005, excluding the classes of 1993, 1994, and 1996, are represented.

^a A small number of individuals have multiple former roommates who are now solicitors in a given year. The average of the solicitors' characteristics is taken and interacted with the individual's characteristic.

Table A2

Basic model—other covariates.

	(1) Probability of making a gift Probit model	(2) Log amount of gift Conditional on giving OLS	(3) Total effect on giving
Yearssince	0.00834** (0.00111)	0.161** (0.00641)	0.0651** (0.00492)
Yearssince2	−0.0000518* (0.0000266)	−0.00303** (0.000153)	−0.00078** (0.000118)
Spouseisalumn	0.0772** (0.00777)	−0.126** (0.0378)	0.298** (0.0356)
Male	−0.00898** (0.00442)	0.120** (0.0278)	−0.0158 (0.0202)
<i>Race/ethnicity</i>			
Amerind	0.0241 (0.0294)	−0.360 (0.273)	0.0279 (0.125)
Black	−0.0210** (0.00875)	−0.193** (0.0546)	−0.121** (0.0382)
Hispanic	−0.0408** (0.00907)	−0.186** (0.0634)	−0.201** (0.0399)
Asian	−0.0136* (0.00726)	0.0161 (0.0484)	−0.0551* (0.0335)
<i>Secondary schooling</i>			
Boarding	0.0176** (0.00611)	0.170** (0.0385)	0.108** (0.0294)
Private	0.00522 (0.00455)	0.0856** (0.0279)	0.0382* (0.0213)
School—Other	−0.0279** (0.0138)	−0.255** (0.112)	−0.159** (0.0595)
SATmath	0.0000546 (0.0000722)	−0.0000227 (0.000399)	0.000228 (0.00326)
SATverbal	−0.0000125 (0.0000745)	−0.000154 (0.000435)	−0.000082 (0.00339)
<i>Admissions office "non-academic" ranking</i>			
B	0.0152 (0.0119)	−0.0137 (0.0836)	0.0618 (0.0568)
C	0.0138 (0.0124)	0.0215 (0.0860)	0.0627 (0.0590)
D	−0.00296 (0.0142)	0.0428 (0.0973)	−0.00485 (0.0666)
E	0.00371 (0.0302)	−0.0476 (0.188)	0.0781 (0.0311)
<i>Admissions office "academic" ranking</i>			
B	0.0133** (0.00654)	0.116** (0.0394)	0.0781** (0.0311)
C	0.0146* (0.00879)	0.256** (0.0551)	0.111** (0.0431)
D	0.00562 (0.0114)	0.293** (0.0751)	0.0789 (0.0559)
E	−0.0262 (0.0234)	0.510** (0.161)	−0.0313 (0.118)
GPA—Bottom Quartile	−0.00205 (0.00836)	−0.200** (0.0549)	−0.0453 (0.0373)
GPA—Second Quartile	−0.0000359 (0.00715)	−0.100** (0.0460)	−0.0186 (0.0324)
GPA—Third Quartile	0.00816 (0.00598)	−0.0702* (0.0362)	0.0215 (0.0273)
Clubsport	−0.00240 (0.00582)	0.0350 (0.0371)	−0.00385 (0.0269)
Honors	−0.00806 (0.00542)	−0.0130 (0.0362)	−0.0367 (0.0248)

Table A2 (continued)

	(1) Probability of making a gift Probit model	(2) Log amount of gift Conditional on giving OLS	(3) Total effect on giving
Greek	0.0335** (0.00428)	0.127** (0.0286)	0.164** (0.0216)
Athlete	0.00573 (0.00464)	0.0160 (0.0294)	0.0274 (0.0216)
<i>Major</i>			
Small Social Science	0.0236 (0.0169)	−0.183* (0.0947)	0.0629 (0.0749)
English	0.0279** (0.0137)	−0.102 (0.0719)	0.0979 (0.0634)
Economics	0.0788** (0.0157)	0.275** (0.0759)	0.405 (0.0793)
Public Policy	0.0719** (0.0220)	0.322** (0.105)	0.386** (0.111)
Political Science	0.0438** (0.0145)	0.130* (0.0724)	0.215** (0.0701)
Psychology	0.0189 (0.0152)	−0.116 (0.0837)	0.0570 (0.0688)
History	0.0390** (0.0138)	0.137* (0.0720)	0.196** (0.0673)
MAE	0.0357** (0.0166)	−0.0707 (0.0843)	0.137* (0.0762)
EE/CS	0.0755** (0.0167)	0.148* (0.0810)	0.359** (0.0820)
Arch & Civ	0.0659** (0.0164)	0.0644 (0.0816)	0.296** (0.0790)
Small Humanities	0.0272** (0.0136)	−0.0694 (0.0742)	0.101 (0.0635)
Small Engineering	0.0541** (0.0183)	0.0342 (0.0981)	0.239** (0.0874)
Small Sciences	0.0161 (0.0128)	0.0264 (0.0712)	0.0735 (0.0604)
<i>Minor</i>			
African/African-American Studies	0.00439 (0.0142)	−0.0232 (0.0811)	0.0143 (0.0656)
American Studies	0.0619** (0.0145)	0.160** (0.0635)	0.303** (0.0700)
Latin	−0.0158 (0.0261)	0.0469 (0.218)	−0.0595 (0.130)
Finance	0.0382 (0.0240)	0.316** (0.124)	0.233** (0.114)
Theater	−0.0326** (0.0153)	−0.380** (0.145)	−0.197** (0.0669)
Public Policy	−0.00178 (0.0158)	−0.0841 (0.0947)	−0.0229 (0.0717)
Other Engineering	0.0143 (0.0160)	0.0218 (0.0975)	0.0650 (0.0756)
Other Sciences	−0.00552 (0.0114)	−0.171** (0.0735)	−0.0540 (0.0504)
Other Humanities	−0.00849 (0.00792)	−0.111** (0.0527)	−0.0557 (0.0354)
Teaching	0.000168 (0.0150)	−0.195* (0.103)	−0.0351 (0.0690)
Reunion	0.110** (0.00311)	0.461** (0.0188)	0.586** (0.0159)
Magazine	−0.0122 (0.0103)	−0.000378 (0.0623)	−0.0521 (0.0459)
AC Mailable	−0.00159 (0.0209)	−0.611** (0.185)	−0.120 (0.102)
AG Mailable	0.0544** (0.00727)	0.214** (0.0393)	0.270** (0.0372)
AG Phonable	0.148** (0.00612)	0.339** (0.0966)	0.656** (0.0589)
No Solicit	−0.00199 (0.0123)	0.104 (0.104)	0.0105 (0.0582)
Reduce Solicit	−0.259** (0.00558)	0.0225 (0.0629)	−1.10** (0.0133)
SP Participant	0.0828** (0.00566)	0.121** (0.0340)	0.377** (0.0296)
No Dues	−0.0618** (0.00523)	−0.0657* (0.0394)	−0.274** (0.0220)
Current Dues	0.0740** (0.00494)	0.289** (0.0295)	0.372** (0.0257)
<i>Post baccalaureate education</i>			
PhD	0.0130 (0.00931)	−0.171** (0.0517)	0.0219 (0.0415)
Masters	0.0245** (0.00648)	−0.217** (0.0377)	0.0604 (0.0289)
JD	0.0497** (0.00786)	0.128** (0.0395)	0.240** (0.0377)
MD/DDS	0.000361 (0.00885)	0.0226 (0.0493)	0.00569 (0.0405)
MBA	0.0592** (0.00835)	0.290** (0.0438)	0.320** (0.0412)

Column (1) shows the incremental effects on the probability of making a gift in a given year, based on a probit model and using 139,869 observations. Column (2) shows the incremental effects on the amount of the gift, conditional on making gift, using ordinary least squares and using observations with a positive gift in the month of June, a total of 36,039 observations. Column (3) combines these, and shows the marginal effects on total giving. The figures in parentheses are standard errors. Coefficients that are statistically significant at the 5% level are marked with **; those significant at the 10% level are marked with *. Standard errors are adjusted for clustering based on individuals. In addition to the variables listed, the regressions include year, location, and class effects, as well as a constant, which are not reported for brevity.

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